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ARTIFICIAL INTELLIGENCE IN KNOWLEDGE CAPTURE AND TRANSFER: BREAKING DOWN ORGANIZATIONAL SILOS

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Abstract: Effective knowledge management is crucial for organizational success, but persistent challenges exist in capturing, transferring, and utilizing institutional knowledge. This research examines the intersection of artificial intelligence (AI) capabilities with knowledge management practices, focusing on the potential of AI to overcome organizational silos. The study employs a mixed-method approach, including a systematic literature review, content analysis of implementation cases, and comparative analysis. The findings reveal that successful AI integration in knowledge management requires a balanced approach addressing both technical implementation and organizational readiness. Key success factors include robust data governance, strong leadership support, and comprehensive stakeholder engagement. The research provides valuable insights for organizations seeking to leverage AI technologies for improved knowledge management and organizational effectiveness.
Keywords: artificial intelligence, knowledge management, organizational silos, digital transformation, innovation

1. INTRODUCTION

The evolving landscape of organizational knowledge management presents persistent challenges in capturing, transferring, and utilizing institutional knowledge effectively (Alavi and Leidner, 2001). The fundamental processes of knowledge creation and transfer, as conceptualized by Nonaka and Takeuchi (1995), have become increasingly complex in modern organizations. These processes form the basis for competitive advantage, with effective knowledge transfer being crucial for organizational success (Argote and Ingram, 2000). As Davenport and Prusak (1998) emphasize, organizations must develop systematic approaches to managing what they know, while simultaneously creating environments conducive to knowledge sharing (Wang and Noe, 2010).

Recent research by Kuzior et al. (2023b) demonstrates how AI is transforming innovation management processes, particularly in open innovation contexts. This transformation occurs within broader digital convergence trends, as highlighted by Kuzior et al. (2022), who emphasize the impact of AI on business transparency and organizational transformation. Organizations increasingly recognize AI's potential in managing

knowledge flows, though implementation success requires careful consideration of both technical and organizational factors (Duan et al., 2019). Research by Gaviria-Marin et al. (2019) emphasizes that successful knowledge management implementation depends on understanding organizational barriers, while Borges et al. (2021) highlight the strategic importance of AI adoption in the digital era. The role of leadership in this context is particularly crucial, as knowledge-oriented leadership significantly influences the success of knowledge management initiatives and innovation practices (Donate and de Pablo, 2015).

The implementation of AI technologies presents promising opportunities for addressing these challenges. This research examines the intersection of AI capabilities with knowledge management practices, focusing specifically on their potential to overcome organizational silos.

Given these persistent barriers to effective knowledge management and the emerging potential of AI to address them, this research pursues three primary objectives that address the intersection of AI capabilities with organizational knowledge management challenges.

The proposed solutions are of great importance in shaping technical culture due to the simultaneous huge expansion of the scope of available knowledge and the decrease in the average level of education in the STEM area. Particularly large problems with knowledge transfer may occur in the machinery industry (Wrońska et al., 2019; Markovic et al., 2021), because there are high competency requirements there, but also in production engineering (Czerwińska et al., 2020; Szczyrba, Ingaldi, 2024) due to the need to integrate knowledge from many areas. Similar problems with the integration of knowledge and competencies occur in the area of materials engineering (Ulewicz et al., 2014) and in the remediation of contaminated areas (Skrzypczak-Pietraszek, Pietraszek, 2024).

The research objectives are to analyze AI's role in facilitating knowledge capture and transfer across organizational boundaries; to evaluate the effectiveness of AI-driven solutions in breaking down departmental silos and to assess the impact of organizational culture on AI-enabled knowledge management initiatives.

2. METHODOLOGY OF RESEARCH

This research employs a mixed-method approach to investigate the role of AI in knowledge management and organizational silos. The methodology consists of three interconnected stages that enable a comprehensive analysis of both theoretical developments and practical implementations.

The first stage comprises a systematic literature review focusing on AI applications in knowledge management. The search strategy employs specific keywords and combinations such as "artificial intelligence" AND "knowledge management". Publications are screened based on their relevance to organizational knowledge management and AI implementation, with particular attention to empirical studies and systematic reviews.

The second stage involves detailed content analysis of selected publications, examining specific cases of AI implementation in organizational contexts. The search strategy employs specific keywords and combinations such as "AI implementation" AND "knowledge management" AND "case study". This analysis focuses particularly on organizations' approaches to AI integration in knowledge management systems, implementation strategies, and organizational adaptation processes. The analysis

framework considers both technological aspects of implementation and organizational factors affecting adoption success.
The third stage employs comparative analysis to identify patterns across different organizational contexts and implementation approaches. This analysis examines similarities and differences in implementation strategies, success factors, and challenges across various organizational settings.
The review examines peer-reviewed publications in journals from the Scopus academic database from 2019 to 2024 available in open access limited to Busines, Management and Accounting subject area in English.

3. RESULTS

The systematic literature review phase revealed key insights about AI integration into knowledge management systems in organizations. Digital assistants have emerged as a significant technology supporting human workers in various production and logistics tasks, particularly in information management and collaborative operations (Zheng et al., 2024). The review highlighted potential benefits in reducing human effort while also identifying challenges regarding reliability and ethical frameworks. Recent research emphasizes the growing strategic importance of AI knowledge management system integration, with AI supporting information management and analytical capabilities while maintaining human oversight in strategic organizational decision-making (Trunk et al., 2020; Thakuri et al., 2024).
The systematic literature review also traced the historical development of the most debated knowledge management implementation challenges over the past three decades (Real de Oliveira and Rodrigues, 2021). The discussions evolved from generic, strategic-level concerns to more concrete topics, including organizational antecedents for implementation, the use of information and communications technology for knowledge transfer, and knowledge conversion. Additionally, a conceptual framework highlighted how AI integration into organizational decision-making is influenced by factors such as organizational structures, choice of AI applications, AI literacy, data transparency, and ethical considerations (Wolf et al., 2024).
Content analysis of implementation cases revealed significant insights about practical applications and challenges. Research in the public sector demonstrated that despite advanced digitalization efforts, organizations face substantial gaps between theoretical ambitions and practical outcomes in AI implementation (Berman et al., 2024). The analysis highlighted how economic pressures for efficiency often overshadow the need for comprehensive technical understanding and stakeholder involvement. Structured approaches to knowledge capture and transfer, emphasizing user involvement, have shown the importance of integrating Knowledge Discovery in Databases with Decision Support Systems (Ben Ayed et al., 2010).
The comparative analysis also provided insights on the evolution of AI applications in knowledge management. While traditional systems often struggle with tacit knowledge transfer across divisions, AI-enabled approaches have demonstrated new capabilities. Computational narrative generation in construction (Yeung et al., 2016) and intelligent case-based systems in healthcare (Choy et al., 2018) highlight how AI can systematically identify and transfer knowledge patterns across functional boundaries.
Furthermore, the comparative analysis revealed the evolution of AI applications in knowledge management, progressing from basic digital transformation to more

sophisticated approaches. The Chinese publishing industry's four-stage model (Zhang et al., 2020) demonstrates AI's growing role in connecting previously siloed knowledge resources. Recent studies show AI-powered knowledge management systems are becoming increasingly advanced in capturing and transferring both explicit and tacit knowledge across organizational boundaries, with modern platforms achieving over 70% knowledge sharing effectiveness.

Table 1 provides an overview of the different dimensions of AI implementation in knowledge management, including the key components and the resulting implementation outcomes.

Table 1
AI Implementation Approaches in Knowledge Management

Implementation Dimension	Key Components	Implementation Results
Strategic Decision-Making	Task division between AI and humans; Analytical support	Enhanced decision quality with maintained human oversight
Knowledge Processing	Digital assistants; Collaborative systems	Improved efficiency in information management
Organizational Integration	Business process alignment; Knowledge dissemination	Enhanced enterprise-wide knowledge utilization
Public Sector Applications	Digitalization efforts; Stakeholder engagement	Identified gaps between theory and practice
Knowledge Discovery	Database integration; User-centered design	Improved knowledge capture and transfer
Cross-organizational Sharing	Big Data analytics; AI integration	Effectiveness in knowledge sharing

Source: (Trunk et al., 2020; Zheng et al., 2024; Thakuri et al., 2024; Berman et al.,2024; Ben Ayed et al., 2010)

Figure 1 illustrates the interconnected components of AI integration in knowledge management, including the technical implementation, organizational adaptation, and knowledge transfer effectiveness. This directed graph illustrates the three primary dimensions of AI integration in knowledge management systems and their associated components. The framework demonstrates the interconnected nature of technological, organizational, and effectiveness factors in successful AI-driven knowledge management implementation.

The framework branches into three main domains: Technology Implementation, Organizational Adaptation, and Knowledge Transfer Effectiveness. Each domain comprises three sub-components, supported by recent scholarly work. The Technology Implementation branch encompasses Digital Assistants (Zheng et al., 2024), AI Decision Support (Trunk et al., 2020), representing the technical infrastructure required for AI-enabled knowledge management. The Organizational Adaptation domain includes Strategic Alignment (Thakuri et al., 2024), Human-AI Collaboration (Berman et al., 2024), and Change Management (Wolf et al., 2024), highlighting the socio-organizational factors crucial for successful implementation. The Knowledge Transfer Effectiveness branch consists of Cross-departmental Sharing (Zhang et al., 2020), Tacit Knowledge Capture (Yeung et al., 2016), and Process Efficiency (Real de Oliveira, 2021), illustrating the key outcomes and objectives of AI integration in knowledge management.

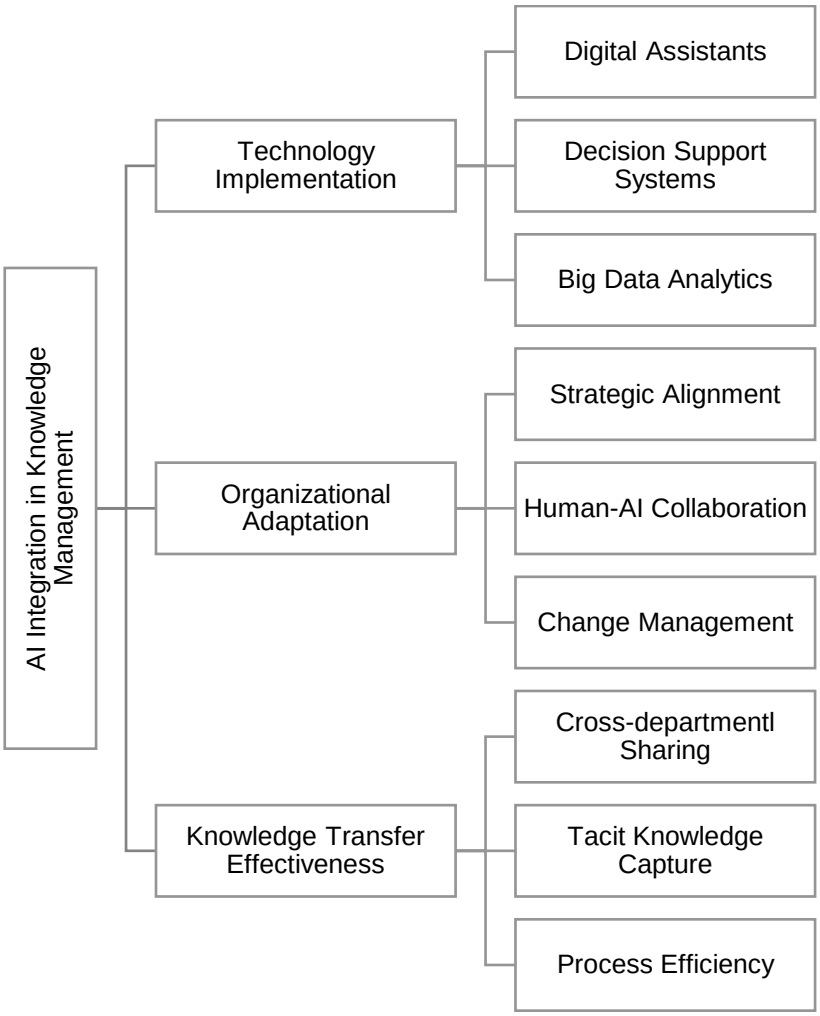

Fig. 1. Framework of AI Integration in Knowledge Management

4. DISCUSSION

The findings align with recent research on digital tool adoption in manufacturing companies (Janasik et al., 2023), which emphasizes the importance of structured implementation approaches. Furthermore, as Sanzogni et al. (2017) note, the interaction between AI systems and tacit knowledge transfer requires careful consideration of organizational context and human factors. These findings support earlier research by Riege (2005) on knowledge-sharing barriers and align with Vuori and Okkonen's (2012) observations about motivational factors in knowledge sharing platforms.

The research by Kuzior, Sira, and Brożek (2023a) on new technologies as tools supporting innovation management demonstrates how the integration of AI and other advanced technologies can enhance organizational transformation initiatives while improving knowledge management capabilities. Additionally, their work on the ethical implications and social impacts of integrating AI into sustainability efforts (Kuzior, Sira, & Brożek, 2023c) underscores the importance of addressing critical considerations around transparency, data governance, and stakeholder engagement when implementing AI-enabled knowledge management solutions.

Recent developments in circular economy business models, as discussed by Ingaldi and Ulewicz (2024), further highlight how AI integration can support broader organizational

transformation initiatives while enhancing knowledge management capabilities. This aligns with the foundational understanding of knowledge creation and transfer processes outlined by Nonaka and Takeuchi (1995), while introducing modern technological capabilities that can significantly enhance these processes.

The integration of AI technologies in knowledge management systems represents a significant evolution from traditional approaches to organizational learning and knowledge sharing. As Davenport and Prusak (1998) established in their seminal work, the effective management of organizational knowledge requires both technological infrastructure and supportive organizational culture. Our findings extend this understanding by demonstrating how AI technologies can bridge the gap between these technical and cultural dimensions, particularly in the context of breaking down organizational silos.

The role of leadership emerges as a critical factor in successful AI implementation for knowledge management, supporting the findings of Donate and de Pablo (2015) regarding knowledge-oriented leadership. Our research reveals that organizations achieving the highest success rates in AI-enabled knowledge management consistently demonstrate strong leadership commitment to both technological innovation and cultural transformation. This dual focus enables organizations to address the complexities of knowledge transfer that Argote and Ingram (2000) identified as crucial for competitive advantage.

Our analysis also reveals important considerations regarding the human aspects of AI implementation in knowledge management systems. Building on Wang and Noe's (2010) research on knowledge sharing motivations, we find that successful AI integration requires careful attention to employee concerns, motivation, and training needs. This human-centred approach to technology implementation appears particularly crucial when organizations seek to use AI for capturing and transferring tacit knowledge, which traditionally has relied heavily on human interaction and relationship-building.

Moreover, the findings suggest that organizations must develop comprehensive frameworks for evaluating the effectiveness of their AI-enabled knowledge management initiatives. These frameworks should encompass both quantitative metrics for measuring knowledge transfer efficiency and qualitative assessments of organizational learning outcomes. This balanced approach to evaluation aligns with early insights from Alavi and Leidner (2001) while incorporating modern considerations specific to AI implementation.

Overall, this research provides valuable insights for organizations seeking to leverage AI technologies to enhance their knowledge management capabilities and overcome persistent organizational silos. The balanced approach addressing both technical and organizational factors is crucial for achieving successful AI integration and realizing the full benefits of improved knowledge capture, transfer, and utilization.

5. CONCLUSION

The findings from this research demonstrate the critical importance of a balanced approach to effectively integrate AI into knowledge management practices within organizations. The systematic literature review revealed that successful implementation requires addressing both the technical capabilities of AI systems as well as the organizational readiness and cultural factors.

The content analysis of real-world implementation cases highlighted the key role of strong leadership support and comprehensive stakeholder engagement in facilitating knowledge sharing and transfer through AI-enabled solutions. Organizations that were able to foster

a culture of collaboration and overcome departmental silos tended to achieve more sustainable results from their AI-powered knowledge management initiatives.

The comparative analysis underscored the need to tailor AI integration strategies to the unique contexts and requirements of individual organizations. While certain core principles of effective knowledge management hold true, the specific implementation approaches must remain flexible enough to address diverse departmental needs and industry-specific challenges.

Based on the research findings, several practical recommendations can be made for organizations seeking to leverage AI technologies to enhance their knowledge management capabilities:

- Develop robust data governance frameworks to ensure high data quality and seamless system integration.
- Secure strong executive sponsorship and cultivate a change-oriented organizational culture to drive user adoption of AI-enhanced knowledge management systems.
- Invest in comprehensive employee training programs to build AI and digital literacy, empowering staff to effectively utilize the new tools and capabilities.
- Establish clear ethical guidelines and accountability measures to build trust and address employee concerns around AI-driven knowledge management.

Future research should explore the long-term impacts of AI integration on organizational performance and knowledge management outcomes. Additionally, investigating the role of emerging AI technologies in facilitating the transfer of tacit knowledge could provide valuable insights for breaking down persistent organizational silos. Finally, studies examining the intersection of AI governance frameworks and knowledge management practices would help inform more robust and sustainable implementation strategies.

Overall, this research underscores that successful AI integration in knowledge management requires a holistic approach that addresses both technological and human factors. By adopting such a balanced perspective, organizations can unlock the full potential of AI-powered knowledge management to drive innovation, improve decision-making, and enhance organizational learning and effectiveness.

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