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DETERMINANTS AND BENEFITS OF KNOWLEDGE MANAGEMENT: CASE OF THE DRGB SONATRACH TRC

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ABSTRACT

Knowledge management has become essential for organizations seeking a sustainable competitive advantage. However, its success depends on several prerequisites. This article aims to provide an overview of knowledge management applied within an Algerian company, the Regional Directorate of Bejaia, for transporting hydrocarbons by pipelines, "DRGB SONATRACH TRC." To this end, we employed two research instruments: an interview guide for a hierarchical manager and a questionnaire addressed to employees. Our final sample consists of 51 employees from various professional categories. SPSS version 23 was used for the analysis of the collected data, and the non-parametric Spearman's rho correlation test was utilized to verify the research hypotheses.

Our findings indicate that knowledge management in the studied enterprise manifests through the combination of five subprocesses: creation, acquisition, application, sharing, and storage of knowledge. These processes are influenced, to varying degrees, by the following determinants: organizational culture, leadership, information technologies, and strategy. Our study also highlighted the benefits of knowledge management, such as increased market share, improved quality of products and services offered, and enhanced company image and productivity.

In light of these results, we recommend the formalization of knowledge management practices and their integration into the company's strategy, the promotion of a flexible compensation system that includes rewards for innovative ideas and solutions, as well as the relaxation of bureaucratic procedures to encourage individual initiatives and creativity. This study enriches the existing literature, which tends to analyze the knowledge management process in a fragmented manner, by proposing a focus on concrete mechanisms applicable in practice. Its practical contribution is reflected in the identification of strengths to leverage and obstacles to overcome.

KEYWORDS: Knowledge Management, Subprocesses, Determinants, Benefits, DRGB SONATRACH TRC, Algeria

JEL CLASSIFICATION: D80, D83, M59.

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INTRODUCTION

The capacity to manage knowledge is considered one of the factors of competitiveness (Dalkir, 2017). In the Algerian context, companies place great importance on knowledge management; however, its application rate remains moderate or even low (Benabderrahmane-Bouriche, 2012; Chenchouna & Britil, 2018).

The objective of this article is to provide an overview of knowledge management as applied within an Algerian company, specifically the Regional Directorate of Bejaia for Hydrocarbon Transport by

Pipelines, "DRGB SONATRACH TRC." It is important to note that in terms of knowledge management, the SONATRACH group considers the capitalization and transfer of knowledge related to the oil and gas professions as a strategic project (Benmahamed & Ermine, 2006), which makes this company an ideal setting for our study. Thus, our starting question is as follows: What is the current state of knowledge management within Algerian companies, particularly within DRGB SONATRACH TRC? This article begins with a literature review on knowledge management, including the case of Algeria, and highlights the research hypotheses. Next, the research methodology is outlined. Finally, the research results are presented and discussed.

1 THEORETICAL BASES

1.1 Overview of Knowledge Management

Knowledge is presented by Bouchez (2016) as a non-rival good, meaning that its use does not lead to destruction or wear. It is also described as cumulative, non-exclusive, and difficult to control due to risks of leakage and evaporation. This nature has led organizations to consider how to manage it. Knowledge management is thus defined by Dalkir (2017, p. 13) as "a deliberate and systematic approach to ensure the full utilization of an organization's knowledge base."

The knowledge management process encompasses five main subprocesses: acquisition, creation, application, storage, and transfer of knowledge (Don-Serge, 2019), described as follows:

- **Knowledge Acquisition:** This process refers to obtaining new and useful knowledge and ideas (Yew Wong & Aspinwall, 2004). Various means of knowledge acquisition are proposed by Gourova (2010), Lee and Wong (2015), and Yew Wong and Aspinwall (2004), such as courses, seminars and exhibitions, training programs, research and development, learning and experimenting with new working methods, acquiring knowledge assets (patents, software, etc.), hiring experts, using the internet, forming joint ventures to access other organizations' knowledge, and leveraging the knowledge of clients, suppliers, and other stakeholders through an open innovation process.
- **Knowledge Creation (Generation):** This process refers to the development of new knowledge and know-how that did not previously exist within the organization (Dalkir, 2017). Knowledge can be created through communication (Gourova, 2010), teamwork, and brainstorming (Lee & Wong, 2015), which foster confrontation and the generation of new ideas.
- **Knowledge Application (Utilization):** Knowledge only gains value when it is properly exploited and applied (Lee & Wong, 2015). The application process aims to integrate this knowledge into the organization's products, services, and practices (Yew Wong & Aspinwall, 2004). Knowledge application provides many benefits to the organization, such as the development of new or improved products and services (Lee & Wong, 2015), and the satisfaction of users in carrying out their daily work (Gourova, 2010).
- **Knowledge Storage (Preservation, Codification):** The process of knowledge preservation involves structuring and storing created or acquired knowledge to formalize it and make it more easily accessible (Yew Wong & Aspinwall, 2004). This step is crucial for organizations aiming to avoid knowledge loss due to employee turnover, reorganization, or technical issues (Gourova, 2010). Therefore, it is essential for organizations to allow their employees the time to codify their knowledge and integrate it into the organizational memory (Lee & Wong, 2015).
- **Knowledge Transfer (Sharing):** This involves the dissemination and distribution of knowledge, as well as the transfer of skills, technologies, and best practices (Wang & al., 2008; Yew Wong & Aspinwall, 2004). This process is facilitated by face-to-face discussions, work meetings, and coaching and mentoring by more experienced and knowledgeable individuals (Lee & Wong, 2015).

The success of implementing knowledge management depends on several (Khalifa & Liu, 2003). Only those used in the empirical section are developed below:

- **Organizational Culture**: A knowledge-oriented organizational culture is one of the key determinants for the successful implementation of knowledge management (Don-Serge, 2019). It is characterized by a high level of trust among employees, strong collaboration and mutual support, and tolerance for mistakes (Lee & Wong, 2015). Thus, an open culture promotes individuals' willingness to share and exchange knowledge (Priyono, 2016). From the perspective that it is necessary to develop a culture in which individuals are encouraged to generate new ideas, knowledge, and solutions, the following hypothesis is proposed: **H_1**: The organizational culture has a positive influence on the knowledge management process.
- **Leadership**: Strong involvement from top management is required for the effective implementation of knowledge management (Garcia-Perez et al., 2019). It is important to note that the leadership style most suited for managing knowledge is transformational leadership (Noruzy & al., 2013), as it fosters commitment and satisfaction among subordinates (Yan & al., 2014). Furthermore, hierarchical leaders should develop their emotional intelligence, particularly in terms of empathy and social skills, which are essential for the effective integration of employees into the knowledge management process (Konigova & al., 2012). It is in this context that the following hypothesis is proposed: **H_2**: The leadership has a positive influence on the knowledge management process.
- **Information Technology**: Information systems help organizations assess and adapt their strategies to address uncertainties in the external environment (Ramakrishnan & al., 2012). They are considered a lever for value creation, dependent on the company's strategy and organizational structure (Bounfour, 2011). Consequently, an information system integrating new collaborative technologies will facilitate the transition from centralized management to network-based management (Abel, 2015), as well as the development of distinctive technological competencies (Real & al., 2006). Information technologies play a crucial role in the success of knowledge management (Bergeron, 2003; Gourova, 2010). Indeed, individuals who access and integrate these technologies into their work gain access to the organization's knowledge capital and codify their tacit knowledge (Abbas & Sağsan, 2019), significantly improving their decision-making and problem-solving abilities (Baltzan, 2020), and becoming more receptive to learning (Bounfour, 2011). This, therefore, leads to the following hypothesis: H3: The information technologies have a positive influence on the knowledge management process..
- **Strategy**: A high-performing knowledge management system is one that aligns with the overall strategy of the organization by integrating both strategic objectives and the requirements of knowledge management (Bencsik, 2021). In this regard, Lee and Wong (2015) point out that without a clearly defined strategy, the company's efforts risk being dispersed, potentially leading to wasted time and valuable resources. To this end, Yew Wong and Aspinwall (2004) suggest setting clear knowledge management objectives and incorporating them into work procedures, using easily retrievable formats for storing acquired knowledge for future use, and allocating a specific budget for the collection and sharing of knowledge. This leads to the following hypothesis: **H_4**: The strategy has a positive influence on the knowledge management process.

Its implementation leads to positive outcomes, such as supporting organizational performance (Lee & Wong, 2015), promoting innovation and competitiveness (Garcia-Perez & al., 2019), improving employee retention (Zamir, 2019), and enhancing customer satisfaction (Edvardsson & Durst, 2012). Dalkir (2017) emphasizes the impact of knowledge management on individual, collective, and organizational dimensions, which she specifies as follows:

- Individual dimension: Knowledge management supports individuals in accomplishing their work, resulting in time savings through better decision-making and more effective problem-solving.

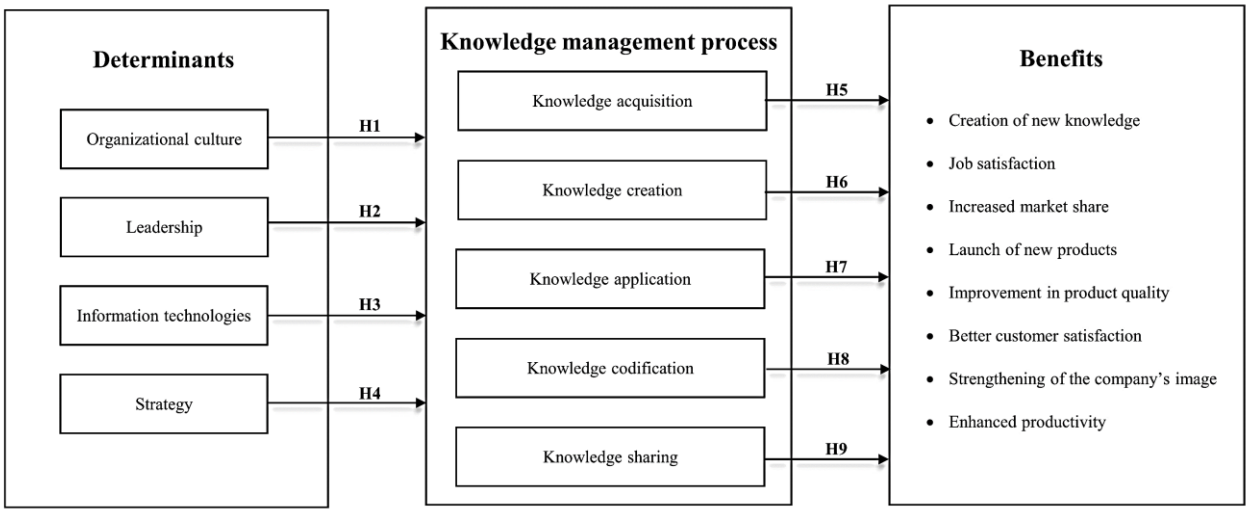
- Collective dimension: Knowledge management enhances the professional skills of workgroups through peer mentoring and networking among individuals, thus fostering the development of a common language.
- Organizational dimension: Knowledge management promotes the development of strategies aimed at problem-solving, the dissemination of best practices, and the encouragement of creativity and innovation.

It is in this context that the following hypotheses are proposed:

H_5: The knowledge acquisition subprocess has positive impacts on the company.
H_6: The knowledge creation subprocess has positive impacts on the company.
H_7: The knowledge application subprocess has positive impacts on the company.
H_8: The knowledge codification subprocess has positive impacts on the company.
H_9: The knowledge-sharing subprocess has positive impacts on the company.

The research model used in this study is illustrated below.

Figure 1 **Illustration of the Research Model**



(*Source:* Created by the authors)

1.2 Previous Studies on Algeria

The study of knowledge management in the Algerian context has led to several scientific articles, with 446 published between 2012 and 2022 on the ASJP platform. Algerian researchers have emphasized its positive outcomes, such as the development of innovation (Kalaf & al., 2022), the improvement of performance (Bourekoua & Boumediene, 2022), and the enhancement of customer satisfaction (Irain & al., 2022).

Other researchers, however, highlight the lack of dissemination of knowledge management in Algerian companies, explaining the slow implementation by the rigidity of companies and the lack of a knowledge-sharing culture (Benabderrahmane-Bouriche, 2012; Boukerrit & Chorfi, 2022). Other reasons include a poor understanding of knowledge management objectives (Elkinai, 2022), employees' weak mastery of technological tools (Zerga & Nekkal, 2022), and the lack of managerial skills necessary to support the changes associated with the knowledge management process (Chenchouna & Britil, 2018).

2 METHODS

2.1 Research Instrument and Measurement Method

We employed two research instruments: an interview guide and a questionnaire. The interview guide aims to assess top management's interest in knowledge management and is structured around the role of knowledge within the company, with details on knowledge acquisition, storage, sharing, and use, as well as the benefits of knowledge management. The interview is conducted face-to-face with the head of the "Administration and Social" department at DRGB SONATRACH TRC, who has 24 years of experience within the company and has held various leadership positions, including head of the "Training" department. The responses from the interview will be analyzed alongside the questionnaire survey results. The purpose of the questionnaire is to understand the practical application of knowledge management principles within the company. It is divided into four main sections, each containing a series of items: the respondent's profile (04 questions), the analysis of knowledge management subprocesses (26 questions), and the evaluation of its determinants (17 questions) and impacts (08 questions).

The target population for the questionnaire consists of employees from the General Directorate of DRGB SONATRACH TRC, in their capacity as knowledge workers (Dalkir, 2017). They were selected based on their accessibility (convenience sampling), regardless of their rank or the department in which they work. The survey was conducted over the course of one month, from May 2, 2024, to May 31, 2024.

Regarding the operationalization of key concepts in our research model (subprocesses, determinants, and benefits of knowledge management), we drew on empirically tested measures from the works of Wang and al. (2008), Lee and Wong (2015), and Carrasco-Hernández and Jiménez-Jiménez (2017). The response scale used in the questionnaire was a five-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree".

Due to the ordinal nature of our data and in accordance with Sedgwick (2014), we employed Spearman's rank correlation coefficient to test our research hypotheses. It is important to note that this is a non-parametric correlation technique used to assess the extent to which "a change in the magnitude of one variable is accompanied by a change in the magnitude of the other variable" (Zar, 2005, p. 1).

2.2 Sample Size and Characteristics

At the conclusion of the survey, 51 usable questionnaires were collected, with an overall completion rate of 98%. The data were processed using SPSS software, version 23.

Our sample is predominantly composed of women (61%), which can be explained by the predominance of women within the management of DRGB SONATRACH. The respondents are predominantly managers, accounting for 84%, while supervisors and operational staff represent 14% and 2% of the total participants, respectively. Regarding educational level, 92% of the respondents hold a university degree. The respondents work in the following departments: Administration and Social Services (27%), Human Resources Management (22%), Budget (20%), Health, Safety, and Environment (HSE) (12%), Information Technology (12%), and Finance (8%). Additionally, more than half of the participants (55%) have over 10 years of experience within the company under study.

3 RESULTS

3.1 Overview of the Five Sub-processes of Knowledge Management

3.1.1 Knowledge Acquisition

This axis includes eight items (Mean = 3.83; Standard Deviation = 0.83). Among the internal sources of knowledge acquisition cited are interactions with competent and experienced colleagues (88%), experimenting with new ideas (80%), and acquiring knowledge from superiors (69%). External sources include participation in training programs (75%), exchanges with external partners (53%), interactions with external professionals and technical experts (65%), and Internet browsing (84%). However, only 37% of respondents reported acquiring knowledge from suppliers and customers.

3.1.2 Knowledge Creation

This sub-process is evaluated using five items (Mean = 4.13; Standard Deviation = 0.98), and their analysis highlights that respondents primarily create knowledge through teamwork (88%), participation in meetings and brainstorming sessions (73%), group problem-solving (84%), and interactions with experienced employees (78%). Additionally, 77% of respondents indicate being motivated to generate new ideas and solutions when rewards are offered in return.

3.1.3 Knowledge Application

The analysis of the four items measuring this sub-process (Mean = 3.94; Standard Deviation = 0.76) indicates that respondents regularly apply the knowledge they acquire (82%), whether it be to solve encountered problems (92%) or to design new products and/or reconfigure company processes (59%). However, it should be noted that only 49% of respondents report receiving support from their superiors during this stage.

3.1.4 Knowledge Codification

This axis is evaluated through three items (Mean = 3.58; Standard Deviation = 1.03). The analysis reveals that the majority of respondents, 80%, are convinced of the importance of codifying and storing knowledge in written and/or electronic form. Additionally, more than half (51%) confirm replacing outdated knowledge with new information. However, only 33% of respondents indicate receiving support from their superiors during this codification phase.

3.1.5 Knowledge Sharing

This sub-process is measured by six items (Mean = 3.85; Standard Deviation = 0.88). Results show that respondents share the knowledge they possess with colleagues to a degree of 90%. This sharing occurs mainly during meetings (75%), through available technological tools (73%), and via the company's manuals and databases (67%). However, only 47% of respondents consider these tools to be easily accessible. Additionally, only 29% are convinced of the effectiveness of face-to-face communication in knowledge transfer. In this regard, the interview guide analysis identifies obstacles that hinder this process: the centralization of management at the leadership level, which inhibits employees' autonomy and limits their attempts to share their knowledge; the compartmentalization of offices, which favors individual work over collective efforts; and the resistance to change from some employees regarding the transfer of their knowledge capital.

3.2 Analysis of the Determinants of the Knowledge Management Process

3.2.1 Organizational Culture

This axis is evaluated by six items (Mean = 3.52; Standard Deviation = 1.02). The results indicate a strong sense of trust among colleagues (71%) and towards superiors (68%). They also highlight a tolerance for mistakes (69%) and a high level of collaboration between employees (71%). However, only 49% of respondents confirm the encouragement of new ideas, debates, and discussions.
The interview guide analysis reveals difficulties in managing new ideas and individual initiatives, partly explained by the fact that DRGB SONATRACH TRC is a public company subject to strict procedures that must be followed.

3.2.2 Leadership

This axis is measured by three items (Mean = 3.57; Standard Deviation = 1.23). The results emphasize the attention given to knowledge by the superiors at DRGB SONATRACH TRC (71%), who place great importance on knowledge sharing (73%) and support the experimentation of new ideas (67%). However, their role in encouraging such initiatives is limited to offering professional promotions as the only form of reward. They lack the authority to grant financial rewards, as compensation management, based on qualifications rather than skills, is governed by strict regulations (Abderrahmane, 2021).

3.2.3 Information Technology

Three items are used to measure this determinant (Mean = 4.46; Standard Deviation = 0.86). Respondents unanimously agree that information technology facilitates the storage and sharing of knowledge and ideas (92%), ensures smooth communication among company members (90%), and serves as essential channels for accessing both internal and external knowledge (88%).

3.2.4 Strategy

This final determinant is evaluated by five items (Mean = 2.92; Standard Deviation = 1.04). The results reveal that only 47% of respondents confirm being assigned specific objectives for the exploitation and dissemination of acquired knowledge, and only 43% report receiving support from their superiors in this endeavor. Additionally, only 28% of respondents indicate being granted dedicated time specifically for the storage and sharing of knowledge. The absence of a budget specifically allocated to knowledge management (80%) is also highlighted.
From the interview guide analysis, we observe that superiors informally support knowledge management initiatives. This is attributed to the fact that their work is governed by strict work procedures and mandatory protocols, which limit their autonomy.

3.2.5 Testing the First Research Hypothesis

The correlation analysis between the knowledge management process and its determinants is conducted using Spearman's test, with a significance level set at 5%.

Our results confirm the existence of a moderate positive correlation between the four determinants and the overall knowledge management process. The culture, leadership, and strategy applied within the studied company positively influence the processes of knowledge application, codification, and transfer. However, these determinants do not have a significant impact on the knowledge acquisition and creation processes (p-value > 0.05). Regarding information technologies, they positively influence the sub-processes of knowledge management, except for the codification process. Based on these results, we partially confirm hypotheses H_1, H_2, H_3, and H_4.

Table 1 **Correlation Test: Determinants - Subprocesses of Knowledge Management**

		Determinants			
		Organizational Culture	**Leadership**	**Information technologies**	**Strategy**
Knowledge management process	Correlation coefficient	0.488**	0.517**	0.515**	0.565**
	Sig. (Two-tailed)	0.000	0.000	0.000	0.000
	N	51	51	51	51
Acquisition process	Correlation Coefficient	0.137	0.148	0.326*	0.153
	Sig. (Two-tailed)	0.338	0.299	0.020	0.284
Creation process	Correlation Coefficient	0.169	0.189	0.526**	0.195
	Sig. (Two-tailed)	0.236	0.185	0.000	0.171
Application process	Correlation Coefficient	0.481**	0.462**	0.532**	0.629**
	Sig. (Two-tailed)	0.000	0.001	0.000	0.000
Codification process	Correlation Coefficient	0.485**	0.638**	0.269	0.455**
	Sig. (Two-tailed)	0.000	0.000	0.056	0.001
Transfer process	Correlation Coefficient	0.518**	0.437**	0.373**	0.581**
	Sig. (Two-tailed)	0.000	0.001	0.007	0.000
Evaluation of hypotheses		H_1 Partially validated	H_2 Partially validated	H_3 Partially validated	H_4 Partially validated

**. The correlation is significant at the 0.01 level (two-tailed).
*. The correlation is significant at the 0.05 level (two-tailed).

(*Source*: Results obtained using SPSS v.23)

3.3 Analysis of the Contributions of Knowledge Management

3.3.1 Evaluation of the Contributions of Knowledge Management

The evaluation of this aspect is conducted through eight items (Mean = 3.50; Standard Deviation = 0.82). The respondents affirm, on the one hand, the increase in the market share of DRGB SONATRACH-TRC (51%), the quality of the company's products and services (53%), and the improvement of its image (55%), and productivity (59%). On the other hand, only 41% of them consider the acquisition of new

knowledge as a competitive advantage, 45% report an increase in their job satisfaction, and 39% observe a rise in customer satisfaction. Furthermore, only 27% of participants note the launch of new products and/or services in the past two years. In this regard, according to the annual report (2022) of the SONATRACH group, several projects have been completed, including the inauguration of a separation and compression center, the commissioning of a pipeline supervision center for transportation activities, the launch of a second photovoltaic power plant, and the establishment of a production complex for Linear Alkyl-Benzene, used in the detergent industry.

3.3.2 Testing the Second Research Hypothesis

The following table presents the results of Spearman's correlation test (Spearman's rho) concerning the evaluation of the correlation between the knowledge management process and its benefits. The significance level is 5%.

Table 2 **Correlation test: Knowledge Management (KM) process - Benefits**

		KM process	Knowledge Management Subprocesses				
			Acquisition process	Creation process	Application process	Codification process	Transfer process
Benefits of KM	Cc	0.575**	0.356*	0.273	0.620**	0.229	0.602**
	Sig. (Tt)	0.000	0.010	0.053	0.000	0.106	0.000
	N	51	51	51	51	51	51
Evaluation of hypotheses		/	H_5 Validated	H_6 Not validated	H_7 Validated	H_8 Not validated	H_9 Validated

Cc: Correlation coefficient; Tt: Two-tailed
**. The correlation is significant at the 0.01 level (two-tailed).
*. The correlation is significant at the 0.05 level (two-tailed).

(*Source*: Results obtained using SPSS v.23)

The table above shows that, in general, the knowledge management process has positive impacts on the company. However, we observe that the impacts of the two subprocesses, namely knowledge creation and codification, are not clearly perceptible. This could indicate difficulties in the formalization of knowledge, particularly tacit knowledge, as well as gaps in the generation of new knowledge within DRGB SONATRACH TRC. Based on these results, we confirm hypotheses H_5, H_7, and H_9, and reject hypotheses H_6 and H_8.

4 DISCUSSION

The discussion of the results will be structured around three key areas: a discussion of the findings related to the subprocesses of knowledge management, the determinants of this process, and its contributions.

4.1 Discussion on the Subprocesses of Knowledge Management

Through the present study, we observed that the five subprocesses of knowledge management, namely, knowledge acquisition, creation, storage, application, and sharing, are present in the company under study.

The results reveal a combination of internal sources (e.g., exchanges with competent and experienced colleagues) and external sources (e.g., browsing the Internet) for knowledge acquisition and creation. In this regard, Sytnik and Kravchenko (2021) emphasized the importance of diversifying channels for knowledge creation. In a survey conducted among 90 Ukrainian companies, these authors highlighted a set of effective tools centered on knowledge creation, such as job rotation, analysis of previous experiences, and mentoring/coaching.

Regarding knowledge creation, the company under study relies on collaborative processes, such as teamwork, group problem-solving, and interactions with experienced employees. The company also uses brainstorming techniques, which Boamah and al. (2021, cited in Karunanayake & al., 2022) define as a process involving a group of individuals addressing a problem by proposing as many original ideas as possible.

The results also confirm the application of retained knowledge, which is an important stage in knowledge management, as, according to Lee and Wong (2015), knowledge only gains value when properly utilized. They also highlight the conviction among knowledge workers regarding the importance of codifying and storing retained knowledge. However, these two subprocesses are hindered within the company under study due to a lack of support from senior management. This issue can slow down the knowledge management process and increase the risk of knowledge loss, as senior managers not only serve as an invaluable internal source of knowledge for employees (Sokół & Figurska, 2018) but also act as coaches and guides in the knowledge management process. Yew Wong and Aspinwall (2004) explain the lack of managerial involvement in the knowledge management process as a deficiency in the necessary managerial skills and competencies required for implementing knowledge-based management.

In terms of knowledge sharing, the results indicate that this subprocess is primarily hindered by the centralization of decision-making at the general management level, which significantly limits employees' freedom of action. In this regard, a survey conducted by Pertusa-Ortega et al. (2010) among 164 large Spanish companies demonstrated a negative relationship between centralized decision-making and knowledge performance. According to these authors, granting more autonomy to company members in certain decision-making processes fosters knowledge generation, making it easier to implement new initiatives. Our study's findings also highlight that knowledge sharing is slowed by a preference for individual work over collective work. It is worth recalling that among the benefits of the latter are its capacity to lead to creative and effective problem-solving and to facilitate knowledge transfer (Figurska & Sokół, 2014). A final barrier is the resistance to change exhibited by some employees regarding the transfer of their knowledge capital, which is explained by the fear of losing control (Gourova, 2010).

4.2 Discussion on the Determinants of Knowledge Management

The results of our study highlight the combination of four enablers of the knowledge management process, namely corporate culture, leadership, information technologies, and strategy.
The culture of the company studied is characterized by a strong sense of trust among employees and close collaboration between them. This work environment fosters the exchange of ideas and the sharing of knowledge (Sokoh & Okolie, 2021) and encourages creativity, experimentation, and learning from mistakes (Figurska & Sokół, 2014). However, the results of the correlation analysis indicate that this determinant does not impact the processes of knowledge acquisition and creation. This may be explained by the high level of formalization within the company studied, which leads to a tightly controlled culture.

Consequently, this inhibits individuals in acquiring and creating new knowledge, processes that require a more relaxed and flexible environment (Chang & Lin, 2015).

The leadership practiced within the company promotes the sharing of knowledge and experimentation with new ideas. However, the correlation analysis shows that, like corporate culture, this determinant does not influence the processes of knowledge acquisition and creation. This can be attributed to the lack of motivational mechanisms available to managers, as the compensation system adopted by the company is exclusively based on qualifications rather than focusing on skills or even performance (Ismail Al-Alawi & al., 2007). In this regard, the studies by Figurska and Sokół (2014) and Sokół and Figurska (2018) confirmed the importance of employee motivation (reward, promotion) in creating an atmosphere conducive to experiential learning and experimentation, which are sources of knowledge generation.

The information technologies adopted by the company facilitate the activities of knowledge acquisition, creation, application, and sharing. However, the results of the correlation analysis indicate that the technologies in place do not impact knowledge codification, which hinders the development of knowledge management. It should be noted that by codifying knowledge, it can be more easily reused, becoming accessible more quickly and to a greater number of users (Dalkir, 2017). Additionally, codification heavily relies on information technologies, which facilitate the exchange of information, make explicit knowledge accessible, and stimulate creativity and learning (Abubakar & al., 2019).

The knowledge management strategy implemented by the company exhibits shortcomings, notably the absence of formalized and clearly defined objectives for the exploitation and dissemination of acquired knowledge. The formulated objectives should reflect the company's vision, as emphasized by Figurska and Sokół (2014), underscoring the importance of making them explicit to channel efforts in knowledge management. The results of the present study also highlight the use of informal procedures to manage knowledge instead of implementing deliberate programs. This same observation was made by Sytnik and Kravchenko (2021), who noted in their survey that the procedures applied to manage knowledge were limited and that the few existing explicit policies were reduced to the formalization of knowledge in the form of official documents. It is also worth noting that the organizational structure of the company is bureaucratic, which slows down knowledge management processes, and these procedures often take considerable time before knowledge filters through each level (Ismail Al-Alawi & al., 2007).

4.3 Discussion on the Contributions of Knowledge Management

The outcomes of implementing knowledge management within the studied company are quite noticeable, which corroborates the literature review on this topic. Alongside this, our results indicate moderate satisfaction among employees and clients. In this regard, based on a survey conducted with 824 employees from a Finnish municipal organization, Kianto et al. (2016) emphasized that the existence of knowledge management processes in the work environment is strongly linked to high job satisfaction. They also highlight collegial support and encouragement, as well as a positive work climate, as strong factors facilitating job satisfaction and high performance.

It should also be noted that the lack of support for knowledge creation and codification processes affects their benefits, which are not clearly visible. This underscores the need to prioritize these processes in the company's strategy, as inadequate knowledge management will lead to ineffective creation and delivery of products and services. This can result in client dissatisfaction and, ultimately, the organization's demise (Sokoh & Okolie, 2021). To address this, Pertusa-Ortega et al. (2010) suggest building a process-oriented organization by applying best practices, such as delegating responsibilities to lower levels of the organization and empowering employees to motivate them to experiment and innovate.

The following table summarizes the strengths and weaknesses identified in the knowledge management process, its determinants, and its contributions.

Table 3 **Summary of results analysis**

Axes	Strengths	Weaknesses
Knowledge management processes	-Diversification of sources for acquiring new knowledge. -Encouragement of teamwork. -Valuation of experience. -Application of acquired knowledge. -Awareness of the importance of knowledge codification and storage. -Presence of a knowledge sharing culture.	-Insufficiency in acquiring knowledge from suppliers and customers. -Limited autonomy in sharing knowledge. -Existence of resistance to change regarding knowledge transfer. -Preference for individual learning at the expense of collective learning.
Determinants of knowledge management	-Presence of a high level of trust among employees. -Existence of a collaborative spirit among employees. -Tolerance for experimentation and mistakes. -Recognition of the strategic nature of knowledge. -Provision of information technologies facilitating communication and access to internal and external knowledge.	-Centralization of decision-making and rigidity of applied regulations -Compensation management based on qualifications rather than skills -Lack of formalization of support mechanisms -Lack of appropriate technologies for knowledge codification and storage -Non-integration of knowledge management practices into objectives -Inadequate time allocated for knowledge storage and sharing
Benefits of knowledge management	-Increase in market share -Improvement in the quality of products and services offered -Enhancement of the company's image and productivity.	-Employees' lack of awareness of the benefits of knowledge. -Job dissatisfaction affecting engagement in knowledge management -Employees' lack of awareness of the company's achievements

(*Source:* Created by the authors)

CONCLUSION

This article aims to examine the current state of knowledge management within the Regional Directorate of Bejaïa for the transportation of hydrocarbons via pipelines - DRGB SONATRACH TRC. To this end, we developed a research model that integrates the subprocesses of knowledge management, their triggers, and their contributions. This approach lends an original dimension to our study, as we analyzed the knowledge management process by considering both its inputs (or determinants) upstream and its outputs (or benefits) downstream.

The results reveal a relatively harmonious combination of the five knowledge management subprocesses: acquisition, creation, application, codification, and sharing of knowledge. We observed a diversification

of sources for acquiring new knowledge, capitalization on experience, and an informal culture of sharing acquired knowledge. However, we also noted limited autonomy in sharing knowledge, a preference for individual learning over collective learning, and resistance to transferring knowledge capital.

Our study shows that the knowledge management process is supported by an organizational culture, leadership, information technologies, and a knowledge-oriented strategy. Indeed, we identified a high level of trust and a collaborative spirit among employees, as well as the availability of information technologies that facilitate communication and access to both internal and external knowledge. Nevertheless, we observed excessive centralization of decision-making and regulatory rigidity, which significantly hinder the knowledge management process. Furthermore, the non-integration of knowledge management practices into assigned objectives and the absence of technologies dedicated to codifying and storing knowledge represent additional obstacles.

Finally, the field survey confirmed the positive impacts of knowledge management on the studied company. However, the contributions of the knowledge creation and codification subprocesses are not fully evident, suggesting difficulties in formalizing knowledge and gaps in generating new knowledge.

These findings lead us to propose the following improvement perspectives:

- Formally integrate knowledge management into the company's strategy and define clear objectives to communicate to employees.
- Establish official mechanisms (guidelines, manuals) to support staff at each stage of knowledge management (acquisition, creation, storage, application, and sharing).
- Consider moderate decentralization and relax bureaucratic procedures to foster individual initiatives and creativity.
- Grant more autonomy to regional managers in assisting employees with the codification, sharing, and application of their knowledge.
- Implement a flexible compensation system that includes rewards for innovative ideas and solutions.
- Strengthen the culture of knowledge codification by using appropriate information technologies.
- Set up knowledge management teams to coach knowledge workers.
- Allocate time for knowledge storage and sharing activities.
- Designate a specific budget for knowledge management-related activities.
- Involve employees in decision-making processes, inform them of achievements and ongoing projects, and clarify the company's strategy and vision to enhance their sense of belonging, increase their satisfaction, and reduce their resistance to change.
- Incorporate clients and suppliers into knowledge management as sources of new knowledge.

The results of our research provide a real-world example of knowledge management implementation within companies, thus offering a basis for practitioners, particularly managers interested in applying the principles of knowledge management. These managers must understand the interrelationship between knowledge management subprocesses, consider the triggers of this process, and involve all stakeholders, both internal and external.

Our study also offers several opportunities for future research. Indeed, researchers can explore the obstacles hindering the implementation of knowledge management, which are: a) strategic (how to concretely incorporate knowledge management concerns into the company’s strategy?), b) cultural (how to effectively involve stakeholders in knowledge management?), and c) operational (by what mechanisms can knowledge-oriented objectives be achieved?).

Additionally, future studies could investigate the operationalization of knowledge management components. The abundance of literature on this topic only exacerbates the difficulty of empirically verifying and measuring this phenomenon.

The first limitation of this research lies in the sample size, constrained by time factors and the availability of respondents. It would therefore be advisable to deepen the research by expanding the study sample. The second limitation is that the company studied is a public enterprise, governed by strict regulations. Hence, it would be valuable to conduct the same study in private companies, which offer more flexibility in their management practices.

Despite the abundance of literature on knowledge management, there is no definitive guide that guarantees successful implementation. Rather, it is a long-term process supported by the patience and conviction of leaders regarding its value to the organization.

RESEARCH ETHICS STATEMENTS

This study did not require research ethics approval. The participants provided informed consent as an answer to the question before accessing the questionnaire.

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