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A Study on the Sustainable Development of the Human Resource Supply Chain in China's Domestic Service Education Industry — From the Perspective of Artificial Intelligence

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Abstract

This study investigates sustainable development strategies for the human resource supply chain within China's rapidly transforming domestic service education industry, significantly impacted by artificial intelligence (AI). Driven by demographic shifts, increasing middle-class demand for high-quality services (exceeding 1.5 trillion RMB market size), and supportive policies, the sector faces a critical imbalance. Persistent challenges include severe talent shortages, skill mismatches, an oversupply of low-skilled labor contrasting with high demand for specialized professionals, inefficient traditional training, and high job turnover (42% annually), exacerbated by fragmented management and inadequate social recognition.

To address these systemic issues, this research systematically analyzes the industry's current status, synthesizing insights from demographic data, policy documents, and industry reports. Utilizing a multi-stage methodology involving literature review, expert interviews, and empirical testing, the study proposes innovative AI-driven human resource supply chain management models. These models operate across four key dimensions: First, AI enables precision demand-supply matching through intelligent profiling and regional resource optimization, directly addressing structural imbalances. Second, AI revolutionizes training via personalized skill enhancement using diagnostics, virtual and augmented reality simulations, and automated scoring for standardized certification. Third, AI elevates service quality through IoT-enabled monitoring, sentiment analysis of customer feedback, and preventive service design. Finally, AI fosters comprehensive sustainability by optimizing resource efficiency (e.g., reducing carbon emissions through route planning) and enhancing professional dignity through AI-driven career path navigation and blockchain-integrated rights protection. While acknowledging potential risks like digital divide and data privacy, this study concludes that AI offers a systematic pathway to improve professional skills, service quality, and foster the industry's transition towards a more professional, human-centered, and ecologically friendly sustainable development model.

Keywords: digital transformation, youth leadership, inclusive technology, SMEs, digital policy, Thailand

Introduction

1. The Rise of the Domestic Service Education Industry and Social Demand

In recent years, the rapid rise of China's domestic service education industry has been closely tied to structural social transformation, consumption upgrades, and policy incentives. First and foremost, changes in the country's demographic structure have become a core driving force. According to data from the National Bureau of Statistics of China, by 2023, the population aged 60 and above had reached 280 million, accounting for nearly 20% of the total population. This aging society has led to a sharp increase in demand for professional home care and chronic disease management services. At the same time, the trend toward smaller family sizes (with an average of 2.62 persons per household) and the fact that dual-income households now make up over 70% of families have contributed to the gradual disappearance of the traditional "housewife" role. As a result, child-rearing and domestic tasks urgently require professional external support (National Bureau of Statistics of China, 2023).

Secondly, the expansion of China's middle class and the ongoing consumption upgrade have created a demand for high-quality domestic services. According to the 2023 White Paper on the Development of China's Domestic Service Industry, the market size of China's domestic service sector exceeded 1.5 trillion RMB. Among high-net-worth households, the annual growth rate in demand for "high-end domestic services"—such as family nutritionists and child development consultants—reached 25%. These types of services require workers not only to have basic skills but also to possess cross-disciplinary knowledge (such as psychology, emergency medicine), thus pushing the domestic service education model to evolve from "skill training" to "professionalized education" (White Paper on China's Domestic Service Industry, 2023).

Moreover, policy guidance and industry standardization have also played critical roles. In 2019, the State Council of China issued the Opinions on Promoting the Quality Improvement and Expansion of the Domestic Service Industry ("36 Articles on Domestic Service"), which explicitly called for "supporting vocational colleges in establishing domestic service programs" and advancing the "industry-education integration" model. By 2023, more than 200 vocational institutions nationwide had launched domestic service-related programs, training over 100,000 professionals annually. Additionally, local initiatives such as "Southern Guangdong Domestic Services" and "Zheli Domestic Services" in Zhejiang have accelerated the standardization process by offering training subsidies and establishing credit systems for practitioners (State Council of China, 2019).

However, despite the enormous demand, significant contradictions persist. On one hand, there is an urgent need for high-quality talent; as of 2023, there were approximately 35 million domestic workers in China, but less than 30% held official certifications, and most had only undergone short-term training. On the other hand, societal biases against domestic work continue to exist, causing an imbalance in the talent supply structure. According to the Ministry of Human Resources and Social Security, the job vacancy ratio (number of job openings per job seeker) in the domestic service sector reached 2.5 in 2022, and the shortage of skilled professionals in areas like maternity care and home health management continues to widen (MOHRSS, 2022).

Technological change is further reshaping the industrial landscape. Internet platforms such as "Swan Daojia" and "58 Daojia" use big data to match supply and demand more accurately, while AI technologies are being

applied in areas such as virtual training and competency assessment. For example, a leading enterprise developed an “AI Care Simulation System” that uses interactive scenarios to train workers in emergency response, improving training efficiency by 40%. These innovations not only reduce the costs of talent mismatches but also inject technological momentum into the industry’s sustainable development.

In summary, based on demographic data, policy documents, and industry reports, this study systematically analyzes the social background behind the rise of China’s domestic service education industry and the contradictions between supply and demand. The industry’s growth is both a natural response to social transformation and a result of synergistic forces from policy, market, and technology. In the future, the key to resolving the structural contradiction of “oversupply at the low end and shortages at the high end”lies in reforming the educational system and empowering it with technology. Only then can the industry realize both social value and economic sustainability.

Objectives

Research Objective

This study aims to explore the application pathways of artificial intelligence (AI) in the human resource supply chain of the domestic service education industry and to construct a sustainable development model that balances both efficiency and fairness.

Core Research Questions

A. What are the current contradictions and sustainability challenges in the human resource supply chain of the domestic service education industry?

B. How can AI reshape mechanisms for talent recruitment, training, and retention?

C. How can AI technologies help balance industrial expansion with resource consumption?

Research Methodology

This study adopts a multi-stage research design, structured around four main phases:

1. Literature Review

A comprehensive review of domestic and international literature on topics such as domestic service industry education, training models, and artificial intelligence applications is conducted. The aim is to identify existing research achievements and developmental trends, clarify the theoretical foundations, and establish a research framework to guide the study.

Current Situation Diagnosis

This phase focuses on an in-depth analysis of the existing human resource supply chain within the domestic service education industry. Through telephone interviews with leading domestic service enterprises and training institutions, the objective is to precisely analyze:

1. Recruitment efficiency

2. Training costs

3. Staff turnover rates

By leveraging expert insights and real-world operational data, this diagnostic phase aims to identify systemic pain points and inefficiencies inherent in current practices.

Technical Verification

Following the diagnosis, this phase involves the development and rigorous testing of several AI-based technological interventions designed to address identified challenges. These include:

1. AI-driven skill-position matching model: This model utilizes clustering algorithms and natural language processing (NLP) to accurately align job seekers' competencies with specific job requirements.

2. Virtual training assistant (AI + AR): This system creates a simulated training environment using augmented reality (AR) to replicate realistic scenarios, such as household first aid procedures and comprehensive elderly care.

Case-Based Empirical Testing

The final phase involves a collaborative empirical test with a selected domestic service enterprise group to evaluate the real-world effectiveness of the implemented AI applications. Key performance indicators (KPIs) are rigorously compared both before and after AI integration, focusing on metrics such as:

1. Average training cost per person

2. Client satisfaction rates

3, This study draws its data from crucial sources, including:

4 Industry databases (e.g., the Ministry of Human Resources and Social Security’s platform for domestic workers)

5. Operational data provided by the participating enterprises

Conclusions and Recommendations

Research Summary: Sustainable Development of HR Supply Chain in China's Service Education Industry - From an AI Perspective This research, titled "Study on Sustainable Development of Human Resource Supply Chain in China's Service Education Industry – From an Artificial Intelligence Perspective," aims to explore and develop a sustainable development model for human resource supply chains in China's service education industry. The study emphasizes the application of Artificial Intelligence (AI) to achieve a balance between efficiency and equity in this rapidly evolving sector. The research analyzes the current situation of an industry facing unprecedented transformation driven by several key factors. These driving forces include demographic structural changes such as an aging society and shrinking household sizes, rising quality demands from the middle class for superior services, and supportive policies from the government sector. These factors have created both opportunities and challenges for the service education industry in China. Despite the expansion of China's service market to over 1.5 trillion yuan in 2023, significant structural problems persist within the industry. These challenges include a shortage of skilled personnel with specialized expertise, inefficient training systems that fail to meet industry needs, exceptionally high employee turnover rates averaging 42% annually, insufficient social security

coverage for workers, and fragmented organizational management systems. These interconnected issues have created a vicious cycle that negatively impacts both service quality and the professional image of the industry.

To address these multifaceted challenges, the research proposes a new AI-driven human resource supply chain management model encompassing four main dimensions. The first dimension focuses on precise demand and supply matching, where AI utilizes Natural Language Processing (NLP) to analyze employer requirements and employee skill databases for efficient job matching. This approach incorporates Geographic Information Systems (GIS) and demand forecasting to optimize regional resource allocation, while creating flexible workforce systems to respond effectively to market volatility. The second dimension emphasizes training innovation through AI-powered solutions. AI helps create personalized skill development programs by diagnosing individual learner weaknesses and developing customized learning plans. The model integrates Virtual Reality (VR) and Augmented Reality (AR) technologies to simulate complex training scenarios, thereby reducing costs and risks while enhancing learning effectiveness. Additionally, automated AI scoring systems are implemented for standardization certification and quality monitoring, ensuring consistent training outcomes across the industry. The third dimension concentrates on service quality enhancement by transforming reactive responses into proactive optimization strategies. This involves using Internet of Things (IoT) and AI for real-time service quality monitoring, conducting deep customer experience analysis through sentiment analysis, and designing preventive services that adapt to household health data. This comprehensive approach aims to transform domestic services into holistic health management systems, significantly elevating the value proposition of the industry. The fourth dimension addresses sustainability enhancement through AI-driven resource efficiency and environmental transition initiatives. AI contributes to optimizing scheduling and route planning to reduce carbon emissions, promoting paperless operations, and supporting environmentally friendly business practices. Furthermore, the model helps elevate professional dignity and social participation through AI-driven career pathways and transparent rights protection via blockchain technology integration, creating a more sustainable and socially responsible industry ecosystem.

However, the research acknowledges several challenges and limitations associated with this technological transformation. Key concerns include the risk of over-reliance on technology, which may lead to digital divides and exclude certain populations from accessing services or employment opportunities. Additionally, there is a critical need for strict data management and privacy protection in compliance with evolving legal regulations, particularly given the sensitive nature of personal and health information involved in service provision. In conclusion, AI serves not merely as a tool but as a strategic mechanism for restructuring the value chain of the domestic service industry. The proposed model aims to elevate the industry toward greater professionalization, humanization, and environmental sustainability. By emphasizing a "human-centered" approach as the foundation for all technological implementations, this research framework seeks to achieve genuine sustainability that balances technological advancement with human welfare, social equity, and environmental responsibility. This comprehensive approach represents a paradigm shift that could transform China's service education industry into a model of sustainable development for other emerging economies to follow.

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