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Emerging Technologies: Can Artificial Intelligence Enhance Knowledge Management in Arab Universities?

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Abstract:

This study aims to identify the implementation of knowledge management processes in Arab universities based on artificial intelligence technology. A phenomenological approach is used to analyze this implementation in leading Saudi Arabian universities. Data were collected through interviews, observations, and literature reviews, then analyzed using the Interpretative Phenomenological Analysis (IPA) method to explore themes and insights from participants' experiences. The study results indicate that implementing knowledge management processes based on artificial intelligence in Arab universities is moderate. Universities have developed networks to generate, store, share, and apply knowledge through artificial intelligence techniques. However, they still face various challenges in this technology-based knowledge management process. Based on these findings, this study recommends improving university infrastructure with the latest artificial intelligence technology and its application in knowledge management. It is also recommended that new services and applications based on artificial intelligence in the field of education be utilized through training programs, workshops, scientific meetings, and seminars related to digital developments. In addition, universities are encouraged to share knowledge internally and externally through knowledge management teams and training units in artificial intelligence systems.

Keywords: *Artificial Intelligence, Knowledge Management, Digital Technology, Knowledge Sharing*

Abstrak:

Penelitian ini bertujuan untuk mengidentifikasi penerapan proses manajemen pengetahuan di universitas Arab berbasis teknologi kecerdasan buatan. Pendekatan fenomenologis digunakan untuk menganalisis penerapan ini di universitas terkemuka Arab Saudi. Data dikumpulkan melalui wawancara, observasi, dan tinjauan literatur, kemudian dianalisis menggunakan metode Interpretative Phenomenological Analysis (IPA) untuk menggali tema dan wawasan dari pengalaman partisipan. Hasil penelitian menunjukkan bahwa penerapan proses manajemen pengetahuan berbasis kecerdasan buatan di universitas Arab berada pada tingkat sedang. Universitas telah mengembangkan jaringan untuk menghasilkan, menyimpan, berbagi, dan menerapkan pengetahuan melalui teknik kecerdasan buatan. Namun, mereka masih menghadapi berbagai tantangan dalam proses manajemen pengetahuan berbasis teknologi ini. Berdasarkan temuan tersebut, penelitian ini merekomendasikan peningkatan infrastruktur universitas dengan teknologi kecerdasan buatan terkini dan penerapannya dalam manajemen pengetahuan. Disarankan juga untuk memanfaatkan layanan dan aplikasi baru berbasis kecerdasan buatan di bidang pendidikan melalui program pelatihan, lokakarya, pertemuan ilmiah, dan seminar terkait perkembangan digital.

Selain itu, universitas didorong untuk berbagi pengetahuan secara internal dan eksternal melalui tim manajemen pengetahuan dan unit pelatihan dalam sistem kecerdasan buatan.
Kata Kunci: *Kecerdasan Buatan, Manajemen Pengetahuan, Teknologi Digital, Berbagi Pengetahuan*

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INTRODUCTION

The development of information and communication technology in the Fourth Industrial Revolution, known as the digital era, has changed how humans interact, work, and learn. Advanced digital technologies such as cloud computing, the Internet of Things (IoT), and artificial intelligence (AI) enable organizations and individuals to access and share knowledge more efficiently, overcoming time and space barriers (Albreem et al., 2021; Cascella et al., 2024; Frenk et al., 2022). This condition creates opportunities for transformation in various sectors, including higher education, where universities compete to adopt these innovations to achieve competitive advantage (Dwivedi et al., 2023; Maisuroh & Aisyah, 2024). In particular, artificial intelligence has become a research focus because of its ability to automate, improve, and accelerate knowledge management processes.

However, although artificial intelligence technology offers various benefits, its application still has significant challenges, especially in universities in Arab countries. Several studies have shown that, although these universities have good technological infrastructure and competent human resources, the application of artificial intelligence in knowledge management still needs to be improved (Bag & Pretorius, 2022; Gupta, 2023; Sarker et al., 2021). Studying it as one of the modern administration trends means that knowledge management includes various processes, such as collecting, organizing, and disseminating knowledge to support decision-making and problem-solving. Chai explained that knowledge management allows organizations to use information to support appropriate and effective decision-making and assist in problem-solving. The management process also encourages collaboration between team members and departments by sharing relevant knowledge to achieve operational efficiency and optimize innovation (Kuleto et al., 2021; Sanjani, 2024). Knowledge management involves technology and includes a cultural approach that encourages openness and continuous sharing of information among all organization members.

Several previous studies have highlighted the importance of artificial intelligence in education and knowledge management. Harrer (2023) emphasizes the importance of innovative education strategies to overcome the barriers to using artificial intelligence in educational institutions. The study by byKitsios and Kamariotou (2021) identifies challenges in implementing this advanced technology, especially related to limited knowledge and resistance to change among teaching staff. Meanwhile, Allioui and Mourdi (2023) recommend increasing the use of artificial intelligence applications in the educational process to achieve better learning outcomes. Finally, research by Valks and Friends (2021) emphasizes the important role of the Internet and modern technologies in

supporting the decision-making process of universities. However, there is a research gap as most of these studies focus more on applying artificial intelligence technology in education in general and not specifically on the knowledge management process in Arab universities. Therefore, more in-depth research is needed on the specific ways to integrate artificial intelligence into the knowledge management process, especially in the cultural and administrative context of universities in Arab countries.

This study offers novelty by focusing on the level of implementation of AI-based knowledge management processes in some Arab universities. By highlighting less discussed aspects, such as appropriate implementation strategies and how to overcome cultural and organizational barriers to the use of this technology, this study seeks to fill the gap in the current academic literature. The development of a comprehensive model or framework for the application of artificial intelligence in knowledge management in Arab universities is also explored by considering the unique contextual factors and specific challenges faced by university institutions.

This study aims to identify the extent of the implementation of AI-based knowledge management in Arab universities and explain the challenges faced. In addition, this study seeks to propose solutions that can improve the effectiveness of knowledge management in academic environments. With this concept, this paper is expected to contribute to a deeper understanding of the use of artificial intelligence in supporting knowledge management and provide practical recommendations for policymakers and implementers in Arab universities.

RESEARCH METHOD

This research method uses a descriptive approach focusing on phenomenology-based narrative analysis. The location of this research involves several leading universities in Saudi Arabia, including King Saud University (KSU), King Abdulaziz University (KAU), King Fahd University of Petroleum and Minerals (KFUPM), King Abdullah University of Science and Technology (KAUST), Imam Muhammad ibn Saud Islamic University (IMSIU), Taibah University, and several other campuses. The phenomenological approach was chosen to deeply understand the experiences and perspectives of participants regarding the application of artificial intelligence in knowledge management at these universities.

The data collection technique in this study was to conduct interviews with sources who were directly involved or had a deep understanding of the research topic, coupled with observations and documentation from various literature (Ismail & Kinchin, 2023). The researchers also utilized leading academic databases to identify and collect in-depth and comprehensive information on the application of artificial intelligence in knowledge management in Arab universities. This data collection technique enabled the researchers to obtain valid and relevant data that could enrich the analysis.

The collected data was then analyzed using Interpretative Phenomenological Analysis (IPA) developed by Smith (1996) in Nizza et al. (2021). The analysis process involves several stages, including reading the data in depth

to understand the context, taking initial notes to capture initial ideas and impressions, developing relevant themes, and connecting these themes to participants' experiences (Rajasinghe et al., 2024). This approach helps researchers gain deeper insights into participants' experiences applying artificial intelligence to knowledge management while ensuring that the resulting interpretations remain aligned with participants' authentic experiences.

RESULT AND DISCUSSION

Result

This study examines the application of artificial intelligence (AI) technology in the knowledge management process at Arab Universities to improve the efficiency and effectiveness of information management. The results show that AI technologies, such as machine learning and intelligent data analysis, can be used to automate the collection, processing, and distribution of knowledge, thereby supporting collaboration between users and increasing the accessibility of information. These findings align with knowledge management theory, emphasizing the importance of utilizing technology to create adaptive and innovative learning environments. The implications of this application include improving the quality of research and operational efficiency of universities and developing curricula that are more relevant to the needs of the workplace.

The Reality of Knowledge Management Implementation

This study examines the application of artificial intelligence (AI) technology in the knowledge management process at Arab Universities to improve the efficiency and effectiveness of information management. The results show that AI technologies, such as machine learning and intelligent data analysis, can be used to automate the collection, processing, and distribution of knowledge, thereby supporting collaboration between users and increasing the accessibility of information. One interview with a lecturer stated, "With AI, we can manage research and learning data faster, so that time that is usually spent on administration can be diverted to more productive academic activities." This finding emphasizes the importance of utilizing technology to create an adaptive and innovative learning environment. The implications of this application include improving the quality of research, the operational efficiency of universities, and developing a curriculum that is more relevant to the needs of the world of work.

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The implications of implementing AI in knowledge management include improving the quality of research, university operational efficiency, and developing a curriculum that is more relevant to workplace needs. In addition, an interview with a student stated, "The AI-based system helps us find learning resources that suit our needs, without having to spend a lot of time searching manually." This approach is also considered capable of encouraging cross-disciplinary collaboration and strengthening institutional competitiveness at the global level.

Implementing artificial intelligence (AI) technology in Arab universities also faces several challenges that affect its effectiveness in supporting knowledge management. One of the main challenges is the limited funding and staff training resources, which hinder the widespread adoption of the technology. Most knowledge management processes still rely on traditional methods, with AI integration still in its early stages. This indicates a gap between the potential of the technology and its application in the academic environment. One respondent explained, "Knowledge management processes still rely on traditional methods, with little integration of AI technology."

The study also found differences in perception among students and academic staff regarding the application of AI. Some students felt that using AI in learning provided a more interactive and adaptive experience. However, many argued that this technology did not fully support the context of specific disciplines. This emphasizes the need for a more adaptive and integrated approach to ensure that AI can meet diverse academic needs. In addition, adequate technological infrastructure support is also needed to overcome limitations in the optimal application of AI.

Observations show that while the potential of AI to improve operational efficiency and strategic decision-making is recognized, the reality of its implementation is still far from optimal. One respondent stated, "The application of AI can help improve operational efficiency and strategic decision-making if used appropriately." The study also noted that 70% of respondents indicated that knowledge management still uses traditional methods, with only 30% integrating AI into their processes. Some of the barriers identified include limited training (40%), inadequate technology infrastructure (35%), and lack of funding (25%). These findings suggest that to maximize the benefits of AI, universities need to develop a strategic approach that includes intensive training for staff, improved technology infrastructure, and better funding allocation. With this step, it is hoped that universities can overcome the gap between technology's potential and its implementation's reality.

Challenges in Integrating Artificial Intelligence in Knowledge Management

The findings identify the challenges faced in implementing artificial intelligence (AI) in knowledge management processes in Arab universities. Although AI applications offer great potential to improve the efficiency and effectiveness of knowledge management, several significant obstacles can hinder their optimal use. High costs are one of the main challenges Arab universities face in implementing AI. One of AM's informants, an academic at King Saud University, explained, "The cost of implementing and maintaining AI systems is

very high. We often face difficulties in allocating sufficient budget for this technology, let alone the additional costs of staff training and constant system updates." AM emphasized that while the benefits of AI are immense, the cost burden is often a significant barrier to broader adoption in educational institutions.

In addition to cost challenges, ethical and human values issues are important concerns in implementing artificial intelligence (AI) in Arab universities. Many are concerned that this technology could ignore the fundamental human aspects of education. One informant stated, "There is a deep concern about how AI could change social interactions and human values in educational settings. Such technologies often ignore traditional aspects that are important in educational contexts." There is also concern that AI could reinforce existing biases in the education system and ignore the needs of individual students. Another informant added that the application of AI should be designed to support efficiency without compromising prevailing social and moral values. These findings emphasize the importance of integrating ethical principles in the development and implementation of AI to create technology that is technically effective and aligned with human values.

In addition, the dominance of large companies in AI application development and the lack of adequate training are significant challenges. Lack of training makes it difficult for educational institutions to use AI technologies optimally, especially in universities located in rural areas with limited digital infrastructure. These barriers create gaps in technology access and innovation, limiting the diversity of solutions available for education. One respondent noted, "These gaps reflect the challenges of the Fourth Industrial Revolution, where technological change often forces a transformation of existing cultural and social values." This suggests that more significant investment in technology infrastructure, staff training, and policy development that supports inclusive and sustainable AI adoption is needed to optimize AI adoption.

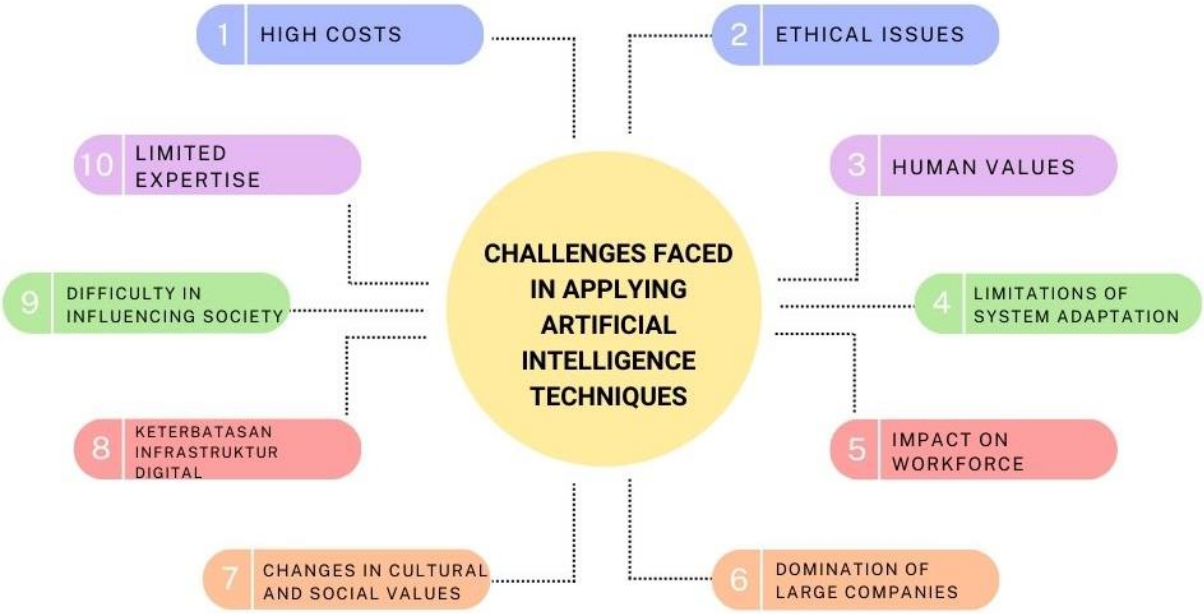

Figure 1. Challenges Faced in the Application of Artificial Intelligence

As an interpretation of the research findings, implementing artificial intelligence (AI) in Arab universities requires a balanced approach between technological advancement and respect for social and ethical values. Figure 1 shows that one of the main challenges is the concern about the impact of AI on social interactions and human values. The observation results show that 60% of respondents expressed concerns about AI reducing the humanistic aspect of the learning process. In comparison, 40% highlighted the risk of strengthening systemic biases that may arise from implementing this technology. This finding aligns with research stating that the main challenge in adopting AI is balancing technological efficiency with human values.

Furthermore, while AI has great potential to improve operational efficiency and educational accessibility, its implementation must have ethical implications. The study supports the view that without careful management, technology can exacerbate social injustice and create inequities in access to educational settings. Therefore, universities must develop strategic policies that integrate ethical principles into the design and implementation of AI. This approach ensures that AI technology is used for efficiency and supports the fundamental principles that underlie education and society as a whole.

Strategic Solutions for AI-Based Knowledge Management

This study identifies several strategic solutions to facilitate the implementation of artificial intelligence (AI) in knowledge management processes. Given the challenges, the findings offer a systematic approach to improving the integration of AI technologies in higher education environments. One key solution is to intensify AI-related training for students and faculty members. This aligns with the recommendations of several studies that emphasize that comprehensive training can strengthen digital competencies and accelerate the adoption of new technologies.

Furthermore, restructuring infrastructure in higher education is essential to meet the needs of teaching and implementing AI. Several studies have shown that modernizing infrastructure dramatically contributes to successfully integrating new technologies. A respondent from King Saud University added, "We must ensure that the existing infrastructure supports the latest technologies. Without adequate infrastructure support, AI applications will be difficult to develop." In addition, adequate budget allocation and recruitment of specialized experts in AI are also needed to support the effective implementation of this technology.

Finally, it is important to develop clear educational policies and standards documents regarding the use of AI. This will ensure that the AI applications implemented are guaranteed high quality and safe in the local context. This is in line with recommendations that highlight the importance of standards and policies in supporting the success of new technologies. A researcher at the University of Jordan stated, "Clear policies and consistent standards are essential to address the challenges of implementing AI and ensuring that the technology delivers maximum benefits." By implementing these solutions and proposals, Arab universities can overcome existing challenges and leverage artificial intelligence to improve knowledge management processes effectively.

The observation results identified several significant challenges in implementing artificial intelligence (AI) in knowledge management in Arab universities, aligning with previous research findings. One of the main challenges found was the inability of AI technology to adapt to uniform data, a problem often encountered in academic environments, especially in Arab universities. This finding aligns with research showing that many educational institutions in the Arab world face obstacles in integrating AI into their knowledge management systems due to the technology's incompatibility with existing data structures.

Observations show that 65% of respondents identified infrastructure limitations as a significant barrier to AI adoption, with 30% citing cost as a significant barrier. These findings are consistent with research emphasizing the importance of specific training and skills development in AI to ensure successful technology adoption. Fifty-five percent of respondents stated that the lack of specific training in AI makes it difficult for academic and administrative staff to maximize the potential of the technology. Furthermore, our observations also found negative perceptions of AI among students, reflecting research findings by Srivani and Oyebode, who found that skepticism of the technology can hinder successful AI integration among end users. This suggests a more contextual and adaptive approach to integrating AI, considering each university's and discipline's specific needs and increasing understanding and acceptance among students and staff.

Discussion

This study shows that although artificial intelligence (AI) has great potential to improve knowledge management, its implementation in Arab universities still faces various obstacles (Peters & Friends, 2020). Knowledge management theory states that modern technology, including AI, can improve the efficiency and documentation of implicit and explicit knowledge (Dana et al., 2021). However, the results of this study indicate a significant gap between well-documented formal knowledge and tacit knowledge hidden in everyday practice (Dakir et al., 2021). Factors such as lack of infrastructure, staff training, and minimal investment in technology are significant barriers to maximizing the benefits of AI in higher education settings (Rasoolimanesh et al., 2021).

The implications of these findings suggest that without adequate infrastructure and competent experts, the potential of AI to improve knowledge management will not be optimally realized (Shofiatun et al., 2021). The lack of AI integration means universities still rely on traditional, less efficient methods, reducing the institution's competitiveness (Faiz et al., 2020). In addition, the ethical and social value challenges associated with implementing this technology, such as concerns about abandoning traditional values and system bias, underscore the need for a careful and planned approach (Hashanah, 2024). In other words, universities that fail to address these barriers risk being left behind in the global competition to provide high-quality education (Mohan et al., 2024).

AI is becoming increasingly important because it has the potential to support the transformation of higher education by improving operational efficiency and strategic decision-making (Munawwaroh, 2024). However, to realize these benefits, universities must invest in infrastructure restructuring,

digital training, and recruiting AI experts. Without a strategic approach that includes technical, social, and ethical aspects, the implementation of AI will only be discourse without real impact (Fajry, 2022). Therefore, the development of clear educational policies and standards and the allocation of adequate resources are top priorities to bridge the gap between the potential of technology and the reality of its application (Mora et al., 2021).

CONCLUSION

The conclusions of this study reveal several important findings related to the application of artificial intelligence (AI) techniques in knowledge management processes in Arab universities. The main findings indicate that while there is great potential to improve knowledge management through AI, the reality of its implementation is still far from optimal. Significant challenges such as high costs, lack of adequate infrastructure, and low training and specialist competencies in AI are substantial barriers. The study also identified differences in perceptions among students regarding the benefits and relevance of AI in education, with more positive impacts seen in more technology-oriented faculties. The lesson from this study is the importance of addressing these barriers through concrete solutions such as more extensive training, improved infrastructure, and curriculum adjustments to utilize AI in academic contexts effectively.

The strength of this study lies in its contribution to a deeper understanding of the application of AI in higher education, as well as its emphasis on the need for more systematic integration of technology. The study updates the scientific perspective by highlighting the urgent need for better training and infrastructure adaptation to support AI adoption. However, the study also has limitations, such as its limited coverage to a specific location and case and the lack of variation in terms of gender and age. Therefore, more comprehensive follow-up research, using broader survey methods and considering various demographic factors, is needed to obtain a more holistic picture. This additional research will help formulate more targeted policies to enhance the application of AI in knowledge management processes in Arab universities.

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