
Original Research Article

Application and Effectiveness Evaluation of Knowledge Management in Knowledge-Intensive Industries

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Abstract: Knowledge-intensive industries heavily rely on specialized knowledge and information, making knowledge management a critical component in these sectors. This paper explores the application of knowledge management in knowledge-intensive industries and evaluates its effectiveness. It analyzes the characteristics of knowledge-intensive industries and the central role of knowledge management while identifying the main challenges in current practices, such as the difficulties in system construction and implementation, barriers to knowledge sharing and utilization, and the inadequacies in effectiveness evaluation. The paper proposes targeted optimization strategies, including enhancing the construction and maintenance of knowledge management systems, fostering a culture of knowledge sharing and collaboration, and improving the evaluation framework for knowledge management effectiveness. The paper concludes by emphasizing the importance of knowledge management in knowledge-intensive industries and provides insights into future research directions and application prospects.

Keywords: knowledge management; knowledge-intensive industries; system construction; knowledge sharing

1. Introduction

With the rapid development of information technology and the transformation of the global economy, knowledge has become a key resource for driving innovation and enhancing competitiveness in enterprises. In knowledge-intensive industries, the acquisition, integration, application, and innovation of knowledge are core elements for the survival and growth of enterprises. This paper aims to explore the current application and effectiveness evaluation of knowledge management in knowledge-intensive industries, analyze existing challenges, and propose optimization strategies.

2. Characteristics of Knowledge Management in Knowledge-Intensive Industries

2.1. High Dependency and Specialization in Knowledge-Intensive Industries

Knowledge-intensive industries, as the name suggests, are those that primarily rely on knowledge and information as key production factors and depend heavily on highly specialized skills and expertise. These industries typically include sectors such as high technology, financial services, legal consulting, pharmaceutical research and development, and education and training. In these industries, the acquisition, integration, application, and innovation of knowledge directly determine a company's competitiveness and sustainable development capabilities^[1]. The dependency of knowledge-intensive industries on knowledge is evident across all aspects of their business operations.

The emphasis on specialization is particularly prominent in knowledge-intensive industries. The knowledge in these industries is highly specialized and complex, requiring professional personnel to manage and operate it. For example, the pharmaceutical R&D industry requires in-depth knowledge of medicine, biology, and chemistry,

while the financial services industry relies on advanced financial theories, risk management, and data analysis skills. Due to the complexity and ever-changing nature of knowledge itself, professionals in these industries must possess high levels of expertise and be capable of continuous learning and updating their knowledge. The rapid updating and continuous accumulation of knowledge are other significant characteristics of knowledge-intensive industries. With the rapid development of technology and changes in market demands, the pace of knowledge updates in these industries is extremely fast, and the knowledge structure within these industries is constantly evolving^[2].

2.2. The Core Role of Knowledge Management in Knowledge-Intensive Industries

Knowledge management is an indispensable strategic tool in knowledge-intensive industries. Its core role lies in enhancing a company's competitiveness, driving innovation, and enabling the sharing and utilization of organizational knowledge. In knowledge-intensive industries, knowledge management is not only the pillar of business operations but also the driving force for sustainable development^[3]. Knowledge management directly impacts a company's competitive advantage. In knowledge-intensive industries, a company's competitiveness often depends on its unique knowledge reserves and its ability to apply that knowledge.

Knowledge management is a key driver of innovation. Knowledge-intensive industries are based on knowledge and technology, and their development and progress rely on continuous innovation^[4]. Knowledge management creates a favorable environment for innovation by building knowledge repositories, encouraging knowledge sharing, and fostering cross-departmental collaboration. Through knowledge management systems, companies can effectively integrate knowledge scattered across different departments and employees, forming collective intelligence that inspires new ideas and innovative solutions.

2.3. Challenges and Opportunities in the Application of Knowledge Management

Despite the important role of knowledge management in knowledge-intensive industries, its application also faces numerous challenges. However, these challenges also present significant opportunities that can help companies further enhance the effectiveness and value of knowledge management. The complexity of knowledge flow and the difficulties of cross-departmental collaboration are major challenges for knowledge management. In knowledge-intensive industries, knowledge is often highly dispersed across different departments, teams, and individuals. Due to differences in the specialized fields and work priorities of each department, the flow and sharing of knowledge are often hindered. Additionally, the lack of effective communication and collaboration mechanisms between departments makes it difficult for knowledge to circulate efficiently within the organization. This not only reduces the efficiency of knowledge utilization but also impedes innovation and problem-solving^[5].

The dual-edged role of information technology in knowledge management is another significant challenge. With the continuous development of information technology, companies can leverage various technological tools and platforms to manage knowledge, such as knowledge bases, collaboration software, and artificial intelligence tools. While these technologies provide convenience, they also introduce new issues. For example, over-reliance on technology may lead to employees neglecting face-to-face communication and the transfer of unstructured knowledge. The rapid update of technology also necessitates continuous adjustment and upgrading of knowledge management systems, adding to the complexity of management^[6].

3. Issues in Knowledge Management within Knowledge-Intensive Industries

3.1. Challenges in the Construction and Implementation of Knowledge Management Systems

In knowledge-intensive industries, constructing and implementing a knowledge management system is a complex and challenging task. The construction of such systems involves multiple stages, including knowledge acquisition, classification, storage, sharing, and application, each requiring meticulous design and effective implementation. Due to the diversity and complexity of knowledge, particularly in knowledge-intensive industries, there are often significant differences in knowledge across different departments, business areas, and professional backgrounds. This diversity makes it difficult to standardize and generalize the knowledge management system.

The execution of a knowledge management system also faces significant challenges. Even if the system is successfully built, effectively implementing it within the organization and ensuring that it is accepted and used by employees remains a difficult task. The challenges in execution are primarily related to employees' perceptions and habits. Many employees may be accustomed to traditional working methods and may lack understanding and acceptance of the newly introduced knowledge management system, leading to low usage rates. Additionally, management support is often insufficient. The successful implementation of a knowledge management system requires strong support and resource investment from management. However, in practice, management often focuses more on short-term performance and overlooks the long-term value of knowledge management, which hinders the effective execution of the system.

3.2. Barriers to Knowledge Sharing and Utilization

Knowledge sharing and utilization are critical aspects of knowledge management, but in practice, knowledge-intensive industries face numerous obstacles that hinder the effective flow and utilization of knowledge. One major barrier is the general lack of willingness among employees to share knowledge. Due to the tacit and scarce nature of knowledge, employees often view it as a personal competitive advantage and are reluctant to share it. Experts and technical personnel in knowledge-intensive industries usually possess highly specialized knowledge, which is often difficult to express in simple language or documentation, exacerbating the issue of tacit knowledge. Tacit knowledge is difficult to transfer, which weakens the overall effectiveness of knowledge management. The lack of effective mechanisms and a culture of knowledge sharing within organizations is also a significant problem.

Departmental silos within organizations also severely impede the cross-departmental flow and utilization of knowledge. Differences in work goals, interests, and other factors between departments often lead to poor communication, further hindering knowledge sharing and collaboration. Barriers to knowledge utilization should not be overlooked either. In many cases, knowledge is shared, but due to a lack of effective application scenarios and support, it fails to translate into actual productivity. Much of the knowledge in knowledge-intensive industries is highly specialized and context-dependent, requiring specific circumstances to be effective. Companies often lack the contextual support needed for this knowledge, leading to poor utilization outcomes.

3.3. Inadequacies in Knowledge Management Effectiveness Evaluation

In knowledge-intensive industries, evaluating the effectiveness of knowledge management is a crucial step in ensuring the successful operation of the knowledge management system. However, many companies currently

face significant inadequacies in their evaluation processes, primarily manifested in the ambiguity of evaluation standards, the difficulty in quantifying knowledge management performance, and the lack of a continuous improvement feedback mechanism. The standards for evaluating the effectiveness of knowledge management are often vague and inconsistent. Due to the intangible and complex nature of knowledge, it is difficult for companies to establish universally applicable evaluation standards to measure the effectiveness of knowledge management. Existing evaluation methods often focus on qualitative analysis, lacking specific quantitative indicators, which leads to highly subjective evaluation results.

Quantifying knowledge management performance presents numerous challenges. The effectiveness of knowledge management is often reflected in the long-term development of the organization and its enhanced competitiveness, rather than in short-term financial metrics. Therefore, traditional performance evaluation methods struggle to capture the potential benefits of knowledge management. For example, how to quantify the impact of knowledge accumulation and sharing on innovation capacity, corporate culture, and employee skill development remains a challenge in current knowledge management evaluations.

The feedback mechanism for evaluating knowledge management effectiveness is also underdeveloped, affecting the application and improvement of evaluation results. Many companies, after conducting evaluations, fail to promptly feed the results back into the knowledge management system for necessary adjustments and optimizations. The lack of an effective feedback mechanism prevents companies from dynamically adjusting their knowledge management strategies based on actual conditions, which in turn hinders the continuous improvement and optimization of the knowledge management system.

4. Optimization Strategies for Knowledge Management in Knowledge-Intensive Industries

4.1. Strengthening the Construction and Maintenance of Knowledge Management Systems

To enhance the effectiveness of knowledge management in knowledge-intensive industries, it is crucial to strengthen the construction and maintenance of knowledge management systems. Companies should establish a comprehensive knowledge management system that encompasses core functions such as knowledge acquisition, classification, storage, retrieval, and sharing. This system should feature a user-friendly interface and robust search capabilities, enabling employees to quickly locate the knowledge they need. The knowledge management system should also be integrated with the company's other information systems to achieve seamless data and knowledge integration, thereby improving work efficiency.

The maintenance of the knowledge management system is equally important. As the company's business evolves and the external environment changes, the content in the knowledge repository needs to be regularly updated and optimized to ensure its timeliness and accuracy. Companies should establish dedicated knowledge management teams responsible for the maintenance and updating of the system, ensuring outdated information is promptly removed, and new knowledge is continually added. Additionally, companies should encourage employees to actively participate in the input and updating of knowledge by implementing incentive measures that increase employee engagement and usage of the knowledge management system. Companies must also pay attention to the security of the knowledge management system.

4.2. Promoting the Formation of a Knowledge Sharing and Collaboration Culture

The formation of a culture of knowledge sharing and collaboration is key to enhancing the effectiveness of

knowledge management. Companies should establish effective incentive mechanisms to encourage employees to actively participate in knowledge sharing. For example, companies can enhance employees' enthusiasm for sharing knowledge by offering rewards for knowledge sharing and recognizing outstanding knowledge contributors.

Creating a positive knowledge-sharing culture is also an important way to promote collaboration. Companies should organize training sessions, workshops, and team-building activities to strengthen employees' sense of cooperation and collective honor. Management should lead by example, actively participating in knowledge-sharing activities and setting an example for others. This top-down cultural guidance can help create a positive and open knowledge-sharing atmosphere within the company, breaking down departmental silos and fostering cross-departmental collaboration. Companies can also leverage advanced collaboration tools and platforms to enhance the convenience and efficiency of knowledge sharing.

4.3. Improving the Knowledge Management Effectiveness Evaluation System

A comprehensive knowledge management effectiveness evaluation system is essential for ensuring the effectiveness of knowledge management strategies. Companies should develop scientific and reasonable evaluation standards that cover all aspects of knowledge management. These standards should include both quantitative and qualitative indicators, such as knowledge utilization rates, frequency of knowledge sharing, employee satisfaction, and innovation outcomes. Through these indicators, companies can comprehensively assess the implementation of knowledge management, identify existing problems, and make necessary adjustments and optimizations.

Companies should adopt diverse evaluation methods to ensure the accuracy and comprehensiveness of evaluation results. Quantitative evaluations can be conducted through data analysis and indicator monitoring, while qualitative evaluations can be obtained through surveys, interviews, and case studies. Combining these methods can help companies better understand the impact of knowledge management on organizational performance and employee development, providing strong support for decision-making.

Companies should also emphasize the application of evaluation results. Evaluation is not only a process of identifying problems but also an opportunity for companies to enhance their knowledge management capabilities. Companies should develop targeted improvement plans based on evaluation results and incorporate them into their strategic planning to ensure that the knowledge management system continues to function effectively.

5. Conclusion

The application of knowledge management in knowledge-intensive industries is crucial for enhancing a company's competitiveness and innovation capacity. However, current practices in knowledge management face significant challenges, including the difficulty of constructing and implementing systems, numerous barriers to knowledge sharing and utilization, and inadequate effectiveness evaluation. This paper proposes optimization strategies such as strengthening the construction and maintenance of knowledge management systems, promoting the formation of a knowledge-sharing and collaboration culture, and improving the knowledge management effectiveness evaluation system. These strategies aim to address existing issues and improve the practical effectiveness of knowledge management.

References

- [1] Chen Lei. Construction of Knowledge Management System for Knowledge-Intensive Enterprises [J]. *Shanghai Electric Technology*, 2023, 16(2):65-67.
- [2] Luo Ying. Exploration of Knowledge Management in the Transportation Design Industry in the Context of Digitalization [J]. *China Survey & Design*, 2024(6).
- [3] Peng Qianhang. Research on the Impact of Knowledge Leadership on Knowledge Acquisition by R&D Teams in Patent-Intensive Enterprises [D]. *South China University of Technology*, 2023.
- [4] Huang Baoying. Knowledge Management: How Knowledge Sharing Enhances Employees' Social Status in Enterprises [J]. *National Circulation Economy*, 2022.
- [5] Guo Yu, Wang Xinying, Lin Chao, et al. Research and Application of Nuclear Power Knowledge Management [J]. *Management and Research of Scientific & Technological Achievements*, 2023(1):2.
- [6] Chen Xiaoqian. Innovation and Realization of Archival Management from the Perspective of Knowledge Management in Survey & Design Units [J]. *Shandong Archives*, 2023(2):17-21.