Information and Knowledge Management (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/infkm.2025.060118
ISSN 2523-5893 Vol. 6 Num. 1

Research on the Balancing Mechanism of Enterprise Knowledge Exploration and Utilization with the Aid of AI

Baolin Tan[1]

[1]*School of Business Administration, Guizhou University of Finance and Economics, Guiyang, Guizhou, 550025, China*

Keywords: Artificial Intelligence, Knowledge Exploration, Knowledge Exploitation, Organizational Ambidexterity, Knowledge Management

Abstract: With the rapid development of information technology, artificial intelligence is more important in the transformation and innovation of enterprise knowledge management. By combing the relevant theoretical foundations and the support mechanism of AI technology for organizational ambidexterity, this paper finds that AI not only enhances the dynamic ability of enterprises in terms of data perception, knowledge integration and collaboration, but also enables enterprises to have a dynamic balance between knowledge exploration and utilization in an uncertain environment by constructing a support mechanism at the cognitive, structural and behavioral levels. At the same time, this paper points out the problems of scattered research frameworks and single methodological paths. This paper systematically analyzes the role of AI on the ambidexterity of organizational knowledge, and also provides a theoretical basis and practical enlightenment for enterprises to formulate the integration scheme of AI and knowledge strategy.

1. Introduction

With the continuous development of science and technology, the level of digitalization in the world is gradually increasing, resulting in an increasingly complex and dynamic market environment for all enterprises. Artificial intelligence(AI) is at the heart of this digital transformation, and it is continuing to change the way organizations acquire, manage, and innovate knowledge. AI technologies such as natural language processing, machine learning, and semantic recognition have provided organizations with more accurate and efficient knowledge processing capabilities[1], thus reshaping innovation models and decision-making logic. Knowledge exploration and knowledge utilization are the two basic paths of organizational learning and innovation [2]. Knowledge exploration emphasizes the acquisition of new knowledge and the development of experimental activities, while knowledge utilization focuses on the refinement and reuse of existing knowledge. Balancing these two pathways is important for companies to gain a competitive advantage[3]. The equilibrium of the two paths is known as organizational ambidexterity. Organizational ambidexterity requires an understanding of the complex mechanisms of organizational strategy, structure, and culture[4][5].

In recent years, there has been an increasing focus on the role of AI in achieving organizational ambidexterity. First, AI tools enhance the efficiency and depth of external knowledge searches, which fosters exploratory innovation. Second, on the other hand, AI systems also play a significant role in

optimizing existing processes, accelerating product iterations, and facilitating knowledge reuse. For example, transformational projects on AI can improve decision-making accuracy, operational efficiency, and strategic fit, and ultimately significantly enhance business performance[6]. As another example, companies can scale AI capabilities through co-evolution processes and feedback mechanisms[7], ultimately enabling enterprises to innovate their business models through improved data infrastructure, algorithm development, and organization-wide AI adoption.

However, current research has focused either on knowledge exploration or knowledge utilization, without a balanced relationship between the two. So, The purpose of this paper is to provide a systematic literature review on how AI can promote enterprises to achieve a dynamic balance between knowledge exploration and utilization. This study integrates theories in the fields of knowledge management, organizational learning, and AI applications, and then constructs a multi-dimensional analytical framework that covers the perspectives of technology, organization, and capabilities. The purpose of this paper is to understand the organizational ambidexterity supported by AI, and to provide theoretical basis and strategic suggestions for future theoretical research and practical application.

2. Theoretical Foundations and Key Concepts

The content of knowledge activities within the organization can be divided into two aspects: knowledge exploration and knowledge utilization. In 1991, March was the first to distinguish between the two, noting that knowledge exploration emphasizes innovation, experimentation, and change, while knowledge utilization focuses on efficiency, execution, and improvement. Currently, the academic community is concerned with how organizations allocate resources in practice to balance both in order to achieve sustained competitive advantage.

The application of AI provides more efficient assistance in helping organizations to carry out knowledge activities. First, AI can help organizations identify potential market needs and cutting-edge trends more quickly through large-scale semantic analysis and data mining in knowledge exploration[8]. For example, AI can help companies identify the hidden needs of customers in social media, and AI can predict the path of industry technology development, which can lead to exploratory research and development for companies. On the other hand, AI uses process automation, decision optimization, and knowledge retrieval to improve the efficiency of the transformation of existing knowledge assets in the organization. Second, AI-driven expert systems can structure and embed the experience and knowledge of technicians into business processes, allowing organizations to achieve standardized replication and knowledge accumulation [6]. Third, the AI system itself has a “learn-re-application” cycle logic, and its continuous optimization mechanism makes the organization's knowledge utilization no longer one-way, but forms a feedback-driven reinforcement process[1]. This mechanism not only improves the efficiency of the organization's knowledge utilization, but also provides more data foundation for enterprise exploration. Finally, AI has the potential to serve as a bridge between knowledge exploration and knowledge utilization, opening up the knowledge flow and feedback mechanism between the two. For example, AI-infused recommendation systems can incorporate user behavior data early in project development, allowing organizations to achieve the convergence of exploration-oriented design and utilization-oriented decision-making[7]. This coupling mechanism brings a new ambidextrous implementation path for organizations, that is, AI dynamically allocates resources and adjusts the support for knowledge exploration and utilization in real time. Therefore, AI not only enhances the ability of knowledge exploration and knowledge utilization, but also becomes a connector between the two, enabling organizations to more effectively achieve knowledge ambidextrous management in a dynamic environment.

3. AI-Driven Innovation Paths and Their Impact on Knowledge Exploration and Exploitation

The development of AI has brought about a seismic shift for businesses, with the advent of AI not only changing the way organizations acquire and utilize knowledge, but also reshaping the dynamic balance between knowledge exploration and utilization[2]. The integration of AI has transformed the innovation process away from traditional experience-driven and into the use of algorithmic models and real-time data analysis. This transformation plays a different role in the two levels of knowledge exploration and knowledge utilization.

First, in terms of knowledge exploration, AI technologies such as natural language processing, machine learning, and semantic search have significantly expanded the scope for organizations to access external knowledge[1]. For example, AI can help R&D teams uncover potential cutting-edge trends in a vast database of academics and technologies, which can spur exploratory innovation in organizations. Second, AI can promote knowledge-based innovation in terms of resource reallocation and business model transformation. AI-driven process reengineering and data analytics can improve operational efficiency and knowledge conversion rates[6]. Enterprises rely on co-evolutionary processes and feedback loops to promote the large-scale deployment of AI, and summarized three types of core AI capabilities[7]. First, data capability(data pipeline) readiness refers to the continuous collection and integration of structured and unstructured data. Second, algorithmic capability (algorithm development) refers to the continuous collection and integration of structured and unstructured data. Finally, organizational absorptive capacity(AI democratization) refers to embedding AI tools into cross-functional teams to improve innovation responsiveness. These capabilities enable enterprises to build customer-centric, data-driven business models through continuous iterative optimization, thereby enhancing the organization's resilience and innovation in uncertain environments. Third, AI also acts as a “regulator and bridge” between knowledge exploration and knowledge utilization. According to organizational ambidexterity framework, the synergistic relationship between knowledge exploration and knowledge utilization depends on structural, situational, or temporal series integration mechanisms[9]. In this context, AI technology has become a key tool to improve organizational awareness and dynamic resource allocation capabilities.

In summary, AI not only independently facilitates both exploratory and exploitative innovation but, more importantly, acts as a systemic coordinator between the two, enhancing dynamic capabilities and enabling enterprises to build sustainable innovation advantages. To synthesize the scholarly contributions discussed above, the following Table 1 provides a comparative summary of key literature on how AI supports different types of innovation:

Table 1 Summary of Literature on AI's Role in Supporting Innovation through Knowledge Exploration and Exploitation

Type of Innovation	Author(s) & Year	Benefits of AI Support
Exploration-driven	March (1991); Dwivedi et al. (2021)	Broader knowledge access, trend discovery, innovation diversity
Exploitation-driven	Wamba-Taguimdje et al. (2020); Sjödin et al. (2021)	Process efficiency, user experience, product iteration
Balancing mechanisms	Raisch & Birkinshaw (2008)	Dynamic resource allocation, organizational learning, ambidexterity support

Note: The information is derived from the author's summary of the relevant literature.

4. Framework Construction of the Balancing Mechanism Empowered by AI

Organizational ambidexterity refers to the ability of a firm to actively explore future growth opportunities while maintaining current operational efficiency[4]. Business managers have long been faced with the problem of how to strike a balance between knowledge exploration and utilization. With the development of AI, organizations have more technical conditions and capabilities to coordinate the entire organization.

First, AI can enhance the cognitive ambidextrous capabilities of enterprises. Organizations need to make trade-offs between structural ambidexterity and situational ambidexterity[5]. AI systems enhance the organization's perception of multiple knowledge activities through data integration and real-time analysis, allowing the organization to more flexibly identify whether to focus on knowledge exploration or knowledge utilization in a specific context[10]. For example, AI-based decision support systems can monitor market feedback, R&D progress, and knowledge flow in real time, providing managers with dynamic strategic adjustment capabilities. Second, AI also supports the redesign of organizational structures and processes, so that organizations can build operating platforms that promote ambidexterity. The "Enterprise AI Canvas" to help organizations identify AI application scenarios[11], reshape decision-making processes, and promote cross-departmental collaboration, so that enterprises can realize the organic combination of knowledge exploration and knowledge utilization activities. Third, AI can also facilitate individual ambidexterity at the micro level. Collaborative learning between humans and AI systems can improve the ability of individuals in knowledge generation and reuse, which is known as "Reciprocal Human-Machine Learning" (RHML)[12]. Then, when using AI tools, employees can simultaneously generate and reuse knowledge to achieve ambidextrous at the individual level. Finally, the process visualization and feedback mechanism brought by AI also make ambidextrous management more controllable. The importance of implementing generative AI governance frameworks in enterprises is evident, as they provide specific governance mechanisms to help organizations effectively utilize AI technology while ensuring security and compliance, thereby achieving "agile ambidexterity"[13]. Therefore, AI not only builds the basic capabilities of knowledge activities for enterprises at the technical level, but also empowers organizations to achieve ambidexterity at the cognitive, structural, and individual levels.

5. Empirical Research Review on the Impact of AI Applications on Knowledge Management Performance

With the deepening integration of artificial intelligence (AI) into enterprise knowledge management (KM) systems, an increasing number of empirical studies have investigated its concrete impact on knowledge exploration, knowledge exploitation, and overall organizational performance. These studies typically evaluate the measurable outcomes of AI-empowered KM from the perspectives of business operations, employee behavior, and innovation output.

Regarding knowledge exploration and innovation capabilities, empirical studies demonstrate significant impacts. Based on panel data from China's manufacturing industry, AI technology has significantly improved the innovation capability of organizations by accelerating knowledge creation and technology spillover[14]. Specifically, AI facilitates the rapid accumulation and dissemination of knowledge, improving firms' absorptive and learning capabilities, which in turn drives technological innovation. In terms of knowledge utilization and organizational performance, research findings indicate strong correlations. Big data analytics capabilities (BDAC) are critical enablers of knowledge utilization performance. Their study revealed that BDAC[15], via dynamic capabilities, improve firms' operational efficiency and responsiveness, thus reinforcing competitive advantage. Concerning AI and knowledge integration capabilities, cross-cultural studies reveal important differences. While Chinese firms prioritize speed and efficiency in AI adoption, German firms emphasize precision and

reliability[16]. Cultural background was shown to have a significant influence on the effectiveness of AI in KM practices. With respect to contextual dependence and performance variability, evidence shows context-dependent effects. The impact of AI on KM performance is context-dependent[17]. AI-driven knowledge sharing and organizational learning were found to significantly improve job performance, but the effects were moderated by factors such as organizational support and employee skills. The study also highlighted that mismatches between AI deployment and knowledge governance mechanisms could negatively affect outcomes.

In summary, current empirical studies offer a multidimensional understanding of how AI influences KM performance. They reveal adaptation mechanisms and performance variability across different organizational contexts, providing theoretical grounding and managerial insights for strategic AI deployment.

6. Research Outlook

Although current research has yielded a series of theoretical and empirical insights into the role of AI in balancing knowledge exploration and exploitation in organizations, several important gaps and directions remain for future inquiry.

First, in terms of research perspective, most existing studies emphasize a linear relationship between technology deployment and organizational performance, with limited attention to the dynamic evolution of knowledge strategies under the influence of AI. Future research should adopt longitudinal data and process-based approaches to examine how AI drives phased shifts and synergies in knowledge exploration and exploitation strategies[18]. Especially in highly uncertain and rapidly changing environments, whether AI can enhance the strategic resilience of knowledge initiatives remains an open question.

Second, regarding methodological dimensions, current research is heavily skewed toward quantitative analyses, lacking in-depth case studies and interaction mechanism deconstruction. Future studies could adopt multi-case comparative methods or embedded longitudinal interviews to uncover differentiated mechanisms through which platform, manufacturing, or service firms achieve knowledge ambidexterity with AI support[19]. Additionally, the inherent complexity and uncertainty of AI systems call for theoretical frameworks such as systems theory or complex adaptive systems(CAS) to capture the non-linear interactions between AI and organizational knowledge systems.

Third, contextual variables such as industry characteristics, organizational size, data quality, and governance structures play a moderating role in the AI–knowledge relationship. While existing research predominantly focuses on high-tech industries, future studies should expand into sectors like education, healthcare, and public service, where AI penetration remains low but knowledge intensity is high, to enhance external validity[20].

Lastly, the evolving nature of AI itself—such as generative AI, large language models, and neuromorphic computing—poses new challenges and opportunities for organizational knowledge logic and strategic choices. Future research should closely examine topics of AI explainability, ethics, and sustainability, and explore how to balance knowledge creation efficiency with governance and risk control[21].

7. Conclusion

This paper provides a comprehensive review of the mechanisms and research progress regarding how artificial intelligence (AI) supports the balance between knowledge exploration and exploitation within enterprises. Drawing on theories of organizational learning and ambidexterity, it highlights how AI enables the technological foundation and capability support for knowledge exploration (e. g. ,

discovering new markets and technology trends) and knowledge exploitation (e. g. , process optimization and knowledge conversion). The paper analyzes the influence of AI on achieving organizational ambidexterity from three key dimensions: AI technical capabilities, organizational dynamic capabilities, and individual knowledge behavior. Empirical studies suggest that AI enhances organizational data sensing, knowledge integration, and intelligent collaboration among employees, thereby improving the efficiency and performance of knowledge activities. By building a portfolio of AI capabilities, enterprises can flexibly adjust their knowledge strategies in uncertain environments. AI plays a vital mediating role in areas such as data-driven decision-making, cross-functional collaboration, and continuous learning. Despite a growing theoretical foundation and practical exploration, research on AI-enabled knowledge ambidexterity still faces challenges such as theoretical fragmentation, methodological limitations, and insufficient contextual analysis. Future studies should focus on the evolution of dynamic capabilities, the micro-mechanisms of different AI systems, and issues of ethical governance and strategic alignment.

In summary, AI is not merely a technical tool but a systemic foundation for organizations seeking flexible and intelligent transformation in their knowledge strategies. This paper presents a structured framework for understanding how AI drives the coordination between knowledge exploration and exploitation and offers theoretical and empirical insights for firms developing integrated AI and knowledge management strategies.

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