

Impact of Artificial Intelligence on Development of Enterprise Management: A Bibliometric Analysis

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Abstract. The development of artificial intelligence (AI) is reshaping the landscape of enterprise management. To cope with this transformation, it is imperative to delve deeply into the logical mechanisms between AI application and management practices. This research aims to analyze studies dedicated to the impact of AI on development of enterprise human resource management, supply chain management, financial management, and operational decision-making. This research leverages bibliometric analysis of Scopus and Web of science data using tools like VOSviewer and Zotero to explore evolutionary-chronological, contextual scientific, and geographical of AI technology driven enterprise management development. In total, 2201 documents on AI driven enterprise management from 2014 to 2024 were analyzed. Publications on AI and enterprise management have grown rapidly since 2022. Research mainly focused on Data Decision Making, AI models, AI management, AI health, AI networks, AI energy, and AI innovation (89.87% of the total studies). The findings contribute to the understanding of the role of AI technology applications (enhancing transparency and satisfaction in human resources management, promoting human-machine collaboration in supply chain management, enabling intelligent automatic processes in financial management, and advancing model-based, supervised decision-making). It underscores the need for future research on practical implementations and ethical considerations of AI application.

1 Introduction

Transformation of the application of artificial intelligence (AI) technology is the core engine for enterprises to improve management quality, and also the core engine for achieving major strategic breakthroughs of enterprises and deepen the transformation towards intelligence of enterprises. Although there has been research in the field of AI technology driven enterprise management, however, the existing studies limited to a specific perspective. The systematic organization and integration of enterprise management driven by AI have not yet been carried out. This research aims to analyze studies dedicated to the impact of AI on development of enterprise human resource, enterprise supply chain, enterprise financial, and enterprise operational decision-making management. With "artificial intelligence" as the drive and "enterprise management development" as the core, it will be explored the role of AI technology in driving enterprise management.

2 Literature review

AI technology's impact on enterprise human resource management development. AI technology is both a challenge and a change in human resource management. The drive of AI technology reduced the labor positions without technical threshold, increased the labor

positions with high technical content, and the salary of the positions with high labor force was better [1]. Also the application of AI technology has driven the demand for AI talents in enterprises [2]. It should be noted that the application of AI in the workplace will replace most people, but it cannot be completely replaced. So, it involves the coexistence of workers and AI. Workers need sustained skills upgrading and retraining to accommodate the AI-dominated work environment. At the same time, the coexistence of AI and workers requires a combination of technical, social and conceptual skills [3]. In the AI-driven changes in the global labor market, human resources remain a key factor in determining labor productivity. AI-driven intelligence complements human resources and improves efficiency. The synergy of AI and human resources is the key to improving productivity [4].

The application of AI technology plays a role in two aspects: on the one hand, it directly enhances organizational performance, and on the other hand, it indirectly drives the overall performance of the enterprise by improving employee productivity. There is a significant positive correlation between employee productivity and organizational performance in the AI environment. [5]. The research also found that verifying effective leadership with the support of AI can have a buff effect on team performance. AI empowers employee training has a strong positive correlation to

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team performance [6]. So, the AI is used in enterprise professional development and talent management, namely in recruitment process, organizing training and skills training, personalized demand development, talent dynamic prediction, and predicting labor skills development needs [7]. AI is being widely used in distributed systems, and the application direction of AI system is mostly transparent, privacy and security. But strict ethical norms need to be established to ensure the fairness of AI decision-making process [8].

AI technology's impact on enterprise supply chain management development. The application of AI technology drives the supply chain reform, conducts research from three dimensions: platform reconstruction, ecological reconstruction and advantage reconstruction, and discusses the empowerment, implementation and challenge of AI technology to the supply chain. It is supposed that the future supply chain management will realize intelligent transition in three aspects: ecological competition and cooperation, technology adoption behavior and technology governance [9]. By applying AI optimization frameworks, enterprises can benefit from three key dimensions simultaneously: improving operational efficiency, promoting sustainable development, and reducing environmental impact [10].

AI technology brings dual value to supply chain management in terms of both theory and application, enhancing the transparency and credibility of data-driven decision-making processes for enterprises. Integrating AI into supply chain management promotes the development of a more intelligent and transparent supply chain decision-making system, provides a systematic analysis, enhances the data analysis ability, improves the accuracy of decision-making, optimizes supply chain risk management, resource deployment and time prediction to improve the achievement rate of projects [11]. AI technology can meet the future challenges of the supply chain, but network security and infrastructure construction must be strengthened [12].

Adoption of AI technology helps enterprises to provide a comprehensive perspective for the technical upgrade of supply chain management, using AI, RFID, VANETs, IoT, blockchain technology to help enterprises, and improve the flexible and sustainability of the supply chain [13]. The combination of AI and IoT technology provides optimization solutions for Intelligent supply chain system and improves the intelligent level of logistics management for enterprises [14]. It should be noted that Sustainable Supply Chain framework from the perspective of digital economy and information management mainly considers three parts: the advantages of each stage of the supply chain, the empowering effect and sustainable value of AI [15].

The AI-driven supply chain can continuously improve the intelligence, but it is still unrealistic to completely replace human beings. Human-machine collaboration constitutes the core driving force for the evolution of future supply chains [16], where AI processes all tasks in the supply chain to reduce human error. The active learning nature of AI can promote the supply chain to adapt to market changes in time and be sustainable.

AI technology's impact on enterprise financial management development. AI technology drives the transformation of financial accounting from traditional management to intelligent management [17]. Collaborative embedding of digital technology and intelligent technology is fundamentally reshaping the industry practices and disciplinary system of modern accounting. These technologies promote enterprises to build the theoretical framework of intelligent finance, improve the intelligent financial system, and realize the intelligent symbiotic development of financial digital economy [18].

AI technology can improve data analysis capabilities, support corporate financial risk monitoring and reduce them, and improve financial transparency and management efficiency [19]. So, the application of AI and deep learning technology has made it possible to conduct real-time monitoring and forward-looking early warning of financial risks. The AI can help to improve the data governance capacity of the financial industry and improve the efficiency of financial decision-making and enterprise financial management [20]. The application of AI has effectively improved both the speed of data transformation and the accuracy of judgment in enterprise auditing [21].

Generated AI is one of the most important influences driving the financial management change. There are a lot of applications, platforms, models, and infrastructures of generative AI, which development promotes the construction of a large-scale model system for financial management is promoted [22]. AI technology in enterprise financial management main applications include automatic reconciliation that can improve the efficiency of data processing and reduce mistakes, intelligent report form with automatic analysis of financial data to improve the accuracy; Big data risk management and machine autonomous learning to predict potential financial risk. Using AI technology helps to solve many financial data problems, budget analysis and statistics, optimization of the structure of financial assets, to maximize the financial benefits. It is possible through the financial office process, the implementation of financial compliance management [17]. The application of AI in financial function can enhance the transparency and credibility of financial affairs.

AI technology's impact on enterprise operation decisions. AI is profoundly changing business process management of enterprise through driving the decision-making from informatization to intelligence [23]. AI technology can improve business operational efficiency through Industry 4.0 [24]. Continuous breakthroughs in cutting-edge technologies, managers must have the ability of remote management and digital communication [25]. AI-driven data mining can improve the manufacturing production efficiency and resource utilization. Adopting the AI-enhanced information management method can help organizations manage information flow more effectively and improve decision-making efficiency [26]. It should be noted that the choice of data sources has a direct impact on AI learning outcomes, especially in social robots and automated decision-making systems [27].

The future intelligent manufacturing will adopt human-machine collaboration optimization decision-making system. Group decision-making with AI participation may improve efficiency but may also amplify group bias. Attention should be on "interpretability" and "accountability attribution" to ensure that the existence of AI is to support decision-making, rather than replace human judgment [28]. Intelligent organizations should ensure the transparency and responsibility of AI and always maintain the human dominant position in the decision-making process, namely, give human beings the final decision right in human-machine collaboration, provide support for the long-term stable development of the organization. And ethical aspects should give priority over logical optimal solutions to promote social acceptance and fairness [29]. The core traits that humans should retain in the AI era are participate in AI decisions, ensure the interpretability of the decision-making, and constantly critically examine the application of AI.

To sum, there is transformation from traditional management to AI-driven intelligent management in enterprises which requires the human-machine collaboration. AI technology has become a pivotal force driving the intelligent management of enterprise human resources, optimization of supply chains, financial innovation, and operational decision-making. The application of AI technologies is transforming the enterprise management system: human resource management is acquiring features of increased transparency, fairness and productivity; supply chain management is characterized by increased human-machine interaction and helps ensure sustainability; financial management is developing in the direction of automation and intellectualization of processes; the process of making management decisions is increasingly based on intelligent models while maintaining human control.

3 Methods and materials

The methodological framework of bibliometric analysis includes four stages (Figure 1). This study selected two databases, Scopus and Web of Science. Research period was from 2014 to 2024. VOSviewer version 1.6.20, Zotero, Microsoft Excel software were used for data processing, analysis, and visualization.

In the first stage of the research, there were used the keywords such as "artificial intelligence", "management", and "driven". Article language was unrestricted. In the second stage of the research, with keywords "artificial intelligence" and "management" 7782 documents were collected in the Scopus database and 3816 documents - in the Web of Science database. In Scopus database 6135 documents were collected under the categories of "artificial intelligence", "management", and "driver", and 785 documents - in the Web of Science database. Finally, 2113 articles were collected in the Scopus database and 504 articles in the Web of Science database. The collected article data was merged using Zotero. After the merging, there was removed withdrawn articles and duplicate articles, and

finally 2201 articles selected. In the third stage of the research, the collected files were visualized and analyzed. They are considered by year, title, scientific field, country, and keywords.

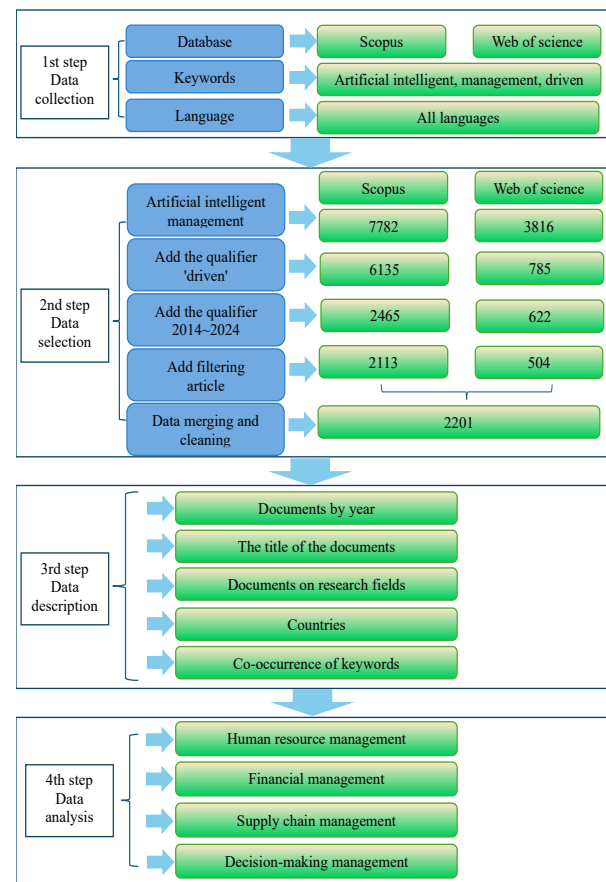


Fig. 1. Research framework

However, this study still has certain limitations. Firstly, in terms of literature sources, the search scope was limited to two major databases, Scopus and Web of Science, excluding other academic databases, which may lead to omissions in certain key literature. Secondly, in terms of keyword selection, although terms such as "digital transformation" and "intelligence" are widely used in different contexts, this study mainly focuses on the core term "artificial intelligence", considering it more relevant to the research topic of enterprise management. Finally, this review only included academic papers and excluded books, reviews, and conference papers, which may have resulted in insufficient coverage of certain viewpoints. Overall, this study only represents a small portion.

4 Analysis and Discussion

AI-driven management has attracted much attention and become a hot field in recent years. By searching the Scopus and Web of Science databases, a total of 2,201 literatures focusing on AI and management as research themes published between 2014 and 2024 were obtained. The last six years showed a rapid growth trend, about 10 times, and reached a peak in 2024 (Figure 2).

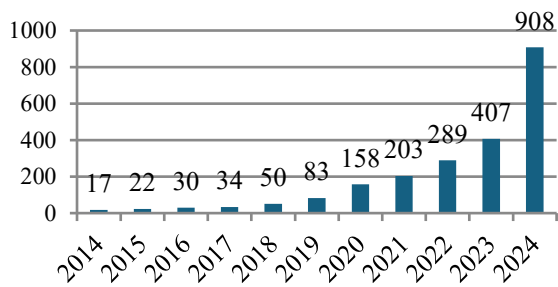


Fig. 2. Related literature on AI-driven management in Scopus and Web of science databases from 2014 to 2024

In the field of AI research, China leads the world in total paper publications, reaching 573, followed by the United States with 235 publications (Table 1). Research suggests that there is a positive correlation between the number of publications and the size of the economy and the total population. In addition, leading countries often have high global innovation indices and high-level publications. Therefore, the deep application of AI is a positive factor in promoting economic development.

Table 1. Number of publications by countries (top 10)

Number	Country	Number of publications
1	China	573
2	United States	235
3	India	184
4	Italy	97
5	Germany	84
6	United Kingdom	81
7	South Korea	67
8	Spain	63
9	Australia	52
10	Saudi Arabia	52

The network of clusters of research papers (Figure 3) shows that there are 5 clusters of papers on AI and enterprise management, each with its own vector.

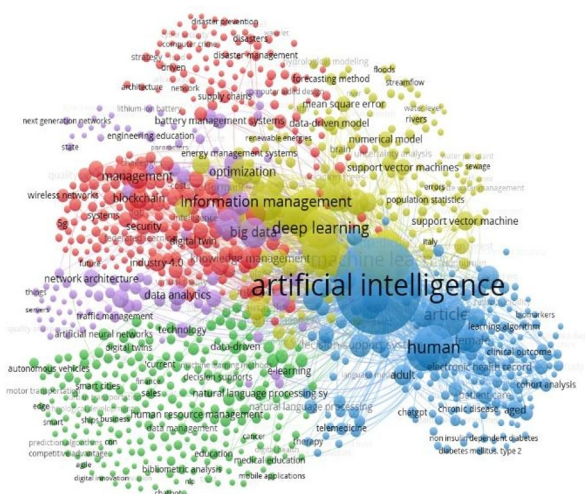


Fig. 3. Research hotspot relationship diagram

The red section highlights the role of AI in system optimization, management processes, and the importance of efficient information processing in decision-making. The green section reflects the application of AI in processing, interpreting, and

extracting insights from large datasets. Data analysis is the core function of AI in understanding patterns, making predictions, and solving complex problems in industries such as healthcare, finance, and marketing. The yellow section highlights the ability of AI to use machine learning techniques, algorithms represented by deep learning, neural networks, and support vector machines. The blue section focuses on how AI systems collaborate with human agents, their impact on human factors, and their role in automated tasks. The violet section highlights the role of AI in improving network systems and infrastructure.

There are 10 main categories of research related AI (Figure 4). The top seven research directions are "AI and Data Decision Making", "AI and Models", "AI and Management", "AI and Healthcare", "AI and Networks", "AI and Energy", and "AI and Innovation" that accounted for 89.9% of the total literature.

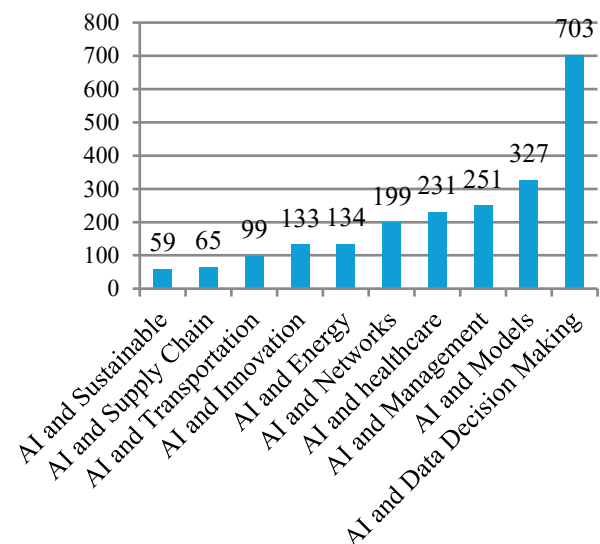


Fig. 4. Main categories of research related AI

Among them, "AI and Data Decision Making" research direction (31.9% of the total literature) focuses more on big data, management and decision support system and using data and AI analysis as a means to enhance decision-making quality. "AI and Models" research direction (14.9% of the total literature) studies the construction and prediction of data models and aims to pass the data analysis and prediction accuracy. "AI and Management" research direction (11.4% of the total literature) dedicated to the deep integration of AI and management practices research and using AI technology to optimize management and business processes. "AI and healthcare" research direction (10.5% of the total literature) focuses on the optimization of nursing and clinical medicine, and studies how to improve medical service and patient satisfaction. "AI and Networks" research direction (9% of the total literature) focuses on network and Internet of Things computing technology, and studies edge computing and network optimization.

Research on AI-driven enterprise digital transformation and management primarily focuses on the following 7 major themes: enterprise models based

on data, organizational change, marketing, collaboration mechanisms, operations management, ecosystem construction, and innovative practices. The integration of AI has injected new possibilities into the study of innovation management: generation of AI technology and innovation types; evolution of technology and design guided by AI technology; cultural creativity and innovation; intellectual property innovation; product innovation; innovation model and achievements; new ecology driven by AI technology; monitoring and management of AI technology; unreasonable use of AI technology; organization and technology scope driven by AI technology [30]. AI drives decision management and summarizes 5 research directions: intrinsic mechanisms of decision management systems, model building and self-learning of decision systems, interactive evolution mechanisms of decision ecosystems, methods for extracting, discovering, and deducing decision knowledge, and theories and methods for decision reasoning and verification [23]. The future of the enterprise will be a highly interconnected data-driven environment, and the core of its activity is data management, transparency, security, and technology infrastructure construction [31]. Human participation remains the key to improving the efficiency and flexibility of the manufacturing system, especially in automated systems [32]. So, Ye et al. (2022) proposed the concept of parallel cognition, which simulates, predicts and guides human behaviour through AI technology [33]. Especially in complex engineering and social systems, it can significantly enhance the intelligence level of the system and human-machine collaboration efficiency. Thus, there appeared new research directions of AI-driven management.

Thus, data shows that after 2020, the number of publications has continued to rise, rapidly growing since 2022. According to the statistics of the first author's country of work, China, United States, India, Italy, Germany, and United Kingdom accounted for 57.0% of the total volume of publications and made the main contribution. At the same time, it was found that gross domestic product and population size are important positive factors that influence the number of publications in a country. The main themes of the article are focused on "AI and Data Decision Making", "AI and Models", "AI and Management", "AI and Health", "AI and Networks", "AI and Energy", and "AI and Innovation". The practical applications of these research directions and their relevance to enterprise management mainly focus on human resource, supply chain, financial, and operational decision-making.

5 Conclusions

Research indicates that AI technology has become the primary driving force for the current development of enterprise management.

The quantitative analysis found that the impact of AI technology on enterprise management is primarily manifested in four key areas: human resources, supply chain, finance, and operational decision-making. In addition, research has found that under the background

of the application of AI technology, human resource management is developing towards information transparency, fairness, and emphasis on employee satisfaction. Supply chain management is developing towards human-machine collaboration and supply chain flattening. Financial management is moving towards intelligence and unmanned development. Operational decision-making is evolving towards intelligent model computation and manual supervision.

Bibliometric analysis shows that publications on AI and enterprise management have grown rapidly since 2022. Research mainly focused on Data Decision Making, AI models, AI management, AI health, AI networks, AI energy, and AI innovation. China, the United States, India are leaders committed to driving enterprise management with AI technology. These countries rank among the top in the Global Innovation Index. In addition, research has found that scientists attach great importance to the analysis of AI technology in practical applications, to create and understand the essence and patterns of new technologies and phenomena and promote the application of AI technology in enterprises.

This article finds that these four aspects have a common feature: AI and human collaboration are the core issues of enterprises introducing AI management. Based on the above multi-dimensional analysis and comprehensive considerations, the research on the application of AI to enterprises will mainly focus on how to gradually or infinitely approach AI to the laws of human thinking. Although AI cannot completely replace humans, there are laws to follow for the development of humans and individuals. AI can use its inherent advantages to learn and imitate the laws of human society and personal biological laws. Gradually approaching biological humans will be the mainstream trend of the development of AI to resolve the contradiction between AI and humans.

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