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Research Article

Critical Success Factors Adopted by an Integrated Energy Company in the Consolidation of the Entire Knowledge Management Process

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ABSTRACT

Organizations, whether public or private, need to keep their knowledge up-to-date and aligned with their guidelines and stakeholder needs. In complex sectors such as the energy industry, notably in the oil and gas industry, the technical knowledge developed over the years, by various agents, is not always properly systematized, through methodologies, processes, techniques and tools that can capture, store, share and apply knowledge in a structured way. This gap can be widened in state-owned enterprises, where the lack of an organizational culture that values and promotes knowledge management, resistance to change, and a lack of adequate technological infrastructure, can affect the way knowledge is managed and preserved. The application of this practice in state-owned enterprises presents additional challenges, such as the complexity of organizational structures, bureaucracy, and regular cycles of government change. The present work intends to address the main critical success factors present in a knowledge management initiative, adopted by a state-owned mixed economy company. The study provides an analysis of the main knowledge management practices adopted by the company studied, as well as the identification of the challenges faced and the best practices that can be replicated in other state organizations. The research involved the collection of data, such as documentary analysis of initiatives, programs, projects and corporate practices adopted, and the application of theoretical models and frameworks to analyze and interpret the results. The research can contribute to the advancement of knowledge management in state organizations, providing inputs for other companies in the public sector to develop their strategies considering the specificities of each organizational context and culture.

Keywords: Knowledge Management, Oil & Gas Industry, Critical Success Factors State Organizations, ISO 30401, *state-owned mixed economy company*.

INTRODUCTION

Nowadays, knowledge management in public companies has become central to discussions about efficiency and innovation in the sector. One of the most recurrent challenges is related to outsourcing and the insufficiency of technological infrastructure, in addition to the adoption of efficient methodologies, techniques, and tools to capture, organize, and disseminate existing knowledge. Lack of autonomy and excessive bureaucracy can limit the freedom and initiative to share information and knowledge among employees.

These organizations, often operating in regulated sectors, face specific political and social demands, where knowledge management may encounter additional barriers. The context in which they operate can bring risks to their efficiency

as public agents and, ultimately, to the very survival of the organization. In the face of these challenges, it is essential to understand the particularities of the public sector and seek solutions to overcome existing threats.

Adesina and Ocholla. emphasize that this dynamic can lead to discontinuity in operational processes and the deterioration of organizational culture [1]. Therefore, it is imperative that public companies implement knowledge sharing strategies that specifically address the barriers to effective knowledge transfer.

To face these challenges, several strategies have been proposed in the literature. It's advisable that organizations adopt clear knowledge management practices to facilitate sharing and minimize losses associated with turnover [2]. The importance of aligning knowledge management practices with the organization's strategic objectives, emphasizing the role of collaborative intelligence in overcoming difficulties related to knowledge loss [3].

The integrating strategic human resource management practices with knowledge management can help public companies minimize the risks associated with the loss of this knowledge, promoting an environment conducive to continuous learning [4]. This approach not only improves knowledge retention but strengthens the organization's ability to innovate and adapt to change.

The main objective of this research is to present the critical factors that influence the implementation of knowledge management in a public company, identifying the practices adopted and the lessons learned throughout this process. Identifying critical success factors (CSFs) is essential, as they can determine the success or failure of these initiatives. Understanding these CSFs is critical so that state-owned enterprises can not only accumulate but also share, create, and retain organizational knowledge.

METHODOLOGY / LITERATURE REVIEW / CASE PRESENTATION

In this case study, the researchers analyzed the main knowledge management practices adopted by a public company. The document analysis involving the reading of reports, interviews with participants and the evaluation of corporate standards allowed the identification of strategies and methods employed by the organization to manage and disseminate knowledge internally.

Although the literature review highlighted a significant gap regarding the "critical success factors", different authors were considered in the present work, establishing a time limit in the last 20 years (2004-2024) to ensure that the data reflect the most recent and relevant trends in the area of knowledge management, resulting in 108 articles selected for analysis [5], [6], [7], [8], [9], [10], [11], [12], [13].

The systematization of knowledge management began to be consolidated in the international ISO standards with the publication of ISO 9001:2015 - Quality management systems — Requirements [14]. This standard introduced the need to document and control processes, emphasizing the importance of explicit knowledge for the effectiveness of the management system. These requirements aim to protect the organization's intellectual capital, ensuring that essential knowledge is not lost with the departure of employees.

The evolution of this theme continued with the inclusion of requirements related to knowledge management in other ISO standards, such as ISO 14001:2015 - Environmental management systems [15], ISO 45001:2018 - Occupational health and safety management systems [16], and ISO 50001:2018 - Energy management systems [17]. Each of these standards addresses knowledge management in their respective contexts, highlighting the importance of identifying and managing the knowledge needed to ensure the effectiveness and sustainability of operations.

The culmination of this development was the publication of ISO 30401:2018 – Knowledge Management Systems [18], which provides guidance for organizations in optimizing the value of knowledge by promoting the creation, sharing, and effective use of knowledge at all levels. She highlights the importance of knowledge management culture, leadership commitment, and employee competence as fundamental elements for the success of the knowledge management system.

This research is justified by the need to fill the gap in the literature on the critical success factors in the implementation of knowledge management in public companies. By identifying and analyzing the effective practices and challenges faced by the organization studied, this study aims to provide a theoretical and practical basis that can be applied by other state-owned companies, promoting a culture of knowledge management that values learning and collaboration among employees.

CASE PRESENTATION

This case study employed a qualitative approach to investigate the critical success factors in the implementation of knowledge management. Exploratory and descriptive research methods were used, including semi-structured interviews with managers and company specialists. In addition, internal documents, annual reports, and meeting records were analyzed to gain a comprehensive understanding of knowledge management practices.

Data collection included interviews with 15 participants, selected for their direct involvement in the company's knowledge management practices. The interviews were conducted through the TEAMS app, and the AI tool Copilot was used to transcribe the respondents' comments. Data analysis was conducted using the content analysis technique, allowing the identification of recurring themes and patterns.

3.1 Profile of the Company Studied

The company studied, is a mixed-capital company majority-controlled by the Brazilian government, founded in 1953, employing approximately 37,000 employees. It stands out as one of the world's largest producers of oil and gas, with a daily production of 2.78 million barrels of oil equivalent (BOE) – which includes oil and natural gas, proven reserves of 10,921 million barrels of oil equivalent and operates more than 1,067 oil and natural gas wells. Geographically, the company has a significant presence in several regions of Brazil, especially in the pre-salt fields, in addition to international activities on all continents.

In the oil and gas industry, especially in the current context of energy transition that requires more sustainable practices, knowledge management becomes a critical success factor. The departure of experienced professionals due to retirement processes, outsourcing of labor, and the lack of interest of the new generations in working in an extractive sector, highlight the importance of effective management of accumulated knowledge.

3.2 Knowledge Management Practices

The company's Knowledge Management System is designed to identify, create, preserve, share, and apply essential knowledge to the organization's processes and projects. Through structured practices such as tutoring, mentoring, publication of technical and academic papers, technical rotation, mentoring programs and communities of practice, the company promotes the socialization and recording of knowledge, allowing integration, exchange of experiences and continuous improvement of projects and work processes.

The existing Knowledge Management (KM) framework is designed to facilitate the sharing, retention, and evolution of knowledge across the organization. This framework encompasses diverse practices that cater to different types of knowledge and employee needs, ensuring that knowledge is not only created but also utilized effectively. Figure 1 illustrates the Knowledge Management System of the company studied.

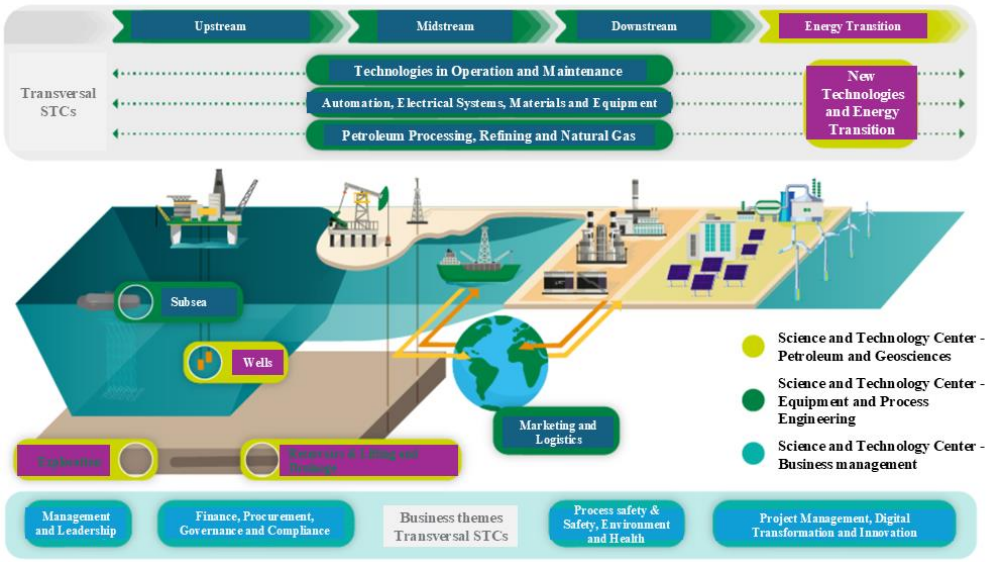


Figure 1. Knowledge Management System

Source: Authors (2024)

3.2.1 Science and Technology Centers - STC

The company studied adopted Science and Technology Centers (STC) as part of its strategy to support the knowledge management process. Such centers are organizational units responsible for research, development, and technological innovation within the company. They are composed of multidisciplinary teams of highly qualified professionals, including engineers, scientists, and technicians specialized in various areas of knowledge.

The main objective of the STCs is to promote the generation of scientific and technological knowledge and its application in the company's activities. They work in the development of new technologies, processes, and products, aiming to increase operational efficiency, reduce costs, improve the quality of products and services, and ensure the safety and sustainability of the company's operations.

The three main knowledge management practices adopted by the company are Tutoring, Mentoring, and Production of technical and academic papers. These practices were identified in the interviews as those that presented the greatest scope and evolution in the last three years.

Table 1 presents the practice of knowledge management Tutoring, with its description, the Critical Success Factors and the respective Challenges, Obstacles and Difficulties.

Table 1 - Tutoring

Tutoring	Critical Success Factors	Challenges, Obstacles, and Difficulties
Individualized guidance and support process that aims at the professional development of employees, as it allows technical knowledge (tacit or explicit) to be shared within the organization.	- Careful selection of tutors with experience and communication skills.	- Resistance to change on the part of tutors or mentees.
	- Establishment of clear objectives for the mentoring process.	- Lack of time for tutoring sessions.
	- Creating an environment of trust and openness to learning.	- Difficulty creating a safe environment for open discussions.

Source: Authors (2024)

Table 2 presents the practice of knowledge management Mentoring, with its description, the Critical Success Factors and the respective Challenges, Obstacles and Difficulties.

Table 2 - Mentoria

Mentoring	Critical Success Factors	Challenges, Obstacles, and Difficulties
Process of transfer and retention of knowledge within organizations, involving the interaction between a mentor, who is an experienced professional, and a mentee, who seeks guidance and development in his career.	- Alignment between mentors and mentees in terms of expectations and goals.	- D ifferences in expectations between mentors and mentees.
	- Training for mentors on how to guide and support effectively.	- Lack of commitment from mentors.
	- Continuous evaluation of progress and mutual feedback.	- Difficulty measuring the progress and results of mentoring.

Source: Authors (2024)

Table 3 presents the knowledge management practice **"Production of Technical and Academic Papers",** with its description, the Critical Success Factors and the respective Challenges, Obstacles and Difficulties.

Table 3 - Production of technical and academic papers

Production of technical and academic papers	Critical Success Factors	Challenges, Obstacles, and Difficulties
This process is supported by the Corporate University, which offers training for employees in the application of methods and guidance, in the production of technical and academic papers for internal and external forums.	- Methodological support for interested employees	Proficiency of employees interested in the selected topics and the type of research that will be carried out
	- Access to corporate databases and academic databases	- Availability of access to work in specific areas of knowledge
	- Technical support for documentary research and formatting according to standards and procedures established by academic, governmental, technical or scientific institutions, national and international.	Insufficient technical support to meet all user demands, especially during periods of high demand such as academic deadlines or important projects

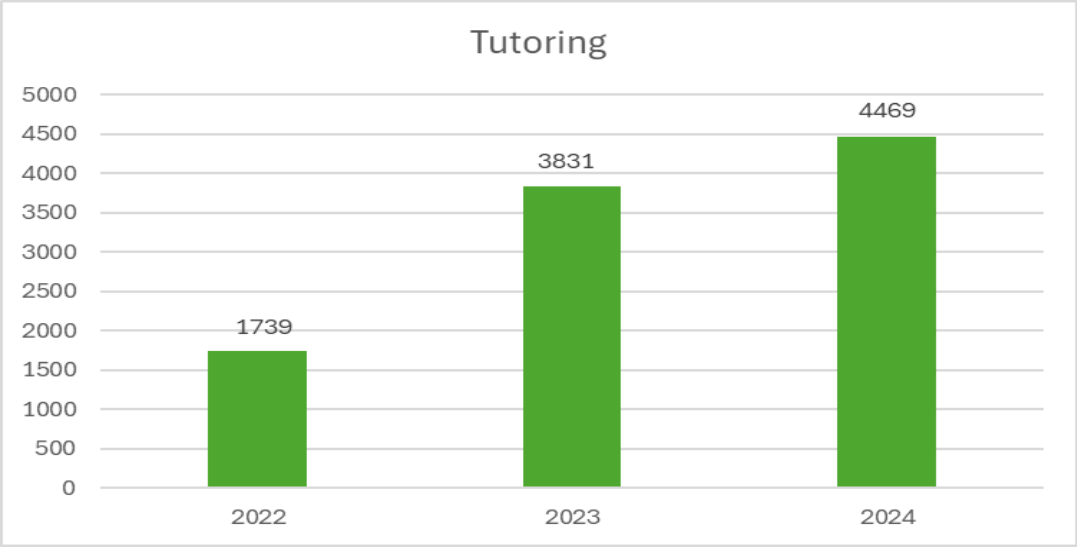
Source: Authors (2024)

RESULTS

When analyzing the results of each knowledge management practice adopted, a significant growth in the number of initiatives carried out is noted.

Graph 1 shows the performance of tutoring practice, which registered an increase of approximately 120% from 2022 to 2023 and about 17% from 2023 to 2024 (until September). This trend is corroborated by the literature, which emphasizes the importance of tutoring as an effective means for the transfer of technical knowledge, both tacit and explicit, contributing to the strengthening of professional competencies and the improvement of organizational performance.

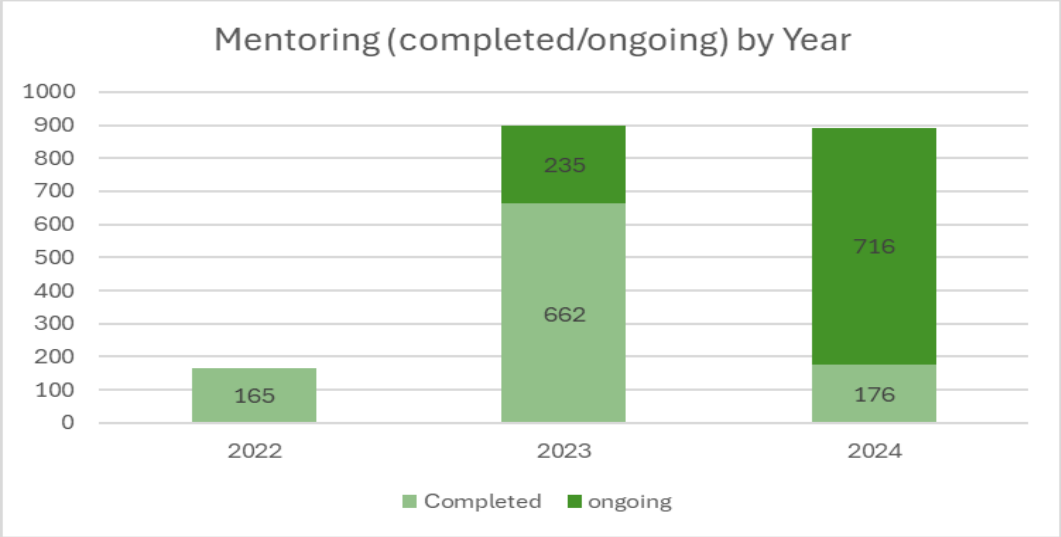
The theoretical and practical implications of these findings are considerable. Mentoring not only promotes individual learning, but also fosters a collaborative organizational culture, which is essential for the sustainable development of the company under study.



Graph 1 – Tutoring in the period from 2022 to 2024

Source: Authors (2024)

Graph 2 presents the performance of the practice of "Mentoring", where the analysis of historical data reveals a significant growth in mentoring activities over the years. This significant increase can be interpreted as a reflection of the company's leadership strategy, which values the practice through the support of the Human Resources area and intense dissemination in the Corporate Workplace. Mentors and mentees are encouraged to participate in the various mentoring programs, with emphasis on mentoring aimed at women and affirmative actions related to diversity and inclusion.

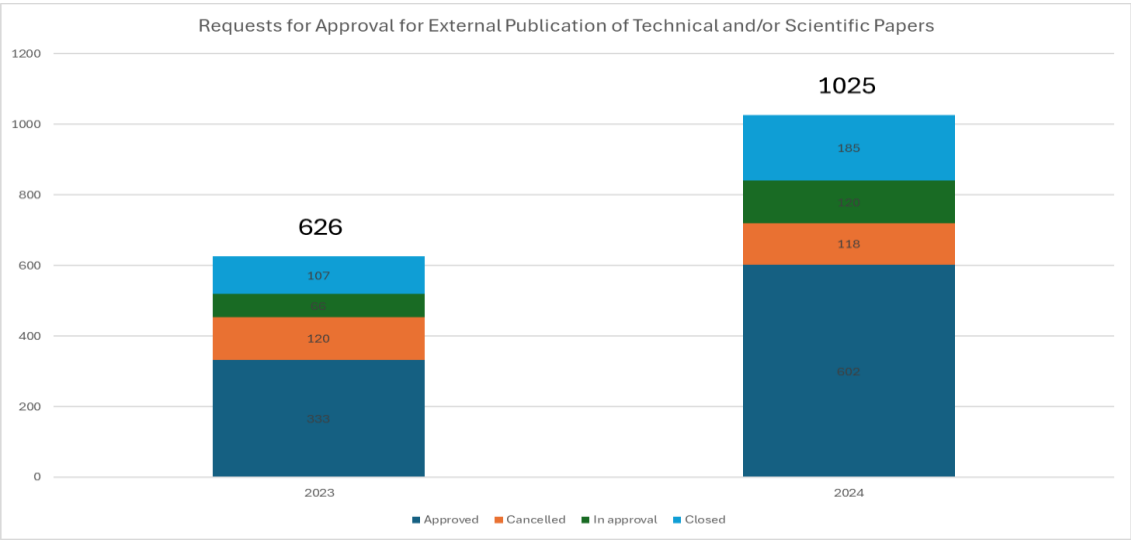


Graph 2 – Mentoring in the period from 2022 to 2024

Source: Authors (2024)

Graph 3 shows the significant expansion in the "Production of technical and academic papers" between 2023 and 2024 (until September). This growth of approximately 64.5% can be attributed to several factors, such as the methodological support offered to employees, access to corporate and academic databases, and technical assistance in research and formatting of papers.

According to evaluations carried out by the participants during the workshops and after the publication of the papers, the initiatives not only facilitated academic production, but also contributed significantly to the improvement of the participants' skills. This reflects the organization's commitment to continuous professional development and the generation of knowledge applied to the various organizational realities.



Graph 3 - Production of technical and academic papers

Source: Authors (2024)

CONCLUSION

Tutoring and mentoring practices were identified as effective strategies for the transfer of knowledge between employees, facilitating the development of skills and competencies through the sharing of experiences and personalized guidance. In addition, the production of technical and academic papers proved to be fundamental for the dissemination of knowledge and the generation of innovation within the company.

The relevance of this study lies in the importance of knowledge management as a competitive advantage for the analyzed company. Through the implementation of these practices, it is possible to promote organizational learning, improve decision-making, and increase operational efficiency.

The final considerations highlight the need for continuous investment in tutoring and mentoring programs, as well as in promoting the production of technical and academic works. In addition, it is suggested to create an organizational culture that values knowledge sharing and encourages the active participation of employees in these practices.

In short, the implementation of knowledge management practices, such as tutoring, mentoring, and the production of technical and academic papers, can contribute significantly to the development and success of a state-owned company, promoting continuous learning, innovation, and the improvement of organizational processes.

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