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Empowering artificial intelligence for knowledge management augmentation

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Abstract

This study investigates the transformative potential of artificial intelligence (AI) in enhancing knowledge management (KM) systems. Organizations face challenges with vast data accumulations and fragmented knowledge silos that traditional management systems cannot efficiently address. This research highlights how knowledge capture, retrieval, and synthesis can be automated to improve organizational performance. This research endeavors to unlock AI's potential, propelling organizations towards a future where knowledge management is efficient, inherently collaborative, and astutely informed, marking a significant evolution in organizational dynamics in the digital age.

Keywords: Artificial Intelligence, Decision-Making, Generative Artificial Intelligence, Knowledge Management, Organizational Performance, Problem-Solving

Introduction

The most comprehensive definition of knowledge management refers to a range of practices used by organizations to identify, create, represent, and distribute knowledge for reuse, awareness, and learning across the organization (Glick, 2007).

In other words, it refers not only to mere knowledge but also to a very forward-looking process of sharing tacit knowledge possessed by employees within the organization and creating the next step. It is a management method that aims to create innovations by utilizing the knowledge and experience of individuals throughout the organization. Recently, this method has become widely known and has attracted attention in business, where the collapse of lifetime employment has made it difficult for companies to pass on their knowledge and know-how. The key point is to convert tacit knowledge into formal knowledge through verbalization and visualization and share it throughout the organization.

The concept of AI dates back to ancient times, with myths and legends about artificial beings with intelligence and consciousness. Surprisingly, artificial intelligence is based on the assumption that human thought processes can be reproduced by machines, and the history of mechanical or formal reasoning goes back to Chinese, Indian, and Greek philosophers. Aristotle, for example, formulated and analyzed the three-stage argument; Hourisme developed algebra, whose name remains as “algorithm.” However, since the modern field of AI research was established in the

1950s, we will now look at the history of modern AI. The main events and developments in the History of Artificial Intelligence are as follows:

1950s: The term artificial intelligence was coined by John McCarthy at the Dartmouth Conference in 1956. Early pioneers such as Alan Turing, John McCarthy, Marvin Minsky, and Claude Shannon began exploring fundamental concepts such as artificial neural networks and machine learning (ML). They are considered the key programmers of the first decade of AI research.

1960s-1970s: the “first AI boom,” a period of rapid progress and optimism in AI. Researchers focused on areas such as reasoning and problem-solving. However, by the mid-1970s, progress slowed, funding was cut, and the “AI winter” set in. AI was then subjected to criticism and funding cuts, AI researchers failed to properly assess the difficulty of the problems they were facing, expectations of expected results were raised too high out of optimism to produce results, and funding for research largely dried up. In addition, the low performance of computers, at least concerning the processing of AI, was a very significant barrier.

The 1980s: The “second AI boom” was driven by the development of expert systems that could replicate human decision-making. These systems, however, were limited in their ability to do so because they were derived from built-in expert knowledge and because the knowledge had to be programmed by hand. Just as quickly, as in 1981, Japan's Ministry of International Trade and Industry launched a 57 billion yen fifth-generation computer project. The goal was to build programs and machines that could achieve a variety of goals, such as interacting with humans in natural language, machine translation, image recognition, human-like reasoning, etc., etc., which led to a worldwide AI boom.

2000s-present: Powerful hardware, large data sets, and the rise of new machine learning algorithms such as deep learning using autoencoders by Jeffrey Hinton led to the “third AI boom, AI has made great strides in areas such as natural language processing, computer vision, and gameplay. Deep learning, in particular, was a breakthrough in artificial intelligence, as it eliminated the need for human knowledge representation in terms of feature extraction without human intervention.

Then, in 2022, the release of ChatGPT, a large-scale language model developed by OpenAI, demonstrated the transformative potential of AI in communication and interaction with machines. Generative AI is now an integral part of our lives. Overall, the History of Artificial Intelligence has been characterized by cycles of progress, setbacks, and renewed optimism as the field has evolved over the past 70 years. 2050, or 2045 at the latest, will be the year when artificial intelligence will far surpass humans in terms of knowledge and intelligence and will be the main driver of scientific and technological progress and transform the world. It is no exaggeration to say that the era in which we now live is on the verge of an even earlier Singularity.

Knowledge management enhancement refers to a variety of strategies and techniques used to improve and optimize an organization's knowledge management. Some important aspects include centralizing knowledge content, leveraging technology and AI, building a knowledge-sharing culture, and measuring and optimizing performance, companies can implement these best practices to drive productivity, innovation, and a better customer experience. A study identifying drivers of innovativeness in a furniture manufacturing company reported that a hybrid of technology management and knowledge management works to promote innovation. The study showed that if

the goal is to maximize product or process innovation, the focus should be on improving modification and computational efficiency, and if the priority is the immediate improvement of innovativeness, the focus should be on improving contextualization efficiency. Thus, knowledge management is also one way to strengthen innovativeness to gain a competitive advantage in business (Reddy et al., 2023).

Interplay of Artificial Intelligence and Knowledge Management

Artificial intelligence and knowledge management are closely related, with knowledge management providing context, structure, and understanding to AI algorithms, while AI leverages machine learning to accelerate knowledge discovery, streamline content curation, and personalize information delivery to enhance the practice of knowledge management. This convergence represents a paradigm shift and opens new possibilities to drive productivity, innovation, and competitive advantage. AI-powered knowledge management tools and platforms analyze vast amounts of data in real time to provide valuable insights to the business but to achieve the best results, human and AI collaboration is essential. Careful attention must also be paid to ethical considerations related to data privacy, security, and the balance between automation and the contribution of human knowledge, successful AI adoption requires seamless integration that bridges the gap between human expertise and AI capabilities, user-friendly interfaces, and employee skill development is necessary.

A significant number of studies have been conducted in the past to explore the relationship between AI/ML and KM systems. However, these studies have focused on the impact of definitive technologies and a small number of AI/ML algorithms, neglecting their other roles and how they impact KM systems to achieve organizational goals. KM systems can be significantly enhanced by AI/ML, especially in knowledge acquisition and knowledge creation, and other knowledge management processes can take advantage of different types of AI/ML algorithms that can enhance an organization's competitiveness. Finding that most of the previous studies agree that there is a positive correlation between AI/ML and knowledge management and discussing the pivotal role that AI/ML plays in the overall improvement of KM systems, also attests to this (Vadari and Desik, 2021).

Recent Knowledge Management Problems

In the modern domain of knowledge management, organizations are inundated with vast amounts of data, creating a major barrier to employees identifying the right information quickly and efficiently. This problem is compounded by the fact that knowledge is often siloed and scattered across various departments and individuals, greatly hindering the potential for collaboration and the fluid exchange of insights. Further complicating matter is the dynamic nature of knowledge itself. As knowledge ages, it tends to become obsolete, leading to inaccurate and inefficient decision-making processes. This temporal decay of knowledge underscores the need for systems that not only capture and store information but also keep it current and relevant over time.

In addition to these challenges, traditional KM systems are inadequate to provide a customized experience. Such systems often fail to provide personalized recommendations in line with the unique needs and preferences of individual users, thus limiting the usefulness and reach of knowledge within the organization. While knowledge management systems are still widely applied and researched in the business sector, research on the use of knowledge management systems in the public sector remains an open question. Furthermore, it explains that the commonly discussed models related to organizational learning relate to elements of management and leadership, culture, knowledge, information and communication systems, and

organizational structure and that the topics related to organizational learning are social processes, corporate values, organizational memory change, operational performance, organizational effectiveness, and total quality management, to name a few variables, and there still seems to be an opportunity to propose a comprehensive model using structural equation model analysis that includes knowledge management systems, organizational learning, innovation, and performance (Fitriastuti et al., 2019).

Taken together, these issues highlight the pressing need for a more sophisticated and nuanced approach to knowledge management. Organizations are called upon to critically evaluate their knowledge management practices and infrastructure and identify bottlenecks and opportunities for innovation to handle the knowledge lifecycle in a more enlightened and efficient manner.

Organizational Impacts

The integration of artificial intelligence into knowledge management practices is expected to transform organizational operations across several dimensions. Specifically, it will increase efficiency, enhance collaboration, improve decision-making, and promote continuous learning. The following is a summary of each dimension based on the results of several studies (Taherdoost and Madanchian, 2023).

Increased Efficiency

Increased efficiency: AI's ability to automate repetitive tasks in knowledge management represents a pivotal shift toward increased organizational efficiency. By minimizing manual labor, AI will allow organizations to focus more on strategic tasks. In addition, advanced search and retrieval capabilities ensure fast and accurate access to information, thus optimizing the flow of knowledge. AI's role extends to organizing and curating vast knowledge bases by employing intelligent algorithms to classify and personalize content, simplify navigation, and improve manageability. The use of AI in this context will not only accelerate productivity but also strengthen the infrastructure underlying the knowledge management process (Taherdoost and Madanchian, 2023).

Enhanced Collaboration

AI-driven systems act as catalysts to improve collaboration within an organization. By suggesting relevant documents, pinpointing subject matter experts, and establishing valuable connections, AI enhances synergy across teams and departments. Implementing AI-powered chatbots and virtual assistants can offload routine inquiries from human staff. AI can enable more in-depth decision-making support and allow managers to engage in more complex problem-solving activities. In addition, AI's analytical ability to decipher communication patterns and knowledge flows will discover new pathways for collaborative innovation and foster a more interconnected and unified workforce (Taherdoost and Madanchian, 2023). The rapid proliferation of Generative Artificial Intelligence has revolutionized the way employees interact with KM systems by providing rapid access to a vast knowledge base. This impact has also raised questions about the balance between human-derived tacit knowledge and AI-generated formal knowledge (Alavi, Leidner, and Mousavi, 2023).

Improved Decision-Making

At the core of AI's impact on knowledge management is its ability to derive actionable insights from vast data sets, enabling decision-makers to better understand underlying trends and correlations. Predictive analytics from AI will increase organizational foresight, reveal future trajectories, and facilitate proactive strategy development. The KM system will also be monitored by an AI system that will be used to monitor

the KM system. AI's vigilance in monitoring the KM system will also enhance regulatory compliance, uncover potential inconsistencies, and support a framework for strategic, sustainable, ethical, and informed decision-making (Tettra, 2024). Knowledge management of knowledge based on experience and intuition, or so-called tacit knowledge, is derived from four dimensions: socialization, externalization, cohesion, and internalization. Tacit knowledge management has been shown to have a significant impact on organizational performance. However, of the four dimensions of socialization, internalization, externalization, and cohesion, tacit knowledge management had a significant impact on organizational performance only for socialization and internalization (Muthuveloo, Shanmugam, and Teoh, 2017).

Continuous Learning

AI systems embody the principle of perpetual growth, continually learn from ongoing interactions, and adapt their knowledge repository to reflect the latest conditions. This adaptive learning ensures that disseminated knowledge remains relevant and valuable to users. By tailoring content to the needs and preferences of individual users, AI redefines the personalization of knowledge provision. Proactively identifying knowledge gaps paves the way for timely enhancement and creates an organizational culture that values continuous progress and intellectual curiosity (Elium, 2024). One point of caution, however, is the impact on organizations of the rapid proliferation of Generative Artificial Intelligence beginning in 2022 while generative AI undoubtedly improves processing and cognitive functions in the process of knowledge creation, storage, transfer, and application. Generative AI facilitates both individual and organizational learning. There are risks of AI bias and human social discrimination. However, there is also the risk caused by AI bias and the marginalization of young knowledge workers. In terms of knowledge application, generative AI is seen as a tool to increase productivity and innovation, but issues such as misuse of knowledge, intellectual property, and ethical considerations are important (Alavi, Leidner, and Mousavi, 2023).

Suggestions for Knowledge Management Enhancement

To enhance knowledge management with artificial intelligence, organizations should undertake a series of strategic steps. First, conduct a comprehensive analysis of knowledge requirements and address specific pain points and user preferences so that AI solutions can accurately address these needs. Furthermore, as the organization gains experience in transforming information into knowledge, it will be able to govern more influentially and efficiently as the future vision of knowledge erupts. It is crucial to recognize that it is challenging to anticipate all the processing that will be necessary for a specific organization. This is because the aggregation of individual sources of information and knowledge requirements is intricate and undergoes constant evolution (Pai et al., 2022). Second, carefully select AI technologies such as natural language processing and machine learning that are aligned with the organization's objectives to provide the most effective solution. Many types of applications and software exist for visualization tools. Such resources do not manage knowledge by themselves. Knowledge management is not just a “technology” per se. Creating a knowledge management “framework” requires a blend and combination of individuals, cultures, and technologies (Pai et al., 2022). Third, customize these AI-driven systems to seamlessly integrate with existing organizational workflows to increase efficiency and consistency. Fourth, establish robust data privacy measures to comply with regulations and protect sensitive information, protecting both the organization and its stakeholders. IT support systems based on artificial intelligence have emerged as crucial elements for organizational innovation, efficiency, and effectiveness. A unified, automated framework to manage the necessary infrastructure, data, IT assets, and lifecycle management is essential for ensuring sustainability, security, compatibility, compliance, and adherence to legal regulations. The primary challenge lies in keeping pace with ongoing advancements in both infrastructure and software technology (Pai et al., 2022). Finally, provide targeted training programs for employees to facilitate the

adoption and effective use of AI tools and maximize their potential benefits. Collectively, these steps are a blueprint for leveraging AI to revolutionize knowledge management practices and make organizations more agile, informed, and competitive in the digital age. In addition, there is an interesting finding about using ChatGPT. It suggests that when students perceive the usefulness of ChatGPT for learning, they experience higher levels of satisfaction and are more likely to continue using ChatGPT. Furthermore, knowledge acquisition has a significant impact on both satisfaction and continued use of ChatGPT, while knowledge sharing and application only affect user satisfaction. This indicates that students prioritize knowledge acquisition over knowledge sharing and application through ChatGPT. Theoretically, utilizing the expectation confirmation model and integrating knowledge management elements would contribute to the understanding and continued use of ChatGPT. User satisfaction not only can be found in education but also in business training (Ngo et al., 2024).

Future Implications

The successful deployment of AI-enhanced knowledge management systems is anticipated to pave the way for developments such as AI-driven virtual assistants, advanced predictive analytics, augmented reality integration, and the need for ethical practices ensuring fairness and transparency in operations. Incorporating knowledge management as a strategic business approach is likely to provide firms with a significant competitive advantage, enabling them to surpass their rivals. Effective KM implementation can lead to increased revenues, reduced resource consumption, significant cost savings, and heightened user acceptance. KM also supports the establishment of an environment conducive to teaching and learning, with both elements recognized as vital corporate assets. Employees are often inspired to pursue continuous personal development, enhance their skills, and take on leadership positions.

Furthermore, the rise of remote working has underscored the importance of robust KM systems more than ever before. In the contemporary digital age, defined by rapid advancements in information technology, SNS (social networking, blogs, etc.), and artificial intelligence, the workforce and knowledge assets of organizations comprise a diverse array of generational cohorts, including Post-war Generation, Transition Generation, Digital Natives, and Internet Generation. This diversity necessitates a reevaluation of an organization's memory and intellectual prowess (Viterouli et al., 2023). Achieving a long-term competitive edge will depend critically on the efficacy of knowledge management. The management and organization of the knowledge management process, which encompasses the generation of knowledge, dissemination, transmission, assimilation, archiving, access, and utilization, are of vital importance for operational success. This study has endeavored to tap into AI's potential to foster organizations that are not only efficient and collaborative but also well-informed in the digital landscape. The expected impact of such AI-driven KM systems extends across various industries. They affect multiple generations of employees and alter organizational practices (Pai et al., 2022).

Conclusion

In this paper, we have explored the profound impact of artificial intelligence on knowledge management systems. We illustrate how AI can transform traditional knowledge management practices into dynamic and efficient processes. As organizations continue to grapple with vast data accumulations and fragmented knowledge silos, AI emerges as a pivotal technology capable of revolutionizing how knowledge is captured, retrieved, and synthesized. This conclusion synthesizes the findings from our research and anticipates future directions in this evolving field.

AI's integration into KM practices has demonstrated significant potential to enhance organizational efficiency by automating routine tasks such as data tagging, indexing, and categorization. This automation

not only speeds up access to relevant information but also alleviates the manual burden on employees, allowing them to engage in more value-adding activities. Furthermore, AI-driven systems have been crucial in breaking down informational silos, promoting an environment of enhanced collaboration across different departments and even geographical locations. By facilitating seamless information flow, these systems contribute to a more cohesive organizational knowledge ecosystem. The decision-making process within organizations has also seen remarkable improvements due to AI's ability to provide timely and fairly accurate insights. Through advanced analytics and predictive modeling, AI aids in uncovering hidden patterns and forecasting future trends, thereby enabling more informed and strategic decision-making.

Additionally, AI's role in ensuring compliance and ethical governance in KM practices cannot be overstated, as it helps organizations navigate the complexities of data privacy and security with greater precision. An equally important aspect of AI in KM is its capability to foster continuous learning and adaptation. AI systems are designed to learn from new data inputs continuously, ensuring that the organizational knowledge base remains up-to-date and relevant. This feature is indispensable in today's fast-paced business environments where information becomes obsolete quickly. AI's ability to personalize knowledge delivery according to individual user preferences further enhances the effectiveness of KM systems, making them more user-centric and responsive. Looking ahead, the successful implementation of AI-powered KM systems is poised to lead to even more sophisticated applications such as AI-powered virtual assistants, enhanced predictive analytics, and augmented reality integrations. These advancements are expected to drive significant shifts in organizational practices and push the boundaries of what is possible in knowledge management. As organizations adopt knowledge management as a strategic business tool, they are likely to experience substantial benefits, including increased revenue, reduced resource utilization, and improved operational efficiencies. Moreover, the rise of remote work has underscored the importance of robust KM systems, which are crucial for supporting a dispersed workforce. In the era of digital transformation, where the workforce comprises multiple generations, rethinking an organization's knowledge strategy and tools is essential to maintain competitiveness and innovation.

In conclusion, this thesis not only highlights the current benefits of integrating AI into KM systems but also sets the stage for future research in this field. By continuously evaluating and adapting AI strategies in knowledge management, organizations can look forward to not only keeping pace with technological advancements but also setting new standards for efficiency, collaboration, and innovation in the digital age.

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