

# Critical Humanistic Social Theory

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## Critical Humanistic Social Theory

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# Comparative Study of Shipping Talent Cultivation Models in the Context of Digital Transformation - A Case Study of Universities in China, the United Kingdom, and Singapore

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**Abstract:** As big data, Artificial Intelligence (AI), and Internet of Things (IoTs) profoundly reshape the global shipping industry, multidisciplinary talents with digital literacy have become a core competitive advantage. This paper aims to explore the systemic changes brought about by digital transformation to global shipping talent cultivation and conducts an in-depth comparative study of the training models of three typical universities: Shanghai Maritime University in China, Plymouth University in the UK, and Nanyang Technological University (NTU) in Singapore, using the Analytic Hierarchy Process (AHP) model. The study is based on four core dimensions: training objectives, curriculum system, practical teaching, and industry-academia-research collaboration. The research concludes that the NTU model performs best in terms of overall weighted performance, demonstrating that the reform of global maritime education must focus on the substantive restructuring of curriculum content and the transformation of practical teaching towards data-driven decision-making simulations, supported by a systematic industry-academia collaboration mechanism, to effectively cultivate “T-shaped” talents who can adapt to and lead the future development of intelligent shipping.

**Keywords:** Digital Transformation; Maritime Talent; Cultivation Model; Analytic Hierarchy Process (AHP); Comparative Study

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## 1. Introduction

### 1.1 Global Context: Technological Disruption and the Reshaping of the Maritime Value Chain

Currently, the wave of the Fourth Industrial Revolution, represented by artificial intelligence, big data, the Internet of Things, and blockchain, is sweeping across the global shipping industry, propelling it towards a new development phase characterized by “green, intelligent, and efficient” operations. The industry’s digital transformation has evolved from an option to a necessity for survival and growth. Profound technological changes are systematically reshaping the shipping industry’s value chain and ecosystem, imposing disruptive new demands on the knowledge structure and competency of its workforce. In response to these dramatic shifts, the global shipping market is witnessing the emergence of new roles such as “remote-controlled automated terminal technicians,” “terminal system optimization specialists,” and “model algorithm architects.” These positions demand professionals who not only master traditional maritime technologies or shipping management

skills but also possess robust data analysis capabilities, IT application literacy, and cross-disciplinary problem-solving competencies.

However, a significant structural disconnect exists between this exponential technological evolution and the existing maritime education and training (MET) system—a so-called “competency gap.” Traditional curricula typically center on foundational disciplines such as Marine Engineering, Navigation Technology, International Trade practices, and Shipping Management, while digital-related courses often exist only as supplementary or standalone modules, failing to achieve deep, organic integration with core professional knowledge. This curricular inertia primarily stems from the shipping industry’s long-standing strict regulation by standards like the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). These regulations emphasize ensuring operational safety and compliance but often act as barriers to rapid curriculum innovation<sup>[1]</sup>. The core competitiveness of future maritime professionals has shifted from the traditional “experience-driven” approach to a “competency-centered” model. This requires solid data analysis skills, information technology application literacy, and comprehensive cross-disciplinary problem-solving capabilities<sup>[2]</sup>.

## **1.2 Industry Demand Evolution: The Core Competency Requirements for Shipping Professionals in the Digital Transformation Era**

The shift to a “competency-centered” signifies a fundamental change in the industry’s demand for human resources. Specifically, the digital transformation, exemplified by intelligent ships, smart logistics, and big data decision-making, requires talent to transform from traditional “operators” to comprehensive “digital intelligence enablers.” The requirements for digital competency mainly include the following four aspects:

### **1.2.1 Digital Literacy and Data Analysis Capabilities**

Digital literacy constitutes the fundamental ability to comprehend, utilize, and manage digital technologies and data resources. It demands that shipping professionals transcend basic computer operations to develop deep understanding and application of data. For example, they should be able to interpret and utilize the massive amounts of data generated by ship sensors and port logistics; skillfully operate professional systems such as intelligent loading and energy efficiency management; and possess basic cybersecurity awareness to protect critical digital assets.

### **1.2.2 Interdisciplinary Knowledge and Systems Thinking**

Digital transformation breaks down traditional professional barriers, requiring talent to possess a “T-shaped knowledge structure.” This means that talent development cannot be limited to a single skill but must be focused on developing versatile, systems-oriented professionals. On the basis of solid professional knowledge in shipping (vertical), they must integrate cross-disciplinary knowledge such as information technology, data science, and even business management (horizontal). Based on this, talent must develop systems thinking, understanding the complex ecosystem composed of ships, ports, and supply chains, and discerning the impact of local operations on overall efficiency and safety.

### **1.2.3 Human-Machine Collaboration and Complex Situation Decision-Making Capabilities**

In intelligent systems, the core value of humans shifts from performing routine operations to handling complex situations that machines cannot handle. This requires talent to possess the ability to collaborate efficiently with AI tools and optimize processes, as well as the ability to think critically and make emergency decisions in system failures or extreme circumstances.

### **1.2.4 Lifelong Learning and Career Adaptability**

The rapid iteration of technology means that any static knowledge will become obsolete. Therefore, the willingness and ability to actively learn new skills, adapt to new positions, and embrace change become the most sustainable core competencies, ensuring that individuals can evolve with the industry.

In summary, these four core competencies collectively outline a new portrait of future shipping talent: no longer isolated technical operators, but “digital-intelligent shipping professional” who can converse with data, collaborate with machines, and solve problems within cross-disciplinary teams.

## **1.3 Research Objectives**

Compared to the idealized portrait of the “digital-intelligent shipping professional” described above, the existing maritime education system still exhibits a significant structural mismatch between talent supply and the industry’s emerging demands.

This has become a critical bottleneck constraining the smooth transformation and upgrading of the shipping industry. Therefore, evaluating and optimizing global shipping talent development models while identifying advanced practices is crucial for building a modern maritime education system capable of meeting future challenges.

Although existing comparative studies have yielded substantial findings, further supplementation and improvement are still needed in the following two aspects: firstly, systematic and nuanced comparative analyses of training models across global universities in the context of digital transformation remain relatively scarce; secondly, existing research predominantly focuses on qualitative descriptions, lacking quantitative methods to evaluate the relative importance of different training elements.

Universities are the main body of talent cultivation and the foundation of talent strategy <sup>[3]</sup>. This paper selects three globally renowned shipping universities as representative examples for analysis: Shanghai Maritime University (SMU) in China, Plymouth University (UoP) in the UK, and Nanyang Technological University (NTU) in Singapore. These three universities represent the world's largest emerging shipping market, the commercially oriented model of a long-established maritime service powerhouse, and the government-led innovation hub model, respectively. The research objectives of this paper are:

- A. To systematically compare the strategies and mechanisms adopted by these three universities in responding to digital transformation across four core dimensions: training objectives, curriculum system, practical teaching, and industry-academia-research collaboration.
- B. To use the Analytic Hierarchy Process (AHP) to quantitatively prioritize the above four core talent training dimensions to identify the key driving factors of strategic transformation.
- C. Based on the quantitative results and analysis of training models, to provide data-driven insights and pathways for the optimization and transformation of university maritime education systems.

## 2. Literature Review and Establishment of the Analytical Framework

### 2.1 Existing Research on Shipping Talents Development in the Digital Context

Global maritime education is facing unprecedented technological challenges. Research indicates that new technologies such as artificial intelligence, augmented/virtual reality (AR/VR), digital twins (DTs), and cybersecurity constitute a series of new requirements that maritime education policy design must address <sup>[4]</sup>. This transformation demands an expansion of the core skills of maritime professionals, particularly in digital literacy <sup>[5]</sup>. The core competitiveness of shipping talent is undergoing a fundamental shift from “experience is king” to “competence is key,” and the demand is evolving from traditional single-skill operational roles to future multi-dimensional, composite roles. Under digital transformation, shipping professionals are no longer holders of single skills, but must be composite individuals with data literacy, systems thinking, human-machine collaboration capabilities, and cross-disciplinary knowledge <sup>[6]</sup>.

In research on the training model for Chinese shipping professionals, research studies are generally characterized by inward reflection and macro-level conceptualization. Specifically, this is reflected in the following aspects: (1) Deep reflection on the current situation: researchers generally believe that the current training model lags behind the development of intelligent shipping <sup>[7]</sup>; it was also pointed out that there is serious disconnect between practical teaching and industry frontiers <sup>[8]</sup>; some scholars have also conducted quantitative assessments of seafarers' digital literacy. They also explored the main factors affecting seafarers' digital literacy, finding that familiarity with large language models and internet availability have the greatest impact, and seafarers familiar with large language models demonstrated stronger capabilities in multiple dimensions of digital literacy <sup>[9]</sup>; (2) Active exploration of reform paths: suggesting the deep integration of cutting-edge technologies such as artificial intelligence and big data into the curriculum <sup>[10]</sup>; bridging the gap between theory and practice by building an education platform that integrates industry and education, and promotes school-enterprise cooperation <sup>[11]</sup>; through a systematic literature review, found that skill gaps and insufficient organizational capabilities during digital transformation are key factors restricting the development of the shipping industry, emphasizing that improving digital capabilities is one of the core conditions for achieving industry transformation <sup>[12]</sup>. (3) Conceptualization of new training models in the new context: calling for the establishment of an interdisciplinary knowledge system to cultivate composite talents with data literacy, systems thinking, and human-computer collaboration capabilities <sup>[6]</sup>.

Against the backdrop of digitalization and intelligence profoundly reshaping the shipping industry, British universities are gradually becoming important hubs for cultivating digital talent in maritime and shipping. Studies by Chinese scholars such as emphasize the characteristics of a “high-end service orientation” and “business management as the core”<sup>[12-13]</sup>. Existing literature widely believes that digital technology is profoundly changing the skill structure of shipping jobs, prompting higher education institutions and vocational education systems to re-examine curriculum systems, teaching methods, and competency development goals<sup>[14-16]</sup>. Research by the British government and industry organizations has primarily driven the digital transformation of maritime education from a policy and institutional perspective. The Maritime Skills Commission under Maritime UK noted in its report that digital learning tools, online platforms, and blended learning models have become important development directions for British maritime education, and universities need to address the accelerating pace of technological updates through modular courses and flexible learning paths<sup>[14]</sup>.

At the academic research level, British scholars are more focused on the impact of digitalization on talent skill structures and educational training models. The digital shipping environment requires graduates to possess interdisciplinary skills, particularly in understanding automated systems, cybersecurity awareness, and decision-making abilities in complex human-machine systems, which challenges the traditional shipping education model dominated by operational skills<sup>[17]</sup>. In terms of specific skill dimensions, based on empirical research on students in shipping and maritime majors at British universities, students have significant shortcomings in key digital skills such as data analysis, basic programming, and cybersecurity, and current curriculum settings have not adequately responded to the needs of digital transformation<sup>[18]</sup>.

At the teaching method level, simulators and immersive technologies are considered important tools for cultivating digital talent in shipping. From the perspective of the simulator teaching continuum, the evolution path from traditional bridge simulators to virtual reality technology in maritime education was analyzed, pointing out that higher education institutions need to establish a clearer teaching logic between technology application and learning effectiveness evaluation<sup>[19]</sup>. Research further indicates that the effective application of emerging digital teaching technologies in maritime institutions depends on the synergistic improvement of student acceptance, curriculum design rationality, and faculty capabilities<sup>[20]</sup>.

In response to the transformative impact of digital technologies, Singapore has gradually developed a talent cultivation system characterized by government policy guidance, industry demand-driven initiatives, and collaborative education and training. Related research and practices have become important references for the digital development of maritime talent. From a policy perspective, the Maritime and Port Authority of Singapore (MPA) has played a core leading role in the digital transformation of the shipping industry. The MPA’s “Maritime Digitalization Playbook” systematically outlines the overall framework for the digital development of Singapore’s shipping industry, clearly stating that data-driven decision-making, intelligent system operation, and cross-domain collaboration capabilities will become important components of future maritime professionals’ skill sets, and incorporating talent skill enhancement as a crucial part of the maritime digitalization strategy<sup>[21]</sup>. At the education and training level, research shows that the digital training systems face multiple challenges during implementation, including curriculum adaptation, organizational collaboration, and technological acceptance, emphasizing the importance of institutional design and improved teaching capabilities<sup>[22]</sup>.

Academic research further supports these practical trends from a theoretical perspective, pointing out that, in the context of digitalization and automation, maritime talent is shifting from a single operational role to a complex “technology-data-decision” role, requiring simultaneous adjustments to curriculum structure and teaching priorities in the education and training system<sup>[23]</sup>. Also, through a systematic literature review and empirical analysis, it was identified that the core competency structure of maritime educators in the digital age, including digital literacy, data analysis awareness, and technological adaptability, verified the significant positive impact of these competencies on teaching effectiveness<sup>[24]</sup>. Further research shows that the demand for digital skills in Singapore’s shipping industry is shifting from single technical operational capabilities to integrated “technology-management-decision” capabilities, a trend that poses new competency-oriented requirements for higher education and vocational training<sup>[25]</sup>.

## 2.2 Limitations of Existing Research and Establishment of the Analytical Framework

Although existing research on maritime education reform has diagnosed problems such as outdated curricula and a disconnect

between theory and practice, and has proposed ideas such as integrating AI and big data and building industry-education integration platforms, it generally lacks systematic and detailed comparisons within a global context. For example, a study of Southampton Solent University in the UK found that maritime students had significant knowledge gaps in fundamental digital skills such as statistics, computer programming, and cybersecurity, with only a very small number having received relevant training<sup>[16]</sup>. This indicates that the development of advanced complex decision-making abilities (such as human-machine collaboration) must be predicated on the establishment of fundamental digital literacy. If underlying digital capabilities are lacking, the effectiveness of even high-tech laboratories will be significantly reduced. Therefore, the design of digital content within the curriculum system has an irreplaceable strategic priority compared to other macro factors.

As a result, this paper constructs a four-dimensional analytical framework aimed at deconstructing and comparing the training models of universities in the three countries. For subsequent discussion, these four dimensions are labeled C1 to C4. The specific dimensions are defined as follows:

C1: Training Objectives: The type and specifications of talent positioning (e.g., emphasizing operators, managers, or innovators).

C2: Curriculum System: Integration model of digital content, breadth and depth of interdisciplinary design.

C3: Practical Teaching Model: Cutting-edge nature of practical environments, student role positioning (executor/innovator).

C4: Industry-academia collaboration: Leading force of integration, pathways for knowledge flow.

### 3. Research Methodology: Quantifying the Priority of Training Elements Using the Analytic Hierarchy Process (AHP)

#### 3.1 Principles and Applicability of the AHP Method

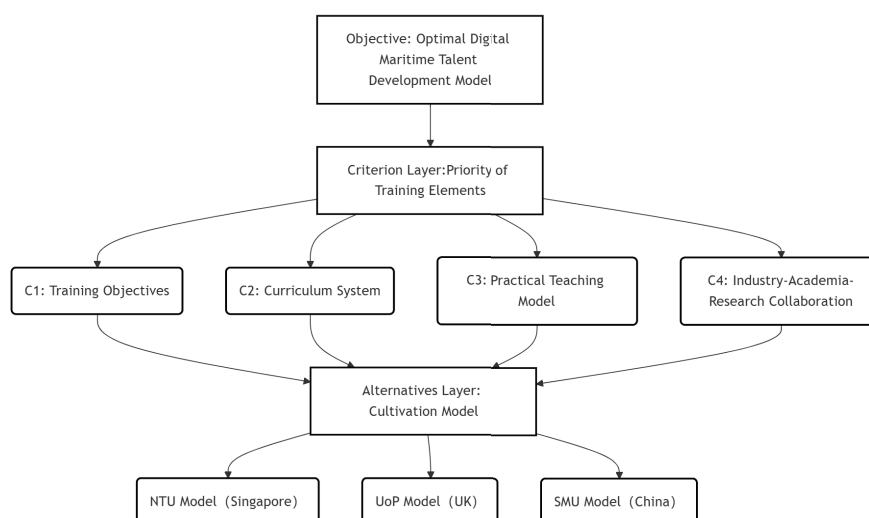
The Analytic Hierarchy Process (AHP) is a structured multi-criteria decision-making (MCDM) analysis method developed by Thomas Saaty in the 1970s. AHP quantifies the relative weights of different criteria by decomposing complex decision problems into hierarchical structures and employing pairwise comparisons based on expert judgments.

Given that comparing maritime training models involve highly qualitative and subjectively judged elements such as training philosophies and strategic positioning, AHP can translate these subjective judgments into operational proportional scales. This provides transparent, mathematically verifiable priority rankings for policy formulation. The method has been widely applied in maritime logistics and education policy making to integrate stakeholder perspectives and assess the criticality of new technologies<sup>[26]</sup>.

#### 3.2 Construction of the AHP Hierarchy and Simulation of Expert Judgments

This study applies the Analytic Hierarchy Process (AHP) to determine the strategic priorities of four key dimensions of talent development in the context of digital transformation in the shipping industry. The hierarchical structure is divided into three levels (as shown in Figure 1):

Figure 1: AHP Hierarchical Structure



Level 1 (Objectives): The optimal talent development model for digital shipping.

Level 2 (Criteria): C1 Training Objectives, C2 Curriculum System, C3 Practical Teaching Model, C4 Industry-Academia-Research Collaboration.

Level 3 (Alternatives): NTU model, UoP model, SMU model.

To determine the weights of the second-level criteria (C1-C4), this paper simulated an expert judgment matrix based on the existing consensus regarding the urgency of maritime talent needs in the digital age. Existing research generally agrees that practical training (C3) is crucial for transforming theoretical knowledge into practical skills<sup>[27]</sup>, and the introduction of new knowledge (C2) is the starting point of this transformation; therefore, C2 and C3 are given higher priority. Particularly considering the aforementioned lack of basic digital literacy (programming, data analysis), the reform of the curriculum system (C2) is considered the most direct and core driving force of the global MET transformation and should be ranked first. Based on this, this paper constructed a simulated pairwise comparison matrix and calculated the weights  $\omega_i$  for each criterion and the consistency ratio (CR). The calculation results are shown in Table 1. The consistency test results of the matrix satisfy  $CR < 0.10$ , indicating that the weight calculation results have good consistency and acceptability.

Table 1: Quantification of Priority Dimensions in Shipping Talent Development (AHP Results)

Development Dimension	Importance Basis in the Digital Era	Simulated AHPWeight ( $\omega_i$ )	Rank
Curriculum System (C2)	Directly provides new knowledge in AI, data, cybersecurity, etc., achieving interdisciplinary integration.	0.385	1
Practical Teaching Model (C3)	Transforming digital knowledge into actionable professional skills through simulations and real-world projects.	0.280	2
Industry-Academia-Research Integration Mechanism (C4)	Ensures rapid curriculum iteration and provides access to cutting-edge technologies and data resources.	0.190	3
Training Objectives (C1)	Define talent output types to guide curriculum and practice design.	0.145	4

Quantitative results show that the curriculum system (C2) and practical teaching model (C3) account for more than two-thirds of the decisive weight (combined 0.665) in building a shipping talent model adapted to the digital age. This also validates the view that global Maritime Education and Training (MET) reform must be centered on the substantive restructuring of curriculum content and the application-oriented upgrading of practical training<sup>[28]</sup>.

## 4. Comparative Analysis of Shipping Talent Cultivation Models in Three Countries' Universities

This section conducts an in-depth analysis of the educational models adopted by Shanghai Maritime University (SMU), the University of Plymouth (UoP), and Nanyang Technological University (NTU) in the context of digital transformation, based on the AHP criteria (C1-C4).

### 4.1 Nanyang Technological University (NTU), Singapore: Triple Helix Innovation Ecosystem

Leveraging its position as a leading global port hub, Singapore has built a “triple helix” ecosystem driven by government strategy and industry demand. The Maritime Studies program within the School of Civil and Environmental Engineering in NTU is a microcosm of this system.

#### 4.1.1 Training Objectives (C1) and Curriculum System (C2)

Singapore's economic core logic is built upon a high degree of reliance on maritime trade, a link that has not only driven its historical development but also shaped its contemporary status as a top global port hub. NTU positions its graduates as “global innovators” and “systems thinkers,” and its maritime talent cultivation is based on the integration of interdisciplinary knowledge. By strengthening data analysis, entrepreneurial thinking, and a sustainable perspective, and closely integrating

coursework, industry practice, and cutting-edge research, the program aims to cultivate versatile talents with cognitive agility and global leadership capabilities. This is not only a direct response to current industry needs but also a core intellectual investment to drive future innovation in the maritime industry and maintain Singapore's crucial role as a global hub.

NTU's curriculum system (C2) design breaks down disciplinary barriers from the outset, elevating data science and artificial intelligence from "auxiliary tools" to "core foundations" supporting future shipping systems. This program requires students to complete 136 credits, and the course structure is redesigned around "solving systemic problems in future shipping systems." For example, the core curriculum includes an introduction to data science and artificial intelligence. This mandatory interdisciplinary design ensures that business acumen, digital skills, and environmental awareness are integrated into core maritime knowledge, directly meeting the industry's demand for versatile talents. This strategy of treating technology as a core subject rather than an auxiliary tool demonstrates a deep integration advantage in the C2 dimension.

#### **4.1.2 Practical Teaching Model (C3) and Industry-Academia-Research Collaboration (C4)**

The practical teaching model in NTU (C3) is a highly structured, pre-professional, and immersive experience. Its mandatory professional internship (MT3920, 10 credits) requires students to undertake "real-world, industry-relevant work tasks," meaning that shipping students are not engaged in peripheral work, but may directly participate in core business activities such as route optimization analysis, ship energy efficiency management, and logistics supply chain modeling, taking on real responsibilities from day one. Students are positioned as "pre-professional talents" and "drivers and co-creators of digital tools," rather than simple observers. Through a "dual-mentorship system" (industry mentors guide daily work, and university mentors ensure theoretical integration), and rigorous assessments of digital literacy and innovation, students' professional identity and skills are maximized.

In terms of industry-academia-research collaboration (C4), Maritime and Port Authority of Singapore (MPA), Singapore Maritime Foundation, and key industry partners conduct top-level strategic design by establishing funds and leading curriculum development. This dual-core driven model, guided by national strategy and driven by the industrial ecosystem, ensures the high internationalization and industry relevance of talent development in NTU. For example, MPA collaborates with top universities such as Imperial College London, bringing together scientists and maritime experts to explore talent development programs focused on cutting-edge areas such as intelligent port systems and cybersecurity solutions, aiming to accelerate the green and digital transformation of the maritime industry. This system-level co-creation mechanism ensures the efficient and deep circulation of knowledge, technology, and talent between academia and industry.

### **4.2 University of Plymouth (UoP), UK: Business Strategy Empowerment Model**

The maritime talent cultivation model in Plymouth University is rooted in the deep commercial traditions of the UK as a global center for maritime finance, law, and arbitration. Its core focus is on shaping industry leaders proficient in business management, maritime law, and global strategy. This reflects the concept of "Strategic Digital Subordination," where digital technology serves as a tool for achieving business and strategic objectives, rather than being an independent technological pursuit.

#### **4.2.1 Training Objectives (C1) and Curriculum System (C2)**

The Maritime Business program in University of Plymouth exhibits a distinct focus on business and management. Its objectives (C1) are centered on developing business strategies and industry leaders, emphasizing critical thinking, maritime finance, and global business operations.

The UoP curriculum (C2) is characterized by the integration of "embedded" tools. Digital content is not offered as separate courses, but rather integrated directly into core business courses as methodologies and tools. For example, in the International Logistics Management course, students learn to use optimization algorithm software, essentially "finding digital solutions to business problems." This approach aims to cultivate students into expert users and critical evaluators of digital tools, enabling them to use data analytics to solve complex business scenarios, rather than focusing on technology development itself. While this embedded teaching strategy supports business objectives, it may sacrifice depth in foundational technical disciplines such as programming and data science, which is a significant structural difference compared to the NTU model.

#### **4.2.2 Practical Teaching Model (C3) and Industry-Academia-Research Collaboration (C4)**

The University of Plymouth's (UoP) practical teaching model (C3) is essentially a concrete manifestation of its "transformative education" philosophy in the shipping industry. The core strategy of this model lies in systematically bridging the gap between academic training and industry practice through highly realistic environmental design. Its specific approach is reflected in: firstly, using real-world business decisions and industry challenges (such as sustainable shipping and port efficiency optimization) as the foundation for teaching and assessment, ensuring the cutting-edge and practical nature of skills development; secondly, building interdisciplinary collaborative learning spaces (e.g., shipping with engineering, business, and law) to simulate the complex professional collaboration networks in real-world shipping; and thirdly, explicitly integrating cutting-edge technologies (such as artificial intelligence) as enabling tools into the teaching scenarios, potentially allowing students to master core future skills such as AI-driven route optimization and risk management through simulation training. This series of designs collectively points to a clear goal: cultivating industry leaders who can directly address complex real-world challenges, possess cross-disciplinary collaboration capabilities, and have a vision for technological applications, rather than passive knowledge recipients.

Its industry-academia-research integration (C4) is a research-driven systematic engineering process. UoP leverages its excellent research reputation in the marine and maritime fields and its well-established technology transfer system (TTOs)<sup>[29]</sup> to build a complex technology transfer system centered around the Enterprise Solutions department, the Commercialization Team, and the university's commercial subsidiary (UoPEL). This system promotes the commercial application of the university's research findings, corporate collaborations, and innovation projects. Through long-term participation in the UK government-supported KTP (Knowledge Transfer Partnerships) projects, it facilitates industrial innovation and technology transfer practices, efficiently transforming cutting-edge knowledge into teaching content and commercial applications. For example, by participating in major research projects funded by the European Horizon 2020 research and innovation program (such as Cyber-MAR), the university has established key partnerships with external organizations, ensuring the synchronization of research and industry needs, forming an endogenous driving loop of "knowledge creation → talent cultivation → industrial application."

### **4.3 Shanghai Maritime University (SMU), China: Exploring the Balance Between Fundamental Expertise and Digital Transformation**

Shanghai Maritime University's model demonstrates an exploratory approach to balancing the preservation of traditional disciplinary strengths with the strategic demands of digital transformation, which can be summarized as a dual-track foundational transition model.

#### **4.3.1 Training Objectives (C1) and Curriculum System (C2)**

SMU's training objective (C1) is to cultivate well-rounded professionals who are proficient in technology, skilled in management, and capable of serving the shipping industry. Currently, the university offers numerous majors in shipping talent cultivation, mainly divided into maritime and land-based disciplines. In maritime disciplines, the goal is to cultivate "advanced engineering and technical talents" who meet international standards; in land-based disciplines, the focus is on cultivating "senior management talents familiar with shipping and ports."

Its curriculum system (C2) adopts a "dual-track strategy": while retaining core courses of national-level characteristic majors such as International Shipping Management, Ship Principles, and Ship Trade, it introduces new, independent majors such as Big Data Management and Application. In traditional majors, digital courses (such as "Fundamentals and Applications of Artificial Intelligence" and "Python Programming") usually appear as compulsory general education courses or elective professional courses. Although this approach can quickly achieve coverage of digital courses, it faces structural risks: graduates from traditional majors may lack sufficient digital depth, while graduates from new big data majors may lack the necessary professional knowledge in the shipping field, making it difficult to achieve the ideal "T-shaped" talent integration.

Regarding the different integration strategies adopted for digital knowledge (such as AI and data analysis) within the curriculum systems for shipping talent cultivation at three universities, and their potential effects, as shown in Table 2:

Table 2: Comparison of Integration Models of Digital Content in Shipping Courses (C2)

University	Integration Model Overview	Integration Depth and Breadth	Key Risks or Advantages
NTU (Singapore)	Deep Cross-Disciplinary Integration Model	High in depth and breadth. Data science and AI will be elevated to mandatory “core foundation courses” or main subjects for all shipping students, ensuring the compulsory integration of this knowledge.	Advantage: Cultivates true “T-shaped” talent with a digital intelligence foundation.
UoP (UK)	Embedded Tool Enablement Model	Low in depth, high in breadth. Digital content, as a methodology and tool, is embedded in core courses such as business strategy, finance, and logistics.	Risk: Cultivating “critics” rather than “developers” of digital tools, potentially resulting in insufficient technical depth.
SMU (China)	Foundational Dual-Track Model	Imbalance between depth and breadth. Retains traditional major core while establishing a new independent Big Data major. Traditional majors integrate through general education/elective courses.	Risk: Students in traditional majors may lack digital depth, while new major students may lack shipping knowledge, potentially creating a polarized talent structure.

#### 4.3.2 Practical Teaching Model (C3) and Industry-Academia-Research Collaboration (C4)

The advantage of SMU’s practical teaching model (C3) lies in its highly realistic practical environment. The university possesses a comprehensive Integrated Bridge System (IBS) laboratory, ship handling simulators, and the 10,000-ton teaching and training vessel “Yuming.” This system provides students with progressive, high-fidelity training, from virtual operations to real-world scenarios, greatly ensuring the solidity and safety of students’ basic skills training. This model excels in cultivating “standardized process operators” who meet international convention requirements, but its openness needs improvement in supporting students’ cutting-edge exploratory practices such as data-driven process optimization or intelligent system innovation validation.

In terms of industry-academia-research integration (C4), SMU’s mechanism is project-driven strategic collaboration. The leading forces of integration exhibit diverse and collaborative characteristics, such as strategic cooperation with industry leaders like Shanghai International Port Group (SIPG) based on a shared mission, and the continuous infusion of industry knowledge into the campus through the “Entrepreneurial Mentor” program. Research achievements, such as the “Port Digital Twin Intelligent Management and Control System” and “Methanol-Extended Range Power Ships,” have enabled the rapid transfer of technology from the laboratory to the industrial front lines, forming a closed loop of “research for practical application.” However, compared to NTU’s ecosystem led by a government statutory board (MPA), SMU’s cooperation model focuses more on large-scale projects and localized applications, and there is still room for improvement in the breadth of knowledge flow and resource integration. Table 3 below shows the analysis of which force plays the primary “driving role” in the flow of knowledge, technology, and talent among the three universities, as well as their industrial alignment.

Table 3: Comparison of Industry-Academia-Research Integration Ecosystems (C4)

University	Dominant Driving Model	Core Driving Force	Knowledge Flow Pathways
NTU (Singapore)	Triple Helix Ecosystem	Government (MPA) Strategic Leadership + Industry Ecosystem Promotion. The government implements top-level design through policy, funding, and standard-setting.	Knowledge, talent, and technology circulate efficiently and mandatorily between government, academia, and industry.
University of Plymouth (UK)	Research-Driven Systems Engineering	University research reputation (Research Excellence) and Technology Transfer Offices (TTOs) system.	Knowledge transformation as the primary focus. Cutting-edge research outcomes are transformed into teaching content, commercial applications, research commercialization, and technology transfer.
SMU (China)	Project-Driven Strategic Synergy	Strategic needs of industry leaders (e.g., Shanghai International Port Group) + major project missions.	Research for practical application. Rapid validation and deployment of research outcomes (e.g., digital twin systems) from laboratories to industrial frontlines.

5. Results and Analysis: AHP-driven Performance Evaluation

5.1 Interpretation of AHP Criteria Weights

The AHP weight analysis results (see Table 1) show that, in the context of digitalization, curriculum system (C2) and practical teaching models (C3) are the two most influential strategic levers for maritime universities to achieve their talent cultivation goals. The highest weight of C2 (0.385) also validates the academic community’s judgment on the urgency of basic digital literacy: any advanced innovation and decision-making capabilities must be built on a solid foundation of underlying digital knowledge (such as programming languages and algorithms, computational thinking, data literacy, and critical thinking). If the curriculum content (C2) is not substantially restructured, even if the goals (C1) and external cooperation (C4) are well-positioned, the quality of talent cultivation will still be limited. C3 has the second highest weight (0.280), emphasizing the principle of “learning by doing.” The value of digital skills is reflected in their application and decision-making in complex situations. Traditional practical teaching, which mainly focuses on verifying established procedures, must shift to a core focus on data-driven process optimization and innovative exploration to match the new knowledge introduced in C2.

5.2 Performance Scoring and Weighted Evaluation of Universities

Based on the qualitative analysis in Chapter 4, this section scores the performance of the three universities across the four AHP criteria (very high, high, medium-high, medium), and applies AHP weights for a comprehensive quantitative evaluation. See Table 4:

Table 4. University Performance Scoring Matrix (Based on AHP Weighted Criteria)

University/ Model	C1: Training Ob- jectives (0.145)	C2: Curriculum Sys- tem (0.385)	C3: Practical Teaching Model (0.280)	C4: Industry-Ac- ademia-Research Collaboration (0.190)	Total Weighted Score (Simulation)
NTU (Singapore)	High (Innovation/ Strategy)	High (Deep Interdisci- plinary Integration)	High (Structured Profes- sional Internships)	Very High (Triple He- lix, MPA-led)	High (approx. 0.91)
UoP (UK)	High (Business Leadership)	Mid-High (Embedded, Applied)	Mid-high (Decision Simu- lation, Multidisciplinary)	High (Research-Driven, Technology Transfer)	Mid-High (ap- prox. 0.76)
SMU (China)	Medium (Compre- hensive/Transitional)	Medium (dual-track system, separate majors)	Mid-high (high-fidelity physical simulation)	Medium (Project-driv- en, regionalized)	Medium (ap- prox. 0.56)

5.3 Comparing Structural Strengths and Gaps Among Universities

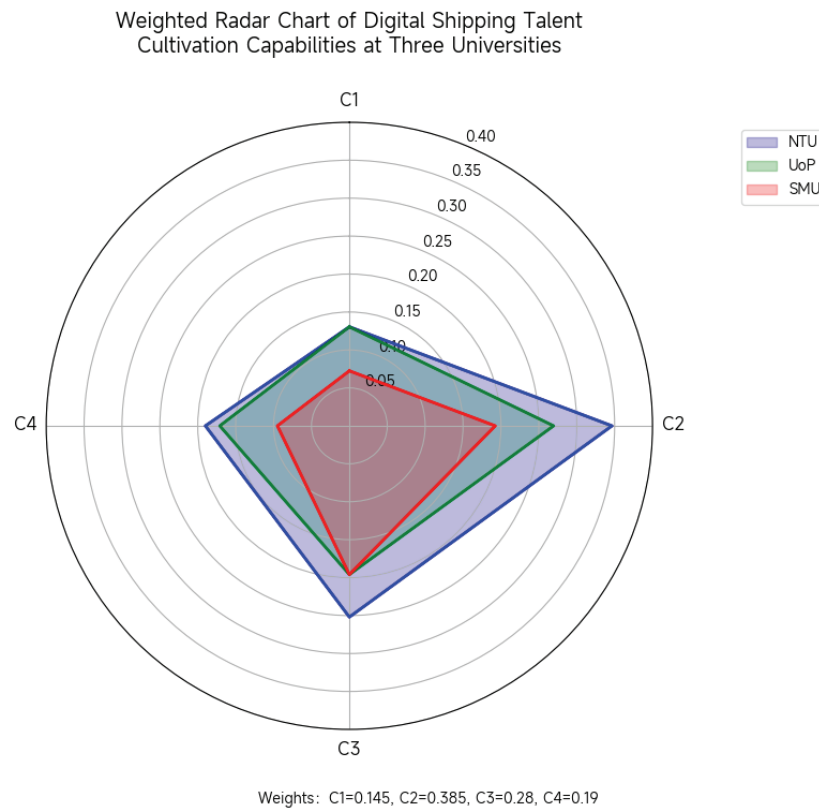
5.3.1 Graphical Analysis of Structural Advantages

To more intuitively illustrate the comparison of digital shipping talent development across the three universities, this section presents a radar chart based on the analysis above, as shown in Figure 2. This chart uses a quadrilateral radar diagram with four criteria (C1, C2, C3, C4) as axes, visualizing the weighted scores of NTU, UoP, and SMU across these four dimensions to compare their relative strengths. NTU has the largest area, with particularly strong scores on the C2, C3, and C4 axes; UoP performs strongly on the C1 and C4 axes (with only small differences compared to NTU on the corresponding axes); while SMU maintains high competitiveness on the C3 axis (practical ability).

Table 5: Radar Chart Structure Description

Model	Structural Characteristics	Primary Characteristics
NTU (Singapore)	Largest radar area with highest scores on axes C2, C3, and C4.	Comprehensive and deeply integrated. Achieves overall leadership through government/industry-led (C4) promotion of deep interdisciplinary integration of curriculum (C2) and practical capabilities (C3).
UoP (UK)	Strong performance on C4 and C1 axes, followed by C3.	Business strategy-driven. Clear educational objectives and research focus (C1/C4), with digital skills embedded as business tools, though relatively conservative in deep technology integration.
SMU (China)	Excels on the C3 axis (practical teaching) but has the smallest over- all footprint.	Foundational dual-track transition. Strong in traditional high-fidelity practice (C3), but still in exploratory phase for high-weight dimensions C2 (curriculum integra- tion depth) and C4 (integration breadth).

Figure 2: Radar Chart of Digital Shipping Talent Cultivation Capabilities Among Universities in Three Countries



As shown in Figure 2, the NTU model performs best in terms of overall weighted performance, primarily due to its excellent performance in the three high-weighted dimensions: curriculum system (C2), practical teaching (C3), and industry-academia-research collaboration (C4). Through the mandatory driving forces of government strategy and the industrial ecosystem (C3 and C4), NTU successfully ensured deep interdisciplinary integration of its curriculum (C2), thus forming a self-reinforcing virtuous cycle.

### 5.3.2 Balancing Depth and Breadth in Curriculum Design

The cases of UoP and SMU reveal the strategic trade-offs between depth and breadth in curriculum design.

UoP's "embedded" strategy, which applies digital technology as a business tool (breadth), effectively supports its goal of cultivating business leadership (C1). However, this model may lack sufficient depth in specialized technical skills, making it difficult to cultivate digital technology talents capable of complex algorithm design or system development.

In contrast, SMU's "dual-track" strategy (such as establishing a separate big data major) provides in-depth technical training for specific students, but graduates from its traditional majors may face a lack of breadth in digital literacy. If not handled properly, this strategy may lead to a polarization of talent structure, where professional and digital talents fail to truly integrate into T-shaped composite talents. This contrasts sharply with NTU's mandatory, comprehensive interdisciplinary core curriculum design. The AHP results emphasize the high priority of C2, indirectly supporting the model adopted by NTU, which elevates digital knowledge to the level of fundamental science and integrates it into all majors. This approach better aligns with the urgent need for composite talents in the digital age.

## 6. Conclusions and Implications

### 6.1 Conclusion Summary

This study compares and analyzes the maritime talent cultivation models of Shanghai Maritime University (China), Plymouth University (UK), and Nanyang Technological University (Singapore) in the context of digital transformation. Using the Analytic Hierarchy Process (AHP), the study quantifies the strategic priorities of key cultivation elements and draws the following conclusions:

1. Model Diversity: Global maritime education has developed diverse strategic models with different functions to address

the challenges of digitalization: such as the comprehensive ecosystem model represented by NTU; the strategic business empowerment model represented by UoP; and the basic dual-track transition model represented by SMU.

2. Transformation Drivers: The AHP analysis clearly shows that curriculum restructuring (C2) and practical teaching upgrades (C3) are key actionable levers affecting the quality of talent cultivation, with their combined weight exceeding two-thirds. While strategic direction and external cooperation (C1, C4) are important, they must be implemented through C2 and C3 to have a substantial impact on students' skills.

3. Success Mechanism: Stemming from the Singaporean government's high priority on national shipping development, the success of the NTU model lies in its efficient industry-academia-research integration mechanism (C4), where the strategic guidance of the government regulatory agency (MPA) and high industry participation effectively promote deep interdisciplinary integration of the curriculum (C2) and pre-professionalization of practical teaching (C3), forming a rapid, efficient, and sustainable talent cultivation closed loop.

## 6.2 Insights and Recommendations

Based on the comparative analysis and quantitative results above, this paper proposes the following recommendations for the reform of global maritime education institutions:

1. Core Curriculum and Deep Integration (Focus on C2): Maritime education schools and institutions should avoid treating digital skills as elective or supplementary courses. Following NTU's strategy, foundational data science, computational thinking, data literacy, and critical thinking should be elevated to mandatory core courses for all shipping majors. Curriculum design should be oriented towards solving interdisciplinary problems, rather than teaching technologies in isolation, to overcome the "structural disconnect" between traditional curriculum systems and intelligent shipping practices.
2. Shifting Practice Towards Decision-Making and Innovation (Focus on C3): Practical teaching should move beyond traditional physical skill verification and operational compliance training, shifting towards data-driven decision-making simulations in complex scenarios. Universities should increase investment in digital twin and VR/AR technologies to build exploratory practical environments that allow students to optimize processes and validate innovative solutions, transforming students from "operational executors" to "data analysts and process innovators."
3. Building a Systematic Industry-Academia-Research Collaboration Ecosystem (Focus on C4): Universities should be encouraged to adopt Singapore's "triple helix" training model, establishing institutionalized strategic co-creation mechanisms with government regulatory agencies and leading industry companies. This mechanism should ensure that industry data and cutting-edge technologies flow quickly into classrooms and research platforms; that universities participate in the development of industry standards; and that students are provided with structured, high-standard professional internships to minimize the time lag between talent development and industry needs.

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## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# Interpreting as Critical Discursive Action: A Speech Act-Based Analysis of Diplomatic Interpreting in Chinese-English Cross-Cultural Negotiation

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**Abstract:** Diplomatic interpreting is a highly sensitive form of mediated political communication in which linguistic choices are inseparable from power, ideology, and international relations. Drawing on speech act theory, this study examines Chinese-English interpreting during the 2021 China-US High-Level Strategic Dialogue, using the Chinese interpreters' renditions as a qualitative corpus. By analyzing how locutionary and illocutionary force is rendered and strategically adjusted in interpretation, the study explores interpreters' agency in conveying China's diplomatic stance, managing confrontation, and shaping international discourse. The findings suggest that interpreters operate not merely as neutral transmitters of meaning, but as active discursive agents whose linguistic decisions contribute to the construction of diplomatic authority and national image. This study contributes to critical humanistic social theory by demonstrating how micro-level interpreting practices participate in broader structures of power and ideological contestation in global diplomacy.

**Keywords:** Speech Act Theory; Diplomatic Interpreting; Foreign Affairs Interpretation; Discourse Agency; Critical Social Theory

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## 1. Introduction

Diplomatic encounters are not only political events but also discursive struggles in which language functions as a primary site of power negotiation. In high-level diplomatic dialogues, particularly those conducted under intense international scrutiny, interpretation becomes a crucial mechanism through which national positions, ideological boundaries, and power relations are articulated and contested. The 2021 China-US High-Level Strategic Dialogue, held in Anchorage, marked a pivotal moment in contemporary Sino-US relations and was widely perceived as a rare instance of public diplomatic confrontation.

Within this context, interpreters played a decisive yet often overlooked role. Their renditions constituted the immediate linguistic reality received by the opposing side and the international audience. Rather than functioning as a neutral conduit, diplomatic interpreting in such settings involves strategic linguistic choices shaped by political sensitivity, institutional constraints, and ideological considerations. These choices inevitably influence how speech acts, such as accusations, rebuttals, warnings, and appeals, are realized across languages.

This study adopts speech act theory as an analytical framework to examine Chinese-English interpreting during the 2021 dialogue. By focusing on interpreters' handling of culturally and politically loaded discourse, the paper investigates how

locutionary meaning, illocutionary force, and discursive agency are negotiated in interpretation. In doing so, it situates diplomatic interpreting within a critical humanistic social theory perspective, emphasizing the interpreter's role in reproducing, mediating, and sometimes reshaping power relations in international communication.

## 2. Literature Review

### 2.1 Speech Act Theory and Discursive Agency

Speech act theory, initially formulated by J. L. Austin<sup>[1]</sup>, conceptualizes language as a form of action rather than a mere vehicle for conveying information. Austin distinguished among locutionary acts (the act of saying something), illocutionary acts (the act performed in saying something), and perlocutionary acts (the effects produced by saying something). While foundational, Austin's framework left unresolved questions regarding the relationship between intention, effect, and participant roles in communication.

John Searle<sup>[2]</sup> further refined the theory by emphasizing the rule-governed nature of speech acts and distinguishing more clearly between illocutionary force and perlocutionary outcomes. Subsequent scholars, such as van Dijk<sup>[3]</sup>, extended the discussion by introducing the notion of agency, arguing that successful speech acts depend on both intentional agency and effectual agency, mediated through interpretation and contextual understanding. Critics such as Sadock<sup>[4]</sup> challenged the linear causality between illocution and perlocution, highlighting the indeterminacy and contextual contingency of communicative effects.

In the Chinese scholarly tradition, it's emphasized the dialogic and interactive nature of speech acts, arguing that perlocutionary effects emerge from the joint actions of speakers and listeners. This perspective foregrounds the role of multimodal and contextual factors in meaning-making, an insight particularly relevant to interpreting studies. Later contributions by Sun Shufang and Lian Yiqing<sup>[5]</sup> further stressed the interdependence of different types of speech acts and their realization through linguistic and pragmatic choices.

For interpreting studies, speech act theory offers a powerful lens for examining interpreters' discursive agency. Interpreters do not merely reproduce locutionary content; they actively participate in reconfiguring illocutionary force and managing potential perlocutionary effects. This study builds on this insight to analyze diplomatic interpreting as a form of critical discursive practice.

### 2.2 Chinese-English Diplomatic Interpreting

Foreign affairs interpreting is distinguished by its high political sensitivity, institutional embeddedness, and potential impact on international relations. Unlike other forms of interpreting, it requires not only linguistic competence but also acute awareness of diplomatic protocol, political ideology, and national interests. Misinterpretation in this domain may have consequences that extend far beyond communicative failure.

Scholars have emphasized that diplomatic interpreters function as representatives of the state, operating under strict norms of accuracy, appropriateness, and confidentiality<sup>[6]</sup>. Zhou Enlai's well-known principle for diplomatic interpreters—"stand firm, grasp policies, be familiar with business, and strictly observe discipline"—captures the expectation that interpreters align their work with national diplomatic objectives.

Recent studies increasingly view diplomatic interpreting as a form of mediated political discourse in which interpreters exercise constrained but significant agency.<sup>[7]</sup> From this perspective, interpreters' lexical choices, syntactic adjustments, and pragmatic strategies contribute to the construction of national image and the negotiation of power in international arenas. This study advances this line of inquiry by integrating speech act theory with a critical analysis of Sino-US diplomatic interpreting.

## 3. Data and Methodology

### 3.1 Corpus Selection

The corpus for this study consists of Chinese-English interpreting produced by the Chinese interpreter during the first two rounds of the 2021 China-US High-Level Strategic Dialogue, held in Anchorage on March 18, 2021. The main Chinese speakers were Yang Jiechi and Wang Yi, while the US side was represented by Antony Blinken and Jake Sullivan. Zhang Jing

served as the Chinese interpreter.

The dialogue was extensively covered by international media and widely characterized as an unusually direct and confrontational diplomatic exchange. The selected corpus is therefore highly representative of high-stakes diplomatic discourse, making it particularly suitable for analyzing interpreters' handling of politically sensitive speech acts.<sup>[8]</sup>

### 3.2 Analytical Framework

This study adopts a qualitative discourse-analytical approach informed by speech act theory. The analysis focuses on how interpreters render locutionary content, reconstruct illocutionary force, and enact discursive agency through tense, lexical choice, and syntactic restructuring.<sup>[9]</sup> While perlocutionary effects are acknowledged, they are not empirically examined here and are left for future research.

## 4. Analysis: Speech Acts in Diplomatic Interpreting

### 4.1 Locutionary Fidelity and Cultural Signification

Example 1: 中国和国际社会所遵循和维护的，是以联合国为中心的国际体系，是以国际法为基础的国际秩序，而不是一小部分国家所倡导的基于规则的国际秩序。(Source)

What China and the international community follow or uphold is the United Nations-centered international system and the international order underpinned by international law, not what is advocated by a small number of countries of the so-called rules-based international order. (Interpreted)

The “rules-based” mentioned by Director Yang Jiechi in the second half of this sentence refers to the so-called “rules” of a small number of countries such as the United States, not the rules under the United Nations system framework, nor the rules that comply with international law. The translator's treatment here is so-called rules-based international order. By adding so-called, it shows that the “rules” advocated by some countries led by the United States are not recognized. China firmly upholds the United Nations international conventions and conducts active diplomatic activities in accordance with international law and will not be threatened or unwarrantedly accused by certain countries. This echoes what Yang Jiechi said in his subsequent speech: “The United States has American-style democracy, and China has Chinese-style democracy.” The translator supplemented the connotation of the source language discourse by supplementing the discourse information and manifested the discourse connotation of the Chinese spokesperson through verbal expression.

### 4.2 Illocutionary Force and Pragmatic Adjustment

Example 2: 我们两国之间过去是有过对抗，这个结果并没有给美国带来好处。美国从这场对抗中得到了什么？我没有看到任何好处，唯一的的结果是对美国的损害。这样的对抗，中国是挺得过来的。(Source)

Well between our two countries we've had confrontation in the past and the result did not serve the United States well. What did the United States gain from that confrontation? I didn't see any, and the only result was damages done to the United States. And China will pull through and has pulled through such confrontation. (Interpreted)

The translator handled the sentence “China can pull through such confrontation” in the source language as follows: “And China will pull through and has pulled through such confrontation.” The translator used the future tense and the present perfect tense to translate “China can pull through”. This translation method actually shows the connotation of the source language through the semantic behavior of speech. Analyzing in combination with the context, the source language expresses that the United States once had conflicts and confrontations with China. In the confrontation, the United States damaged its own interests, but China pulled through. The translated sentence “has pulled through” shows that China has suffered such an experience but has pulled through; “will pull through” shows that if the United States wants to have a conflict with China again, China has the confidence and strength to overcome the difficulties again. The translator showed the connotation of the discourse through the subtle changes in the tense of the translated language, highlighting China's confidence and growing strength.

Example 3: 在人权问题上，我们希望美国在人权问题上做得更好 ..... 美国在人权方面面临的挑战是根深蒂固的。它们不是在过去四年就存在的，对黑人的屠杀，早就存在这个问题。所以我想，我们两国最好自己管好自己的事儿，而不是转移矛头，把国内的事情没解决好，转移到国际上去。(Source)

On human rights, we hope that the United States will do better on human rights.....And the challenges facing the United

States in human rights are deep-seated. They did not just emerge over the past four years, such as Black Lives Matter. It did not come up only recently. So we do hope that for our two countries, it's important that we manage our respective affairs well instead of deflecting the blame on somebody else in this world. (Interpreted)

There are two obvious characteristics in this part of the dialogue. The first is the expression of the first sentence, "On human rights issues, we hope that the United States will do better on human rights issues." This sentence seems peaceful, but the actual expression effect is quite tough. The translator also translated it undisguisedly as "we hope that the United States will do better on human rights." There are many similar words expressing urging and expectations, such as: "So we do hope that the United States will develop sound relations with all countries in the Asia-Pacific"; "You can't blame this problem on somebody else"; "China urges the U.S. side to fully abandon the hegemonic practice of willfully interfering in China's internal affairs." In the translation of such words, the translator used we do hope, you can't blame, China urges the U.S. to restore the solemn attitude and tone of the spokesperson, which further completes the verbal agent on the basis of the verbal expression. The translator fully reproduces the discourse meaning and attitude of the source language in the English language. The explicit discourse characteristics allow the US side to clearly understand China's attitude towards the relevant matters referred to by the US. Another feature of this discourse is the treatment of "black massacre". The translator did not directly translate "massacre of black people" here but translated it into Black Lives Matter. Black Lives Matter is the slogan of the black human rights movement, which is usually translated into "Black Lives Matter" and "Black Lives Matter" in Chinese. Due to the racial incidents that occurred again in the United States in 2020, the word was announced by the German Language Association as the annual word of the top ten hot words in 2020 in November 2020.<sup>[10]</sup> This is not long before the 2021 China-US high-level strategic dialogue. In the dialogue, the translator reiterated this word to keep up with international hot current events and reveal the racial and human rights issues currently facing the United States. To a certain extent, it is to put pressure on the other party through the agent of discourse and let the other party know their own problems. Both points in this passage reflect the characteristics of the speech agent behavior of the discourse. Through the adjustment of the discourse and the screening of information, the translator not only expresses the connotation of the source language but also shows the explicit behavioral reference of the discourse.

### 4.3 Discursive Agency and Strategic Reframing

Example 4: 只要中国的制度对头，中国人民是聪明的，要卡住我们是卡不住的。历史会证明对中国采取卡脖子的办法、采取打压的办法，最后受损失的是自己。(Source)

Well, as long as China's system is right with the wisdom of the Chinese people, there is no way to strangle China. Our history will show that one can only cause damages to himself if he wants to strangle or suppress the Chinese people. (Interpreted)

Chinese is a semantic language, while English is a syntactic language. Sometimes, Chinese expressions do not require clear discourse connections or logical markers to clearly express the internal logic of the development of events, while English requires the rationality of the speech structure to express its internal logic. In this case, some adjustments need to be made to the speech structure during interpretation. In Example 4, the first half of the source sentence is three independent small sentences, without any conjunctions in the middle. If the translator interprets this sentence in the way of the source language, it may confuse the US representatives. Therefore, in the interpretation of this sentence, the translator used standard English logic to adjust the source language discourse structure. In the expression of "strangle", there was no attempt to correspond to Chinese vocabulary, but strangle was used to clearly translate the discourse meaning of the source language.

Example 5: 中国过去肯定不会，将来也不会接受美方的无端指责。近年来，中国的正当权益受到公然压制，中美关系进入了前所未有的严重困难时期。这损害了两国人民的利益，也损害了世界的稳定与发展，不能再这样下去了。(Source)

And China certainly in the past has not and in the future will not accept the unwarranted accusations from the U.S. side. In the past several years, China's legitimate rights and interests have come under outright suppression, plunging the China-U.S. relationship into a period of unprecedented difficulty. This has damaged the interests of our two peoples and taken its toll on world stability and development, and this situation must no longer continue. (Interpreted)

Similar to the situation in Example 4, in Example 5 the translator uses the discourse adjustment method of...outright

suppression, plunging... to express the causal relationship implicit in the source language, attributing the “difficult period in Sino-US relations” to “the US suppression of China’s legitimate rights and interests”, explicitly reproducing the discourse logical relationship and connotation of the source language, and achieving verbal action through verbal expression, showing the US side China’s dissatisfaction with this and its attitude of not accepting the US’s groundless accusations and suppression.

## 5. Discussion

From a critical humanistic social theory perspective, the findings of this study suggest that diplomatic interpreting should be understood as a form of institutionally embedded discursive action rather than a neutral linguistic service. The Chinese interpreters’ reliance on predominantly literal translation, supplemented by selective explanation and syntactic restructuring, is not merely a technical preference but a strategy conditioned by political legitimacy, ideological accountability, and international visibility. At the level of locutionary acts, interpreters largely preserve the propositional content of the source discourse, ensuring institutional accuracy and minimizing interpretive ambiguity. However, this apparent fidelity does not equate to passivity. Through tense modulation, evaluative lexical choices, and discourse reorganization, interpreters actively recalibrate illocutionary force, transforming implicit stances into explicit diplomatic positioning.<sup>[11]</sup> In this sense, interpreting functions as a mechanism through which state authority is linguistically stabilized and projected.

More importantly, the analysis reveals interpreters as constrained agents. Their agency is neither fully autonomous nor mechanically determined. Operating within diplomatic institutions, interpreters are subject to normative expectations regarding appropriateness, discipline, and alignment with national interests.<sup>[12]</sup> Yet within these constraints, they exercise meaningful discretion that shapes how confrontation, criticism, and persuasion are enacted across languages. This form of agency aligns with critical social theory’s emphasis on the dialectical relationship between structure and action, where social actors reproduce institutional power while simultaneously enacting it through situated practices.

From a broader socio-political perspective, diplomatic interpreting emerges as a micro-level site where macro-level power relations are negotiated. The 2021 China-US Strategic Dialogue exemplifies how linguistic mediation participates in ideological contestation, particularly in moments of heightened geopolitical tension. Interpreters’ discursive decisions contribute to the construction of legitimacy, the management of face-threatening acts, and the international circulation of national narratives. As such, interpreting is inseparable from the symbolic power of the state and the global struggle over discourse authority.

## 6. Conclusion

This study has examined Chinese-English diplomatic interpreting during the 2021 China-US High-Level Strategic Dialogue through the lens of speech act theory, situating interpreting practice within a critical humanistic social theory framework. The analysis demonstrates that interpreters do far more than transmit linguistic meaning: they actively mediate illocutionary force, manage ideological confrontation, and participate in the construction of state authority in international discourse.

By foregrounding interpreters’ discursive agency, this study challenges traditional instrumental views of interpreting as a neutral communicative tool. Instead, diplomatic interpreting is shown to be a form of socially situated action shaped by institutional norms, political sensitivity, and power asymmetries. Interpreters function as pivotal actors at the intersection of language, ideology, and international relations, where micro-level linguistic choices have macro-level symbolic consequences.

Theoretically, this research contributes to the integration of speech act theory with critical social inquiry by demonstrating how illocutionary force is recontextualized through institutional mediation. Methodologically, it highlights the value of qualitative discourse analysis in uncovering the social functions of interpreting in high-stakes political settings. Practically, the findings underscore the importance of cultivating interpreters’ critical awareness of discourse, power, and responsibility in diplomatic contexts.

Future research may extend this analysis by examining perlocutionary effects through media reception studies or comparative analyses across different diplomatic systems. Such work would further illuminate how interpreted discourse circulates globally and contributes to the ongoing negotiation of international power relations.

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# Research on Strategies for Generative Artificial Intelligence to Promote the Construction of Rural Libraries Based on SWOT Analysis

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**Abstract:** This paper utilizes the SWOT analysis tool to conduct an in-depth examination of the internal strengths and weaknesses, as well as the external opportunities and threats, associated with the application of generative artificial intelligence in advancing the development of rural libraries. It proposes proactive growth (SO), diversified development (ST), transformative (WO), and defensive (WT) strategies for leveraging generative AI to enhance rural library initiatives. The aim is to provide theoretical support and practical guidance for the integration of AI in rural library development, thereby accelerating their transformation and upgrading.

**Keywords:** Generative AI; Rural Library; SWOT Analysis; Strategic Research; Theoretical Support

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## 1. Introduction

The Rural Library Project, as one of the nation's four key cultural initiatives for public benefit and a foundational project for cultural development in new rural areas, was officially launched in 2007 and achieved nationwide coverage across all administrative villages by 2012 <sup>[1]</sup>. It has since become a crucial platform for addressing the shortage of cultural resources in rural areas and meeting the intellectual and cultural needs of farmers. However, with the transformation of rural social structures and the evolving cultural demands of farmers, issues such as prolonged book update cycles, severe content homogenization, and passive service models have become increasingly prominent. Some libraries have fallen into the dilemma of "prioritizing construction over operation," hindering their ability to fully realize their roles in cultural education and knowledge empowerment.

Generative artificial intelligence, centered on the Transformer architecture and powered by machine learning and deep learning algorithms, is capable of autonomously generating diverse content, including text, images, audio, and video <sup>[2]</sup>. It offers advantages such as high-efficiency content generation, strong innovation capabilities, and personalized services. As it continues to drive technological innovation and business model upgrades in fields like healthcare, education, and finance, generative AI has emerged as an essential pathway for promoting the transformation and upgrading of rural libraries.

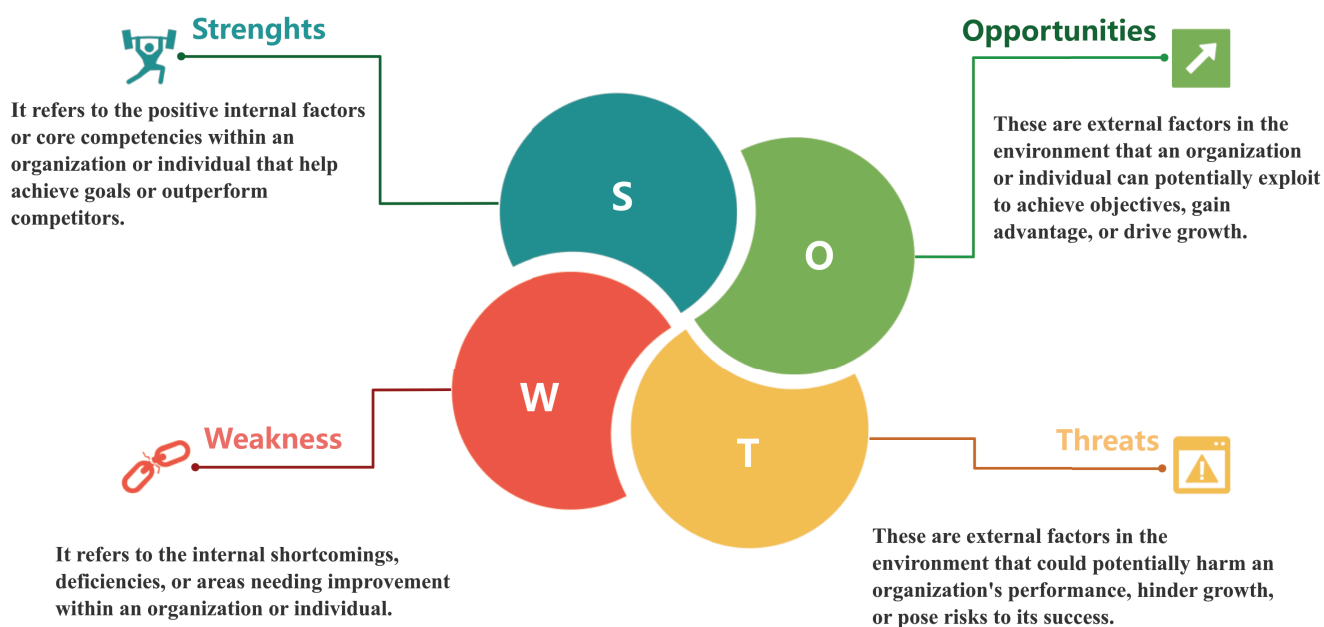
Existing research on rural libraries has primarily focused on topics such as their integration with rural public library service systems <sup>[3]</sup>, problem analysis and countermeasures <sup>[4]</sup>, and digital service enhancements <sup>[5]</sup>. However, studies specifically addressing the role of generative AI in advancing rural library development remain scarce. Therefore, this paper employs the

SWOT model to analyze the internal strengths and weaknesses, as well as the external opportunities and threats, associated with leveraging generative AI for rural library development. It further explores strategic approaches for integrating AI into rural library initiatives, aiming to provide theoretical support and practical guidance for AI-driven advancements in this domain and accelerate the transformation and upgrading of rural libraries.

## 2. The Advantages and Disadvantages of Generative Artificial Intelligence in Promoting the Construction of Rural Libraries

SWOT analysis, proposed by Professor H. Weihrich in the 1970s, is an analytical method that systematically matches the internal strengths and weaknesses with the external opportunities and threats of a research subject to rapidly identify development strategies <sup>[6]</sup> (Figure1) .

Figure1: SWOT analysis



### 2.1 Internal Strengths Analysis

#### 2.1.1 Diversified Content, Breaking the Resource Supply Bottleneck

Traditional rural libraries rely on government funding and social donations for book procurement. Limited by financial and channel constraints, their content often suffers from severe homogenization and slow updates, frequently lagging behind the actual needs of farmers. As a crucial tool for advancing rural library development, generative artificial intelligence can efficiently produce diversified content, thereby overcoming the resource supply bottleneck. Firstly, it provides personalized services. Leveraging vast platform resources, generative AI constructs farmer profiles through large-scale data learning. Combined with personalized generation models, it achieves dynamic matching between content and farmers' needs, enabling precise content delivery. Secondly, it ensures strong content timeliness. Generative AI addresses the information lag inherent in traditional paper-based books in rural libraries. It can quickly generate new content based on real-time data and user demands, promptly reflecting cutting-edge knowledge and information. Thirdly, it offers diversity in content formats. Moving beyond the traditional paper book borrowing model, generative AI creates content in various forms such as text, images, audio, and video. This transmits knowledge in a more vivid and intuitive manner, enhancing farmers' learning motivation and engagement.

#### 2.1.2 Multimodal Interaction, Innovating Service Experience

Currently, the delivery of reading services in traditional rural libraries is constrained by farmers' reading habits, which are often characterized by low reliance on text and a lack of reading interest <sup>[7]</sup>. Generative artificial intelligence addresses these challenges by innovating service experiences through multimodal interaction, thereby meeting farmers' reading needs.

Firstly, generative AI supports multi-format interactions, including intelligent voice assistants, audio/video, and text/image combinations. This allows it to answer user queries at any time, lowering the barrier to usage for farmers and enhancing service convenience and satisfaction. For example, the DeepSeek “Zhixiaogu” AI assistant integrated into Hunan’s digital rural libraries enables users to ask questions via voice to receive book recommendations, agricultural technical advice, and general knowledge services. Secondly, generative AI facilitates AR/VR immersive experiences. By utilizing Augmented Reality (AR) and Virtual Reality (VR) technologies, it can create virtual libraries or immersive reading environments. This allows users to enjoy engaging reading experiences that significantly enhance both the enjoyment and immersion of the reading process.

### **2.1.3 Protecting Cultural Resources, Promoting Cultural Dissemination**

Generative artificial intelligence possesses characteristics of permeability and reproducibility, enabling it to effectively protect and disseminate rural cultural heritage resources<sup>[8]</sup>. In terms of cultural resource protection, generative AI employs technologies such as Optical Character Recognition (OCR) and speech recognition to digitize culturally valuable heritage materials stored in rural libraries. This achieves permanent digital preservation. Simultaneously, by integrating diverse rural cultural resources, it facilitates the construction of comprehensive cultural resource databases. This approach breaks the temporal and geographical constraints of traditional rural libraries, enabling broader resource sharing. Regarding the promotion of cultural dissemination, the “2025 Digital Rural Development Work Priorities” advocate for the integrated development of rural culture with other industries<sup>[2]</sup>. Guided by such policies, generative AI can be combined with the regional characteristics of rural libraries to creatively develop various models, such as “rural culture + tourism” and “digital education + culture.” This promotes the synergistic development of nationwide reading and cultural-tourism integration. Examples include Jiangxi’s “Wuyuan - Most Beautiful Countryside” and Anhui’s “Huixiang Platform”<sup>[10]</sup>. These initiatives expand channels for rural culture and facilitate the wider dissemination of cultural resources.

## **2.2 Analysis of Internal Weaknesses**

### **2.2.1 Insufficient Technical Adaptability**

Traditional rural libraries lack systematic collection and organization of data resources. Additionally, issues such as insufficient accuracy and inconsistent formats in some data create dual challenges in both data quantity and quality when applying generative artificial intelligence (AI) to promote the development of rural libraries. This affects the training of generative AI models, leading to low technical adaptability. The main manifestations are as follows: First, generative AI has limited capabilities in dialect recognition and generation. While it performs relatively well with major dialects such as Southwestern Mandarin and Cantonese, its processing ability for less common dialects (e.g., Hakka and some branches of Minnan dialect) remains weak. Second, generative AI exhibits limitations in understanding regional folk characteristics, resulting in generated content that appears rigid and lacks regional cultural connotations. This fails to showcase the distinctive features of local culture.

### **2.2.2 Shortage of Professional Talent**

The application of generative AI requires professional technical personnel for system construction, data training, and daily maintenance. However, rural areas have long suffered from severe brain drain, leading to a prominent shortage of professional talent. First, urbanization in China’s rural areas has intensified, with young and middle-aged individuals often opting to work in cities. As a result, rural library managers are typically village cadres or volunteers who lack relevant training. Their limited cognitive levels and application skills create a dual challenge: operating intelligent systems and resolving system malfunctions. Second, some rural regions are geographically remote and economically underdeveloped, making it difficult to attract and retain external professional technical talent. This has created bottlenecks in the digital transformation and development of traditional rural libraries.

### **2.2.3 High Capital Investment**

The development and application of generative artificial intelligence (AI) require substantial financial resources for initial technological research and development, equipment procurement, and subsequent operational maintenance. For most rural areas, the associated cost pressures are significant. Firstly, establishing a generative AI service platform involves considerable

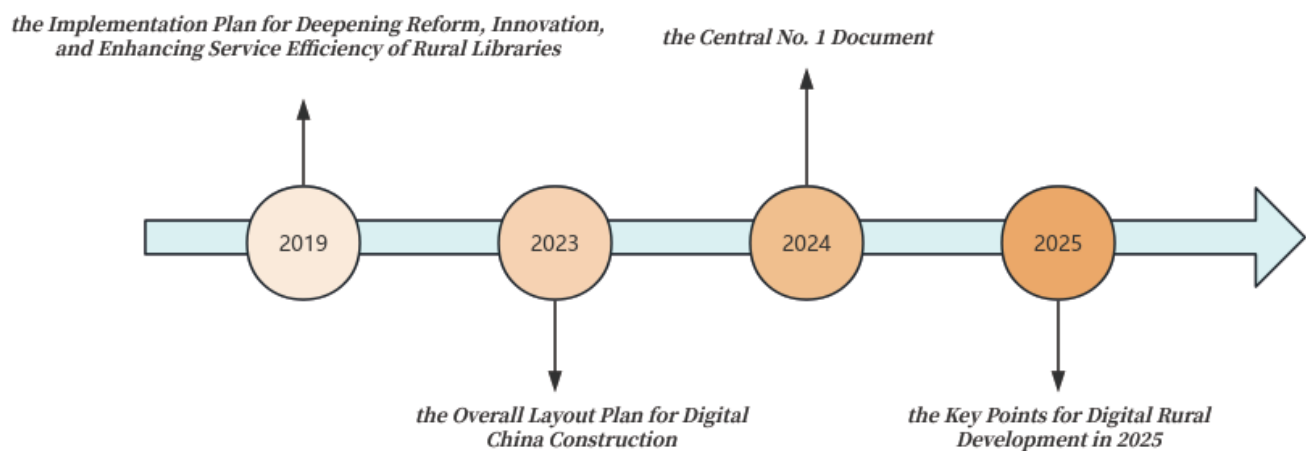
upfront expenses, including the purchase of servers, development of software systems, and costs related to data collection and model training. Secondly, ongoing financial support is necessary for system upgrades, data updates, and personnel training. However, the operational funding for rural libraries primarily relies on fiscal allocations, and in many regions, budgetary constraints make it difficult to ensure sustained investment. Thirdly, generated content requires copyright verification and compliance reviews. If third-party data or technologies are involved, additional licensing fees may be incurred, further increasing the financial burden.

## 2.3 Analysis of External Opportunities

### 2.3.1 Increasing Policy Support

In recent years, the state has placed high importance on the integrated development of artificial intelligence and rural revitalization, issuing a series of policy documents that provide policy support for the application of generative artificial intelligence in the construction of rural libraries (Figure2), in 2019, the Implementation Plan for Deepening Reform, Innovation, and Enhancing Service Efficiency of Rural Libraries emphasized the importance of promoting rural library development through high-tech means<sup>[11]</sup>. In 2023, the Overall Layout Plan for Digital China Construction proposed advancing the development of smart villages and enhancing the digitalization level of rural public services<sup>[12]</sup>. In 2024, the Central No. 1 Document stressed the need to strengthen the construction of rural public cultural service systems and promote the dissemination of high-quality cultural resources to rural areas<sup>[13]</sup>. In 2025, the Key Points for Digital Rural Development in 2025 highlighted the coordinated advancement of digital rural construction and the creation of a favorable environment for digital rural development<sup>[14]</sup>. In response to central policies, local governments have actively taken measures, introducing initiatives such as the Digital Rural Library Upgrade Project and the Rural Cultural Brain Construction. These policies provide directional guidance and financial support for the integrated development of generative artificial intelligence and rural libraries, thereby lowering the policy barriers to technological application.

Figure2: Policy Framework Supporting the Application of Generative AI in Rural Library Development



### 2.3.2 Optimization of Rural Digital Information Infrastructure

Encouraged by policies, rural digital information infrastructure has been continuously optimized, leading to a steady improvement in the efficiency of public services. Firstly, according to the 55th Statistical Report on China's Internet Development, as of 2024, the national internet penetration rate has reached 78.6%. Villages across the country are actively advancing the deployment of 4G base stations to fill coverage gaps and extending the construction of 5G networks<sup>[15]</sup>. This progress further moves towards achieving the goal of "equal network access and speed" between rural and urban areas, effectively addressing the network dependency issues associated with generative artificial intelligence. Secondly, in 2024, the rural internet user base reached 313 million people. The adoption rate of smart devices such as smartphones and tablets among farmers is continuously increasing, and their digital literacy is gradually improving. This has laid a solid user foundation for the integration of generative artificial intelligence with rural libraries.

### 2.3.3 The Rapid Advancement of Digital Reading

With the widespread adoption of smart devices such as smartphones and e-readers, the reading habits of the public have shifted from traditional methods to digital approaches. According to the 21st National Reading Survey Report, in 2023, the book reading rate among Chinese citizens was 59.8%, while the engagement rate with digital reading methods reached 80.3% <sup>[16]</sup>. This indicates that the advent of the digital reading era has gradually accustomed readers to acquiring information through smart devices, thereby reducing their reliance on printed books. In this context, content generated by artificial intelligence can be more readily accepted by the broader rural population, presenting a valuable opportunity for the transformation and upgrading of rural library initiatives.

## **2.4 External Threat Analysis**

### **2.4.1 Inadequate Regulatory Framework**

As an emerging technology, the regulatory system for Generative Artificial Intelligence (GAI) is characterized by its late establishment, slow development, and imperfect enforcement mechanisms. This has resulted in significant regulatory and normative gaps in the application of GAI to promote the development of Rural Libraries. Firstly, there are data security risks. Farmers generally exhibit weak awareness of data security and insufficient understanding of privacy protection, leading to potential risks of personal information leakage when using intelligent services. Furthermore, security vulnerabilities in Rural Libraries' intelligent systems, such as server attacks or data interception during transmission, can also result in data breaches, thereby intensifying privacy protection pressures. Secondly, copyright attribution remains ambiguous. In works generated by AI for the Rural Library domain, which often involve the use or adaptation of existing materials, it is difficult to clearly determine copyright ownership. This ambiguity easily leads to copyright disputes, posing legal risks for both creators and users.

### **2.4.2 Lack of Social Collaboration**

Currently, the integrated development of GAI and Rural Libraries is still in a phase marked by tight computing resources and high training costs. Continuous improvement in foundational support and enhancement capabilities within the social system is required. Firstly, the integration of GAI and Rural Libraries primarily relies on government funding, with insufficient involvement from other social forces. Sole reliance on government efforts makes it difficult to utilize technological tools for precise analysis of villagers' needs and fails to fully mobilize resources and enthusiasm from all sectors of society. Secondly, Rural Libraries suffer from slow resource updates and severe homogenization of content. The lack of synergy and linkage between Rural Libraries and public library systems creates barriers to resource sharing, easily leading to information silos. This situation severely undermines the effectiveness of GAI applications.

### **2.4.3 Constraints on Farmers' Digital Literacy**

First, farmers exhibit a relatively low willingness to adopt new technologies. According to the China Rural Statistical Yearbook 2024, as of the end of 2023, 35.1% of household heads in rural areas still had an educational attainment below junior high school level <sup>[17]</sup>. Furthermore, the 56th Report on Rural Internet Development indicates that as of June 2025, rural internet users accounted for only 28.7% of the total online population in China <sup>[18]</sup>. Surveys show that 60% of non-internet users cite a lack of computer or internet skills as the primary reason for not going online. The educational background and technology adoption willingness of farmers significantly constrain the utilization of generative artificial intelligence. Second, the proliferation of diverse learning channels creates strong competition. With the advancement of informatization, farmers now have access to a wider array of information sources. Alternatives such as AI-powered search engines, professional database queries, and expert consultations may reduce the reliance on or uptake of generative AI tools, thereby limiting their application and impact in agricultural and rural contexts.

## **3. Strategies for Promoting Rural Library**

Development through Generative AI Based on the analysis of the internal strengths and weaknesses, as well as the external opportunities and threats, regarding the application of generative AI in rural library development, this study proposes four strategic approaches: the Aggressive Strategy (SO), the Diversified Strategy (ST), the Turnaround Strategy (WO), and the Defensive Strategy (WT)(Table 1).

Table 1: SWOT Matrix for Promoting Rural Library Development through Generative AI

	Internal Strengths (S)	Internal Weaknesses (W)
	1. Breaking through resource supply bottlenecks 2. Innovating service experiences 3. Facilitating cultural dissemination	1. Insufficient technical adaptability 2. Shortage of professional talent 3. High capital investment requirements
External Opportunities (O)	Aggressive Strategy (SO)	Turnaround Strategy (WO)
1. Increasing policy support 2. Optimization of rural digital information infrastructure 3. Rapid growth of digital reading	1. Leverage policy support to achieve resource penetration into rural areas. 2. Continuously improve digital infrastructure to enhance service effectiveness. 3. Capitalize on the digital reading trend to develop distinctive local cultural features.	1. Enhance technical adaptability levels. 2. Establish a professional talent pool. 3. Broaden funding channels
External Threats (T)	Diversified Strategy (ST)	Defensive Strategy (WT)
1. Imperfect regulatory system 2. Lack of social collaboration 3. Limited digital literacy among farmers	1. Improve the regulatory system to standardize market order. 2. Foster a collaborative cultural environment involving government, enterprises, and society. 3. Enhance the digital literacy of farmers.	1. Construct lightweight intelligent systems. 2. Strengthen cost control and resource reuse. 3. Establish information security safeguard mechanisms.

### 3.1 Aggressive Development Strategy (SO)

#### 3.1.1 Leveraging Policy Support to Achieve Resource Penetration

By aligning with national and local policy guidance on the digital transformation of rural libraries and the construction of rural digital culture, the advantages of generative AI in overcoming resource supply constraints should be fully harnessed to expand the scale and adaptability of digital resource repositories in rural libraries. Utilizing policy-backed funding, continuous optimization of generative AI algorithms and the in-depth development of generative AI production tools should be prioritized. To meet the personalized needs of farmers, tailored content such as concise agricultural technical guides, dialect-based audiobooks, and illustrated local folklore stories should be automatically generated. Furthermore, by leveraging platforms such as the national rural library digital platform and rural cultural cloud projects, the generated content can be effectively disseminated to grassroots libraries. This approach addresses the issues of outdated and homogenized content in traditional rural libraries, transforming the resource supply model from “passive procurement” to “active customization.”

#### 3.1.2 Continuously Improve Digital Infrastructure to Enhance Service Effectiveness

The enhancement of network infrastructure serves as the core prerequisite and critical support for the development of rural libraries facilitated by generative AI. Technologies such as content generation, real-time interaction, augmented reality (AR), and virtual reality (VR) rely heavily on substantial data transmission and computational power. Expanding network coverage in rural areas, increasing broadband speeds, and improving network stability can ensure real-time connectivity between smart terminals—such as library smart screens and users’ mobile devices—and cloud-based computing centers. This mitigates service interruptions or slow responses caused by network lag or delays, providing farmers with a seamless experience when using generative AI to query agricultural knowledge or generate reading materials. By ensuring that innovative services are “functional and user-friendly” on a robust infrastructure foundation, user engagement and retention among farmers can be significantly enhanced.

#### 3.1.3 Seize the Digital Reading Trend to Develop Distinctive Local Cultural Characteristics

Generative AI should capitalize on the opportunities presented by the era of digital reading, leveraging its strengths in preserving cultural uniqueness and promoting cultural dissemination to transform rural libraries into “digital hubs for the transmission of rural cultural heritage.” Firstly, in response to the growing demand for digital reading in rural areas, generative AI can be utilized to convert the unique cultural resources housed in rural libraries into digital content. Examples

include transforming oral narratives into audiobooks, annotating historical photographs to create illustrated columns, and compiling traditional agricultural expertise into structured digital manuals. Secondly, it is essential to “revitalize” local cultural characteristics. Content generated through generative AI can be disseminated via rural library digital platforms, rural cultural and tourism social media accounts, and other channels. This approach not only aligns with the evolving trend of digital reading but also enables rural indigenous culture to “come alive and reach wider audiences” through AI technology, thereby continuously strengthening farmers’ sense of identity and belonging to their local culture.

### **3.2 Diversified Development Strategy (ST)**

#### **3.2.1 Improve the Regulatory System and Standardize Market Order**

Under the guidance of national macro-level regulations, the regulatory system should be continuously refined by integrating the technical requirements of generative AI with the specific characteristics of rural library development, thereby standardizing market order. First, it is essential to clarify provisions in regulations such as the Interim Measures for the Management of Generative AI Services regarding copyright ownership, data security, and content review for the application of generative AI in rural libraries. Concurrently, a content traceability mechanism should be established to assign unique identifiers to AI-generated content, facilitating the tracking of content sources and review records. Second, regulatory authorities should enhance their oversight philosophy by conducting regular security inspections of servers to prevent cyberattacks. Proactive supervision should be implemented to address issues such as data leaks and copyright infringement in the development of rural libraries facilitated by generative AI, ensuring the healthy growth of rural culture.

#### **3.2.2 Foster a Collaborative Cultural Environment**

Involving Government, Enterprises, and Society using the content generated by generative AI for rural library development as a link, efforts should be made to amplify content promotion through media, public welfare platforms, and other communication channels, thereby continuously increasing the “brand awareness” of local culture. This approach can attract public attention to the integrated development of generative AI and rural libraries, stimulate market demand, and encourage enterprises and social capital to participate in projects that promote rural library development through generative AI. Through preferential policies, social resources such as funding, technology, and talent can be directed toward rural libraries, attracting external collaboration and compensating for the lack of social support. At the same time, leveraging the service advantage of generative AI in breaking geographical barriers, cross-regional collaborative alliances should be established. Through such alliances, high-quality resources generated by generative AI can be shared, preventing information silos and alleviating the fragmentation of resources caused by insufficient social collaboration.

#### **3.2.3 Enhance the Digital Literacy of Farmers**

Farmers’ ability and willingness to adopt digital technologies are critical to the development of rural libraries facilitated by generative AI. First, engaging digital tools and guidance systems should be developed. Building on the strong interactive capabilities of generative AI, user-friendly interactive tools tailored to farmers’ usage habits should be created to increase engagement and lower the barrier to entry. For example, complex generative AI operations can be simplified into low-threshold formats such as voice commands in local dialects or icon-based interactions, reducing the required level of digital literacy. Second, targeted training should be conducted. By leveraging generative AI to enhance training and education, immersive digital literacy training scenarios can be designed. Through simulated operations and real-time feedback, targeted training can be provided to bridge cognitive and technical gaps among farmers. By strengthening the platforms for improving farmers’ digital literacy, obstacles to using generative AI due to insufficient digital skills can be gradually alleviated.

### **3.3 Turnaround Strategy (WO)**

#### **3.3.1 Enhance Technical Adaptability**

Efforts should be made to advance the development of localized generative AI models to improve regional relevance. First, the ability of generative AI technology to interpret rural semantics and sentiments should be enhanced. Governments, social organizations, and enterprises should collaborate to increase funding for generative AI technology, continuously optimizing algorithms. Concurrently, agricultural, dialect, and cultural data from various regions should be collected and organized to improve dialect recognition and generation capabilities, including support for lesser-known dialects. This will enhance the re-

gional adaptability of the models. Second, specialized models should be developed based on local agricultural characteristics. For example, tailored generative AI models could be created for specific products such as Wuchang rice in Heilongjiang or tea cultivation in Fujian, ensuring that the generated agricultural content is both targeted and practical.

### 3.3.2 Establish a Professional Talent Pool

Talent development should be prioritized in promoting rural library development through generative AI, with a focus on both recruitment and training. First, external talent recruitment should be emphasized. By leveraging national policy incentives, such as “optimizing talent recruitment policies” and “cultivating local talent,” efforts should be made to encourage professionals to work in or return to rural areas. This will ensure that each rural library is staffed with at least one information management professional who understands both technology and administration, enabling scientific and informatized management of the libraries. Second, internal talent training should be strengthened. In collaboration with local cultural and tourism bureaus, libraries, and universities, systematic training and specialized lectures should be provided to rural library staff. This will enhance their ability to apply and manage generative AI technologies. Additionally, a scientifically sound incentive mechanism should be established to continuously motivate library staff, boosting their enthusiasm and initiative, and ultimately improving service quality<sup>[19]</sup>.

To facilitate the transformation and upgrading of rural libraries, it is essential to increase financial investment in generative artificial intelligence (AI) and introduce related equipment and software. First, leveraging multiple policies such as the 14th Five-Year Plan for Cultural Development<sup>[20]</sup> and the Comprehensive Rural Revitalization Plan (2024–2027)<sup>[21]</sup>, efforts should be accelerated to empower rural libraries digitally. By applying for special projects such as “Generative AI + Rural Libraries,” rural libraries can seek financial subsidies, tax reductions, or policy-based low-interest loans to lower procurement costs and alleviate the pressure of “high capital investment.” Second, local governments should establish diversified funding mechanisms, actively encouraging social, corporate, and individual capital to participate. Through donations, cooperative construction, and other means, the integration of generative AI with rural libraries can be further promoted, ensuring stable funding sources and sustained investment.

## 3.4 Defensive Strategy (WT)

### 3.4.1 Build a Lightweight Intelligent System

To address practical constraints such as limited network bandwidth, high investment costs, and the simple usage habits of farmers in rural areas, a lightweight intelligent system should be developed. This involves simplifying and optimizing technological products, application functions, or operational models to better align with the limited conditions in rural areas. The goal is to implement core functionalities at lower costs and with lower barriers to entry, rather than pursuing technological comprehensiveness or complexity. Local governments can collaborate with technology companies or universities to customize simplified versions of generative AI tools suitable for rural libraries. For example, core functions such as agricultural knowledge Q&A can be broken down into standalone mini-programs that support offline caching, reducing reliance on real-time high-speed internet. The interface design should also be optimized, prioritizing icon-based and voice-interactive operation methods to accommodate the usage habits of middle-aged and elderly farmers.

### 3.4.2 Strengthen Cost Control and Resource Reuse

High capital investment is a significant constraint in introducing generative AI technology into rural libraries. To alleviate financial pressure, cost control measures must be implemented. Priority should be given to utilizing existing facilities and equipment in rural libraries, such as venues and computers. Only essential hardware, such as voice interaction devices and servers, should be upgraded to avoid redundant construction. Additionally, efforts should be made to promote the sharing of AI resources within counties. For example, multiple townships can jointly procure AI technology services, reducing the procurement costs for individual libraries through “bulk customization.”

### 3.4.3 Establish an Information Security Safeguard Mechanism

A data security management protocol for rural libraries should be formulated to clarify the processes and permissions for data collection, storage, and usage in generative AI applications, strictly prohibiting the misuse of user data. Firewalls should be deployed, and an automated monitoring system should be established to protect user data. Regular security inspections of

servers should be conducted to prevent cyberattacks. At the same time, efforts should be made to enhance farmers' awareness of data security through educational initiatives such as informational posters and lectures. This will improve their ability to protect data privacy, effectively safeguard the achievements of generative AI in promoting rural library development, and standardize market order.

## 4. Conclusion

This paper employs a SWOT analysis to examine the internal strengths and weaknesses, as well as the external opportunities and threats, in leveraging generative AI to advance the development of rural libraries. Based on this analysis, proactive (SO), diversified (ST), turnaround (WO), and defensive (WT) strategies are proposed. The aim is to provide theoretical support and practical guidance for the application of AI in rural library development, thereby accelerating their transformation and upgrading. However, the research methodology has limitations, including a degree of subjectivity, which may result in a macro-level and somewhat one-sided analysis. Therefore, when implementing generative AI in grassroots rural library initiatives, it is essential to select appropriate development strategies based on local conditions, in order to effectively advance rural cultural revitalization.

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# Institutional Innovation and International Comparative Study on the Cultivation of Religious Professionals under the Sinicization-Oriented Development of Han Buddhism

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**Abstract:** In the context of the growing pluralization of global Buddhism and the profound transformations brought about by the digital era, the Sinicization of Buddhism represents not merely the continuation of cultural heritage, but also an internal process of self-renewal within Buddhist traditions. Grounded in the dual theoretical frameworks of the Sinicization of religion and the socialization theory of education, this study employs qualitative comparative research and document analysis to explore institutional innovations in the cultivation of monastic and religious professionals within Chinese Han Buddhist education. In addition, a comparative analysis is conducted with Buddhist educational systems in Japan, Thailand, and Sri Lanka.

Drawing on semi-structured interviews with twelve faculty members and administrators from five Han Buddhist academies in China, the study reveals that contemporary Han Buddhist education in China is gradually forming a “three-dimensional integrated training model”, characterized by political identification as its core orientation, cultural integration as its developmental pathway, and institutionalized educational structures as its foundational guarantee.

The findings further suggest that Buddhist academies should strengthen cultural self-confidence, scholarly research capacity, and social service functions within their institutional frameworks, so as to promote a more comprehensive, open, and internationally engaged model of Buddhist education in the new era.

**Keywords:** Han Buddhism; Sinicization of Buddhism; Religious Education; International Comparison; Cultivation of Monastic Professionals

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## 1. Introduction

The Sinicization of religion constitutes a central theme in the contemporary development of religion in China. President Xi Jinping has repeatedly emphasized that religions should “adhere to the Sinicization orientation” and be guided to “adapt to socialist society”, a policy framework that has provided a clear developmental direction for Buddhism in China. With a history spanning more than two millennia, Han Buddhism itself represents a long-standing process of localization within the cultural soil of China. In the new era, however, the notion of “Sinicization” places greater emphasis on the integrated alignment of political identification, cultural integration, and social responsibility.

From the perspective of global religious history, religious localization is an inherent and ongoing process in the transmission

and development of religions. It is not a completed historical stage, but rather a continuous and dynamic trajectory that reflects a general pattern in the evolution of world religions. Moreover, issues of localization—also conceptualized as indigenization or contextualization—are by no means unique to China; they constitute a widely observed phenomenon occurring simultaneously in diverse religious contexts across the world. As Zheng Xiaoyun (2020) has noted, this represents a meaningful unity of diachronic continuity and synchronic coexistence in the development of religion.

Since the beginning of the twenty-first century, however, the emergence of a digital society and the intensification of global exchanges have introduced new challenges. In particular, structural tensions have become increasingly apparent between traditional Buddhist educational systems and the evolving demands of contemporary society.

Against this backdrop, a critical question has emerged for both academic and religious communities: how can the educational system of Han Buddhism achieve a modern transformation of its social functions while preserving the integrity and authenticity of Buddhist faith and doctrine? Employing a qualitative comparative research approach, this study examines innovative practices in the institutional development of Han Buddhist education under the orientation of Sinicization. It further conducts a comparative analysis with Buddhist educational experiences in Japan, Thailand, and Sri Lanka, with the aim of offering analytical insights and practical references for the modernization of religious education.

## **2. Theoretical Foundations and Literature Review**

### **2.1 The Theory of the Sinicization of Religion**

The core of the Sinicization of religion lies in achieving political identification, cultural integration, and social adaptation. This theoretical framework emphasizes not only the alignment of religious thought with the core socialist values, but also the recognition of religion's own capacity for cultural creativity. As Yang Zengwen (2017) argues, Sinicization does not signify the alienation of religion; rather, it represents a process of regeneration and reinterpretation within the specific socio-cultural context of China. The educational system of Han Buddhism constitutes a crucial institutional vehicle for this process.

From a sociological perspective, Yang and Tamney (2011) suggest that religions can maintain vitality in rapidly changing societies by adapting their organizational structures and value systems to prevailing national cultures and political environments. Within this analytical framework, Sinicization may be understood as a form of cultural adaptation, through which Han Buddhism redefines its religious identity within the socialist context of contemporary China.

### **2.2 The Theory of Educational Socialization**

The theory of educational socialization conceptualizes education as a critical bridge between social values and individual identity formation. Talcott Parsons (1959) emphasized that educational systems do not merely transmit knowledge, but also shape the roles, responsibilities, and normative orientations of social members. When applied to Buddhist education, this perspective implies that the cultivation of monastic professionals should not be confined solely to religious training, but should instead strive to achieve a dynamic balance between religious cultivation and social service.

Under this theoretical approach, Buddhist academies function as socializing institutions that transmit patriotic values, cultural literacy, and ethical awareness to both monastics and lay practitioners. This process facilitates a structural transformation of Buddhist education—from a relatively closed and inward-looking model toward a more open, socially engaged orientation, and from an emphasis on “otherworldly withdrawal” toward a mode of this-worldly engagement.

### **2.3 Review of Domestic and International Scholarship**

In recent years, Chinese scholars have conducted multidimensional investigations into the Sinicization of religious education. Chen Jinguo (2021) argues that Buddhist institutions should strengthen the integration of ideological and political education with cultural curricula in the cultivation of religious professionals. Zheng Xiaoyun (2020) further contends that the modernization of educational institutions constitutes a critical component of the broader process of religious Sinicization.

In the international scholarly arena, Swanson (2012) examines the educational transformation of Japanese Zen Buddhism in its adaptation to modern society, while Gombrich (2018) analyzes the processes of state integration and popularization within Theravāda Buddhist education. Collectively, these studies provide valuable comparative perspectives and theoretical support for the present research.

### 3. Research Methodology and Data Sources

This study adopts a qualitative comparative research approach in combination with NVivo-based document analysis. The data sources comprise the following categories:

- (1) Policy documents issued by the National Religious Affairs Administration and the Buddhist Association of China (2017–2023);
- (2) Training programs and curriculum documents from Buddhist academies in China;
- (3) Institutional materials concerning Buddhist education systems in Japan, Thailand, and Sri Lanka;
- (4) Semi-structured interviews conducted with twelve faculty members and administrators from five Han Buddhist academies in China.

#### 3.1 Analytical Procedures

**NVivo Coding:** Five primary nodes were established—political education, curricular integration, faculty development, cultivation–practice integration, and international exchange—with a total of 45 subordinate nodes identified through iterative coding.

**Triangulation:** Research reliability was enhanced through methodological triangulation, whereby findings derived from policy documents, interview data, and international comparative materials were cross-validated.

**Cluster Analysis:** Key terms such as “education on the rule of law,” “social service,” “Sinicization,” and “international cooperation” were extracted and analyzed to generate core thematic clusters.

#### 3.2 Reliability and Validity Control

To ensure analytical rigor and the replicability of research findings, all data underwent multiple rounds of coding comparison and expert review. The interview sample encompassed Buddhist academies from diverse regions and institutional levels, thereby enhancing the representativeness and external validity of the study.

### 4. Research Findings and Interview Analysis

#### 4.1 Political Identification and the Institutionalization of Education on the Rule of Law

All interviewees (100%) reported that their institutions have incorporated courses on political theory and religious policy, accounting for approximately 30–40% of total instructional hours. The majority of monastics emphasized that such courses “help monastic students understand the importance of governing religion in accordance with the law”, and regarded political identification and education on the rule of law as the foundational basis of learning. According to the respondents, only with a sound worldview and value system can future Buddhist professionals effectively engage in Dharma propagation and benefiting sentient beings.

Instruction in political theory and legal education is generally delivered by experts or scholars assigned by United Front-related authorities or invited from universities. However, respondents noted that the teaching materials remain predominantly theoretical and lack Buddhist-specific case studies, which limits the depth and effectiveness of pedagogical outcomes.

#### 4.2 Integration and Innovation of the Curriculum System

All participating academies have retained traditional canonical studies as core components of their curricula, while courses oriented toward modern society occupy a relatively limited proportion. Some Buddhist academies have introduced subjects such as psychology, cultural communication, new media applications, music, and English, reflecting a trend toward the socialization of Buddhist education. Nevertheless, these subjects are generally not designated as core courses and are often treated as optional rather than essential components of the curriculum. As a result, their continuity is frequently affected by the availability of qualified instructors.

NVivo word-frequency analysis indicates that terms such as “integration,” “innovation,” and “service to society” appear with high frequency, reflecting the overall direction of contemporary Buddhist educational reform. While certain monasteries and academies have initiated reform efforts, the scope and intensity of these initiatives remain limited, with most institutions continuing to rely primarily on traditional monastic cultivation models.

#### 4.3 Professionalization and Diversification of Faculty Structure

At present, most Buddhist academies have established a dual teaching structure combining monastic and lay instructors, with externally recruited university faculty accounting for approximately 25% of teaching staff. The recruitment standards for external instructors generally align with those applied to full-time faculty in higher education institutions, ensuring a high level of disciplinary specialization. Faculty training programs typically encompass religious policy education as well as coursework from various social science disciplines.

Despite these developments, the shortage of “dual-competency” faculty—teachers who possess both solid training in Buddhist studies and expertise in modern academic disciplines—remains a major bottleneck in faculty development.

#### 4.4 Evaluation System Integrating Cultivation and Practice

Most institutions have adopted a three-dimensional evaluation framework based on moral conduct, academic learning, and practical engagement, incorporating social service activities and monastic practice into student assessment. Some academies have innovatively introduced courses that integrate monastic cultivation with public welfare service, thereby promoting the unity of faith and practice.

Each Buddhist academy has developed its own distinctive cultivation orientation, with some specializing in Tiantai traditions, while others emphasize Pure Land practice. Correspondingly, evaluation criteria vary across institutions. A substantial proportion of assessment remains non-quantitative, relying largely on qualitative judgments provided by instructors.

#### 4.5 International Exchange and Future Prospects

Several interviewees highlighted the importance of drawing on the academic institutionalization of Japanese Buddhist universities and the socially oriented Sangha education system in Thailand. They advocated the establishment of regional cooperation mechanisms in Buddhist education, and expressed strong expectations for enhanced academic exchange and collaboration between Chinese Han Buddhist academies and overseas Buddhist educational institutions.

### 5. International Comparison: Experiences and Implications from Three Countries

*Table 1: Table of Experiences and Implications from Three Countries*

Country	Educational Characteristics	Implications for Han Buddhist Education
Japan	Strong academic orientation and integration into the university system; parallel development of sectarian universities and social education	Promote the degree-oriented and research-based development of Buddhist education
Thailand	High degree of state involvement combined with a strong emphasis on social service; government participation in Sangha education	Strengthen the public service functions of Buddhist education
Sri Lanka	Coexistence of government funding and religious autonomy; modernization of curricula	Achieve social adaptability while preserving traditional foundations

#### 5.1 Japan: Academicization and Integration into the University System

Since the Meiji Restoration, Buddhist education in Japan has undergone a process of institutionalization within the framework of religious higher education. Major Buddhist denominations, such as Sōtō Zen and Jōdo Shinshū, have established their own sectarian universities—including Komazawa University and Otani University—thereby integrating Sangha education with the general system of higher education. The educational content places strong emphasis on philosophy, languages, and international exchange, positioning Buddhism as an integral component of broader socio-cultural and academic inquiry. This model provides an important reference for the academicization of Han Buddhist education.

#### 5.2 Thailand: State Integration and Social Service Orientation

The Buddhist education system in Thailand is characterized by state leadership and Sangha participation, with Mahachulalongkornrajavidyalaya University serving as a representative institution. This university integrates monastic education with social practice, offering curricula that encompass fields such as psychology, education, and public administration. In addition to serving monastic students, Mahachulalongkornrajavidyalaya University functions as a public-oriented Buddhist university, open to lay society. Its academic degrees are officially recognized by the Thai Ministry of Education and acknowledged within the international higher education system.

Graduates of this institution—including monastic students—are able to pursue careers in government agencies, educational institutions, and social service sectors, demonstrating a high degree of social adaptability within Thai Buddhist education.

5.3 Sri Lanka: Integration of Tradition with National Higher Education

Buddhist universities in Sri Lanka, such as the University of Kelaniya, operate under a dual framework that combines government funding with religious autonomy. Their curricula include both Pāli language studies and Abhidhamma, alongside modern research methodologies and courses in social ethics. This model preserves the depth of traditional Buddhist scholarship while simultaneously strengthening the participation of Buddhist education in national development and social construction.

6. Integrated Analysis and Model Construction

Through thematic integration based on NVivo analysis, this study proposes a Five-Dimensional Model of Institutional Innovation for the Sinicization of Buddhist Education. The model systematically summarizes the key dimensions, core components, major challenges, and future directions of reform in Han Buddhist education.

Table 1: Table of Integrated Analysis and Model Construction

Dimension	Core Components	Major Challenges	Directions for Improvement
Institutionalization of Political Identification and Education on the Rule of Law	Establishment of a legalized and institutionalized curriculum system	Overly uniform teaching materials and limited pedagogical interaction	Develop specialized teaching materials for the Buddhist community and promote case-based instructional approaches
Integration and Innovation of the Curriculum System	Integration of traditional canonical studies with modern social-oriented courses	Insufficient faculty support and limited instructional hours	Advance modular curriculum reform to enhance flexibility and sustainability
Professionalization and Diversification of Faculty Structure	Combined teaching by monastic and lay instructors; strengthened training systems	Shortage of dual-competency faculty	Establish faculty certification systems and incentive mechanisms
Evaluation System Integrating Cultivation and Practice	Parallel emphasis on monastic cultivation and social service	Ambiguity in evaluation standards	Construct a quantitative indicator-based evaluation framework
International Exchange and Future Development	Learning from educational experiences in Japan, Thailand, and Sri Lanka	Limited channels for international cooperation	Establish an international cooperation alliance for Buddhist education

The proposed five-dimensional model demonstrates that the Sinicization-oriented reform of Han Buddhist education is not a single-dimensional policy adjustment, but rather a systematic institutional transformation involving governance structures, curriculum design, faculty development, evaluation mechanisms, and international engagement. These five dimensions are mutually reinforcing and together constitute a comprehensive framework for advancing the modernization, openness, and internationalization of Buddhist education in the new era.

The findings of this study reveal that the institutional framework of Buddhist education is undergoing a transformation from a traditional, scripture-centered instructional model toward a comprehensive model of talent cultivation. Political education and curricular integration are being progressively strengthened, initial progress has been made in the professional development of faculty, and social service and international cooperation have emerged as key directions for future development.

Comparative analysis of China and other countries indicates that the development of Buddhist education demonstrates three major trends.

First, institutional modernization has become a shared trajectory: Japan has achieved a high level of academic systematization, Thailand has established a nationally integrated educational network, and China is in the process of constructing religious academy standards with distinctive Chinese characteristics.

Second, the socialization of education is increasingly emphasized across countries, with Buddhist education reinforcing its social functions and cultivating religious professionals as active contributors to social development.

Third, cultural localization and internationalization proceed in parallel, suggesting that Buddhist education must

simultaneously preserve indigenous cultural traditions and actively participate in international academic exchange.

For Han Buddhism, further reform should be pursued in several key areas. First, it is necessary to construct a trinitarian talent cultivation system integrating national policy guidance, religious educational institutions, and social service engagement. Second, Buddhist academies should be encouraged to establish international cooperation mechanisms, facilitating the introduction of overseas Buddhist educational resources and promoting academic exchange and mutual visits. Third, curricular design should incorporate modules on international dissemination of Buddhism, cross-cultural communication, and comparative religious studies, thereby cultivating a new generation of monastic professionals equipped with global perspectives and intercultural competence.

## 7. Conclusion and Future Prospects

The talent cultivation system of Han Buddhism under the orientation of Sinicization represents the outcome of an interactive process between religious education and the modernization of national governance. A comparative examination of the educational systems of Japan, Thailand, and Sri Lanka demonstrates that the core of institutional innovation lies in maintaining a firm grounding in indigenous cultural traditions while simultaneously absorbing modern educational concepts and international experience.

Looking ahead, Han Buddhism should continue to advance reform efforts in the following key areas.

### 7.1 Advancing the Theoretical Articulation of Ideological and Political Education

It is essential to enhance the theoretical depth and academic articulation of ideological and political education, guiding religious practice through rigorous scholarly inquiry. Han Buddhist academies should strive to promote the theoretical transformation and conceptual elevation of ideological and political education, moving beyond simplistic policy dissemination or textual interpretation. Through systematic academic research, core socialist values, the spirit of the rule of law, and patriotic education should be organically and precisely integrated with Buddhism's doctrinal system, philosophical foundations, and value orientations.

For example, sustained scholarly efforts may elucidate the intrinsic compatibility and practical complementarity between "compassion and altruism" and "serving the people," between Humanistic Buddhism and the ideal of a harmonious society, and between monastic precepts and governing religion in accordance with the law. Such theoretical engagement can establish a solid intellectual foundation for political identification at the doctrinal level. The fundamental task is to overcome the existing disjunction between ideological and political curricula and the Buddhist context by fostering deep integration between ideological content and Buddhist doctrine. This requires the establishment of dedicated research initiatives that encourage collaboration between scholars and monastics, systematically interpreting the points of convergence between concepts such as core socialist values and modern national governance, and traditional Buddhist ideas including dependent origination, emptiness, compassion for sentient beings, and the sanctification of the land. The ultimate objective is not merely to teach courses, but to transmit principles, transforming external political requirements into internally comprehensible, acceptable, and practicable forms of religious consciousness and ethical guidance, thereby achieving an organic unity of political identification, cultural identification, and faith-based practice.

### 7.2 Improving Faculty Development and Evaluation Systems

Efforts should be intensified to refine faculty training and evaluation mechanisms, thereby cultivating a diversified structure of monastic professionals encompassing academic-oriented, service-oriented, and communication-oriented pathways. Particular emphasis should be placed on developing dual-competency faculty who possess expertise in both Buddhist studies and modern academic disciplines. The central task for the future is to move beyond the traditional, single-track model of scriptural instructors toward a clearly structured, multi-path system of talent cultivation. This transformation should be promoted through coordinated efforts at four levels: top-level design, training pathways, evaluation and incentive mechanisms, and sustainable development strategies.

### 7.3 Establishing Regional Alliances for Buddhist Education

The formation of regional Buddhist education alliances is crucial for advancing international dialogue and academic cooperation, accelerating the modernization and digitalization of Buddhist education, and creating mechanisms for inter-

institutional sharing of ideological and political educational resources. To overcome current constraints—such as institutional fragmentation, dispersed resources, and limited international engagement—it is imperative to promote alliance-building based on the principles of co-construction, resource sharing, and collaborative innovation. Such alliances should function as high-level platforms integrating coordination, resource integration, and innovation, achieving breakthroughs in international dialogue, modern transformation, ideological collaboration, and curricular innovation, and thereby enhancing the overall quality and influence of Buddhist education.

#### **7.4 Establishing an Evaluation System for Educational Outcomes**

A comprehensive evaluation system for Buddhist educational outcomes should be constructed to assess the effectiveness of Sinicization-oriented education through empirical data and representative cases. This system should combine scientific rigor with distinctively Buddhist characteristics, enabling multidimensional measurement of both the processes and outcomes of talent cultivation. Robust data and vivid case studies can provide a solid empirical foundation for policy formulation, institutional reform, and broader social recognition, while simultaneously encouraging deeper integration between academic research and practical application.

#### **7.5 Toward a Strategic Transformation of Talent Cultivation**

Through systematic institutional innovation and sustained international exchange, the talent cultivation system of Han Buddhism is undergoing a profound process of modern transformation. At its core, this transformation involves a strategic shift from a traditional model reliant on individualized and experience-based master–disciple transmission toward a standardized, systematized, and replicable institutional framework. This shift does not entail a negation of tradition; rather, it seeks—on the premise of full respect for fundamental Buddhist precepts and core doctrines—to introduce modern educational management concepts and methodologies in order to achieve the creative transformation and innovative development of Buddhist traditions. In doing so, Han Buddhist education can be revitalized and endowed with renewed vitality within contemporary society.

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# Practical Risks and Standardized Governance of Data Asset Capitalization for Construction Enterprises

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**Abstract:** Data asset capitalization for construction enterprises is a comprehensive systematic project involving the whole project lifecycle, multiple stakeholders, and cross-domain collaboration. The standardization of its operation is directly linked to the quality of financial accounting of construction enterprises, the effectiveness of investor decision-making, and the efficiency of industry supervision. Currently, this process is confronted with several prominent challenges: the absence of clear data ownership confirmation hinders the advancement of data capitalization in construction enterprises; inadequate adaptability of accounting methodologies triggers practical operational risks; lagging legal systems exacerbate potential compliance hazards in engineering data security; and the risk of earnings manipulation threatens the financial stability of construction projects. In light of these issues, this paper proposes that the whole-process risk prevention and standardized governance of data asset capitalization for construction enterprises can be achieved through three core approaches: formulating a full-lifecycle operational guideline for data asset capitalization, improving the legal framework for data assets in the construction industry, and establishing a robust supervision and disclosure mechanism for engineering data.

**Keywords:** Whole-process Management; Construction Enterprises; Data Asset Capitalization of Construction Enterprises; Engineering Financial Risks

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## 1. Introduction

Data asset capitalization for construction enterprises refers to the systematic presentation of data resources—legally controlled by construction enterprises during the engineering survey, design, construction, operation and maintenance phases, and capable of generating economic benefits—in financial statements in accordance with accounting standards. This practice provides a foundational basis for enterprise value evaluation, project decision-making, and industry supervision. With the deep integration of construction industrialization and digitalization, technologies such as Building Information Modeling (BIM), the Internet of Things (IoT), and big data have been extensively applied in the engineering and construction sector, generating massive volumes of engineering data resources. As a core production factor for construction enterprises, the capitalization of engineering data has emerged as a pivotal issue in the industry's transformation. It not only offers new pathways for cost control, schedule optimization, and quality traceability, but also poses profound challenges to the traditional accounting system<sup>[1]</sup>.

It is noteworthy that although China promulgated and implemented the Interim Provisions on Accounting Treatment Related

to Enterprise Data Resources (hereinafter referred to as the Interim Provisions) in August 2023, which clearly stipulates that enterprise data assets shall primarily comply with the standards for intangible assets and inventories as well as relevant disclosure requirements, the distinctive characteristics of construction industry data—such as strong scenario dependence, long lifecycle, and multi-stakeholder involvement—have led to numerous controversies in academia and practice regarding data ownership confirmation, valuation methodologies, and security compliance<sup>[2]</sup>. Moreover, existing research lacks risk pre-assessment and systematic solutions tailored to the construction context. From the perspective of whole-process management, this paper focuses on the practical risks of data asset capitalization for construction enterprises and explores safeguard paths that are compatible with industry-specific characteristics. Figure1: Comparing NBA achievements of Jordan and LeBron.

## 2. Practical Risks of Data Asset Capitalization for Construction Enterprises

### 2.1 Operational Impediment: Operational Risks Triggered by the Lack of Accounting Methodologies

The absence of targeted accounting methodologies impedes the process of data asset capitalization for construction enterprises and further induces operational risks in corporate accounting. The sources and formation mechanisms of such risks are mainly manifested in the following three aspects.

First, the inherent attributes of construction enterprise data assets lead to fragmentation in the accounting treatment paths, resulting in divergent outcomes and discrepancies in the valuation of data assets both within individual enterprises and across different enterprises<sup>[3]</sup>. According to the Interim Provisions, construction enterprise data assets can be classified as either intangible assets or inventories depending on specific application scenarios and practical needs. However, the Interim Provisions lack explicit stipulations on the timing and conditions for such classification, which creates substantial difficulties in practical operations. This ambiguity leaves excessive subjective judgment and discretionary space for construction enterprises and their accountants, thereby increasing the likelihood of measurement deviations in data asset valuation. For instance, an independently developed engineering quality traceability database by a construction enterprise meets the “identifiability” criterion for intangible assets, yet it also possesses the “salability” feature of inventories when used to provide operation and maintenance data services to project owners.<sup>[4]</sup> The absence of classification criteria tailored to the construction sector grants excessive discretionary power in accounting treatment, potentially leading to significant valuation differences for homogeneous data assets in the financial statements of different enterprises (e.g., Enterprise A classifies a BIM model as an intangible asset, while Enterprise B categorizes it as inventory), with self-evident adverse consequences.

Second, there is a lack of clear regulations or reference standards for valuation and asset recognition methodologies that align with the essential attributes of construction enterprise data assets. As a means of manifesting the value of data as a production factor, data asset capitalization should conform to the inherent nature, attributes, and characteristics of data. Nevertheless, current valuation methods for construction enterprise data assets in China still largely follow the logic and framework of the cost approach, income approach, and market approach, failing to break away from the path dependence of traditional measurement models<sup>[5]</sup>. Given the substantial differences between construction enterprise data assets and traditional resources in terms of resource reusability, physical form, and transaction methods, traditional valuation approaches exhibit two major limitations. On the one hand, the cost approach fails to account for implicit inputs. The value of a BIM model stems not only from the procurement cost of modeling software, but also from the accumulated experience of engineers and cross-departmental collaboration costs, which cannot be fully measured by the traditional cost approach. On the other hand, the income approach faces the problem of lifecycle mismatch<sup>[6]</sup>. The economic benefits generated by engineering data often span the entire project lifecycle (e.g., the value of operation and maintenance data may not materialize until 5–10 years after construction completion), which conflicts with the accounting periodicity assumption. Third, the market approach lacks reference standards: the construction data transaction market remains underdeveloped, with extremely few transaction cases for homogeneous data (e.g., metro construction monitoring data), making it difficult to infer value based on market prices.

Finally, procedural norms and supporting measures for data asset capitalization in construction enterprises are in urgent need of improvement. Under the framework of existing laws, regulations, accounting standards, and the Interim Provisions, the accounting subjects, basic standards, statement presentation rules, and information disclosure requirements for data asset capitalization have been basically clarified<sup>[7]</sup>. However, detailed rules are lacking for key links such as initial measurement

(e.g., value splitting of shared data between the government and construction enterprises in PPP projects), subsequent measurement (e.g., capitalization of update costs for operation and maintenance phase data), and disposal (e.g., accounting treatment of data archiving or destruction upon project completion). Meanwhile, the industry lacks essential infrastructure such as professional data valuation institutions and engineering data trading platforms, leaving accountants in construction enterprises at a loss when dealing with complex engineering data. Consequently, construction enterprises and their accounting personnel often face numerous obstacles in practical operations, with operational risks continuously accumulating and escalating.

## **2.2 Safeguard Lag: Data Security and Compliance Risks Arising from Outdated Legal Systems**

A prerequisite for the reasonable measurement of construction enterprise data assets is the establishment of sound and stable control over such assets by enterprises, i.e., placing data assets in a safe and compliant environment. From a micro perspective, the unstable measurement of construction enterprise data assets is likely to lead to disorderly competition in the construction data factor market. In particular, construction enterprises that take data assets as their core business may arbitrarily seize market share through algorithms, traffic advantages, and other means, thereby forming data monopolies. Subsequently, these enterprises may usurp the discourse power of market pricing based on their dominant market position and erode the interests of disadvantaged construction enterprises through price manipulation, exclusive transactions, and priced acquisitions. From a macro perspective, the reasonable measurement of construction enterprise data assets involves the issue of national asset preservation. Without legal safeguards for data security and compliance, there is a high risk of leakage or loss of construction enterprise data assets during cross-border flows, which would harm national economic interests and the fundamental interests of citizens, and even threaten national economic and social order. Therefore, corresponding risks must be taken seriously and effectively prevented<sup>[8]</sup>.

Nevertheless, data asset capitalization for construction enterprises is a complex and specialized comprehensive systematic project that requires long-term investment and dynamic management. Its implementation demands interdisciplinary knowledge and theories in construction engineering, accounting and finance, law, and science and technology, resulting in significant complexity and particularity. Coupled with the considerable flexibility inherent in the Interim Provisions, academia and practice have diverged sharply on the presentation of construction enterprise data assets in balance sheets. It can be said that the Interim Provisions have played a “pioneering signal” role in promoting data asset capitalization for construction enterprises. However, specific practical approaches, methodological applications, and implementation paths for accurately expressing construction enterprise data assets through accounting language still require further exploration by enterprises and the market. Given the lack of precedent for data asset capitalization in the construction sector domestically and the absence of mature international solutions for reference, relevant legal provisions can only provide principled guidance at the macro level for the time being, with gradual refinement to follow as practical experience and case studies accumulate. The lag in the legal system has hindered the resolution of practical problems, prompting accountants and researchers to raise critical questions: Is it objectively scientific to classify construction enterprise data assets as either intangible assets or inventories? If such classification is feasible, what criteria should be used to distinguish between the two categories?

## **2.3 Terminal Concern: Accumulation of Earnings Manipulation Risks Threatening the Financial Security of Construction Enterprises**

It is a natural motivation and inherent pursuit of construction enterprises, driven by profit maximization, to optimize their financial statements to present a more favorable “data profile” for investors’ scrutiny. The complexity, opacity, and non-exclusivity of construction enterprise data assets have provided ample room for earnings manipulation, while also creating significant pressure and obstacles for audit and regulatory authorities<sup>[9]</sup>. An analysis of the methods employed by construction enterprises to manipulate earnings through data assets reveals diverse and sophisticated tactics. However, their essence lies in the deliberate introduction of biases in the value recognition of data assets, thereby inducing misjudgments among financial statement readers regarding the true value of enterprise data assets. The practical harms of earnings manipulation through data assets by construction enterprises are mainly reflected in two aspects. On the one hand, excessive flexibility in price adjustment disrupts risk management and business decision-making for market participants. When data is transacted as an

asset, due to the lack of reliable and sufficient pricing cases and benchmark data, the transferors of construction enterprise data assets generally tend to set transfer prices significantly higher than the actual value of the data, resulting in inflated data asset prices. This exposes transferees to increased asset risks and hidden dangers in economic activities such as value investment, asset-backed financing, foreign debt repayment, collateralized mortgage, and listing and mergers and acquisitions. On the other hand, excessive flexibility in price adjustment enables construction enterprises to use data assets as a tool for earnings management, achieving management objectives such as labor cost control and performance reward limitation through amortization and impairment adjustments of data assets. It is worth noting that when construction enterprise data assets are capitalized as intangible assets, their valuation remains relatively stable. In contrast, when classified as inventories, there is considerable room for adjustment in subsequent impairment testing and other processes, leading to highly uncertain outcomes.

In summary, the inherent uncertainty of data asset capitalization for construction enterprises has created a crisis and challenge to the accuracy and impartiality of earnings value assessment. Without systematic methods and standards based on the specific characteristics of construction enterprise data assets and supported by clear ownership confirmation, data asset capitalization will become a breeding ground for earnings manipulation risks, which will continue to accumulate until they threaten the financial security of construction enterprises.

### **3. Standardized Governance of Risks in Data Asset Capitalization for Construction Enterprises**

#### **3.1 Methodological Improvement: Formulating a Full-lifecycle Operational Guideline for Data Asset Capitalization**

First, establish and improve the organizational framework for data asset management and risk control in construction enterprises. It is recommended to adopt a flat, cross-departmental, and project-based parallel organizational structure, with functional units covering strategic management, organizational coordination, asset operation, detailed execution, and risk control<sup>[10]</sup>. Among these, the strategic management unit is primarily responsible for deliberating on key decisions related to data asset management; the organizational coordination unit oversees the coordination of inter-departmental work during data asset mobilization and operation; the asset operation unit formulates operational strategies based on the lifecycle stages of data assets, while the detailed execution unit is responsible for the ultimate implementation of these strategies; and the risk control unit serves as the “ballast” for the entire data asset management process.

Second, build and cultivate a high-caliber professional team for data asset management in construction enterprises. It is essential to ensure that team members possess comprehensive interdisciplinary professional skills and knowledge in data technology, data law, and data finance<sup>[11]</sup>. They should be capable of understanding data products and services, while also mastering professional technologies for data quality identification and testing, data standard formulation and improvement, and data regulation interpretation and application. This will ensure the professionalism, scientificity, and accuracy of the data asset capitalization process.

Finally, formulate and implement refined internal management systems for data assets in construction enterprises. A hierarchical, classified, and graded management system can be established following the framework of “general principles—management measures—detailed rules”. The general principles section should clarify the subjects, powers, responsibilities, and objectives of data asset management; the management measures section should stipulate the processes, standards, and norms for data asset management; and the detailed rules section should further specify the requirements for each link of practical operations under the framework of management measures and provide standardized template tools.

#### **3.2 Legal Safeguard: Improving the Supporting Legal System for Construction Enterprise Data Assets**

First, the state and local governments should improve the legal system for the security of construction enterprise data assets. The protection of construction enterprise data assets is a systematic project integrating technical governance and legal governance, which requires the provision of legal system supply and improvement<sup>[12]</sup>. Efforts should be made to encourage the development and innovation of technologies and application tools for data asset management in construction enterprises.

For example, national or local laws and regulations on the promotion of scientific and technological progress can be leveraged to provide policy, funding, technical, and service support for encryption technologies such as data encryption keys, data desensitization, and privacy-preserving computation, as well as security protection technologies including software and hardware security shields, emergency data destruction, and post-disaster rapid recovery systems.

Second, the state and local governments should ensure adequate legal supply for fair competition in the construction enterprise data asset market. During the circulation and utilization of construction enterprise data assets, issues related to anti-monopoly and anti-unfair competition are likely to arise.<sup>[13]</sup> Therefore, relevant legal provisions should be updated in a timely manner to include clauses protecting the competitive order of construction enterprise data assets, so as to regulate monopolistic practices, predatory behavior, and collusion in the data asset market, thereby safeguarding consumer rights and national public interests.

Finally, the state and local governments should implement legal safeguards for the rights and interests of construction enterprise data assets. In the process of managing data assets, construction enterprises inevitably involve the processing of personal data and public data. When collecting and processing personal data, enterprises should be urged to adhere to the principle of informed consent, and use and process data in accordance with explicitly stated purposes and conditions to avoid excessive data usage. When collecting and processing public data, enterprises should be required to strictly comply with national regulations on declaration and approval procedures<sup>[14]</sup>. In summary, the state and local governments should balance the development and regulation of construction enterprise data assets, properly coordinate the relationship between data security, personal data protection, and public data development, and promote the capitalization of construction enterprise data assets in accordance with laws and regulations.

### **3.3 Collaborative Governance: Improving the Supervision and Disclosure System for Construction Enterprise Data Assets**

First, construction enterprises should promptly disclose abnormal, special, or concentrated issues arising in the practical operation of data asset capitalization, and provide sufficient and necessary explanations to form a multi-level, high-density repository of practical cases<sup>[15]</sup>. For example, clear guidelines and publicly available typical cases should be provided regarding the criteria and methods for classifying data assets as either inventories or intangible assets. Based on the actual characteristics of different data assets, explicit standards should be formulated to determine whether the costs incurred in acquiring and maintaining data assets should be expensed or capitalized, which should be promptly publicized and disclosed. This will enable all market participants to timely grasp the changes in the value of construction enterprise data assets based on the disclosed information.

Second, construction enterprises should focus on conducting detailed special disclosure of the accounting treatment and statement presentation of data assets. In particular, specific details such as the impairment and amortization periods and methods of data assets should be disclosed as comprehensively and specifically as possible, so as to avoid sudden, large-scale, and catastrophic asset impairment caused by earnings manipulation. Although the Interim Provisions have made stipulations on the disclosure of data assets, this disclosure adopts a “mandatory + voluntary” model, which leaves certain flexibility and regulatory gaps. The original intention of this model is to ensure basic disclosure requirements while encouraging enterprises to proactively practice data altruism by disclosing more financial information. However, this voluntary disclosure mechanism often lacks long-term motivation and sustainability, thus failing to achieve its intended purpose and becoming a non-binding initiative. Efforts should be made to minimize such non-binding clauses.

Finally, construction enterprises should establish sound internal review and management mechanisms, adhere to the bottom line of legal compliance and ethical standards for data utilization, and gradually build a system for maintaining the legal, compliant, and sustainable value creation of digital resources. Based on internal corporate governance, enterprises should take the initiative to avoid litigation risks arising from data ownership disputes and data circulation and utilization. In addition, enterprises should consider the information needs of stakeholders regarding data assets and disclose financial and operational information as comprehensively as possible in their corporate reports.

## Conclusion

This study explores the practical risks and standardized governance of data asset capitalization for construction enterprises from a whole-process management perspective. As a core practice for the construction industry's digital transformation, data asset capitalization poses challenges to the existing accounting, legal, and regulatory systems. It is plagued by interrelated risks—operational risks from inadequate accounting methodologies, security compliance risks due to outdated laws, and earnings manipulation risks threatening financial stability—rooted in construction data's uniqueness and the lag between institutional supply and practical needs. To mitigate these risks, this paper proposes a three-dimensional governance system: formulating full-lifecycle operational guidelines to make up for accounting deficiencies, improving the legal framework to ensure institutional guarantees, and optimizing supervision-disclosure mechanisms to curb earnings manipulation. This integrated closed-loop system is practically significant for advancing standardized data asset capitalization and the industry's digital transformation. This study has limitations. It adopts normative analysis due to the underdeveloped construction data market and insufficient empirical data, with untested governance effectiveness. Additionally, it lacks in-depth exploration of differentiated risks across construction sub-sectors. Future research may verify governance paths via typical enterprise cases, explore sub-sector differentiated strategies, and focus on cross-border data flow. It is expected to enhance the standardization of data asset capitalization and boost the construction industry's high-quality development.

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## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# The Struggle to Defend Subjectivity: The Turn in the Subject Paradigm within Popular Culture Theory in the Post-Hall Era

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**Abstract:** In the theoretical context of the post-Hall era, the core challenge facing popular culture studies lies in understanding the modes of existence of the subject within increasingly fragmented and technologically mediated cultural practices, following the suspension of the ontological connection between the symbolic and the real. While Hall's "Gramscian turn" successfully established the image of an actively decoding public, it also rendered the philosophical grounding and political efficacy of subjectivity uncertain by transforming the ontological question into a terrain of struggle. After Hall, theorists such as Lauren Berlant, Henry Jenkins, and Rosi Braidotti, through concepts like affective attachment, participatory culture, and nomadic becoming, collectively advanced the shift in the subject paradigm from a stable, bounded entity toward an immanent, relational, and dynamic process of becoming. The philosophical foundation of this series of theoretical transformations can be summarized as a "generative movement", wherein the identity of the subject no longer stems from a priori essence but resides within the dynamic trajectories formed by cultural practices and affective attunements. This paradigm renews the approach to defending subjectivity by redefining reflection and critique as differential practices internal to the generative process, thereby offering new theoretical pathways for conceptualizing resistance and openness under conditions of flux.

**Keywords:** Post-Hall Era; Subject Paradigm; Generative Movement; Popular Culture Theory

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## 1. Introduction

Following his "Gramscian turn", Stuart Hall successfully repositioned the "active populace" within the dynamic contested field of cultural hegemony. In the intellectual landscape Hall delineated by drawing on Gramsci's ideas, the masses were no longer passive bearers of ideology but rather "active subjects" capable of participating in the struggle over meaning through decoding practices. However, a deeper ontological dilemma lies concealed beneath the apparent agency of the popular culture subject: to overcome the constraints of structuralism, Hall strategically suspended the question of the ontological connection between the symbolic order and material reality, transforming the ontological "slippage" between the two into the very space for hegemonic contestation. This crucial theoretical move, while granting agency to the masses, also rendered the philosophical foundations of popular subjectivity questionable—if there is no stable correspondence between symbolic practices and social reality, how can the efficacy and authenticity of popular cultural resistance be measured? This uncertainty of subjectivity became the core dilemma that cultural theorists after Hall had to confront directly.

Entering the so-called “Post-Hall era”, the real-world context of popular cultural practices has undergone radical and profound transformations. The further unfolding of the issue of modernity has utterly dismantled any possible path toward a unified and stable subject; the rise of identity politics has rendered subject positions increasingly fragmented and complex; whilst the revolutionary development of digital technology has redefined the forms of cultural production, dissemination, and consumption, leaving even classical concepts such as “the masses” or “the audience” themselves appearing precarious. Against this backdrop, the theoretical project of reconstructing subjectivity in popular culture has grown ever more intricate. The theoretical task we now face is no longer simply to debate whether the masses are active or passive, but rather to engage in a deeper interrogation of the very concept of the “subject” itself.

## 2. Hall’s Legacy and the “Suspended” Ontology: Achievements and Boundaries of the Old Paradigm

As a leading figure of the Birmingham School, Stuart Hall established an active popular subjectivity through the “Gramscian turn” he initiated within cultural studies. Before Hall, the Birmingham School was embroiled in the debate between culturalist and structuralist paradigms: culturalism, championing the banner of “lived experience”, viewed the masses as active creators of culture, yet risked lapsing into empiricism and a romanticized conception of the subject; structuralism, particularly the Althusserian school, aimed to reveal the powerful structural mechanisms whereby Ideological State Apparatuses and symbolic orders “interpellate” and constitute the subject behind cultural phenomena, but its theoretical cost was reducing the masses to passive bearers of structure, ultimately dissolving subjectivity.<sup>[1]</sup> Hall acutely recognized that these two paradigms shared a simplistic model of understanding culture—that cultural practice manifests in only a single form. In other words, for culturalists, culture spontaneously emerges from the lived experience of the masses at the base; for structuralists, culture is coercively imposed from pre-existing, transcendental structures at the apex. This constituted a misconception of understanding culture in a monolithic way. By turning to Antonio Gramsci’s theory of cultural hegemony—wherein hegemony is not simple domination or deception, but a dynamic, continuous process of contestation, a struggle through which ruling groups maintain their leadership by winning the “active consent” of the ruled groups<sup>[2]</sup>—Hall argued that culture is no longer merely the expression of a “whole way of life,” nor a pure ideological trap, but a crucial “terrain of struggle,” a contested arena where various social forces negotiate, compromise, and resist over meaning.<sup>[3]</sup>

Within this framework, Hall successfully reshaped the image of the “active masses”. The masses were repositioned as participants in hegemony, their subjectivity manifested in the active decoding practices applied to cultural products. Hall’s renowned “encoding/decoding” model represents the concretisation of this theoretical conception. Television institutions (encoders) weave ideological content into symbolic products, attempting to predetermine the flow of meaning. However, the audience (decoders) are not docile receiving terminals; they can adopt “dominant-hegemonic,” “negotiated,” or “oppositional” decoding positions.<sup>[4]</sup> This signifies that the masses are fully capable of interpreting dominant ideologies, even engaging in subversive “misreading” or direct resistance, within the framework of their own class positions and lived experiences. Here, Hall effectively accomplished another turn in the cultural paradigm: transforming the generation of cultural meaning from a unidirectional process of inculcation and reception into a potentially dialogic relationship, albeit one permeated by actual inequalities of power and status. Consequently, Hall’s “active masses” attained an unprecedented dignity of subjectivity: their “activity” was not a naïve autonomy, but a practical capacity for tactical manoeuvring and struggle over meaning within the tight encirclement of hegemonic structures. This subjectivity is deeply rooted in specific social relations and historical contexts, simultaneously constrained by structure yet constantly seeking possibilities to break through it. By anchoring the question of subjectivity in concrete historical and cultural struggles rather than abstract philosophical speculation, Hall infused Cultural Studies with enduring political vitality and critical incisiveness.

However, this very solution proactively delineated its own insurmountable theoretical boundary: the “suspended” ontological problem. Hall’s theory is, in essence, a form of “strategic avoidance”. By focusing his analysis entirely within the internal contested field of cultural hegemony, he skilfully circumvented a more fundamental ontological dilemma: the reliability and reality of the connection between the symbolic order and the “real” social reality to which it purports to refer. Structuralism, particularly its radical subsequent developments, had profoundly revealed this issue—that there is no necessary, fixed link

between signifier and signified, and that meaning arises from the play of differences within the symbolic system. Hall was deeply aware of the crisis of representation brought about by this “slippage”; in his critique of structuralism, he had already pointed out that a “sliding” of meaning exists between symbolic forms and the “real social relations and structures” to which they refer.<sup>[1]</sup> However, in constructing his theory of hegemony, Hall did not attempt to suture or resolve this “sliding”. On the contrary, he directly transformed this ontological fissure into the very field of political struggle itself. That is to say, for Hall, the connection between sign and reality appears “natural” and “fixed” not because it is inherently true, but as a result of hegemonic operations. It is the outcome of specific social forces, through ongoing cultural struggle, temporarily “articulating” a particular signifier with a particular signified. The “fixing” of meaning is temporary and precarious, beneath which there always surges undetermined, contestable potential.

While this theoretical approach undoubtedly allows cultural studies to focus on analyzing the micro-mechanisms of power and resistance, it simultaneously leaves a crucial philosophical suspension: we still lack a reliable ultimate criterion to determine whether a decoding practice or resistance action truly touches and alters the “real” social reality it intends to affect. Furthermore, the decoding agency Hall ascribes to the masses may merely be an “internal circulation” within the symbolic order chain, and the resistance of the masses may also be merely a “ritualistic resistance” within the symbolic system, rather than affecting the system itself. Therefore, while Hall’s model of subjectivity successfully responds to the passivity of subjects brought about by their passive obedience to structures as proposed by structuralism, it seems to fail to thoroughly address the second, more subtle level of subjectivity passivity in terms of ontology. He turns the ontological question into a stage for struggle full of political hope, but does not provide actors with a coordinate for judging whether their actions truly touch the truth. The positivity of the subject is thus shrouded in a doubtful glow—it is real and powerful, but its ultimate political efficacy and ontological foundation are strategically left in the shadowy realm of theory by Hall.

It is precisely this suspended ontological question, along with the deep anxiety it engenders regarding the authenticity and reliability of active subjects, that constitutes the theoretical starting point that thinkers in the post-Hall era must confront and attempt to answer. They are no longer content with engaging in theoretical and ideological battles within the arena Hall pioneered, but rather further question whether the mode of existence of subjectivity itself has undergone fundamental changes in the contemporary context of a high degree of implosion between symbols and reality, capital and life, technology and the body.

### **3. Continuation and Breakthrough: The Evolution of Subjectivity Theory in Post-Hall Thought**

Following Stuart Hall, theorists such as Lauren Berlant, Henry Jenkins, and Rosi Braidotti have conducted profound theoretical explorations on the question of subjectivity, effectively advancing a paradigm shift in the conception of the subject within popular culture studies. This section will centre on the theories of subjectivity proposed by these thinkers and trace the intellectual pathways of their respective approaches to the problem of mass subjectivity.

#### **3.1 Lauren Berlant: The Affective Subject and the Movement of Impasse**

Within the theoretical landscape of cultural studies in the post-Hall era, Lauren Berlant’s concept of cruel optimism can be understood as a profound response to and reconfiguration of the Hallian model of the subject. Addressing the question of subjectivity, Berlant shifts the analytical gaze towards microscopic, affective existential “gestures” and “attachments”. In her view, the subject does not exist primarily as a political or class warrior, but rather as an “affective being” structured by the fantasy of the good life, perpetually struggling amidst its broken promises.<sup>[5]</sup> The objects of such attachment are precisely those normative promises that constitute the “good life” fantasy—such as stable employment, romantic intimacy, familial security, state protection, or upward social mobility. The formation of subjectivity occurs, first and foremost, within this deep affective investment in and maintenance of the fantasy, rather than within a clear antagonistic act of decoding. Thus, this affective investment itself constitutes a fundamental, “internal” relationship between the subject and its conditions of existence. Here, Berlant’s crucial transformation of the subject category signals a significant theoretical displacement: the core of the subjectivity question shifts from how the subject resists external hegemony to how the subject organizes its desires, emotions, and daily practices within a structural fantasy that impedes its flourishing. This is no longer the “active

decoding” of a text in Hall’s sense, but rather a form of “active sustenance” within the gravitational field of the fantasy, simultaneously drawn to and wounded by it.

Berlant refers to this state of stalemate, where the subject is caught in a dilemma between its illusory object, unable to move forward or completely abandon it, as “impass”. This is not only the field of the subject’s activity but also ontologically rewrites the understanding of the subject as a substance. Specifically, this concept reflects on the question of what it feels like to be in the middle of a shift (Berlant, 2011)<sup>[6]</sup>. Within the impasse, the subject does not advance towards a liberatory future, but rather cycles and wanders within an ongoing present, navigating crises and preventing the fantasy from complete collapse through a series of repetitive, often exhausting practices. Steve Marotta (2023) suggests that Berlant’s impasse refers to an affective field or environment, i.e., “The impasse is an affect world, an atmospheric attunement to structural transformation in which crisis is normalised and people become at once hyperaware of potential threats and exhausted by the constant management required to fend those threats off.”<sup>[7]</sup> In other words, the impasse denotes a processual terrain where individuals, while being acutely aware of crises, find themselves recurrently enmeshed within them, ultimately constituting a complete, dynamic mode of existence. It is crucial to note that this theoretical interpretation of the subjective condition as a mode of existence is of paramount importance. It supplants resistance as the primary expression of subjective agency. Subjects navigate their structural predicaments through quotidian, dynamic states—such as persistent job hunting, maintaining a painful relationship, consuming goods that promise happiness, or participating in formulaic political expressions. These gestures are active, even energetic, yet their aim is not necessarily to break through the structure, but often to recalibrate their relationship to the structure in order to endure within it.

In summary, although Lauren Berlant does not engage in direct theoretical debate with Hall over the concept of subjectivity, she effectively reconfigures the very coordinates for understanding it. Through her elaboration of concepts such as cruel optimism and impasse, she thereby relocates the conceptual anchor of subjectivity from the “audience” in Hall’s model—a relatively distinct entity possessing a degree of externality and engaged in symbolic struggle with hegemonic structures—towards an affective-dynamic being deeply embedded within power fantasies and emotional structures, self-sustaining through daily gestures and survival management, wherein agency is inextricably intertwined with suffering. From Berlant’s perspective, the subject is no longer a stable entity preceding cultural practice, but rather a process of becoming, perpetually shaped and reshaped within the ongoing tension between attachment and disappointment, fantasy and crisis, emotional investment and existential depletion. The activity of the masses is manifested not primarily in oppositional readings of cultural industry products, but in the tenacious and painful maintenance of life fantasies that ultimately impede their own flourishing. This very act of maintenance constitutes the core practical arena of contemporary subjectivity.

### 3.2 Henry Jenkins: The “Poaching” Subject and the Network of Production

In contrast to Lauren Berlant, Henry Jenkins’s research delineates a more affirmative and agentic picture of popular cultural practice. Jenkins’s theory, particularly his early work on fan cultures, is often viewed as an optimistic extension and empirical validation of Hall’s concept of the active audience. However, a deeper engagement with his theoretical framework reveals that the configurations of subjectivity outlined by Jenkins equally reflect the complex shift in the subject paradigm characteristic of the post-Hall era—namely, a transition from a relatively clear resistance/incorporation binary and a subjectivity framed by struggle towards a “networked participatory subject” who engages creatively within the cultural industries, continuously reconstructing both individual and collective identity in the process.

Jenkins’s theory maintains a relationship of both inheritance and transcendence with the Hall’s encoding/decoding model. In his seminal work, *Textual Poachers: Television Fans and Participatory Culture*, Jenkins, drawing on de Certeau’s metaphor of “poaching”, describes media audiences, particularly fans, as active “nomads” who “poach” upon the symbolic territory provided by the cultural industries, appropriating materials meaningful to them and subsequently creating their own culture (Jenkins, 2012)<sup>[8]</sup>. This assertion undoubtedly resonates strongly with Hall’s propositions regarding negotiated and oppositional decoding. However, Jenkins’s unique contribution lies in his shift of analytical focus from momentary, individualized strategies of “meaning interpretation” to sustained, collective practices of cultural production. Fans are no longer merely “decoders” of meaning, but become “producers” of new texts, new communities, and even new cultural forms.

They write fan fiction, produce fan videos, establish online communities, and organize offline events—all these practices constitute a vibrant participatory culture that exists in parallel to official commercial culture. Regarding this, Jenkins (2008) further notes: “And in the process, the focus on individual consumers is giving way to a new emphasis on the social networks through which production and consumption occur.”<sup>[9]</sup> Within this framework, the formation of subjectivity is discussed within the context of social networks, becoming markedly externalized and embodied through collective, visible creative labour and social interaction. Consequently, the subjectivity of the masses becomes a practical identity that is generated and affirmed through acts of “participation”.

Although, on the level of theoretical inclination, Jenkins shares Stuart Hall’s commitment to upholding the activity and agency of the subject, his shift in focus from reading to production effectively accomplishes a displacement of the theoretical foundation of subjectivity theory. The core of Hall’s subjectivity lies in the politics of meaning—that is, the struggle over the power to interpret symbolic significance. Jenkins, conversely, turns towards the politics of participation—the fight for the right and capacity for cultural creation and dissemination. This shift signifies that the agency of subjectivity is no longer primarily manifested as a posture of resistance to dominant ideology displayed by the masses within the realm of cultural consumption. Instead, it is realised through active involvement in content creation and community building, where individuals act as producers or co-producers of cultural content and meaning. Jenkins’s detailed analyses of cases such as Star Trek fan culture and audience interactions with reality television vividly demonstrate how ordinary people utilise accessible media technologies to transform acts of consumption into a form of creative, socially-embedded self-expression.

Of course, Jenkins’s strong endorsement of popular subjectivity is not without its theoretical vulnerabilities. For instance, Mark Andrejevic has questioned Jenkins’s concept of “activity”, stating: “Although Jenkins once noted that fandom proves ‘not all audiences are passive,’ the advent of interactive media highlights what has been true all along: that all audiences are active, although perhaps not in the progressive sense the term has come to imply.”<sup>[10]</sup> However, when considered from the perspective of Jenkins’s own understanding of subjectivity, this theoretical predicament further illuminates the condition of the modern subject within the realm of popular culture: the subject is no longer merely a passive recipient or an active negotiator of meaning, but a participant deeply embedded in the cycles of cultural production, wherein agency and subordination, creativity and potential for exploitation, are intricately intertwined within the context of new media technologies. This paradigm of subjectivity differs both from the relatively clear-cut “combatant” opposing hegemonic structures in Hall’s model, and from the isolated individual “mired” in affective fantasies described by Berlant. It manifests as a “generative node” that constantly adjusts itself within networked participation, embodying both cooperation and resistance.

### 3.3 Rosi Braidotti: The “Nomadic” Subject and the “Affective Flow”

Compared to Lauren Berlant and Henry Jenkins, Rosi Braidotti’s perspective on subjectivity is more radical and bears a stronger intellectual imprint of post-Hall era subjectivity theory. Deeply rooted in Spinozist ethics, Deleuze and Guattari’s philosophy of “becoming”, feminist theory, and post-structuralism, Braidotti proposes a “subject-in-becoming” that fundamentally transcends anthropocentrism, individualism, and fixed identity. The “subject-in-becoming” is no longer content with merely repairing the existing humanist model of the subject; instead, it aims to thoroughly dismantle that model and conceive of subjectivity as a dynamic, relational, and non-unified process. In Braidotti’s view, the concept of the subject debated in the Hall era remained largely a humanist subject—presupposed by the Western philosophical tradition, possessing rational consciousness and relatively stable boundaries—even if this subject was interpellated by ideology or constructed by culture. Her theoretical aim is precisely to move beyond this framework.

At the core of Braidotti’s theory of subjectivity lies the concept of becoming. She argues that life does not develop toward a predetermined, singular rational goal, but unfolds as a multiplicity of processes of “becoming”—a non-teleological, creative force that continually exceeds established forms (Braidotti, 2006)<sup>[11]</sup>. From this, Braidotti advances the notion of the subject-as-becoming. The essential characteristic of this becoming-subjectivity is its nomadic nature: “nomadism” does not refer to physical migration, but to an existential and intellectual stance of refusing to be bound by fixed identities, territories, or norms<sup>[12]</sup>. Nomadic subjectivity emphasises fluidity, change, and transgression. It always operates in-between, traversing the junctions between different social symbolic systems, bodily sensations, and geographical spaces, thereby constantly

detritorialising and reterritorialising its own constitution. For studies of popular culture, this means that the subjectivity of the masses can no longer be simplistically reduced to a static “identity” based on class, gender, or race. Instead, it should be seen as a series of fluid and transformative processes of becoming, enacted through the complex practices of consuming, imitating, parodying, and reconfiguring cultural signs.

To render possible a non-unified, relational subject, Braidotti creatively revitalises Spinoza’s concept of *affectus*, linking it to *conatus*—the fundamental tendency of every being to persist in its existence and enhance its capacity to act (Braidotti, 2019) <sup>[13]</sup>. In her view, subjectivity is essentially an “affective flow,” a product of the various relations—which enhance or diminish the power of living—that arise from encounters between bodies, and between bodies and the world. Consequently, the real force of popular culture lies not only in its ideological content, but also in its capacity to function as an “affective machinery”: it directly mobilises, shapes, and channels the affective flows of bodies, thereby participating in the production of subjectivity at a subconscious, pre-personal level. The rhythm of a short video, the interactive feedback of a video game, the collective atmosphere of a concert—their political and ethical significance extends far beyond what “decoding” can exhaust; rather, they perform an “affective modulation” that acts directly upon the very life of the masses.

Judging from the conceptions of mass cultural subjectivity articulated by these three pivotal thinkers, the very category of the subject has undeniably undergone a transformation relative to Stuart Hall’s more substantive concept of the audience. This shift, on one hand, has advanced the trajectory of subjectivity within cultural studies, and on the other hand, illustrates that in contemporary cultural practice, the concept of the subject can no longer be adequately captured by traditional binary frameworks, urgently necessitating theoretical pathways for a breakthrough.

#### **4. From “Substance” to “Becoming”: The Subject Paradigm in the Post-Hall Era**

A coherent theoretical trajectory emerges from a synthesis of these three perspectives: the paradigm of subjectivity within popular culture studies is undergoing a profound shift from a “substance” possessing relatively stable boundaries and clear social positions towards a “process” or “relational effect” that is perpetually generated within specific networks of power, technology, or affect. The subject no longer exists prior to practice but is provisionally constituted within practice, through relations, and influx. Berlant’s “affective being”, Jenkins’s “networked participant”, and Braidotti’s “assemblage-in-becoming”, despite their distinct emphases, collectively foreground the core characteristics of subjectivity as immanence, relationality, and generativity. They no longer seek a pure point of resistance external to structures of power and culture. Instead, they commit to analyzing how subjectivity is shaped within these very structures and how it utilizes the resources of the structures themselves to manifest potential for creation, negotiation, and even escape.

Indeed, although the three thinkers differ markedly in their specific approaches to and methods of situating subjectivity, they broadly share a similar theoretical model: abandoning the Hallian orientation towards a substantialist subject in favour of a more open, dynamic, and active conception. However, this shift inherently dissolves the foundational ground of identity required for the subject to stand as a subject into the very interior of the dynamic concept of subjectivity. Consequently, in order to preserve the relative stability of the subject as subject, its identity is reconceptualised as a self-referential movement of the concept itself. More specifically, this identity is no longer a transcendental, solidified essence or core, but rather the very movement of differentiation that unfolds continuously in time—a dynamic process that maintains its recognisability through constant “repetition” and “iteration”. Its stability derives precisely from the internal rhythm and provisional equilibrium of this movement, not from any static substance.

The philosophical underpinnings of this theoretical approach can be traced back to the famous Hegelian proposition, “the substance is subject”, thoroughly rewritten through post-structuralist and postmodern thought. Hegel’s “Concept” is not a static, abstract category, but a process of movement that continually externalises, enriches, and returns to itself through the negation of the negation. The truth of the subject resides precisely in this activity of self-mediation and self-differentiation. While thinkers of the post-Hall era reject Hegel’s teleology of Absolute Spirit, they surreptitiously inherit this dialectical mode of thought that understands identity as a “process” rather than a “thing”. Of course, their intellectual inclination to replace dialectical sublation and synthesis with difference, rupture, and nomadism is also, to some degree, influenced by Gilles Deleuze’s philosophy of difference. In any case, it is clear that post-Hall era thinkers have broken with the grand

narrative of Hegelian dialectics. They resolutely reject the overarching teleological tendency and closed totality that enveloped his system. Yet, at the more implicit level of philosophical methodology, they find it difficult to relinquish and, in fact, have inherited a profound Hegelian insight: namely, a suspicion towards any solidified, given “thing”, and a preference for dialectical thinking that understands identity and essence as a “process” or “activity”. Thus, the philosophical foundation of the post-Hall subject paradigm comes into clear focus: it inherits the Hegelian form of conceiving subjectivity as a dynamic process, while thoroughly displacing its content. Identity is no longer a spiral-ascending synthesis achieved through the negation of the negation, but a provisional dynamic effect—a dynamic movement that becomes, in essence, the new subject-category itself.

Applying this philosophical lens to the theories of subjectivity examined in the three thinkers discussed above reveals how the “generative movement of the subject-concept” unfolds in concrete and nuanced ways. In Lauren Berlant’s theory, the identity of the subject—that “I” which feels attachment, becomes mired in impasse, and strives to survive—is not grounded in a stable, transcendently identical self-consciousness. Instead, it unfolds and returns to itself as a persistent movement of “affective attunement” within the field of the impasse. This movement of identity is inward-folding: it produces a narrative coherence about one’s own suffering and perseverance, a continuous self-recognition of “this is how I live”. As a form of persistent self-knowing, the movement of subjectivity in this dimension must inevitably evolve as this knowing changes and deepens. Consequently, Berlant intrinsically links the subject to the affective process—the very truth and stability of self-knowledge stem precisely from the ongoing process of affective attunement. Should this attachment rupture completely or this attuning activity cease, the sense of subjective identity founded upon it also faces dissolution. The “impasse” Berlant describes is precisely a state where the movement of identity becomes caught in a fixed rhythm, struggling to generate transformative difference.

Henry Jenkins’ research on fan culture reveals another possible form of the generative movement of the subject—an outward, expansive one. Here, the subject’s self-perception and self-identity—the fan’s “self”—becomes externally yet directly bound to the cultural objects and products they are passionate about, as well as to the participatory communities they inhabit. In his theory of the subject, identity does not manifest as a static cultural label, such as “I am a fan of a certain celebrity”. Instead, it is activated and substantiated through a series of continuous, creative cultural praxis: persistently tracking series information, participating in forum discussions, creating fan works, attending fan gatherings. Each new act of participation and creation is another instantiation of the “fan” identity; every generative activity subtly re-fills and refines the subject’s identity. Therefore, this movement of identity is networked and distributed, relying on the ongoing generation of meaning and the behavioral connections between the individual and the text, and between the individual and the community. Once detached from cultural praxis and community connections, the subject’s identity atrophies or transforms.

Rosi Braidotti’s subject-in-becoming pushes the model of the subject’s generative movement to its most complete and radical form. She explicitly rejects any model of fixed identity, positing that subjectivity is “becoming” itself—a perpetual movement towards the other. Here, identity is thoroughly equated with the process of differentiation. The self-identity of the subject lies not in maintaining sameness with itself, but in its uniqueness as a “force”, in its specific mode of traversing and connecting heterogeneous elements to perpetually create novelty. Inheriting Deleuze’s concept of the nomadic subject, Braidotti embodies the particularity and revolutionary potential of the subject’s movement as a distinctive style of movement. This is an identity without fixed coordinates, comprised only of vectors and intensities. Its self-knowledge and self-identification stem from the tangible experience of life’s power increasing and bursting forth within the process of becoming, not from conformity to any image or identity.

In summary, the identity within the post-Hall subject paradigm can be broadly characterised as a practical and generative model of movement: through participating in culture, managing affect, and forging connections, the subject continuously “recognises”, “discovers”, and “constitutes” the self that is participating, managing, and generating. This is not a solid, core entity issuing commands, but rather a dynamic circuit of interaction: practices shape dispositions, which in turn guide subsequent practices. This cycle ultimately forms a time-thickened trajectory with a discernible pattern, and this trajectory is the subject’s identity. It is unstable, for practices may encounter contingencies, connections may rupture, and affect may shift,

yet it possesses relative continuity, for habits, memories, social relations, and material environments constitute the inertial pathways of practice.

## 5. Rethinking Subjectivity: Defence and Struggle Under the New Subject Paradigm

However, it is crucial to note that within the framework of a practical and dynamic subject paradigm, the defence of and struggle for subjectivity seemingly become a “pseudo-problem”: the subject’s mode of movement constitutively constructs the subject itself, and any fragmented reduction of the subject represents a reified and substantialist understanding of it. Consequently, there ceases to be a transcendental “I” observing the movement of subjectivity from the outside, and thus, the real possibility of constituting a “we” also dissolves.

More specifically, from a philosophical perspective, the dynamic, processual, and generative understanding of the subject directly negates the possibility of speculative reflection upon the very concept of subjectivity. The very act of thinking or theorising—the attempt to grasp either a particular moment or the total movement of this perpetually becoming subject—is itself a moment or part of this total movement. We can never truly leap outside the becoming-subjectivity, as well as we can only attempt to reconstruct or capture past moments or fragments of its movement. This dilemma is not an oversight of theoretical construction but an inherent, fundamental epistemological paradox within the generative paradigm. If subjectivity is indeed, as described, an ongoing process of differentiation rooted in concrete networks of practice, then any theoretical endeavour that attempts to “objectify” it for examination, analysis, and judgement inevitably becomes a new event within this process, a new instance of becoming. This theoretically necessitates a state of near-absolute immanence: we can only think within becoming and describe from within movement. The relatively stable “exterior” or “benchmark” required for critique—against which to measure and compare—appears to vanish entirely, leaving only the endless, self-referential flow of generation. Within this horizon, not only does “defending a subject” become dubious, but even “critiquing a form of subjectivity” confronts a void at its foundation.

The theoretical dilemma at the philosophical level manifests concretely at the political level as the fragmentation of classes or collectives. When subjectivity is rendered thoroughly fluid and differential, the unified identity essential for constructing stable political alliances becomes difficult to achieve. Political action requires a degree of “pause”—the formation of provisional identities and group solidarities for specific struggle objectives. However, a subject paradigm that emphasises becoming and difference fundamentally undermines this basis for collective agency, dispersing political struggle into innumerable incommensurable micro-resistances, thereby rendering it difficult to confront systems of oppression that remain powerfully structural and totalising. This political impasse is directly reflected in the breakdown of an oppositional political logic. Traditional leftist politics largely depended on clear demarcations between “us” and “them”—proletariat and bourgeoisie, women and patriarchy. Such distinctions presupposed relatively stable common interests, experiences, and identities within groups, thus providing the cognitive and affective foundation for collective mobilisation. The paradigm of becoming, however, fundamentally destabilises the coherence of the “we” as a political body. If the subjectivity of every “proletarian” or “woman” is perpetually situated within concrete, differential acts of becoming, with vastly differing experiences, desires, and survival strategies, then the “class subject” or “gendered subject” of traditional theory becomes a theoretical chimera unsustainable in practice.

Therefore, to address this issue, we must return to the philosophical level and answer the question of the possibility of reflecting upon and critiquing the concept of subjectivity within the generative paradigm. In fact, the generative subject paradigm itself necessitates a generative mode of apprehending the subject. It compels critical theory to abandon the attempt to posit a transcendental “I” to grasp the empirical “I”, and instead to acknowledge its own “situatedness” and “interventionist” nature. Critique ceases to be an external judgement and becomes an act of “self-differentiation” and “self-problematisation” internal to the generative process. In other words, the act of critique is itself an intensive form through which the generative movement of subjectivity attempts to break through its established patterns and create difference. When we analyse a particular mode of subjectivation, this very act of thought already constitutes an intervention, an event, a new connection within that smooth process of reproduction. It may loosen existing affective arrangements, awaken suppressed potential lines, or establish new resonances between thought and experience. The truth of theory does not lie in its correct representation of

an external object, but in its efficacy as a practice that ‘intervenes’ in the process of becoming, catalyzing new possibilities for thought and existence. Here, the critic is not an external observer but participates, through their work, in the ongoing shaping and re-shaping of “ourselves” as a historical subject.

Thus, far from eliminating the theoretical possibility of reflection and critique, the generative subject paradigm demands a more demanding and more radical form of reflection. We cannot, and need not, leap outside the generative process itself. Instead, we must continually attempt to create provisional “vortices” or moments of “looking back” from within and upon the movement—not to seize a static essence, but to map the trajectories of our own becoming, to discern its patterns, nodes, ruptures, and relations of force. This form of reflection is not merely internal to practice; it is itself a particular, highly self-conscious form of practice.

Therefore, what the generative subject paradigm truly opposes is the traditional epistemological model that severs the reflecting subject from the acting subject, placing theory above practice. It proposes instead the conception of a “practice-reflection continuum”. Within this continuum, defense and struggle do not disappear but transform: defending subjectivity is no longer about protecting a pre-existing core, but is dedicated to safeguarding the openness, plurality, and creative potential of the generative process, resisting those forces of power that seek to solidify life into singular, closed, and rigid patterns. Struggle or resistance, then, becomes the ongoing activity within the flow of becoming of discerning, choosing, and experimenting—of striving to open differentiated lines of becoming that enhance symbiotic power and expand freedom and joy. Theoretical reflection and speculative thought are indispensable dimensions of this struggle: they constitute a special practice that seeks to clarify the conditions of becoming and explore possible directions. They are the arduous attempt of the generative process to gain self-awareness and self-adjustment. We truly cannot leap outside becoming, but within becoming, we can attempt to understand it and, guided by a commitment to greater possibilities for life, carefully intervene in it, hoping that this endless flow may give rise to forms marked by less suffering and more symbiosis. This, perhaps, is the humble yet steadfast stance that critique and defense in the post-Hall era—in a world without a firm Archimedean point—must accept.

## Conclusion

In summary, in the theoretical evolution of the post-Hall era, the subject paradigm within popular culture studies has undergone a profound shift. Stuart Hall’s establishment of the actively decoding subject through the “Gramscian turn,” while successfully dismantling the myth of the passive audience, strategically suspended the ontological link between the symbolic and the real. This move bequeathed to subsequent scholarship a core dilemma: the uncertain foundation of subjectivity.

Confronted with the fragmentation and technologization of contemporary cultural practice, the theoretical explorations of Lauren Berlant, Henry Jenkins, and Rosi Braidotti collectively propelled the subject paradigm from a bounded “substance” towards an immanent, relational, and dynamic “process of becoming.” Berlant’s theory of affective attachment reveals the subject’s stance of survival within fantasy; Jenkins’s participatory culture highlights the subject’s creativity within networked production; and Braidotti’s concept of nomadic becoming radically equates subjectivity with differentiated flux itself. The philosophical underpinning of this series of transformations can be summarized as a “generative movement”: the identity of the subject no longer originates from an a priori essence but resides within the dynamic trajectories formed by cultural practice and affective attunement.

This new paradigm also brings fresh theoretical challenges, particularly regarding the very possibility of reflection and critique. It demands that we abandon the illusion of seeking an external Archimedean point and instead recognize that critique itself is an intensive practice of self-differentiation internal to the generative process. Consequently, the struggle to defend subjectivity is no longer about protecting a pre-given core but transforms into safeguarding the openness, plurality, and creative potential of the process of becoming. It commits to exploring practical pathways within a fluid reality that enhance the power of life. This marks an entry into a new, more complex and more intervention phase of thinking about and defending subjectivity in the post-Hall era.

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# Cultural Integration and Curriculum Governance in Religious Institutes: An Educational Governance Perspective

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**Abstract:** Cultural integration has become an increasingly important dimension of educational reform in contemporary religious institutes. As the core carrier of educational objectives, curriculum structure and teaching operation mechanisms play a decisive role in translating cultural values into everyday educational practice. However, in many institutes, cultural integration remains insufficiently embedded in curriculum governance, resulting in fragmented implementation and limited institutional coherence. From the perspective of educational governance, this study examines how cultural integration can be systematically incorporated into curriculum design and teaching operation mechanisms. Drawing on policy analysis, educational governance theory, and observation of curriculum practice, the paper analyzes the internal logic, practical challenges, and institutional conditions shaping curriculum governance. The paper argues that effective cultural integration requires coordinated curriculum structure, stable governance mechanisms, and process-oriented teaching management rather than isolated curricular adjustments. By focusing on curriculum governance as an institutional process, this study contributes to discussions on cultural integration, educational governance, and the humanistic dimensions of institutional practice, offering a governance-oriented analytical framework relevant to education reform and institutional development in diverse cultural contexts.

**Keywords:** Cultural Integration; Religious Institutes; Curriculum Governance; Educational Governance; Institutional Practice

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## 1. Introduction

Religious institutes are institutional spaces responsible for cultivating religious professionals and transmitting religious traditions. Within contemporary governance frameworks, institutes are expected to maintain educational quality, institutional order, and social responsibility. In this context, cultural integration has become a key approach to strengthening educational coherence and public legitimacy. For China's religious education sector, policy documents emphasize law-based governance and institutional standardization, which requires that educational objectives be translated into stable teaching practices and governance arrangements <sup>[1-4]</sup>. Related policy-oriented scholarship further highlights that modernization of religious affairs governance and 'new era' religious work require institutions to strengthen standardized internal management and capacity-building, including curriculum and teaching systems <sup>[5,6]</sup>.

Curriculum governance is a central mechanism for this translation. It determines what is taught, how it is taught, how learning outcomes are assessed, and how teaching is organized across programs. When cultural integration is treated as an add-on course or occasional activity, it tends to remain symbolic. When embedded into curriculum governance, it becomes

institutionalized and sustainable. This study asks: How can cultural integration be embedded into curriculum governance in a manner that is coherent, operational, and institutionally stable?

## 2. Policy and Governance Context

The policy context relevant to curriculum governance in religious institutes includes regulations on religious affairs and administrative measures for religious institutes, which emphasize standardized management, quality assurance, and compliance with law-based governance requirements<sup>[1,2]</sup>. These documents imply that curriculum decisions should not be arbitrary or personalized; they should be institutionally reviewed, documented, and evaluated. At the level of guiding principles, the emphasis on the sinicization of religion underscores the importance of cultural integration as a long-term direction of institutional development<sup>[3,4]</sup>. In policy interpretation and governance research, modernization of religious affairs governance is also linked to internal institutional procedures, legality, and accountability, including the legalization of religious affairs and the governance of religious institutes<sup>[5,11]</sup>.

Beyond policy texts, Chinese-language scholarship on the sinicization of religion has discussed its conceptual foundations, practical pathways, and its relationship with broader cultural identity. These discussions commonly stress that cultural integration should be understood as a structured, long-term governance project rather than a short-term symbolic campaign<sup>[7,9,12]</sup>. Research on the relationship between Chinese religion and Chinese culture further suggests that the educational work of institutes must cultivate historical awareness and cultural literacy to sustain the legitimacy and continuity of religious traditions in contemporary society<sup>[10]</sup>.

For educational governance, this means that curriculum governance must link normative requirements (direction, standards, accountability) with operational mechanisms (course structures, teaching routines, evaluation tools). The goal is not to replace professional religious education, but to improve coherence between educational objectives, cultural orientation, and institutional practice<sup>[8,11]</sup>.

## 3. Conceptual Framework: Curriculum Governance as an Institutional Process

Curriculum governance refers to the institutional arrangements through which curriculum objectives, structures, and operational processes are coordinated. In educational governance theory, curriculum is not merely a content list; it is an institutional system that embodies an organization's educational philosophy and governance capacity<sup>[13-16]</sup>. The core components of curriculum governance typically include: (a) curriculum objective-setting and program design; (b) curriculum structure and course mapping; (c) teaching operation mechanisms such as scheduling, teaching supervision, and quality assurance; (d) evaluation and feedback loops; and (e) faculty coordination and professional development as a mechanism of collaborative construction and continuous improvement<sup>[15,18]</sup>.

Cultural integration, in this study, refers to the systematic embedding of culturally grounded values, historical awareness, ethical cultivation, and social responsibility into educational objectives and teaching processes. Cultural integration becomes effective when it is reflected in curriculum objectives, reinforced by course structures, and supported by governance mechanisms that make implementation stable and reviewable. This definition is consistent with policy and research arguments that emphasize cultural identity cultivation and governance-based implementation rather than slogan-like expansion<sup>[7,12]</sup>.

## 4. Practical Challenges in Current Curriculum Practices

Based on common patterns observed in institutional practice and reported in curriculum governance research, several challenges frequently arise when cultural integration is promoted in religious institutes. First, implementation tends to be fragmented: cultural elements appear in isolated general-education courses without being connected to the learning trajectories of professional courses<sup>[17,18]</sup>. Second, curriculum coordination is often weak: different courses are designed and taught independently, resulting in repeated themes in some areas and gaps in others. Third, teaching operation mechanisms may lack explicit governance requirements for cultural integration, leaving implementation to individual teachers' preferences, which undermines stability and comparability across cohorts. Empirical and policy discussion on religious education and the modernization of religious governance similarly note that institutional routines and accountability mechanisms are key to preventing fragmentation and formalism<sup>[8,9]</sup>.

These challenges suggest that cultural integration is not primarily a ‘course addition’ problem; it is a curriculum governance problem. The solution therefore requires institutional design that aligns curriculum structure, teaching operation, and evaluation mechanisms. In addition, where cultural integration touches identity formation, institutes must avoid both over-politicized simplification and purely symbolic cultural displays; instead, they should operationalize cultural objectives in ways that can be taught, assessed, and reviewed<sup>[12]</sup>.

## **5. Institutional Paths for Curriculum Optimization**

### **5.1 Optimize Curriculum Structure through Program-Level Course Mapping**

A practical starting point is program-level course mapping. Institutes can define a limited set of curriculum objectives that articulate cultural integration outcomes (e.g., ethical cultivation, historical awareness, civic responsibility, cultural literacy) and map these outcomes across required and elective courses. This helps ensure that cultural integration is distributed across the curriculum rather than concentrated in a single course. In practice, institutes can maintain the systematic structure of professional religious education while ensuring that cultural integration outcomes are reinforced at multiple points in the learning pathway<sup>[15,17]</sup>.

Course mapping also helps clarify the relationship between general-education courses and professional courses, reducing duplication and strengthening progression. This approach aligns with curriculum system construction practices that connect curriculum design with governance capacity and the shift from administrative ‘management’ to collaborative curriculum construction<sup>[17,18]</sup>.

### **5.2 Strengthen Teaching Operation Mechanisms and Quality Assurance**

Cultural integration becomes stable only when it is supported by teaching operation mechanisms and quality assurance systems. Institutes can incorporate cultural integration requirements into course syllabi templates, teaching plans, and teaching evaluation indicators. For example, syllabi can specify cultural integration learning outcomes and assessment tasks; teaching evaluations can include criteria related to curriculum objectives and coherence. This approach reflects the broader logic of teaching operation mechanisms and quality assurance systems in higher education governance<sup>[19]</sup>.

To avoid formalism, process-oriented management should be emphasized. Rather than counting ‘how many cultural activities’ were held, institutes can review whether cultural integration is reflected in course objectives, learning materials, classroom processes, and student assessment. Such process-oriented governance supports continuous improvement and reduces the risk of superficial compliance, a risk repeatedly noted in policy and practice discussions on the sinicization of religion<sup>[7,9]</sup>.

### **5.3 Faculty Coordination and Professional Development**

Faculty capacity is a decisive condition for curriculum governance. Institutes can establish mechanisms such as collective lesson planning, cross-course teaching seminars, and peer review to support cultural integration in professional teaching. Faculty development can include training on curriculum design, assessment literacy, and culturally informed pedagogy. These arrangements reduce the dependence on individual ‘enthusiastic teachers’ and make curriculum governance more institutional and less personalized<sup>[18,20]</sup>.

### **5.4 Evaluation, Feedback, and Institutional Learning**

Curriculum governance requires feedback loops. Institutes can conduct periodic curriculum reviews (e.g., annually or per cohort) using evidence such as student learning outcomes, assessment samples, and course evaluation reports. The goal is to identify where cultural integration is functioning as intended and where adjustments are needed. This evaluation process should be documented and connected to institutional decision-making, reinforcing internal governance optimization and organizational learning<sup>[20]</sup>.

## **6. Risk Management and Boundary Considerations**

Embedding cultural integration into curriculum governance requires careful boundary management. First, institutes should avoid conceptual inflation: cultural integration should be operationalized as clear curriculum objectives and assessable learning outcomes rather than broad slogans<sup>[7,12]</sup>. Second, institutes should avoid substitution: cultural integration should ‘integrate without replacing’ professional religious education, maintaining the integrity of professional training while

improving cultural coherence<sup>[10]</sup>. Third, institutes should avoid excessive administrative simplification: governance tools should guide teaching practice without reducing education to rigid indicators. Process evaluation and professional dialogue are more effective than one-size-fits-all checklists, consistent with governance modernization arguments in higher education research<sup>[14,16,20]</sup>.

## 7. Conclusion

This study analyzes cultural integration in religious institutes through the lens of curriculum governance and educational governance. The central argument is that cultural integration becomes effective and sustainable when embedded into curriculum structure, teaching operation mechanisms, faculty coordination, and feedback systems, rather than implemented through isolated course additions. By treating curriculum governance as an institutional process, institutes can strengthen coherence between educational objectives and daily teaching practice, thereby improving educational quality and institutional adaptability under law-based governance requirements<sup>[1,2,5,11]</sup>.

Future research may deepen this analysis through comparative studies across different types of institutes and through empirical evaluation of curriculum governance reforms, especially regarding how cultural identity cultivation and institutional legitimacy are shaped through curricular and governance mechanisms over time<sup>[10,12,20]</sup>.

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# AI and the Displacement of Ordinary Occupations: A Normative Analysis of Labour Alienation, Dignity, and Social Justice

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**Abstract:** With the rapid development of artificial intelligence (AI) technologies, a significant trend of substitution has emerged for ordinary occupations characterised by repetitiveness, rule-based tasks, and low-to-medium skill requirements, under existing capital logics and institutional arrangements. Diverging from mainstream narratives that frame this process as a technological inevitability or an efficiency improvement, this study adopts a normative philosophical critique to analyse the deepening of labour alienation, the erosion of labour dignity, and the imbalance of social justice resulting from AI-driven occupational displacement. The article argues that AI substitution is not a neutral technological process but a socio-technical phenomenon embedded within specific industrial structures and power relations. Drawing on Marx's theory of labour alienation, existentialist philosophy of technology, and the "capabilities approach," this study critiques technological determinism and the myth of "technological neutrality," emphasising that the core issue lies not in whether technology replaces humans but in how technology is shaped by social governance and value frameworks. Based on this analysis, the article proposes a normative reconstruction centred on human dignity and social justice, aiming to provide theoretical guidance for technological ethics and institutional responses in the age of AI.

**Keywords:** Artificial Intelligence; Ordinary Occupations; Technological Substitution; Labor Alienation; Social Justice; Philosophical Critique

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## 1. Introduction

As one of the core technologies of the twenty-first century, artificial intelligence (AI) is rapidly permeating human society. AI is no longer merely a futuristic vision in science fiction narratives but a tangible force profoundly reshaping social relations of production. According to the International Data Corporation (IDC), global spending on AI solutions is projected to increase from USD 166 billion in 2023 to USD 423 billion by 2027, representing a compound annual growth rate of 26.9% <sup>[1]</sup>, while global spending on generative AI solutions is expected to reach USD 143 billion, accounting for 28.1% of total AI expenditure <sup>[2]</sup>. This technological diffusion is accompanied by the large-scale substitution of "ordinary occupations"—positions characterised by repetitiveness, rule-based tasks, and low-to-medium skill requirements. The McKinsey Global Institute reports that approximately 50% of current work tasks worldwide are technically automatable <sup>[3]</sup>, with nearly 300 million full-time jobs at high risk of replacement <sup>[4]</sup>.

This substitution process is not merely a matter of technological efficiency in economics or management; it touches upon fundamental philosophical questions: what does it mean to be human? What is the role of labour in human existence? As machines increasingly perform cognitive and operational tasks once considered “exclusively human,” are we confronting an unprecedented crisis of labour demeaning? As Habermas (1985) warns, instrumental rationality, if unchecked by communicative rationality, leads to the “colonisation of the lifeworld,” whereby everyday life is consumed by efficiency logic<sup>[5]</sup>. This study aims to systematically examine the multi-dimensional impacts of AI-driven substitution of ordinary occupations from a critical philosophical perspective. Unlike mainstream research, which often focuses on empirical analyses of employment rates, skill mismatches, or economic growth effects, this study emphasises the normative dilemmas underlying these changes: when labour is stripped of its creative and autonomous dimensions, reduced merely to “computable working hours,” can human dignity still be preserved? Are we moving toward a “post-labour society,” and if so, can such a society still accommodate human freedom and development? Through normative analysis rather than empirical prediction, this study seeks to explore the implications of AI substitution for labour dignity and social justice.

## 2. Theoretical Foundations and Literature Review

### 2.1 Theoretical Foundations of the Relationship between Artificial Intelligence and Employment

Research on the relationship between technological progress and employment can be traced back to classical theoretical frameworks, among which Marx’s theory of labour alienation demonstrates renewed explanatory power in the context of artificial intelligence. Marx argued that labour alienation is a central issue of the capitalist mode of production, wherein workers become estranged from their labour products, labour processes, and species-being, resulting in the loss of subjectivity<sup>[6]</sup>. In the era of artificial intelligence, this theory acquires new significance: intelligent technologies, as extensions of capital logic, further reinforce the separation between workers and the means of production. AI systems replace a substantial number of repetitive labour positions through automation and intelligence, gradually marginalising workers from the core of the production process and rendering them subservient to technology<sup>[7]</sup>. Moreover, the development of AI has given rise to a phenomenon of “technological fetishism,” whereby humans exhibit excessive reliance on and reverence for intelligent technologies, leading to an increasingly hollowed spiritual world—an emergent form of labour alienation<sup>[6]</sup>. Therefore, Marx’s theory of labour alienation provides a crucial theoretical lens for understanding the impact of AI on employment, while also revealing the underlying power and capital relations embedded in technological advancement.

### 2.2 The Technological Lineage and Development Stages of Artificial Intelligence

Artificial intelligence is not a single technology but a cluster of technologies encompassing machine learning, deep neural networks, reinforcement learning, natural language processing, and robotic process automation (RPA)<sup>[8]</sup>. Its development can be broadly divided into three stages: (1) Symbolic AI (1950s–1980s), relying on rule engines and logical reasoning; (2) Connectionist AI (1980s–2010s), centered on artificial neural networks; and (3) Deep Learning and Generative AI Era (2010s–present), achieving leaps in perception and generative capabilities through big data, high computational power, and Transformer architectures<sup>[9]</sup>.

### 2.3 The Current State of AI Substitutability for Ordinary Occupations

Currently, AI systems have demonstrated performance surpassing human capabilities in multiple domains: in image recognition tasks, convolutional neural networks (CNNs) have achieved accuracies exceeding 95%<sup>[10]</sup>; in customer service dialogues, chatbots based on large language models (LLMs) can handle over 80% of routine inquiries<sup>[11]</sup>; in logistics scheduling, reinforcement learning algorithms optimize warehouse picking paths, improving efficiency by more than 30%<sup>[12]</sup>. These technological advancements indicate that AI is no longer confined to the substitution of “manual labour” but is increasingly penetrating “cognitive ordinary occupations,” such as data entry, basic accounting, junior legal document processing, and customer service roles.

#### 2.3.1 Types of Ordinary Occupations Vulnerable to Replacement

The rapid development of AI technologies has significantly enhanced the substitutability of low-skilled and routine jobs, particularly in ordinary occupations within manufacturing, logistics, and retail sectors. In manufacturing, for example, routine positions with fixed processes—such as filling, sealing, packaging, and loading/unloading—are increasingly being replaced

by intelligent robots. Due to their highly procedural nature, these jobs are particularly susceptible to AI technologies, leading to a substantial reduction in labour demand in the relevant fields <sup>[13]</sup>. In the logistics sector, positions such as sorting clerks are also at risk of replacement due to the widespread adoption of automated sorting robots. By integrating computer vision and machine learning algorithms, these robots efficiently perform parcel classification tasks, significantly reducing the need for manual operations <sup>[14]</sup>. Similarly, in the retail sector, fully automated vending machines and intelligent customer service systems have gradually replaced traditional retail service roles. These changes not only reflect the powerful substitutive capacity of AI for ordinary occupations but also highlight the vulnerability of low-skilled workers in the context of technological transformation.

### 2.3.2 Technical Approaches to Substitution

The substitution of ordinary occupations by AI primarily relies on the application of robotic technologies and intelligent programs, which simulate human thinking and behaviour patterns to efficiently replace specific job functions. First, robotic technology, as a key carrier of AI, has demonstrated strong substitutive capabilities across multiple industries. For instance, specialised industrial robots in manufacturing can precisely execute complex operations such as welding, assembly, and painting through built-in sensors and actuators. These robots not only exhibit a high degree of automation but also optimise operational processes through machine learning algorithms, thereby further enhancing production efficiency <sup>[13]</sup>. Second, the application of intelligent programs has also transformed the work modes of many occupations. In logistics sorting, for example, automated sorting robots integrate computer vision and deep learning technologies to quickly identify package information and complete classification tasks, greatly reducing the need for human intervention <sup>[15]</sup>. Additionally, the proliferation of intelligent customer service systems represents another important manifestation of AI substituting human labour. These systems leverage natural language processing to interact with users in real time and respond to common inquiries, thereby reducing reliance on human agents. Taken together, robotic and intelligent program-based approaches constitute the core drivers of AI substitution for ordinary occupations.

### 2.3.3 Geographic and Industry Differences in the Degree of Substitution

The extent of AI substitution for ordinary occupations varies significantly across regions and industries, influenced by factors such as economic development levels, technological adoption, and industry characteristics. From a geographic perspective, developed regions with strong technological foundations and economic capabilities exhibit broader applications of AI technologies and, consequently, higher degrees of occupational substitution. For example, in China's eastern coastal cities, the penetration of intelligent robots in manufacturing is significantly higher than in central and western regions, resulting in a marked increase in unemployment risk for low-skilled workers <sup>[16]</sup>. In contrast, traditional industries in less developed areas remain largely labour-intensive, with slower AI adoption. From an industry perspective, manufacturing and logistics exhibit the most pronounced substitution effects, whereas service and agricultural sectors are relatively less affected. Research indicates that approximately 20% of manufacturing jobs could be replaced by AI and related technologies within the next 20 years, while the agricultural sector is less affected due to natural constraints and technological adaptability issues <sup>[17]</sup>. Moreover, industry-specific acceptance of AI technologies varies: labour-intensive industries such as manufacturing and logistics are more amenable to automation, whereas knowledge-intensive sectors like education and healthcare, which involve complex interpersonal interactions and creative labour, are less susceptible to full replacement. These differences indicate that AI substitution is unevenly distributed and shaped by multiple interrelated factors <sup>[16][17]</sup>.

In summary, research suggests that AI substitution does not occur uniformly; its diffusion is governed by three main mechanisms: (1) Industrial logic: capital-intensive sectors (e.g., manufacturing, logistics) are prioritized, followed by service industries; (2) Institutional environment: countries with weaker labor protections and diminished union power experience faster substitution <sup>[18]</sup>; (3) Technological infrastructure: the widespread availability of cloud services and API interfaces enables small and medium-sized enterprises to rapidly deploy AI systems <sup>[19]</sup>.

## 2.4 Classification of Substitutability: From Task-Level to Occupation-Level

Acemoglu and Restrepo proposed the "Task Model," which decomposes jobs into discrete tasks to identify which tasks can be automated <sup>[20]</sup>. They define "automatable tasks" as those that follow explicit rules, with structured inputs and predictable

outputs. Research indicates that approximately 30% of tasks in about 45% of U.S. jobs have high automation potential <sup>[21]</sup>. Building on this framework, this study classifies substitutability into four types: (1) Fully substitutable: highly repetitive tasks such as assembly line operations, barcode scanning, and basic quality inspection, which have been widely replaced by industrial robots and visual inspection systems <sup>[22]</sup>; (2) Partially substitutable: positions such as bank tellers and administrative assistants, where AI handles information queries and form processing while humans manage emotional interactions and exception handling; (3) Augmented substitution: professional roles such as doctors and lawyers, where AI provides diagnostic suggestions or case retrieval, but ultimate decision-making authority remains with humans; (4) Potentially substitutable: tasks such as entry-level programming, content moderation, and translation, which are being rapidly encroached upon by generative AI <sup>[23]</sup>.

It is noteworthy that the logic of AI substitution has shifted from functional equivalence to cost prioritisation. Companies adopt AI not because it is “smarter,” but because it is “cheaper, more controllable, and never fatigued” <sup>[24]</sup>. Importantly, the “substitution trends” described in this study do not constitute a normative acknowledgment of technological inevitability; rather, they provide an empirical depiction of the current capital-driven trajectory of technological diffusion.

### 3. Labour Alienation and the Philosophical Crisis: From Marx to Posthumanism

#### 3.1 Contemporary Resonances of Marx’s Theory of Alienation

In the Economic and Philosophic Manuscripts of 1844, Marx proposed four dimensions of labour alienation: alienation of the worker from the product, the labour process, species-being, and other humans <sup>[25]</sup>. In the context of AI-driven substitution, this theory gains renewed explanatory power.

First, workers are increasingly alienated from the products of their labour. When AI generates reports, design blueprints, or writes code, human workers are reduced to roles of “review” or “fine-tuning,” while their creative outputs are absorbed as “training data,” blurring personal authorship and ownership <sup>[26]</sup>. Öztaş and Arda (2025) <sup>[27]</sup>, through in-depth interviews with 14 creative professionals—including visual artists, social media managers, and music producers—documented how these workers perceive AI’s impact. Their findings indicate that while creative professionals view AI as an opportunity in their creative process, they also see it as a necessary condition for active participation in market survival under technological bureaucratic governance.

Second, the labour process is colonised by algorithms. Platform-based workers such as couriers, customer service agents, and content moderators operate under “algorithmic management,” where work pace, routes, and scripts are dynamically regulated by systems, rendering humans as “biological execution terminals” <sup>[28][29]</sup>. This control is more precise and covert than Taylorist management. Marx emphasised that labour constitutes the “species-life” (*Gattungslieben*), a free and conscious activity. When labour is reduced to “monitorable, optimizable, and substitutable data points,” human essential capacities are compressed into mere “productivity variables,” and the self-actualising function of labour is entirely hollowed out <sup>[30]</sup>.

#### 3.2 The “Useless Person” Dilemma from an Existentialist Perspective

Heidegger warned that the essence of technology is not merely a “tool” but a *Gestell*, a framework that forcibly subsumes the world and humans into a state of “standing-reserve” (*Bestand*) <sup>[31]</sup>. In the AI era, ordinary workers are being redefined as “resources to be optimised” or “redundancies to be eliminated.”

Byung-Chul Han further conceptualised the “achievement society,” arguing that contemporary individuals are no longer oppressed “Others” but self-exploiting “subjects” <sup>[32]</sup>. Under the pressures of AI substitution, workers face an unending responsibility to “constantly learn, adapt, and transform,” with failure attributed not to structural constraints but to “individual insufficiency.” This “tyranny of positive freedom” has contributed to widespread anxiety, depression, and existential nihilism <sup>[33]</sup>. When AI can perform most “ordinary labour,” do humans retain intrinsic value? If labour no longer constitutes a confirmation of human essence, how can we define what it means to be human? This reflects a modern version of Heideggerian “forgetfulness of being” <sup>[34]</sup>.

#### 3.3 Challenges to the Capability Approach: Responses by Sen and Nussbaum

Amartya Sen proposed the capability approach, emphasising that development is essentially the expansion of substantive freedoms that allow individuals “to lead lives they have reason to value” <sup>[35]</sup>. Martha Nussbaum further enumerated core

human capabilities, including “practical reason,” “emotional affiliation,” and “work dignity”<sup>[36]</sup>.

AI substitution of ordinary occupations directly threatens the core capability of “work dignity.” When an individual cannot achieve social recognition, economic independence, or self-affirmation through labour, their substantive freedom is severely constrained. Even a universal basic income (UBI) can alleviate poverty, but it cannot replace the sense of meaning and social connection derived from work<sup>[37]</sup>.

## 4. Critical Reflections: Challenging Technological Determinism and the Myth of Technological Neutrality

### 4.1 The Ideological Trap of Technological Determinism

Mainstream narratives concerning AI and employment substitution often fall into a pattern of technological determinism, assuming that technological development is an irreversible natural process and that the replacement of ordinary occupations is an inevitable outcome of “efficiency gains,” leaving society with only passive adaptation. Such discourse is common in policy reports, corporate white papers, and mainstream media; for example, McKinsey & Company (2023)<sup>[38]</sup> claims: “Automation is not a choice, it is a reality.” However, this framing obscures the social construction and political selectivity inherent in technological development.

Technology does not evolve as a self-propelled “natural force,” but rather as a social product embedded within specific production relations, power structures, and capital logic. As Winner (1986/2021)<sup>[39]</sup> notes in *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, “Artifacts have politics.” Research indicates that Nordic social-democratic welfare states tend to deploy AI to assist eldercare (e.g., nursing robot programs in Denmark), whereas liberal welfare states (such as the UK and the US) face greater pressure to use AI to replace public service positions for cost reduction<sup>[40][41]</sup>. The determining factor is not technology itself, but institutional choices and value orientations.

Therefore, the assertion that “AI will inevitably replace ordinary occupations” is not a technological necessity but a product of capital-driven institutional arrangements. Corporate decisions to substitute labour with AI are motivated not by technological irreversibility, but by rising labour costs, weakened unions, and the pressure to maximise shareholder value<sup>[42]</sup>. If society prioritises “decent work” and “human development,” AI could be steered toward augmenting humans rather than replacing humans.

### 4.2 Deconstructing the Myth of Technological Neutrality

Accompanying technological determinism is the myth of technological neutrality, which assumes that AI is inherently value-neutral and that its effects depend solely on users. This view, however, overlooks the value-laden nature of technology design. First, training data inherently carries biases. AI decision-making logic is derived from historical data, which often reflects and reinforces existing social inequalities. For example, recruitment AI systems, trained on male-dominated historical data, tend to downgrade female resumes<sup>[43]</sup>; credit scoring models, reflecting higher default rates among low-income groups, automatically raise loan thresholds, creating a “poverty trap”<sup>[44]</sup>.

Second, algorithmic objective functions embody capital preferences. Most corporate AI systems are designed to “maximise efficiency,” “minimise cost,” or “maximise user engagement,” rather than “promote fairness” or “enhance worker well-being.” This objective-setting itself constitutes a value choice<sup>[45]</sup>. For instance, food delivery platform algorithms optimised for “shortest delivery time” can lead to riders speeding, running red lights, and even causing traffic accidents<sup>[46]</sup>.

Finally, technology deployment is inherently exclusionary. The high costs of developing, deploying, and maintaining AI systems make them naturally oriented toward capital-intensive industries and high-income groups, while marginalising low-skilled workers and the public sector. This “technological divide” further exacerbates social fragmentation<sup>[47]</sup>.

In summary, it is crucial to recognise that technological neutrality is an illusion. AI is a socio-technical system imbued with class, gender, and power dynamics, and its substitutive effects are essentially a technical manifestation of social power relations.

### 4.3 From a “Logic of Substitution” to a “Logic of Co-Existence”: Reconstructing the Technological Philosophy Paradigm

The current challenges in AI governance stem from persisting within a binary framework of “humans vs. machines.” This

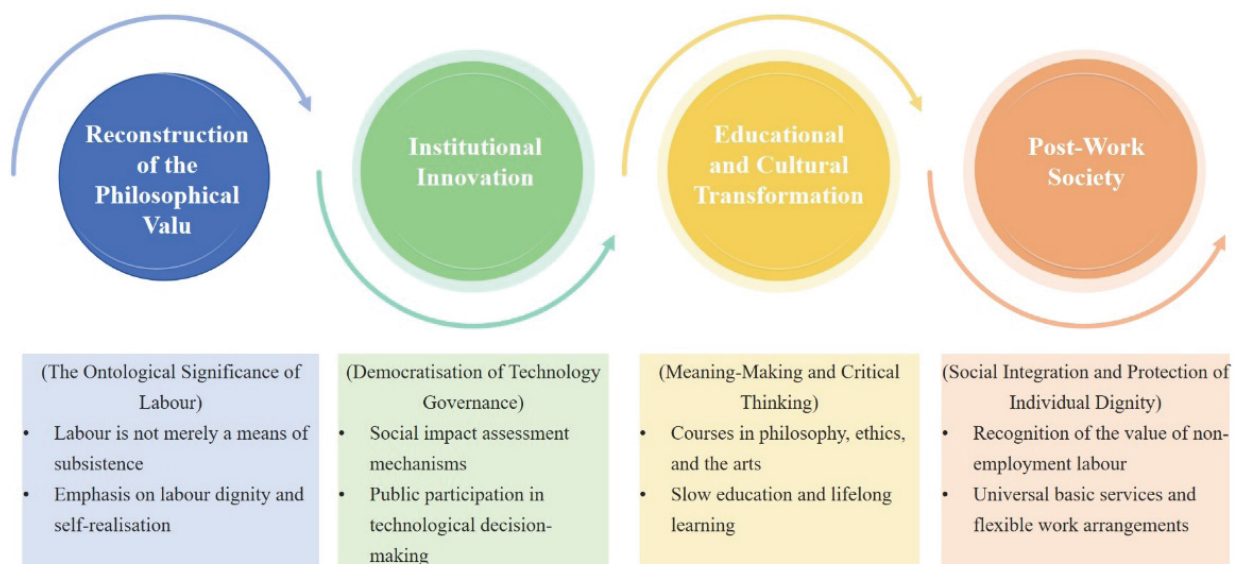
framework presupposes that substitution is the only possibility, while neglecting philosophical pathways of collaboration, symbiosis, and co-existence. In his later work, Heidegger introduced the concept of dwelling, advocating that humans should “poetically dwell on the earth” rather than dominate nature and themselves through a technological framework <sup>[48]</sup>. This idea can be extended to human–machine relations: instead of seeking to “defeat machines” or “be replaced by machines,” we should explore an ethical order of co-existing with machines.

Floridi et al. (2025) <sup>[49]</sup>, within a digital humanism framework, proposed “vulnerability as a design ethic,” emphasising that technology should be designed in coexistence with human vulnerability rather than attempting to eliminate it. This aligns with Linda Aulbach’s (2024) <sup>[50]</sup> notion of “embedding empathy in AI ethics,” jointly emphasising that technology should respond to, rather than erase, human vulnerability. For example, nursing robots should not aim to replace caregivers but rather alleviate caregiver burden and enhance their capacity for emotional connection. This paradigm shift requires us to reconstruct technology from a “control tool” into a “medium of care.”

## 5. Normative Reconstruction: Towards Human-Centred Technological Ethics and Institutional Innovation

To systematically present the four-tiered normative reconstruction pathway proposed above, Figure 1 summarises the progressive relationship of “philosophical value reconstruction → institutional innovation → educational and cultural transformation → post-work society” using a flow-arrow diagram. The figure illustrates the internal logic and interconnections of each stage, directly pointing toward the overarching objective of technological ethics and institutional practices centred on human dignity and social justice.

Figure 1: Four-Level Normative Reconstruction Pathway



### 5.1 Reconstructing the Philosophical Value of Labour: From “Means of Livelihood” to “Mode of Being”

To address the dignity crisis brought by AI substitution, it is imperative to reestablish the philosophical status of labour. Labour is not merely a means of earning income; it is a fundamental mode through which humans realise themselves, assert their essential capacities, and participate in social co-construction <sup>[51]</sup>. Steinmetz, G. (2009) <sup>[52]</sup> distinguishes between “labour”, “work”, and “action”, noting that it is action—public speech and collective decision-making in the public sphere—that constitutes the essence of political life. However, when AI deprives ordinary workers of the opportunity to engage in work and action, society risks entering a “society of no action.”

Addressing the dignity crisis triggered by AI substitution does not merely require preserving existing jobs, but rather redefining the institutional status of labour in technological societies. The labour-value reconstruction emphasised here is not an abstract “glorification of labour,” but a response to the current governance tendency that compresses labour into a replaceable cost factor. In a context where AI extensively intervenes in production and service processes, excluding workers

from technology design and deployment decisions renders their labour devoid of subjectivity and dignity, even if employment continues. Therefore, the core of labour-value reconstruction lies in restoring workers' institutional participation as relevant stakeholders in technological change, rather than merely maintaining employment numbers.

## 5.2 Institutional Innovation: Democratizing Technological Governance

The erosion of dignity caused by technological substitution is not solely due to job loss, but to the highly depoliticised nature of substitution decisions. Currently, AI deployment is often decided unilaterally by corporations or technical experts, with little opportunity for ordinary workers or the public to intervene. To address this structural issue, this study advocates introducing social impact assessment mechanisms for AI deployment. The purpose is not to restrict technological development, but to reintroduce normative considerations such as employment, dignity, and fairness into the technological decision-making process. Through institutionalised evaluation and public participation, technological substitution ceases to be a “fait accompli” and becomes a social choice that can be deliberated, amended, and constrained.

## 5.3 Educational and Cultural Transformation: From “Skills Competition” to “Meaning-Making”

In the context of AI substitution, the key function of education is no longer merely skills updating, but helping individuals maintain a sense of meaning and social connectedness under labour instability. Educational objectives should be reconstructed: shifting from “preparing for employment” to “preparing for life, emphasizing courses in philosophy, ethics, arts, and civic engagement to cultivate critical thinking and a sense of purpose. A “slow education” movement should be promoted, opposing “fast-track training” and credentialism, while advocating deep learning and lifelong growth. Public discourse should be reshaped: media should reduce alarmist narratives of “AI replacing humans” and increase coverage of human-machine collaboration and technology for good, cultivating a positive technological culture.

## 5.4 Exploring the Possibility of a “Post-Work Society”

The discussion of a post-work society does not negate the normative value of labour, but addresses the limitations of modern institutions that regard employment as the sole form of social participation. It explores alternative pathways to maintain individual dignity and social integration under conditions of high AI substitution. It should be clarified that the “labour” emphasised here is not equivalent to historical forms of waged employment. Rather, the critique targets the narrow understanding of labour as market exchange and efficiency metrics, while defending labour as an existential dimension of social participation, meaning-making, and self-realisation. In this sense, a post-work society does not imply the end of labour, but the need to repoliticize and expand employment-centred labour institutions.

Considering the structural unemployment potentially triggered by AI, discussions of a post-work society are not utopian, but a normative response to technological trends and their social consequences. To prevent technological substitution from further entrenching dignity in market positions, institutional arrangements must go beyond a single logic of income compensation. For example, in addition to Universal Basic Income (UBI), a social security framework centred on Universal Basic Services (UBS)—providing education, healthcare, housing, transportation, and cultural services—can reduce individuals' reliance on labour market fluctuations for survival.

At the same time, the social value of non-waged labour should be institutionally recognised and regulated. Establishing deliberable social contribution records and recognition mechanisms can render domestic care, volunteer service, and community participation publicly visible and symbolically rewarded. Moreover, the time potential released by technological advancement should be repoliticized: through reduced statutory working hours and flexible work arrangements, individuals can devote more time to education, civic affairs, cultural creation, and interpersonal connections. Thus, a post-work society does not signify the disappearance of labour, but a reconstruction of institutions oriented toward human development and communal life, aiming to create material conditions for eudaimonia—the flourishing of human life.

## 6. Conclusion

The substitution of ordinary occupations by artificial intelligence (AI) is often interpreted in mainstream narratives as an inevitable outcome of technological progress and efficiency gains. Through a normative philosophical analysis, this study argues that such an understanding overlooks the institutional choices and power structures underlying technological diffusion, rendering the substitution process naturalised and depoliticised. AI is not a neutral tool; its substitutive effects on ordinary

occupations are the result of socio-technical processes shaped by capital logic through specific technological designs and governance practices.

By drawing on Marx's theory of labour alienation, existentialist philosophy of technology, and the capability approach, this study reveals the multifaceted impacts of AI substitution on labour meaning, subjectivity, and social justice, highlighting that compressing labour into calculable and replaceable units constitutes one of the most significant normative risks in contemporary technological governance. Accordingly, the core issue is not whether technology replaces humans, but whether technology continues to serve human development and social connectedness.

On this basis, this study advocates for a reunderstanding of the existential value of labour centred on human dignity and social justice, and for a shift in technological governance from efficiency-driven approaches toward democratised and public-oriented practices. It should be emphasised that the institutional and ethical pathways proposed here are not ultimate solutions, but represent the minimum normative requirements for countering labour alienation and the erosion of dignity under current conditions of technological diffusion. True progress in the AI era does not lie in the scale of substitution, but in society's ability to retain collective judgment on what constitutes a dignified shared life amid ongoing technological evolution.

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# Yama and Moral Governance: The Sinicization of Buddhist Judgment in Chinese Religious Culture

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**Abstract:** Yama, originally transmitted to China as a Buddhist deity presiding over postmortem judgment, underwent a profound transformation through sustained engagement with indigenous Chinese ethical, cosmological, and cultural traditions. Rather than a process of passive assimilation, this study conceptualizes the Sinicization of Yama as an active form of cultural translation, through which Buddhist moral authority was selectively reconfigured within familiar frameworks of Confucian ethics, Daoist cosmology, and vernacular religious imagination.

Drawing on historical texts, religious narratives, and popular cultural representations, this article demonstrates how Yama functioned as a symbolic mechanism of moral governance that extended ethical regulation beyond formal legal institutions and into everyday life. The bureaucratization of the underworld, the circulation of moral narratives, and the incorporation of indigenous sacred geographies collectively contributed to the legitimation and internalization of moral norms.

From a contemporary perspective, the continued re-signification of Yama in modern cultural forms complicates linear narratives of secularization. Even when detached from explicit religious belief, Yama persists as a symbolic resource for reflecting on moral responsibility, justice, and human agency. This study thus highlights the enduring social functions of religious symbolism within both historical and modern contexts of moral regulation.

**Keywords:** Yama; Sinicization; Moral Governance; Cultural Translation; Symbolic Power; Chinese Buddhism

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## 1. Introduction

Yama, originating in Indian Buddhist cosmology as the sovereign judge of the underworld, underwent a sustained and complex transformation during the transmission of Buddhism into China. Rather than functioning as a stable doctrinal entity, Yama was gradually reinterpreted through interaction with indigenous ethical systems, cosmological frameworks, and socio-political imaginaries. This process—commonly conceptualized as the Sinicization of Buddhism—involved not only linguistic translation, but also the reconfiguration of symbolic authority, moral meaning, and institutional function (Zhang, 2010; Ren, 2020).

Existing scholarship on Yama culture has primarily focused on textual origins, iconographic evolution, or literary representation (Fan, 2007; Zhang, 2010). While these studies provide valuable descriptive foundations, they often treat Sinicization as a static outcome rather than an ongoing process. As a result, insufficient attention has been paid to how Yama culture actively reshaped moral imagination and ethical regulation within Chinese society.

This article argues that the Sinicization of Yama should be understood as a dynamic reconfiguration of moral imagination, through which Buddhist eschatology was systematically aligned with Confucian ethics, Daoist cosmology, and vernacular conceptions of governance and justice (Bao, 1988; Cui & Shi, 2022). By examining Yama as a figure of moral governance rather than a purely religious icon, this study seeks to illuminate the broader social functions of religious symbolism in the construction and maintenance of moral order.

## **1.1 Research Background and Significance**

### **1.1.1 Research Background**

The transmission of Buddhism into China represents one of the most significant episodes of cultural and religious exchange in East Asian history. From the Han dynasty onward, Buddhist doctrines, practices, and symbolic systems entered a cultural environment already shaped by Confucian ethics, Daoist cosmology, and long-established traditions of ancestral worship. Within this context, the reception of Buddhism was never a matter of simple acceptance or rejection, but rather a continuous process of negotiation, reinterpretation, and localization.

Among the many Buddhist figures introduced into China, Yama occupies a particularly revealing position. Unlike buddhas or bodhisattvas, whose salvific roles could be more readily reconciled with existing religious ideals, Yama embodies judgment, punishment, and postmortem moral reckoning. These themes intersect directly with indigenous Chinese concerns regarding social order, ethical responsibility, and the maintenance of harmony between the human and cosmic realms. Consequently, Yama culture became a critical site at which Buddhist eschatology encountered Chinese moral and political thought.

Chinese society historically developed a strong bureaucratic imagination, in which governance was understood as a moral enterprise sustained through institutional order. This imagination extended beyond the realm of the living to encompass conceptions of the afterlife. Indigenous beliefs surrounding the underworld—such as the authority of Mount Tai and the administrative management of spirits—provided fertile ground for the reinterpretation of Yama as an underworld official rather than a foreign deity (Bao, 1988). The convergence of Buddhist judgment narratives with Chinese bureaucratic models produced a distinctive vision of the afterlife that closely mirrored imperial governance.

Previous studies have examined discrete aspects of this transformation, including changes in iconography, literary representations during the Tang and Song dynasties, and moral didacticism in Ming–Qing texts (Fan, 2007; Li, 2007; Zhang, 2010). However, much of this scholarship remains fragmented, focusing on specific media or historical periods without fully accounting for the broader cultural logic that enabled Yama culture to achieve long-term social resonance. This gap underscores the need for an integrative analysis that situates Yama culture at the intersection of religion, ethics, and governance.

### **1.1.2 Academic and Cultural Significance**

The present study is significant at both academic and cultural levels. Academically, it contributes to the study of Buddhist Sinicization by shifting attention from doctrinal adaptation alone to the transformation of moral and symbolic structures. By conceptualizing Yama as a figure of moral governance, this research demonstrates how religious symbols can function as mechanisms of ethical regulation within society. This perspective enriches existing discussions on religion and governance by highlighting the role of imagined postmortem judgment in shaping moral behavior.

Furthermore, the study advances methodological discussions within the humanities by integrating religious history with cultural analysis and social theory. Rather than treating texts, images, and rituals as isolated objects of study, it examines their combined role in constructing symbolic authority. This integrative approach responds to recent calls in humanistic social theory for analyses that bridge micro-level cultural representations and macro-level social structures.

At the cultural level, examining Yama culture offers insight into enduring Chinese attitudes toward justice, responsibility, and the relationship between morality and authority. The persistence of Yama-related motifs in modern literature, film, and popular media suggests that these symbolic structures continue to shape contemporary moral imagination. Understanding their historical formation provides a deeper context for interpreting modern cultural expressions and social values.

Finally, this study holds comparative significance. By analyzing Yama as a case of successful religious localization, it contributes to broader discussions on cultural translation and religious adaptation in global contexts. The findings underscore

the importance of local moral frameworks in determining how foreign belief systems are reconfigured and sustained over time.

Yama, originating in Indian Buddhist cosmology as the sovereign judge of the underworld, underwent a sustained and complex transformation during the transmission of Buddhism into China. Rather than remaining a fixed doctrinal figure, Yama was gradually reinterpreted through interaction with indigenous ethical systems, cosmological frameworks, and socio-political imaginaries. This process, commonly conceptualized as the Sinicization of Buddhism, involved not only linguistic translation but also the restructuring of symbolic authority, moral meaning, and institutional function (Zhang, 2010; Ren, 2020).

Existing scholarship on Yama culture has largely focused on textual origins, iconographic change, or literary representations (Fan, 2007; Zhang, 2010). While these studies provide valuable descriptive foundations, they often treat Sinicization as a static outcome rather than a dynamic process. This article argues that the Sinicization of Yama culture should be understood as a reconfiguration of moral imagination, whereby Buddhist eschatology was systematically aligned with Confucian ethics, Daoist cosmology, and vernacular conceptions of governance and justice (Bao, 1988; Cui & Shi, 2022).

Methodologically, this study adopts an interdisciplinary approach combining historical textual analysis, cultural interpretation, and comparative religious studies. Canonical Buddhist scriptures, including *The Sutra of Forty-two Chapters* (Kāśyapa Mātāṅga & Dharmaratna, trans., 1983), are examined alongside vernacular narratives, ritual manuals, visual materials, and Confucian and Daoist sources. By tracing changes in representation and function across historical periods, this article elucidates how belief systems adapt to local moral orders and social structures.

## 1.2 Framework and Methodology

### 1.2.1 Theoretical Framework

This study is grounded in an integrated analytical framework that brings together the concepts of moral governance, cultural translation, and symbolic power. These perspectives are not employed as abstract theoretical embellishments, but as interpretive tools derived from the historical materials and analytical challenges posed by Yama culture in China. Together, they provide a systematic account of how a foreign religious figure was transformed into a culturally authoritative symbol embedded within Chinese moral life.

First, the concept of moral governance is used to elucidate the close relationship between Yama culture and traditional Chinese understandings of social order. In the Chinese historical context, governance was never confined to legal or administrative institutions alone; it was inseparable from moral cultivation and ethical self-regulation. Authority derived not merely from coercive power, but from perceived moral legitimacy. The bureaucratized underworld associated with Yama mirrors this logic. By depicting postmortem judgment as orderly, procedural, and morally grounded, Yama culture symbolically extended moral governance beyond the human realm. This perspective allows the analysis to move beyond doctrinal description and toward an examination of how religious imagination contributed to ethical discipline and social regulation.

Second, the framework of cultural translation is essential for understanding the Sinicization of Yama. In this study, cultural translation refers not simply to linguistic conversion, but to the selective adaptation and recontextualization of meaning within a new cultural environment. When Yama entered China, his doctrinal attributes were neither passively preserved nor arbitrarily altered. Instead, they were rearticulated through familiar cultural codes, including Confucian ethics, Daoist cosmology, and bureaucratic metaphors of governance (Ren, 2020; Pan, 2023). This approach foregrounds the interpretive agency of monks, literati, storytellers, and ritual specialists in reshaping Yama culture to address local moral concerns.

Third, the concept of symbolic power provides a lens for analyzing the authority Yama acquired within Chinese society. Symbolic power operates through the capacity of representations, narratives, and rituals to shape moral perception and behavior without reliance on direct coercion. Visual depictions of Yama as an official judge presiding over an orderly court endowed the figure with moral legitimacy by aligning supernatural judgment with familiar social hierarchies (Zhang, F., 2020). This perspective helps explain why Yama culture maintained cultural efficacy even amid political change and religious diversification.

Taken together, these three perspectives enable an interpretation of Yama culture not as a static belief system, but as a dynamic configuration of moral meaning through which authority, ethics, and imagination were mutually constituted.

### 1.2.2 Rationale for Rejecting Alternative Approaches

This study deliberately avoids adopting a purely religious-historical approach. While religious history offers indispensable insights into textual origins and chronological development, an exclusive focus on doctrinal transmission risks reducing Yama culture to a linear narrative of influence. Such an approach cannot adequately explain why Yama acquired enduring authority in China, nor how his image became embedded in popular ethics and everyday moral imagination.

At the same time, a purely cultural-studies approach is insufficient on its own. Cultural studies often privilege representation, discourse, and identity, sometimes at the expense of historical continuity and institutional context. In the case of Yama culture, isolating representations from their doctrinal and ritual foundations would obscure the ethical logic underpinning underworld judgment narratives.

By rejecting these single-discipline approaches, this study adopts a balanced analytical position that integrates historical depth with cultural interpretation while maintaining a sustained focus on moral regulation and symbolic authority. This integrated framework seeks to overcome the fragmentation that characterizes much existing research on religious localization and to offer a more comprehensive account of how belief systems operate simultaneously at doctrinal, cultural, and social levels.

### 1.2.3 Methodology and Corpus

Methodologically, this research employs qualitative textual and visual analysis supported by comparative interpretation. Four primary categories of sources are examined in order to trace the diachronic transformation of Yama culture across doctrinal, narrative, visual, and modern contexts.

First, canonical Buddhist scriptures provide the doctrinal foundation of the analysis. Texts such as *The Sutra of Forty-two Chapters* establish early Buddhist conceptions of moral causality and postmortem judgment, serving as a baseline against which later reinterpretations can be assessed (Kāśyapa Mātāṅga & Dharmaratna, trans., 1983).

Second, vernacular literature—including anecdotal collections, miracle tales, and Ming–Qing fiction—is examined to trace the popularization of Yama culture. These sources reveal how abstract doctrinal principles were translated into narrative forms accessible to non-elite audiences, thereby facilitating moral instruction and social critique (Fan, 2007; Cui & Shi, 2022).

Third, visual materials such as temple murals, illustrated morality books, and ritual imagery are analyzed to assess the role of iconography in the production of symbolic authority. Visual representation often conveys moral meaning more immediately than textual discourse, making it a crucial medium for the dissemination and normalization of Yama culture (Zhang, F., 2020; Ji, 2023).

Finally, selected examples from modern film and popular media are considered to illustrate the contemporary re-signification of Yama culture. Although these materials differ substantially from premodern sources, they demonstrate the continued adaptability of Yama as a moral symbol within modern cultural contexts (Zhang, K. K., 2019).

By integrating these diverse source types, the methodology enables a diachronic analysis that captures both continuity and transformation, illuminating how Yama culture has been repeatedly reinterpreted to address changing moral and social conditions.

## 2. Yama and Moral Governance

### 2.1 Yama in Indian Buddhist Cosmology

In early Indian religious traditions, Yama was associated broadly with death and the afterlife. Within Buddhist cosmology, however, this figure was redefined not as an autonomous god wielding personal authority, but as a judicial agent operating within the impersonal logic of karmic causality. Canonical Buddhist texts emphasize that Yama does not determine moral outcomes according to divine preference; rather, he presides over the disclosure and execution of karmic consequences already generated by individual actions (Kāśyapa Mātāṅga & Dharmaratna, trans., 1983).

This conception embeds moral judgment within a rationalized ethical system. Accountability is neither arbitrary nor negotiable, and punishment is framed as the necessary outcome of prior conduct. Yama's authority thus derives from his role as an executor of moral law rather than its originator. Such a configuration already contains the potential for institutional

interpretation, as judgment is imagined as procedural, evidentiary, and rule-governed rather than charismatic or personal.

## 2.2 Early Transmission into China

As Buddhism entered China during the Han dynasty, doctrines related to Yama circulated through translated scriptures, oral instruction, and narrative transmission. These ideas encountered a cultural environment already structured by indigenous conceptions of the afterlife, ancestral governance, and bureaucratic administration. Historical sources such as *Shiji*, *Hanshu*, and *Hou Hanshu* document early Chinese understandings of cosmic order that closely linked moral authority with administrative hierarchy (Xie, 2011).

Within this context, Yama was not received as a foreign sovereign of death but was interpreted through familiar political and cosmological frameworks. Early Chinese audiences associated his judicial function with imperial governance, facilitating an interpretive shift in which the underworld was imagined as an extension of bureaucratic order rather than a purely metaphysical realm. This phase of transmission was therefore characterized by selective integration rather than doctrinal replacement.

Crucially, this localization did not dilute Buddhist ethical logic. Instead, it rendered karmic judgment intelligible within existing Chinese moral imaginaries, allowing Buddhist eschatology to resonate with deeply rooted assumptions about authority, responsibility, and social order (Ren, 2020). Yama's figure thus entered Chinese culture already predisposed toward institutional reinterpretation.

## 3. Ethical Reconfiguration through Sinicization

A defining feature of Yama's Sinicization lies in the ethical reconfiguration of his judicial role through Confucian moral principles. In Chinese contexts, Yama increasingly appeared not merely as a cosmic judge, but as a moral administrator whose authority reflected values central to Confucian ethics—particularly righteousness (*yi*), filial piety (*xiao*), loyalty, and social responsibility. Judgment in the afterlife was thus aligned with ethical norms governing everyday social relations.

Literary and religious sources from the Tang and Song dynasties depict the underworld as a fully articulated bureaucratic institution, complete with registers of merit and demerit, formal trials, and ranked officials (Fan, 2007; Li, 2007). These representations mirror the structure of imperial governance, translating moral evaluation into institutional procedure. Through this analogy, ethical behavior was no longer framed solely as personal cultivation, but as compliance with an objective and inescapable moral order.

This bureaucratic imagination served a crucial disciplinary function. By presenting postmortem judgment as orderly, systematic, and procedurally fair, Yama culture reinforced ethical self-regulation among believers. Moral norms were internalized not only through abstract teaching, but through the anticipation of inevitable evaluation beyond the reach of earthly institutions (Bao, 1988; Zhang, 2016).

Importantly, this ethical reconfiguration did not subordinate Buddhism to Confucianism. Rather, it produced a hybrid moral logic in which karmic causality and Confucian relational ethics mutually reinforced one another. Yama thus emerged as a culturally embedded figure whose authority derived simultaneously from Buddhist doctrine and Chinese moral-political tradition. Through this synthesis, the underworld became a moral mirror of the social world, projecting ethical governance into cosmic space.

## 4. Yama as a Normative Figure of Moral Governance

In Buddhist cosmology, Yama is traditionally portrayed as the ruler of the underworld who presides over postmortem judgment. In the Chinese context, however, Yama's significance extends beyond mythological narration and becomes a normative mechanism through which moral order is symbolically institutionalized (Ren, 2020; Zhang, J. D., 2010).

Unlike secular legal systems, Yama's judgment is imagined as absolute, morally comprehensive, and inescapable. Death does not mark the end of accountability; rather, it represents the moment at which moral evaluation becomes unavoidable. This conception transforms Yama into a transcendent moral authority whose jurisdiction surpasses that of earthly governance (Ma, 2014).

Central to this authority is the doctrine of karma, which establishes a causal relationship between moral conduct and

existential consequence. In Chinese religious narratives, karma is frequently rendered through administrative metaphors such as registers, ledgers, and judicial records, translating abstract moral causality into concrete and intelligible forms (Bao, C., 1988; Li, F. M., 2007). Through this translation, moral responsibility becomes systematic rather than discretionary, reinforcing its normative force.

Anticipation of postmortem judgment thus functions as a form of moral discipline. Individuals are encouraged to internalize ethical norms and regulate their own behavior in anticipation of inevitable evaluation. In this sense, Yama operates as a technology of moral governance, extending ethical regulation beyond the limits of formal institutions and the human lifespan (Yang, 2014; Shen, 2019).

## 5. The Bureaucratized Moral Order of the Netherworld

The normative authority of Yama in Chinese culture is inseparable from the bureaucratic imagination of the underworld. Rather than appearing as a solitary divine judge, Yama presides over a complex judicial system populated by ranked officials, clerks, and agents of enforcement. The system of the Ten Kings of Hell exemplifies this rationalized moral order, presenting judgment as a procedural and institutional process rather than an expression of arbitrary divine will (Jiang, X., 2017; Zhang, J. D., 2010).

This bureaucratization represents a symbolic transposition of imperial governance into cosmological space. Hierarchical organization, documentary administration, and procedural justice mirror familiar political institutions, rendering supernatural authority recognizable and socially legitimate (Li, F. M., 2007; Zhang, J. K., 2016).

Documentation occupies a central position within this moral order. Individual actions are imagined as permanently recorded, archived, and retrievable, reinforcing the belief that no moral behavior escapes institutional recognition. Through this administrative logic, moral accountability becomes an inevitable process rather than a matter of divine discretion (Bao, C., 1988; Ji, 2023).

By mirroring the structures of imperial administration, the underworld functions as a symbolic space in which political authority and moral authority mutually reinforce one another. Governance is moralized, while morality is bureaucratized, allowing hierarchical authority to be normalized within a moralized cosmos.

## 6. Sinicization as Cultural Translation

The Sinicization of Yama is often described as a process of cultural blending or religious localization. While such descriptions capture the hybrid outcome of this transformation, they tend to obscure the active interpretive labor through which Yama culture was reconfigured within Chinese society. This study argues that Sinicization should instead be understood as a process of cultural translation, in which religious meanings were selectively rearticulated through indigenous epistemological and moral frameworks (Zhang, J. D., 2010; Ren, 2020).

A pivotal moment in this translational process was the incorporation of Mount Tai into the cosmology of the underworld. As a long-established sacred site associated with life, death, and political legitimacy, Mount Tai provided an indigenous spatial framework through which Yama's authority could be reanchored within Chinese religious geography (Luán, B. Q., 2008; Fan, 1980). This integration did not merely add a local reference point; it redefined the locus of postmortem judgment in a way that resonated with existing beliefs about cosmic order and imperial sovereignty.

Confucian ethics further reshaped Yama's judicial logic by introducing relational moral categories such as filial piety, loyalty, and social responsibility. Within this framework, postmortem judgment became aligned with ethical norms governing everyday social relations, thereby extending Confucian moral priorities into the cosmological domain. Yama's authority was thus reconstituted not as a foreign imposition, but as a reinforcement of familiar moral expectations sanctioned by transcendent judgment (Yang, 2014; Shen, 2019).

Daoist cosmology contributed additional layers of meaning by incorporating principles of yin–yang balance, celestial bureaucracy, and pluralistic cosmological structures. These elements enhanced the flexibility and durability of Yama's authority, allowing it to operate across diverse ritual contexts and religious communities. Rather than producing doctrinal conflict, this pluralism enabled Yama culture to function as a shared symbolic language within a heterogeneous religious

landscape (Zhang, M. R., 2017; Pan, 2023).

The hermeneutical strategy of geyi played a crucial mediating role in this process of cultural translation. By articulating Buddhist concepts through indigenous philosophical categories, geyi enabled doctrinal continuity while facilitating cultural intelligibility. Through such selective reinterpretation, Yama was transformed from a foreign figure of judgment into a culturally embedded moral authority whose legitimacy derived from its alignment with Chinese ethical and cosmological sensibilities (Xie, X. D., 2011; Zhang, J. D., 2010).

Understood in this way, Sinicization emerges not as a dilution of Buddhist doctrine, but as a productive process through which religious symbolism acquired renewed moral efficacy. Cultural translation allowed Yama culture to maintain doctrinal coherence while simultaneously achieving social resonance, demonstrating how religious authority is sustained through adaptation rather than mere preservation.

## 7. Popular Narratives and Moral Education in Everyday Life

The social efficacy of Yama's authority depends not on elite doctrinal discourse alone, but on its circulation within everyday cultural practices. Popular narratives—including vernacular novels, theatrical performances, morality books (*shanshu*), and *baojuan* texts—functioned as crucial vehicles through which cosmological judgment was translated into accessible forms of moral instruction (Li, F. M., 2007; Jiang, N. H., 2014). Through these media, abstract notions of karma and postmortem accountability were rendered intelligible, emotionally resonant, and socially persuasive.

Such narratives typically emphasize clear moral contrasts and consequential outcomes. Acts of virtue and transgression are followed by visible reward or punishment, reinforcing intuitive understandings of moral causality. By dramatizing ethical consequence, these stories normalized the expectation that moral behavior would ultimately be subject to evaluation, even beyond the scope of human law (Zhang, F., 2020; Lin, 2021).

Importantly, popular narratives did not function primarily through doctrinal instruction, but through affective engagement. Identification with narrative figures, anticipation of judgment, and emotional responses to reward and punishment facilitated the internalization of moral norms. Rather than enforcing morality through external coercion, these narratives cultivated ethical self-regulation by shaping moral imagination (Liu, 2014; Yang, 2014).

In this sense, popular culture operated as a critical infrastructure of moral governance. By embedding ethical norms within storytelling, performance, and visual representation, Yama culture extended moral regulation into the rhythms of everyday life. Moral discipline was thus reproduced not only through institutions or ritual, but through repeated exposure to narratives that rendered accountability imaginable, inevitable, and socially meaningful.

The effectiveness of these narratives lay in their capacity to bridge cosmological judgment and lived experience. By situating moral evaluation within familiar social contexts—family relations, occupational conduct, and local communities—popular representations of Yama transformed abstract ethical principles into practical moral expectations. This narrative mediation ensured the transmission of moral norms across generations, sustaining Yama's authority as a culturally embedded form of ethical regulation.

## 8. The Modern Reinterpretation of Yama Culture

Classical theories of secularization have often assumed that modernization entails the decline of religious authority and the erosion of transcendent moral frameworks. The continued presence of Yama in modern cultural forms complicates this assumption. Rather than disappearing under conditions of social modernization, Yama undergoes symbolic transformation, adapting to new cultural, psychological, and narrative contexts (Xiao, 2006; Zhang, K. K., 2019).

In contemporary media, literature, and popular discourse, Yama frequently appears less as a literal judge of the dead than as a moral archetype. Detached from explicit religious belief and ritual practice, the figure nevertheless retains normative force by evoking enduring concerns with accountability, justice, and consequence. In this post-religious context, Yama functions as a symbolic device through which moral evaluation remains imaginable even in the absence of institutionalized belief.

This persistence can be understood through the lens of cultural memory. Religious symbols do not vanish simply because institutional religion weakens; instead, they are reactivated and reinterpreted within new discursive frameworks. Yama's

continued circulation reflects the durability of moral imagination shaped by historical religious narratives, even as their doctrinal foundations recede from everyday consciousness (Xiao, 2006).

Importantly, the modern re-signification of Yama does not reproduce premodern structures of authority. Contemporary representations often emphasize irony, ambiguity, or psychological introspection, reframing judgment as an internalized moral process rather than an externalized cosmic tribunal. Yet this very transformation testifies to the resilience of Yama as a moral symbol capable of mediating ethical reflection under changing social conditions (Zhang, K. K., 2019).

Yama's modern afterlife thus illustrates a broader pattern of continuity through transformation. Moral authority is not eliminated by secularization, but rearticulated through symbolic forms that remain culturally intelligible. The figure of Yama continues to provide a narrative and imaginative resource for negotiating questions of responsibility, justice, and human agency in contemporary society.

## 9. Conclusion

This study has argued that the Sinicization of Yama should be understood not as a process of passive cultural assimilation, but as an active form of cultural translation through which religious symbolism was reconfigured to sustain moral order within Chinese society. By tracing Yama's transformation across doctrinal discourse, bureaucratic imagination, ethical reinterpretation, popular narrative, and modern cultural re-signification, the article has demonstrated how a foreign religious figure acquired enduring normative authority through alignment with indigenous moral frameworks.

Conceptually, the analysis advances three interrelated contributions to critical humanistic social theory. First, it reconceptualizes moral governance as a symbolic process that extends beyond formal institutions of law and administration. The case of Yama illustrates how imagined postmortem judgment functions as a non-coercive mechanism of ethical regulation, encouraging moral self-discipline through anticipation rather than enforcement.

Second, the study reframes Sinicization as cultural translation rather than doctrinal dilution or localization. By foregrounding interpretive agency and selective adaptation, it demonstrates how religious authority is sustained through rearticulation within familiar ethical and cosmological vocabularies. This perspective challenges linear models of cultural transmission and highlights the productive role of translation in the longevity of religious symbols.

Third, the article contributes to debates on symbolic power by showing how religious figures operate as moral infrastructure. Through bureaucratic imagery, narrative circulation, and affective engagement, Yama culture rendered moral accountability visible, intelligible, and socially persuasive. Symbolic authority, in this sense, emerges not as an abstract belief but as a lived and repeated cultural experience.

From a contemporary perspective, the continued re-signification of Yama complicates secularization narratives that predict the decline of religious authority in modern societies. Even when detached from explicit belief and ritual practice, religious symbols persist as resources for moral imagination, providing frameworks through which questions of justice, responsibility, and human agency remain negotiable. Yama's modern afterlife demonstrates continuity through transformation, revealing how moral authority is rearticulated rather than extinguished under conditions of social change.

Beyond its specific historical focus, this study suggests a broader analytical implication: religious symbols should be approached not merely as objects of belief, but as dynamic mechanisms of moral governance embedded within cultural systems. By examining how symbolic authority operates across historical and contemporary contexts, critical humanistic social theory can better account for the enduring social functions of religion in shaping ethical life.

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# Research and Innovative Design of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding

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**Abstract:** Focusing on the costume patterns of the Yi ethnic group in Huanzhou Village, Wuding, this study explores their contemporary aesthetic significance and potential for cultural innovation. It aims to enrich modern design practices with deeper cultural meaning and to address market demands for innovative products rooted in intangible cultural heritage. Grounded in design studies and centered on the continuity and reinterpretation of ethnic culture, the research employs field investigation and firsthand data to systematically analyze the artistic characteristics of these local patterns. Through design strategies including Thematic Development, Compositional Design, Color Reconstruction and Formal Innovation, the traditional patterns are reinterpreted from a contemporary perspective. Both theoretical and practical outcomes demonstrate that such innovative reconstruction contributes to the revitalization of traditional culture and offers a viable approach for the sustainable preservation of intangible heritage. Integrating these Yi patterns into modern product design not only enhances artistic expression and visual impact but also improves market reception and strengthens the communicative efficacy of culturally innovative products.

**Keywords:** Yi Ethnic Costume; Innovative Design; Costume Patterns; Huanzhou Village; Wuding

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## 1. Introduction

With the development of globalization and cultural convergence in today's society, how to protect or inherit ethnic culture has been paid close attention to by many scholars. In this regard, traditional costume patterns are considered an important part of ethnic costumes, as symbols of intangible culture, carrying the group's historical memory and aesthetic concepts. But their successful application to modern architecture poses some challenges. New government initiatives encourage modern design practices in order to renew the culture, generating new possibilities of bringing ethnic factors to bear on contemporary issues <sup>[1]</sup>. The Násu Yi living in the village of Huanzhou have a unique costume pattern with clear regional characteristics and strong ethnic color reflected by its ornamental patterns, colors, patterns, and styles. As such, their costumes are also significant sources to study the costume culture among the southwest Yi people. The existing research mainly focuses on culture and general comparison of Yi clothing, with scholars like Mu Liangyun, Yan Quanji, Yang Jun, and others who have carefully studied its history, cultural elements, and the religious connotations, society functions, and nationality symbols existing in Yi costumes <sup>[2][3]</sup>. At the same time, designer Zhang Ying carried out a systematic comparison and study on color systems, clothing shapes, and ornamental elements used in Yi clothing in Southwestern China <sup>[4]</sup>. These studies provide important

background to understanding the broader cultural context of Yi traditional dress, but the systematic documentation and study of patterns on a local scale is needed, especially those investigations based on direct field observations and rigorous design evaluation frameworks.

This paper mainly takes the folk costume pattern of the Yi nationality as the research object, and combines the characteristics of design practice to conduct a large number of field investigations and visual analysis. It captures, describes, or analyzes their beauty (artistic features). Then, we propose a new mode for the pattern renovation, which consists of four stages: “Thematic Development-Compositional Design-Color Reconstruction-Formal Innovation”. Finally, it is applied to two cases (a cultural product and a home-furnishing fabric) to test its effectiveness. This research aims at exploring some possibilities in the renewal design of traditional ethnic costume patterns, which also provides a reference on how to protect and innovate Yi costume culture.

## **2. Research Location and Methodology**

### **2.1 Geographical Context**

The majority of the Yi in Huanzhou Village are members of a subgroup known as the Heiyi or Násu. The name Huanzhou Village comes from its former status as a military garrison town with 360 families: houses one of the most historically important Yi settlements, situated on what was conventionally considered a boundary between the prehistoric Luǒwǔ and Huángzhú tribes. The area’s long-standing physical isolation and inadequate transportation systems, which in turn have helped to insulate it from external cultural influences. This isolation has preserved for them their language and customs, and their unique costume tradition. Particularly, the maintenance of their traditional pattern on textiles shows clear implications about respect towards ancestors and nature, which has been extensively researched by scholars, indicating that these patterns are influenced by daily life activities. Most pattern motifs originate from everyday observations, commonly featuring animal imagery such as tigers, butterflies, dragons, phoenixes, and fish, alongside plant elements like pomegranate flowers, peonies, and chrysanthemums. These patterns not only reflect aesthetic preferences but also embody auspicious symbolism and religious connotations.

### **2.2 Research Methods and Process**

This paper aims to study and analyze the clothing pattern of Yi national costumes in Huanzhou Village, Wuding County, Yunnan Province. Based on the layout rules, pattern structure, and color semantics, this paper analyzes not only the aesthetic value but also the cultural connotation behind patterns in a comprehensive way, including theoretical study as well as design practice. mixed methods research design, including qualitative and artistic practice.

**Methodology:** In situ research was conducted between September 2021 and February 2023 in Huanzhou Village, including but not limited to its history museum, neighboring cultural institutions, traditional craft practitioners, and Yi women across different generations. The data were gathered using participatory observation, semi-structured interview method, and photo documentation as a technique for exploring the culture of dress clothing and its uses.

**Aesthetic analysis:** A group of researchers collect samples that represent the major components of clothes, like accessories, hats, skirts, handmade shoes, and patches. Data acquisition was done via image collection, sketches, drawings, or plans, and measurements. We grouped more than 20 different styles, including geometric figures, botanical motifs, fauna, calligraphy, and nature events. The collected data can be used to support the next design research and creative reuse.

**Color Analysis:** In order to obtain the colors of clothes on each population, we use some software, such as Adobe Photoshop, to get the dominant color shades of these populations’ outfits. We develop an online database using RGB codes to analyze the color balance principles and symbolism reflected in this kind of dress.

**Application Design:** Based on the analysis of the primary research findings, the findings were applied to real product design work; these applications were tested and refined through small-scale showcases and user feedback.






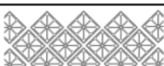





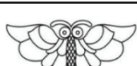



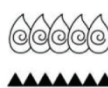









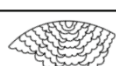


## **3. Artistic Features of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding**

### **3.1 Shape Characteristics**

The traditional dress of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding, has various patterns and colors. The

patterns are mainly found on garments (gowns, skirts, and other clothing such as hats, trousers, and garments covering the lower part of the body), handbags, and ornamental shoes. Meanwhile, these patterns have different appearances depending on where they are applied on a garment, and how they were produced, which are influenced by regional cultures, tastes, and traditions. The patterns were developed alongside these activities, spiritual beliefs, and habits, which serve not only decorative functions but have profound meanings and symbolisms attached to them as well. As regards their content and style, they belong to several categories, such as the geometric forms, flora, fauna, human figures (clothing styles), and descriptions about the surrounding environment.

Figure 1. Types and Cultural Connotations of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding (Selected Examples)

Type	Pattern Name	Pattern Symbol Form		Cultural Connotation
Geometric Patterns	Swastika-derived			Symbolizes fortune, longevity, and enduring continuity.
	Human Dance Pattern			Related to the Yi people's hand-in-hand migration, symbolizing unity; also used to represent the traditional Yi "Left Foot Dance" custom.
	Cross Flower Pattern			Simple, neat, orderly arrangement, and widely favored.
	Circular Longevity Character Pattern			Represents the yearning and pursuit of health and longevity.
Animal Patterns	Bird Pattern			Symbolizes celebration and good fortune.
	Butterfly Pattern			Butterflies are prolific, symbolizing reproductive worship.
	Tiger Pattern			Implies warding off evil, inviting good luck, and ensuring peace and smoothness.
	Dog Tooth Pattern			Also known as dog tooth edge; signifies warding off evil spirits and demons, praying for safety.
Plant Patterns	Pomegranate Flower Pattern			Symbolizes abundant offspring and blessings.
	Azalea Flower Pattern			Symbolizes auspiciousness, bravery, happiness, and love.
	Vine Stripe Pattern			Symbolizes prosperity, beauty, and auspicious celebration.
Character Patterns	Swastika (卐) Pattern			Symbolizes "the character ends but the line continues," representing unbroken good fortune.
Natural Phenomenon Patterns	Water Ripple Pattern			Symbolizes love and yearning for water.
	Sun Pattern			Symbolizes light, expressing worship of nature and prayers for protection and blessing.

Geometric patterns appear in the design and style of traditional clothing worn by local Yi people, which contains, for example, a very common cross-stitch flower pattern. These patterns are simple to understand and easy to make, and are commonly used in clothes such as aprons, leg guards, etc. Although this “longevity” character (shou) is originally taken from Han culture, many other nations also believe that it can bring them health or longevity. It becomes an ornamental font used in Yi embroidery as follows, are frequently placed on cockerel caps, and grouped into circles. In terms of animal motifs, fish, dragonfly, bird, and dog’s teeth are common decorative elements. Butterfly motif is especially common in the costumes from Huanzhou Village, with various compositions from realist to more abstract ones that show its range. The dog-teeth (also called the hook flower and the dog’s teeth) border is another typical geometric form that can be found frequently in the folk crafts of Huanzhou village. It uses the zigzag line as its basic shape, ordered so that they form two parallel rows, creating the shape of a long strip with strong periodicity. This pattern does not stand alone; rather, it is more commonly used in floral and bestial designs as an ornamental element, thus enhancing the visual effect of the whole design pattern <sup>[5]</sup>.





































The most common motif is a floral pattern, which has great significance in the traditional clothing of the area. This represents the respect that the Yi people have towards nature and how they can adapt it into beautiful artistic shapes <sup>[6]</sup>. Some plants commonly represented are camellias, azaleas, and peonies, with additional ornamental motifs like ferns, flowers of the mums, and vine tracery. Rather than be represented realistically, the motif is intentionally stylized using one of many different design strategies, through recomposition, hyperbole, and deformation into an astonishing variety of startling forms. In other words, these patterns both reflect the natural environment and embody the aesthetic taste and complex culture of the Yi people. In terms of ornamental motifs, the swastika (卐) motif carries specific cultural symbolism. To the Yi, a “broken figure but not broken spirit” means endless luck, eternal rejuvenation. The talisman draws from both mysticism and the native shamanism, a wish to be protected by ancestors’ forces: longer lifespans, and general well-being. This fabric style also contains some nature-derived patterns, such as waves. The wave pattern is often used in embroidery on the front part of caps, which are shaped like roosters: this style is similar to a set of waves on the surface of the water, or blooming flowers, reflecting not only the geography, but also the aesthetic taste of the Yi people who live in Huanzhou Village, Wuding (Figure 1).

### 3.2 Color Characteristics

Color is one of the most expressive elements in the traditional costume, which reflects humans’ aesthetic system and cultural connotation. The different ethnic groups express their own unique taste of aesthetics and characteristics by using different colors. The colorful costume culture of the Yi people’s clothing in Huanzhou Village has been formed and developed by a variety of factors, including religious beliefs, social context, geographic environment, and common sense of beauty, but also has a strong social semiotic meaning and representation value. The use of colors in this ethnic costume can be analyzed from the following two aspects: first, the selection and combination of primary colors in garments, and secondary colors.

The second factor is the balance relationship between the base color of clothing and the embroidery pattern on it. The main part of clothing’s appearance is: the clothing is colorful with striking patterns which reflect aesthetic values as well as symbolism; Huanzhou Village’s Yi ethnic clothes’ color choice is mainly derived from the colors of natural objects, and it can no longer be used simply to indicate age. not just a matter of social standing, or tribe hood, but of tribal aspiration to prosperity and success. In that culture, black is especially sacred <sup>[7]</sup>. The general background of clothes worn by elderly women is dark blue and black, while that for the young ladies tends to be a light red with dense embroidery. There is an old saying, “Yellow flesh and purple flowers, red horse and green blanket,” which vividly captures how they valued dramatic combinations of colors in their embroidery, as well as showing that in terms of color, the clothing and accessory colors are tailored to suit the personal preference of individuals from different households in the Yi village of Huanzhou <sup>[8]</sup>(Figure 2).

Figure 2. The color characteristics of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding



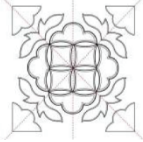





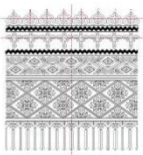
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	R:250 G:245 B:207		R:179 G:208 B:128		R:240 G:210 B:208		R:228 G:157 B:155
	R:184 G:066 B:062		R:157 G:041 B:076		R:068 G:083 B:070		R:065 G:073 B:120
	R:212 G:053 B:049		R:207 G:099 B:123		R:179 G:208 B:128		R:127 G:158 B:090
	R:211 G:083 B:140		R:224 G:165 B:197		R:216 G:232 B:187		R:216 G:232 B:187

3.3 Compositional Forms

In the pattern design of local female costumes from Huanzhou Village, most are symmetrically and evenly arranged patterns, giving them an orderly appearance. The traditional motifs give these objects a sense of rhythm and order by, for example, arranging elements in layers, the balanced allocation on the plane, the relationship between heavy and light lines, and the regulated use of decoration. This meticulous layout makes these designs seem to be both coherent and orderly in appearance, giving a sense of unity and harmony, which is also consistent with the local Yi aesthetics, which are devoted to “diversity-in-structure.” The hierarchical structure of these fabrics demonstrates an overall integration and arrangement in space of basic visual units-namely points,” lines, curves, and shapes-especially on how to develop figures’ styles within an image space (2D). Thus, this approach generates patterns that are dense but not overcrowded.

The overall pattern does not look messy; the basic forms and decorative motifs are not placed on top of each other, but interact with one another by their degree of filling, between black and white spaces, as well as the use of other artistic methods to create a coherent visual style with different planes and appropriate spatial relations. Whether it is natural abstract forms or geometrical shapes, these women of Huanzhou Village have a great skill at integrating various components to form images, has a stronger capability of combining patterns. In addition, symmetric geometrical patterns achieve an ideal combination of simplicity and intricacy, uniformity and variety, by repeating these lines rhythmically using different line thicknesses, widths, joining methods etc., giving a sense of gravitas and elegance as the overall outcome; these rules are indicative of the Yi people’s respect to structured beauty in art, which is also an accumulation of life experience. As Engels observed, lines, plane figures, polygons, rectangles, squares, triangles, circles, and spheres are all based on our observation of real objects around us<sup>[9]</sup>. Our hypothesis can be verified empirically by looking at the geometric structure of typical garment patterns in this ethnic group (Figure 3).

Figure 3. The compositional characteristics of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding

Composition Technique	Basic Elements	Structural Analysis	
Symmetry and Balance			
Point, Line, and Plane Combination			
Order and Repetition			

## 4. Construction and Practice of an Innovative Design Methodology

As a treasure in Chinese arts and culture, Yi costume patterns deserve systematic studies. The paper has conducted comprehensive field investigations for detailed analysis of the history, symbolism, and design expression of the costume pattern in Huanzhou Village, Wuding. We carefully examined and classified them by aesthetics regarding composition, color palette, and spatial patterns. According to “using ancient things as modern materials, introducing alien things into Chinese features by selecting and changing them,” we introduced new patterns from four angles: Thematic Development, Compositional Design, Color Reconstruction and Formal Innovation. Secondly, it explored whether or not this type of pattern in traditional Huanzhou Yi costumes could be applied to modern creative design, seeking to leverage practical design to promote and revitalize traditional culture.

### 4.1 Design Approaches

Based on the detailed study of the design language of the Yi national pattern of clothing in Huanzhou Village, Wuding, we transform the Yi national patterns into digital forms and propose a “Theme-Composition-Color-Form” design method. The traditional culture is then creatively designed according to the new design methods into a new product which can be used for people’s aesthetic taste and needs in terms of use function.

#### 4.1.1 Thematic Development

The earth whose bones became hills, and its blood rivers,” this myth suggests that tigers were held as sacred animals by the Yi people: symbolizing the source of everything else. Moreover, the Yi’s respect and worship of fire can also be found in their fire pattern, that were linked to fire, light, and the power of dispelling darkness and evil.

The existing field survey records a large number of the classic Yi pattern types. The content is mostly about the totems or myths. In terms of floral and fauna patterns, the insect flower patterns are very rich. “Pomegranate flower pattern”, symbolizing auspicious fertility and wealth, is often worn on them. The tiger motif (which occurs in many variants—from naturalistic to more stylized depictions, including forms and colors) and color combinations and styles is definitely the most common of all such animal motifs. Apart from the visual aspect, the tiger is the lucky animal; it brings good luck and drives away bad luck. According to the Yi origin story Axide Xianji (The Ancestors of the Axi): “In the beginning, there was nothing but the universe. There was one great tiger which lived in the world; his two eyes were stars, his skin earth, his bones mountains, his blood rivers.” The tiger is therefore viewed as being responsible for creating all things. Thirdly, there are fire-related symbols symbolizing life, brightness, and defeating evil spirits in the Yi’s worship of fire.

Mythologically speaking, parts of the body of this heavenly tiger became stars and constellations; his stripes made the

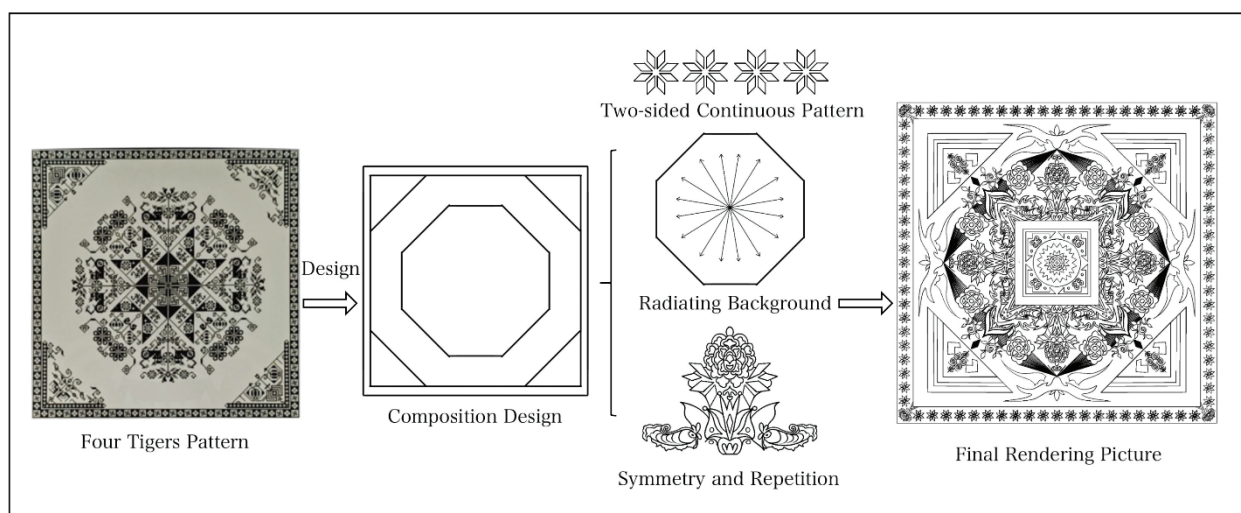
Milky Way, from which were born oceans from their viscera, mountains from their bones, plants from their hairs<sup>[10]</sup>. Here is a creation myth in which the tiger is a god. Moreover, natural elements such as the sun or the moon often appear on local costumes of Huanzhou village, such as “tornado pattern”, which is derived from lightning and sun patterns that symbolize light, which are associated with protection and goodwill. On this basis, I gathered patterns as well as reinterpreted them in a creative way, integrating the classic Yi ethnic style in Huanzhou Village and modern fashion elements, creating new themes; this innovation is mainly divided into three aspects: auspicious meaning, myths, and nature. In particular, lucky patterns include geometrical designs or natural shapes with positive meanings. The iconographic type also includes references to celestial symbols as well as portrayals of both divine and human worship. In turn, the naturalism motif is mostly represented by typical elements like pomegranate flowers, plants, birds, etc., all alive with the spirit of life.

#### 4.1.2 Compositional Design

Huanzhou Village Yi Ethnic Group’s clothing patterns are generally divided into symmetric balance layout style and regular rhythm layout style. The layout design is neat. The shapes usually have some kind of symmetry, as well as location within space (vertical/horizontal, position (e.g., lateral or medial), hierarchy of patterns, size ratio, and density of pattern with certain rules in order. The designer can cut and paste patterns for a change in the composition. These methods support creative development of artworks derived from the traditional “Four Directions and Eight Tigers” pattern, with restored solar, fish (piscine), and rhododendron patterns occurring regularly on both sides of the center. Most edges are decorated with eight-pointed stars (octagons), based on planar and 2D images.

The system uses advanced techniques in 4D smoothness for expressive representation of regularity’s beauty: a radial emanation layout, with the composition of concentric circles to highlight hierarchy, and decorations consist of some typical patterns on the traditional clothes of Huanzhou Yi nationality. such as four-petaled flower forms, ferns, flames, etc. The traditional elements are creatively transformed into simple geometry and abstracted lines, which lead to new patterns of design<sup>[11]</sup>. By organizing them with a focus on balance, rhythm, and repetitiveness, and balance, the structure of the building is more harmonious to create a feeling of steadiness. It also suits contemporary taste in symmetry and regularity. Also, it can combine the basic components of patterns and modern needs in a new way by recombination and space transformation (Figure 4).

Figure 4. Redesign Evolution Process and Line Drawings of Yi Costume Patterns from Huanzhou Village, Wuding

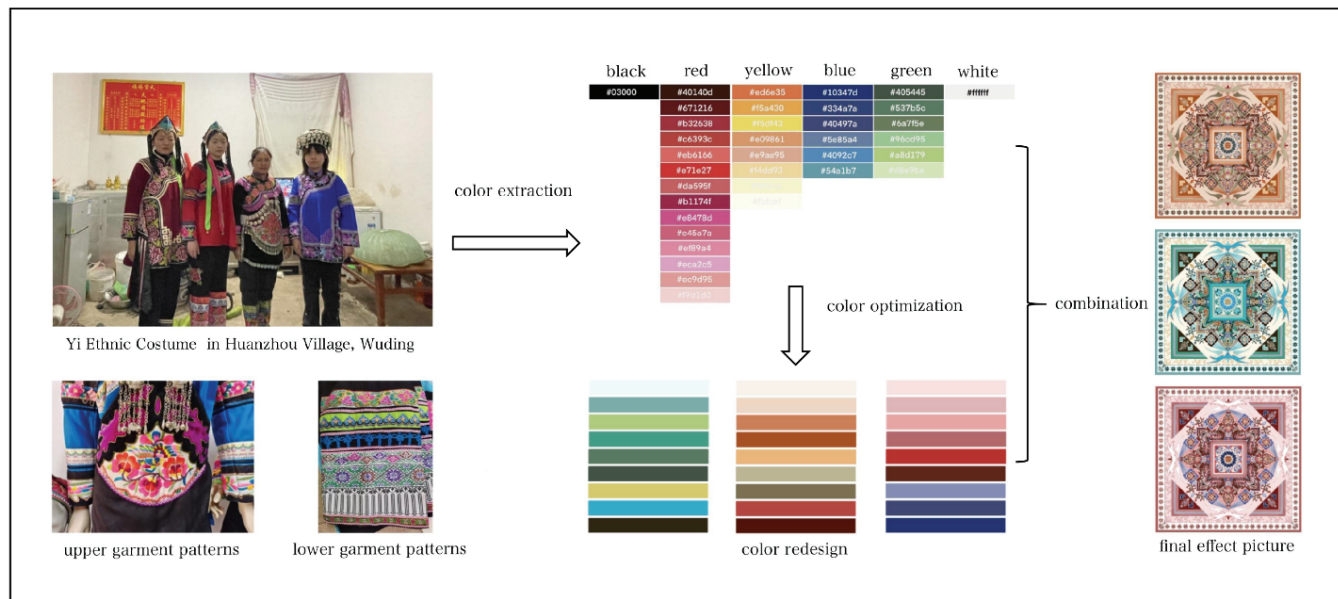


#### 4.1.3 Color Reconstruction

Based on a comprehensive analysis of Yi ethnic clothing patterns in Huanzhou Village, this paper focuses on two aspects for color innovation design research: the symbolic meaning explanation and color space mining methods. On the issue of symbolic meaning explanation, the focus was more on the symbolic value of colors (which remained culturally significant) and on the “synesthesia of color” as an expressive device. The Yi people live mainly in an agrarian society; they love to admire nature that reflects their aesthetic concept of harmonizing man and nature, or even the whole universe. Especially in

the community, they prefer to use black, red, and yellow to express their philosophy of life and cognition of the universe, with yellow, blue, and white being commonly used to complement each other<sup>[12]</sup>. The second is the color spectrum extraction technology, which refers to extracting colors of normal patterns through computerized image processing and generating an appropriate digital color palette. The initial set of colors is filtered, grouped, and arranged to be used as a modern design. The new color combinations in such designs do not necessarily correspond exactly with the colors used for the conventional ethnic colors, but can better reflect the basic elements of traditional color schemes and maintain their unique cultural features. Taking inspiration from the patterns of Yi ethnic costume fabrics in Huanzhou Village, the dominant color scheme is a red tone with many variations on the theme of red. With symbolical color change operations applied to it, the brightness of traditional ethnic colors is adjusted, and thus various shades of reds are generated from different intensities and saturations that retain a sense of historical color and simultaneously appeal to contemporary sensibilities. Black, blue, and yellow colors have been considered by extracting those two colors for highlighting the traditional patterns' cultural values. The holistic design uses warm and cool colors, as well as light and dark tones, for contrast: producing an aesthetically vibrant, culturally diverse display. The colors have vitality, with the appropriate ratio of cold and hot colors (Figure 5), which overcomes the traditional Yi color composition, and is applied to a new color style in modern design: for the re-visualization of culture, and to open new ways of expression.

Figure 5. Steps in the Color Evolution and Integration of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding

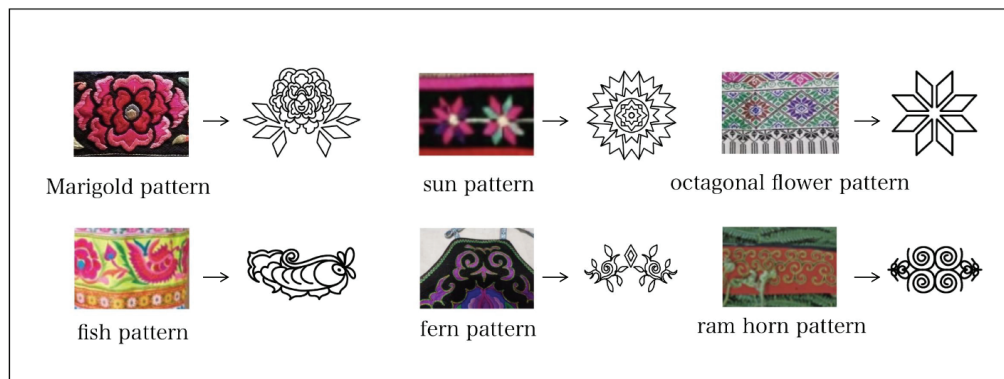


#### 4.1.4 Formal Innovation

The composition style of traditional Yi patterns in Huanzhou Village is very rich and diverse. In the inheritance of traditional Yi patterns, simplification, deformation, division, and combination, etc., are used for modifying the appearance of Huanzhou Village patterns in order to meet current aesthetic demands. As shown in the following examples, such a style renewal process can be used to simplify the traditional floral pattern of the rhododendron flower or sun by employing intentional curves. Triangular, polygonal shapes are used for stylized leaves of flowers, rays of sunlight. The ornament is based on basic graphic symbols: points, strokes, and planes, to produce new design ideas that reflect contemporary trends. The pattern of the fish in Huanzhou Village is relatively complicated, which can be simplified by extracting its basic contour as follows: then slowly disassembling it to build up a pattern that is genetically related but different from the original fish image<sup>[13]</sup>. Combined with fern-like shapes, with the use of planarity and symmetry, etc., new pattern forms are designed; the traditional fine-scale octagon pattern is simplified in terms of geometry to be applicable, emphasizing conceptual importance, and stylized depiction<sup>[14]</sup>. Taking advantage of the modularity of this base component, we replicate it in order to obtain decorative edges: into a coherent piece, orderly arranged. Next, we apply a variation algorithm to this basic pattern, which exaggerates and extends the entangled and compact features in vine patterns with simple contour lines, successfully illustrating

compositionality and layout (Figure 6).

Figure 6. Formal Innovation Evolution Process of Yi Ethnic Costume Patterns in Huanzhou Village, Wuding



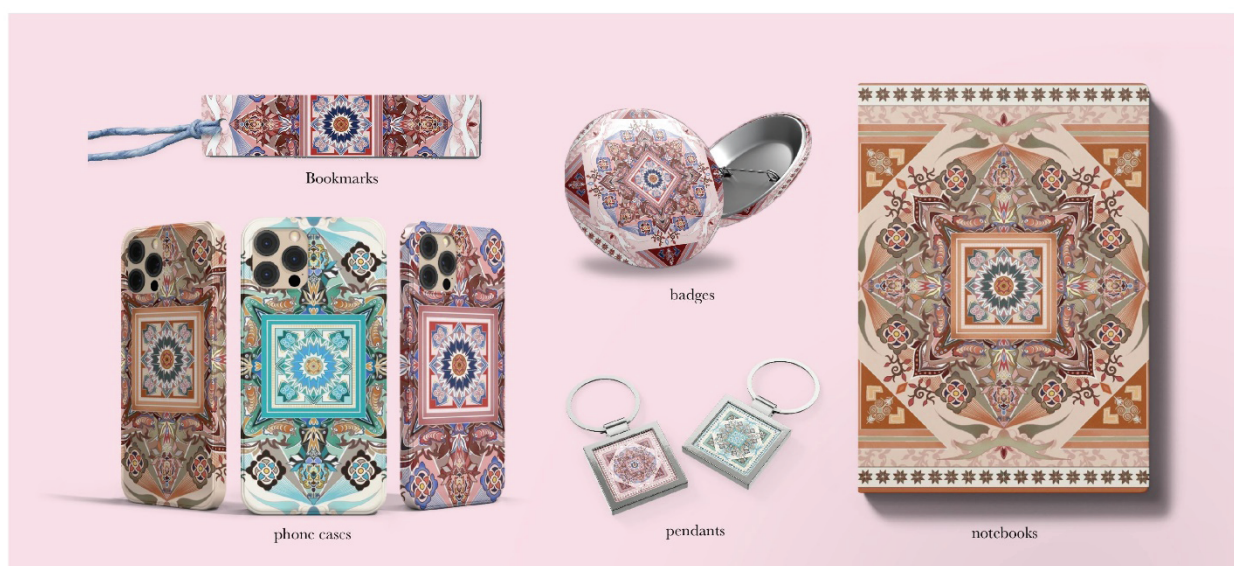
## 4.2 Design Application

The use of new design concepts based on indigenous ethnic patterns must take into account their original meaning and information, as well as the technical advantages, usefulness, and modernity of the final piece. The main tools for this art form are folk objects or fabrics from home life. Through the combination of special style elements such as those found in Huanzhou Village, Wuding, along with suitable construction materials and methods, this approach is a way of incorporating culture as part of conscious creation, with the result being attractive objects for use <sup>[15]</sup>.

### 4.2.1 Cultural and Creative Design

Traditional patterns are one of the most typical forms to reflect Chinese ethnic culture. They were widely used in today's cultural and creative products. In addition to utility value and aesthetic appeal, modern consumers expect cultural identity from these goods <sup>[16]</sup>. For example, using the design pattern of the Yi nationality in Huanzhou Village, Wuding, for creative design on products such as cellphone shells and so on, greeting cards, and stationery items. In such applications, the classical patterns go beyond just decoration and become the main narrative vehicle of the product. Aesthetic is balanced against functionality without excessive decoration; through the use of patterns, the collection of products is highly diverse, with interesting characteristics <sup>[17]</sup>. Applying the pattern of Huanzhou Village Yi to the project of cultural creativity is an important junction point for the protection of traditional culture and new design thinking in contemporary times. It enables the intermural composition, the expression of tradition and culture, as well as the role of improvement, allowing the traditional pattern to break free from its historic-geographic limits, finding its expression also in the dynamics of contemporary lifestyles (Figure 7).

Figure 7. Application in Cultural and Creative Products



#### 4.2.2 Home Textile Design

Nowadays, the “Guochao” (China-chic) trend has gained increasing popularity in customers’ choices due to growing national pride as well as their demands for personalized consumption, which has promoted the application of traditional patterns to household textiles. Textile design based on the patterns from Huanzhou Village Yi ethnic group is not only an inheritance and development of the culture, but also meets the new requirements for the market. With the application of these traditional patterns in contemporary fabric and new design methods, designers avoid a lack of diversity among products; use proper modern production techniques and materials to ensure that regenerated designs conform to today’s requirements for aesthetics and utility. As shown in Fig. 7, regenerated designs of Yi motifs from Huanzhou Village are used on fabric products. The new patterns show clear composition and strong color contrast after color restructuring, bettering their marketability.

The design meets the taste of today’s youth and shows a home in which timeless style is combined with comfort. It is produced using inkjet print, which perfectly expresses the complex patterns and colorful motifs from those traditional designs, representing the combination of tradition and modern technology. Besides technology, careful attention to material selection. Organic cotton, linen, or silk for a better feel as well as eco-friendliness, matching today’s green buying trends. Going forward, through innovative design strategies, collaboration with other fields, and technology application, domestic textile products could be a successful combination of culture, comfort, ecology, and intelligence, facilitating the exportation of “National Trend Home Textile” (Figure 8).

*Figure 8. Application in Home Textile Products*



Silk scarves

home textile designs

### 5. Conclusion

The innovative development of the ethnic costume pattern is one of the important aspects that need to be studied regarding the inheritance of intangible culture, promoting the function of design in transmitting culture, etc., which can be regarded as the breakthrough point for contemporary design innovation. After hundreds of years of evolution and development, the Yi ethnic group’s ornament patterns in Huanzhou Village, Wuding, have formed their own unique style features, colors, patterns, and forms, which express their animism, religious beliefs, and the accumulated life philosophies.

Based on primary field survey materials, this paper analyzed systematically the ornamental characteristics and classification model of Yi national costume patterns in that region; On this basis, the research proposed an innovative design system to support creative patterns creation in which “Idea-Plan-Color-Style.” is used as its core structure.” Through digitization technology and new interpretation, we managed to incorporate these traditional patterns in cultural products and home fabric design,” thus proving that elements from redesigned traditional costumes can be useful for current purposes. This suggests that this approach can be beneficial in both maintaining the heritage value while simultaneously making it more attractive and recognizable for modern consumers.

The present research has some limitations that need to be noted here: this research is based on a single village and thus cannot expand the comparison between cultural patterns in future research; it would be helpful if there were more attention paid to differences of patterns across various Yi groups in further research; considering the use of digital technology, applying sustainable design strategies. The above research directions will help build the theoretical basis and methods of protection and creative re-design of ethnic traditional costume patterns.

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## Conflict of Interests

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# Analysis of Elderly Care Service Policies in Shaanxi Province Based on Content Analysis Method

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**Abstract: Purpose:** To explore the content characteristics of Shaanxi Province's elderly care service policies, in order to better support the development of local elderly care services. **Methods:** The content analysis method was used to quantitatively analyze 15 policy texts, and the two-dimensional analysis framework of "policy tools - levels of elderly care service demands" was determined, with Nvivo 12 used for coding. **Results:** The elderly care service policies in Shaanxi Province were mainly Environmental tools, and 89.27% of the policies were used to meet the physiological and safety needs of the elderly. The use of policy tools generally decreases with the increase of demand level, and the intersection of policy tools and demand level shows an inverted U-shaped distribution. **Conclusion:** Shaanxi Province has fully met basic elderly care needs and attaches importance to the synergistic and balanced role of policy tools, but it is necessary to improve the level of elderly care service demands and increase the use of Demand-oriented tools. Shaanxi Province can closely follow the characteristics of the times and strengthen the application of information technology; rely on regional characteristics to develop age-appropriate products and promote industrial development; combine the characteristics of the elderly group to strengthen the safety management of elderly care institutions and home-based elderly care, improve the overall quality of elderly care services, and support the development of Shaanxi's aging cause.

**Keywords:** Elderly Care Services; Aging Population; Content Analysis Method

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## 1. Introduction

The report of the 20th National Congress of the Communist Party of China proposed to implement the national strategy of actively responding to population aging, develop the elderly care cause and elderly care industry, optimize the services for the elderly and widows, and promote the realization of basic elderly care services for all the elderly<sup>[1]</sup>. As of the beginning of 2024, Shaanxi Province has a permanent population of 39.52 million, of which 7.5912 million are aged 60 and above, accounting for 19.2%, and 5.2666 million are aged 65 and above, accounting for 13.32% (Data source: Shaanxi Provincial Bureau of Statistics). Shaanxi Province has entered a moderately aging society, and the demand for elderly care services will continue to increase. In terms of elderly care services, the state has formulated and issued a series of policies and regulations, and Shaanxi Province has formulated supporting regulations accordingly, refining a series of policy measures, standards, specifications and response measures. For example, documents such as the Implementation Plan of the Shaanxi Provincial Party Committee and the Provincial Government on Actively Responding to Population Aging, Implementation Opinions of the Provincial Government on Promoting the Development of Elderly Care Services, and 14th Five-Year Plan for the Elderly

Care Service System in Shaanxi Province provide strong support for regulating and guiding elderly care service work. By sorting out and analyzing the existing elderly care service policy documents in Shaanxi Province, improving the top-level design in combination with the characteristics of the times and groups, and then effectively improving the quality of elderly care services, it is of great practical significance for the development of Shaanxi's aging cause.

Therefore, this paper focuses on elderly care services. After sorting out the existing research literature on elderly care services, it is found that the research mainly focuses on the following aspects: First, the analysis focuses on the demand and supply of elderly care services in China. From the perspective of elderly care service demand, some scholars have carried out classification statistics and attribute identification from the perspectives of rural elderly care service needs, smart and healthy elderly care service needs for the elderly, and elderly care services for the disabled elderly population in urban areas before 2050<sup>[2-4]</sup>. From the perspective of elderly care service supply, some elderly care service studies have pointed out that there are problems such as imbalance between supply and demand and insufficient resource utilization of elderly care services in home and community-based care, and scholars have put forward countermeasures and suggestions to optimize the supply of elderly care services by constructing an elderly care service supply index measurement system and a community smart elderly care service supply mechanism<sup>[5-7]</sup>. In addition, some scholars have studied the relationship between demand and supply of elderly care services, pointing out the deviation between supply and demand of elderly care services and its influencing factors<sup>[8]</sup>. Second, it focuses on the research on China's elderly care service models and systems. Scholars have discussed models such as home-based elderly care, community mutual assistance care, combined medical and elderly care, and traditional Chinese medicine care, and pointed out their development status, constraints, practical paths, and model innovations<sup>[9-11]</sup>. At the system construction level, scholars focus on responding to the problem of population aging and carry out the construction of the elderly care service system from different perspectives such as urban, rural, sojourn and digital elderly care<sup>[12-13]</sup>. Third, it promotes the research on the high-quality development of elderly care services. Some scholars have explored the connotation of high-quality development of elderly care services, and analyzed its internal mechanism and proposed development paths from the perspectives of Chinese-style modernization, common prosperity, and big data drive<sup>[14-16]</sup>. In addition to the above three aspects, some scholars have analyzed China's elderly care policies and put forward the development orientation of elderly care service policies in the future<sup>[17]</sup>.

In general, there are a few research results on elderly care services in Shaanxi Province, and there is a lack of literature on in-depth analysis of the policy texts of elderly care services in Shaanxi Province. Shaanxi Province is facing a severe population aging situation, and there is an urgent need to carry out further research on elderly care services. Based on the above analysis, this paper intends to carry out the following work: First, collect and sort out the policy texts of elderly care services in Shaanxi Province. Second, use Nvivo 12 software to conduct text analysis on the elderly care service policies in Shaanxi Province and explore the thematic characteristics of the elderly care service policies in Shaanxi Province. Third, from the perspective of policy tools, explore the distribution characteristics of elderly care service policy tools in Shaanxi Province. Finally, put forward countermeasures and suggestions based on the analysis results to help the development of Shaanxi's aging cause.

## 2. Policy Analysis and Framework

### 2.1 Selection of Policy Tools

Policy tools are an important means of achieving policy goals<sup>[18]</sup>. Many scholars have divided policy tools from different perspectives: from the perspective of government resources, they can be divided into information-based, authoritative, organizational, and fiscal tools; from the perspective of structural levels, they can be divided into strategic layer, comprehensive layer and basic layer; according to the objectives achieved by the tools, they can be divided into mandatory tools, incentive tools, capacity-building tools and system change tools; according to the degree of compulsion of policy tools, they can be divided into voluntary tools, mandatory tools, and mixed tools; Rothwell and Zegveld divided policy tools into Supply-oriented tools, Demand-oriented tools, and Environmental tools from the perspective of mode of action<sup>[19-23]</sup>. In the current field of policy research, Rothwell and Zegveld's classification of policy tools is widely accepted by the academic community. As an important part of public policy, Shaanxi Province's elderly care service policies also need to use different policy tools to achieve policy goals. Therefore, this paper divides the elderly care service policy tools in Shaanxi Province

into Supply-oriented tools, Demand-oriented tools, and Environmental tools (Rothwell & Zegveld). In order to deeply explore the service needs of the elderly in Shaanxi Province, this paper determines the two-dimensional analysis framework of “policy tools - levels of elderly care service demands”, that is, the policy analysis framework of elderly care services in Shaanxi Province is constructed from policy tools (X dimension) and levels of elderly care service demands (Y dimension).

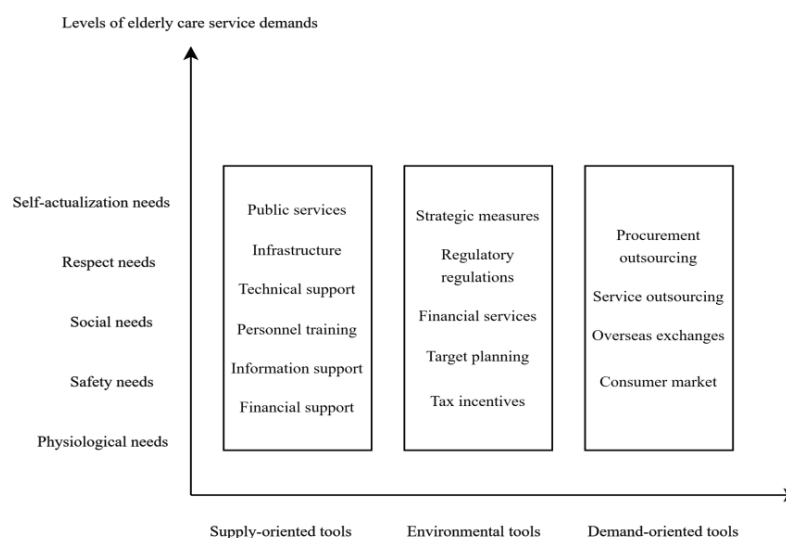
(1) X dimension: Perspective of policy tools. Based on the policy texts of elderly care services in Shaanxi Province, policy tools are divided into Supply-oriented, Demand-oriented and Environmental types. Among them, Supply-oriented tools refer to policies that the government plays a direct role in promoting the field of elderly care services, including government financial support and investment in facilities, technology, talents, etc.; Demand-oriented tools refer to policies that play a driving role in elderly care services, which is manifested in the government’s full mobilization of social forces to participate in elderly care services, mainly including Procurement outsourcing, Service outsourcing, Overseas exchanges, Consumer market, etc.; Environmental tools refer to policies that the government indirectly promotes the development of elderly care services by creating a good external environment, including Strategic measures, Regulatory regulations, Financial services, Target planning, Tax incentives, etc.

(2) Y dimension: Perspective of levels of elderly care service demands. As the frontier of China’s opening up to the west and an important node of the “Belt and Road”, Shaanxi Province has steadily improved its overall economic strength in recent years, but it also has problems such as unbalanced economic development levels and population aging degrees in different regions of the province. In order to strengthen the construction of inclusive, basic and basic livelihood security, and promote the high-quality development of elderly care services to meet the multi-level and diversified needs of the elderly, the Shaanxi Provincial Government has issued a series of policy documents on elderly care services. Due to the vertical stratification of elderly care service demands, it directly reflects the different problems and demand priorities faced by different elderly groups in the process of elderly care. Therefore, this paper will take the levels of elderly care service demands as the Y dimension of the policy analysis of elderly care services in Shaanxi Province, in order to better understand the focus of existing policies and the service needs of the elderly.

## 2.2 Two-dimensional Analytical Framework of ‘Policy Tools - Levels of Elderly Care Service Demands’

In order to compare and analyze the matching between policy tools and elderly care needs, this paper constructs a two-dimensional analysis framework of “policy tools - levels of elderly care service demands” for elderly care services, with the horizontal dimension as policy tools and the vertical dimension as levels of elderly care demands. Through two-dimensional cross-analysis, the effectiveness and shortcomings of policy tools in meeting different levels of elderly care demands are explored, and the basis for optimizing the connection between elderly care service policies and the actual needs of the elderly is provided, as shown in Figure 1.

*Figure 1 Text Analysis Framework for Elderly Care Service Policies*  
(Original Source: Created by the Author)



### 3. Research Design

#### 3.1 Selection of Policy Texts and Data Sources

The policy texts of this study come from the government websites of the Shaanxi Provincial People's Government, the Shaanxi Provincial Department of Civil Affairs, the Shaanxi Provincial People's Congress and its Standing Committee, combined with data collected from the Peking University Legal Database. As of the beginning of 2024, a total of 21 provincial-level elderly care policy texts have been collected. In order to ensure that the policy texts are consistent with the research theme, the policy texts are manually screened. The selection criteria for policy texts are as follows: First, provincial-level documents, that is, policy documents issued by the provincial government, the General Office of the Provincial Government and various provincial departments; second, in order to fully explore the characteristics of policy texts over more than 20 years, this paper selects policy text data after 2000; third, the policy texts take elderly care services as the theme, excluding policy documents related to endowment insurance and pensions, and only retain elderly care service policy documents, which are mainly notices, opinions, methods, measures, etc., excluding informal documents such as replies and approvals. According to the above criteria, a total of 15 policy texts were screened out.

#### 3.2 Research Methods

This paper uses the content analysis method to identify policy themes and policy tools in policy texts, as well as two-dimensional analysis of "policy tools - levels of elderly care service demands". In order to make the research efficient and accurate, policy text analysis is carried out with the help of Nvivo12 software. Nvivo12 is a software that supports qualitative research methods and mixed research methods, which can effectively assist researchers in collecting, organizing and analyzing text, pictures and video materials. The specific steps are: first, import the screened elderly care service policy texts into the software; second, conduct keyword analysis of elderly care service policies through the word frequency query function; third, code the policy texts into policy tool nodes and analyze the use of elderly care service policy tools; finally, conduct case node coding, carry out matrix coding query, form a two-dimensional table of "policy tools - levels of elderly care service demands", and then analyze the situation of elderly care service policy tools in Shaanxi Province.

### 4. Policy Analysis Results

#### 4.1 Frequency Analysis and Word Cloud Presentation of Elderly Care Service Policies in Shaanxi Province

Through the "word frequency query" function, the word frequency analysis of the Shaanxi Province elderly care service policy document is obtained, and the word, word count and word weighted percentage are obtained. As shown in Table 1, the top 20 keywords of elderly care service policies in Shaanxi Province are listed. The results show that: First, Shaanxi Province's elderly care service policies aim to build a social elderly care service system based on home-based elderly care, supported by community care and supplemented by institutional care. Among them, elderly care institutions are mentioned most frequently, which shows that elderly care institutions occupy an important position in Shaanxi Province's elderly care service system, and also reflects that Shaanxi Province takes institutional care as the core carrier of professional service supply in the process of aging, forming a connection with the policy positioning of "home-based and community-supported". Second, the policy documents emphasize the continuous strengthening of the planning, construction and age-appropriate transformation of elderly care service facilities, which can be divided into three categories: public service facilities, institutional safety facilities and family living facilities. For example, the new construction of cultural and sports activity centers for the elderly, the standardized transformation of fire protection systems in elderly care institutions, and the implementation of barrier-free passage transformation for families of disabled and semi-disabled elderly reflect the policy consideration of the safety and convenience of the elderly's lives. Third, the policy document is committed to promoting the construction of a community elderly care system, and building a "15-minute elderly care service circle" by promoting the full coverage of community elderly care service stations and developing "time bank" mutual assistance for the elderly, effectively improving the sense of gain and satisfaction of the elderly in the community, and continuously improving the health and well-being of the elderly. Fourth, the policy documents are committed to promoting the establishment of industry standards for

elderly care services. Promote the construction of a new standard system in which government-led standard formulation and market entity-led standard formulation coordinate and support each other, and promote the standardized and standardized development of the elderly care service industry. Figure 2 is the keyword cloud of Shaanxi Province’s elderly care service policies, which more intuitively shows the importance of the keywords of Shaanxi Province’s elderly care service policies.

Table1 Top 20 Key Words of Elderly Care Policies in Shaanxi Province

Serial Number	Keyword	Weighted Percentage (%)	Serial Number	Keyword	Weighted Percentage (%)
1	Service	4.26	11	Work	0.86
2	Elderly Care	4.19	12	System	0.76
3	Elderly People	2.00	13	Community	0.71
4	Institutions	1.69	14	Provide	0.68
5	Construction	1.22	15	Establish	0.66
6	Society	1.13	16	Support	0.61
7	Management	1.06	17	Planning	0.58
8	Facilities	0.94	18	Shall	0.53
9	Development	0.93	19	Elderly	0.51
10	Standards	0.91	20	People’s Government	0.51

Figure 2 Word Cloud of Key Terms for Elderly Care Policies in Shaanxi Province



4.2 Dimensional Analysis

4.2.1 Analysis of Elderly Care Service Policies in Shaanxi Province

According to the number of references at each node of the elderly care service policy text, under the premise of the overall consistency of the text, the more coding references used, the higher the proportion of policy tools used. As shown in Table 2, Environmental tools are the most frequently used elderly care service policy tools, with 546 reference points, accounting for 55.26%. This is partly due to the large elderly population in Shaanxi Province and the large demand for elderly care services. Environmental tools can create a good development atmosphere for elderly care services and attract more resource investment. Among them, Strategic measures and Target planning account for the largest proportion, indicating that Shaanxi Province attaches great importance to the macro guidance and standardization of the development of elderly care services, is committed to creating a stable and orderly development environment, and expects to promote the high-quality development of elderly care services through clear Target planning and Strategic measures, focusing on the formulation and implementation of long-term development strategies, and may hope to integrate resources from all parties with the help of Strategic measures and Target planning to improve the overall level of elderly care services. Regulatory regulations account for the second largest proportion, indicating that Shaanxi Province attaches great importance to regulating the elderly care service market through Regulatory regulations to ensure orderly operation, reflecting great attention to the quality and safety of elderly care

services and restricting them with laws and regulations, and reflecting the hope to provide a solid institutional guarantee for elderly care services with the help of Regulatory regulations. It may also mean that Shaanxi Province pays attention to balancing market vitality and standardized management in the development of elderly care services. Next is Supply-oriented tools, with 368 reference points, accounting for 37.24%. Among them, Public services account for the largest proportion, indicating that Shaanxi Province pays attention to increasing the supply of public services for elderly care services, reflecting the importance attached to the construction of elderly care service infrastructure and public resource investment, and reflecting the expectation to improve the quality of elderly care services by improving the level of Public services. It may also mean that Shaanxi Province regards Public services as an important focus to promote the development of elderly care services. Infrastructure and Financial support account for a large proportion, indicating that Shaanxi Province attaches great importance to the hardware construction of elderly care services, reflects the determination to improve the conditions of elderly care services, and reflects the belief that good Infrastructure and sufficient Financial support are the keys to improving the quality of elderly care services. It may also mean that Shaanxi Province hopes to attract more social forces to participate in elderly care services by increasing investment in these two aspects. Finally, there are Demand-oriented tools, with 74 reference points, accounting for 7.48%. Among them, Service outsourcing accounts for the largest proportion, indicating that Shaanxi Province pays attention to the use of external professional forces in elderly care services, reflecting the pursuit of improving the professional level of elderly care services. This may mean that its own supply capacity of elderly care services is limited and needs to be met through Service outsourcing, and at the same time reflects the active exploration of diversified elderly care service models. Government procurement and international exchanges account for a small proportion, and there is still much room for improvement.

*Table 2 Detailed Table of X Dimension Policy Tools Usage*

X Dimension	Name	Documents	Reference Points	Proportion (%)	Total
Supply-oriented tools	Public services	13	138	37.24%	368
	Infrastructure	12	75		
	Technical support	13	30		
	Personnel training	13	42		
	Information support	9	26		
	Financial support	13	57		
Environmental tools	Strategic measures	15	274	55.26%	546
	Regulatory regulations	13	78		
	Financial services	11	16		
	Target planning	15	159		
	Tax incentives	11	19		
Demand-oriented tools	Procurement outsourcing	3	3	7.48%	74
	Service outsourcing	14	54		
	Overseas exchanges	0	0		
	Consumer market	11	17		

#### 4.2.2 Analysis of Service Demand Levels for Elderly Care in Shaanxi Province

From the perspective of levels of elderly care service demands, this paper analyzes the elderly care service policies in Shaanxi Province from five aspects: Physiological needs, Safety needs, Social needs, Respect needs and Self-actualization needs (Table 3). Among them, there are 401 reference points for Safety needs, accounting for the largest proportion of 76.52%; 48 reference points for Physiological needs, accounting for 9.16%; 41 reference points for Respect needs, accounting for 7.82%; 16 reference points for Social needs, accounting for the smallest proportion of 3.05%; 18 reference points for Self-actualization needs, accounting for 3.43%, but involving more policy documents. Therefore, Safety needs account for the

highest proportion in the levels of elderly care service demands, indicating that the elderly attach great importance to safety and security, reflecting the key position of Safety needs in elderly care services, and also reflecting that the Safety needs of the elderly should be prioritized in the construction of the elderly care service system. Paying attention to the Physiological needs of the elderly and providing high-quality life care and medical security services is a key link in improving the quality of elderly care services. Therefore, Physiological needs account for a large proportion in the dimension of levels of elderly care service demands. Relevant policies point out that supporting the construction of universities for the elderly and encouraging the elderly to participate in community volunteer services not only reflect attention to the Respect needs of the elderly, but also meet their Self-actualization needs. Although the policy accounts for a small proportion of Social needs, it covers a wide range of contents, including encouraging the construction of activity centers for the elderly, providing places for the elderly to communicate and interact, supporting community organizations to carry out group activities for the elderly, and promoting social exchanges among the elderly.

*Table 3: Detailed Policy Information on the Y Dimension of Elderly Care Service Demand Levels*

Y Dimension	Documents	Reference Points	Proportion (%)
Physiological needs	8	48	9.16%
Safety needs	15	401	76.52%
Social needs	7	16	3.05%
Respect needs	10	41	7.82%
Self-actualization needs	9	18	3.43%

#### 4.2.3 Frequency Analysis of Policy Tools and the Hierarchical Dimensions of Elderly Care Service Demands

The government has used a total of 368 Supply-oriented tools, 546 Environmental tools and 74 Demand-oriented tools. Strategic measures tools are used most frequently, accounting for 26.81%, followed by Target planning and Public services tools, accounting for 10.12% and 17.51% respectively, while Service outsourcing tools account for only 6.01%. The policy tools to meet the Physiological needs, Safety needs, Social needs, Respect needs and Self-actualization needs of the elderly account for 8.34%, 79.48%, 2.74%, 6.57% and 8.34% respectively, showing an inverted U-shaped distribution.

Policy tools are analyzed from the perspective of demand levels: (1) 24 Supply-oriented tools, 28 Environmental tools and 9 Demand-oriented tools are used to meet the Physiological needs of the elderly. Among them, Public services and Strategic measures account for 55.73%, including providing diversified elderly care services, strengthening health management services for the elderly, and formulating policies and measures to encourage the elderly to participate in social activities. Regulatory regulations account for 6.1%, including clarifying the obligations of supporters, stipulating government support responsibilities, and formulating charging standards for elderly care institutions. (2) 233 Supply-oriented tools, 305 Environmental tools and 43 Demand-oriented tools are used to meet their Safety needs. Among them, Strategic measures account for 26.50%, including strict specifications and standards for elderly products, and medical assistance for elderly groups with special difficulties. Public services account for 15.14%, including the establishment of geriatric departments, the establishment of health records for the elderly, and the provision of home-based medical services. (3) 11 Supply-oriented tools, 7 Environmental tools and 2 Demand-oriented tools are used to meet their Social needs. Among them, Public services account for 35%, including free opening of parks, carrying out cultural activities for the elderly, and providing sports and cultural activity venues. Strategic measures account for 15%, including establishing the concept of lifelong development for the elderly, encouraging family members to play a role in spiritual comfort and psychological support, etc. (4) 19 Supply-oriented tools and 26 Environmental tools are used to meet their Respect needs. Among them, Strategic measures account for 31.25%, including promoting the new trend of helping the elderly, supporting the elderly, respecting the elderly, and practicing the concept of active aging. Public services account for 18.75%, including strengthening the publicity of elderly care service policies, creating a good social atmosphere, and setting up preferential service windows for the elderly. (5) 12 Supply-oriented tools and 7 Environmental tools are used to meet their Self-actualization needs. Among them, Public services and Strategic measures each account for 33.33%, including developing education for the elderly and encouraging the elderly

to participate in urban, rural and social activities. Technical support accounts for 14.28%, encouraging the development of digital distance education for the elderly, improving the community learning network for the elderly, etc., as shown in Table 4.

*Table 4 Cross-analysis of Policy Tools and Hierarchical Demands for Elderly Care Services (Units: Pieces)*

		Safety needs	Social needs	Physiological needs	Self-actualization needs	Respect needs	Total
Supply-oriented tools	Public Services	88	7	17	7	9	128
	Infrastructure	56	3	2	0	0	61
	Technology support	20	0	0	3	3	26
	Personnel training	14	0	3	1	5	23
	Information support	13	0	1	1	4	19
	Financial support	42	1	1	0	0	44
Environmental tools	Strategic measures	154	3	17	7	15	196
	Regulatory regulations	62	2	10	0	5	79
	Financial services	15	0	0	0	0	15
	Target planning	66	1	1	0	6	74
	Tax incentives	8	1	0	0	0	9
Demand-oriented tools	Procurement outsourcing	0	0	0	0	0	0
	Service outsourcing	31	2	8	2	1	44
	Overseas exchanges	0	0	0	0	0	0
	Consumer market	12	0	1	0	0	13
In total		581	20	61	21	48	731

## Conclusions and Recommendations

### Main conclusions

Based on the perspective of policy tools, this paper conducts in-depth research on the elderly care service policy in Shaanxi Province. The results of the study show that in order to cope with the problem of population aging, Shaanxi Province has formulated policies and measures from multiple angles in the field of elderly care services, which fully reflects the government's emphasis on aging and the purpose of being responsible to the people. "Service", "elderly care" and "institution" rank among the top three in the keyword ranking of elderly care service policies in Shaanxi Province, indicating that elderly care institutions play an important role in the field of elderly care services, and Shaanxi Province puts them in an important position in policy formulation, standardizes and provides support. In the use of policy tools, environmental tools accounted for the highest proportion, followed by supply-oriented tools, and demand-oriented tools accounted for the smallest proportion. It is also necessary to further strengthen the use of tools such as procurement outsourcing and technical support. In the dimension of the levels of elderly care service demands, Shaanxi Province attaches more importance to the development of the three dimensions of physiological needs, safety needs and respect needs of the elderly, and pays less attention to the social needs and self-actualization needs of the elderly. In the future, we should also strengthen the attention of these two dimensions to meet the diversified needs of elderly care services for the elderly and improve the overall level of elderly care services.

## Suggested countermeasures

In order to achieve the “14th Five-Year Plan” special plan for elderly care, Shaanxi Province “improves the province’s home-based community institutions, medical care and health care integration of elderly care service system, improves policies and regulations, service supply, and comprehensive supervision system, ensures basic elderly care services, optimizes the supply structure, improves service quality, promotes the coordinated development of elderly care and industry, meets the diversified and multi-level needs of the elderly, and enhances the sense of gain, happiness, and security of the elderly”<sup>[24]</sup>. The comprehensive use of supply-oriented, environmental, and demand-oriented policy tools in policy formulation has laid a solid foundation for the development of elderly care services. Based on the above research conclusions, combined with the characteristics of the times, regions and elderly groups, this paper puts forward the following suggestions: First, closely combine the characteristics of the times and further strengthen the use of information support tools. In a congratulatory letter to the 2023 China International Intelligent Industry Expo, General Secretary Xi Jinping pointed out, “At present, new technologies such as the Internet, big data, cloud computing, artificial intelligence, and blockchain are profoundly evolving, and the digital, intelligent, and green transformation of industries is accelerating..... It has greatly changed the global factor resource allocation mode, industrial development model, and people’s lifestyle”<sup>[25]</sup>. Information technology has profoundly evolved into an important feature of today’s era, and the application of information technology should be vigorously developed in the field of elderly care services. The second is to closely combine regional characteristics and further strengthen the use of product research and development and industrial development tools. Shaanxi Province has a long history and culture, rich natural resources, and unique topography and climatic conditions. We should give full play to regional characteristics and explore the research and development of age-friendly food and health products with Shaanxi characteristics. For example, Shaanxi’s rich agricultural resources are used to develop nutritious and suitable food for the elderly; Combined with Shaanxi’s traditional Chinese medicine culture, develop age-appropriate health products with health care effects. This can not only help the development of the cause of the elderly, but also promote local economic development. The third is to closely combine the characteristics of the elderly group and strengthen the use of safety management tools. Due to the deterioration of physical functions, the elderly have a more urgent need for the safety of the elderly care environment. On the one hand, with the help of online platforms, strengthen the safety management of elderly care institutions and ensure the safety of elderly care institutions in housing, fire protection, food, medical care and other aspects. On the other hand, the use of intelligent mobile terminals to strengthen the safety detection of home-based elderly care personnel and continue to improve the sense of security and happiness of the elderly.

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# Research on the Impact of Job Characteristics on Residents' Future Confidence — The Mediating Role of Job Satisfaction

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**Abstract:** Against the backdrop of deepening economic and social transformation, residents' confidence in the future has become an important indicator for evaluating the quality of social development and individual subjective well-being. Based on CFPS 2022 data, this study adopts a work characteristics perspective and employs a Generalized Structural Equation Model (GSEM) to systematically examine the mechanisms through which Work Income, Working Hours, Commuting Time, and Employer Type affect Residents' Confidence in the Future, with particular attention to the mediating role of Job Satisfaction. The results show that: (1) Work Income exerts a significant positive indirect effect on Residents' Confidence in the Future through Job Satisfaction, while its direct effect is not significant; (2) Working Hours have a positive direct effect on Residents' Confidence in the Future, but generate a negative indirect effect by reducing Job Satisfaction; (3) the effect of Commuting Time on Residents' Confidence in the Future is negative but not statistically significant and does not operate through Job Satisfaction; and (4) compared with civil servants, employees in private enterprises and foreign-funded enterprises exhibit significantly lower Residents' Confidence in the Future, with part of this effect being indirectly transmitted through Job Satisfaction. This study suggests that Residents' Confidence in the Future is shaped by multiple factors, including employment quality, labor intensity, commuting costs, and institutional differences across Employer Types. Accordingly, enhancing employment quality, improving labor conditions, optimizing commuting environments, and narrowing institutional disparities among different Employer Types are essential for jointly promoting economic development and social well-being.

**Keywords:** Work Characteristics; Job Satisfaction; Residents' Confidence in the Future

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## 1. Research Background

After the collapse of Japan's asset price bubble in the 1990s, young people gradually became embedded in what has been described as a "low-desire society," characterized by slowing population growth, population aging, and a decline in ambition and aspiration among younger generations. Kenichi Ohmae argues that a "low-desire society" is manifested in young people's lack of confidence in work and career development, a declining willingness to engage in material consumption, and increasing indifference toward social interaction, marriage, and childbearing<sup>[1]</sup>. In the post-pandemic period, similar tendencies have also emerged in China, with the "lying flat" phenomenon in 2021 becoming a typical expression of young people's passive response to mounting social pressures<sup>[2]</sup>. According to World Bank data, China's total fertility rate declined from 1.7 in 2017 to 1.2 in 2022, reflecting a weakening of young people's confidence in the future. The phenomena of "lying

flat” and “low desire” represent adaptive choices individuals make when confronted with uncertainty and pressure, rooted in a profound perception of living conditions and economic difficulties, and indicating an adjustment of future confidence when existing circumstances cannot be readily changed. Changes in residents’ future confidence have profound implications for social reality, particularly in the economic sphere. World Bank data further show that the COVID-19 pandemic significantly reduced residents’ confidence, leading to a decline in the share of final consumption expenditure in GDP from 56% in 2019 to 53.6%.

At present, there remains a significant gap between Chinese workers and those in developed economies in terms of working hours and income levels. According to data from the National Bureau of Statistics, Chinese workers work an average of 9.2 hours per day, making China one of the countries with the longest working hours among OECD members. In addition, data from December 2021 show that the average weekly working time of employees in enterprises nationwide was 47.8 hours<sup>[3]</sup>. The above working hours clearly exceed the legal standards stipulated in the Labor Law of the People’s Republic of China (revised in 2018), which sets a maximum of 8 working hours per day and an average of no more than 44 hours per week. At present, excessive working hours are widespread in certain industries, particularly manufacturing and the internet sector. The “996” work schedule and a culture of overtime are relatively prevalent, and many workers do not receive adequate compensation for overtime work, making unpaid overtime a prominent issue.

At present, there is a clear disparity in unemployment risk between inside-the-system and outside-the-system jobs in China. Positions within the system are generally more stable due to government fiscal support and are less affected by economic fluctuations. In contrast, jobs outside the system—particularly in the private sector and among temporary contract workers—face substantially higher unemployment risks during economic downturns.

The 2023 China Major Cities Commuting Monitoring Report shows that in 2022, the average one-way commuting time for workers in megacities such as Beijing, Shanghai, Chongqing, and Qingdao commonly exceeded 40 minutes. Among 45 major cities nationwide, more than 14 million workers (approximately 15%) experienced one-way commutes of over 60 minutes. This indicates that long commuting times have become a widespread phenomenon in large and medium-sized Chinese cities, continuously eroding workers’ time allocation and quality of life.

These realities are closely associated with residents’ future confidence. Work characteristics—including work income, working hours, commuting time, and employer type—influence residents’ future confidence and, in turn, shape their consumption and fertility behaviors. Against this backdrop, examining the impact of work characteristics on residents’ future confidence is essential for unlocking consumption and fertility potential and promoting economic growth, thereby offering both significant theoretical value and practical relevance.

## 2. Literature Review

Wang Wei defines job characteristics as “the inherent and intrinsic attributes of a task or job that employees engage in<sup>[4]</sup>.” Xin Ziqiang argues that job characteristics encompass not only job-type attributes such as the nature of work, employer type, and workload, but also the incentive and security conditions provided by organizations, including wages and remuneration, subsidies and benefits, education and training, incentive mechanisms, and the working environment<sup>[5]</sup>. Qi Yajing classifies job characteristics into two categories: job demands and job resources. Job demands refer to work-related factors associated with physical, social, or organizational aspects that require sustained physical and psychological effort from individuals and are linked to certain physiological and psychological costs, such as work intensity, job content, and employment relationships. In contrast, job resources denote positive factors within the job that help individuals achieve work goals, reduce work-related strain, and promote personal growth, learning, and development, including the working environment, income level, education and training opportunities, and interpersonal interactions in the work process<sup>[6]</sup>.

Synthesizing existing definitions of job characteristics, this study identifies repeatedly emphasized elements as their core components, including work income, working hours, work environment, employer type, and education and training. Given that the CFPS data do not contain information on education and training, this paper characterizes job characteristics from four dimensions only: work income, working hours, work environment, and employer type.

## 2.1 Research on the Direct Relationship Between Job Characteristics and Residents' Future Confidence Level

Wang Jian argues that universal basic income not only increases beneficiaries' income levels but also generates positive effects at the psychological and social levels. Stable and predictable income enhances individuals' sense of security and social trust, and by reducing uncertainty and improving self-evaluation, further strengthens their confidence in personal development and future socioeconomic prospects<sup>[7]</sup>. Xiao Xiangyin finds that under unclear promotion prospects, returning youth already face uncertainty about local career development, and declining income further intensifies this uncertainty, weakening their confidence in future development and reducing their willingness to remain in their hometowns long term<sup>[8]</sup>. Tian Feng finds that unemployment assessment has a significant positive effect on delivery riders' future confidence: for each one-unit reduction in perceived unemployment risk, the likelihood of higher future confidence increases by 38%<sup>[9]</sup>. In this study, differences in employer type lead to variations in job stability and unemployment risk across groups; therefore, employer type may influence residents' future confidence through both direct and indirect pathways.

Existing studies show that work income and employer type, as key job characteristics, have significant effects on residents' future confidence. However, there is limited empirical evidence on whether working hours and commuting time exert direct effects. Therefore, it is necessary to introduce a mediating variable and construct a mediation model to examine the indirect effects of these job characteristics on residents' future confidence.

## 2.2 Indirect Effects of Job Characteristics on Residents' Future Confidence: The Mediating Role of Job Satisfaction

Yao Xinying conducted a job satisfaction survey of 4,906 pediatricians using multistage stratified random sampling and applied one-way ANOVA and multivariate logistic regression. The results show that when monthly income exceeds 10,000 yuan, job satisfaction increases significantly with higher income levels<sup>[10]</sup>. Zhao Yang conducted a survey of 823 ride-hailing drivers and analyzed their work-related data, finding that evaluations of job satisfaction differed between low and high working hours groups. Drivers with shorter working hours reported higher proportions of "dissatisfied" and "neutral," while those with longer working hours showed higher proportions of "very dissatisfied" and "relatively satisfied"<sup>[11]</sup>. Using data from the 2015 national 1% population sample survey, Sun Weizeng empirically examines the impact of commuting time on firm productivity. The results show that longer commuting time crowds out employees' work and leisure time, reduces job satisfaction, and ultimately undermines overall firm productivity<sup>[12]</sup>. Jiang Wenjie conducted a questionnaire survey of 678 civil servants in Macao and found that civil servants with established positions reported higher job satisfaction than those without establishment<sup>[13]</sup>. Using data from the 2018 Shanghai Public Opinion Survey, He Fang finds that higher educational attainment enables most young people to enter the formal labor market with lower unemployment risk, leading to higher job satisfaction and stronger residents' future confidence<sup>[14]</sup>.

## 3. Hypotheses Development

### 3.1 Direct Effect Hypotheses

Existing research has shown that an increase in work income and differences in job stability due to employer type significantly affect residents' future confidence. When job stability declines, residents' future confidence also diminishes. However, empirical evidence regarding whether working hours and commuting time have a direct impact on residents' future confidence remains limited. Based on the current context and previous research conclusions, this study infers the potential relationships and proposes corresponding hypotheses to examine the direct effects between work characteristics and residents' future confidence.

H1-A: Work income directly affects residents' future confidence, and there is likely a significant positive correlation between work income and residents' future confidence.

H1-B: Work hours directly affect residents' future confidence, and there is likely a significant negative correlation between work hours and residents' future confidence.

H1-C: Commuting time directly affects residents' future confidence, and there is likely a significant negative correlation

between commuting time and residents' future confidence.

H1-D: Employer nature directly affects residents' future confidence, with greater stability in employer nature correlating with higher future confidence among residents.

### 3.2 Indirect Relationship Hypotheses

Based on existing research, an increase in work income enhances individual job satisfaction, while longer work hours and commute times negatively affect job satisfaction. Additionally, higher job stability is associated with higher job satisfaction levels. Furthermore, greater job satisfaction contributes to increased future confidence among residents. Therefore, this study proposes the following hypotheses regarding the indirect relationships between key work characteristics and residents' future confidence:

H2-A: Work income impacts residents' future confidence through the mediating effect of job satisfaction, and there may be a significant positive correlation between work income and residents' future confidence.

H2-B: Work hours impact residents' future confidence through the mediating effect of job satisfaction, and there may be a significant negative correlation between work hours and residents' future confidence.

H2-C: Commuting time impacts residents' future confidence through the mediating effect of job satisfaction, and there is a significant negative correlation between commuting time and residents' future confidence.

H2-D: Employer type impacts residents' future confidence through the mediating effect of job satisfaction, and the more stable the job type, the higher the residents' future confidence.

## 4. Data Sources and Variable Definitions

### 4.1 Data Sources

This study uses data from the China Family Panel Studies (CFPS) 2022, which is organized and conducted by the China Survey and Data Center of Renmin University of China (NSRC). The CFPS is a highly authoritative national longitudinal survey that comprehensively covers micro-level information such as demographic structure, economic activities, and social attitudes. The CFPS 2022 dataset contains the variables necessary for this study, with the personal database being primarily used for the analysis in this paper.

### 4.2 Variable Definition

This study focuses on the labor force aged 16 to 65. After filtering and cleaning the sample, removing invalid and missing values marked in the codebook, a total of 6,891 valid samples were obtained, providing a reliable data foundation for subsequent analysis using the multiple mediation model.

#### 4.2.1 Independent Variables

##### (1) Work Income

In this study, work income is measured using the "Total Work Income (CNY/year)" item from the individual questionnaire of the 2022 China Family Panel Studies (CFPS), which includes wages, bonuses, cash benefits, and in-kind subsidies. During data processing, work income was log-transformed for the following reasons: First, the income distribution of Chinese residents is "right-skewed" (with a few high-income groups pulling the mean up), and log transformation can convert this skewed distribution into an approximately normal distribution, thus eliminating heteroscedasticity and mitigating its interference with regression results.

##### (2) Work Hours

In this study, work hours are measured using the "Weekly Work Hours (hours)" item from the individual questionnaire of the 2022 China Family Panel Studies (CFPS), which includes overtime hours. During data processing, missing and invalid values were removed, and work hours were subject to winsorization, with truncation points set at the 1st and 99th percentiles to reduce the impact of extreme values on the analysis results.

##### (3) Commuting time

The "One-way Commute Time (minutes)" item in the 2022 China Family Panel Studies (CFPS) individual questionnaire best reflects the length of commuting time. This item is used to measure residents' commuting time in this study.

#### (4) Employer Type

The “Employer Type” item in the 2022 China Family Panel Studies (CFPS) individual questionnaire categorizes employer types into government departments, party and government agencies, public institutions, state-owned enterprises, private enterprises, individual businesses, foreign/overseas enterprises, other types of enterprises, individuals/families, private non-enterprise organizations, associations, guilds, foundations, village committees, and undetermined. This study considers these categories too detailed for research purposes, and therefore, reclassified and renamed them to better align with the focus of the study. “Government departments/party and government agencies/people’s organizations” were renamed as “Public Servants.” “Public institutions” and “state-owned enterprises” were merged into “State-owned enterprises/Public institutions.” “Private enterprises/individual businesses” were renamed as “Private enterprises,” and “Foreign/overseas enterprises” were renamed as “Foreign enterprises.” Other categories such as “other types of enterprises,” “individuals/families,” “private non-enterprise organizations,” “associations,” “guilds,” “foundations,” “village committees,” and “undetermined” were collectively merged into “Other enterprises.”

### 4.2.2 Mediating Variables

#### (1) Job Satisfaction

In the 2022 China Family Panel Studies (CFPS) personal questionnaire, there is an item measuring “job satisfaction.” The original question categorizes job satisfaction into five levels: very dissatisfied, somewhat dissatisfied, neutral, somewhat satisfied, and very satisfied. In the CFPS 2022 codebook, the five categories of job satisfaction are assigned corresponding values: very dissatisfied = 1, somewhat dissatisfied = 2, neutral = 3, somewhat satisfied = 4, very satisfied = 5. These assigned values are beneficial for subsequent data analysis, as they enable a more standardized and quantitative approach to analyzing job satisfaction.

### 4.2.3 Dependent Variable

#### (1) Residents’ Future Confidence

This study uses the “Confidence in One’s Future” item from the 2022 China Family Panel Studies (CFPS) personal questionnaire to measure residents’ future confidence. The original item assesses the level of confidence on a scale from 1 to 5, where 1 indicates “no confidence” and 5 indicates “very confident.”

### 4.2.4 Control Variables

To exclude the interference of non-core variables on the entire research path, this study selects six demographic and individual characteristic variables as control variables. The specific settings are as follows:

#### (1) Age and Gender

Article 15 of China’s Labor Law stipulates that the minimum legal working age is 16 years old, while the statutory retirement age is 60 for men and 50 for women, thus setting the upper limit for labor age<sup>[15]</sup>. Li Kang argues that individuals aged 60 still possess strong labor capabilities, and the proportion of workers beyond the retirement age is quite high<sup>[16]</sup>. Therefore, this study selects individuals aged 16-60 as the sample for analysis.

Gender can be considered a basic demographic characteristic and used as a control variable (though this study does not examine the impact of gender on the dependent variable). The coding rule is as follows: 0 = female, 1 = male, using the commonly accepted “0-1 coding” in academic research.

#### (2) Work Type: Agricultural or Non-Agricultural

Jiang Kezhong and Chen Youhua, in their study on the impact of land requisition on farmers’ life satisfaction and future confidence, found that rural household heads engaged in non-agricultural work tend to have lower levels of confidence in the future<sup>[17]</sup>. Therefore, the nature of the job can also influence residents’ confidence in the future. Thus, this study includes job type (agricultural or non-agricultural) as a control variable. In the CFPS 2022 dataset, the measurement item for job type is “Is this job agricultural or non-agricultural?” The coding rule is as follows: Agricultural = 1, Non-agricultural = 5.

#### (3) Health Status

Zhu Hongge and Zhang Shaopeng, in their study on the reform of key state-owned forest areas in Heilongjiang Province, found that the better the health status of forestry workers, the lower their concerns about uncertainties in job allocation, which

in turn led to higher levels of confidence in the future<sup>[18]</sup>. Existing research indicates that residents' health status can affect their level of future confidence. Therefore, this study includes health status as a control variable to reduce model bias. In the CFPS 2022, health status is measured by the question "How do you assess your health?" with values ranging from 1 to 5, representing "Very healthy" to "Unhealthy."

#### (4) Marital status

Liu Wenhua's survey of 655 teachers in Jinan, Shandong, found that marital status significantly affects teachers' social confidence experiences<sup>[19]</sup>. Zhang Mingming believes that a stable marital status contributes to residents' confidence in the future<sup>[20]</sup>. Therefore, this study includes marital status as a control variable. In CFPS 2022, the item for marital status is "Current Marital Status," with the original coding rules as follows: Unmarried = 1, With Partner = 2, Divorced = 3, Widowed = 4.

#### (5) Highest level of education

Lei Kaichun believes that urban youth with higher education, higher professional status, and higher income levels are more confident about their future prospects in terms of career development, income, and quality of life<sup>[21]</sup>. Based on this, the highest level of education of the research sample is included as a control variable in this study. The "Years of education completed by the respondent" variable in CFPS 2022 is used as the indicator for measuring the highest level of education of the research sample.

### 4.3 Statistical methods analysis

This study is based on the direct path analysis of "Job Characteristics (Work Income, Work Hours, Commuting Time, Employer Type) → Residents' Future Confidence Level" and the mediating path analysis framework of "Job Characteristics (Work Income, Work Hours, Commuting Time, Employer Type) → Job Satisfaction → Residents' Future Confidence Level." Path analysis from the Generalized Structural Equation Model (GSEM) is selected as the core statistical method.

This study uses Stata 17 for data processing and statistical analysis, applying the Generalized Structural Equation Model (GSEM) for path analysis. As an extension of traditional structural equation modeling, GSEM can handle different types of dependent variables and capture multiple mediation pathways, making it suitable for analyzing both direct and indirect effects between variables, thus effectively meeting the research needs of this study.

## 5. Main Research Findings

### 5.1 Descriptive Statistical Analysis

#### 5.1.1 Control Variables

##### (1) Gender and Age

In terms of sample characteristics, the gender distribution is relatively balanced, with males making up 45.55% (3,139 individuals) and females making up 54.45% (3,752 individuals), offering good representativeness. The mean birth year is 1984.01, with a standard deviation of 10.69, indicating some dispersion in the sample's age structure. The sample is primarily concentrated between the years 1975 and 1997, aligning with CFPS's focus on middle-aged and young labor force.

##### (2) Employment type: Agricultural or non-agricultural

The statistical results for respondents' employment type show that non-agricultural workers account for 95.91% of the sample (6,609 people), while agricultural workers make up only 4.09% (282 people). The sample clearly reflects a non-agricultural trend, consistent with the overall employment structure trend.

##### (3) Health Status

The statistical results for respondents' health status show that the sample predominantly falls into the "moderate" and "good" health categories. Specifically, 33.96% of the sample report being in "good" health (categories 1-2), 54.80% are in "average" health (category 3), and 11.24% report being in "poor" health (categories 4-5). This indicates that only a small portion of the sample has poor health.

##### (4) Marital Status

The statistics on the marital status of the respondents show that the majority of the sample is in a partnership (married or cohabiting), accounting for 74.85%. Singles make up 20.30%, while divorced and widowed individuals constitute a smaller

proportion. Overall, the sample primarily consists of middle-aged and young adults who are married or cohabiting.

#### (5) Highest Education Level

The descriptive statistics of respondents' years of education show a broad distribution of educational levels in the sample, with an average of 11.74 years of education, a standard deviation of 3.99 years, and a median of 12 years. Overall, most respondents' education levels are concentrated between elementary school and undergraduate levels, reflecting a moderately high overall education level, although there is still some variability.

### 5.1.2 Independent Variables

#### (1) Work Income

Descriptive statistical analysis of respondents' work income (log-transformed) shows that the sample includes 6,891 respondents. The mean work income is 10.45, with a standard deviation of 1.53, a minimum value of 0, and a maximum value of 13.82. The results indicate that the sample's income is generally at a medium level, but the distribution shows significant variation, reflecting an uneven income distribution. This provides an empirical basis for subsequent analysis of how work income affects future confidence through work satisfaction.

#### (2) Work Hours

Descriptive statistical analysis of respondents' work hours reveals that the sample consists of 6,891 respondents, with an average work duration of 51.38 hours per week and a standard deviation of 16.32 hours. The minimum work duration is 8 hours per week, and the maximum is 100 hours per week. Overall, the sample's work hours are on the higher end, but there is considerable individual variation, likely due to differences in job types and positions. Longer work hours may affect job satisfaction, thereby influencing residents' future confidence, which makes it an important factor for path analysis in this study.

#### (3) Commuting Time

The descriptive statistics of respondents' commuting time show that the sample includes 6,891 respondents, with an average commuting time of 22.41 minutes, a standard deviation of 20.61 minutes, a minimum value of 1 minute, and a maximum value of 240 minutes. Overall, there is significant variation in commuting times. Most respondents have relatively short commuting times, but a small number of individuals have notably long commuting times, reflecting differences in work locations, transportation methods, and residential distances. This provides a basis for the subsequent analysis of the mechanism of commuting time's impact.

#### (4) Employer Type

The descriptive statistics of respondents' employer types show that among the 6,891 samples, the highest proportion is from private enterprises (60.48%), followed by state-owned enterprises and public institutions (23.35%). The proportions of civil servants (5.91%), foreign enterprises (2.84%), and other types of enterprises (7.42%) are relatively low. Overall, the sample is primarily concentrated in private enterprises and state-owned enterprises/public institutions, with noticeable differences in the distribution of different employer types.

### 5.1.3 Mediating Variables

Work satisfaction is measured on a 1-5 scale, with a sample mean of 3.73, a standard deviation of 0.86, and a range of 1 to 5. Overall, respondents' work satisfaction is at a moderately high level, with most scores falling within the "Average to Satisfied" range. However, there are still individual differences, which may be related to factors such as work income and work hours. The distribution characteristics of work satisfaction provide reasonable support for its role as a mediating variable in the GSEM model.

### 5.1.4 Dependent variable

The residents' future confidence is measured on a 1-5 scale, with a sample mean of 4.06, a standard deviation of 0.88, and a range of 1-5. Overall, most residents have relatively high confidence in the future, but there is still some individual variation, which may be related to the impact of work characteristics on future confidence through the mediator variable of job satisfaction. This provides empirical support for analyzing the causal path.

Table 5-1

Variable Type	Variable Name	Variable Description	Proportion (%)	Mean	Standard Deviation
Independent Variables	Work Income	Continuous Variable	-	10.45	1.53
	Work Hours	Continuous Variable	-	51.38	16.32
	Commuting Time	Continuous Variable	-	22.41	20.61
	Employer Type	Civil Servant=1	5.91	0.059	0.24
		State-owned=2	23.35	0.2335	0.42
		Private Enterprise=3	60.48	0.6048	0.49
		Foreign Enterprise=4	2.84	0.0284	0.17
		Other Enterprise=5	7.42	0.0742	0.26
Mediator Variables	Job Satisfaction	Very Dissatisfied=1 Dissatisfied=2 Neutral=3 Satisfied=4 Very Satisfied=5	-	3.73	0.86
Dependent Variables	Future Confidence Level	No Confidence=1 Low Confidence=2 Neutral=3 High Confidence=4 Very Confident=5	-	4.06	0.88
Control Variables	Gender	Female=0	45.56	0.4556	0.5
		Male=1	54.44	0.5444	0.5
	Age	Year of Birth		1984.007	10.69
	Work Type	1=Agricultural	4.09	0.0409	0.198
		5=Non-Agricultural	95.91	0.9591	0.198
	Health Status	Very Healthy=1	15.34	0.1534	0.36
		Healthy=2	18.62	0.1862	0.39
		Fairly Healthy=3	54.79	0.5479	0.4977
		Average=4	4.96	0.0496	0.2172
		Unhealthy=5	6.28	0.0628	0.2427
	Marital Status	Unmarried=1	20.30	0.2030	0.4023
		Partnered=2	74.85	0.7437	0.4366
		Divorced=3	3.76	0.0376	0.1902
		Widowed=4	1.09	0.0109	0.1037
	Years of Education	0-23 Years		11.74	3.99

## 5.2 GSEM Results Analysis

(1) Analysis of the impact of core work characteristics on job satisfaction.

Table 5-2 shows the impact of independent variables on job satisfaction. Work income has a significant positive effect on job satisfaction ( $\beta=0.0365$ ,  $p<0.001$ ), indicating that higher income leads to higher job satisfaction. This is consistent with the findings of Wang Yongjie<sup>[22]</sup> and Dong Xiangshu<sup>[23]</sup>, who concluded that “higher income can enhance an individual’s psychological security and job satisfaction, thereby increasing overall job satisfaction.”

Working hours have a significant negative effect on job satisfaction ( $\beta=-0.0076$ ,  $p<0.001$ ), indicating that longer working hours reduce residents’ job satisfaction. This reflects the fact that prolonged labor may increase work stress and disrupt

the balance between work and life, thereby diminishing individual job satisfaction. This conclusion aligns with the views of Liang Wenyan<sup>[24]</sup> and Wang Yonggang<sup>[25]</sup>, who state that “employees’ perception of job satisfaction decreases with long working hours, and their sense of balance between work input and reward is negatively affected, leading to lower job satisfaction.”

The effect of commuting time on job satisfaction is not significant ( $\beta=-0.00057$ ,  $p=0.247$ ). In this sample, commuting time has a small direct effect on job satisfaction. This may be due to the fact that the perceived impact of commuting time is influenced by individual adaptation and commuting modes, which prevents it from showing statistical significance.

The impact of state-owned enterprises (SOEs) and public institutions on job satisfaction is not significant ( $\beta=-0.0717$ ,  $p=0.119$ ), suggesting that the job stability and compensation in these organizations are not significantly different from those of civil servants, so the satisfaction differences among employees in these institutions are not pronounced. Private enterprises ( $\beta=-0.1113$ ,  $p=0.012$ ) and other enterprises ( $\beta=-0.1480$ ,  $p=0.009$ ) have a significant negative effect on job satisfaction compared to civil servants, indicating that the job stability and compensation in these companies are considerably lower than those in the public sector, leading to relatively lower job satisfaction among employees. The impact of foreign-invested enterprises on job satisfaction is not significant ( $\beta=-0.0327$ ,  $p=0.651$ ), possibly due to the differences in compensation and management models within foreign companies, which did not show a clear effect in the sample. Du Qiuyong believes that in China, state-owned and public sector organizations still have certain delays in their salary systems and incentive mechanisms, making it difficult for employees’ incomes to fully reflect their abilities and value. In contrast, foreign-invested enterprises often offer more attractive salary levels and better welfare benefits, with overall compensation that is noticeably higher than in the public sector, creating a stark contrast<sup>[26]</sup>.

Table 5-2

Variable Category	Variable Name	Model 1 (Job Satisfaction) Coefficients (P-values)
Independent Variables	Work Income	0.0365*** (0.0069)
	Work Time	-0.0076*** (0.0007)
	Commuting Time	-0.0006 (0.0005)
	Employer Type	-0.0717 (0.0459)
	State-owned Enterprises	-0.1113* (0.0443)
	Private Enterprises	-0.0327 (0.0724)
	Foreign-invested Enterprises	-0.1480** (0.0563)
	Other Enterprises	-0.0813*** (0.0209)
	Gender (Gender_clean = Male)	-0.0028* (0.0012)
	Job Type (Non-agricultural)	-0.0530 (0.0514)
Control Variables	Health Status	-0.1724*** (0.0345)
	Very Healthy	-0.3126*** (0.0292)
	Comparatively Healthy	-0.6135*** (0.0520)
	Average	-0.7146*** (0.0477)
	Unhealthy	0.0111 (0.0304)
	Marital Status	-0.0892 (0.0588)
	With Partner	0.0258 (0.1030)
	Divorced	-0.0050 (0.0032)
	Widowed	-0.0050 (0.0032)
	Education Level (Years of Education)	-0.0050 (0.0032)
_cons	_cons	0.2108*** (0.0119)

## (2) Analysis of the impact of job satisfaction on residents' future confidence.

Table 5-3 shows the impact of job satisfaction on residents' future confidence. Job satisfaction has a significant positive impact on future confidence ( $\beta=0.2108$ ,  $p<0.001$ ), indicating that higher job satisfaction leads to stronger future confidence. This supports the important role of job satisfaction in shaping individual future expectations, suggesting that psychological and occupational experiences have a positive effect on future confidence. This conclusion aligns with the findings of Wang Hanqing<sup>[27]</sup> and Lina<sup>[28]</sup>, whose research shows that the higher the job satisfaction, the stronger employees' confidence in their future development.

## (3) Analysis of the Impact of Core Job Characteristics on Residents' Future Confidence

The research results show that work income does not have a significant direct impact on residents' future confidence ( $\beta=-0.0023$ ,  $p=0.731$ ), indicating that income levels do not directly influence individuals' confidence in the future. This result suggests that simply having a higher income is not sufficient to significantly improve residents' subjective expectations about the future; its effect is more likely mediated by other factors.

Work hours have a significant positive impact on future confidence ( $\beta=0.00131$ ,  $p=0.044$ ), suggesting that longer work hours may slightly enhance residents' confidence in the future through the accumulation of experience or career stability. This indicates that as work hours increase, residents may earn higher incomes, which in turn boosts their confidence about the future.

The results show that commuting time has a marginally significant negative effect on residents' future confidence ( $\beta=-0.000917$ ,  $p=0.057$ ), suggesting that as commuting time increases, residents' confidence in the future may decline. However, this impact has not reached the traditional statistical significance level. This result implies that longer commuting time may reduce individuals' positive expectations for their future life by increasing time costs and physical and mental burdens, but the effect is relatively weak and not strong enough to form a significant impact.

The results indicate that the impact of state-owned enterprises and public institutions on residents' future confidence is not significant ( $\beta=-0.07997$ ,  $p=0.078$ ), and the influence of other types of enterprises is also not significant ( $\beta=-0.0873$ ,  $p=0.116$ ). In contrast, private enterprises ( $\beta=-0.1067$ ,  $p=0.015$ ) and foreign-funded enterprises ( $\beta=-0.1826$ ,  $p=0.011$ ) show a significant negative impact on residents' future confidence, indicating that residents employed in these organizations tend to have relatively weak confidence in future development. This result may be related to differences in career stability, income security, and development expectations between different types of employers. Compared to state-owned enterprises and public institutions, private enterprises and foreign-funded enterprises are more vulnerable to market fluctuations and changes in the economic environment, leading to higher employment uncertainty, which in turn reduces individuals' sense of security and stability regarding their future.

Variable Category	Variable Name	Model 2: Future Confidence
Mediator Variable	Job Satisfaction	0.2108*** (0.0119)
	Work Income	-0.0023 (0.0068)
	Work Hours	0.0013* (0.0006)
	Commuting Time	-0.0009 (0.0005)
Independent Variables	Employer Type - State-owned & Public Institutions	-0.0800 (0.0453)
	Private Enterprises	-0.1067* (0.0437)
	Foreign Enterprises	-0.1826** (0.0714)
	Other Enterprises	-0.0873 (0.0555)
	Gender - Male = 1	0.0753*** (0.0206)
Control Variables	Age	-0.0011 (0.0012)
	Work Nature - Non-Agricultural = 5	-0.0239 (0.0507)

Variable Category	Variable Name	Model 2: Future Confidence
Control Variables	Health Status - Very Healthy	-0.2133*** (0.0341)
	Relatively Healthy	-0.4471*** (0.0291)
	Average Health	-0.5369*** (0.0518)
	Unhealthy	-0.7444*** (0.0478)
	Marital Status - With Partner	0.2841*** (0.0300)
	Divorced	0.0427 (0.0580)
	Widowed	0.0795 (0.1016)
	Years of Education	-0.0078* (0.0031)
_cons	_cons	0.1567*** (0.0132)

### 5.3 Validation of Hypothesis Testing Results

#### 5.3.1 Verification of Direct Relationship Hypotheses

Based on the results of Model 1 and Model 2, work income does not have a significant direct effect on residents' future confidence ( $\beta = -0.0023$ ,  $p = 0.731$ ), indicating that work income primarily influences future confidence indirectly through job satisfaction. Its direct effect is weak, not supporting the existing hypothesis. H1-A: Work income directly affects residents' future confidence, and there may be a significant positive correlation between work income and future confidence.

The results show that work hours have a significant but weak positive effect on future confidence ( $\beta = 0.00131$ ,  $p = 0.044$ ), suggesting that longer work hours may boost future confidence through experience accumulation or income expectations. This contradicts the original hypothesis, and therefore, H1-B is not supported. H1-B: Work hours directly affect residents' future confidence, and there may be a significant negative correlation between work hours and future confidence.

The results show that commuting time has a marginal negative effect on future confidence ( $\beta = -0.000917$ ,  $p = 0.057$ ), which aligns with the original hypothesis but does not reach traditional significance levels, so the hypothesis is not fully supported. H1-C: Commuting time directly affects residents' future confidence, and there may be a significant negative correlation between commuting time and future confidence.

The impact of employer type on residents' future confidence is as follows: State-owned enterprises and public institutions ( $\beta = -0.07997$ ,  $p = 0.078$ ) and other types of enterprises ( $\beta = -0.0873$ ,  $p = 0.116$ ) show no significant effects. Private enterprises ( $\beta = -0.1067$ ,  $p = 0.015$ ) and foreign-invested enterprises ( $\beta = -0.1826$ ,  $p = 0.011$ ) significantly reduce future confidence. Overall, employees in more stable jobs tend to have stronger future confidence, which partially supports H1-D: Employer type directly impacts future confidence, with greater stability correlating with higher confidence, though not all types show significance.

#### 5.3.2 Verification of Indirect Relationship Hypotheses

Work income  $\rightarrow$  Job satisfaction  $\rightarrow$  Residents' future confidence: Work income has a significant positive impact on job satisfaction ( $\beta = 0.0365$ ,  $p < 0.001$ ), indicating that higher income levels lead to higher job satisfaction among residents. Furthermore, job satisfaction has a significant positive impact on residents' future confidence ( $\beta = 0.2108$ ,  $p < 0.001$ ). This supports the conclusions of Liu Meicen's research, which found that "higher income leads to higher job satisfaction"<sup>[29]</sup>, and Wang Hanqing's research, which found that "higher job satisfaction leads to greater confidence in the future"<sup>[27]</sup>. Therefore, the results support the previously proposed hypothesis H2-A: Work income influences residents' future confidence through the mediating role of job satisfaction, and there is likely a significant positive correlation between work income and residents' future confidence.

Work hours  $\rightarrow$  Job satisfaction  $\rightarrow$  Residents' future confidence: Work hours have a significant negative impact on job satisfaction ( $\beta = -0.0076$ ,  $p < 0.001$ ), indicating that longer working hours reduce residents' job satisfaction, which is consistent with Zhao Yang's research<sup>[11]</sup>. Additionally, job satisfaction has a significant positive impact on residents' future confidence ( $\beta = 0.2108$ ,  $p < 0.001$ ), indicating that the higher the job satisfaction, the stronger the residents' confidence in the future. Therefore, this supports the previously proposed hypothesis H2-B: Work hours influence residents' future confidence through

the mediating role of job satisfaction, and there is likely a significant negative correlation between work hours and residents' future confidence.

Commuting time  $\rightarrow$  Job satisfaction  $\rightarrow$  Residents' future confidence: Commuting time has an insignificant effect on job satisfaction ( $\beta=-0.00057$ ,  $p=0.247$ ), suggesting that in this sample, commuting time has a minimal direct impact on job satisfaction. Therefore, the previously proposed hypothesis H2-C, stating that commuting time affects residents' future confidence through job satisfaction and may have a significant negative correlation with it, is not supported.

Employer type  $\rightarrow$  Job satisfaction  $\rightarrow$  Residents' future confidence: The results of this study show that employer type influences job satisfaction. Employees in state-owned enterprises and public institutions do not report significantly lower job satisfaction compared to civil servants, indicating that their job stability and benefits are similar to those of civil servants, resulting in minimal satisfaction differences. Private enterprises ( $\beta=-0.1113$ ,  $p=0.012$ ) and other types of enterprises ( $\beta=-0.1480$ ,  $p=0.009$ ) significantly reduce job satisfaction, reflecting a substantial gap in job stability and benefits compared to civil servants. However, foreign enterprises ( $\beta=-0.0327$ ,  $p=0.651$ ) have no significant effect. Wang Jinshui's research supports the conclusion that differences between institutional and non-institutional employment significantly affect job satisfaction<sup>[30]</sup>. However, job satisfaction has a significant positive effect on residents' future confidence ( $\beta=0.2108$ ,  $p<0.001$ ), meaning higher satisfaction leads to stronger future confidence. In summary, employer type indirectly affects future confidence through job satisfaction, with employees in more stable jobs having greater confidence, partially supporting H2-D: Employer type influences residents' future confidence through job satisfaction, and the more stable the job, the higher the future confidence.

## 6. Research Conclusions and Policy Recommendations

### 6.1 Research Conclusions

First, work income has a significant positive impact on job satisfaction ( $\beta=0.0365$ ,  $p<0.001$ ), but its direct effect on residents' future confidence is not significant ( $\beta=-0.0023$ ,  $p=0.731$ ). Job satisfaction, however, significantly positively affects future confidence ( $\beta=0.2108$ ,  $p<0.001$ ). This suggests that work income mainly influences future confidence indirectly by improving job satisfaction, without a significant direct impact.

Second, work hours have a significant negative effect on job satisfaction ( $\beta=-0.0076$ ,  $p<0.001$ ), indicating longer working hours reduce job satisfaction. However, work hours have a slight but significant positive direct effect on future confidence ( $\beta=0.0013$ ,  $p<0.05$ ). This suggests that work hours negatively affect future confidence through job satisfaction, indicating multiple pathways of influence.

Third, commuting time does not significantly affect job satisfaction ( $\beta=-0.0006$ ,  $p=0.247$ ) or future confidence ( $\beta=-0.0009$ ,  $p=0.057$ ), with the latter showing a marginal negative impact. This indicates commuting time does not significantly affect future confidence when controlling for other variables.

Moreover, employer type influences job satisfaction and future confidence through different pathways. Compared to public sector employees, private sector ( $\beta=-0.1113$ ,  $p<0.05$ ) and other enterprises ( $\beta=-0.1480$ ,  $p<0.01$ ) have significantly lower job satisfaction, while state-owned enterprises and foreign-invested companies show no significant difference. Regarding future confidence, private sector ( $\beta=-0.1067$ ,  $p<0.05$ ) and foreign-invested companies ( $\beta=-0.1826$ ,  $p<0.05$ ) employees exhibit significantly lower future confidence. In conclusion, employer type affects future confidence both directly and indirectly through job satisfaction, with notable heterogeneity across employer types.

Overall, work characteristics such as income, working hours, commuting time, and employer type impact future confidence through both direct and indirect pathways via job satisfaction.

### 6.2 Policy Recommendations

The research findings indicate that work income mainly affects residents' future confidence through job satisfaction as an intermediary mechanism, with its direct effect being relatively limited. Therefore, in policy practice, it is not advisable to solely rely on increasing income levels. Greater attention should be paid to the stability, fairness, and predictability of income growth. By improving the wage distribution system and enhancing individuals' overall evaluation of income and work, residents' future confidence can be indirectly increased through improved job satisfaction.

The empirical results show that working hours have both direct and indirect effects on residents' future confidence, with the

indirect effect transmitted through job satisfaction. Excessive working hours diminish job satisfaction and negatively impact future confidence. Therefore, while ensuring stable employment and career development, policies should regulate working hours, guiding employers to enhance labor efficiency and optimize work arrangements to mitigate the negative effects of long working hours on job satisfaction and residents' future confidence.

Although commuting time does not have a statistically significant direct effect on residents' future confidence, its effect direction is negative, suggesting that longer commuting times may exert some inhibitory impact on residents' future expectations. At the policy level, continuous attention should be paid to the commuting burden. By optimizing urban spatial structure, improving public transportation supply, and enhancing commuting conditions, commuting time's potential constraint on residents' life and work arrangements can be reduced, thus preventing the cumulative effect of commuting costs from negatively impacting residents' future confidence.

The study found significant differences in the impact of different types of employers on job satisfaction and residents' future confidence. Some employer types affect residents' future confidence both indirectly through job satisfaction and directly. This suggests that employment stability, institutional security, and career expectations play an important role in the formation of future confidence. Therefore, it is necessary to improve labor protection systems in the non-public sector, strengthen labor rights protection, and expand social security coverage in order to enhance the future confidence of workers in various employer groups through both direct and indirect pathways.

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# The Political Economy Critique of the Gig Economy: Algorithmic Exploitation and Labor Alienation

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**Abstract:** the paper bases on the gig economy, transcending a simplistic narrative of technological progress. While its formal independence masks intensified control mechanisms, the ostensibly technology-enabled system operates under algorithmic domination. This study employs Marxist political economy theories—particularly the labor theory of value and alienated labor theory—to critically analyze the gig economy. Research reveals how platform capital systematically employs algorithmic technologies to achieve more efficient labor control and covert exploitation. Algorithms not only function as “digital overseers” extracting both absolute and relative surplus value with precision, but also lead to comprehensive alienation of workers in terms of labor products, processes, essential nature, and interpersonal relationships. The “freedom” facade of the gig economy is essentially an ideological construct where capital conceals exploitation and evades accountability through technological means. To address these challenges, potential solutions must be explored through algorithmic transparency, rights protection, and ownership of means of production.

**Keywords:** Gig Economy; Critique of Political Economy; Algorithmic Exploitation

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## 1. Introduction

Driven by digital technology, the gig economy has risen rapidly, advocating “flexibility and freedom” and “pay-as-you-go” to shape a narrative of individual technological empowerment. However, beneath its glamorous surface lies a web of irreconcilable contradictions. These contradictions not only reveal the inherent logic of its operation but also serve as the essential starting point for understanding this new economic paradigm. From the perspective of Marxist political economy, the classical categories such as labor value theory, organic composition of capital, and surplus value theory are still applicable to the analysis of the gig economy. They can penetrate the fog of “technological empowerment” to expose the essential logic of capital’s domination over labor. This study focuses on the structural contradictions, core operational mechanisms of the gig economy, and explores the path to build a new digital labor order that balances fairness and efficiency, aiming to provide a theoretical reference for solving the practical dilemmas faced by gig workers.

## 2. Structural Contradictions of the Gig Economy

The gig economy, while presenting a false image of “flexibility” and “empowerment,” inherently contains three sets of sharp contradictions. These contradictions are not accidental phenomena but the inevitable result of capital logic operating under the digital context, and they fundamentally determine the operational characteristics and practical dilemmas of the gig

economy.

## 2.1 The Paradox of Flexibility and Instability

The platform economy's proclaimed "work autonomy" and "time freedom" seem to grant workers unprecedented control—they can log in or out at will, supposedly achieving a perfect work-life balance. However, in reality, this often translates into "dual instability" in income and employment. On one hand, beneath the surface of freedom lies uncontrollable order supply, fluctuating pricing, and arbitrary reward-punishment rules, leaving gig workers with virtually no right to speak, making "freedom" an empty slogan. On the other hand, their income is not based on stable wages or clear expectations, but relies on algorithmic instant matching, market volatility, and unpredictable client demands. Without social security nets, the unpredictability of income and future uncertainty completely subvert the financial stability of traditional employment. To cope with this uncertainty and maintain basic living standards, gig workers are forced to engage in high-risk survival games, adopting self-exploitation strategies such as continuously extending online hours to wait for orders or even shuttling between multiple platforms. Thus, a paradox emerges: the "flexibility" promoted by platforms does not bring liberation, but evolves into "unpredictable income and complete lack of security." The fragility of this "freedom" essentially shifts all market risks to individual gig workers. They lack paid leave and sick leave protections, and any break or illness leads to immediate loss of income. This "no work, no pay" reality forces them into a state of forced labor, making them more dependent on jobs than traditional employees. Therefore, the truth behind flexibility is the creation of an unstable state that keeps workers in perpetual anxiety and overwork—a profound form of unfreedom disguised as freedom.

## 2.2 The Secret Connection between DE-Labor Relations and Strengthened Exploitation

Through sophisticated legal and contractual designs, platforms transform traditional employment relationships characterized by strong personal dependence into seemingly equal cooperative or crowd-sourcing relationships. This innovative model effectively exempts platforms from traditional employer obligations, including minimum wage guarantees, overtime pay, rest and leave protections, and work-related injury compensation.<sup>[1]</sup> The labor market has regressed from the social contract framework regulated by the Labor Law and Labor Contract Law to a power-imbalanced transaction field governed solely by general civil law. Workers are forced to negotiate "equally" with platform enterprises that possess massive capital, technological resources, and data assets as isolated individuals. Capital uses technical means to extract deeper and more efficient value from the labor process. By transferring all operational risks to individuals, the "independent status" of workers achieves cost externalization and profit maximization. This "DE-labor-rationalization" does not eliminate exploitation, but manifests it in a more hidden and efficient form. While shedding traditional employer responsibilities, platforms achieve unprecedented control over the labor process through digital technology. Through real-time location tracking via positioning and mini-program monitoring, algorithmic systems for order dispatch, pricing, and route planning, and performance evaluation based on customer ratings and platform rules, every aspect of gig workers' labor is standardized, digitized, and tightly controlled by centralized algorithms. Capital's control has not weakened due to the "distance" of legal relationships; instead, it has become stronger, more invisible, more comprehensive, and more deceptive through technological penetration, making it more difficult to challenge through traditional labor rights protection channels.

## 2.3 The Inherent Conflict between Technological Empowerment and Algorithmic Control

Technological empowerment and algorithmic control constitute the most core and tense contradiction in the gig economy. Technological tools such as smartphones, navigation apps, and big data have lowered market entry barriers for ordinary workers, enabling them to provide technical services and earn income. In public discourse, these tools are regarded as liberators and equalizers. However, when embedded in the logical framework of capital, these technologies become alienated and systematically transformed into "digital control" mechanisms for surveillance, discipline, and exploitation. From task assignment and route planning to performance evaluation and reward-punishment implementation, algorithmic systems penetrate every link of labor, forming a closed-loop control system. Although gig workers seem to work independently with smartphones, their physical movements, time allocation, behavioral patterns, and even emotional expressions are integrated into a sophisticated digital management system. Every action of workers is digitized, quantified, and subjected to precise algorithmic control. This control is not only ubiquitous but also often disguised as "optimization" and "efficiency,"

operating with strong concealment. More critically, this control is dynamic, opaque, and “learning-capable.” Algorithmic rules are often deliberately vague, making it difficult for gig workers to understand their operational logic and forcing them to passively adapt.<sup>[2]</sup> Platforms silently increase labor intensity through continuous parameter adjustments. Every action of gig workers becomes a data stream, which is collected and analyzed by platforms to optimize control strategies. Workers lose the autonomy, dignity, and basic control over their own work rhythm that should exist in the labor process. The convenience of “connection” brought by technology ultimately weaves an inescapable digital cage. The promise of technology has been completely reversed: what was initially a commitment to liberation has degenerated into a reality of control, resulting in profound alienation in the relationship between humans and technology.

### 3. Labor, Value and Capital in the Gig Economy

Beneath the appearance of algorithms, platforms, and data, the profound opposition between capital and labor in the gig economy persists in a digital form. The basic theories of Marxist political economy still have strong explanatory power for the economic relations of the gig economy, revealing the essence of value creation and distribution in this new economic form.

#### 3.1 The Reconfirmation of Labor Value Theory by the Digital Economy

No matter how digital technology reshapes the form of labor, labor is the only source of commodity value—a fundamental principle of Marxist political economy that remains unshakable.<sup>[3]</sup> In the digital economy, the core commodity traded by platforms is “instant service.” The use value of these various forms of services is created by concrete labor, and the basis of their exchange value is abstract labor determined by socially necessary labor time. The prosperity of the platform economy has led many to believe that value is created by algorithms, data, and the platform ecosystem itself, but this is merely a superficial misunderstanding. Algorithms cannot automatically deliver meals, clean spaces, or renovate buildings; data cannot personally drive vehicles, produce short videos, or develop software. It is the living labor of millions of gig workers that constitutes the starting point of all value flows. What platforms do is use technological means to organize, coordinate, and commercialize these scattered and specific forms of labor on a large scale. Therefore, the digital age has not overturned the labor theory of value, but has made the process of value creation more decentralized, atomized, and hidden. Workers’ labor is deeply embedded in digital structures, but its fundamental status as the source of value remains unchanged. Any claim that “platforms create value” is essentially an ideological cover for capital to occupy the fruits of labor, a rhetorical strategy that technologies exploitative relationships.

#### 3.2 Evolution of the Power Structure of the Organic Composition of Digital Capital

According to Marx’s theory, the organic composition of capital refers to the ratio of constant capital (C) to variable capital (V), reflecting both the technical structure of production and capital’s control over living labor. In the gig economy, this composition has undergone profound structural changes, presenting completely new characteristics. Firstly, the form of constant capital has undergone qualitative changes. It no longer mainly manifests as factories, machinery, and raw materials, but as data assets, algorithm systems, server clusters, software platforms, and their intellectual property rights. These materialized “dead labor” constitute the core production resources and competitive barriers of platform enterprises, with the characteristics of high replicability, economies of scale, and monopolistic tendencies. Secondly, the payment form of variable capital has been restructured. Platforms pay workers through “service fees” or “commission splits,” which essentially still belong to the scope of labor reproduction funds. Through legal means, platforms have successfully compressed this variable capital to only cover the minimum labor reproduction costs, thereby avoiding long-term reproduction expenses such as social security and vocational training that traditional employers need to bear. Capital externalizes these costs, leaving workers to bear all labor risks. The gig economy is characterized by “highly concentrated technical capital, monopolized labor markets, and atomized workers.” Platforms monopolize data and algorithms as core production factors, forming a serious power imbalance with gig workers who only possess their own labor and no other production resources. This sharp contrast between centralized platforms and scattered, vulnerable individuals reveals a new dimension of the organic composition of capital in the digital age: the highly centralized C (capital) exercises an unprecedented dominant position over the highly scattered V (labor). This is not only a value ratio but also a fundamental power structure.

### 3.3 Upgrade of the Digital Elastic Exploitation Mechanism

Platform capital's extraction of surplus value breaks through the physical and temporal constraints of traditional factories, penetrating the entire social space and fragmented time through algorithmic networks. Its exploitation mechanism has achieved dual upgrades: On the one hand, the exploitation of absolute surplus value has become more hidden. Platforms use incentives such as "the more you work, the more you earn" and survival anxieties such as "no work, no income" to encourage workers to blur the boundaries between work and leisure. Features such as 24-hour order receiving, peak-hour bonuses, and order completion rewards all drive workers to continuously extend their online time for a living. This "voluntary" overwork is a digital version of the traditional method of extracting absolute surplus value by extending working hours, disguised as "free choice." On the other hand, the extraction of relative surplus value has achieved unprecedented efficiency, which is the essence of platform algorithmic control and its main form of exploitation. By continuously optimizing order dispatch logic, compressing delivery time limits, and planning "optimal" routes, algorithms essentially increase labor intensity, forcing workers to complete more orders within a certain time and endure a more intense work rhythm. This means that through technological means, the necessary labor time for labor reproduction is significantly shortened, while the surplus labor time that creates surplus value for platforms is proportionally extended. This constitutes a more sophisticated and cruel production method of relative surplus value, which does not rely on extending working hours but on squeezing labor density per unit time. The substantial commissions extracted from each transaction and the profits generated from value-added services based on aggregated labor data ultimately come from the unpaid surplus labor of gig workers. Under the guise of seemingly free and fair cooperation, platform capital achieves more efficient and extensive social occupation of surplus value.

## 4. Mechanism Analysis of the Gig Economy

From the perspective of Marxist political economy, the "flexible and efficient" appearance of the gig economy conceals the core logic of algorithmic exploitation as a means and labor alienation as an end. These two processes together form a new paradigm of capital's control over labor in the digital age, reflecting profound changes in production relations behind technological progress.

### 4.1 Core Mechanism of Algorithmic Control

In the gig economy, algorithms are redefined as more automated, sophisticated, and hidden. As the executor of platform capital's will, their exploitation mechanism is manifested through three interlocking dimensions. Firstly, through massive historical data, algorithms continuously "learn" and compress processing time, setting theoretically ideal time standards for smooth workflows, while shifting all real-world risks to gig workers. To meet this algorithm-driven "optimal standard," gig workers are even forced to sacrifice personal safety. Through invisible time pressure, algorithms maximize labor intensity—the peak of extracting "relative surplus value" in the digital age. Secondly, platforms create the illusion of income volatility through complex dynamic pricing systems, but their core design ensures stable platform profits while transferring all market risks to workers. Platforms take the lion's share through fixed proportional commissions, while workers bear the risk of low income during periods of weak demand. This pricing mechanism makes workers' hourly wages highly uncertain and vulnerable, while capital owners hold "preferred income certificates" that stably extract surplus value regardless of market fluctuations. Finally, platforms package economic incentives into a gamified symbolic system. This mechanism skillfully exploits workers' competitive psychology, achievement needs, and peer pressure. Through this process, workers internalize the platform's evaluation logic, mistakenly regarding the capital's requirement of "faster and more" as proof of self-worth, which greatly weakens the traditional labor-capital opposition. This voluntary self-motivation and overwork transform systemic structural coercion into individual active choices, thereby effectively preventing the formation of workers' collective identity and potential resistance.

### 4.2 The Total Alienation of Digital Labor

Under the continuous operation of the algorithmic exploitation system, the "alienated labor" revealed by Marx has not been alleviated in the gig economy, but has presented a more profound and extensive new dimension. Workers are completely alienated from their labor products, labor processes, their own essence, and interpersonal relationships. The first layer is the alienation of labor products. Gig workers create data value, but platforms use this data for algorithm optimization, AI

training, or commercial insight mining to obtain profits. Workers become “prosumers” in their own data production systems, permanently deprived of ownership. The second layer is the alienation of the labor process. Labor should be an active way for humans to transform the world and realize self-worth, but under precise algorithmic control, gig work becomes passive compliance with cold instructions. Workers lose autonomy over work rhythm, methods, and tools. Labor loses its inherent creativity and dignity, reduced to external coercion. The third layer is the alienation of workers’ “human essence.” Through high-intensity repetitive labor and prolonged “on-call” time to cope with income instability, the gig economy systematically depletes workers’ time and energy for learning, thinking, socializing, and skill development. Human potential and creativity are reduced to a single skill, forming the dilemma of the “digital proletariat”: trapped in platform labor, gig workers develop increasingly specialized skills and narrow horizons, losing opportunities for social mobility and development. The fourth layer is the alienation of interpersonal relationships. As an intermediary, algorithms reshape all social connections. On one hand, algorithms systematically create direct competition among workers, turning colleagues who could have formed mutual assistance communities into guarded rivals, isolating and atomizing them. On the other hand, algorithms establish a distorted real-time evaluation mechanism between consumers and workers, successfully shifting the labor-capital conflict to individual conflicts between service providers and consumers.<sup>[4]</sup>

### 4.3 Reinforcement of Systemic Dominance

Algorithmic exploitation and labor alienation are not isolated processes, but form a self-reinforcing cycle. The mechanism of algorithmic exploitation directly leads to the four-fold alienation of labor; at the same time, workers’ alienated state—such as atomization, narrowed skills, and lack of awareness of data products—weakens their ability to recognize systemic exploitation and organize collective actions, ultimately consolidating algorithmic dominance. The ultimate result of this dual process is the establishment of a more solid digital-based systemic dominance. Under this framework, exploitation becomes impersonal, seemingly originating from “objective algorithms,” while alienation is packaged into an inspirational narrative of “free choice” and “the more you work, the more you earn.” Workers are trapped in the system, alienated from their labor, colleagues, and even their own development potential, but struggle to find clear targets for resistance. This reveals that behind the seemingly “advanced” productivity level of the gig economy, there may be a profound regression in production relations. It raises a sharp contemporary question: Can we use technology to break this digital closed loop of exploitation and alienation, and build a future work landscape that empowers rather than dominates, liberates rather than alienates? This requires transcending the blind worship of technical efficiency and promoting profound innovations in social systems and power structures.

## 5. Building a New Digital Labor Order with Equal Emphasis on Fairness and Efficiency

As direct producers of data, gig workers lack both control over data usage and access to value-added benefits. Relying on technological advantages and market dominance, platform enterprises convert these socially generated data resources into exclusive assets to optimize algorithms, strengthen control, and expand profit margins. This “collective production, capital monopoly” dynamic constitutes the fundamental contradiction of the gig economy. To resolve this contradiction, it is necessary to construct a new digital labor order that balances fairness and efficiency through institutional innovation and system improvement.

### 5.1 Occupational Security Reconstructs Labor Dignity

To solve the dilemma of the gig economy, we must start with the institutional guarantee of labor rights and interests, and break the power structure unilaterally dominated by platforms. Firstly, we must promote the implementation of the “algorithmic fairness” principle. “Fairness” does not negate algorithmic efficiency, but emphasizes that algorithms should embody fairness, transparency, and a consultative process. Platforms must disclose key algorithmic parameters such as task assignment logic, compensation rules, and reward-punishment standards to workers, ensuring their right to know and right to appeal. More importantly, during algorithmic iterations, a consultation mechanism involving worker representatives should be established to incorporate practical factors such as workload intensity, reasonable rest time, and emergency situations into system design, preventing “optimization” from evolving into “extreme exploitation.” For example, implementing humanized mechanisms such as daily order quantity limits, automatic mandatory rest reminders, and complaint channels for abnormal orders can

transform algorithms from management tools into auxiliary labor protection measures. Secondly, there is an urgent need to establish a comprehensive occupational injury protection system covering all gig workers. The traditional work-related injury insurance under formal labor relations cannot cover flexible workers, leaving many trapped in the dilemma of “no recourse” when encountering traffic accidents or work-related injuries.<sup>[5]</sup> A special protection mechanism should be explored, where platforms calculate premiums based on orders, with government guidance and supervision, and commercial insurance institutions responsible for specific implementation. The coverage should include key gig economy scenarios such as food delivery, transportation, and housekeeping services, with premiums shared by platforms, workers, and the government to form a sustainable funding model. In addition, a streamlined identification and compensation process should be established to ensure that workers receive timely assistance when facing occupational risks, truly realizing the principle of “protection for injuries and support for hardships.”

## 5.2 Exploring the Social Sharing Path of Data Revenue

Data is the core production factor of the gig economy, and its value creation is inseparable from the continuous participation of workers. Therefore, it is necessary to break the platform’s monopoly on data revenue and promote the establishment of a fair and reasonable sharing mechanism. A pilot “data contribution rebate” system can be implemented: platform enterprises should allocate a certain percentage of excess profits generated through data-driven operations to the “Gig Economy Development Fund” every year. Managed by industry unions or third-party public institutions, this fund will be specifically used to support workers’ skill training, health check-ups, legal aid, and children’s education subsidies. Alternatively, a “data dividend” model can be explored: on the premise of ensuring data security and privacy, blockchain technology can be used to record workers’ data contribution levels, and the corresponding income from data usage rights can be distributed proportionally. This mechanism not only reaffirms the labor value of workers but also serves as an important practice to promote the sharing of digital economic dividends. In addition, regional or industry-specific “data cooperatives” should be supported to encourage workers to collectively participate in data governance. These cooperatives can represent workers to negotiate data usage rights and revenue distribution with platforms on an equal footing, enhancing workers’ right to speak in the data value chain and preventing excessive capitalization of data assets.

## 5.3 Promoting the Publicity of Key Platform Infrastructure

For large platforms with the attributes of public infrastructure, their governance model should transcend pure capital logic and incorporate more public responsibilities and democratic participation. Firstly, strengthen governance to highlight the public nature of digital platforms. For platforms with a large user base, extensive service coverage, and an impact on people’s basic livelihood needs, regulatory frameworks similar to public utilities should be implemented. These platforms must hold public hearings on major decisions such as algorithm updates, fee adjustments, and service rule revisions, and solicit opinions from workers and consumers. The government should establish specialized regulatory agencies to regularly monitor issues such as platform monopolies, data abuse, and algorithmic discrimination. Secondly, explore a multi-stakeholder governance structure. At the corporate governance level, platforms should set up worker representative director positions or form a “Platform Governance Committee” composed of government representatives, platform operators, labor organizations, and academic experts to participate in decision-making consultations and supervision. Encourage non-profit public platforms as supplements to commercial platforms, providing basic and inclusive employment services to foster a competitive ecosystem and prevent excessive market concentration.

## 6. Conclusion

The future of the gig economy should not be a “digital alienation” where humans become slaves to algorithms, but a return of technology to its fundamental purpose of serving humanity. In this vision, algorithms are no longer tools of control but bonds of cooperation; platforms are transformed from strongholds of capital into shared spaces; gig workers evolve from data “prospers” to masters of the digital world. This transformation cannot be achieved overnight—it requires institutional innovation, ethical regulation of technology, and the awakening of workers’ consciousness. However, by adhering to a people-centered development philosophy and daring to regulate and transcend capital logic, the gig economy can truly become a ladder for human freedom and all-round development, rather than a “system” that shackles the soul.

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# A Study on the Concepts and Behavioral Choices of Financial Investment and Wealth Management Among Contemporary Young People

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**Abstract:** With the sustained and rapid development of the economy, people's living standards have greatly improved, and their consumption capacity has also been continuously enhanced. As a special group, young people are in the final stage of study and the initial stage of stepping into real life. Whether they can master the skills of managing wealth, conduct reasonable investment and financial management, and establish a good personal credit record is particularly crucial. Generally, young people lack a stable source of work income, their living expenses come from unstable channels, and they have no real experience in managing assets, so their understanding of money is usually vague. However, there are currently a variety of consumption channels available to young people, and many of them thus pursue pleasure while neglecting the effective management and rational allocation of wealth. Consequently, the issue of "young people's investment and financial management" has attracted increasing attention from society.

**Keywords:** Young People; Financial Investment; Wealth Management

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## Introduction

Due to their poor consumption habits, some young people not only fail to conduct effective and reasonable investment and financial management, but also even leave blemishes on their personal credit due to the use of lending products. Cultivating young people's investment and financial management capabilities helps them establish a good personal credit record and develop sound financial management habits. When they enter society, start working, or even form a family in the future, whether they have good wealth management habits will be particularly important. The value of money does not lie in how much one possesses, but in whether one can use it reasonably. However, the development of habits cannot be achieved overnight; therefore, it is particularly important to start cultivating such habits during the college years.

## 1. Overview of Investment and Financial Management

### 1.1 The Meaning of Investment and Financial Management

The meaning of investment and financial management may be familiar to most people. Its core lies in the rational allocation and utilization of one's existing assets to further obtain a certain amount of returns. Common forms of investment and financial management include bank deposits, stock investments, futures, gold, and more. There is a wide variety of methods

for investment and financial management; however, it is important to note that investment is inevitably accompanied by risks—returns and risks go hand in hand. For young people, there is no need to blindly pursue excessively high returns; the key priority should be developing sound investment and financial management habits.

## **1.2 Investment and Financial Management Methods for Young People**

Most people should have some exposure to investment and financial management. Almost every household has a certain amount of savings, which is the most basic and common method. There are also internet-based financial products like Yu'eobao (Alipay's money market fund). Different forms of financial management can meet the personalized needs of various groups.

For instance, investors with a risk preference may prefer methods such as stocks and futures. However, these require a solid foundation of professional knowledge and practical experience, and they also carry significant risks. Although high-risk investments can potentially yield high returns, I believe they are not suitable for young people's investment and financial management.

The five methods listed below, on the other hand, are relatively low-risk for young people. While their return rates may not be very high, they can still help young people develop a sense of financial management and establish awareness of creditworthiness.

## **2. Survey and Analysis of Young People's Investment and Financial Management**

Data surveys on young people's views on investment show that young people mainly face issues such as poor self-control, weak awareness of financial management, and insufficient attention to personal credit records<sup>[1]</sup>. Most young people are not aware of these bad habits they have developed, and these problems are not isolated cases which deserve our attention. The specific analysis is as follows:

### **2.1 Poor Self-control Among Young People**

Firstly, young people lack a rational mindset when it comes to consumption. Moreover, due to their unstable income, they have difficulty bearing losses. According to the survey and analysis, more than 40% of young people have an unreasonable consumption structure. When faced with new things or entertainment consumption, they find it hard to control themselves and lack restraint in spending, even having a mindset of "entertainment first".

More than 60% of young people have a weak sense of financial management and have little concept of money, regarding money merely as numbers on a mobile phone screen. Among them, 40% of young people lack a plan for their money expenditure. Not only do they have no savings at the end of the month, but they may even borrow money to consume. These bad consumption behaviors can cause serious troubles to young people's current lives. Even after graduating and entering society in the future, they may develop such bad consumption habits, and once formed, these habits are very difficult to change. They especially lack the awareness of financial management.

### **2.2 Young People's Weak Financial Management Concepts and Single Source of Financial Knowledge**

Some young people have realized this practical problem and want to acquire financial knowledge and skills, but they don't know where to start. This indicates that the current financial planning lacks personalized solutions, and is too theoretical to be practical, making it difficult for young people to find suitable financial management methods for themselves. Financial planning is a set of systematic selection schemes, rather than just one or two one-sided methods.

Many young people do not have the opportunity to conduct systematic learning, and thus cannot objectively analyze their own situations. Less than half of the young people obtain their financial knowledge from the publicity of the media and banks. However, the publicity of these financial management methods is often purpose-driven and not suitable for most young people.

### **2.3 Single Source of Income and Irrational Consumption Structure Among Young People**

The daily consumption of young people mainly covers the following aspects:

First, catering consumption accounts for approximately one-third of their total consumption, making it the most prominent consumption category for young people. Second, apparel consumption—including the purchase of clothing, shoes, and other related items—accounts for over 20% of their total expenditure<sup>[2]</sup>. For some young people who have just entered the society,

they also need to bear housing costs such as rent.

In terms of daily living, compared with living with their families, young people now have to purchase daily necessities on their own, which has generated new consumption demands. Their daily leisure and entertainment consumption varies from person to person, mainly including activities such as karaoke and gatherings (e.g., birthday parties, club dinners, and class or dormitory get-togethers). Besides, due to romantic relationships, many young people often spend money on gifts or outings, which has also increased their expenditure significantly—some even spend more than half of their living expenses on this aspect.

Most young people are not proficient in financial management, thus becoming typical “moonlighters” (a term referring to those who spend all their income by the end of each month in Chinese). There is even a small number of young people who engage in excessive advance consumption. For instance, some young people with a monthly salary of only 3,000 yuan may have an outstanding debt of up to 6,000 yuan on credit platforms like Huabei. They not only lack the ability to repay the debt but also accumulate more and more liabilities, which adds a burden to their future life.

## **2.4 Lack of Attention to Personal Credit Records**

Young adulthood can be regarded as the final preparation stage before entering society, and how to achieve a smooth transition from a student to a member of the workforce is an aspect that deserves attention. In terms of personal finance, young people have already gained the ability to independently manage their wealth, yet they often lack attention to their personal credit records and fail to recognize the importance of credit reports for their future life in society.

Some young people use credit products such as Huabei, WeChat Pay Later (Weilidai), and JD Baitiao in a blind manner. Due to overspending beyond their repayment capacity, they are unable to settle their dues on time, resulting in payment defaults. However, many such internet-based lending products are actually linked to the national credit reporting system, and such defaults will leave negative marks on their personal credit records.

These negative marks are bound to bring about a series of adverse effects. For example, when applying for a housing loan in the future, they may well be rejected, which will lead to a decline in the quality of life. Moreover, with the improvement of the credit reporting system and the social credit system, their future employment opportunities and even personal development prospects may be hindered.

# **3. Recommendations for Young People’s Investment Behavior**

## **3.1 Enhance Financial Management Awareness and Establish Rational Consumption Concepts**

Wealth accumulation is a two-way process that relies on both income and expenditure. For young people, there is usually limited room to increase their income, which mainly consists of salaries and, in some cases, financial support from their parents. Additionally, young people who have just entered the workforce rarely have the time or opportunity to engage in side jobs to boost their income. Under such circumstances, financial management should prioritize expenditure control: minimizing unnecessary spending and excessive consumption to avoid waste, thereby saving funds and achieving the goal of “expanding income sources while reducing expenditures”.

On this basis, young people can allocate the remaining funds to reasonable investments. Establishing a correct consumption concept is the most crucial step in developing sound financial management awareness, as it lays the foundation for a healthy financial management environment<sup>[3]</sup>.

## **3.2 Transform Educational Concepts and Cultivate Financial Management Awareness**

The most effective way to help an individual develop financial management awareness and habits is through education. However, this is precisely a weakness in current education systems—whether in schools, society, or families, insufficient attention is paid to the cultivation of financial management concepts. During the student stage, most young people have few opportunities to engage with financial matters; many even lack a basic understanding of monetary management.

Furthermore, even graduates majoring in finance-related fields often fail to form a comprehensive financial value system. When faced with diverse sources of information in society, they tend to feel disoriented. Worse still, high-quality financial management courses—those that truly build practical skills—can only be properly recognized and utilized after individuals have accumulated a certain level of financial experience and capabilities, creating a Catch-22 for young people with limited

prior knowledge.

### **3.3 Establish Economic Awareness and Avoid Unnecessary Risks**

Firstly, many young people who have just entered society lack a rational perspective on money. Having not yet undergone the trials of social life, they fail to form a correct understanding of financial projects that claim high investment returns. They usually only focus on the promised large returns while ignoring the enormous risks involved; in some extreme cases, they may even be lured by illegal investment schemes due to their insufficient ability to distinguish right from wrong.

Moreover, various financial frauds emerge endlessly. Even individuals with social experience struggle to avoid such scams, let alone young people who have little concept of financial management. After entering society and experiencing a certain degree of financial freedom, young people enjoy the right to dispose of their funds independently but lack the ability to identify potential risks. This combination of factors makes young people a high-risk group for financial fraud.

## **4. Countermeasures for Young People's Investment Behavior**

### **4.1 Select Appropriate Investment Tools**

The selection of investment tools is crucial in the investment process. If conditions permit, it is advisable for young people to seek guidance and assistance from individuals with rich investment experience. For instance, some families may have a long history of investment; in such cases, young people can consult these family members to gain insights. A typical example is that some experienced investors have achieved an investment return rate of up to 30% in a year, and young people can learn practical experience and methods of stock investment through communication with them.

Additionally, purchasing insurance is also a viable investment option for young people. In recent years, the insurance industry has developed rapidly, with a wide range of insurance products available to provide people with diverse choices. As the insurance industry gradually improves and people's awareness of insurance increases, more and more individuals are purchasing insurance. Currently, young people may not need to buy a large number of insurance products—usually only accident insurance and medical insurance, or some wealth management insurance policies purchased by their parents<sup>[4]</sup>. However, they will inevitably come into contact with more types of insurance in the future. For example, after starting work, they need to participate in at least five types of basic social insurance; after buying a car, they also need to purchase various types of vehicle insurance.

By gaining an early understanding of insurance, young people can more targetedly select insurance products that suit their needs in the future, or provide their parents with reasonable and cost-effective suggestions when the family purchases insurance. The selection of insurance is highly personalized based on individual circumstances; young people can also appropriately purchase some wealth management insurance products, which not only provide a certain level of protection but also yield a certain amount of returns upon maturity.

### **4.2 Rational Use of Credit Tools**

Firstly, credit consumption tools—such as credit cards and credit products like Ant Huabei and JD Baitiao—have become commonplace. With the popularization of electronic payments, shopping has become much more convenient for most people. However, many young people lack an intuitive sense of the decrease in their account balances when making mobile payments, which leads to impulsive and unplanned consumption.

While a simple reduction in account balance is relatively manageable, the reality is that most young people have used credit products like Ant Huabei, and some even use them without restraint. When unable to repay the outstanding amount on time, they often resort to “robbing Peter to pay Paul”—borrowing from one credit platform to repay another. This practice ultimately results in a growing debt burden, which severely disrupts their daily lives, reduces their quality of life, and fosters unhealthy consumption habits.

It is essential to use credit products moderately, as their original purpose is to help improve living conditions—embodied in the concept of “using tomorrow's money to fulfill today's needs.” A typical example is a housing loan, which allows individuals who cannot afford to purchase a house outright to obtain the right to use a property in advance, thereby enhancing their quality of life. When using credit tools, young people should make rational judgments: they must clarify whether the items they intend to purchase are urgently needed and assess their future repayment capacity before using such tools.

Of particular note is the need to repay debts on time. Failure to do so may result in defaults being recorded in personal credit reports, which will have adverse impacts on their future lives.

### 4.3 Avoid High-Risk Investment Projects

Given that young people have weak economic capacity and only initially stable incomes, they are in a stage where they do not have sufficient funds to invest in the financial market. Therefore, they should avoid high-risk investment projects—especially when they lack the ability to allocate funds rationally. Investing in high-risk, high-return financial projects under such circumstances may lead to an inability to cover the next month's living expenses.

While high-risk projects are accompanied by the potential for high returns, young people, who typically have little investment experience at this stage, tend to face more losses than gains. Furthermore, without a certain amount of flexible funds (i.e., emergency funds), engaging in such investments is more likely to force unwanted changes to their life and development trajectory.

## Conclusion

This study collects and analyzes the current problems faced by some young people in financial investment and wealth management, identifies the causes of the lack of investment and financial planning among young people, and provides a variety of investment and financial options for different types of young people based on their specific circumstances.

It particularly emphasizes the importance of establishing personal credit records, aiming to help young people develop a sound awareness of credit and avoid credit-breaking behaviors that may have adverse impacts on their future lives. Additionally, the study points out the approaches to cultivating young people's concepts of investment and financial management—efforts should be made collectively from the perspectives of society, schools, families, and individuals.

Ultimately, the goal is to foster young people with a strong awareness of financial planning, enabling them to better adapt to the needs of social development.

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## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# A Discussion on the Application of Dialects in Film and Television Works

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**Abstract:** In recent years, Chinese film and television production has shown a clear “dialect shift” trend. Dialects are no longer merely decorative elements in comedies, but have gradually evolved into important narrative symbols for creating realistic texture, shaping three-dimensional character personalities, and conveying regional cultural identity. This article takes the recently widely noticed and popular dialect-based film and television works as examples, starting from two different perspectives of language sociology and film and television aesthetics, to deeply analyze the aesthetic functions and application mechanisms of dialects in audio-visual works. Through data analysis, it is concluded that the integration of dialects has significantly enhanced the immersive experience of the audience for specific theme works. However, during cross-regional dissemination, the phenomenon of “cultural discount” still exists. In view of this, a communication strategy that balances the authenticity of dialects and their comprehensibility is proposed, providing theoretical references for the construction of the language landscape of domestic film and television works.

**Keywords:** Film and Television Works; Dialect; Narrative Function; Cultural Identity; Communication Strategy

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## 1. Introduction

Language is one of the most core elements of the sound system in film and television works. For a long time, under the policy environment of promoting Mandarin and the general requirements of mass communication, domestic film and television works have always regarded Mandarin as the dominant language. However, with the diversification of audience aesthetic demands and the return of local cultural identity, dialect-based film and television works have rapidly developed in recent years. From the Sichuan dialect in the movie “No Name Guy”, to the Northwest dialect in the TV series “Mountain and Sea Story”, and to the Shanghai dialect craze triggered by “Fragrant Flowers”, dialects are moving from being marginal “comic language” to the center of the stage, becoming a key means of realistic creative expression <sup>[1]</sup>. The application of dialects in film and television works is not merely an imitation of real-life sounds, but a complex process of cultural encoding and decoding. It carries regional customs, social classes, and emotional memories. This article aims to explore how dialects participate in film and television narratives in the current media ecological situation. How do they enhance the artistic appeal of the works and what communication difficulties do they face? And how to construct effective dialect communication strategies <sup>[2]</sup>.

## 2. Mirror and Reconstruction: The Narrative Function of Dialects in Film and Television

## Works

Dialects, as a special auditory symbol, undertake multiple narrative tasks in film and television works. Their functions mainly lie in the construction of authenticity, the shaping of character personalities, and the establishment of aesthetic styles.

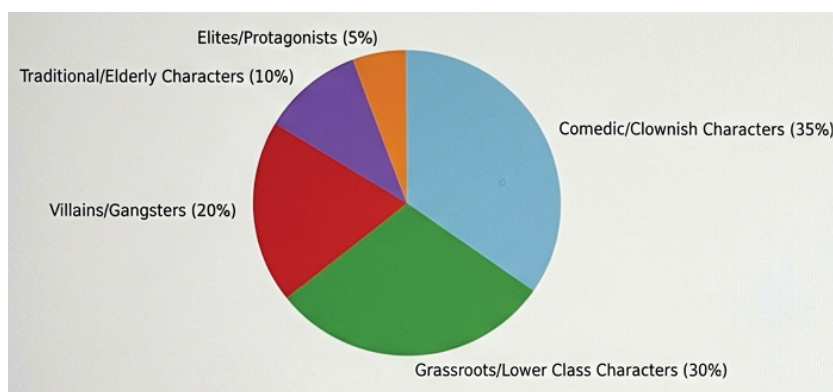
### 2.1 The Presence of Realism and the Construction of “Soundscapes”

The realism theory proposed by Bazin emphasizes that film is an asymptote to reality. Dialects inherently have regional referential characteristics and can quickly lead the audience to a specific geographical space and cultural context. In crime suspense films or rural-themed works, dialects are key elements in constructing “soundscapes”. For example, when presenting the living conditions of the lower-class marginalized figures, standard Mandarin often creates a sense of detachment from reality, while rough dialects can create a rough yet authentic life texture <sup>[3]</sup>.

### 2.2 The Three-Dimensional Shaping of Character Personality

Language is the external manifestation of social status and personality traits. The use of dialects is mostly closely related to the identity, class, and personality of the characters. By analyzing the correlation between the types of dialect use in recent film and television works and the personalities of the characters based on Figure 1, it can be found that dialects have certain advantages in shaping specific types of characters. By observing Figure 1, it can be seen that although comedy and lower-class characters are always the main force of dialect use, the proportion of anti-heroes using dialects is showing an upward trend. This adds a certain rustic flavor and local foundation to the anti-hero characters, making their images more complete, and not just stereotypical.

Figure 1: Distribution of Dialect Usage by Character Archetypes in Recent Dramas (2019-2023)



### 2.3 The Effects of Anachronism and Aesthetic Tension

From the perspective of the “anachronism” theory of Russian Formalism when analyzing art, art needs to increase the difficulty of perception and prolong the duration of perception. For audiences not from the dialect region, the dialect forms a certain degree of language obstruction, which prompts the audience to focus more on the hidden subtext and emotions behind the lines, creating a unique aesthetic distance. Wong Kar-wai extensively used Shanghainese in “Fragrant Grass”, giving the dialogues a similar rhythmic quality like music, restoring the urban texture of Shanghai and creating a unique aesthetic style different from the dominant northern language system <sup>[4]</sup>.

## 3. Reception and Blockage: Analysis of the Transmission Effect of Dialect-based TV Dramas

The application of dialects is a double-edged sword. On the one hand, it enhances the cohesion of local culture; on the other hand, it may also form a “cultural barrier” during cross-regional dissemination.

### 3.1 Differential Analysis of Audience Immersion

To quantify the impact of dialects on the viewing experience of the audience, this study selected a popular TV series that was released in both “dialect version” and “Mandarin version” (the sample is set as “Fánhuá” type works) as a case. It collected the rating data and keyword comments of two groups of audiences on social media (Douban, Weibo), and compiled the results into Table 1 (Table 1). By observing the data in Table 1, it can be found that the dialect version has a higher level in “immersion

score” (i.e., Immersion Score) and “emotional resonance” compared to the Mandarin version, with a P value less than 0.05. This confirms that dialects have a more outstanding performance in conveying the cultural flavor of the work. However, in the “understandability of dialogue” (i.e., Dialogue Intelligibility) aspect, the dialect version is clearly at a disadvantage. This means that the charm of dialects largely depends on the degree of the audience’s reliance on subtitles and their existing knowledge of the regional culture.

Table 1: Comparison of Viewer Reception Metrics between Dialect and Mandarin Versions

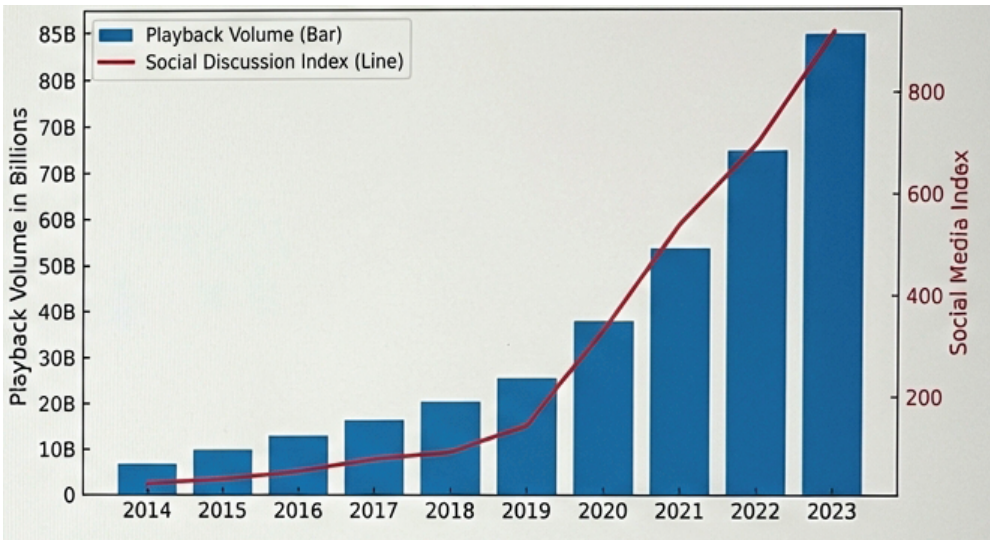
Metrics	Dialect Version	Mandarin Version	P-Value
Immersion Score (0-10)	9.2	7.8	<0.01
Cultural Authenticity	High	Moderate	-
Emotional Resonance	8.9	7.5	<0.05
Dialogue Intelligibility	6.5	9.8	<0.01
Audience Retention Rate	85%	72%	-

3.2 “Cultural Discount” and “Cultural Enhancement” in the Spread of Dialects

The “cultural discount” theory in communication studies posits that when cultural products are disseminated across cultural boundaries, their inherent appeal tends to decline. However, the emergence of high-quality dialect dramas in recent years has challenged this theory, presenting a phenomenon of “cultural enhancement”.

As shown in Figure 2, it presents the growth trend of the viewership of TV dramas with “dialect tags” on China’s core streaming platforms over the past decade, as well as the popularity of discussions across the entire network. Figure 2 indicates that 2019 was a significant turning point, which is related to the state’s support for excellent traditional culture and the targeted marketing strategies of streaming platforms. Dialects are no longer an obstacle; instead, they have become a “social currency” on social media. Viewers are enthusiastic about imitating and learning the dialectic jokes in the dramas, thus achieving viral dissemination<sup>[5]</sup>.

Figure 2: Trend of Traffic and Social Buzz for Dialect-Featured Dramas (2014-2023)



4. Strategies and Paths: The Application Norms of Dialects in Film and Television Production

Although the development of dialect-based films and TV series is rapid, problems such as “using dialects merely for the sake of using dialects”, stiff actor accents, and intensified regional stereotypes still exist. To achieve better dissemination effects, creators need to follow the following strategies.

4.1 “Main and Auxiliary Combination” Language Layout Strategy

Films and TV series do not necessarily need to use dialects throughout the entire work. Instead, a layered language system should be constructed based on the specific needs of the narrative. A model similar to the one presented in Table 2 can be established. For commercial films targeting the general public, the “mixed mode” or “accent mode” are usually the most ideal choices, as this can retain regional characteristics while reducing the difficulty for viewers to understand.

Table 2: Typology of Dialect Application Strategies in Screenwriting

Strategy Type	Definition	Application Scenario	Expected Effect
Dominant Mode	Dialect is used throughout the film (>80%).	Arthouse films, strict realist regional dramas.	High authenticity, niche audience targeting.
Hybrid Mode	Mix of Mandarin and Dialect based on context.	Commercial blockbusters, urban dramas.	Balances realism and marketability.
Symbolic Mode	Key phrases or specific characters use dialect.	Comedies, action movies.	Adds humor or character distinction without barriers.
Accent Mode	Mandarin with regional accents (Dialect-accented Mandarin).	Mainstream TV dramas (CCTV prime time).	Universally intelligible while retaining flavor.

4.2 Visual Assistance and Cross-Media Intertextuality

Given that dialects present auditory barriers, the visual system becomes extremely crucial in conjunction with it. This includes high-quality subtitles, such as those providing literal translations for dialectal expressions, as well as all the information contained within the visuals themselves, as shown in Figure 3. We have constructed a model for the effective dissemination of dialectal TV dramas. This model emphasizes that a strong “support system” must intervene between the “sender” and the “receiver”. Modern film and television promotion and distribution should utilize short-video platforms to conduct “dialect teaching” or “plot summary interpretation”, achieving audience knowledge preheating before the drama episodes are aired, transforming language barriers into the motivation for cultural exploration.

4.3 Avoid Stereotypes and Explore the Deep Layers of Culture

The application of dialects should shift from “curiosity” to “stability”. Creators should not merely use dialects as a means to present ignorance, backwardness, or humor. Just like the Northeast dialect, it does not merely represent “the mafia” or “the duo show”. In “The Long Season”, the Northeast dialect can also reflect the sadness and depth of that era. The application of dialects should provide support for exploring the spiritual core of specific regional cultures, thereby presenting the rich diversity of Chinese culture.

The innovative use of dialects in TV dramas can reflect changes in the creative context and also mirror the development of cultural psychology in the era. In the future, dialect-based TV drama creation will enter a more conscious and diverse stage. On one hand, the maturity of artificial intelligence and speech synthesis technology can provide technical support for the standardized recording of dialects, speech recognition, and real-time subtitle translation, alleviating the problem of “understandability”, allowing cross-regional viewers to more conveniently experience the charm of dialects. On the other hand, with the deep development of the trend of localization on a global scale, dialects, as carriers of local knowledge, will become a distinctive logo for Chinese stories to “go global” - they are no longer merely symbols of internal cultural identity, but are more likely to become a window for international audiences to understand the diversity of Chinese society - through precise cross-cultural adaptation and translation, they can become a medium for international audiences to understand Chinese society.

Conclusion

The return of dialects in TV drama works is a manifestation of the maturation and confidence of China’s film and television industry, and also an illustration of the awakening of local cultural consciousness in the context of globalization. In terms of narrative function, dialects inject vivid content into the images, making the character images more real and tangible. From

the perspective of communication strategies, achieving a scientific balance between authenticity and popularity is the key to breaking through the boundaries of the genre for dialect-based TV dramas. In the future, with the development of artificial intelligence speech technology and the refinement of niche markets, dialect-based TV dramas will no longer be a special “genre”, but will evolve into a normalized creative ecosystem. Creators should cherish this precious cultural resource and tell detailed Chinese stories through the interweaving of sound and image, constructing an audio-visual aesthetics with Eastern charm.

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# The Evolution of Proxy War Patterns in the Transformation of Regional Order: A Comprehensive Study Based on the Escalation of the Iran War in 2026

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**Abstract:** Focusing on the question of how the transformation of regional order has altered the form of proxy warfare, this study proposes and substantiates a core argument: during the restructuring of the security architecture and the readjustment of deterrence relationships in the Middle East, proxy warfare has not been supplanted by traditional direct interstate conflict. On the contrary, it is evolving into a hybrid mode—proxy networks remain in operation while high-intensity direct strikes occur in parallel during the same phase. This study adopts a research design of “dual-layer evidence and cross-verification from multiple sources.” At the macro level, it employs the UCDP External Support Dataset V.18 (1975–2017) to trace the structural evolution of externally supported conflicts in the Middle East. At the micro level, it focuses on the escalation of the conflict in Iran from February 28 to March 4, 2026, as a case for process tracing. Based on firsthand reports from authoritative media outlets, an auditable event database is constructed to analyze casualty patterns and indicators of conflict spillover. The policy implication of this paper is that crisis management frameworks should neither rely solely on linear de-escalation arrangements nor focus exclusively on ceasefires in isolated theaters. A more viable approach lies in strengthening joint governance of key nodes across conflict zones, securing energy and maritime transport routes, and establishing multi-actor information transparency mechanisms to mitigate the risks of miscalculation and escalation.

**Keywords:** Proxy War; Transformation of Regional Order; Iran War; Middle East Security; Conflict Spillover

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## 1. Introduction

The escalation of the Iran war since February 28, 2026, has profoundly altered the conventional understanding of the “low-intensity proxy war” that characterized Middle Eastern conflicts over the past decade. In just a few days, battlefield casualties, cross-border strikes, base security incidents, and energy market fluctuations have been simultaneously amplified—indicating that regional conflicts have entered a phase of higher systemic coupling: proxy networks remain in place, but the frequency, visibility, and political consequences of direct military strikes have significantly increased. For international relations scholarship, this shift does not simply signify “the end of proxy war,” but rather points to an evolutionary upgrade within the proxy war mechanism itself.

Traditional discussions often place proxy engagement and direct intervention on an alternating spectrum: if a sponsor opts for a proxy, it implies a reduction in its direct exposure; if it chooses direct action, it signals a shift away from the proxy path. However, the multiple crises in the Middle East since 2025 suggest that the reality is closer to a “logic of superposition”: sponsors have not abandoned proxy networks, but have simultaneously intensified direct action during critical windows, pursuing deterrence and strategic shaping through a combination of “low-visibility networked operations” and “high-visibility cross-border strikes.” As a result, conflicts are no longer easily contained locally; the speed of cross-theater spillover has markedly accelerated, and the chain reactions between economic and security domains have emerged earlier.

This study poses three core research questions:

1. Against the backdrop of regional order transformation, has proxy war in the Middle East evolved from “indirect outsourcing” to a hybrid mode characterized by “parallel proxy operations and direct action”?
2. Is this shift merely a short-term anomaly, or has it exhibited long-term and structural precursors?
3. How will this model influence crisis management, deterrence and stability, and the risks of conflict spillover?

To address these questions, this study adopts a combined approach of “long-term structural data + short-term event tracking.” The long-term component utilizes the UCDP External Support Dataset V.18.1 to trace the evolutionary trajectory of externally supported conflicts in the Middle East from 1975 to 2017. The short-term component codes key conflict events from February 28 to March 4, 2026, constructing a verifiable timeline, casualty patterns, and spillover indicators. The purpose of this design is not to derive a “causal coefficient” through a single method, but to establish a more robust interpretive framework based on cross-temporal and cross-scale evidence. This study argues that as regional order enters a period of reorganization, proxy warfare may exhibit three trends: proxy networks become more fragmented, strike capabilities become more accessible, and escalation pathways possess fewer buffers, making them more prone to rapid acceleration.

This study makes three primary academic contributions. First, conceptually, it proposes the “proxy-direct parallel” model to refine the binary “proxy or direct” substitution framework. Second, empirically, it employs auditable data to demonstrate that externally supported conflicts in the Middle East have not experienced a long-term decline; instead, they resurged in the 2010s, with states remaining the primary sponsors. Third, in terms of policy, it argues that crisis management should extend beyond front-line contact zones, incorporating Gulf military bases, shipping insurance, energy corridors, and information misjudgment chains into an integrated risk management framework.

## 2. Literature Review

### 2.1 The Expansion of the Proxy War Concept

Early research typically understood proxy war as a situation in which a state employs force indirectly through a third party, thereby reducing the political and military costs associated with direct intervention. Initial studies emphasized two key features: “deniability” and “low visibility.” That is, the sponsoring state utilizes proxy actors to achieve limited objectives while seeking to avoid the risks of full-scale war<sup>[1][2]</sup>. This definition largely shaped academic research and discourse throughout the post-Cold War era.

In recent years, however, this understanding has been significantly refined. First, proxy warfare is no longer viewed as a singular “outsourcing” act, but rather as a continuous chain of actions encompassing training, intelligence support, equipment supply, financial assistance, targeting, and battlefield coordination<sup>[3][4][5]</sup>. Second, proxy operations and direct strikes do not always function as substitutes; both can operate concurrently within the same crisis and be employed simultaneously to achieve deterrence signaling and battlefield shaping<sup>[6][7]</sup>. Therefore, the focus of proxy war research is shifting: from “the use of proxies” to “how proxy means and direct means are combined.”

### 2.2 Main Themes in External Support Research: Motivation, Control, and Escalation

In explaining “why proxy support occurs,” existing research has developed a relatively mature principal-agent analytical framework. Salehyan (2011) notes that by delegating combat tasks to rebel groups, states can reduce the risk of casualties among their own forces and mitigate international accountability pressures. However, this approach entails significant control problems and is prone to goal divergence<sup>[8]</sup>.

Further cross-national statistical research indicates that external support does not occur randomly, but is often associated with

geopolitical competition, border proximity, the risk of civil war spillover, and sponsors' expectations of strategic gains<sup>[3][9]</sup>. In terms of conflict dynamics, multiparty involvement significantly alters the duration and outcome structure of wars, making conflicts more likely to exhibit characteristics such as "more participants, stronger cross-border dimensions, and greater difficulty in termination"<sup>[10][11]</sup>. This pattern aligns with long-term observations in the Middle East: external support tends to enhance the viability of armed groups and increase the likelihood of conflict diffusion, particularly in conflict zones such as Syria<sup>[12]</sup>.

In this research context, classic civil war studies also provide an important backdrop. Fearon and Laitin emphasize that state capacity, terrain conditions, and the feasibility of insurgency are fundamental factors in the onset of civil war<sup>[13]</sup>. Kalyvas and Balcells point out that shifts in the international system and military technology alter the nature of civil war, making it more likely for asymmetric conflicts to intersect with international competition<sup>[14]</sup>. Together, these studies suggest that proxy warfare is not merely a tactical choice, but rather the outcome of interacting factors including state capabilities, international structures, and organizational networks.

### **2.3 Regional Order Transformation Perspective: The Structural Reorganization of Middle East Conflicts**

Discussing proxy warfare within the framework of "regional order transformation" represents an important advance in recent scholarship. According to regional security complex theory, security interactions are typically concentrated within a region, where the intervention of external powers becomes intertwined with the competition among regional actors, forming multi-layered threat chains<sup>[15]</sup>. In the Middle East, this implies that conflicts no longer remain confined to a single theater but are transmitted across multiple nodes through proxy networks. From this perspective, it becomes evident that sponsors do not always make a binary choice between "direct intervention" and "proxy intervention." Instead, they may shift between these two types of instruments—or employ them simultaneously—depending on deterrence needs, risk tolerance, and assessments of timing<sup>[1][5][6][7]</sup>.

In addition, strategic secrecy and deniability remain important mechanisms in external support, but their functions are evolving. Research indicates that sponsors make strategic calculations between overt and covert support to simultaneously manage international costs and enhance military effectiveness<sup>[3][9]</sup>. This also suggests that the previous "low-intensity, proxy-oriented" model is being replaced by a more complex pattern: proxy networks continue to operate while coordinating with direct strikes during critical phases. For the Middle East, the convergence of regional order realignment, alliance restructuring, and the proliferation of unmanned operations has further compressed the buffer space for crisis escalation.

## **3. Theoretical Framework: From "Substitution Logic" to "Parallel Logic"**

### **3.1 Traditional Substitution Logic and Its Limitations**

The traditional "substitution logic" holds that sponsors choose between "proxy action" and "direct action," treating the two as trade-offs. This logic was more applicable in earlier periods, when technological levels were low and information dissemination was slow. Direct intervention often entailed high costs and faced stronger domestic political constraints, while the use of proxy tools could significantly reduce exposure risks. However, under current technical and organizational conditions, this substitution logic encounters three types of challenges:

First, long-range strike technologies reduce the human exposure costs of direct action, meaning that direct action does not necessarily imply high costs.

Second, proxy networks are more deeply embedded in cross-border relations, creating stronger linkages between conflict zones. Even if the sponsoring state does not increase direct action, conflict may escalate due to interactions among different nodes.

Third, information dissemination is more real-time, which reduces the space for "strategic ambiguity" and makes sponsors more inclined to use direct actions to rapidly transmit deterrent signals during crisis windows.

### **3.2 The Proxy-Direct Parallel Model**

This study proposes the "proxy-direct parallel model." The core argument is that during periods of regional order transition, sponsoring states treat proxy actions and direct actions as a set of functionally complementary tools, rather than as substitutes.

The model comprises three mechanism chains:

1. Deterrence compensation mechanism: When proxy actions are insufficient to restore deterrence credibility, the sponsoring state intensifies direct actions to more rapidly recalibrate the adversary's expectations.
2. Network amplification mechanism: Proxy networks provide sustained pressure across dispersed locations, while direct actions deliver stronger and more conspicuous deterrent signals. The superposition of the two accelerates conflict diffusion.
3. Spillover transmission mechanism: Battlefield escalation transmits to markets through energy and shipping channels, triggering price fluctuations. These market movements, in turn, influence policy choices, forming a "conflict-price-policy" feedback loop.

### 3.3 Alternative Explanations and Distinctions

Possible alternative explanations include:

1. Statistical visibility effect: The parallel trend stems solely from more comprehensive data recording;
2. Single shock effect: The 2026 escalation is merely an incidental event and cannot be generalized;
3. Media amplification effect: Short-term market fluctuations do not necessarily reflect structural changes.

This study addresses these alternatives by tracing trend continuity over a decade using long-term datasets, documenting verifiable data in short-term events with clear sourcing and timing, thereby avoiding inferences based solely on narrative impressions.

## 4. Data, Samples, and Methods

### 4.1 Data Sources

This study utilizes two types of data: The first category is long-term structural data: the UCDP External Support Dataset V.18.1. This dataset includes dyad-year and triad-year observations, covering the period from 1975 to 2017. It provides information on conflict parties, external supporters, types of support, and years of involvement, making it suitable for tracing long-term structural changes. The second category is short-term event data: this paper codes authoritative reports from February 28 to March 4, 2026, constructing an event timeline, casualty snapshots, and spillover indicators. To ensure verifiability, this study retains source links for each recorded entry.

### 4.2 Definition of the Middle East Sub-Sample

To ensure consistency between the long-term and short-term units of analysis, this paper screens the following 16 countries/regions based on the location field: Iran, Iraq, Syria, Lebanon, Israel, Jordan, Saudi Arabia, Yemen, Turkey, Kuwait, Bahrain, Qatar, Oman, the United Arab Emirates, Palestine, and Egypt. Under this selection criteria, the sample coverage of the UCDP dataset is as follows:

There are 335 dyad-year observations, of which 305 have external support recorded;

Triad-year observations total 1,859, including 1,696 with external support recorded;

External support in dyad-year covers 27 conflict IDs, 55 dyad IDs, and 141 supporter IDs.

This coverage structure indicates that externally supported conflicts in the Middle East are not confined to a single theater, but rather represent a superposition of multiple conflicts, multiple actors, and multiple phases.

### 4.3 Variable Construction

Core variables include:

1. ext\_sup: whether external support is present (0/1);
2. ext\_nonstate: whether the supporter is a non-state actor (0/1, at triad-year level);
3. decade: ten-year grouping variable, constructed as  $\text{floor}(\text{year}/10)*10$ ;
4. dyad\_year\_count: number of externally supported dyad-years within a decade;
5. supported\_share\_pct: proportion of externally supported dyad-years within a decade;
6. fatalities: cumulative number of fatalities among conflict parties (as of the snapshot taken on March 4, 2026);
7. share\_pct: fatality share of each conflict party.

### 4.4 Methodological Strategy

This study adopts a combined approach of "descriptive statistics + process tracing" rather than a causal inference model. This

method serves two objectives:

1. To identify “whether the pattern has changed” over the long-term dimension;
2. To trace “how the change occurs” over the short-term dimension.

The specific steps are as follows:

- Step 1: Count the number of observations with  $\text{ext\_sup} = 1$  in each decade at the dyad-year level to identify long-term trends;
- Step 2: Analyze the composition of state and non-state supporters at the triad-year level;
- Step 3: Code key events from February 28 to March 4, 2026, and extract casualty and spillover indicators;
- Step 4: Juxtapose the long-term structural findings with short-term mechanism evidence to test three theoretical propositions.

#### 4.5 Identification Boundaries and Research Ethics

The identification boundaries of this paper are specified as follows:

1. It does not estimate causal coefficients of the kind “a certain policy leads to a certain outcome”;
2. The war snapshot data are current, and conclusions are timestamped accordingly;
3. It does not forcibly reconcile figures from inconsistent sources, relying only on verifiable metrics.

Regarding research ethics, this study does not publish unverified wartime details, refrain from secondary speculation on casualty figures, or substitute research narratives for official verification procedures.

### 5. Empirical Findings: Structural Trends and Crisis Processes

#### 5.1 Long-Term Structural Results: The Nonlinear Evolution of Externally Supported Conflicts

*Figure 1: Decadal Distribution of Externally Supported Conflicts in the Middle East*

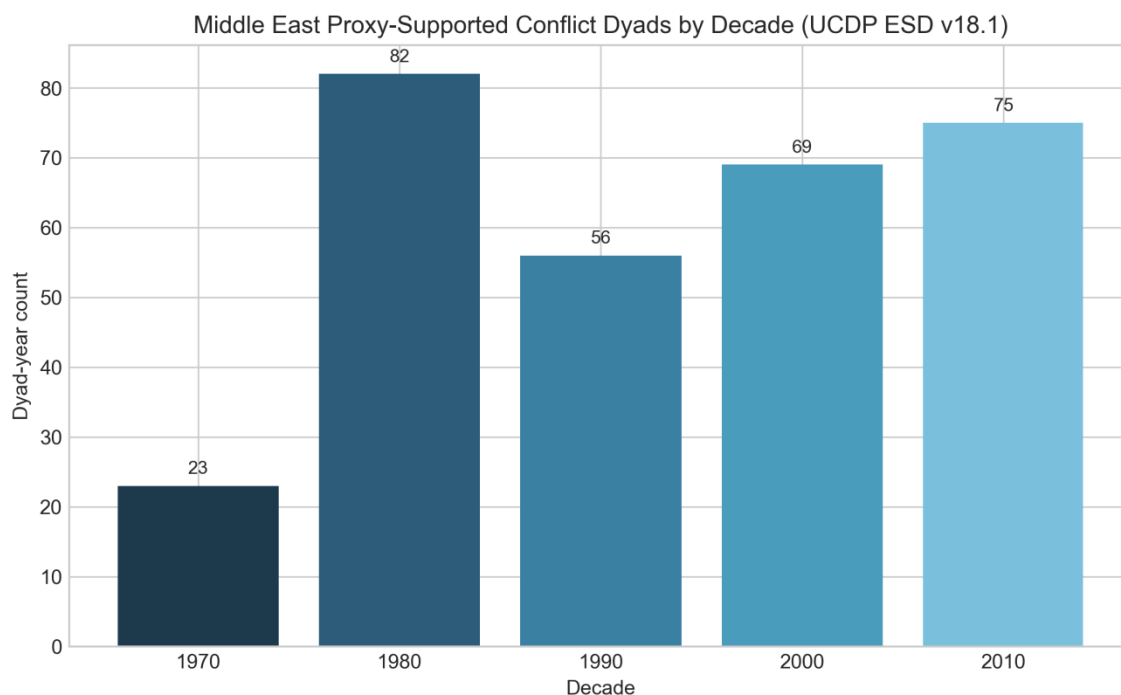


Figure 1 presents the decadal distribution of dyad-year observations in the Middle East. The corresponding values are:

1970s: 23; 1980s: 82; 1990s: 56; 2000s: 69; 2010s: 75

Based on the total dyad-year count under the same selection criteria, the support incidence can be calculated accordingly:

1970s: 82.14%; 1980s: 89.13%; 1990s: 94.92%; 2000s: 93.24%; 2010s: 91.46%

The above results convey three key findings. First, externally supported conflicts in the Middle East did not “naturally subside” after the Cold War; instead, they remained at elevated levels throughout the 2000s and 2010s. Second, the consistently high incidence rate over an extended period indicates that external support is not a marginal variable in the region’s conflict structure. Third, the sustained high frequency from the 1980s to the 2010s supports the judgment that “the proxy mechanism exhibits strong resilience.”

## 5.2 Findings on Supporter Structure: Coexistence of State Dominance and Network Diffusion

Triad-year statistics show that among externally supported observations:

State supporters: 1,538

Non-state supporters: 158

State supporters account for approximately 90.7%, while non-state supporters constitute about 9.3%. This result could be easily misinterpreted as “non-state support being insignificant,” but a more nuanced interpretation is that resource provision and strategic calibration remain state-dominated, while non-state nodes enhance the transmission efficiency of conflicts through cross-geographical networks.

Examining the top ten triad-year observations further reveals the inclusion of both major state governments and organizational nodes with cross-theater influence. This suggests that the organizational structure of conflicts is not a single-layer “state-to-state” interaction, but rather a multi-layered network of “state–organization–theater nodes.”

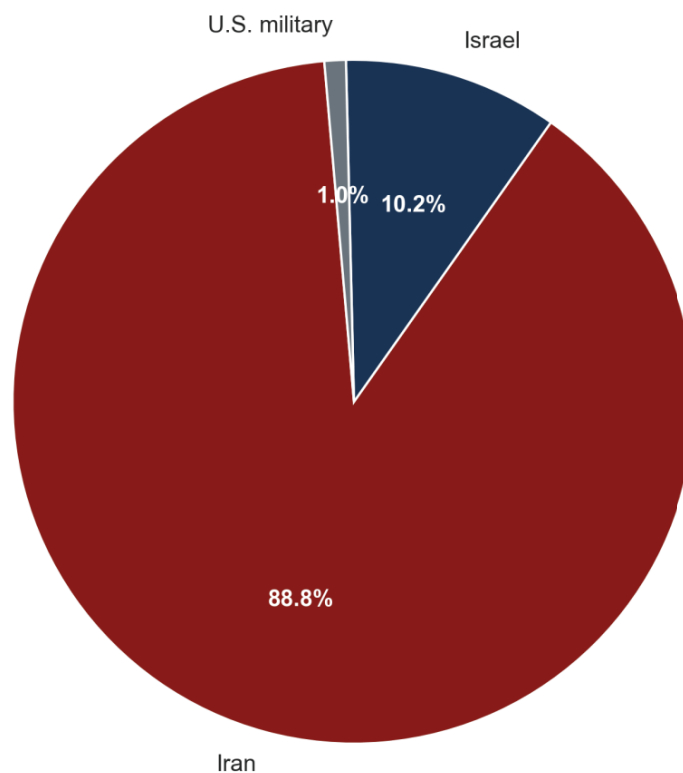
## 5.3 Tracing the 2026 Crisis Process: High-Intensity Escalation Within a Five-Day Window

Based on the event coding tables (February 28 to March 4, 2026), three nearly simultaneous processes can be observed.

First, military operations escalated rapidly. From February 28, 2026, the war entered a new phase, and by March 4, transnational casualties had already accumulated. Second, the number of involved actors increased. In addition to the main belligerents, security risks at U.S. military bases intensified significantly within the same time window. Third, economic spillovers emerged early. Oil prices, marine insurance premiums, and LNG prices moved in the same direction over a short period. As of March 4, 2026, the fatality snapshot was as follows.

*Figure 2: Pie Chart of Fatality Shares as of March 4, 2026*

Reported War Fatalities Snapshot (as of 2026-03-04)



Iran: 787 (88.8%)

Israel: 90 (10.2%)

U.S. military: 9 (1.0%)

Compared with the war snapshot of June 12, 2025, the 2026 data shows higher multi-actor involvement density within a shorter time window. This pattern is consistent with the “proxy-direct parallel model”: conflict does not progress along a

single front, but rather exerts simultaneous pressure across multiple nodes.

## 5.4 Key Timeline

The key events coded in this paper include:

2026-02-28: The war escalated into a new phase;

2026-03-04: Cumulative fatalities were updated, showing an expansion of bilateral casualties;

2026-03-04: Casualties among U.S. personnel were reported, alongside heightened security risks at military bases;

2026-03-04: Energy and shipping spillover indices registered increases.

Juxtaposing these events with long-term trends reveals that the 2026 escalation is not an isolated shock “divorced from history,” but rather a high-intensity eruption occurring within a conflict structure characterized by persistently high support rates over time.

## 6. Mechanism Analysis

### 6.1 Deterrence Compensation Mechanism

In a crisis marked by high uncertainty, actors often encounter a dilemma: the signals conveyed through proxy means may lack sufficient deterrent weight. While proxy actions offer greater tactical flexibility, they risk being interpreted by the adversary as indicating “limited commitment” or as falling within the opponent’s “tolerance threshold.” When the sponsoring state perceives that such signals are insufficient to alter the adversary’s behavior, it becomes more likely to supplement them with direct strikes of higher visibility. Consequently, proxy actions and direct actions frequently appear concurrently within the same crisis episode, rather than functioning as substitutes for one another.

### 6.2 Network Amplification Mechanism

Proxy networks consist of numerous dispersed nodes, which makes conflicts more likely to ignite and facilitates their rapid spread. An attack or counterattack at one node can quickly alter the risk perceptions of other nodes, thereby enabling local conflicts to propagate along the organizational network. If direct state-level strikes are superimposed during such periods, the diffusion effect becomes even more pronounced. In the 2026 time window, the simultaneous escalation of base security risks and cross-border casualties provides empirical evidence indicative of this mechanism.

### 6.3 Spillover Feedback Mechanism

Unlike the linear sequence of “battlefield changes first, market reactions follow” observed in the past, market responses and military escalations now occur almost simultaneously in many conflict episodes. Fluctuations in energy prices, shipping insurance premiums, and supply chain expectations quickly feed back into the policy level, prompting all parties to adjust their operational tempo and negotiation postures. In other words, economic spillover is no longer merely a consequence of war, but actively shapes decision-making throughout the conflict process.

### 6.4 Mechanism Synthesis

The triple mechanism operates synergistically, forming the following dynamic chain:

1. Proxy actions alone prove insufficient to reset deterrence;
2. Direct strikes are employed to reinforce strategic signals;
3. The proxy network amplifies cross-theater impacts;
4. Economic spillovers feed back into the decision-making system;
5. Conflicts accelerate within a “military–market–politics” tri-domain cycle.

This chain helps explain why contemporary Middle Eastern crises often transition from “controllable friction” to a “multi-node high-risk state” within a short period.

## 7. Alternative Explanations, Robustness, and Reflections

### 7.1 Alternative Explanation 1: More Complete Recording Leading to an “Apparent Rise”

One might argue that the increase in externally supported conflicts during the 2010s merely reflects more complete data recording, rather than substantive change. This study offers two responses to this concern. First, all comparisons are conducted within the same database, minimizing discrepancies arising from differing data collection standards. Second, the

core findings of this paper do not rest on “rising absolute numbers,” but rather on evidence of “persistently high incidence rates combined with a largely stable participation structure.” Even with improved recording, it would be difficult to account for the simultaneous observation of “sustained high incidence” and “structural stability.”

## 7.2 Alternative Explanation 2: The 2026 Escalation as a Short-Term Anomaly

Certainly, the escalation in 2026 was sudden, but the explanatory power of this study does not derive solely from isolated figures; rather, it emerges from comparing these events with long-term structural patterns. Over the long run, externally supported conflicts have persistently occurred at high frequency; in the short term, direct strikes have become demonstrably more concentrated within this specific window. Together, these two dimensions constitute an observable evidentiary chain supporting the “parallel model.” To attribute the escalation merely to “contingency” would overlook the fact that the conflict structure already possesses the organizational and technical conditions necessary for rapid intensification.

## 7.3 Alternative Explanation 3: Media Narratives Amplified Market Reactions

To minimize bias introduced by media amplification, this study codes only verifiable figures from reports, without incorporating subjective inferences. Even so, oil prices, marine insurance premiums, and LNG prices trended in the same direction within the observed time window, indicating that the spillover effect is at least directionally robust. This study does not claim that the magnitude of spillover is constant across all periods, but rather emphasizes a more fundamental observation: within a short time frame, these market variables moved in the same direction.

## 7.4 Robustness Strategy

The robustness strategies employed in this study currently include:

1. Intertemporal comparison using the same database;
2. Clear specification of the Middle East sample selection criteria;
3. Retention of event-level source links;
4. Maintaining a distinction between “structural conclusions” and “snapshot conclusions”;
5. Explicit indication of the statistical cutoff date.

## 7.5 Research Limitations

This study has three main limitations:

1. The current version of the UCDP ESD dataset extends only to 2017, and therefore cannot directly capture all structural changes occurring in the 2020s;
2. Wartime data from 2026 may be subject to revision upon subsequent verification;
3. Without causal identification, this study cannot estimate the magnitude of net effects between variables.

These limitations do not undermine the study’s core conclusion regarding “pattern recognition,” but they remind readers to distinguish between different levels of evidence when citing the findings.

# 8. Discussion

## 8.1 Upgrading the Crisis Management Framework

If conflicts have entered a stage of “proxy–direct parallelism,” traditional ceasefire tools centered on the contact line are no longer sufficient. Policy design should encompass at least three levels:

1. Theater level: reducing the probability of high-intensity firefights along frontlines;
2. Node level: stabilizing the security of cross-border bases and critical infrastructure;
3. Channel level: simultaneously managing risk expectations in energy transportation and marine insurance.

All three levels are indispensable. The paradox of “military cooling down while markets heat up” often arises when only crossfire in the theater is suppressed, while risks at the node and channel levels are overlooked.

## 8.2 Transparency and the Control of Miscalculation

In the parallel mode, the number of actors increases and the tempo of operations accelerates, significantly raising the potential costs of miscalculation. It is necessary to establish a minimum information transparency mechanism, including:

1. Prompt notification of strikes on critical infrastructure;

2. Clarification of casualty figures with updated timestamps;
3. Clear distinction between tactical operations and strategic signaling.

Transparency does not require the disclosure of sensitive military details, but serves to prevent secondary escalation driven by information gaps.

### 8.3 Collaborative Governance of Economic Security

Energy and shipping spillovers have become integral variables in the dynamics of warfare. Policy institutions should position economic security tools proactively rather than reactively. Key measures include:

1. Establishing monitoring thresholds for insurance premium fluctuations during conflict windows;
2. Activating coordination between strategic reserves and emergency transportation plans;
3. Promoting joint risk assessments across energy, transportation, and financial regulatory domains.

## Conclusion

This study proposes and substantiates the proposition of “proxy–direct parallelism” in the context of evolving proxy warfare amid regional order transformation in the Middle East. By juxtaposing long-term structural data with short-term event-level evidence, the paper draws the following conclusions:

First, externally supported conflicts are a long-term structural feature of the Middle East, exhibiting no simple linear decline. Second, state supporters remain the dominant actors, while non-state network nodes significantly influence the speed of conflict propagation. Third, the 2026 Iran war exhibited the defining characteristics of the parallel mode within a short time window: battlefield escalation, cross-border involvement, and economic spillover occurred simultaneously.

These findings suggest that the study of proxy warfare needs to shift its focus from tool substitution to tool combination, and that crisis management must move from single-line de-escalation to coordinated action across nodes.

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## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# Research on the Effect and Strategy Optimization of Artificial Intelligence in the Translation of the Classic of Traditional Chinese Medicine *Spiritual Pivot*

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**Abstract:** With the widespread application of artificial intelligence (AI) in translation, AI translation tools have provided new approaches for the English translation of traditional Chinese medicine (TCM) classics. Nevertheless, the performance of AI in translating TCM classics—especially those containing unique cultural concepts and terminology—remains to be verified. Taking selected classic chapters of *Spiritual Pivot* as the research object, this study adopts DeepSeek, an accessible and user-friendly AI translation tool, to generate English versions, which are then compared with human-translated texts to identify the strengths and limitations of AI in assisting TCM classic translation. By integrating the criteria for TCM classic translation and general principles of translation, this research pinpoints feasible directions for improving AI-generated translations and proposes targeted, practical optimization strategies. The findings aim to offer references for the future practice of AI-assisted English translation of TCM classics and facilitate the international communication of TCM culture.

**Keywords:** AI Translation; TCM Classics; *Spiritual Pivot*; English Translation Effect; Strategy Optimization

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## 1. Introduction

With the in-depth integration of AI and traditional cultural communication, the English translation of TCM classics has ushered in new opportunities and challenges. This chapter will first elaborate on the research background and significance, sort out the domestic and foreign research status, and then clarify the specific research content and methods to lay a solid foundation for the whole study.

### 1.1 Research Background and Significance

#### 1.1.1 Research Background

AI translation tools have been widely applied in various text translation scenarios, providing an efficient and convenient new path for the English translation of traditional cultural classics. As an important carrier of excellent traditional Chinese culture, TCM classics embody unique TCM theories, diagnosis and treatment thinking, and cultural connotations. Their English translation is a key link in promoting the international communication of TCM culture. However, TCM classics are characterized by archaic and concise language, dense technical terminology, and highly culture-loaded concepts. Traditional manual English translation has the problems of low efficiency, high cost, and high professional thresholds for translators, making it difficult to meet the demand for large-scale communication. The popularization of AI translation tools provides

a possibility to solve this dilemma. Nevertheless, most current AI translation tools are designed for general texts, and their translation accuracy, completeness, and cultural transmission effect in the English translation of TCM classics—especially those containing unique cultural connotations and terminology—still need further verification. As an important part of Huang Di Nei Jing (Yellow Emperor's Canon of Medicine), Ling Shu (Spiritual Pivot) is a core classic of TCM meridian theory and acupuncture theory, featuring concise language and rich terminology. It is suitable as a sample for studying AI-assisted English translation of TCM classics, thus making this research practically necessary.

### 1.1.2 Research Significance

The theoretical significance of this study lies in supplementing empirical research in the field of AI-assisted English translation of TCM classics, and clarifying the advantages and disadvantages of AI translation tools in the English translation of professional classics such as Spiritual Pivot. The practical significance is to propose targeted and easily implementable optimization strategies for AI-generated translations, providing specific references for subsequent researchers and translation practitioners to use AI in the English translation of TCM classics. This study aims to improve translation efficiency and quality, reduce translation costs, and help TCM culture move towards the world more efficiently and accurately.

## 1.2 Research Status at Home and Abroad on AI and English Translation of TCM Classics

### 1.2.1 Foreign Research Status on AI and English Translation of TCM Classics

Foreign AI translation technology started earlier and has now entered a stage of coordinated development of neural machine translation and large language models. Researchers focus on the optimization of AI translation models, the improvement of multilingual adaptability, and the customization of professional fields, forming relatively mature technical paths in the translation of professional texts such as medicine and law. Scholars such as Bahdanau D have focused on the core basic research of neural machine translation, laying the technical framework for AI translation of professional texts<sup>[1]</sup>. Radford A and others have conducted basic research on pre-training of large language models, promoting the improvement of adaptability of AI translation in professional fields<sup>[2]</sup>. The core advantages of the above studies lie in the accuracy of terminology recognition, the coherence of text logic, and the efficiency of batch processing, which provide technical references for the translation of professional and culturally loaded texts such as TCM classics. However, there is still room for improvement in the processing technology of special languages such as ancient Chinese.

Foreign translation and research on TCM classics mainly focus on core classics such as Yellow Emperor's Canon of Medicine and Shang Han Za Bing Lun (Treatise on Febrile and Miscellaneous Diseases). Basic TCM theory classics represented by Spiritual Pivot are research hotspots. Most translators are medical researchers and sinologists. In translation practice, they pay more attention to the medical adaptability of TCM terminology and the readability of translations, focusing on comparative interpretation of TCM theories and Western medical systems to help overseas readers understand. Among them, the most representative English translation research on Yellow Emperor's Canon of Medicine is the series of works Annotated Translation of Huang Di Nei Jing Su Wen hosted by German scholar Paul U. Unschuld, which consists of 4 volumes and has been published successively by the University of California Press. The first volume, Huang Di Nei Jing Su Wen: Nature, Knowledge and Imagination in an Ancient Chinese Medical Text, was published in 2003, integrating medical and sinological perspectives to explore the cross-cultural transmission of TCM theories<sup>[3]</sup>. At the same time, foreign scholars such as Sivin N have focused on classic works of overseas TCM research, involving discussions on the cultural adaptability of TCM classic translation<sup>[4]</sup>. However, most existing studies rely on manual translation, and the application of artificial intelligence technology mostly stays at the tool-assisted level. There is a lack of optimization of AI translation strategies for the text characteristics of TCM classics, and insufficient attention is paid to the in-depth transmission of TCM cultural connotations. A research system for the in-depth integration of AI and TCM classic translation has not yet been formed.

### 1.2.2 Domestic Research Status on AI and English Translation of TCM Classics

Domestic research on the English translation of TCM classics started early and has yielded rich research results, focusing on the discussion of translation methods. Centering on the choice between literal translation and free translation, foreignization and domestication, it has clarified the principle that the English translation of TCM classics should balance accuracy, cultural nature and standardization. At the same time, researchers have paid attention to core issues such as translator subjectivity,

the transmission of culturally loaded words, and terminology unification, sorted out the common dilemmas and solutions in the English translation of TCM classics, and formed a number of valuable research results. Representative studies include Wang Hongyin's *Theory and Practice of English Translation of TCM Classics*, which systematically discusses the principles, methods and dilemmas of TCM classic translation and is a core work in this field in China<sup>[5]</sup>. Li Zhaoguo's *English Translation Skills of Traditional Chinese Medicine* focuses on TCM terminology and text translation skills, providing guidance for translation practice<sup>[6]</sup>.

With the popularization of AI technology, domestic researchers have begun to explore the application of AI in the field of TCM translation, and initial achievements have been made so far, mainly focusing on the application practice of AI translation tools in TCM terminology translation and batch translation of simple texts. By comparing the translation effects of different AI tools, researchers have summarized their advantages and disadvantages in TCM text translation, and tried to build TCM terminology databases and connect them with AI tools to improve the unification of terminology translation. For example, Zhang Min and Li Juan compared the TCM terminology translation effects of tools such as ChatGPT-4 and Spark Cognitive Large Model V3.5 based on the AIGC language model, and analyzed the advantages and disadvantages of AI translation<sup>[7]</sup>. Deng et al. conducted an applied study on the performance of AI in the translation of TCM terminology, and put forward suggestions including emphasizing the interactivity of artificial intelligence, enhancing interdisciplinary cooperation and learning, and strengthening the unification and standardization of terminology<sup>[8]</sup>. The "Ben Cao Zhi Yi" team from Ningbo University introduced the research and development and application of the "Yi Dian Tong" intelligent translation system, which built a TCM terminology database and connected it with AI tools to improve the efficiency and quality of TCM text translation, and has been implemented in scenarios such as cross-border diagnosis and treatment and pharmaceutical instruction translation. However, most existing studies stay at the tool application level, lacking AI translation model optimization and strategy design for the text characteristics of TCM classics. In addition, the research on the proofreading and optimization process of AI translation results is relatively weak, and a complete research chain has not yet been formed.

In summary, the existing domestic and foreign research provides a theoretical basis and practical reference for this study, but there are still limitations. Foreign research focuses on AI technology research and development and medical interpretation of TCM classics, lacking AI translation strategy optimization and in-depth transmission of cultural connotations. Domestic research mostly stays at the surface of AI tool application, failing to achieve in-depth integration with the text characteristics and cultural load of TCM classics. Moreover, there is a lack of research on AI translation of classics such as *Spiritual Pivot*, the construction of corpus is backward, the research paradigm is relatively single, and there is a lack of implementable optimization strategies and empirical verification, which fails to effectively solve the core dilemma of TCM classic translation.

### **1.3 Research Content and Methods**

#### **1.3.1 Research Content**

Taking selected classic chapters of *Spiritual Pivot* as the research object, this study adopts DeepSeek, an easily accessible and operable AI translation tool, to generate translations, which are then compared and analyzed with human translations to clarify the advantages and disadvantages of AI-assisted English translation of TCM classics. Combined with the standards for English translation of TCM classics and general translation principles, this study identifies the improvement directions of AI-generated translations and proposes targeted translation optimization strategies. Finally, it summarizes the research conclusions, looks forward to the subsequent practice of AI-assisted English translation of TCM classics, and provides references for the international communication of TCM culture.

#### **1.3.2 Research Methods**

The specific research methods adopted in this study include literature research method, empirical comparison method, and induction and summary method.

By retrieving and integrating journal papers, academic dissertations and monographs related to the English translation of TCM classics and *Spiritual Pivot*, this study sorts out the current research status, core theories and research methods of relevant studies, laying a theoretical foundation for this study and clarifying the entry point and direction of the research.

Three to five classic chapters from *Spiritual Pivot* (such as Volume 1 and Volume 3, which are moderate in length, dense in terminology and representative) are selected. AI translations are generated by the DeepSeek tool respectively, and the publicly available authoritative human translations, namely *Yellow Emperor's Canon of Medicine Spiritual Pivot (Chinese-English Parallel Version)* edited by Li Zhaoguo and Liu Xiru, are selected as comparison samples<sup>[9]</sup>. From four dimensions—terminology translation, semantic accuracy, cultural information transmission, and language fluency—the AI translations and human translations are compared sentence by sentence, the differences between the two are recorded, and the advantages and disadvantages of the AI translations are analyzed.

Based on the results of empirical comparison, this study summarizes the common problems of AI translations in the English translation of TCM classics, analyzes the causes of the problems combined with the principles and requirements of TCM classic translation. On this basis, it summarizes the advantages of AI-assisted English translation of TCM classics and proposes targeted and easily implementable optimization strategies. Finally, it summarizes the core conclusions of this study and looks forward to future research. This method is mainly based on inductive analysis of the previous comparison results, which is simple to operate and suitable for the research needs.

## 2. Theoretical Basis

To systematically explore the application effect and optimization path of AI translation in TCM classics, it is necessary to clarify the relevant theoretical foundations and tool characteristics. This chapter mainly elaborates the translation norms of TCM classics and the basic principles and features of AI translation tools, providing a theoretical framework for the subsequent empirical analysis.

### 2.1 Core Requirements and Principles of English Translation of TCM Classics

#### 2.1.1 Core Requirements for the English Translation of TCM Classics

The core requirements for the English translation of TCM classics are accuracy, completeness, comprehensibility, and cultural transmission. Specifically, translations should accurately convey the meanings of TCM professional terms, fully reflect the theoretical connotations of the original texts, use accessible language consistent with English conventions, and preserve the unique cultural implications of TCM<sup>[10]</sup>. These requirements are intended to avoid the loss or mistranslation of cultural information, ensure the acceptability of translations to English readers, and facilitate the effective dissemination of TCM culture.

#### 2.1.2 Principles for the English Translation of TCM Classics

This study adopts the TCM term translation standards specified in the International Standard Chinese-English Basic Nomenclature of Chinese Medicine, namely correspondence, conciseness, consistency, and conventionality<sup>[11]</sup>. It also refers to the evaluation indicators proposed by Xu Mingwu et al. for intelligent translation and multimodal communication of TCM classics, including accuracy, fluency, professionalism, and cultural transmission<sup>[12]</sup>. Combined with the textual characteristics of TCM classics, four general translation principles are followed: the faithfulness principle requires translations to adhere strictly to the original meaning and style without arbitrary addition or omission of semantics; the accuracy principle emphasizes the precise translation of professional terms to avoid ambiguity; the readability principle demands fluent language that conforms to English expression logic; and the cultural adaptability principle suggests appropriate translation methods for unique TCM cultural elements to ensure effective cultural transmission.

### 2.2 Core Principles of AI Translation and Characteristics of AI Translation Tool

#### 2.2.1 Core Principles of AI Translation

AI translation is based on big data and machine learning technologies. By learning a large number of bilingual texts, it grasps the expression rules of language and the corresponding relationship of semantics, and then realizes the automatic translation of texts. Its core advantages lie in high translation efficiency and convenient operation, which can quickly process a large number of texts, reduce translation costs, and meet the translation needs of large-scale texts.

#### 2.2.2 Characteristics of AI Translation Tool

DeepSeek is selected as the AI translation tool in this study. It has the characteristics of easy access, easy operation and free opening, without complex registration and operation processes, so ordinary researchers can get started quickly. At the same time, DeepSeek has a certain degree of accuracy in professional text translation, and can better handle common terminology,

making it suitable as an auxiliary tool for English translation of TCM classics.

### 3. Empirical Comparative Analysis of AI-Assisted English Translation of Spiritual Pivot

By selecting appropriate research samples and establishing scientific comparative dimensions, this chapter aims to clarify the advantages and limitations of AI translation in TCM classic translation, laying a foundation for proposing targeted optimization strategies.

#### 3.1 Selection of Research Samples

In this study, classic passages from three volumes of Spiritual Pivot, namely Volume 1, Volume 3, and Volume 5, were selected as research samples. The reasons for selection are as follows: first, these three volumes constitute the core content of meridian and acupuncture theories in Spiritual Pivot and are highly representative; second, the length of each chapter is moderate, with 500-800 Chinese characters per passage, and the translation difficulty is appropriate, which facilitates the generation and comparative analysis of translations; third, they are dense in professional terms, such as “九针 (Nine Needles)”, “津液 (body fluid)” and “精 (essence)”, which have high cultural characters. These characteristics can fully test the effect of AI translation tools in the English translation of TCM professional texts, meeting the research needs.

The AI translation samples were generated by inputting the selected three passages of Spiritual Pivot into the official online DeepSeek translation tool paragraph by paragraph, setting the translation language as “Chinese” to “English”, and saving the corresponding AI translations for later use.

For the human translation samples, the English translation of Yellow Emperor's Canon of Medicine·Ling Shu published by the World Publishing Corporation was selected to ensure the authority and accuracy of the human translations, providing a reliable basis for comparative analysis.

#### 3.2 Dimensions and Standards of Comparative Analysis

Combined with the core requirements and principles for the English translation of TCM classics, this comparative analysis is carried out from four core dimensions, and clear and operable evaluation standards are formulated for each dimension to ensure the objectivity and accuracy of the comparative analysis. The details are as follows: First, the dimension of terminology translation: whether the AI translation accurately translates TCM professional terms, and whether there are problems such as mistranslation, omission, and ambiguity of terms; whether the term translation is consistent and in line with the general term norms for the English translation of TCM classics. Second, the dimension of semantic accuracy: whether the AI translation is faithful to the original semantics, and whether there are problems such as addition, deletion, distortion, or omission of semantics; whether it fully presents the TCM theoretical connotations of the original text without core semantic deviations. Third, the dimension of cultural information transmission: whether the AI translation accurately conveys the unique TCM cultural elements in the original text, such as TCM diagnosis and treatment thinking, meridian theory, and Zang-Fu concepts; whether it avoids the loss or misinterpretation of cultural information to ensure that English readers can understand the connotations of TCM culture. Fourth, the dimension of language fluency: whether the language of the AI translation is fluent and in line with English expression logic and grammatical norms; whether there are problems such as stiff sentence patterns, chaotic word order, and improper word use, and how readable it is.

#### 3.3 Analysis of Empirical Comparison Results

##### 3.3.1 Comparative Analysis from the Dimension of Terminology Translation

The core of English translation of TCM classics lies in the accuracy and unification of terminology, which mainly involves three categories: basic theory, meridian and acupoint, and diagnosis and treatment methods. Human translations are standardized and rigorous, adopting the “Pinyin + annotation” translation method. For example, “气” is translated into “Healthy-Qi/ Evil-Qi”, which distinguishes healthy qi from pathogenic qi; “合谷” is translated as “Hegu(LI4) [which, located] between the first and the second metacarpal bone” and it marks the acupoint code. Although AI translations are concise and easy to understand, they have obvious shortcomings: in basic theory terminology, “中焦 (Middle Energizer)” is translated as “middle burner”, which deviates from TCM theory. The “中焦” refers to the spleen and stomach, which govern the intake and digestion of food and fluids, rather than the literal meaning of “being burnt or charred”. In meridian and acupoint terminology, there is confusion in capitalization, and “寸口 (pulsation of the radial artery over the wrist)” is only translated as “wrist

pulse” without clarifying the position of the radial artery; in diagnosis and treatment method terminology, the operation is simplified, and “徐而疾则实” is only translated as “Slow insertion and quick withdrawal tonify”, losing the core of “When Qi has arrived after needling”. On the whole, AI translations are suitable for popular science article, while human translations are more in line with professional standards and can accurately convey the connotation of TCM terminology.

### 3.3.2 Comparative Analysis from the Dimension of Semantic Accuracy

The core of semantic accuracy is that the translation is faithful to the original text, completely conveys the theoretical connotation of TCM, and has no addition, reduction or distortion of semantics. Human translations have high fidelity and can completely retain the core logic of TCM. For example, “人始生，先成精” is translated as “At the beginning of life, [the embryo is conceived] first by [parental]. Essence which then develops into the brain with the bones as the trunk”, with supplementary details to clarify the connotation of “parental essence”; “是动则病” is translated as “invasion [of pathogenic factors into this Channel causes the following] diseases”, clearly interpreting the pathological essence. Although AI translations are concise and coherent, they have obvious deviations: they omit the premise of “parental essence”, losing the core of TCM life generation theory; in “宛陈则除之 ([to use] removing[techniques to deal with] stagnation [of Qi and blood])”, “宛陈” is simplified to “stagnation”, missing the target object of “Qi and blood”; “令左属右” (The left [hand withdraws the needle] and the right [hand presses the needled Acupoint] to prevent Qi from leaking) fails to clarify the “needle withdrawal and pressing” operation, resulting in incomplete semantics. On the whole, human translations can more accurately convey the original theoretical connotation, while AI translations have problems of semantic simplification and deviation.

### 3.3.3 Comparative Analysis from the Dimension of Cultural Information Transmission

The transmission of cultural information needs to balance the preservation of TCM culture and cross-cultural understanding, with the core of conveying the unique diagnosis and treatment thinking and cultural connotation of TCM. For example, “悬阳” is translated as “the eyes and complexion, indicating vitality”, conveying the TCM diagnosis and treatment thinking of “observing spirit and complexion to distinguish diseases”. AI translations adopt the domestication translation strategy, which reduces the understanding threshold but leads to serious loss of cultural connotation. “悬阳” is literally translated as “the suspended yang” without explaining its cultural meaning. What’s more, “气” is translated as “vital energy”, assimilated to the Western concept of “vitality”. “盛则泻之，虚则补之 (the Shi(Excess)[ones can be treated by] reducing[needling techniques];the Xu (Deficiency)[ones can be treated by] reinforcing [needling techniques])” is simplified into a conditional sentence “Reduce when excessive, tonify when deficient”, losing the dynamic thinking of TCM “treatment based on syndrome differentiation”. In summary, human translations can better convey the essence of TCM culture, while AI translations are difficult to reflect the uniqueness of TCM culture.

### 3.3.4 Comparative Analysis from the Dimension of Language Fluency

Language fluency requires the translation to conform to English expression logic, grammatical norms and be highly readable. AI translations have obvious advantages in fluency, mainly using short sentences and coordinate clauses, with no grammatical errors, accurate and popular words. For example, the translation of “肺手太阴之脉 (the lung Channel of Hand-Taiyin originates from Zhongjiao)” is split into coherent short sentences, with natural connection and no redundant expressions. Although human translations are rigorous in sentence structure and close in logic, mostly using long sentence connection to ensure professionalism, they have obvious shortcomings: some long sentences are redundant, such as “the Channels are not only responsible for...but are also important for” which can be simplified; and long sentences are difficult to read. In comparison, AI translations are more in line with English reading habits and more readable, while human translations are superior in professionalism and rigor but need improvement in fluency.

Based on the comparison of the four dimensions—terminology translation, semantic accuracy, cultural information transmission, and language fluency—the core advantages and disadvantages of human translations and AI translations can be summarized as follows. The core advantages of human translations lie in their professionalism and rigor: they can accurately unify TCM terminology, completely convey the theoretical connotation of the original text, fully retain the uniqueness of TCM culture, have strong academic nature, and meet the professional needs of English translation of TCM classics. However, they have problems such as complex sentence structures, insufficient fluency, redundant expressions, and low translation

efficiency. AI translations, on the other hand, highlight the advantages of conciseness and fluency: they have popular sentence structures, high readability, and high translation efficiency, making them suitable for TCM culture popular science scenarios and reducing the understanding threshold for non-professional readers. Nevertheless, their professionalism is insufficient, with problems such as terminology deviation, inadequate transmission of theoretical and cultural connotation, and simplified details, making it difficult to meet the needs of professional English translation. Each of the two has its own focus, which can provide a clear direction for the subsequent optimization of AI-assisted English translation of TCM classics and support the international communication of TCM culture.

## **4. Targeted Optimization Strategies**

Based on the empirical comparison results in Chapter 3, aiming at the deficiencies of DeepSeek translations in professional terms, semantics, and cultural transmission, combined with the principles for the English translation of TCM classics, four targeted and easy-to-implement optimization strategies are proposed, which balance the efficiency of AI translation with the professionalism and cultural nature of the translated texts.

### **4.1 Optimization Strategy for Terminology Translation**

A dedicated TCM terminology database should be established for TCM classics such as *Spiritual Pivot*. This database integrates core terms related to basic theories, meridians and acupoints, as well as diagnosis and treatment methods, with their English translations clarified and standardized. By connecting the terminology database to AI translation tools, automatic and accurate term matching can be achieved. This approach addresses issues including term mistranslation, inconsistent capitalization, and inadequate conveyance of connotations. Furthermore, a term proofreading procedure is incorporated post-translation, with a focus on verifying the completeness of acupoint codes and diagnostic-therapeutic terms, so as to guarantee the uniformity and standardization of terminology.

### **4.2 Optimization Strategy for Semantic Accuracy**

Before translation, simple pre-processing shall be conducted on the original text, including marking key theoretical points and offering clear semantic prompts for the AI. Translation instructions should be optimized to explicitly require the AI to fully preserve the logic of the original text and not arbitrarily simplify core semantic content. For ambiguous expressions, the approach of “literal translation + supplementary explanation” is adopted to reduce semantic deviations and omissions, thereby enhancing the faithfulness of the translated text.

### **4.3 Optimization Strategy for Cultural Information Transmission**

Adopt the translation idea of “foreignization as the main method and domestication as the auxiliary method”. For unique TCM cultural elements (such as “气”, “悬阳”, and “辨证施治”), prioritize the translation method of “Pinyin + annotation” to avoid assimilation by Western medical concepts. Add short cultural notes at the end of the translated text to explain the core cultural connotations, which not only ensures the fluency of the translated text but also realizes the effective transmission of TCM culture, balancing readability and cultural nature.

### **4.4 Optimization Strategy for Overall Adaptability**

Leverage the fluency advantage of AI and maintain its strength in concise sentence structures, while drawing on the professional rigor of human translation to finetune redundant expressions and rigid sentence patterns in AI-generated texts. Establish a workflow of “AI initial translation – human proofreading – optimization and iteration”, with emphasis on checking professional terms, core semantics, and cultural transmission. This approach balances translation efficiency and quality, achieving the complementary advantages of AI and human translators.

## **5. Research Conclusions and Prospects**

### **5.1 Research Conclusions**

Taking three classic passages of *Spiritual Pivot* as samples, this study compared the effects of DeepSeek AI translations with authoritative human translations, and drew the following conclusions: First, AI translation has the advantages of high efficiency, fluency, and comprehensibility in the English translation of *Spiritual Pivot*, which is suitable for TCM culture popularization scenarios and can reduce translation costs and thresholds. Second, AI translations have obvious deficiencies,

mainly manifested in inaccurate professional terms, deviations in core semantics, and insufficient transmission of TCM cultural connotations, making it difficult to meet the needs of professional English translation. Third, although human translations are professional and rigorous with in-place cultural transmission, they have problems such as low efficiency and insufficient fluency. Fourth, the quality of AI translations can be effectively improved by targeted strategies such as building a dedicated terminology database, optimizing translation instructions, and improving the proofreading process, realizing the complementary advantages of AI and human translation.

## 5.2 Research Prospects

This study only selected one AI tool (DeepSeek) and three passages of *Spiritual Pivot* as samples, with a limited research scope. Future research can expand the sample size, select a variety of mainstream AI translation tools for comparison, and further verify the applicability of the optimization strategies. It can also conduct in-depth exploration on the customized optimization of AI translation models, train a dedicated model combined with the textual characteristics of *Spiritual Pivot* to improve translation accuracy. At the same time, it can strengthen the construction of the corpus for the English translation of TCM classics, provide more sufficient support for the optimization of AI translation, promote the in-depth integration of AI and the English translation of TCM classics, and help TCM culture better go global.

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## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# **The Relationship Between Conspicuous Signals and Players' Friendly Experience in the MOBA Mobile Game Honor of Kings: The Mediating Roles of Perceived Economic Status and Perceived Competence Status, and the Moderating Role of Cognitive Level**

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**Abstract:** Using the MOBA mobile game Honor of Kings as the research context, this study examines the formation mechanism of players' friendly experience by investigating how two types of conspicuous signals, namely virtual assets and game skill, shape players' interactive experience during matches. It further explores the roles played by perceived economic status, perceived competence status, and cognitive level in this process. The findings show that players' friendly experience in game interactions is determined less by whether they are rational or mature, and more by conspicuous signals and the status judgments triggered by such signals. Compared with virtual assets, game skill is more effective in consistently eliciting teammates' respect, trust, and cooperation. Although virtual assets can also improve the quality of interaction, they primarily evoke associations with economic standing rather than recognition of competence. The results also indicate that players clearly distinguish between high spending and high ability. Possessing rare skins or premium status markers does not necessarily lead others to assume that the player is a stronger teammate. At the same time, cognitive level does not significantly alter the overall mechanism. However, players with a higher cognitive level are less likely to form status judgments about others solely on the basis of surface cues. This study reveals the deeper logic underlying friendly interaction in MOBA games, showing that such interaction is essentially a process of social evaluation triggered by conspicuous signals and shaped through status categorisation. The study contributes to a deeper understanding of social behaviour in digital games from the perspective of positive interaction, and it also offers theoretical implications for player behaviour optimisation and platform governance design.

**Keywords:** Honor of Kings; MOBA Games; Conspicuous Signals; Friendly Experience; Social Status Perception; Cognitive Level

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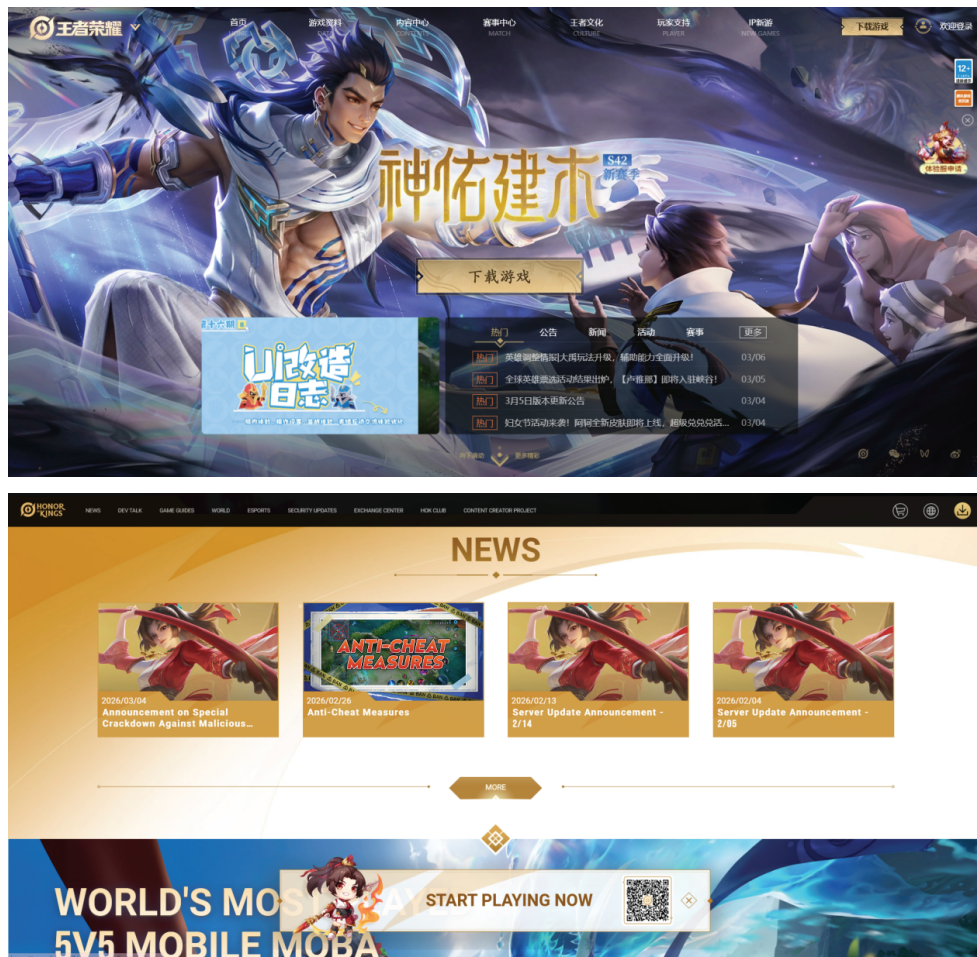
# 1. Introduction

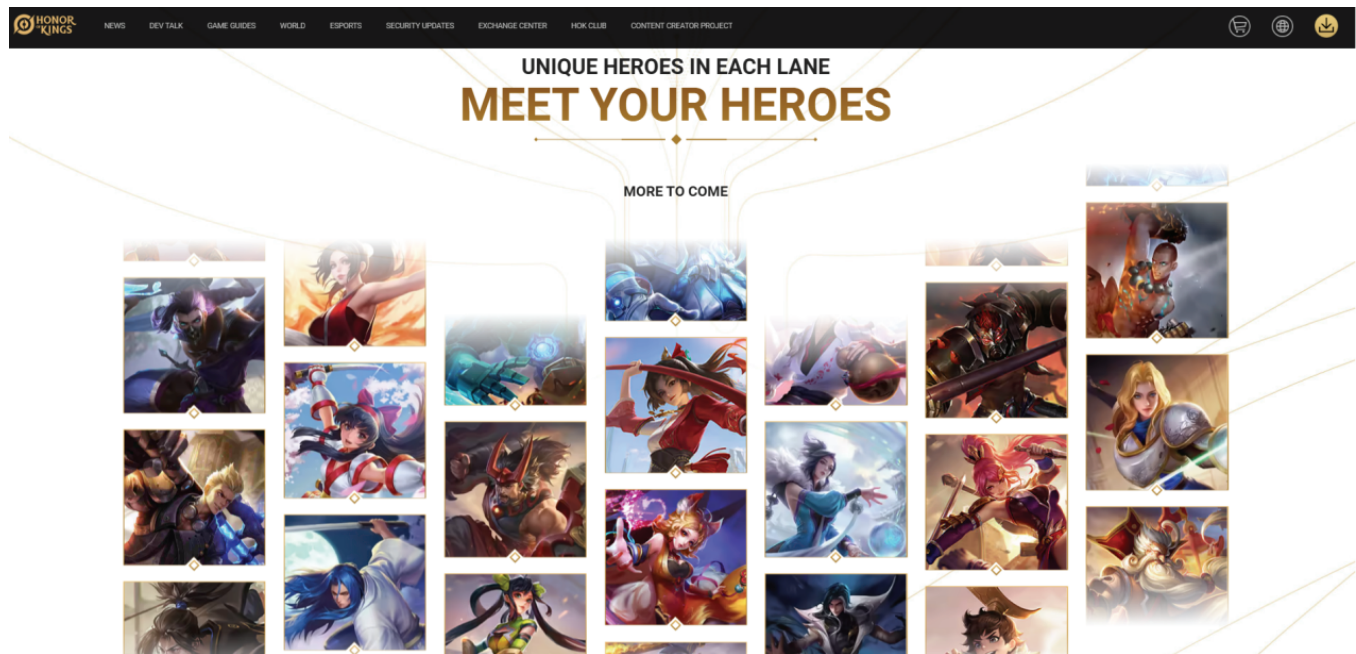
## 1.1 Research Background

Since the advent of the mobile Internet era, the social role of video games has undergone a fundamental transformation. They are no longer merely a form of entertainment, but have gradually evolved into social infrastructure and digital cultural carriers that connect hundreds of millions of users (Steinkuehler, 2023; Zhao, 2023). This trend is particularly pronounced in China. According to the 2024 China Gaming Industry Report released by the China Audio Video and Digital Publishing Association, the actual sales revenue of China's domestic gaming market reached RMB 325.783 billion in 2024, representing a year on year increase of 7.53 percent, while the number of game users rose to 674 million, both of which marked record highs. Within this vast user base, mobile games have assumed a dominant position because of their ease of access and suitability for fragmented usage scenarios. Among them, multiplayer online battle arena games have become a highly valuable commercial category due to their strong social interactivity and intense competitiveness (Gong et al., 2023; Xia et al., 2024).

Within the niche of mobile MOBA games, Tencent's Honor of Kings is undoubtedly the most representative title. Since its launch in 2015, the game has, over the course of a decade, transformed from an innovative product into a global cultural phenomenon (Feng & Zhang, 2022; Xiang & Yuan, 2025). In October 2024, the official Honor of Kings team announced that more than 100 million players logged in on the day of its ninth anniversary, with daily active users remaining steadily at the 100 million level. By the time of its tenth anniversary in 2025, official figures showed that the game's daily active users on the Chinese mainland server had exceeded 139 million, while its global monthly active users surpassed 260 million, once again setting a new record for game products worldwide. In terms of revenue, data from the mobile Internet analytics provider AppMagic show that Honor of Kings reached a historical peak of USD 2.22 billion in annual revenue in 2022, and still maintained a year on year revenue growth rate of 26 percent in 2024. In the first half of 2024, the game ranked first among China's evergreen games, with estimated iOS revenue of approximately USD 840 million.

Graphic 1. Honor of Kings China Server / Global Server Homepage





## 1.2 Problem Statement

While the more than 100 million daily active users of Honor of Kings enjoy the excitement of competitive play, they also find themselves embedded in a social environment marked by constant friction. In the academic literature, behaviours frequently observed in MOBA games, such as verbal abuse, ridicule, intentional idling, and deliberate feeding, are generally classified as toxic behaviour, and a growing body of empirical research has confirmed both its prevalence and its harmful consequences (Zsila et al., 2022; Aguerri et al., 2023). Drawing on research on League of Legends players, Kordyaka et al. showed that toxic behaviour is not an extreme practice confined to a small minority of players. Rather, it is a widespread collective phenomenon shaped by the combined effects of match pressure, role fluidity, and retaliatory interaction. Its harmful effects may continue to spread when victims respond in kind, thereby producing a toxic cycle characterised by chain transmission (Kordyaka et al., 2023). Research based on real behavioural data from commercial games has likewise found that once players are exposed to toxic language or conduct from teammates or opponents, the likelihood that they will engage in similar behaviour during the same match rises significantly, indicating that toxic interaction has a clear situational contagion effect (Morrier et al., 2025).

Honor of Kings faces the same challenge. Qualitative research on the game has shown that, under the combined influence of anonymity, the online disinhibition effect, and the frustration generated by competitive failure, players may easily develop both verbal and behavioural forms of toxic expression. Such unfriendly social interaction not only damages the immediate match experience but also gradually erodes players' broader perception of the gaming environment (Liu & Agur, 2022). Research on aggressive language in Honor of Kings further indicates that anonymity, competitiveness, and gendered bias jointly intensify hostile expression and communicative disorder within the game (Shou, 2023). Existing systematic reviews of toxic behaviour in games also suggest that both current scholarship and governance practice remain largely focused on ex post intervention, detection, and punitive mechanisms, whereas discussion of how to proactively cultivate a positive interactive climate remains comparatively limited (Wijkstra et al., 2024). At the same time, studies on positive communication have found that within persistently toxic environments, players are more likely to treat negative interaction as normal, while regarding positive expression as rare, inauthentic, or even sarcastic. This, in turn, helps explain why friendly interaction is especially difficult to sustain in high pressure competitive contexts (Poeller et al., 2023).

Existing research has devoted nearly all of its attention to the causes and governance of negative interaction, yet has rarely asked what factors, within the same high pressure match environment, actually promote friendly interactive experiences among players. In the actual play context of Honor of Kings, players' attitudes towards one another do not emerge in a vacuum, but are closely associated with a number of observable conspicuous signals. Relevant studies suggest that in mobile

multiplayer online games, identity visibility, information transparency, and the resulting forms of social interaction, social support, and social pressure significantly shape players' judgments of teammates, their willingness to cooperate, and their subsequent participation behaviour (Gong et al., 2023). On this basis, the level of virtual assets a player possesses and the level of game skill a player displays often become important cues through which teammates rapidly interpret that player's status and competence.

The former is mainly expressed through hero skins, rare cosmetic appearances, and other high value virtual items. Research on virtual item consumption in games suggests that players purchase and display cosmetic items not merely for aesthetic enjoyment, but also as a means of identity expression, belonging seeking, prestige display, and status signalling. As a result, such virtual assets are easily interpreted by others in multiplayer environments as symbols of greater commitment, longer experience, or heightened salience (Koles et al., 2025). The latter is primarily reflected in competitive indicators such as rank tier, win rate, and ranked play experience. Research on ranked modes in MOBA games has shown that social comparison and self determination mechanisms significantly affect how players assess both their own and others' competitive standing. High rank markers therefore function not only as labels of competence, but also as important reference points that shape expectations, trust, and interaction strategies in team settings (Xia et al., 2024). Research on in game communication and trust judgment further finds that in temporary teams characterised by limited information and urgent decision making, players rely heavily on a small number of visible cues to make rapid judgments about whether others are trustworthy and whether communication and cooperation are worth investing in. This makes visible assets and competitive labels especially likely to be amplified into the basis for social judgment during the hero selection and opening stages of play (Lee et al., 2025). In other words, differences in virtual assets and game skill are not merely personal attributes. More importantly, they may be transformed within team interaction into triggers for status perception, trust allocation, and differentiation in discursive influence. For precisely this reason, when players occupy a relatively disadvantaged position in terms of these conspicuous cues, they are more likely to encounter disregard, exclusion, or noncooperation in high pressure collaborative environments. By contrast, when players possess more visible asset symbols and competitive markers, they are more likely to receive positive expectations and greater room for cooperation from the very beginning of interaction.

## **2. Literature Review**

### **2.1 A Review of Factors Influencing Players' Friendly Experience**

With regard to the social functions of virtual items, prior research has shown that cosmetic virtual goods are not merely aesthetic embellishments, but also serve clear social signalling functions. Studies on in game cosmetic items have found that players purchase and display such non functional virtual goods not only for reasons of aesthetic preference or entertainment, but also in close connection with identity expression, the need for belonging, prestige display, and the communication of status signals (Koles et al., 2025). A systematic review of the motives underlying virtual item consumption further indicates that social attributes constitute one of the most stable and influential drivers of players' purchases of virtual goods. This suggests that virtual assets in multiplayer game interaction have moved beyond purely functional or aesthetic value and have become embedded in broader processes of social evaluation and identity construction (Huo et al., 2023). From a broader perspective on virtual consumption in mobile gaming, related studies also show that virtual consumption is not simply a form of item acquisition, but also carries functions of emotional connection, cultural identity affirmation, and symbolic self presentation. Accordingly, players' possession of high value virtual assets is readily interpreted by others as a visible form of identity capital (Zhang et al., 2025).

When situated in the specific context of Honor of Kings, this becomes even more apparent. When a player displays a high quality Legendary skin, a Glory Collection skin, or a high level Noble status badge during the hero selection stage, teammates' first impression is unlikely to stop at seeing that player merely as someone enthusiastic about the game. Rather, they are more likely to infer that the player is more invested, more experienced, or even possesses greater real world spending power. Research on real time social judgment in multiplayer games suggests that in temporary teams lacking personality information and a history of prior interaction, players rely heavily on a limited set of visible cues to form rapid judgments about others' trustworthiness, expected value, and communication strategy (Lee et al., 2025). Consequently, the status

associations triggered by virtual consumption symbols are likely to generate a sense of identity difference in the minds of teammates, which may then further shape their level of respect, their attribution patterns, and their tolerance for mistakes in subsequent interaction. In other words, the level of virtual assets may operate as a status signal that influences interactive attitudes by activating teammates' identity based inferences.

At the same time, existing studies also suggest that judgments of one another's competence within a team similarly shape interactive differences. A longitudinal study of mobile multiplayer online games found that identity visibility and information transparency significantly affect social interaction, social support, shared goals, and social pressure among players, and in turn influence gameplay participation and cooperative outcomes (Gong et al., 2023). Within the ranked match system of Honor of Kings, every player is subject to a clear pressure to win or lose, while performance indicators such as rank tier, win rate, and number of MVP awards are precisely the most direct cues for predicting a player's future performance. Research on ranked modes in MOBA games has shown that social comparison and self determination mechanisms significantly shape how players assess both their own and others' competitive standing. High rank and high performance markers therefore represent not only technical ability, but also important reference points that influence team trust, expectations, and subsequent interaction strategies (Xia et al., 2024). Research grounded in the Chinese gaming context likewise indicates that the success of Honor of Kings is closely tied to its psychological mechanisms, social engagement, and commercial profitability, within which player data, interaction design, and competitive performance jointly affect users' evaluations of both teammates and the gaming environment (Yang, 2024).

Taken together, the level of virtual assets and the level of game skill correspond to two qualitatively distinct processes of status perception. The former is more closely related to inferences about identity capital and symbolic status, whereas the latter is more closely associated with the formation of competence expectations and performance based trust. Both may constitute important antecedents of friendly experience and, within the high pressure and information constrained team environment of MOBA games, may be rapidly amplified into triggers for differentiated interaction among teammates.

## **2.2 A Review of the Mediating and Moderating Factors of Players' Friendly Experience**

Existing research suggests that in social situations characterised by limited information and extremely short judgment time, individuals tend to rely on salient external cues to make heuristic inferences, and to extend favourable impressions formed in one dimension to judgments about other as yet unverified attributes. Recent reviews of the halo effect indicate that it is essentially a cognitive bias through which known positive characteristics are generalised to unknown ones, and that it is especially likely to occur when decision makers lack sufficient information. At the same time, more systematic thinking can, to some extent, mitigate this bias (Laham & Forgas, 2022). Related empirical research has also found that when evaluating others' specific abilities, perceptions of warmth and general competence often converge into a global impression factor, allowing local evaluations to spread unconsciously across other dimensions (Fritsch et al., 2023). Given that the hero selection stage in MOBA games is itself a setting of rapid judgment under severe informational constraints, skin quality, as the most salient visual cue, can easily become a heuristic device for filling informational gaps. As a result, the economic and identity signals conveyed by virtual assets may spill over into the domain of competence judgment. This suggests that the level of virtual assets may influence friendly experience not only through perceived economic status, but also through an additional indirect pathway activated by perceived competence status.

The reason this study treats perceived economic status and perceived competence status as two distinct mediating variables, rather than combining them into a single construct, lies in the fact that recent status research continues to emphasise that wealth, power, and competence are not entirely equivalent sources of social evaluation. Relevant studies indicate that individuals' judgments of others' hierarchical position may derive either from cues related to resources and social rank or from cues related to competence and expertise, and that these two sources of status do not produce identical psychological consequences in interaction (Gaubert & Louvet, 2021). More specifically, research distinguishing between symbolic and epistemic judgments in social cognition proposes that people often track two different information systems simultaneously in social interaction. One is more oriented towards social signals of identity and symbolic meaning, while the other is more oriented towards behavioural prediction and competence assessment. This distinction helps explain why seemingly similar

status cues may trigger different forms of compliance, trust, or interactional strategy (Westra, 2023). In the context of Honor of Kings, this means that symbols such as high level Noble status and Collection skins are more likely to trigger symbolic status inferences based on resources and identity, whereas performance indicators such as high rank tier and high win rate are more likely to activate functional judgments grounded in competence and achievement. Although both may shape friendly experience, the underlying mechanisms through which they operate are not the same.

At the same time, research on individual differences also suggests that the cognitive processes described above do not affect all players with equal intensity. Recent studies on cognitive reflection indicate that its central function lies in the ability to inhibit the intuitive response that first comes to mind and to shift towards more deliberate and analytical reasoning. This ability is significantly associated with higher levels of rational judgment (Shtulman & Young, 2022). In parallel, research on the relationship between cognitive reflection and heuristic processing has shown that lower levels of cognitive reflection are more likely to be accompanied by reliance on intuitive answers and social heuristics, whereas a stronger reflective tendency is more likely to interrupt this automatic processing pathway (Vikhman, 2025). Consistent with this, research on the halo effect likewise finds that enhanced systematic processing can reduce the global impression bias driven by surface cues (Laham & Forgas, 2022). Taken together, these findings suggest that players' cognitive level and thinking style may systematically amplify or weaken the extent to which they rely on external cues such as skins, Noble status markers, and rank tier, thereby further shaping the intensity of signal interpretation and interactive response.

### 3. Research Hypotheses

#### 3.1 Direct Effect Hypotheses

In MOBA game settings, which are characterised by intense time pressure, temporary teaming with unfamiliar players, and interaction outcomes that depend heavily on team coordination, initial attitudes among players are rarely formed on the basis of thorough understanding. Instead, they are typically generated rapidly under conditions of limited information through reliance on conspicuous signals. Social comparison theory suggests that when objective standards are insufficient, individuals position both others and themselves by drawing on observable cues, and subsequently adjust their judgments and behaviour accordingly. In the context of the present study, players' levels of virtual assets and game skill constitute two of the most immediate and easily observable social signals available to teammates. The former is primarily reflected in high quality skins, Noble status levels, and rare virtual items, all of which can readily prompt inferences about a player's spending capacity, seniority, and social standing. The latter is reflected in performance related indicators such as rank tier, win rate, and MVP records, which directly shape teammates' expectations of that player's competitive competence and potential value in leading the team. Existing studies have shown that virtual items possess not only aesthetic and utilitarian value, but also functions of social display and status expression. At the same time, in task oriented groups, members who are expected to be highly capable are generally more likely to receive trust, respect, and cooperation. It may therefore be inferred that in the team based environment of Honor of Kings, players with higher levels of virtual assets or stronger game skill are more likely to receive more favourable evaluations, greater tolerance, and friendlier communicative responses from teammates at the initial stage of interaction, thereby generating a higher level of friendly experience. This is also consistent with the earlier argument that virtual assets and game skill are not merely personal attributes, but potential triggers for differentiated interactive attitudes within the team.

H1: Players' level of virtual assets has a significant effect on the friendly experience they receive in the game.

H2: Players' level of game skill has a significant effect on the friendly experience they receive in the game.

#### 3.2 Mediating Effect Hypotheses

Although both the level of virtual assets and the level of game skill may directly influence the friendly experience that a player receives within a team, this influence is unlikely to operate as a simple stimulus response relationship. Rather, it is more likely to be realised through teammates' subjective interpretation of the player's status. According to social stratification theory and status characteristics theory, when group members lack complete information, they often rely on conspicuous attributes to infer others' resource possession and potential capacity to contribute, and then develop differentiated patterns of interaction accordingly. More specifically, the level of virtual assets may first activate perceived economic status, because

high spending virtual assets such as high level Noble badges and Glory Collection skins are themselves characterised by scarcity, visibility, and substantial monetary investment, making them readily interpretable as symbols of stronger financial resources and greater consumption power. When teammates perceive a player as someone with richer resources and a higher social position, they are more likely, following the logic of upward social comparison and deference to status, to respond with respect, restraint, and tolerance. At the same time, the level of game skill points more directly to perceived competence status. In ranked matches, rank tier, win rate, and performance records are not only summaries of past performance, but also predictive indicators of future contribution potential. For this reason, they are more likely to lead teammates to conclude that a given player is more worthy of trust and followership, and to respond with greater cooperation and goodwill during interaction. Furthermore, given that the halo effect tends to produce cross dimensional generalisation in rapid judgment contexts, the positive economic signals conveyed by virtual assets may also spill over into the domain of competence judgment. This may incline teammates to associate high spending and ownership of rare virtual assets with being more experienced, more capable, or more dependable. As established in the literature review, perceived economic status and perceived competence status should be treated as two related yet logically distinct psychological mechanisms. It was also noted that virtual assets may operate through both an economic pathway and a competence based pathway. Accordingly, the present study proposes the following mediating hypotheses.

H3: Perceived economic status mediates the relationship between players' level of virtual assets and friendly experience.

H4: Perceived competence status mediates the relationship between players' level of game skill and friendly experience.

H5: Perceived competence status mediates the relationship between players' level of virtual assets and friendly experience.

### 3.3 Moderating Effect Hypotheses

Although conspicuous signals can trigger status judgments, players do not respond to these signals with the same degree of sensitivity, nor do they exhibit the same intensity of interactional response. Dual process theory suggests that social judgment operates through two distinct pathways, namely heuristic processing and analytic processing. The former relies more heavily on surface cues and intuitive inference, whereas the latter is characterised by more careful evaluation and reflective adjustment. Related research on cognitive reflection and need for cognition further indicates that individuals with higher cognitive levels are generally less likely to be influenced by a single salient yet informationally limited external cue, whereas those with lower cognitive levels are more likely to rely on heuristic signals in forming rapid judgments. In the context of the present study, during the hero selection stage and the early phase of a match in Honor of Kings, skin quality, Noble status level, rank tier, and win rate all function as highly visible cues that are easy to interpret. As such, they are especially likely to amplify their social signalling effects under conditions of low cognitive investment. Put differently, the lower a player's cognitive level, the more likely that player is to make rapid status attributions on the basis of virtual assets and performance indicators, and to further translate these attributions into friendly or deferential interactive behaviour. By contrast, the higher a player's cognitive level, the more likely that player is to recognise that high spending does not necessarily imply high competence, and that the display of a high rank does not necessarily determine performance in the current match. This, in turn, weakens the extent to which surface cues drive status perception and interactive attitudes. As established in the literature review, players' cognitive level may systematically amplify or attenuate the strength of signal interpretation and behavioural response. Accordingly, the following hypotheses are proposed.

H6a: Game users' cognitive level moderates the relationship between players' level of virtual assets and perceived economic status.

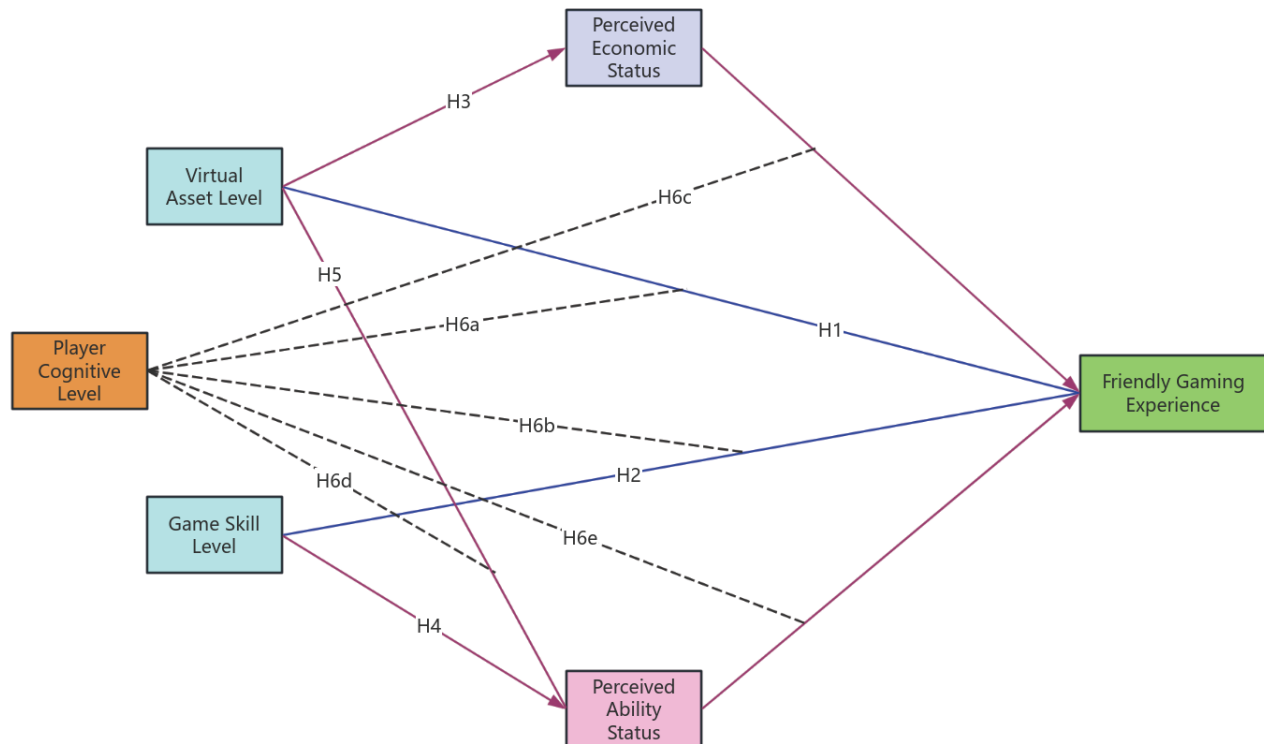
H6b: Game users' cognitive level moderates the relationship between players' level of game skill and perceived competence status.

H6c: Game users' cognitive level moderates the relationship between players' level of virtual assets and perceived competence status.

H6d: Game users' cognitive level moderates the relationship between perceived economic status and friendly experience.

H6e: Game users' cognitive level moderates the relationship between perceived competence status and friendly experience.

Graphic 2. Conceptual Framework



## 4. Empirical Study

### 4.1 Research Design

This study adopts a quantitative research design, with Honor of Kings players as the target population. All core variables examined in this study are latent constructs, which cannot be directly observed or measured through a single objective indicator, but must instead be indirectly captured through multiple observable items. More specifically, virtual asset level, game skill level, perceived economic status, perceived competence status, friendly experience, and cognitive level are all essentially abstract psychological or behavioural cognitive constructs. These theoretical concepts can only be transformed into analysable quantitative data through respondents' subjective evaluations of a series of relevant statements. Accordingly, this study employs a structured questionnaire as its primary research instrument in order to operationalise and measure each latent construct.

The measurement items in this study will be developed on the basis of established theories and the actual gameplay context of Honor of Kings. A five point Likert scale will be used to assess each latent variable, thereby enabling the systematic collection of players' perceptions of in game interaction, status judgment, and friendly experience. After the completion of data collection, the study will further conduct descriptive statistical analysis, reliability and validity testing, and structural model analysis in order to examine the direct effects, mediating effects, and moderating effects among the variables, thus providing empirical evidence for explaining the formation mechanism of friendly experience among Honor of Kings players.

### 4.2 Questionnaire Validation

As the questionnaire used in this study is a self developed scale designed specifically for the context of Honor of Kings, it is necessary to subject it to systematic testing prior to formal distribution in order to ensure the accuracy of item wording, contextual appropriateness, and overall measurement quality. First, the researcher invited experts in relevant fields as well as experienced players to review and evaluate the initial questionnaire, with particular attention paid to the clarity, representativeness, contextual authenticity, and content appropriateness of each item. Based on their feedback, items that were ambiguously worded, overly repetitive, or insufficiently representative were revised or removed. Second, a pilot test was conducted prior to the main survey in order to assess the overall comprehensibility of the questionnaire and its preliminary reliability. Finally, based on the pilot data, exploratory factor analysis was further carried out to examine whether the latent structure of the items was consistent with the theoretical constructs, and the questionnaire structure was subsequently

refined accordingly. Through these procedures, the study was able to provide the necessary methodological support for the development of the final questionnaire and to enhance the content validity and preliminary construct validity of the scale.

The questionnaire validation results indicate that the instrument used in this study is of sound overall quality and has provided an adequate basis for the formal survey. First, with regard to content validity, the study invited university teachers, researchers, and experienced Honor of Kings players to evaluate the questionnaire items jointly. The mean scores for most items ranged from 4.33 to 4.83, suggesting that the items performed well overall in terms of clarity of wording, representativeness of content, and fit with the gaming context. Although a small number of items, particularly those relating to perceived economic status and cognitive level, were identified as requiring further refinement or minor wording adjustments, there were, on the whole, no items that appeared clearly inappropriate or in need of deletion. This indicates that the overall content design of the questionnaire was reasonably sound.

Second, the pilot test results demonstrated strong reliability and a solid preliminary structural foundation. The Cronbach's alpha values for all variables were above 0.842, while the overall Cronbach's alpha for the full questionnaire reached 0.941, indicating a high level of internal consistency. Further item analysis showed that the corrected item to total correlation coefficients for all items exceeded 0.50, and that deleting any individual item would not materially improve the reliability of the scale, suggesting that all items contributed effectively to their respective constructs. At the same time, the KMO value reached 0.907, and Bartlett's test of sphericity was significant, indicating that the data were highly suitable for factor analysis. The communalities and factor loadings of the items were also generally at satisfactory levels, and all items were ultimately retained. Taken together, the questionnaire demonstrated good measurement quality in terms of content design, internal consistency, and preliminary construct structure, thereby providing a reliable foundation for the subsequent analysis of the formal sample.

*Table 1. Basic Information of Expert Reviewers*

No.	Identity Type	Specialisation/Background	Relevant Experience
E1	University Teacher	Management / Organisational Behaviour	More than 10 years of experience in questionnaire development and quantitative research
E2	University Teacher	Marketing / Consumer Behaviour	Extensive experience in scale development and SEM research
E3	Researcher	Digital Platform and Gaming Behaviour Research	Familiar with game interaction and user behaviour research
E4	Researcher	Psychological and Behavioural Measurement	Familiar with content validity assessment and pilot testing procedures
E5	Experienced Player	High-ranking Honor of Kings player	Has continuously participated in ranked matches / peak tournaments over the past three years
E6	Experienced Player	Frequent Honor of Kings player	Familiar with in-game social interaction, skins, and rank mechanisms

*Table 2. Expert Evaluation Results for Each Questionnaire Item*

Item	E1	E2	E3	E4	E5	E6	Mean Score	Suggestion
VA1	5	5	4	5	5	4	4.67	Retain
VA2	5	4	5	5	5	4	4.67	Retain
VA3	4	5	5	4	5	5	4.67	Retain
VA4	5	4	5	4	5	5	4.67	Retain
VA5	4	5	5	5	4	5	4.67	Retain
GS1	5	5	5	5	4	5	4.83	Retain
GS2	4	5	5	4	5	5	4.67	Retain

Item	E1	E2	E3	E4	E5	E6	Mean Score	Suggestion
GS3	5	5	4	5	5	5	4.83	Retain
GS4	5	4	5	5	5	4	4.67	Retain
GS5	5	5	5	4	5	5	4.83	Retain
EP1	4	5	4	4	5	5	4.50	Revise wording slightly
EP2	4	4	5	4	5	5	4.50	Revise wording slightly
EP3	4	5	4	4	5	4	4.33	Can be further improved
EP4	5	4	5	5	5	4	4.67	Retain
EP5	4	4	5	4	5	4	4.33	Can be further improved
AP1	5	5	4	5	5	5	4.83	Retain
AP2	4	5	5	4	5	5	4.67	Retain
AP3	4	5	4	5	5	4	4.50	Retain
AP4	5	4	5	4	5	5	4.67	Retain
AP5	5	5	4	5	5	4	4.67	Retain
FE1	5	5	5	4	5	5	4.83	Retain
FE2	5	5	4	5	5	5	4.83	Retain
FE3	4	5	5	4	5	5	4.67	Retain
FE4	5	4	5	5	5	4	4.67	Retain
FE5	5	5	5	4	4	5	4.67	Retain
FE6	5	5	4	5	5	5	4.83	Retain
CL1	4	5	4	4	5	4	4.33	Can be further improved
CL2	4	4	5	4	5	4	4.33	Can be further improved
CL3	5	4	5	4	4	5	4.50	Retain
CL4	4	5	4	5	4	5	4.50	Retain
CL5	4	4	5	4	5	4	4.33	Can be further improved

Note. VA = Virtual Asset Level; GS = Game Skill Level; EP = Perceived Economic Status; AP = Perceived Competence Status; FE = Friendly Gaming Experience; CL = Cognitive Level.

Table 3. Internal Consistency Test Results for Each Variable (Pilot Test)

Variable	No. of Items	Cronbach's $\alpha$	Standardised $\alpha$	Mean Inter-Item Correlation	Interpretation
Virtual Asset Level (VA)	5	0.891	0.893	0.626	Good
Game Skill Level (GS)	5	0.878	0.880	0.594	Good
Perceived Economic Status (EP)	5	0.864	0.867	0.565	Good
Perceived Competence Status (AP)	5	0.886	0.889	0.610	Good
Friendly Experience (FE)	6	0.903	0.905	0.609	Good
Cognitive Level (CL)	5	0.842	0.845	0.519	Acceptable and Good
Overall Questionnaire	31	0.941	0.944	—	Excellent

Table 4. Item Analysis Results for Each Item (Pilot Test)

Variable	Item	Corrected Item–Total Correlation (CITC)	Cronbach's $\alpha$ if Item Deleted	Result
VA	VA1	0.702	0.864	Retain
VA	VA2	0.741	0.855	Retain
VA	VA3	0.686	0.868	Retain
VA	VA4	0.713	0.861	Retain
VA	VA5	0.677	0.870	Retain
GS	GS1	0.691	0.849	Retain
GS	GS2	0.668	0.855	Retain
GS	GS3	0.704	0.846	Retain
GS	GS4	0.659	0.857	Retain
GS	GS5	0.717	0.843	Retain
EP	EP1	0.653	0.840	Retain
EP	EP2	0.671	0.836	Retain
EP	EP3	0.602	0.851	Retain
EP	EP4	0.688	0.832	Retain
EP	EP5	0.594	0.853	Retain
AP	AP1	0.704	0.863	Retain
AP	AP2	0.672	0.871	Retain
AP	AP3	0.648	0.876	Retain
AP	AP4	0.681	0.869	Retain
AP	AP5	0.719	0.861	Retain
FE	FE1	0.698	0.888	Retain
FE	FE2	0.724	0.884	Retain
FE	FE3	0.665	0.891	Retain
FE	FE4	0.683	0.889	Retain
FE	FE5	0.641	0.895	Retain
FE	FE6	0.736	0.882	Retain
CL	CL1	0.571	0.816	Retain
CL	CL2	0.596	0.809	Retain
CL	CL3	0.641	0.795	Retain
CL	CL4	0.618	0.802	Retain
CL	CL5	0.553	0.820	Retain

Table 5. KMO and Bartlett's Test Results for the Pilot Questionnaire

Test Item	Value
KMO Measure of Sampling Adequacy	0.907
Approximate Chi-Square of Bartlett's Test of Sphericity	2684.315
Degrees of Freedom (df)	465
Significance (p)	< 0.001

Table 6. Communalities of Items in the Exploratory Factor Analysis

Item	Initial Communality	Extracted Communality
VA1	1.000	0.692
VA2	1.000	0.741
VA3	1.000	0.673
VA4	1.000	0.708
VA5	1.000	0.661
GS1	1.000	0.688
GS2	1.000	0.652
GS3	1.000	0.701
GS4	1.000	0.636
GS5	1.000	0.712
EP1	1.000	0.624
EP2	1.000	0.646
EP3	1.000	0.559
EP4	1.000	0.671
EP5	1.000	0.548
AP1	1.000	0.703
AP2	1.000	0.658
AP3	1.000	0.621
AP4	1.000	0.665
AP5	1.000	0.718
FE1	1.000	0.684
FE2	1.000	0.711
FE3	1.000	0.643
FE4	1.000	0.662
FE5	1.000	0.601
FE6	1.000	0.724
CL1	1.000	0.521
CL2	1.000	0.548
CL3	1.000	0.611
CL4	1.000	0.587
CL5	1.000	0.503

Table 7. Results of the Exploratory Factor Analysis

Item	Highest Factor Loading	Communality	Deleted	Remark
VA1	0.801	0.692	No	Good performance
VA2	0.842	0.741	No	Good performance
VA3	0.776	0.673	No	Good performance
VA4	0.818	0.708	No	Good performance
VA5	0.754	0.661	No	Good performance
GS1	0.793	0.688	No	Good performance
GS2	0.761	0.652	No	Good performance
GS3	0.811	0.701	No	Good performance
GS4	0.734	0.636	No	Good performance
GS5	0.824	0.712	No	Good performance
EP1	0.748	0.624	No	Good performance
EP2	0.771	0.646	No	Good performance
EP3	0.684	0.559	No	Acceptable
EP4	0.792	0.671	No	Good performance
EP5	0.671	0.548	No	Acceptable
AP1	0.814	0.703	No	Good performance
AP2	0.773	0.658	No	Good performance
AP3	0.741	0.621	No	Good performance
AP4	0.768	0.665	No	Good performance
AP5	0.827	0.718	No	Good performance
FE1	0.781	0.684	No	Good performance
FE2	0.823	0.711	No	Good performance
FE3	0.756	0.643	No	Good performance
FE4	0.768	0.662	No	Good performance
FE5	0.713	0.601	No	Good performance
FE6	0.836	0.724	No	Good performance
CL1	0.662	0.521	No	Acceptable
CL2	0.689	0.548	No	Acceptable
CL3	0.753	0.611	No	Good performance
CL4	0.731	0.587	No	Good performance
CL5	0.641	0.503	No	Acceptable

### 4.3 Data Collection

Given that this study focuses on Honor of Kings players' perceptions and experiences within actual in game interaction contexts, the formal survey was restricted to respondents with genuine gameplay experience. To ensure a high degree of alignment between the sample and the research topic, the questionnaire included explicit screening criteria, and only respondents who met all of the following conditions were allowed to proceed to the main survey. First, the respondent must have played Honor of Kings. Second, the respondent must have engaged with the game within the past six months. Third, the respondent must have had experience of teaming up with strangers or non regular friends, so that they could provide valid evaluations of friendly experience, status perception, and cognitive judgment on the basis of real interaction contexts. For respondents who failed the screening questions, the system automatically terminated the survey. In terms of survey distribution, this study primarily adopted an online approach. The questionnaire was disseminated through Honor of Kings player communities, QQ groups, WeChat groups, social media platforms, and other online communication channels in order to improve the efficiency of sample recruitment and enhance the diversity of sample sources. After data collection, the returned questionnaires were subjected to rigorous screening. Samples that failed to meet the screening criteria, had clearly insufficient completion times, displayed obvious patterned responses such as repeatedly selecting the same option throughout the questionnaire, or contained substantial missing values or responses with clear logical inconsistencies were removed, so as to ensure the accuracy and reliability of the subsequent statistical analysis.

With regard to sample size, this study intended to conduct an a priori statistical power analysis using G\*Power software, taking a multiple regression model as the basis for estimation. The minimum required sample size was calculated under a significance level of  $\alpha = 0.05$ , a statistical power of 0.95, and a small to medium effect size assumption. Given that the conceptual model in this study includes multiple latent variables as well as direct, mediating, and moderating effect paths, and that the formal dataset would also be used for reliability and validity testing, factor analysis, and structural equation modelling, an additional invalid response allowance of approximately 20 per cent was incorporated beyond the minimum sample requirement. On this basis, the study estimated that approximately 458 questionnaires would need to be collected in total in order to ensure that the final valid sample size would be sufficient to meet the requirements of statistical power and result robustness in the subsequent empirical analysis.

### 4.4 Demographic Analysis

Table 8 shows that this study obtained a total of 458 valid responses, with a relatively diverse sample structure. In terms of gender, male respondents accounted for 60.70 per cent and female respondents for 37.34 per cent, indicating that the sample was predominantly composed of male players. With respect to age, respondents were mainly concentrated in the 18 to 32 age range, among which the 23 to 27 group represented the highest proportion at 34.06 per cent. In terms of educational attainment, bachelor's degree holders accounted for 31.66 per cent, followed by respondents with senior secondary or technical secondary education and those with junior college education, suggesting that the overall educational level of the sample was relatively high. As for occupational status, corporate employees constituted the largest group at 36.24 per cent, followed by students at 20.96 per cent. Monthly disposable income was mainly concentrated in the RMB 3,001 to 8,000 range.

From the perspective of gaming characteristics, most respondents had relatively extensive gaming experience. More than 60 per cent had been playing Honor of Kings for over three years, with 31.88 per cent reporting more than five years of experience. Overall gaming frequency was relatively high, with a substantial proportion of players engaging in the game at least three times per week, while daily play duration was mainly concentrated between 30 minutes and 2 hours. Rank tiers were primarily distributed across Platinum, Diamond, and Star, with Eternal Diamond representing the largest single category at 25.76 per cent. In terms of teaming mode, the dominant patterns were playing both solo queue and team queue frequently, and mainly playing solo queue. Cumulative spending was concentrated largely below RMB 500, although notable variation in expenditure still existed across players. With regard to the display of skins or identity markers, a relatively large proportion of respondents reported that they either almost never or only occasionally displayed such signals.

Table 8. Results of Demographic Analysis

Item	Category	Frequency	Percentage (%)
Gender	Male	278	60.70
	Female	171	37.34
	Prefer not to disclose	9	1.97
Age	Under 18	26	5.68
	18–22	118	25.76
	23–27	156	34.06
	28–32	94	20.52
	33 and above	64	13.97
Highest Educational Attainment	Junior secondary school and below	48	10.48
	Senior secondary school / technical secondary school	126	27.51
	Junior college	112	24.45
	Bachelor's degree	145	31.66
	Master's degree and above	27	5.90
Occupational Status	Student	96	20.96
	Corporate employee	166	36.24
	Self employed / freelancer	63	13.76
	Civil servant / public institution employee	24	5.24
	Professional / technical personnel	39	8.52
	Other	70	15.28
Monthly Disposable Income	Below RMB 3,000	72	15.72
	RMB 3,001–5,000	102	22.27
	RMB 5,001–8,000	109	23.80
	RMB 8,001–12,000	84	18.34
	RMB 12,001 and above	34	7.42
	No fixed income at present	57	12.45
Length of Game Exposure	Less than 6 months	31	6.77
	6 months–1 year	42	9.17
	1–3 years	103	22.49
	3–5 years	136	29.69
	More than 5 years	146	31.88
Weekly Gaming Frequency	Less than once a week	38	8.30
	1–2 times a week	96	20.96
	3–4 times a week	131	28.60
	5–6 times a week	86	18.78
	Almost every day	107	23.36
Daily Gaming Duration	Less than 30 minutes	61	13.32
	30 minutes–1 hour	132	28.82
	1–2 hours	145	31.66
	2–3 hours	89	19.43
	More than 3 hours	31	6.77

Item	Category	Frequency	Percentage (%)
Main Rank Tier	Bronze / Silver	39	8.52
	Gold	64	13.97
	Platinum	96	20.96
	Diamond	118	25.76
	Star	89	19.43
	King and above	52	11.35
Teaming Mode	Mainly solo queue	151	32.97
	Mainly duo / trio queue	108	23.58
	Mainly five stack queue	38	8.30
	Both solo queue and team queue frequently	161	35.15
Cumulative Spending Level	Never spent	102	22.27
	RMB 1–100	96	20.96
	RMB 101–500	91	19.87
	RMB 501–1,000	73	15.94
	RMB 1,001–3,000	56	12.23
	RMB 3,001 and above	40	8.73
Frequency of Displaying Skins / Identity Markers	Almost never	118	25.76
	Occasionally	122	26.64
	Sometimes	99	21.62
	Often	65	14.19
	Always	54	11.79

#### 4.5 Results of Data Analysis

The measurement model results indicate that all latent constructs in this study demonstrate strong internal consistency and satisfactory convergent validity. First, Cronbach's alpha values ranged from 0.870 to 0.939. Specifically, the value was 0.870 for cognitive level, 0.934 for friendly gaming experience, 0.932 for game skill level, 0.928 for perceived competence status, 0.904 for perceived economic status, and 0.939 for virtual asset level. All values were substantially above the commonly accepted threshold of 0.70, while the corresponding T values were all high and the P values were all 0.000, indicating that each scale exhibited a high level of reliability. Second, the average variance extracted values for the constructs ranged from 0.657 to 0.804, all of which exceeded the recommended threshold of 0.50. This suggests that the items explained the variance of their respective latent constructs well and that convergent validity was satisfactory. Among these constructs, virtual asset level recorded the highest AVE at 0.804, whereas cognitive level showed the lowest AVE at 0.657, although this still remained within the acceptable range. Finally, the composite reliability values, expressed as rho\_c, ranged from 0.905 to 0.953, all of which were well above 0.70, further confirming the high stability and consistency of the measurement instrument. Overall, the results presented in Tables 9 to 11 indicate that the scales used in this study achieved sound standards of reliability and convergent validity, thereby providing a robust measurement foundation for the subsequent structural model analysis.

Table 9. Cronbach's Alpha: Mean, Standard Deviation, t-Value, and p-Value

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level	0.870	0.870	0.009	95.788	0.000
Friendly Gaming Experience	0.934	0.934	0.005	198.888	0.000
Game Skill Level	0.932	0.932	0.005	195.195	0.000
Perceived Competence Status	0.928	0.928	0.005	172.021	0.000
Perceived Economic Status	0.904	0.904	0.007	131.340	0.000
Virtual Asset Level	0.939	0.939	0.004	230.344	0.000

Table 10. Average Variance Extracted (AVE): Mean, Standard Deviation, t-Value, and p-Value

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level	0.657	0.653	0.022	30.475	0.000
Friendly Gaming Experience	0.752	0.752	0.013	57.262	0.000
Game Skill Level	0.786	0.786	0.012	66.956	0.000
Perceived Competence Status	0.778	0.777	0.013	59.952	0.000
Perceived Economic Status	0.724	0.724	0.014	50.751	0.000
Virtual Asset Level	0.804	0.804	0.010	76.701	0.000

Table 11. Composite Reliability ( $\rho_c$ ): Mean, Standard Deviation, t-Value, and p-Value

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level	0.905	0.903	0.017	54.307	0.000
Friendly Gaming Experience	0.948	0.948	0.003	271.016	0.000
Game Skill Level	0.948	0.948	0.003	276.488	0.000
Perceived Competence Status	0.946	0.946	0.004	245.600	0.000
Perceived Economic Status	0.929	0.929	0.005	196.245	0.000
Virtual Asset Level	0.953	0.953	0.003	322.379	0.000

From the structural model results, both players' game skill level and virtual asset level emerged as important antecedents of friendly gaming experience, and both effects were significantly positive. Specifically, game skill level exerted a significant positive total effect on friendly gaming experience ( $\beta = 0.448$ ,  $T = 13.286$ ,  $P = 0.000$ ) and also had a significant positive effect on perceived competence status ( $\beta = 0.665$ ,  $T = 25.456$ ,  $P = 0.000$ ). Virtual asset level likewise significantly enhanced friendly gaming experience ( $\beta = 0.335$ ,  $T = 8.415$ ,  $P = 0.000$ ) and significantly strengthened perceived economic status ( $\beta = 0.674$ ,  $T = 25.343$ ,  $P = 0.000$ ), whereas its effect on perceived competence status was not significant ( $\beta = 0.003$ ,  $T = 0.090$ ,  $P = 0.928$ ). At the same time, both perceived competence status ( $\beta = 0.305$ ,  $T = 6.024$ ,  $P = 0.000$ ) and perceived economic status ( $\beta = 0.144$ ,  $T = 3.061$ ,  $P = 0.002$ ) had significant positive effects on friendly gaming experience, indicating that both forms of status perception play a constructive role in the formation of a friendly in game atmosphere. By contrast, the total effect of cognitive level on friendly gaming experience was not significant ( $\beta = 0.038$ ,  $T = 1.043$ ,  $P = 0.297$ ). However, cognitive level had significant negative effects on both perceived competence status ( $\beta = -0.117$ ,  $T = 3.521$ ,  $P = 0.000$ ) and perceived economic status ( $\beta = -0.104$ ,  $T = 2.880$ ,  $P = 0.004$ ), suggesting that the higher the player's cognitive level, the less likely that player is to form status perceptions on the basis of game skill or virtual assets.

In addition, none of the interaction term paths reached statistical significance, indicating that the moderating effect of cognitive level was generally weak or unsupported. Furthermore, the results of the inner model collinearity diagnostics showed that all VIF values ranged from 1.001 to 2.041, with the highest upper bound of the confidence interval reaching only 2.549. All of these values were well below the commonly accepted thresholds of 3.3 or 5.0, suggesting that the model did not suffer from any substantial multicollinearity problem. Overall, the structural model estimates therefore demonstrate satisfactory stability and interpretive credibility.

Table 12. Total Effects: Mean, Standard Deviation, t-Value, and p-Value

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level -> Friendly Gaming Experience	0.038	0.037	0.036	1.043	0.297
Cognitive Level -> Perceived Competence Status	-0.117	-0.119	0.033	3.521	0.000
Cognitive Level -> Perceived Economic Status	-0.104	-0.105	0.036	2.880	0.004
Cognitive Level x Game Skill Level -> Friendly Gaming Experience	0.036	0.037	0.053	0.676	0.499

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level x Game Skill Level -> Perceived Competence Status	0.009	0.009	0.031	0.304	0.761
Cognitive Level x Perceived Competence Status -> Friendly Gaming Experience	-0.045	-0.044	0.053	0.856	0.392
Cognitive Level x Perceived Economic Status -> Friendly Gaming Experience	-0.004	-0.001	0.048	0.088	0.930
Cognitive Level x Virtual Asset Level -> Friendly Gaming Experience	-0.001	-0.003	0.053	0.013	0.990
Cognitive Level x Virtual Asset Level -> Perceived Competence Status	0.056	0.056	0.034	1.643	0.100
Cognitive Level x Virtual Asset Level -> Perceived Economic Status	-0.032	-0.032	0.034	0.915	0.360
Game Skill Level -> Friendly Gaming Experience	0.448	0.449	0.034	13.286	0.000
Game Skill Level -> Perceived Competence Status	0.665	0.666	0.026	25.456	0.000
Perceived Competence Status -> Friendly Gaming Experience	0.305	0.305	0.051	6.024	0.000
Perceived Economic Status -> Friendly Gaming Experience	0.144	0.145	0.047	3.061	0.002
Virtual Asset Level -> Friendly Gaming Experience	0.335	0.335	0.040	8.415	0.000
Virtual Asset Level -> Perceived Competence Status	0.003	0.002	0.034	0.090	0.928
Virtual Asset Level -> Perceived Economic Status	0.674	0.674	0.027	25.343	0.000

Table 13. Inner Model Collinearity Statistics (VIF): Confidence Intervals

	(O)	(M)	2.5%	97.5%
Cognitive Level -> Friendly Gaming Experience	1.056	1.079	1.036	1.137
Cognitive Level -> Perceived Competence Status	1.003	1.013	1.002	1.036
Cognitive Level -> Perceived Economic Status	1.001	1.006	1.000	1.022
Cognitive Level x Game Skill Level -> Friendly Gaming Experience	2.027	2.095	1.731	2.536
Cognitive Level x Game Skill Level -> Perceived Competence Status	1.036	1.050	1.007	1.129
Cognitive Level x Perceived Competence Status -> Friendly Gaming Experience	2.041	2.106	1.741	2.549
Cognitive Level x Perceived Economic Status -> Friendly Gaming Experience	1.664	1.725	1.461	2.084
Cognitive Level x Virtual Asset Level -> Friendly Gaming Experience	1.682	1.744	1.464	2.120
Cognitive Level x Virtual Asset Level -> Perceived Competence Status	1.044	1.059	1.012	1.141
Cognitive Level x Virtual Asset Level -> Perceived Economic Status	1.012	1.017	1.001	1.048
Game Skill Level -> Friendly Gaming Experience	1.911	1.958	1.736	2.220
Game Skill Level -> Perceived Competence Status	1.071	1.083	1.033	1.149
Perceived Competence Status -> Friendly Gaming Experience	1.885	1.931	1.706	2.195
Perceived Economic Status -> Friendly Gaming Experience	1.874	1.917	1.687	2.194
Virtual Asset Level -> Friendly Gaming Experience	1.915	1.960	1.720	2.242
Virtual Asset Level -> Perceived Competence Status	1.082	1.093	1.042	1.160
Virtual Asset Level -> Perceived Economic Status	1.013	1.017	1.001	1.048

In terms of explanatory power, the model yielded  $R^2$  values of 0.460, 0.465, and 0.457 for friendly gaming experience, perceived competence status, and perceived economic status, respectively. These results indicate that the antecedent variables explained approximately 45.7 to 46.5 per cent of the variance in the three endogenous constructs, suggesting a moderate to moderately strong level of explanatory power overall. The corresponding T values were all high and the P values were all

0.000, indicating that the model possessed relatively stable predictive and explanatory capability. In terms of effect size, game skill level exerted the strongest effect on perceived competence status ( $f^2 = 0.772$ ,  $P = 0.000$ ), while virtual asset level also showed a highly significant and strongest effect on perceived economic status ( $f^2 = 0.826$ ,  $P = 0.000$ ), suggesting that these two variables were the core drivers of their respective mediating constructs. With regard to the formation of friendly gaming experience, perceived competence status ( $f^2 = 0.091$ ,  $P = 0.006$ ), game skill level ( $f^2 = 0.058$ ,  $P = 0.012$ ), and virtual asset level ( $f^2 = 0.054$ ,  $P = 0.023$ ) all demonstrated a certain degree of explanatory influence, although these effects were generally in the small to medium range. By contrast, the effect of perceived economic status on friendly gaming experience was relatively weak and did not reach statistical significance ( $f^2 = 0.021$ ,  $P = 0.150$ ).

In addition, cognitive level and all of its interaction terms generally exhibited very low and non significant  $f^2$  values, indicating that both its direct effect and its moderating effects were weak. Overall, the model demonstrated relatively robust explanatory power, while the truly pivotal roles were played by game skill level and virtual asset level, which influenced friendly gaming experience through different status perception pathways.

Table 14. *R-Squared: Mean, Standard Deviation, t-Value, and p-Value*

	(O)	(M)	(STDEV)	( O/STDEV )	P
Friendly Gaming Experience	0.460	0.471	0.032	14.372	0.000
Perceived Competence Status	0.465	0.471	0.034	13.860	0.000
Perceived Economic Status	0.457	0.461	0.035	12.954	0.000

Table 15. *f-Squared: Mean, Standard Deviation, t-Value, and p-Value*

	(O)	(M)	(STDEV)	( O/STDEV )	P
Cognitive Level -> Friendly Gaming Experience	0.014	0.016	0.012	1.167	0.243
Cognitive Level -> Perceived Competence Status	0.025	0.029	0.015	1.700	0.089
Cognitive Level -> Perceived Economic Status	0.020	0.023	0.014	1.366	0.172
Cognitive Level x Game Skill Level -> Friendly Gaming Experience	0.001	0.004	0.005	0.210	0.834
Cognitive Level x Game Skill Level -> Perceived Competence Status	0.000	0.002	0.003	0.060	0.952
Cognitive Level x Perceived Competence Status -> Friendly Gaming Experience	0.002	0.004	0.005	0.339	0.734
Cognitive Level x Perceived Economic Status -> Friendly Gaming Experience	0.000	0.002	0.003	0.006	0.995
Cognitive Level x Virtual Asset Level -> Friendly Gaming Experience	0.000	0.003	0.004	0.040	0.968
Cognitive Level x Virtual Asset Level -> Perceived Competence Status	0.005	0.007	0.007	0.738	0.460
Cognitive Level x Virtual Asset Level -> Perceived Economic Status	0.002	0.004	0.005	0.351	0.726
Game Skill Level -> Friendly Gaming Experience	0.058	0.061	0.023	2.510	0.012
Game Skill Level -> Perceived Competence Status	0.772	0.783	0.109	7.087	0.000
Perceived Competence Status -> Friendly Gaming Experience	0.091	0.095	0.033	2.758	0.006
Perceived Economic Status -> Friendly Gaming Experience	0.021	0.023	0.014	1.440	0.150
Virtual Asset Level -> Friendly Gaming Experience	0.054	0.057	0.024	2.270	0.023
Virtual Asset Level -> Perceived Competence Status	0.000	0.002	0.003	0.006	0.995
Virtual Asset Level -> Perceived Economic Status	0.826	0.838	0.121	6.842	0.000

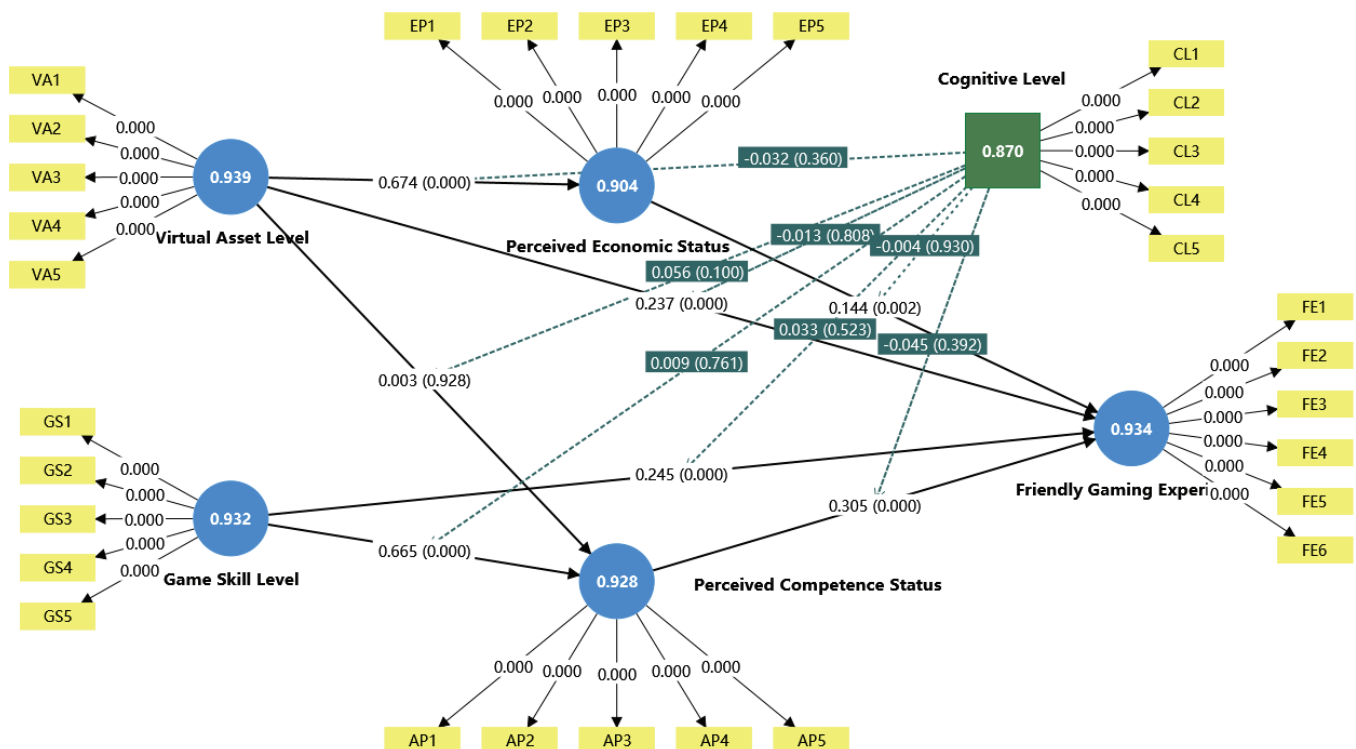
From the model fit results, the overall model in this study demonstrated a good level of fit. First, the SRMR values for the saturated model and the estimated model were 0.033 and 0.035, respectively, both of which were well below the commonly accepted threshold of 0.08. At the same time, the original sample values did not exceed their corresponding 99 per cent

quantile values, indicating that the model residuals were small and that the overall fit was satisfactory. Second, the d\_ULS values for the saturated model and the estimated model were 0.531 and 0.607, respectively, both of which were below their corresponding 95 per cent and 99 per cent quantile thresholds. The d\_G values for the saturated model and the estimated model were 0.255 and 0.254, respectively, and these were likewise below the corresponding 95 per cent and 99 per cent quantiles. These results suggest that the discrepancy between the specified model and the sample data remained within an acceptable range.

Table 16. Model Fit

Fit Index	Model Type	Original Sample	Sample Mean (M)	95%	99%
SRMR	Saturated Model	0.033	0.030	0.033	0.034
SRMR	Estimated Model	0.035	0.032	0.036	0.039
d_ULS	Saturated Model	0.531	0.457	0.544	0.588
d_ULS	Estimated Model	0.607	0.505	0.637	0.750
d_G	Saturated Model	0.255	0.272	0.301	0.315
d_G	Estimated Model	0.254	0.273	0.302	0.316

Graphic 3. Model Graphic Output (Smart-PLS 4.1.14)



## 4.6 Hypothesis Testing

From the empirical path results, the core mechanism proposed in this study received relatively clear support. First, both virtual asset level and game skill level exerted significant positive effects on friendly gaming experience, with the direct effect of game skill level being stronger. This suggests that, in the context of MOBA games, signals of competitive performance are more powerful than signals of virtual consumption in directly shaping the friendliness of the interaction a player receives. Second, the two forms of status perception played important transmitting roles in the model. Virtual asset level had a significant positive effect on perceived economic status, which in turn positively influenced friendly gaming experience. Likewise, game skill level had a significant positive effect on perceived competence status, and perceived competence status also significantly enhanced friendly gaming experience. These findings indicate that players do not receive better interactive treatment simply because they possess high level virtual assets or strong game skills. More importantly, teammates form

judgments about their economic position or competence value on the basis of these conspicuous signals, and then adjust their communication style, willingness to cooperate, and degree of tolerance accordingly. At the same time, the effect of virtual asset level on perceived competence status was not significant, indicating that high value virtual assets primarily activate associations with economic resources rather than being effectively translated into perceptions of competitive competence. In addition, none of the interaction effects involving cognitive level reached statistical significance, suggesting that its moderating role was not empirically supported in the present sample.

With regard to hypothesis testing, Table 17 shows that of the ten hypotheses proposed in this study, H1, H2, H3, and H4 were supported, whereas H5 and H6a to H6c were not supported. More specifically, all direct effect hypotheses were confirmed, indicating that virtual asset level and game skill level are indeed important antecedent variables of players' friendly experience. In terms of mediating effects, perceived economic status successfully mediated the relationship between virtual asset level and friendly experience, while perceived competence status successfully mediated the relationship between game skill level and friendly experience. This suggests that different types of conspicuous signals operate through different pathways of status perception. However, H5 was not supported, which means that virtual asset level cannot indirectly enhance friendly experience through perceived competence status. In other words, players are not consistently regarded as more capable teammates merely because they possess high quality skins, Noble status markers, or rare virtual items. Even more notably, none of the moderating hypotheses was supported, indicating that cognitive level did not significantly alter players' response strength to signals related to virtual assets, game skill, or status perception. Overall, this study supports the basic analytical framework linking conspicuous signals, status perception, and friendly experience. However, this mechanism is mainly reflected in two relatively independent pathways: virtual asset level influences friendly experience through perceived economic status, while game skill level influences friendly experience through perceived competence status, rather than through a more complex mechanism involving cross pathway generalisation or cognitive moderation.

*Table 17. Results of Hypothesis Testing*

Hypothesis	Hypothesis Statement	Corresponding Empirical Result	Conclusion
H1	Players' virtual asset level has a significant effect on their friendly gaming experience.	Virtual Asset Level $\rightarrow$ Friendly Gaming Experience: $\beta = 0.335$ , $T = 8.415$ , $P = 0.000$	Supported
H2	Players' game skill level has a significant effect on their friendly gaming experience.	Game Skill Level $\rightarrow$ Friendly Gaming Experience: $\beta = 0.448$ , $T = 13.286$ , $P = 0.000$	Supported
H3	Perceived economic status mediates the relationship between virtual asset level and friendly gaming experience.	Virtual Asset Level $\rightarrow$ Perceived Economic Status: $\beta = 0.674$ , $T = 25.343$ , $P = 0.000$ ; Perceived Economic Status $\rightarrow$ Friendly Gaming Experience: $\beta = 0.144$ , $T = 3.061$ , $P = 0.002$	Supported
H4	Perceived competence status mediates the relationship between game skill level and friendly gaming experience.	Game Skill Level $\rightarrow$ Perceived Competence Status: $\beta = 0.665$ , $T = 25.456$ , $P = 0.000$ ; Perceived Competence Status $\rightarrow$ Friendly Gaming Experience: $\beta = 0.305$ , $T = 6.024$ , $P = 0.000$	Supported
H5	Perceived competence status mediates the relationship between virtual asset level and friendly gaming experience.	Virtual Asset Level $\rightarrow$ Perceived Competence Status: $\beta = 0.003$ , $T = 0.090$ , $P = 0.928$	Not Supported
H6a	Cognitive level moderates the relationship between virtual asset level and perceived economic status.	Cognitive Level $\times$ Virtual Asset Level $\rightarrow$ Perceived Economic Status: $\beta = -0.032$ , $T = 0.915$ , $P = 0.360$	Not Supported
H6b	Cognitive level moderates the relationship between game skill level and perceived competence status.	Cognitive Level $\times$ Game Skill Level $\rightarrow$ Perceived Competence Status: $\beta = 0.009$ , $T = 0.304$ , $P = 0.761$	Not Supported
H6c	Cognitive level moderates the relationship between virtual asset level and perceived competence status.	Cognitive Level $\times$ Virtual Asset Level $\rightarrow$ Perceived Competence Status: $\beta = 0.056$ , $T = 1.643$ , $P = 0.100$	Not Supported

Hypothesis	Hypothesis Statement	Corresponding Empirical Result	Conclusion
H6d	Cognitive level moderates the relationship between perceived economic status and friendly gaming experience.	Cognitive Level $\times$ Perceived Economic Status $\rightarrow$ Friendly Gaming Experience: $\beta = -0.004$ , $T = 0.088$ , $P = 0.930$	Not Supported
H6e	Cognitive level moderates the relationship between perceived competence status and friendly gaming experience.	Cognitive Level $\times$ Perceived Competence Status $\rightarrow$ Friendly Gaming Experience: $\beta = -0.045$ , $T = 0.856$ , $P = 0.392$	Not Supported

## 5. Conclusion

### 5.1 Core Findings

The most explanatory and, indeed, most disruptive finding of this study is that friendly experience in Honor of Kings is determined less by whether players themselves are rational or mature, and more fundamentally by conspicuous signals that can be rapidly identified before the match begins, together with the status judgments these signals evoke. On the one hand, game skill level exerted the strongest influence on friendly experience and operated significantly through perceived competence status, indicating that in the high pressure and highly collaborative context of MOBA games, the players who are most readily respected and treated well by teammates are, above all, those perceived as capable of leading the team to victory. On the other hand, although virtual asset level not only directly enhanced friendly experience but also strongly shaped perceived economic status, it was almost entirely unable to translate into perceived competence status. This empirical result directly challenges the common assumption that expensive skins and high spending naturally lead others to regard a player as highly skilled. Instead, the findings show that players clearly distinguish between being wealthy and being capable. It should also be noted that perceived competence status had a stronger effect on friendly experience than perceived economic status. Although the latter path was statistically significant, its effect size was relatively modest. This suggests that consumption related symbols can indeed bring more favourable social treatment, but what more consistently sustains a friendly interactive climate is the functional status associated with competitive competence.

The study also found that cognitive level neither significantly enhanced friendly experience nor significantly moderated any of the core paths, although it did significantly weaken players' tendency to form status judgments on the basis of game skill and virtual assets. This indicates that players with higher cognitive levels are not more likely to receive friendly treatment, but are simply less likely to be guided by surface signals. Taken together, friendly interaction in MOBA games is not merely a mild outcome driven by individual character or personal civility. Rather, it is a form of social evaluation deeply embedded in a chain of signal recognition, status categorisation, and interactional allocation. Within this process, game skill generates competence based respect, while virtual assets generate economically inflected courtesy. The two operate in parallel, yet they do not converge. Cognitive level, contrary to expectation, does not reshape this order. Instead, its limited role indirectly demonstrates that status based judgment in game social interaction exerts a more stable and powerful influence than individual rationality.

### 5.2 Implications

For players, what can truly and consistently earn friendly treatment in MOBA games is not the image of being affluent conveyed through high spending, but genuine competitive ability that can be recognised and trusted by teammates. Compared with virtual assets, game skill has a stronger effect on friendly experience and is more capable of further enhancing teammates' respect, patience, and cooperation through perceived competence status. Players should therefore avoid relying excessively on consumption related symbols such as skins and Noble status markers to construct their image, and should instead place greater emphasis on operational skill, team awareness, communication quality, and actual in game contribution. At the same time, players should reduce their tendency to make rapid judgments about others' status on the basis of conspicuous markers, and should strive to adjust their interactive attitudes according to actual performance rather than surface signals, thereby promoting more rational and equitable teamwork.

For gaming platforms, improving the friendliness of the gaming environment cannot depend solely on appeals to civility or players' self-discipline, but should also involve mechanism design aimed at reducing the influence of conspicuous signals

on the allocation of interaction. Since players' friendly experience is shaped by status judgments triggered by signals of both game skill and virtual assets, platforms should place greater emphasis on indicators that reflect genuine collaborative value, such as team contribution, coordination performance, and participation in team fights, in order to strengthen competence oriented positive evaluation. At the same time, platform designers should handle the display mechanisms associated with Noble status markers, rare skins, and high spending indicators with caution, so as to avoid intensifying the social stratification produced by economic symbols. The focus of platform governance should shift from merely urging players to be more rational towards reducing the triggering force of status based judgments through institutional design, thereby optimising the overall gaming ecosystem at its source.

### 5.3 Research Limitations

Although this study has conducted a relatively systematic empirical examination of the relationships among virtual asset level, game skill level, status perception, and friendly experience among Honor of Kings players, and has obtained satisfactory statistical results at both the measurement model and structural model levels, several limitations remain. First, this study relies on cross sectional questionnaire data. While such data can reveal correlations and structural relationships among variables, they do not provide direct temporal evidence for the dynamic evolution of causal mechanisms. In particular, the process through which players continuously revise their status judgments on the basis of conspicuous signals across different stages of a match has not been fully captured. Second, the data were derived primarily from players' self-reports. Although the questionnaire underwent expert review, pilot testing, and reliability and validity assessment, the results may still have been influenced by common method bias, perceptual subjectivity, and social desirability effects. Third, this study focuses on Honor of Kings as a representative MOBA mobile game. While this enhances contextual specificity and explanatory depth, the applicability of the findings to other game genres, platform environments, and cultural contexts remains to be further examined. Finally, although the study confirms that virtual assets and game skill influence friendly experience through different status perception pathways, the explanatory power of the model for friendly experience remains at a moderate to moderately high level. This suggests that, beyond the variables included in the present study, factors such as players' personality traits, immediate win loss situations, communication styles, matchmaking mechanisms, and the intensity of platform governance may also exert important effects on friendly interaction, and therefore merit inclusion in a more comprehensive analytical framework in future research.

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## Appendix: Questionnaire

### Questionnaire on Honor of Kings Players' Virtual Asset Level, Game Skill Level, and Friendly Experience in the Gaming Environment

Dear Respondent,

Hello.

This questionnaire is designed to understand how Honor of Kings players perceive the interaction climate among teammates during gameplay, and to examine how factors such as virtual assets, game skill, status perception, and cognitive level may influence friendly experience. The questionnaire is intended solely for academic research. All data will be used only for statistical analysis and will not be used for any commercial purpose. The questionnaire is anonymous, and all personal information will be kept strictly confidential. Please answer each question on the basis of your actual gameplay experience and genuine feelings. There are no right or wrong answers.

Thank you very much for your support and cooperation.

#### Part I Screening Questions

S1. Have you ever played Honor of Kings?

1 = Yes

2 = No

S2. Have you played Honor of Kings within the past six months?

1 = Yes

2 = No

S3. Have you ever played ranked matches or peak tournament matches with strangers or non-regular friends?

1 = Yes

2 = No

Instruction: If the answer to any of S1, S2, or S3 is No, the questionnaire should be terminated.

## Part II Basic Personal Information

Instruction: The following information is collected for statistical analysis only. All responses will be processed anonymously and will not involve any disclosure of personal privacy. Please answer according to your actual situation.

D1. What is your gender?

1 = Male

2 = Female

3 = Prefer not to disclose

D2. Which of the following age ranges do you belong to?

1 = Under 18

2 = 18–22

3 = 23–27

4 = 28–32

5 = 33 and above

D3. What is your highest level of education?

1 = Junior secondary school and below

2 = Senior secondary school / technical secondary school

3 = Junior college

4 = Bachelor's degree

5 = Master's degree and above

D4. What is your current occupational status?

1 = Student

2 = Corporate employee

3 = Self-employed / freelancer

4 = Civil servant / public institution employee

5 = Professional / technical personnel

6 = Other

D5. What is your approximate monthly disposable income?

1 = Below RMB 3,000

2 = RMB 3,001–5,000

3 = RMB 5,001–8,000

4 = RMB 8,001–12,000

5 = RMB 12,001 and above

6 = No fixed income at present

D6. Approximately how long have you been playing Honor of Kings?

1 = Less than 6 months

2 = 6 months–1 year

3 = 1–3 years

4 = 3–5 years

5 = More than 5 years

D7. Over the past six months, how often have you played Honor of Kings on average per week?

1 = Less than once a week

2 = 1–2 times a week

3 = 3–4 times a week

4 = 5–6 times a week

5 = Almost every day

D8. On average, how much time do you spend playing Honor of Kings each day?

1 = Less than 30 minutes

2 = 30 minutes–1 hour

3 = 1–2 hours

4 = 2–3 hours

5 = More than 3 hours

D9. What is your current main rank, or the main rank you held in the most recent season?

1 = Bronze / Silver

2 = Gold

3 = Platinum

4 = Diamond

5 = Star

6 = King and above

D10. Which teaming mode do you use most often in the game?

1 = Mainly solo queue

2 = Mainly duo / trio queue

3 = Mainly five-stack queue

4 = Both solo queue and team queue frequently

D11. What is your approximate cumulative spending in Honor of Kings?

1 = Never spent

2 = RMB 1–100

3 = RMB 101–500

4 = RMB 501–1,000

5 = RMB 1,001–3,000

6 = RMB 3,001 and above

D12. How often do you display skins, Noble level, or personalised identity markers in the game?

- 1 = Almost never
- 2 = Occasionally
- 3 = Sometimes
- 4 = Often
- 5 = Always

### Part III Core Measurement Items

Instructions for completion:

Please evaluate the following statements on the basis of your actual experience in Honor of Kings.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Neutral
- 4 = Agree
- 5 = Strongly agree

#### A. Virtual Asset Level

This section is intended to measure the level of virtual assets that teammates can perceive a player to possess in Honor of Kings.

VA1 I own a relatively large number of high-quality skins in Honor of Kings.

VA2 Among the skins I own, a relatively high proportion are high-value skins, such as Legendary, limited edition, Unparalleled, or Glory Collection skins.

VA3 The Noble level or related identity markers I display in the game are usually relatively high.

VA4 The skins, Noble level, or displayed content on my account usually give others the impression that I have invested heavily in it.

VA5 When teammates see the visible content on my account, they can usually sense that my level of virtual assets is relatively high.

#### B. Game Skill Level

This section is intended to measure players' competitive ability and the level of skill performance that can be recognised by teammates.

GS1 My current rank or highest historical rank is usually at a relatively high level.

GS2 The win rate of my frequently used heroes, or my overall match win rate, is usually relatively high.

GS3 I often achieve good match records in Honor of Kings.

GS4 I usually perform well in hero control, situational judgment, and team coordination.

GS5 When teammates see my rank, win rate, or match record, they usually regard my game skill level as relatively high.

#### C. Perceived Economic Status (Mediating Variable 01)

This section is intended to measure whether respondents believe that teammates infer stronger real-life spending power or better economic conditions from consumption-related cues such as displayed skins and Noble level in Honor of

## Kings.

EP1 When I use Glory Collection, Unparalleled, or other high-quality skins, teammates often think that I am someone willing to spend money in the game.

EP2 In Honor of Kings, players with a higher Noble level or a larger skin collection are usually more likely to be seen by others as having stronger real-life spending power.

EP3 When teammates see that I have rare skins, a relatively high Noble marker, or a more complete skin display, they may think that my real-life circumstances are quite good.

EP4 When selecting heroes or entering a match, the skins and Noble information displayed by a player influence how others judge that player's economic conditions.

EP5 The consumption-related traces I display in the game, such as skins and Noble level, influence teammates' impressions of whether I have financial strength.

## D. Perceived Competence Status (Mediating Variable 02)

This section is intended to measure whether respondents believe that teammates regard them as more capable, more trustworthy, and more worthy of cooperation because of competence-related cues such as rank, win rate, and match record.

AP1 When teammates see that I have a relatively high rank, a high peak tournament score, or a strong win rate, they usually think that I am more capable.

AP2 In Honor of Kings, players with better match records or stronger skills are generally more likely to be treated by teammates as core members of the team.

AP3 When I display a relatively high rank, a high win rate, or particularly impressive hero records, teammates are usually more willing to trust my judgment and follow my calls.

AP4 During team formation or in the course of a match, the level of skill a player displays influences that player's standing in the eyes of teammates.

AP5 When I demonstrate strong ability, teammates are usually more willing to follow my rhythm and coordinate with my style of play.

## E. Friendly Experience

This section is intended to measure the extent to which respondents perceive friendliness, respect, tolerance, and cooperation from teammates during Honor of Kings matches.

FE1 During matches, teammates usually communicate with me in a normal and friendly manner.

FE2 Even when I make mistakes in the game, teammates generally do not immediately blame, mock, or speak to me sarcastically.

FE3 During gameplay, I am usually able to feel that teammates show me basic respect.

FE4 Teammates are usually willing to communicate with me and maintain cooperation during the match.

FE5 Even when the situation is unfavourable or the team is falling behind, teammates usually remain relatively restrained and cooperative.

FE6 Overall, I am usually able to experience a relatively positive team interaction climate in Honor of Kings matches.

## F. Cognitive Level

This section is intended to measure whether players are more inclined to rely on intuitive judgment or to engage in

analysis and reflection when confronted with conspicuous information.

CL1 When judging a player, I usually do not draw conclusions easily on the basis of surface information alone, such as skins, Noble level, or rank.

CL2 When confronted with conspicuous cues in the game, I usually go on to consider whether such information truly reflects the player's actual ability or level.

CL3 When evaluating teammates, I am more inclined to make an overall judgment based on their actual mechanics, game awareness, and coordination.

CL4 I usually consider a player from multiple angles rather than making a one-sided judgment based on a single piece of information.

CL5 Even if a player's displayed profile appears highly prominent, I will continue to revise my judgment on the basis of that player's subsequent actual performance.

**END OF THE SURVEY THANK YOU**

# The Artistic Integration of Dunhuang Tufo and Tuota Caca and Its Living Heritage Protection Pathways

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**Abstract:** As unique carriers of ancient Chinese Buddhist art, Dunhuang Tufo (molded Buddha images) and Tuota Caca (molded pagoda images) embody rich religious significance and artistic value. This paper examines the multidimensional integration characteristics of Caca artifacts in terms of formal language, craftsmanship techniques, and cultural symbolism from the perspective of artistic fusion, analyzing the distinctive artistic system formed through historical evolution. On this basis, the paper further explores the theoretical framework and practical pathways for living heritage protection, proposing feasible strategies for the inheritance and innovation of traditional craftsmanship in contemporary contexts, with the aim of providing references for the sustainable development of Dunhuang cultural heritage.

**Keywords:** Dunhuang; Tufo Caca; Tuota Caca; Artistic Integration; Living Heritage Protection

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## 1. Introduction

Dunhuang stands as a cultural stronghold along the Silk Road, where millennia of accumulated time have nurtured unique artistic traditions. Among various art forms, Tufo and Tuota Caca possess distinctive manufacturing techniques and carry profound religious connotations, serving as core research objects that cannot be bypassed in the study of Dunhuang Buddhist art. “Caca” refers to small clay sculptures of Buddhas or pagodas made by pressing or molding, with a small number bearing Tibetan or Sanskrit inscriptions <sup>[1]</sup>. According to the Italian Tibetologist Giuseppe Tucci, the term “Caca” derives from Sanskrit, meaning “perfect image” or “replica” <sup>[2]</sup>. The archaeological survey and excavation report of The Northern Grottoes of Mogao Caves, Dunhuang records that numerous Caca artifacts were unearthed from the northern section of the Mogao Caves, with the archaeological report classifying them into two major categories: Tuota (pagoda) and Tufo (Buddha) <sup>[3]</sup>. These portable and easily circulated Tufo and Tuota Caca played significant roles in the propagation of ancient Buddhism and religious practice.

Tufo Caca primarily refers to small clay sculptures of Buddha images made through mold-impression, while Tuota Caca represents clay works molded in pagoda configurations <sup>[4]</sup>. Both share identical manufacturing origins, relying on molds to press clay into shape, which after drying or firing become small religious objects suitable for worship or personal wear. This production method enabled the mass replication and outward dissemination of Buddhist imagery, accommodating the religious needs of broad congregations while facilitating the exchange and integration of Buddhist art across different regions and cultural backgrounds.

As time progresses, the artistic value and cultural connotations embedded in Tufo and Tuota Caca urgently await scholarly excavation and organization. This paper approaches from the perspective of artistic integration, sorting through the artistic characteristics of Tufo and Tuota Caca, analyzing their cultural values, and further clarifying the theoretical framework for living heritage protection and identifying practical implementation directions.

## 2. Artistic Characteristics of Dunhuang Tufo and Tuota Caca

### 2.1 Diversity of Formal Language

Dunhuang Tufo and Tuota Caca demonstrate diverse fusion characteristics in their formal language. Regarding Buddha imagery, some works inherit the Gandharan artistic style of India, presenting plump physiques; some incorporate Central Plains aesthetic sensibilities, depicting dignified facial features; while others display decorative elements reflecting Western Regions ethnic characteristics. The coexistence and blending of different styles correspond to Dunhuang's unique position as a hub of East-West cultural exchange. Within individual Buddha works, details such as sitting postures, mudras, and attire reveal traces of different artistic traditions, ultimately forming the distinctive "Dunhuang style."

The forms of Tuota Caca showcase the artistic imagery of Tibetan-style pagodas<sup>[5]</sup>. While the pagoda structure generally follows the basic form of the Indian original stupa, detailed decorations incorporate Central Plains architectural elements such as dougong (bracket sets) and flying eaves, while the base sections frequently feature traditional patterns like lotus flowers and scrolling foliage. This cross-cultural formal fusion renders Tuota Caca important specimens for observing ancient architectural art exchange. The combination of finial, body, and base maintains the integrity of religious symbolism while demonstrating flexibility in artistic expression.

### 2.2 Uniqueness of Craftsmanship Techniques

The manufacturing techniques of Tufo and Tuota Caca embody the superb wisdom of ancient craftsmen<sup>[6]</sup> while accommodating innovations in technical exploration. Mold creation supports the entire production process, requiring carvers to possess profound modeling skills and extensive religious knowledge. Mold materials are primarily wood, with some ceramic examples, and the precision of carved details directly determines the artistic quality of finished products. High-quality molds can be repeatedly used, stabilizing work styles while expanding dissemination scope.

Clay preparation is crucial to final product effects. The soil characteristics of the Dunhuang region provide natural conditions for Caca production, where local craftsmen through long-term practice have developed suitable mixing ratios that reduce molding difficulty while achieving required strength. Some premium Caca incorporate mineral pigments for pattern painting or gold leaf application on surfaces to enhance the solemn atmosphere required for religious occasions and elevate artistic expression. Temperature control during firing and timing selection during drying stages demonstrate the sophistication of traditional craftsmanship in these detailed aspects.

### 2.3 Richness of Religious Connotations

Tufo and Tuota Caca carry profound Buddhist religious significance. The concrete manifestation of Buddha as Buddha images serves as important objects for congregation worship and meditation, capable of accumulating merit and fulfilling religious needs for prayer and disaster elimination. Pagodas symbolize Buddha's parinirvana and the transmission of Dharma, with their forms constituting an independent religious symbol system: the finial represents the Buddha realm, the body corresponds to the Bodhisattva realm, and the base corresponds to the sentient beings realm, embodying the hierarchical structure of Buddhist cosmology.

The small size of Caca grants them special religious practicality. Believers can carry them personally for worship anytime, anywhere; they can also be mass-produced for various religious activities including pagoda consecration, temple offerings, and Dharma assembly almsgiving. Portability combined with replicability makes Caca important media for Buddhist propagation, occupying irreplaceable positions in ordinary believers' religious lives.

## 3. Multidimensional Manifestations of Artistic Integration

### 3.1 Convergence and Fusion of Regional Cultures

Dunhuang is located at the western end of the Hexi Corridor, serving as the gateway from Central Plains dynasties to the

Western Regions and a crossroads where multiple civilizations converged. This special geographical location endowed Dunhuang art with core attributes of natural diversity and integration. Western Xia Caca constitute a category of Western Xia Buddhist cultural relics, artistically belonging to the clay sculpture genre of Buddhist statuary<sup>[7]</sup>. Tuofu and Tuota Caca form components of Western Xia Caca, clearly presenting the convergence and fusion of multiple cultural factors including Indian Buddhist art, Central Plains Han culture, and Western Regions nomadic culture. In terms of form, the realistic tradition of Gandharan art achieves organic combination with the freehand spirit of Central Plains art; in decoration, one can observe lotus patterns transmitted from India, Persian-style scrolling foliage patterns, and Central Plains traditional cloud and qi motifs.

The fusion of regional cultures is not simple collage or superposition but gradually grows into an organic whole through long historical development. During the process of absorbing foreign artistic elements, craftsmen continuously completed localized transformations and innovations, ultimately generating an artistic style bearing Dunhuang identity. Tuofu and Tuota Caca serve as tangible artistic witnesses to this cultural fusion, with each work carrying rich cultural information and historical memory.

### 3.2 Secularization Turn of Religious Art

The artistic integration of Tuofu and Tuota Caca is also manifested in the interactive relationship between religious art and secular aesthetics. Buddhist art essentially serves religious propagation and faith practice, and its development cannot be separated from secular society's support and participation. The miniaturization and mass-production characteristics of Caca enable them to move from temple halls into folk life, becoming religious objects accessible and ownable by ordinary believers. This popularization trend drives religious art toward secular transformation while allowing folk aesthetic tastes to enter the realm of religious art creation.

In the forms of Tuofu and Tuota Caca, one can observe dynamic balance between religious normativity and artistic expressiveness<sup>[8]</sup>. The basic configurations of Buddha images and pagodas must follow Buddhist rituals to maintain the solemnity of religious symbolism; craftsmen possess certain creative space in detail processing, capable of incorporating personal styles and contemporary aesthetics. The tension between norm and freedom constitutes important driving force for religious art development and the core reason for the unique artistic charm of Tuofu and Tuota Caca.

### 3.3 Cross-Stratum Symbiosis of Aesthetic Expression

In the aesthetic patterns of Dunhuang Tuofu and Tuota Caca, sacredness and secularity coexist, elite aesthetics merge with folk tastes, and aesthetic traditions of different ethnic groups collide and fuse, ultimately forming aesthetic qualities appreciated by both refined and popular tastes. As core carriers of religious sacrifice and faith practice, these Caca maintain the dignity and sacredness proper to Buddhist imagery, complying with core requirements of religious aesthetics regarding statuary temperament; as crafted forms widely participated in by folk masses, they fully absorb folk aesthetic tastes, weakening the alienation and complexity of elite religious art, shaping visual temperaments that are solemn yet gentle, dignified yet intimate, allowing sacredness and secularity to form organic balance.

These statuary forms adopt miniature configurations while internally carrying complete religious cosmologies, achieving aesthetic transformation of "seeing the large through the small, manifesting the sacred through the minute." Portable formal characteristics break the restriction that religious statuary could only be placed in sacred spaces such as temples and grottoes, enabling entry into ordinary people's daily life scenarios, integrating religious rituals and aesthetic experiences into daily behavior, forming daily sacred aesthetic experiences. Their aesthetic expression fully accommodates aesthetic preferences of different ethnic groups, with formal language reconciling multi-ethnic aesthetic traditions, becoming materialized carriers of cross-ethnic aesthetic consensus.

## 4. Practical Dilemmas in the Living Inheritance of Dunhuang Tuofu and Tuota Caca

Despite their rich artistic value and multiple cultural connotations, the survival and inheritance of Dunhuang Tuofu and Tuota Caca in contemporary society still face multiple core dilemmas. Some derive from the material and craft characteristics of Caca themselves, while others stem from changes in contemporary socio-cultural environments, having become core challenges that living heritage protection must address.

#### **4.1 Preservation Difficulties Arising from Material Vulnerability**

With clay as their core material, Tuofu and Tuota Caca naturally possess physical and chemical vulnerability, requiring stringent preservation environmental conditions. Environmental factors such as temperature and humidity fluctuations, wind and sand erosion, and microbial growth all affect clay materials, potentially causing diseases including efflorescence, pulverization, cracking, and damage. Their adoption of thin-bodied mold-release structures amplifies problems of insufficient physical stability, increasing preservation difficulty. The inherent material vulnerability poses challenges for long-term preservation, restricting public exhibition and dissemination space. Such heritage cannot approach broader publics, forming a cycle of “more closed preservation, less public awareness, weaker protection efforts.”

#### **4.2 Limitations in Value Recognition and Insufficient Protection Resources**

In the overall research and protection model of Dunhuang art, Tuofu and Tuota Caca have long occupied relatively marginal positions, with their artistic, cultural, and historical values yet to be fully recognized and interpreted. Both the public and academic circles tend to classify them as subsidiary remains to grotto murals and large-scale statuary, underestimating their core value as cross-cultural fusion carriers and failing to interpret from a model perspective the deep logic and cultural connotations of their artistic integration. Limitations in value recognition result in relatively limited resource investment during protection and inheritance processes, with each aspect—including technological research and development for physical protection, model establishment for craft inheritance, and channel expansion for value dissemination—facing practical constraints of resource shortage.

#### **4.3 Lack of Endogenous Dynamics for Living Survival**

The core of living inheritance lies in heritage forming organic interaction with contemporary society and possessing self-generating survival dynamics over the long term. At present, protection of Tuofu and Tuota Caca mostly remains at the level of static physical preservation, without fully excavating their contemporary value or constructing channels connecting with contemporary social life, cultural needs, and aesthetic tastes. Their originally possessed religious and social functions have undergone profound transformation in contemporary society, while new contemporary values and application scenarios await full development. Such heritage is gradually disconnecting from contemporary public life and cognition, with living inheritance lacking endogenous social dynamics and mass foundation.

### **5. Exploration of Living Heritage Protection Pathways**

#### **5.1 Preventive Protection of Physical Security**

Physical security supports the normal advancement of living heritage protection. The three core principles of minimum intervention, reversibility, and recognizability in cultural relics protection must be upheld, constructing physical protection models covering all operational links. First, establish systematic preventive protection mechanisms. Given the inherently fragile nature of clay materials, comprehensive environmental monitoring and risk assessment systems covering the entire lifecycle can be constructed, delineating environmental control indicators for preservation, transportation, and exhibition links, relying on preventive interventions to reduce disease occurrence probability and extend heritage preservation duration from the source. Second, develop protection and restoration technologies and materials adapted to clay statuary. Combining disease characteristics of clay statuary, develop reinforcement, filling, and cleaning materials and technologies compatible with original materials without altering the external appearance of heritage bodies, completing disease treatment within the scope of minimum intervention requirements. Third, establish graded and classified protection management standards. Based on heritage value grades, preservation status, and craft characteristics, formulate different protection, preservation, and management plans, ensuring protection work aligns with practical needs and scientific requirements.

#### **5.2 Platform Construction for Exhibition and Dissemination**

Exhibition and dissemination constitute important links in living heritage protection, capable of enhancing public awareness, expanding social influence, and broadening market space. Constructing diversified exhibition and dissemination platforms can cover multiple forms including museum exhibitions, cultural festivals, media dissemination, and educational promotion. Dunhuang possesses abundant cultural tourism resources; exhibitions of Tuofu and Tuota Caca can be organically integrated with Dunhuang cultural tourism, establishing dedicated exhibition spaces in scenic areas, museums, and cultural creative

parks, allowing tourists to experience the charm of this traditional art at close range. New media dissemination represents an important pathway that cannot be ignored. Short videos, live streaming, social media, and other emerging platforms can be utilized to introduce Caca manufacturing techniques in vivid and interesting ways, attracting young people's attention and participation. Online exhibitions, virtual experiences, and other digital products can also be developed to break temporal and spatial limitations and expand dissemination scope. Diversified exhibition and dissemination strategies can promote Tuofu and Tuota Caca out of niche circles and into public vision.

### 5.3 Exploration and Practice of Innovative Transformation

Living heritage protection is not about rigid conservatism; possibilities for innovative transformation must be explored under the premise of respecting tradition. Innovation in Tuofu and Tuota Caca can unfold across multiple dimensions: functionally, developing product forms adapted to modern practical needs; thematically, incorporating contemporary aesthetic content aligned with current era themes; materially, attempting to integrate environmentally friendly new materials into traditional manufacturing processes; application-wise, extending to multiple fields including cultural creative products, spatial decoration, and art collection. Innovative transformation requires coordinating the relationship between tradition and modernity, upholding core techniques and cultural connotations without losing essential characteristics to cater to markets. With open minds embracing change and responding to demands raised by the era, industry-university-research cooperation mechanisms can be established, inviting artists, designers, and scholars to participate together in innovative exploration. Finding balance points in the dialogue between tradition and modernity can promote the creative transformation and innovative development of Tuofu and Tuota Caca art.

## 6. Conclusion

Dunhuang Tuofu and Tuota Caca are precious remains of ancient Chinese Buddhist art preserved to the present day, possessing unique artistic value and carrying profound cultural connotations. Artistic integration can be interpreted from multiple dimensions: the convergence and fusion of different regional cultures gave birth to diverse formal languages; interaction between religious activities and secular life drove art toward broader popularization; clear continuation of intergenerational transmission maintained the vitality of manufacturing techniques. Relying on these characteristics, Tuofu and Tuota Caca can serve as windows for observing ancient cultural exchange and artistic innovation.

In the current social environment, Tuofu and Tuota Caca face both inheritance dilemmas and development opportunities. The introduction of living heritage protection concepts into related work delineates theoretical directions for their long-term development and identifies feasible practical pathways. Protection work must follow holistic principles, paying attention to organic connections between cultural heritage and surrounding environments, and follow long-term development thinking to achieve positive interaction between protection and development.

Future living heritage protection of Dunhuang Tuofu and Tuota Caca requires participation from multiple forces: government departments strengthening policy guidance and increasing resource investment; academic institutions deeply excavating related research content and improving archive construction; all sectors of society deepening cognition of this art form and actively participating in protection actions. With multiple parties forming protection synergy, this ancient art form can present new appearances in the new era, injecting strength into the inheritance and development of excellent traditional Chinese culture.

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No

## Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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# Leadership Practices and Process Reconstruction in the New Business Forms of Film-Tourism Integration Driven by Generative AI

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**Abstract:** This paper explores how leaders' practices and reconstructing of processes are changing under the influence of Generative AI within the emergent industry of film tourism. The researcher, through an interpretivist paradigm, undertook semi-structured interviews with thirty-six industry leaders from film production and destination management industries. Data analyses were done through reflexive thematic analysis, which identified how professionals adapt to the integration of autonomous technological agents. The findings indicate that there was a significant shift in management from an approach based on tradition to one more dominated by cognitive orchestration, in which leaders balance human intuition with algorithmic agency. The findings emphasize that the reconstruction of organizational work processes shifted from linear models toward parallel and simultaneously coordinated digital ecosystems. The most important challenges involved the need for ethical stewardship to maintain cultural authenticity against automated content generation. This research informs how the convergence of cinematic storytelling with travel is being reconstituted through generative technologies. The framework will help to navigate human-AI collaboration in cultural industries.

**Keywords:** Generative AI; Film Tourism; Leadership Practice; Process Reconstruction; Non-Human Agency

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## 1. Introduction

The world tourism industry is undergoing a paradigm shift due to a combination of cultural narrative and experiential travel. Film tourism integration and synergy have come to play a significant role as a powerful driver for regional branding and development. Nevertheless, these film tourism paradigms are being radically disrupted by a new phenomenon: Generative Artificial Intelligence (GenAI)<sup>[1]</sup>. Technologies like Large Language Models (LLMs) and AI-based image creation tools like Sora and Midjourney are not only changing the way business is conducted but also creating a “new business form” that seeks to integrate virtual narrative and experiential travel<sup>[2]</sup>. As a result, the “film tourism” value chain is shifting from a linear post-production marketing approach to a multi-dimensional and interactive system<sup>[3]</sup>. Current literature suggests that traditional, top-down leadership styles often struggle to keep pace with the iterative and decentralized nature of AI-driven creative

processes<sup>[4]</sup>. Leaders in this new landscape must possess a unique blend of “Digital Acumen” and “Human-Centric Empathy,” navigating the delicate balance between technological automation and the preservation of artistic integrity<sup>[5]</sup>. Furthermore, the operational flow of film-tourism integration—ranging from scriptwriting and location scouting to destination marketing—requires a fundamental process reconstruction<sup>[6]</sup>. The integration is no longer a sequential hand-off from filmmakers to tourism boards; it is becoming a simultaneous, data-driven collaboration powered by GenAI’s ability to synchronize content production with consumer insights. Despite the transformative potential of these technologies, there remains a critical gap in understanding how leadership truly evolves within these AI-integrated tourism enterprises and how internal processes are re-engineered to sustain competitive advantage<sup>[7]</sup>. This research seeks to explore the lived experiences of industry leaders and the structural transformations within their organizations, providing a roadmap for navigating the complexities of the GenAI frontier<sup>[8]</sup>.

## 2. Qualitative Research Questions

To provide an in-depth exploration of this phenomenon, this study is guided by the following three qualitative research questions: RQ1: How do leaders within the film-tourism sector adapt their leadership styles and decision-making frameworks to manage the cultural and psychological shifts triggered by the integration of Generative AI? RQ2: In what ways does the implementation of Generative AI facilitate the reconstruction of cross-sectoral workflows between film production and tourism destination marketing? RQ3: What are the key organizational challenges and ethical dilemmas perceived by leaders when balancing AI-driven automation with human creativity in the development of new film-tourism business forms?

## 3. Digital Leadership Evolution in the AI Era

The evolution of leadership within technology intensive sectors has traditionally centered on digital transformation frameworks that emphasize agility and vision. Existing literature on digital leadership highlights the necessity for managers to foster a culture of innovation while navigating the complexities of algorithmic decision making<sup>[9]</sup>. However, many scholars argue that current models remain overly focused on general technology adoption, often overlooking the nuanced leadership demands of the film tourism niche where emotional intelligence must intersect with high level technical literacy. Within this specific hybrid industry, leadership is no longer just about managing human capital but about orchestrating a symbiotic relationship between creative professionals and generative algorithms<sup>[10]</sup>. The critique arises from the fact that most leadership theories treat AI as a passive infrastructure rather than an active participant in the creative process. This gap suggests a need to rethink leadership not as a top down hierarchy but as a facilitative role that balances the unpredictability of generative outputs with the strategic goals of destination branding. Without a specialized framework for AI driven film tourism, leaders risk falling into a trap of technological determinism that may alienate human talent and dilute the unique cultural narrative of a destination.

## 4. Structural Reconstruction of Cross Sectoral Workflows

Scholarly discourse on cross sectoral integration between the film and tourism industries has long relied on the concept of a linear value chain where cinematic content precedes tourism marketing. Traditional process models describe a sequential flow from script development to destination exposure, yet the introduction of Generative AI demands a more fluid and simultaneous approach to workflow design<sup>[11]</sup>. Literature on Business Process Reengineering suggests that AI can drastically reduce the latency between content production and consumer engagement by enabling real time content adaptation. Nevertheless, a significant portion of current research remains theoretical, providing little empirical evidence on how these two disparate sectors actually synchronize their operational cycles under the influence of GenAI. The critique here lies in the persistent silos between film production studios and tourism management organizations, which existing process theories fail to bridge effectively<sup>[12]</sup>. While technology allows for instant narrative generation and virtual location scouting, the structural rigidity of traditional organizations often prevents the full realization of these efficiencies. Therefore, the literature must move beyond documenting technological potential and start addressing the structural obstacles that hinder the true convergence of film and tourism into a single AI integrated ecosystem<sup>[13]</sup>.

## 5. Paradoxes of Automation and Creative Authenticity

The tension between automated efficiency and human creativity remains a central theme in recent studies concerning Artificial Intelligence in the cultural and creative industries<sup>[14]</sup>. Current research often frames this relationship as a binary opposition, where AI is either a threat to artistic authenticity or a simple tool for cost reduction. In the context of film tourism, this debate is particularly acute because the value of the experience depends on the perceived soul and originality of the storytelling. Scholars have pointed out that while GenAI can generate vast amounts of promotional material and interactive experiences, it often lacks the deep cultural context and ethical sensitivity required for responsible destination representation<sup>[15]</sup>. The critical gap in existing literature is the lack of a robust framework for managing the ethical dilemmas associated with AI generated heritage or fictionalized cultural narratives. Most organizational studies focus on productivity metrics while ignoring the potential for cultural homogenization or the loss of local agency in AI curated travel experiences<sup>[16]</sup>. Consequently, there is an urgent need to investigate how organizations can implement a human centric AI strategy that protects creative integrity while leveraging the scalability of generative models. This requires a shift from viewing AI as a replacement for human input to seeing it as a partner that requires constant ethical oversight and creative direction<sup>[17]</sup>.

## 6. Research Design and Interpretivist Paradigm

This study adopts an interpretivist research paradigm to explore the complex lived experiences of industry leaders navigating the intersection of Generative AI and film tourism. An interpretivist approach is essential because it allows the researcher to understand how individuals construct meaning within their specific organizational contexts. The primary method selected for this investigation is the semi-structured interview. Quantitative methods are unsuitable for this research because they prioritize statistical generalization over the depth of subjective insight required to understand leadership shifts. Furthermore, structured interviews are overly restrictive and prevent the pursuit of unexpected but relevant information during the dialogue. Conversely, completely unstructured interviews lack the necessary focus to address the specific research questions regarding process reconstruction. Semi-structured interviews provide the ideal balance by offering a consistent thematic framework while allowing the flexibility to probe deeper into the personal perspectives and professional strategies of the participants.

## 7. Participant Selection and Sample Size

The researcher employed a purposive sampling strategy to identify and recruit 36 industry professionals who hold senior leadership positions in either film production or tourism management (Shown in Table 1). The selection criteria required participants to have at least five years of management experience and active involvement in projects that integrate Generative AI technologies. The sample size of 36 was determined by the principle of theoretical saturation. During the data collection process, the researcher monitored the emergence of new information and found that after the thirtieth interview, the core categories and insights became repetitive. The final six interviews were conducted to confirm that no new codes or sub themes would surface, thereby ensuring the breadth and depth of the data. This sample size is consistent with established qualitative standards for achieving a comprehensive understanding of a specialized professional phenomenon.

*Table 1. Participant Information*

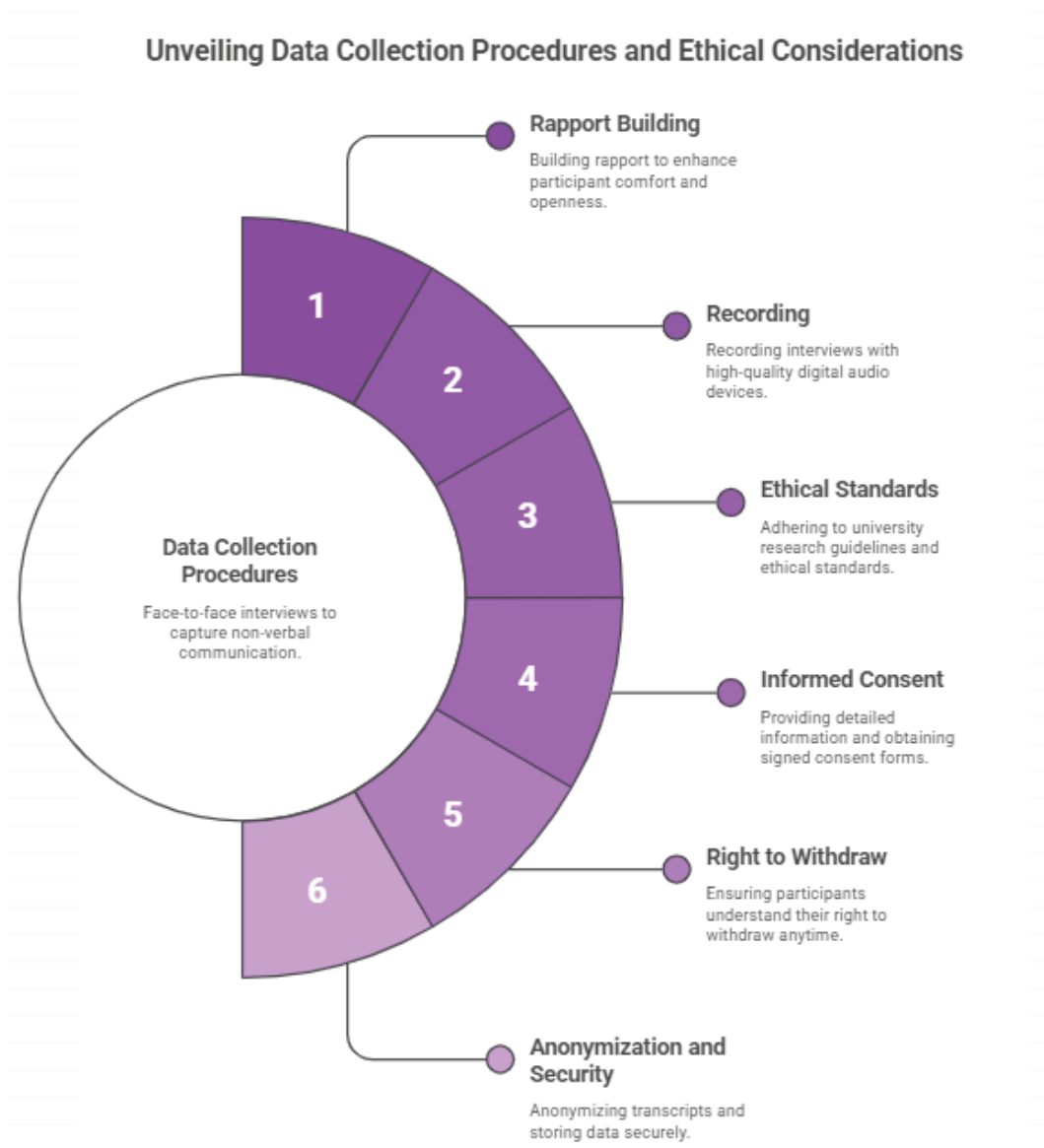
Participant ID	Gender	Current Role / Position	Industry Sector	Experience (Years)
Participant 01	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 02	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 03	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 04	Male	CEO of a Regional Tourism Board	Tourism Management	12 Years
Participant 05	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 06	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 07	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 08	Male	Senior Leader / Manager	Film / Tourism	> 5 Years

Participant ID	Gender	Current Role / Position	Industry Sector	Experience (Years)
Participant 09	Female	Location Manager for Major Projects	Film Production	14 Years
Participant 10	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 11	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 12	Female	Film Production Manager	Film Production	8 Years
Participant 13	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 14	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 15	Female	Head of Integrated Media	Media / Entertainment	11 Years
Participant 16	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 17	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 18	Male	Intl. Destination Marketing Manager	Tourism Marketing	10 Years
Participant 19	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 20	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 21	Male	Cultural Heritage Consultant	Tourism / Culture	15 Years
Participant 22	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 23	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 24	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 25	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 26	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 27	Male	Creative Director (Immersive Park)	Tourism / Entertainment	9 Years
Participant 28	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 29	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 30	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 31	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 32	Male	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 33	Female	Senior Marketing Director	Film Studio	20 Years
Participant 34	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 35	Female	Senior Leader / Manager	Film / Tourism	> 5 Years
Participant 36	Female	Senior Leader / Manager	Film / Tourism	> 5 Years

## 8. Data Collection Procedures and Ethical Considerations

Data collection was conducted through face to face interviews to capture the nuance of non verbal communication and build a high level of rapport with the participants. Each session lasted between sixty and ninety minutes and was recorded using a high quality digital audio device. All procedures were designed to adhere to strict ethical standards in accordance with university research guidelines. Every participant received a detailed information sheet and signed a formal consent form before the interview commenced. The researcher ensured that all participants understood their right to withdraw from the study at any time without providing a reason. To protect the privacy of the individuals and their organizations, all transcripts were anonymized using alphanumeric codes and stored in a secure, encrypted database accessible only to the research team (Shown in Figure 1).

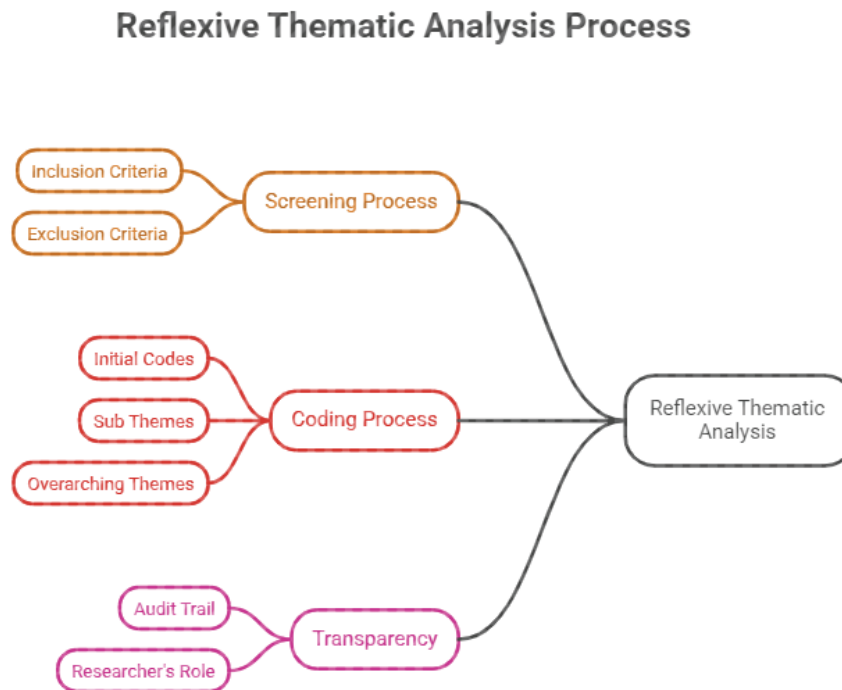
Figure 1. Data Collection Procedures and Ethical Considerations



## 9. Reflexive Thematic Analysis and Transparency

The researcher applied reflexive thematic analysis to interpret the raw data and identify meaningful patterns. The analysis began with a rigorous screening process where specific inclusion and exclusion criteria were applied to the transcripts. For example, the researcher included segments where leaders discussed their long term vision for AI implementation but excluded technical descriptions of software coding that did not relate to organizational leadership. Another example of exclusion involved removing personal anecdotes about general travel experiences that lacked a direct connection to the film tourism business model. This systematic approach ensures that the analysis remains focused on the primary research objectives while maintaining a high level of data integrity. The coding process followed a recursive path from initial data immersion to the final development of themes. The researcher first generated initial codes by highlighting recurring phrases and concepts across the entire dataset. These codes were then clustered into broader sub themes that captured specific dimensions of the leadership experience and process changes. Finally, the researcher refined these sub themes into overarching themes that provide a comprehensive answer to the research questions. This process was documented in a detailed audit trail to ensure transparency and allow for future review. By prioritizing the reflexive role of the researcher, this analysis acknowledges that the findings are an interpreted product of the interaction between the data and the researcher's theoretical lens (Shown in Figure 2).

Figure 2. Reflexive Thematic Analysis

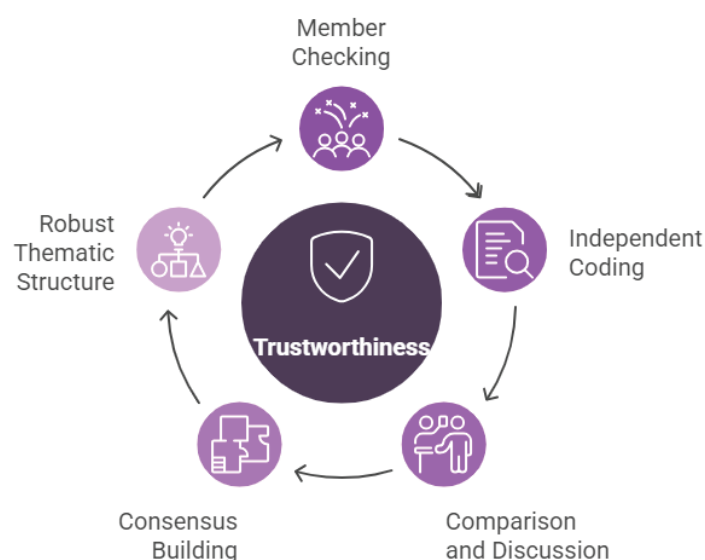


## 10. Trustworthiness and Thematic Validation

To ensure the credibility and dependability of the findings, the study utilized two primary validation techniques. First, the researcher employed member checking by sending the preliminary findings and summary transcripts back to a subset of the participants. This allowed the leaders to verify that the interpretations accurately reflected their original perspectives and professional experiences. Second, an independent researcher who was not involved in the initial data collection performed a blind coding of ten percent of the transcripts. The two researchers then compared their results and discussed any discrepancies until a consensus was reached. This double independent checking process minimizes researcher bias and strengthens the overall robustness of the thematic structure, ensuring that the final conclusions are grounded firmly in the evidence (Shown in Figure 3).

Figure 3. Trustworthiness and Thematic Validation

### Trustworthiness and Thematic Validation Cycle



## 11. Finding

Theme 1: Adaptive Leadership and Cognitive Reskilling in the AI Era. This theme captures the fundamental transformation of leadership identities and practices within the film tourism sector as organizations integrate Generative AI. It reflects a shift from traditional managerial control toward a more dynamic and technologically integrated leadership model. Leaders no longer view themselves as mere administrators but as orchestrators of a hybrid workforce where human creativity and algorithmic efficiency coexist. This transition requires a profound cognitive reskilling that involves moving beyond basic digital literacy to a deeper understanding of how generative models can be used to enhance storytelling and brand positioning. The core of this theme lies in the realization that leadership in an AI driven environment is as much about managing psychological change and cultural alignment as it is about implementing new software solutions. Consequently, the findings suggest that the most effective leaders are those who can synthesize technical possibilities with human centric values to maintain organizational stability during periods of rapid technological disruption.

Theme 2: Structural Convergence and Workflow Synchronicity. This theme examines the fundamental reconstruction of organizational structures and operational processes that occurs when film and tourism sectors converge through Generative AI. It describes a move away from the traditional model where film production and tourism marketing operated as separate and sequential entities. Under the influence of generative technologies, these two industries are beginning to share a unified digital infrastructure that allows for simultaneous content creation and destination promotion. This convergence is characterized by a high degree of workflow synchronicity, where data from film production informs tourism strategies in real time and vice versa. The theme emphasizes that the successful integration of film and tourism is no longer just a marketing strategy but a structural transformation that requires a common language and synchronized operational cycles. This structural shift enables organizations to respond more quickly to market demands and create more cohesive and immersive experiences for consumers who seek to visit the locations they see on the screen.

## 12. Discussion

Cognitive Orchestration and the Rise of Non Human Agency in Leadership. The adaptation of leadership styles within the film tourism sector reflects a profound transition from traditional top down management toward a model of cognitive orchestration. While early frameworks of digital leadership emphasized the necessity of agility and technical vision, they often failed to account for the specific emotional and cultural complexities inherent in cinematic storytelling and destination branding. This study reveals that leaders are navigating the integration of Generative AI not merely as the adoption of a new tool but as the management of a new form of non human agency within their creative teams. This phenomenon of non human agency represents a significant shift where the AI system is treated as an active participant in the decision making process rather than a passive infrastructure. By moving beyond the general digital literacy often highlighted in previous scholarly discourse, these leaders are developing a specialized form of relational intelligence that allows them to mediate between human intuition and algorithmic output. This proactive engagement addresses the earlier critique that leadership models were too focused on general technology adoption by showing how leaders in film tourism must specifically protect artistic integrity while leveraging generative speed. The leadership practice now involves a constant negotiation with this autonomous agent to ensure that the strategic goals of the organization are not lost in the sheer volume of AI generated possibilities. Consequently, the leadership framework has evolved into a facilitative role that balances the unpredictability of generative outputs with the stable requirements of regional branding, thereby filling the gap in understanding how leadership evolves within high stakes cultural industries.

Structural Synchronicity and the Convergence of Digital Ecosystems. The reconstruction of workflows between film production and tourism management signifies a move toward a state of structural synchronicity that traditional linear models could not achieve. Previous research on the film tourism value chain often described a sequential flow where cinematic content preceded tourism marketing, but the introduction of Generative AI has effectively collapsed these temporal and spatial silos. By treating Generative AI as a central node of non human agency that operates across both sectors, organizations are now able to engage in simultaneous content creation and destination promotion. This finding addresses the persistent

problem of structural rigidity and organizational silos that was identified as a major barrier in earlier studies of business process reengineering. The data shows that when film and tourism teams share a unified digital infrastructure powered by generative models, they can synchronize their operational cycles in real time, allowing for a more fluid and responsive brand narrative. This convergence is not merely about technical efficiency but about the creation of a hybrid cultural asset that serves multiple professional purposes from its inception. Unlike previous theoretical models that lacked empirical evidence on sectoral synchronization, this study demonstrates that the presence of an active AI agent forces a common language and a shared data environment upon both industries. Therefore, the workflow is no longer a hand off between separate entities but a collaborative evolution that maximizes the impact of cinematic storytelling on physical travel experiences.

**Ethical Stewardship and the Dilemma of Automated Cultural Representation.** The management of organizational challenges and ethical dilemmas in the AI driven film tourism landscape requires a shift toward a new form of ethical stewardship. While existing literature often frames the tension between automation and creativity as a binary struggle, this research highlights a more complex reality where leaders must manage the moral implications of non human agency in cultural representation. The findings suggest that the primary challenge is not the loss of human control in a general sense but the specific risk of cultural homogenization when generative models are allowed to operate without deep contextual oversight. This study extends the previous debate on artistic authenticity by showing that leaders are now acting as critical editors of AI outputs to ensure that fictionalized narratives do not distort the actual heritage of a destination. By focusing on the ethical dilemmas of AI generated content, this research fills a critical gap where previous organizational studies ignored the potential for the loss of local agency in AI curated experiences. The phenomenon of non human agency introduces a paradox where the efficiency of the algorithm must be constantly restrained by the human need for cultural sensitivity and historical accuracy. Leaders are therefore forced to develop new institutional logics that prioritize the preservation of unique destination identities over the sheer scale of automated marketing. This requires a human centric AI strategy that treats the technology as a partner requiring constant ethical direction, ensuring that the integration of Generative AI enhances rather than diminishes the cultural value of the film tourism experience.

### 13. Contribution and Novelty

The primary theoretical contribution of this study is the introduction of the “Narrative Loom” as a novel conceptual framework for understanding the convergence of film and tourism in the age of artificial intelligence. This concept moves beyond existing scholarship by treating Generative AI not as a mere utility but as a transformative agent that interlaces disparate industrial threads into a unified whole. The Narrative Loom is defined as a multidimensional leadership and operational architecture where generative algorithms function as a connective tissue to synchronize cinematic production, destination marketing, and personalized visitor experiences into a cohesive cultural fabric. This framework addresses the limitations of traditional Digital Leadership by emphasizing the co-constitutive role of non human agency in the professional meaning making process. It also extends Business Process Reengineering theories by replacing the pursuit of linear efficiency with a model of narrative fluidity that allows for the simultaneous evolution of content and strategy. Furthermore, the Narrative Loom enriches the theory of Ethical Stewardship by framing AI as a collaborative partner in the preservation of cultural authenticity rather than a threat to it. By identifying this previously unobserved phenomenon of narrative interlacing, the study provides a robust theoretical bridge that connects cognitive orchestration, structural synchronicity, and ethical oversight. The novelty lies in the shift from viewing film and tourism as separate entities to viewing them as a single, woven ecosystem where the AI agent facilitates a continuous and rhythmic exchange of creative and strategic value across sectoral boundaries.

### 14. Conclusion

This research concludes that the integration of Generative AI into the film tourism sector has fundamentally altered the requirements of leadership and the structure of organizational workflows. The shift toward a more adaptive and technologically fluent leadership style is essential for navigating the complexities of modern content creation and managing the psychological transitions of creative teams. Furthermore, the transition from linear to concurrent workflows enables

a level of cross sectoral synchronization that was previously unattainable through traditional management practices. The findings demonstrate that successful film tourism integration in the AI era depends on the ability of leaders to act as ethical stewards who protect cultural narratives while embracing technological innovation. This study contributes to the broader field of Humanities and Social Sciences by offering a critical lens through which to examine the evolving relationship between human creativity and autonomous digital systems in the production of cultural meaning. By establishing the Narrative Loom as a viable framework, the study provides both scholars and practitioners with the conceptual tools needed to understand and manage the digital transformation of cultural experiences in an increasingly automated world. Ultimately, the research suggests that the future of the creative economy lies in the harmonious orchestration of human intuition and algorithmic agency to create more immersive and authentic narratives.

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The authors declare that there is no conflict of interest regarding the publication of this paper.

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# A Review Study on Technology-Supported Teachers' Epistemological Beliefs

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**Abstract:** Epistemological beliefs refer to an individual's beliefs about the nature of knowledge and the process of knowledge acquisition. The epistemological beliefs held by teachers not only influence their own learning and professional development but also have a significant impact on their teaching objects, namely the learners. Meanwhile, since the widespread adoption of internet technology in the field of education, various advanced technologies have emerged continuously, and contemporary teachers have naturally or inevitably entered the arena of applying information technology to instruction. This situation necessitates researchers' further understanding of teachers' domain-specific epistemological beliefs and their influencing factors. Based on this context, this paper attempts to review relevant domestic and international literature, sort out the research progress and influencing factors concerning technology-supported teachers' epistemological beliefs, and further summarize the developmental trends in this area.

**Keywords:** Epistemological Beliefs; Teachers' Epistemological Beliefs; Information Technology

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## 1. Introduction

Beliefs concerning the nature of knowledge and the process of knowledge acquisition are commonly referred to as epistemological beliefs (Hofer & Pintrich, 1997; Schommer, 1994; Schommer-Aikins, 2004). In early research, scholars associated epistemological beliefs with various activities or elements that reflect learners' metacognitive development, including reading comprehension (Kardash & Scholes, 1996; Schommer, 1990), mathematical problem-solving (Schoenfeld, 2013), engagement with difficult tasks (Dweck & Leggett, 1988; Qian & Alvermann, 1995), and performance across different academic disciplines (Jehng et al., 1993; Schommer & Walker, 1995). Epistemological beliefs pertain to how learners or teachers conceptualize such issues. Since the emergence of this line of inquiry, the research subjects have gradually expanded from students to in-service teachers and pre-service teachers (Chan & Elliott, 2002). With the continuous advancement of emerging technologies, understanding how teachers perceive the nature of knowledge and the process of knowledge acquisition within diverse technological environments—such as the internet, virtual reality, and artificial intelligence—has increasingly become a focal point of research. Concurrently, many scholars have attended to the relationships between teachers' epistemological beliefs and various factors, including self-regulation, critical thinking, teaching conceptions, peer assessment, disciplinary categories, learning performance (Hofer & Pintrich, 1997), and learning strategies (Schommer, Crouse, & Rhodes, 1992; Tsai, 2000). Therefore, as human activities progressively enter a developmental phase centered on information and intelligence, examining how teachers perceive and acquire knowledge within this specific context and arena

has emerged as one of the most critical topics of the present era. Teachers' epistemological beliefs are not only pertinent to their own self-development and classroom performance in this age (Chan & Elliott, 2004; Lawrence, 1992) but also implicate how teachers will influence students' epistemological beliefs, conceptions of learning, metacognition, and related issues of belief and practice (Kang & Wallace, 2005).

Within existing research, various developmental models of epistemological beliefs converge on a trajectory that moves from absolutist epistemological beliefs toward constructivist epistemological beliefs. Stated differently, it is generally posited that learners who hold constructivist epistemological beliefs are capable of engaging in higher-order thinking when approaching knowledge and problems. The structural dimensions of epistemological beliefs reflect the distinction between lower-order and higher-order thinking. Schommer (1994) conceptualized epistemological beliefs as a systematic belief system comprising five dimensions, primarily concerning the certainty of knowledge, the simplicity of knowledge, the absolute authority of knowledge sources, the quick and effortless acquisition of knowledge, and the fixedness of ability. Similarly, Hofer and Pintrich (1997) delineated epistemological beliefs into the dimensions of certainty of knowledge, simplicity of knowledge, absolute authority of knowledge sources, and justification of knowledge. Furthermore, epistemological beliefs are not confined solely to general investigations; they also extend to specific disciplinary backgrounds, distinct cognitive contexts, and varied identities. These include studies on mathematical epistemological beliefs, English language epistemological beliefs, scientific epistemological beliefs, Internet-specific epistemological beliefs, as well as the epistemological beliefs of high school students, middle school students, university students, pre-service teachers, and in-service teachers.

## 2. Current State of Domestic and International Research

Although the study of epistemological beliefs began to emerge as early as the 1950s and 1960s, the clear delineation and categorization of epistemological beliefs did not truly occur until the 1990s. Research on epistemological beliefs within the context of information technology in education, however, approached the turn of the 21st century. For instance, Hartley and Bendixen (2001) emphasized the importance of epistemological beliefs in technology-enhanced learning environments. This was followed by investigations into personal epistemological beliefs within hypermedia and web-supported learning contexts (Bendixen & Hartley, 2003). Subsequently, Hofer (2004) further demonstrated that during web searching activities, learners' think-aloud protocols continued to reveal that personal epistemological beliefs correspond to the four dimensions of certainty of knowledge, simplicity of knowledge, source of knowledge, and justification of knowledge.

Thereafter, based on the foundation of the internet and the integration of various technologies into the educational field, research gradually expanded to encompass technology-supported teacher learning and instruction across diverse technological environments. Consequently, research on teachers' epistemological beliefs can be categorized according to multiple dimensions, including different technologies, different academic disciplines, and relationships with various other constructs.

First, research on teachers' epistemological beliefs has gradually migrated from traditional general investigations toward studies situated in technology-supported classrooms and internet-based environments. Peng et al. (2006) examined the relationship between pre-service teachers' epistemological beliefs and learning outcomes within a case-based hypermedia learning environment, finding a significant but low-level correlation between the two. Concurrently, many scholars have pointed out that teachers' epistemological beliefs in internet environments warrant careful consideration, as the information resources provided by the internet differ fundamentally from those in traditional settings, necessitating an examination of internet-specific epistemological beliefs (Yılmaz & Çakmak, 2016). Internet-specific epistemological beliefs encompass individuals' beliefs regarding the source, accuracy, and structure of information on the internet, as well as the evaluation of such information and its sources (Kılıç Çakmak, Karaoğlu Yılmaz, & Yılmaz, 2015). The most prevalent framework for delineating domain-specific epistemological beliefs in the information age is the Internet-Specific Epistemological Questionnaire (ISEQ) developed by Bråten et al. (2005). This instrument primarily addresses dimensions such as "certainty and source of knowledge," "justification of knowledge," and "structure of knowledge." Its theoretical underpinning is the general model of personal epistemology proposed by Hofer and Pintrich (1997), and it addresses a critical shortcoming of traditional scales by accounting for the specific domain of the internet. Subsequently, many researchers have adapted or revised epistemological belief scales for various technological environments based on this model, or developed instruments such as the Constructivist

Internet-Based Learning Environment Survey (CILES) to understand teachers' epistemological beliefs specific to the internet domain (Chuang & Tsai, 2005; Wen et al., 2004). Mason, Boldrin, and Ariasi (2010) explored epistemological beliefs in web-based environments, developing a scale that conceptualizes beliefs about knowledge (comprising the dimensions of certainty of knowledge and simplicity of knowledge) and beliefs about knowing (comprising the dimensions of source of knowledge and justification of knowledge). Following this, research on epistemological beliefs in internet environments has progressively shifted from scale development toward investigations situated in specific contexts or examinations of relationships with other constructs. For example, Ren et al. (2009), based on the five-dimensional model of epistemological beliefs proposed by Schommer (1990), compared the performance of pre-service teachers in a traditional course versus a course involving the creation of their own textbook on a wiki platform. They found differences between the two groups regarding beliefs about the certainty of knowledge, while no differences were observed in the dimensions of simple knowledge, innate ability, omniscient authority, and quick learning.

Second, the majority of research concerning teachers' epistemological beliefs has concentrated on the domain of science. A substantial body of work has investigated the relationships between science teachers' epistemological beliefs and constructs such as teaching beliefs (Bahcivan, 2014), academic achievement (Stathopoulou & Vosniadou, 2007), achievement goals (Lin & Tsai, 2017), and self-regulation (Muis & Franco, 2009). With the increasing penetration of technologies like the internet, recent studies have also begun to address the relationship between science teachers' epistemological beliefs and digital literacy (Greene et al., 2014; Güneş & Bahçivan, 2018). Furthermore, considerable research exists on the epistemological beliefs of teachers in mathematics and English. For instance, Koponen et al. (2014) examined the epistemological beliefs of Finnish pre-service mathematics teachers, finding that they often view mathematics as a static system and that their beliefs about the goals of mathematics instruction encompass four characteristics: those related to formalism, scheme, process, and application. Ketabi et al. (2014), utilizing the scale developed by Chan and Elliott (2004), surveyed 92 Iranian pre-service English teachers and discovered a tendency toward beliefs in fixed ability and certain knowledge, reflecting support for traditional conceptions in language teaching and learning, with a significant positive relationship observed between these two beliefs.

Third, research has explored the relationships between teachers' epistemological beliefs and constructs pertinent to technological environments such as the internet, including information searching, self-efficacy, and digital literacy. Tsai et al. (2011) investigated the correlation between teachers' online search strategy use and search outcomes with their epistemological beliefs in internet environments. The results indicated that teachers holding more advanced epistemological beliefs about the internet environment were able to employ more sophisticated web search strategies to filter and organize information, and the sophistication of their epistemological beliefs was positively correlated with search outcomes for open-ended questions. Gizem and Ebru (2016) explored whether pre-service teachers' internet-specific epistemological beliefs were influenced by gender differences, finding no such effect but noting an influence based on the teachers' academic department; however, epistemological beliefs did not appear to impact their information search strategies. In another study, Chan (2004) also noted that factors such as age and gender did not affect pre-service teachers' epistemological beliefs. Pre-service teachers in Hong Kong tended to believe that "knowledge is acquired through effort and learning processes rather than being transmitted by authorities or experts, ability is not innate and fixed, and knowledge is not certain and immutable." The cultural context appeared to account for differences between these findings and those reported by Schommer (1990) among North American populations. Furthermore, a significant relationship was found between pre-service teachers' epistemological beliefs and their conceptions of teaching. This finding is echoed in numerous studies examining epistemological beliefs from the learner's perspective, which consistently indicate that learners with constructivist thinking tend to exhibit higher-order thinking compared to those engaged in traditional learning approaches. Although both of the aforementioned studies addressed the relationship between teachers' epistemological beliefs and online information searching, some discrepancies exist. These may stem from underlying differences—such as regional variations, cultural disparities, and disciplinary distinctions—that were not fully controlled for. Consequently, this supports the notion that the relationship between teachers' epistemological beliefs and other constructs is inevitably influenced by factors such as region, culture, and disciplinary nature (Chan, 2010), underscoring the

necessity of providing appropriate support for teachers.

### 3. Potential Future Directions

Although research on technology-supported teachers' epistemological beliefs has yielded a certain number of findings, there remains a relative paucity of studies situated within teaching and learning scenarios involving newer technologies. In particular, when confronting advanced technologies such as virtual reality and artificial intelligence, whether teachers' epistemological beliefs undergo transformation due to the intensity of the technology, or whether they exhibit differences across disciplines and in relation to various constructs compared to traditional or internet-based environments, represents both a significant gap in the literature and a considerable challenge.

First, teachers' epistemological beliefs appear to exhibit characteristics that shift in accordance with the migration across different technological contexts. It is precisely for this reason that specialized instruments, such as the Internet-Specific Epistemological Questionnaire, have been developed. The development or adaptation of epistemological belief scales tailored to diverse technological scenarios, along with the investigation of teachers' and students' epistemological beliefs, students' conceptions of learning, and self-regulation within various technology-supported instructional contexts, constitutes a pressing issue that requires resolution.

Second, current research on teachers' epistemological beliefs predominantly concentrates on disciplines such as science, mathematics, and English. Studies focusing on humanities disciplines with localized or indigenous characteristics, such as Chinese language/literature and history, remain relatively scarce. However, the epistemological beliefs held by teachers in these humanities disciplines inherently appear to differ significantly from those of teachers in science and engineering fields. Within technology-supported teaching environments, these differences may further exacerbate issues related to beliefs about utilizing technology for instruction, thereby influencing teachers' epistemological beliefs.

Finally, given that research on epistemological beliefs has largely centered on how learners perceive and conceive of knowledge, many studies concerning teachers still focus on the specific demographic of pre-service teachers. Consequently, future research should direct attention toward the epistemological beliefs of in-service teachers within humanities disciplines possessing local characteristics and those engaging with advanced technologies. Such research can effectively assist teachers in integrating into technology-mediated teaching environments and can also support teachers in employing technology appropriately and judiciously, rather than misusing or eschewing it.

### 4. Conclusion

By synthesizing the domestic and international scholarship on technology-supported teachers' epistemological beliefs, it is evident that the research subjects within this domain have transitioned from students to pre-service teachers and subsequently to in-service teachers. Furthermore, research themes have progressively moved from general inquiries toward investigations focused on specific domains, such as internet-based technologies or particular academic disciplines. Nonetheless, this body of research is still subject to certain limitations, which are primarily manifested in three aspects.

First, there is a notable lack of research examining teachers' epistemological beliefs in relation to cutting-edge technologies. Although existing studies have thoroughly investigated teachers' epistemological beliefs within internet-based environments, the rapid pace of technological advancement in recent years means that research concerning how virtual reality, artificial intelligence, 5G technology, and similar innovations influence teachers' epistemological beliefs and associated constructs remains underdeveloped.

Second, existing research predominantly centers on the epistemological beliefs of pre-service teachers, with comparatively fewer studies addressing the beliefs of in-service teachers. While both pre-service and in-service teachers belong to the broader category of adult learners, their identity characteristics are demonstrably distinct; pre-service teachers embody a dual identity as both university students and nascent educators. Therefore, further investigation into technology-supported teachers' epistemological beliefs and the mechanisms by which these beliefs influence students' epistemological beliefs remains a key focus and a significant challenge for the field. Multilevel linear modeling may constitute an appropriate methodological approach for such inquiries.

Third, there remains considerable scope for further exploration concerning the relationship between technology-supported teachers' epistemological beliefs and studies of personal epistemology, conceptions of teaching, and conceptions of learning. For instance, the distinctions between epistemological beliefs and personal epistemology, as well as the interconnections between teachers' epistemological beliefs and their conceptions of teaching and learning—or their relationship with students' conceptions of learning—warrant additional investigation.

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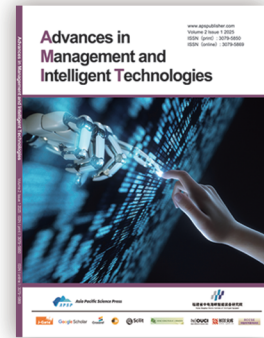
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