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Master's degree thesis in Strategic  
Management and Information  
Systems

**Implementing Knowledge Management  
System in Algerian Company  
Case study: Sonatrach**

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# Abstract

*This paper examines how humans, Technology, and Organizations can help implement the concept of “Knowledge Management System” which we propose as the management paradigm for decentralizing organization learning in the company and for emerging the of “Knowledge Creation” in the company. For methodologie, we used the inductive approach and we used qualitative tools for our investigation. We present our System of Knowledge Management and associated with the Three parties: Partners, Third parties (which include Universities, Start-up, and Incubators), and Environment. along with the actual System of organizational learning. For the purpose of creating value of knowledge inside Algerian Company and help to change the old mindset. systems will help employees create, capture, organize and distribute knowledge by decentralizing Organization Knowledge Creation will facilitate implementing new ideas and new strategies.*

**Keyword:** knowledge management, knowledge creation, information system, knowledge economy

# Résumé

*Ce mémoire examine comment l'implémentation de(système de la gestion de la connaissance). Système de gestion de la connaissance es proposé comme paradigme de management permettant de décentralisation l'apprentissage organisationnel au niveau de l'entreprise afin de faire émerger lacreation de connaissances. Pour la méthodologie, l'étude est basée sur une approche inductive et des outils qualitatifs pour notre enquête. Nous présentons notre proposition de gestion des connaissances et l'associons aux trois parties : Partenaires, Tiers (qui incluent les Universités, les Start-up et les Incubateurs), et Environnement. Et ce, dans le but de créer une valeur de la connaissance au sein de l'entreprise algérienne Sonatrach en remplaçant les anciennes pratiques par de nouvelles plus modernes.*

**Les notes clés:** la gestion de la connaissance, système d'information, startup,

# ملخص

تدرس هذه مذكرة كيفية المساعدة في خلق المعرفة داخل المؤسسة بمساعدة ثلاث عوامل هم الإنسان والتكنولوجيا و المؤسسة. من خلال نظام الإدارة المعرفة يهدف الى خلق اللامركزية في التعلم و التعليم بإشراك الجميع الأطراف داخل المؤسسة و من خلال ربطها مع الأطراف الخارجية و التي هيا المجتمع و الشركاء و الطرف الثالث (التي تشمل الجامعات والشركات الناشئة والحاضنات). و هذا بهدف مساعدة الشركة في التغير و التطوير. و أستعملت في هذا البحث منهج الإستقرائي و أدوات منهج النوعي.

**الكلمات المفتاحية:** إدارة المعرفة ، إدارة المعلوماتية ، اقتصاد المعرفة.

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# Abbreviation list

Abbreviation	Concept
KM	Knowledge management
KMS	Knowledge management system
OL	Organizational learning
AI	Artificial intelligence
ML	Machine learning
IT	Information technology
GDP	Gross domestic product
OPEC	The organization of the petroleum exporting countries
CEO	Chief executive officer
ERP	Enterprise resource planning
CRM	Customer relationship management
SRM	Supplier relationship management
SH	<i>Sonatrach</i>

# **Introduction**

# Introduction

ﷻ الله، سبحانه وتعالى :

«اذ أخذ الله ايثمق ان يذ وأوتا الكتاب بمن يبت ان لئس ولا تكتموننه»

[آ عمران:187]

**Ali 'Imran 187 :**

**( And as Allah took Compact with the ones to whom the Book was brought : "Indeed you shall definitely make it evident to mankind and not keep it back." ) [Surah Ali 'Imran, Ayat 187]**

The creator shows the crucial of knowledge for our humanity and the importance of sharing knowledge with each other to our community. Moreover, For hundreds of years, humans have passed their wisdom on to their children. The cycle of sharing knowledge will never end.

Knowledge viewed by many thinkers and authors as a strategic tool for building Intellectual Capital, Benjamin Franklin founding father of the United States said “An investment in knowledge always pays the best interest.” (Benjamin Franklin)

In order to study knowledge creation inside companies and organizations and how we can manage it, (Peter Drucker, Soliman, and Spooner, Nonaka and Takeuchi, Collison and Parcell, J. Liebowitz, Maryam, Dorothy E, Rowley, Sharma, Cleveland, Williams). The authors have created theories and frameworks for knowledge management in organizations. Began with knowledge worker term and knowledge creation by Nonaka into KMS that we currently know it.

		<i>Knowledge Creating Company</i> HBR Nonaka	Emergence of virtual organizations		<i>Your Company's Most Valuable Asset: Intellectual Capital</i> Stewart	Certification of knowledge innovation standards
ARPANET		<i>Organizational Learning</i> Sloan Mgmt.	Measurement of intellectual assets	<i>Community of Practice</i> Brown		
<b>1969</b>	<b>1985</b>	<b>1988</b>	<b>1991</b>	<b>1994</b>	<b>1997</b>	<b>2000 +</b>
	Proliferation of information technology	<i>Fifth Discipline</i> Senge	<i>Knowledge Management Foundations</i> Wiig	<i>The Balanced Scorecard</i> Kaplan and Norton	APQC benchmarking	First KM programs in universities
		<i>First CKO</i> Edvinsson				

**Figure 1** A Summary Timeline Of Knowledge Management

This dissertation will extend this work into knowledge management and its relationship to organizational learning. The dissertation will begin with an overview of the concept of Nonaka and Takeuchi of organizational knowledge creation, the second by Soliman, and Spooner by article of Strategies for implementing knowledge management: role of human resources management, the third article that reviewed by Maryam and Dorothy E, with Knowledge Management And Knowledge Management Systems Article, the last is by J. Liebowitz with an article of Knowledge management and its link to artificial intelligence.

## Problem Statement

After Covid-19 the world view the importance of IT inside our life and how to make life easier, and with the rise of a new concept of the new economy, Covid-19 force the global economy to move forward to a knowledge economy which is a system of consumption and production that based on intellectual capital. Which economy stands on knowledge, and most countries start to invest in human capital. “*Success in the knowledge economy comes to those who know themselves their strengths, their values, and how they best perform.*” Peter F. Drucker, *Managing Oneself*

This dissertation examined how Algeria's country start the progress of move forward to the new knowledge economy, by investigating in the largest company owned by the Government.

According to BCG many leaders consider knowledge management a boring, back-office function, the question start by :

- The problem began with how is Sonatrach views knowledge?
- How organizational learning is working?
- How can we implement KMS inside the company?
- How the company engages Organizational Learning?
- How implement a new culture?
- How can we link Sonatrach with partners, universities, and the environment?

## **Objectives Of This Study**

This study was about knowledge management in Sonatrach Groups, our investigation process was by a qualitative approach through a descriptive and analysis in order to answer our research, all details are provided in the chapter 2 of methodology and chapter 3 of this dissertation. However for the objective of this research was :

- Build an environment facilitate knowledge sharing.
- Build a system link Sonatrach with all parties.
- Improve organizational learning.
- Build an knowledge management systems for Algerian company.
- How can we build a best practice for the Organization.
- Create a value for Knowledge inside Algeria economy.

## **The Question Study**

What is the most effective way for implement knowledge management system on the largest company in Algerians.

# **Chapter 1**

## **Literature review and Conceptual Framework**

# Chapter 1 Literature review and Conceptual Framework

## 1 Literature review

The vital importance of Knowledge Management culture in business and economy had been highlighted by authors as (Alvin Toffler, Peter Drucker, James Quinn, George David Smith, and Laurence E. Steadman) each of these authors created their vision of how it will be the new society and how knowledge will be.

Peter Drucker was the first who coined the term “Knowledge Worker” in his book “ The Landmarks of Tomorrow ” early of 1960s, and in his article “ The New Society of Organizations, 1993 ” Drucker said :

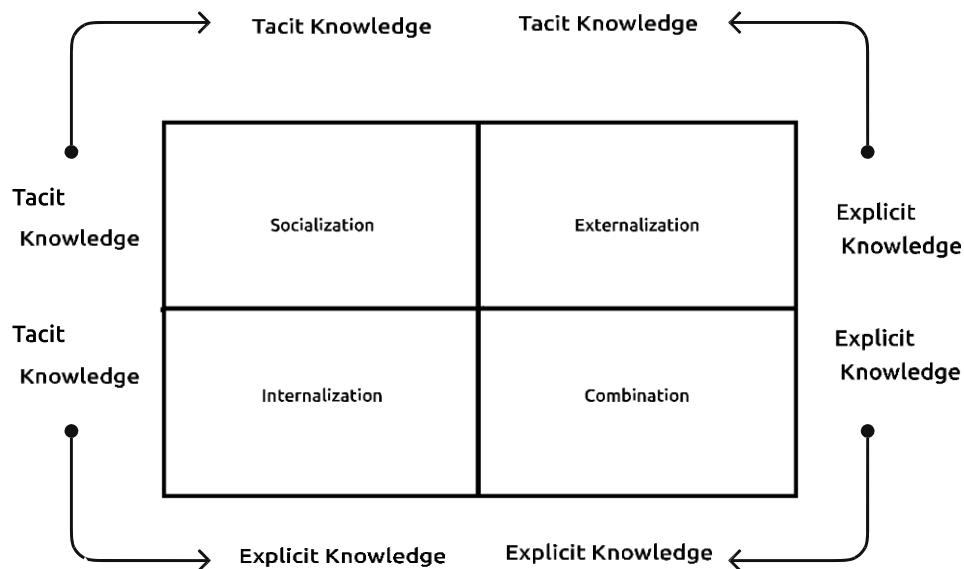
“ *In this society, knowledge is the primary resource for individuals and for the economy overall.* ” moreover, the KM study was developed by Drucker (1993) in terms of knowledge-intensive firms.

By the time when the information technology has come, Knowledge has developed in a new society by other researchers and theorists, who start view the effectiveness of knowledge in the organizations (Huber 1991, Nonaka 1994).

### 1.1 The routine model of Knowledge Conversion

Nonaka and Takeuchi examine how information technology can help to implement knowledge creation (Knowledge Management) inside the organization, the article ‘ *From Information Processing to Knowledge Creation* ’ discussed the routine of knowledge creation, with create the 4 models of transformation information. Nonaka and Takeuchi used descriptive tool to investigate in their research, also they examine the two western and Japanese world, the authors found the exchanging tacit and explicit knowledge between groups and individuals have some boundaries, so they came with the 4 modes of knowledge conversion :

- Socialization from individual tacit knowledge to group tacit knowledge.
- Externalization from tacit knowledge to explicit knowledge.
- Combination from separate explicit knowledge to systemic explicit knowledge.
- Internalization from explicit knowledge to tacit knowledge.



**Figure 2** Model Of Knowledge Conversion

Nonaka and Takeuchi view the organization needs a routine across these four modes of knowledge conversion, Nonaka create the knowledge spiral model. which is the cycle between the four modes, and may start from any mode, and work for the objective of the organizations, besides, engaging with individuals and groups in a creative and diverse environment. However controlling the information helps to avoid information redundancy that can change the vision of the organization, moreover, organizational knowledge creation is a never-ending process and the synergy of the knowledge creation begins between human and Information Technology, all that working for one objective which is the vision of organizational knowledge creation.

## **1.2 Implementing Knowledge Management by the Human Resources Department**

### **1.2.1 KM by Human Resources Department**

Although some authors believe that information technology is a driver for knowledge management, on other hand Soliman and Spooner, view Information Technology is the key for implementing Knowledge Management. And the role of the Human Resources department is to make sure the Knowledge Management is cycling inside the organization. However, Soliman and Spooner's research '*Strategies for implementing knowledge management: role of human resources management*', the researchers use the qualitative approach to find the strategy for implementing the KM in the human resources department.

Soliman and Spooner consider the Knowledge Management objective is improving the productivity and enhancing the business environment, also increasing the levels of innovation.

The authors separate knowledge management into two perspectives, the role of human resources management in an organization and the goals of organizations. Furthermore, Soliman (1999) described the processes of managing the human resources knowledge in organizations as to make raw knowledge (inputs) in order to create processed knowledge (output). However, the role of human resources is managing employees to collect their knowledge by focusing on three aspects of Knowledge Management activities: Knowledge processing, Knowledge domains, and Knowledge formality.

### **1.2.2 The strategies for implementing KM**

However most organizations utilize these five processes to obtain the knowledge from their employees: (1) create (2) capture (3) organize (4) access and (5) use knowledge.

These five processes cover almost the entire scope of human resources functions.

Soliman suggested creating supportive environments for knowledge management programs :

1. Social gatherings of staff.
2. The office layout.
3. Trust between employees of the firm.
4. Differences in culture and language.
5. Timeliness.
6. Learning and mistakes handling.
7. Senior management involvement and support.

All these suggestions are for enhancing the business environment to build a Knowledge Management, which will create competition and stimulate innovation within the company, also for encouraging collaboration between employees.

Most companies see the interaction, talking, open spaces, and trust between colleagues have no value added for the organization, however, Soliman views the organization needs that interaction, and the human resources department could facilitate the social gatherings and improves the chance for sharing knowledge, also meeting informally is important to encourage exchange ideas.

In general, these strategies needs a environments to encourage distributing knowledge, and build the role of leadership and supportive culture, to discuss the mistakes that happen between employees with their senior managers, which will support the “openness and seeking help”, openly culture can lead to the creation of a learning organization.

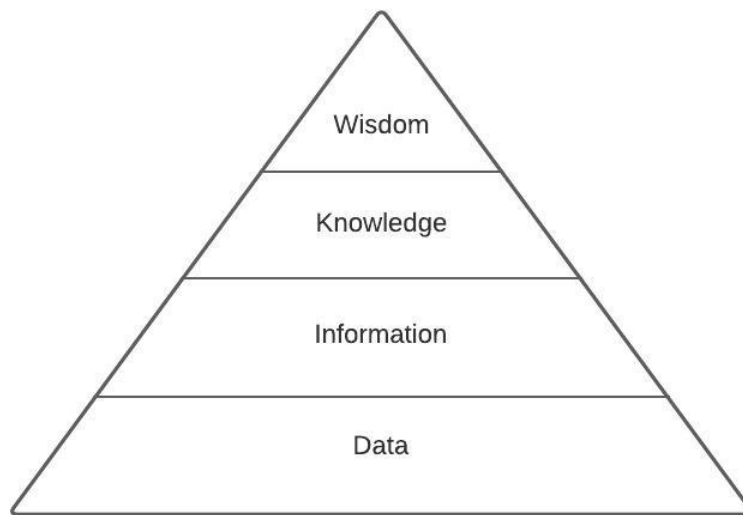
### **1.3 Knowledge Management Systems**

Many research views knowledge management and information system that can't be separated, however, researchers have begun promoting and referred to these two as knowledge management systems, Maryam and Dorothy E. researchers of information system, the objective of their study is the enhancement and communication of knowledge concerning the development of IT services.

Based on the qualitative approach and experimental methodology, Maryam and Dorothy E views the organizations use a knowledge management system (KMS) to make knowledge easy to find through capturing and sharing information. The major point of knowledge perspective is a emphasis on

understanding the differences among data, information, and knowledge and represent the difference between these concepts (Maryam, Dorothy E. 2001).

In the other hand, we have the Data-Information-Knowledge-Wisdom hierarchy or pyramid is based on filtration, reduction, and transformation to help in decision-making (Adler1986, Ackoff 1989, Zeleny1987, Rowley 2007, Sharma 2008, Cleveland1982, Lambe 2011, Williams 2014) for that, knowledge management system was created to promote the distribution of knowledge, with combination between knowledge management and information system.



**Figure 3** DIKW Pyramid

Otherwise, the distribution of knowledge is based on IT system (Nonaka, Takeuchi 1995) for knowledge creation inside the organization, although KMS is more complex than the four modes conversion of knowledge by Nonaka and Takeuchi, KMS is particularized with application, creation, and capitalization of knowledge (Maryam, Dorothy E. 2001).

#### **1.4 The benefits of Artificial Intelligence in Knowledge Management**

In the late years, with the development of new computer and Big data technology, with Expert System, or what John McCarthy's named the Artificial Intelligence (AI), mentioned in the article concerning 'Mental Qualities to Machines', examined machines need to obtain the knowledge to transmit it

into a computer to understand it clearly, and predicting to be an intelligent computer program or an expert system like John McCarthy who said:

*“Machines as simple as thermostats can be said to have beliefs, and having beliefs seems to be a characteristic of most machines capable of problem-solving performance.”*

J. Liebowitz the Professor of Information Systems at the University of Maryland Baltimore County, used the descriptive approach in his research to find the relation between knowledge management and artificial intelligence. The professor viewed, one of the important areas of KMS is collecting, representing, and distributing of individual knowledge into collective organization knowledge, used by mechanisms built through IT systems, ought to be applied on knowledge acquisition techniques to eliciting the tacit or explicit knowledge into expert system (J. Liebowitz 2001), the acquisition techniques of knowledge could be used by knowledge discovery or machine learning (AI)

However, that can be tacit or explicit knowledge converted into documented and represented to constitute a data that can be used, as in intranet or extranet, and stored as Big DATA. Besides, organizing these Big Data helps machines understanding via deep learning to encourage utilizing AI on it, the knowledge could be determined in knowledge application, therefore, can be stored or acquired by machine (J. Liebowitz 2001), and the role of Artificial Intelligence and Information Technology is build the best way to share knowledge and create a value that added benefits to the Organizations.

## **2 Conceptual Framework**

In this part, we will explain the study variables and the relational nature between them, plus we described some related concepts to our study, also will includes the research gap when it mentions what other authors had studied and what our study did.

### **2.1 The Origins of Knowledge**

Knowledge is the basis of human evolution since its very beginning of many years ago, and Still, the word knowledge is not easy to define, today there are numerous descriptions and definitions of knowledge. Besides that, the multidisciplinary word is used in almost all fields in which one of this field has a description related to that field. however, Knowledge has become one of the most important intangible assets for the company in the current competitive world (Drucker 1993, Nonaka, 1994, Hunt, 1995).

Hislop has viewed knowledge as: “Knowledge can be understood to emerge from an application, analysis and productive use of data and/or information”, to defined knowledge it is necessary to understand the difference between data, information, knowledge and wisdom . Often organizations confuse between them (Adler1986, Ackoff 1989, Zeleny1987, Rowley 2007, Sharma 2008, Cleveland1982, Lambe 2011, Williams 2014).

#### **2.1.1 Definition of Data**

Are combination of raw images, numbers, words, sounds which is gathered/collected as result of some measurement or observation without any contextual details by Hislop

#### **2.1.2 Definition of Information**

Content that represents analyzed data, or structured Data. (J. Liebowitz 2017).

### **2.1.3 Definition of Knowledge**

Nonaka described it as a meaningful set of information that constitutes a justified true belief and/or an embodied technical skill. (Ikujiro Nonaka, Katsuhiko Umemoto and Dai Senoo)

### **2.1.4 Definition of Wisdom**

Using knowledge to establish and achieve goals, or as the faculty of making the best use of knowledge, experience, and understanding by exercising good judgement ( Paul E., Eric H. and Edward W. 2000).

## **2.2 Type of Knowledge**

Although knowledge is the core of KM, in km literature has been several types of knowledge working together with their contributions and complementary entities to create the best practice or routine for knowledge creation, and authors find there are two types exist of knowledge, Tacit and explicit knowledge, which is the most fundamental concept of knowledge management by Michael Polyani in the 1960s, and he was the first who is classified, the concepts developed by Nonaka and Takeuchi's (1995).

### **2.2.1 Tacit knowledge**

Is the individual skills, and “know-how” that are formed by intuition, perspectives, beliefs, and values and are difficult to be shared (Hubert (1996), Ahmed, Lim, and Zairi (1999)).

### **2.2.2 Explicit knowledge**

“Meaningful set of information we can share on platforms or document on articles in clear language including numbers or diagrams” Nonaka and Takeuchi(1995)

## 2.3 The Knowledge Creation

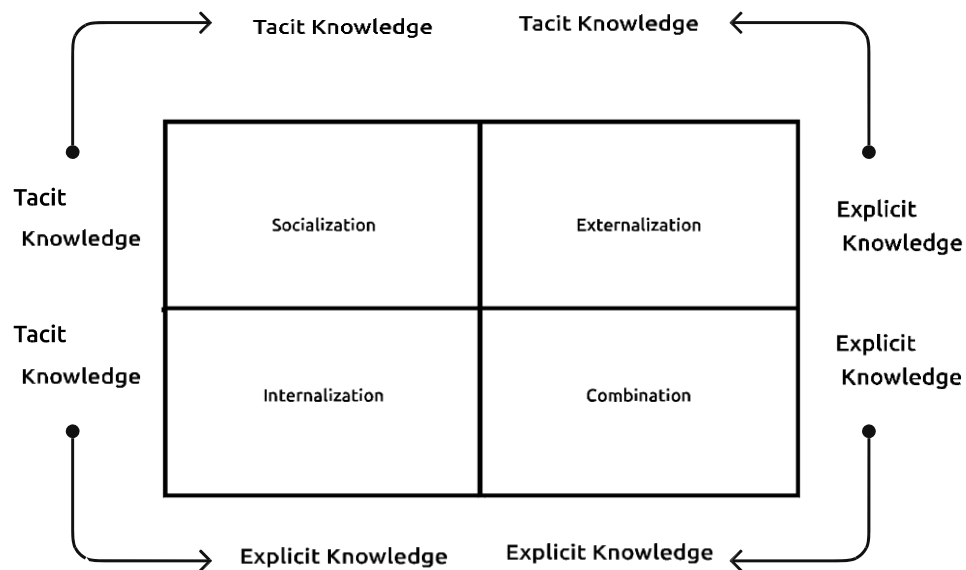
Is a continuous interaction process between tacit knowledge and explicit knowledge.(Nonaka and Takeuchi)

## 2.4 The four modes of knowledge conversion (SECI model)

Is the routine model by Nonaka and Takeuchi for knowledge creation:

- Socialization from individual tacit knowledge to group tacit knowledge.
- Externalization from tacit knowledge to explicit knowledge.
- Combination from separate explicit knowledge to systemic explicit knowledge.
- Internalization from explicit knowledge to tacit knowledge.

Each of these four modes of knowledge conversion along with examples of IT used in each mode will be discussed below:



**Figure 4** Model Of Knowledge Conversion

### **2.4.1 Socialization**

Is a process of creating common tacit knowledge via shared experience the usage of observation, imitation, exercise, participate in formal and informal way, where individuals or groups share experiences at the same time in same reality or virtual, thereby creating common unarticulated knowledge or embodied skills. Tacit knowledge has two dimensions: i.e. technical and cognitive. For technical dimension: apprenticeship or on the job training as for the cognitive dimensions, brainstorming, for developing or creating common tacit knowledge

### **2.4.2 Externalization**

Is a process of articulating tacit knowledge through such explicit knowledge, often using in metaphors, analogies, and/or sketches. This conversion is codifying a skill or experience into various forms as documents, concepts, diagrams,, in which create a new product concept or prototype. Recent endeavors have been focused on the development of more advanced Groupware to support the creation of new knowledge.

### **2.4.3 Combination**

Is a process of assembling discrete pieces of existing in explicit knowledge into a new form<sup>[2]</sup> like: review report, a new database to organize content or such as a set of specifications for a prototype of new product.

It is critical for any organizational leader to create a thought-provoking and fertile concept, or what we call a “mother concept,” which gives birth to many “offspring concepts.”

Yet, the goal of this mode is to build a prototype for a new product, and working model for a soft innovation such as a new business procedure.

### **2.4.4 Internalization**

Is a process of embodying explicit knowledge into tacit knowledge. This mode sharing and diffusing explicit knowledge documented, concept or prototype into text, sound, or video formats.

Internalization process that triggered by “learning by doing or using.” Ex: experiences, best practices, lessons learned, new services or new products,

therefore reducing the time lag between learning and the actual use of such knowledge.

### 2.5 The Knowledge Spiral

The spiral is the cycle between the four-mode A knowledge spiral may start from any mode, the star from the needs of the organization forward to its goals concerning the organization intention also the engaged with individual and groups, Nonaka view :

*“we can also visualize a knowledge spiral in the ontological dimension, namely, across the levels of knowledge creating entities such as individuals, groups, an organization, and collaborating organizations.”(Nonaka 1996).*

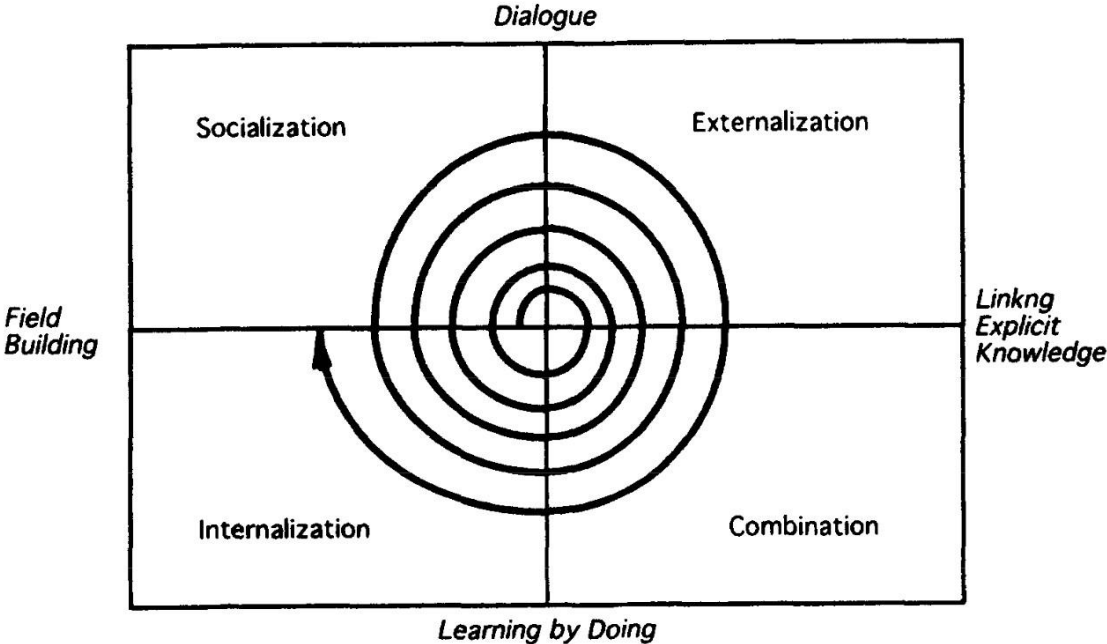


Figure 5 The knowledge spiral Chart

## **2.6 Knowledge management System**

### **2.6.1 Knowledge management**

Many authors identified over a hundred published definition of knowledge management and, at least some of this research could be considered as, stander definition of KM, Here are a few sample definitions of knowledge management from the business perspective:

Gray view Knowledge management is a collaborative and integrated method of creating, capturing, organizing, accessing and using enterprise intellectual capital. (J,Liebowitz 2017).

Stankowski view Knowledge management includes "using intellectual assets to improve organizational performance. (J,Liebowitz 2017).

Brooking view Knowledge management is our process of managing people oriented assets. The function of knowledge management is to protect and develop personal knowledge, and when possible, transfer assets to a form that is easier to share with other employees of the company. (J,Liebowitz 2017).

Rigby view Knowledge management build a systems and processes for collect and transfer intellectual assets. It increases the generation of useful, actionable, and meaningful information, and seeks to increase both Organizational learning. However, it can augment the value of an organization's knowledge base across differ functions and disparate locations. Knowledge management maintains that successful businesses are a collection not of products but of distinctive Intellectual assets. This intellectual capital is the key that will give the company a competitive advantage with its targeted customers. Knowledge management seeks to accumulate intellectual capital that will build unique core competencies and lead to superior results. (J,Liebowitz 2017).

Wiig view Knowledge is understanding, and practicing the knowledge that all of us have is the basic resource that allows us to operate intelligently. Over time, consider that knowledge is also shared in other forms, such as books, technologies, practices, and traditions in various organizations and society as a whole. These changes will accumulate expertise and, if used properly, can increase efficiency. Knowledge is one of the main factors, if not the principal,

that makes the intelligent behavior of individuals, organizations, and society possible (J,Liebowitz 2017).

Dalkir and Liebowitz view Knowledge management is the deliberate and systematic coordination of an organization ' s people, technology, processes, and organizational structure in order to add value through reuse and innovation. This is achieved through the promotion of creating, sharing, and applying knowledge as well as through the feeding of valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning. (J,Liebowitz 2017).

## **2.6.2 Knowledge management System**

Knowledge management is the conscious and systematic coordination of the organization's personnel, technology, process, and organizational structure to add value through reuse and innovation. This is achieved by facilitating the creation, sharing, and application of knowledge, and by incorporating valuable lessons and best practices into corporate memory to promote continuous organizational learning. (Maryam and Dorothy).

## **2.7 Definition of some terms**

### **2.7.1 Knowledge capture**

Knowledge capture refers to the identification and subsequent codification of existing (usually previously unnoticed) internal knowledge and know-how within the organization and/or external knowledge from the environment (J,Liebowitz 2017).

### **2.7.2 Knowledge access**

The lessons learned are stored in a database with adequate metadata or tags that will enable easy access and retrieval (J,Liebowitz 2017).

### **2.7.3 Knowledge learning**

Some of the lessons learned are incorporated into an employee orientation session and others into a project management-training course. In this way, the material is used to enable role playing and to provide themes for group discussion (J,Liebowitz 2017).

### **2.7.4 Knowledge application**

Refers to the actual use of knowledge that has been captured or created and put into the KM cycle. A quick scan of the sorts of things that went wrong in the past help the manager to prepare a risk management and contingency plan for these known challenges. At best, the same mistakes will not be repeated (J,Liebowitz 2017).

### **2.7.5 Knowledge reuse**

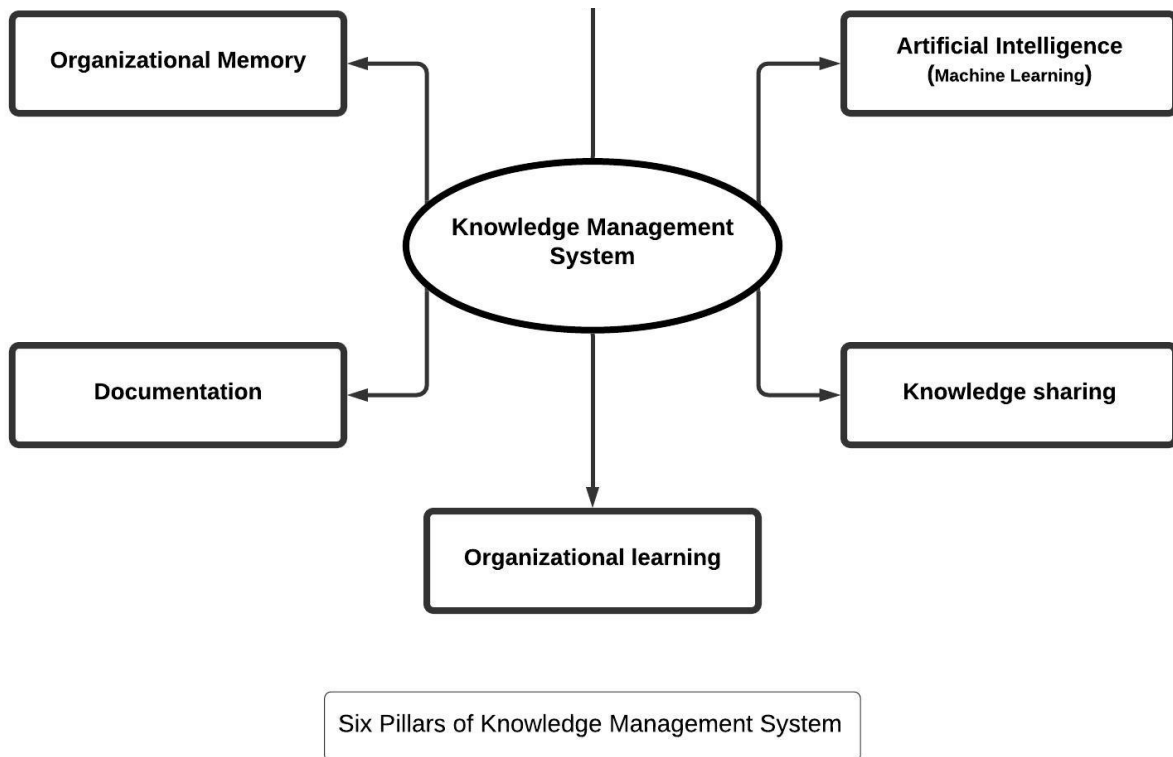
This is knowledge reuse, the process whereby useful nuggets of knowledge or knowledge objects are made available in a library of such objects. These knowledge objects can be annotated references, components (programs or text), templates, patterns, or other types of containers. For example, consulting companies often reuse project proposal templates as they convey the company brand and they contain useful reusable objects such as testimonials, company description, and so on. The goal is to reduce the time it takes to complete tasks as well as to help maintain higher standards regarding the quality of the work to be done. (J,Liebowitz 2017).

### **2.7.6 ERP fundamentals**

ERP systems are designed around a single defined data structure (schema), which usually has a common database. This helps ensure that the information used throughout the enterprise is standardized and based on common definitions and user experience. These core structures are then interconnected with business processes driven by workflows across business units (such as finance, human resources, engineering, marketing, operations), connecting systems and the people who use them. In short, ERP is a tool for integrating people, processes, and technology in a modern enterprise. (Oracle)

## **2.8 Six pillars of knowledge management system**

The six pillars of knowledge management system Based on many research and study of KMS by (Soliman and Spooner, AND Nonaka and Takeuchi, Peter Drucker, J. Liebowitz), we view these six pillars is the stand of this research:



**Figure 6** Six pillars of knowledge management system

### 2.8.1 Acquisition

The acquisition is the process by which an organization intentionally or unintentionally acquires knowledge claims or information from others (usually outside the organization). (J, Liebowitz).

### 2.8.2 Organizational Memory

The use of organizational memory is to create value for individuals, groups, and organizations themselves. The countless ways in which knowledge can be applied and used are related to decision sequences and personal characteristics (J, Liebowitz).

### 2.8.3 Documentation

Documentation is an effective and ineffective process, a technical "container" that allows us to insert this collective experience of the organization and the ability to get help to reuse or put this collective knowledge into work so that everyone can do it better their job (J, Liebowitz).

## **2.8.4 Organizational learning**

(OL) can be defined as learning what was worked and what was not work in the past, and effectively transferring the knowledge learned from this experience to today and future knowledge workers (J, Liebowitz).

## **2.8.5 Knowledge sharing**

The existence of the lessons learned is made public and made available to others (perhaps the entire organization, or a specific target group) (J, Liebowitz).

### **2.8.6.1 Artificial Intelligence**

The ability of a computer system to perform tasks that normally require human intelligence (National Defense Science Council).

### **2.8.6.2 Machine Learning**

The term machine learning refers to a set of topics that involve the creation and evaluation of algorithms that facilitate pattern recognition, classification, and prediction based on models derived from existing data (Tarca, Carey, Chen, Drăghici 2007).

# **Chapter 2**

## Methodology and Sonatrach Description

## **Chapter 2 Methodology and Sonatrach Description**

In this chapter, we will be discussing the methodology of this research, in its first part, the rational purpose behind using a qualitative approach, also the reasons behind selecting the target participants,

In the second part of this chapter, we have a description of Sonatrach Groups, and we profound on the structure of the organization.

### **Section 1 : Methodology Of This Research**

#### **1 Methodology**

“The next society will be a knowledge society. Knowledge will be its key resource, and knowledge workers will be the dominant group in its workforce” (Peter Drucker 2001).

The new global economy is a knowledge economy where Knowledge is the currency that enables people to participate in the new global economy. And all global companies consider knowledge as intellectual capital. “ organized knowledge that can be used to produce wealth. ” Stewart (1997)

In this research, we aimed to implement a knowledge management system for the company that is the lead of the Algerian economy. This study will concentrate on how will be the implementing of the Knowledge management system, by using the qualitative method (the inductive approach) which will help use for investigate with the qualitative tools, for answering the question of the study, which is create a new system for the company, we needed to collect data, via process that we followed as : “inductive learning is a process of acquiring knowledge by drawing inductive inferences from teacher- or environment-provided facts. Such a process involves operations of generalizing, transforming, correcting and refining knowledge representations” (Michalski 1983).

## **1.1 Inductive paradigm**

It starts with the observations and theories are proposed towards the end of the research process as a result of observations. (Research Methodology).

## **1.2 Qualitative methods**

The inductive approach helped us to choose the right method for our investigation. Through a qualitative approach, we gain a deeper understanding of the system and develop a strategy to improve it. Qualitative tools helped us to investigate, in the internship using analytic and descriptive tools helped in interviewing and observations, also allowed us to explore the organization's learning and implement KMS in the organization. ( Eunsook, Willis L. And Rouse, Martin Dick).

“ Qualitative researcher’s goal is to collect in great details the understanding of the human behavior, and the result that led to such particular behavior. In other words, the qualitative research method examine and answers questions of how, where, what, when and why a person would act in a certain way toward a specific matter ” (Musab A and, Christian).

Qualitative research involves collecting and analyzing non-digital data (such as text, video, or audio) to understand concepts, opinions, or experiences. It can be used to check for problems or generate new ideas (scribbr).

## **1.3 Collecting Data**

To answer our research question we used several instruments to collect qualitative data. Through analysis method (David Harper) ,indeed we consulted many (books, studies, dissertations, and articles related to the subject). In addition, we consulted several websites in this context, we benefited from the ENSM library.

On the other hand, on the place of training we have privileged the documentary research of certain processes and job descriptions. We emphasize that our

study was based much more on interviews with some employees in Sonatrach company.

## 1.4 Documents collected

The documentary sources used in our research are mainly books, articles, theses, web pages that have a relationship with (Knowledge Management, management, Information Systems, the integration of Knowledge Management System), and all the process type documents and job descriptions in the internship place to describe the existing company.

## 1.5 Interviews:

The interviews were guided by a plan and questions for the participants inside the organization, that we did choose them for their experience and knowledge they have.

### 1.5.1 Participants' profiles

The participants in these interviews were three, and the interviews were with the

Interviewed	Date	Duration
In charge of Internal Control Department in HR	1/04/2021	+2h
	20/04/2021	+2h
	27/05/2021	2h
Employee in SPE	26/04/2021	30min
Project Management Manager in HSE	27/04/2021	2h

three types: unstructured, semistructured, and structured.

**Table 7** for Interviews Participants

### 1.5.2 Interviews unstructured

Minichiello et al. (1990) defined them as interviews in which neither the question nor the answer categories are predetermined. Instead, they rely on social interaction between the researcher and the informant.

### **1.5.3 Interviews semi - structured**

A semi-structured interview is a verbal interchange where one person, the interviewer, attempts to elicit information from another person by asking questions. Although the interviewer prepares a list of predetermined questions, semi-structured interviews unfold in a conversational manner offering participants the chance to explore issues they feel are important.

### **1.5.4 Interviews structured**

In structured interviews, questions are planned and created in advance, which means that all candidates are asked the same questions in the same order.

## **1.6 The Question Study**

What is the most effective way for implement knowledge management system on the largest company in Algerians.

## **Section 2 : Sonatrach Organization**

### **2.1 General Introduction**

This section contains the description of the company our study investigated in which is SONATRACH, the description is about the oil and gas company in national and international level, started by its Algeria resources and evolution to the organization and staff.

### **2.2 Algeria Resources**

Algeria is a land rich in natural resources that serve to be an important oil and natural gas producer and a member of the Organization of the Petroleum Exporting Countries (OPEC). Besides, The Algerian economy is mainly driven by hydrocarbons and public investment. Algeria's hydrocarbons account for 98 percent of its export earnings in 2020, 60 percent of its budget revenues, and 19 percent of its GDP. The country was the fourth-largest crude oil producer in Africa after Nigeria, Angola, and Libya, Algeria's crude oil production can be constrained by the group's crude production quotas, also it produces condensate and natural gas liquids, which are exempt from OPEC quotas. Algeria was the eighth-largest natural gas producer in the world in 2020 and the third-largest gas supplier to Europe.

The chemical and plastics industries in Algeria were developed using the country's oil and gas resources. The industry is expected to play a major role in the country's economic development. The country aims to produce an integrated, not based on petrochemical industry to reduce dependence on imports, and increase the volume of petrochemicals and fertilizers available for export. The industry contributes substantially to the country's economy, on the other hands, prices of petrochemicals have become very sensitive to movement in crude oil prices.

### **2.3 SONATRACH Corporate**

SONATRACH has been playing a leading role in the national economy, the Algerian national oil company which is responsible for the management of the country's oil and associated industries. This includes an important role in the chemicals industry where its chemicals subsidiary, nicknamed the African

major, draws its strength from its ability to be a fully integrated group across the hydrocarbon value chain.

Overview of SONATRACH Corporate :

**Company Name:** The National Society for research, processing, transportation and marketing of hydrocarbons, took as name Sonatrach or ( in French Société Nationale pour la Recherche, la Production, le Transport, la Transformation, et la Commercialisation des Hydrocarbures s.p.a)

**Legal Form:** Sonatrach is transformed into joint stock company (SC) governed by the laws in force underwent to the provisions of the Constitution(**state-owned enterprise (SOE)**).

**Registered Office:** The head office of Sonatrach is set in Algiers "Hydra".

**Capital:** The Sonatrach has a capital of five hundred billion Dinars Algerian(500 000 000 000 DA).

**Date of Creation:** December 31/1963.

**Activity :** Petroleum Company, Employers: Sonatrach employs more than 250,000 people across the Group, (2020).

**Turnover:** 33 billion \$ (2019).

**Website:** [www.sonatrach.com](http://www.sonatrach.com).

**E-mail:** [sonatrach@sonatrach.dz](mailto:sonatrach@sonatrach.dz).

**Tel:** + 023 48 31 31.

### 2.3.1 History and evolution

Just after the independence, the Algerian State has decided to appropriate its oil and gas wealth, and adopt a development tool with all conditions of its sovereignty, the creation of Sonatrach (National Society of Transportation and Marketing of Hydrocarbons). This was on 12/31/1963 by Decree No. 63/491 published in the Official newspaper on 10/01/1964, and due to the nature of its activities, Sonatrach is placed under the Ministry of Energy and petrochemical industries, and governed by the Algerian commercial law.

On September 22, 1966 by Decree No. 66/296, the government defines new missions of Sonatrach in a way to expand its field of activity in oil industry, including research, production and processing more marketing and transportation of hydrocarbons, by taking stakes in the concessions held by some foreign companies such as (ESSO, Royal Dutch Shell, Sinclair Oil Corporation,).

February 24, 1971, SONATRACH experienced the largest and most significant transformation in its history, it has been assigned the task of managing and developing all branches of the Algerian oil and gas industry, after the government decided to nationalize the hydrocarbons by President Houari Boumedienne's, In 1980, Sonatrach managed to control 10% of Algerian oil and gas. In 1981, after restructuring, in September 10 new firms have emerged, including: ASMIDAL, ANIP, EMPC, ENAFOR, NAFTAL, NAFTEC, KNPC, and more.

In 1998, Sonatrach has been transformed into a joint stock company (SC), governed by the law in force subject to the provisions, and in 1999 it launched a bond issue at the Algiers stock exchange.

In 2001, the CEO (Chief Executive Officer )of Sonatrach has carried the signature of the decision defining the organizational scheme of the macro structure of the company that has known a redevelopment on 30/01/2006 to adapt and update the implementation of missions.

Today the Algerian company Sonatrach is for Research, Exploitation, Pipeline, Transportation, Processing and Marketing of Hydrocarbons and their derivatives. It also operates in other sectors such as power generation, new and renewable energies and desalination of seawater, It operates in Algeria and around the world where opportunities arise, it is already present in several countries in the upstream and downstream, Spain, Peru, Libya, Africa. With nearly 300,000 employers, Sonatrach currently has 16 domestic subsidiaries and 24 international subsidiaries in the exploitation, refining marketing, storage, services for wells.

Sonatrach has been able to classify:

- First oil and gas company in Africa.
- First gas company in the Mediterranean.
- 6th exporter of Liquefied natural gas in the world.
- 7th exporter of natural gas in the world.
- 12th largest oil consortium in the world.

### **2.3.2 The Main Tasks of Sonatrach**

The tasks entrusted to SONATRACH shows his role in the dynamics of development of the economy, both in Algeria and abroad are: .

- Prospecting, exploration and exploitation of hydrocarbons.
- The implementation and development of oil and natural gas.
- Contribution to national development by maximizing the long-term value of hydrocarbon resources in Algeria. .
- The construction, industrial and commercial exploitation of all transport of oil.
- The treatment and processing of hydrocarbons and their derivatives.
- The supply of oil and products derived from it in national and international markets.
- The processing, refining and marketing of hydrocarbons.
- The acquisition and holding of all portfolios of shares, equity and other securities in any existing or new companies in Algeria or abroad.
- The development of all forms of joint activities in Algeria and outside of Algeria, with national or foreign companies.
- Development and maintenance of transport and packaging of hydrocarbons.
- Development of modern national management through continuing education.
- Intensifying efforts to exploit and capitalize on studies in this area, for a better understanding of the basement and the identification of potential hydrocarbon reserves.
- The development, operation and management of transport networks, storage and loading of hydrocarbons.

### **2.3.3 The Organization of Sonatrach**

The organizational structure of Sonatrach group is based on principles of organization and operating logic contributing to capacity building of senior management in terms of developing strategies and policies, effective decentralization and simplification of the operation. It aims to:

Strengthen the Directorate General in his role as design and coordination, steering and management group, Limit the number of the center decision and reduce the range of subordination of the CEO, Allow a degree of decentralization of powers and responsibilities. Ensure a permanent and reliable reporting on all activities of the group, its operation and evolution of its cost centers. Strengthen significantly the human resources function group, give priority to operational activities, ensure the

support of functional units to operations and expand resource sharing, Ensuring responsiveness, transparency and fluidity of information necessary to the overall effectiveness of the group. The organizational scheme of the Sonatrach group based on:

- The Directorate General.
- The Central Functional Structures.
- The Operational Structures.

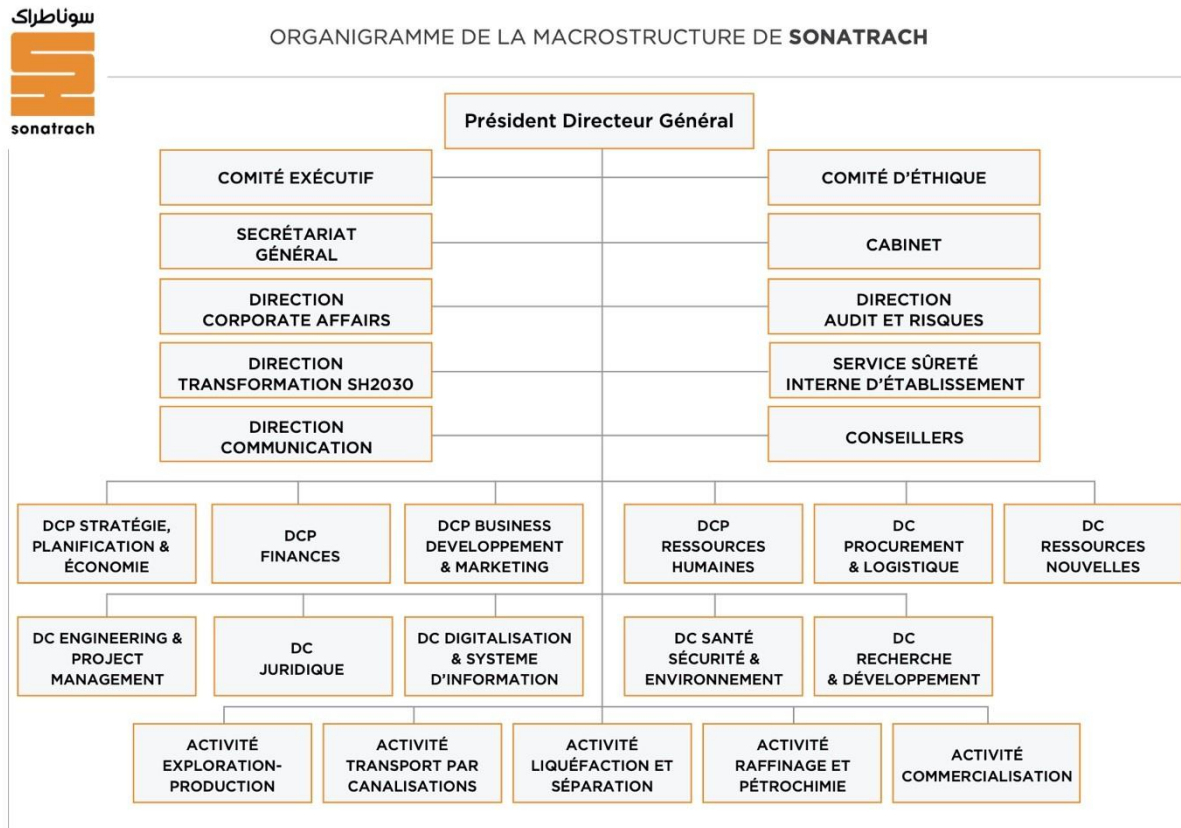


Figure 8 Sonatrach Organization Structure

## 2.3.4 The Directorate General

4.1. The General Direction: it is assured by the CEO who is assisted in carrying out its functions by:

**Executive Committee:** its mission is to examine and decide on issues relating to the objectives and evaluation of the function of the whole company.

**General Secretariat :** it is respond providing the necessary support in monitoring and consistency of management of the group.

**Ethics Committee:** responsible for ensuring compliance with the provisions of the Code of Ethics and to strengthen ethical practices within the Company.

**Cabinet:** Provide advice and technical support to the President and CEO,  
on specific issues also to define and implement a sponsorship policy and to promote the social investment.

**Corporate Affairs Department:**From the secretariat of the Executive Committee, the Secretariat of the Board of Directors, the Secretariat of the General Assembly.

**Transformation Department Sh2030 (TRF):** is responsible for the coordination and monitoring the implementation of SONATRACH's transformation plan SH2030.

**Communication Department (Cmn):** in charge of the elaboration and implementation of SONATRACH's communication strategy.

### **Advisors**

**Internal Security Department (Isd):** is responsible for ensuring the The Company's internal system, in accordance with the regulations in force,  
especially for the Company's Headquarters.

**Audit And Risk Management:** which is responsible for managing and conducting audits and evaluation of the application of the regulations and  
procedures in force. It ensures the animation of the control policy and coordinates the process of managing the Company's internal risks.

### 2.3.5 The Central Functional Structures

The functional departments develop and ensure implementation of policies and strategies of the group. They provide expertise and support for operational activities of the group,

- Ensure development and ensure the application of policies and strategies of the group.
- Plan, provide and coordinate the provision of expertise and support to various operational common missions activities of the group.
- Assert a center of excellence and expertise in their respective fields.
- Strengthens the information center of the group and contribute to its reporting.

**The Transformation Department (TRF):** is responsible for coordinating and monitoring the implementation of the Company's transformation plan.

**The Communication Department (CMN):** is in charge of developing and implementing SONATRACH's communication strategy.

**The Corporate Strategy, Planning and Economics Department (SPE):** is in charge of the elaboration and development of medium and long term plans and to evaluate their implementation.

**The Corporate Finance Department (FIN):** is responsible for developing policies and strategies in the area of finance. It evaluates their implementation and monitors the quality of financial information.

**The Corporate Business Development and Marketing Department (BDM):** is responsible for formulating the Company's growth strategy and identifying investment opportunities.

**The Corporate Human Resources Department (RHU):** is responsible for developing human resources policies and strategies and monitoring their implementation.

**The Central Procurement & Logistics (P&L):** Department is responsible for managing the Group's procurement and logistics processes.

**The New Resources (R&N):** Central Division is responsible for managing and operating Non-Conventional Resources and Offshore projects from the center.

**The Central Engineering & Project Management Department (EPM):** is responsible for the management and execution of the Group's major industrial projects.

**The Central Legal Department (JUR):** is responsible for the development and harmonization of legal instruments and for monitoring their application.

**The Central Digitalization and Information Systems Department (DSI):** is responsible for defining and monitoring the Company's IT and digitalization policy.

**The Corporate Health, Safety and Environment Department (HSE):** is responsible for developing policies on the environment, safety and quality of life in the workplace. It monitors their application.

**The Central Research and Development (R&D):** Department is responsible for promoting and implementing the policy of applied research and development of technologies in the Company's core businesses.

### 2.3.6 The Operational Structures

Operational activities cover the whole chain hydrocarbons, starting with research and exploration, to the hydrocarbon processing and marketing to the last consumers. Each of these activities is under the authority of a vice president.

We could group them into four main branches:

- Exploration-Production (E&P).
- Transport by Pipeline (TRC).
- Liquefaction and Separation (LQS).
- Refining and Petrochemicals (RPC).
- Marketing (COM).

#### **2.3.6.1 Exploration-Production (E&P):**

Responsible for formulating and implementing policies and strategies for development and operation of upstream oil and gas, it is also responsible for international activities. It covers the following operational areas:

- Exploration.
- Research and development.
- Production.
- Drilling.
- Engineering and construction.
- Associations in partnership.

#### **2.3.6.2 Transport by Pipeline (TRC):**

Responsible for formulating and implementing policies and strategies of hydrocarbons transport. It is also responsible for international development activities. It covers the following operational areas:

- Storage of liquid and gaseous hydrocarbons in upstream and downstream.
- Transport by pipeline of liquid gaseous hydrocarbons, from the primary production area, through the primary and secondary network.
- The loading of oil tankers.
- The operation and maintenance of pipeline transportation system. IT
- In addition, it provides input and expertise support to necessary, for the development of international activities, subsidiaries, national and international participations.

#### **2.3.6.3 Liquefaction and Separation Activity (LQS)**

- Responsible for formulating and implementing policies and strategies for development and operation of the downstream oil and gas. It is structured into five major activities.
- Liquefaction of natural gas.
- Separation of LPG.
- Petroleum Refining.
- Petrochemical.
- Design and development of new technologies.

#### **2.3.6.4 Marketing (COM):**

It covers the following operational fields: ·

- Marketing on external markets.
- Marketing on the internal market.
- Maritime transport of hydrocarbons.

#### **2.3.6.5 Refining and Petrochemicals (RPC):**

The Refining and Petrochemicals activity covers, in particular in the following operational areas:

- Crude Oil and Condensate Refining .
- Petrochemistry.
- Research and Development.
- The Refining and Petrochemicals Activity is also responsible for the organization of information and reporting of the activity. In addition, it provides input and expertise support to necessary for the development of international activities and subsidiaries and national and international participations.

### **2.4 Sonatrach Subsidiaries**

In the Upstream to midstream, and downstream activities. SONATRACH is involved in the exploration and exploitation of various oil deposits in the Algerian Sahara. The Group has a total of 154 subsidiaries and participations. Some of these are fully-owned and operated daily by various national.

Moreover, 105 subsidiaries are operating in Algeria and 49 others around the world, such as Peru, England, Spain, Mali, Niger, etc.

### **2.4.1 Sonatrach Group companies operate in various fields, including:**

- Production and hydrocarbon exploration.
- Oil services.
- Production and marketing of fertilizers.
- Construction and engineering.
- Seawater desalination.
- Aircraft.
- Trading.
- Shipping.

### **2.4.2 Major subsidiaries of Sonatrach are:**

- ENAFOR (Drilling operations).
- ENAGEO (Geophysical).
- ENSP (Well services).
- ENTP (Drilling and Work over).
- ENGTP (Construction Of Industrial Facilities).
- GCB (Civil Engineering and Building).
- ENAC (Engineering, Construction & Installation of pipes).
- SAFIR (Engineering and construction of industrial units).
- NAFTAL, (Marketing and Distribution of Petroleum Products).
- HYPROC SC (Shipping).
- Tassili Airlines (Aircraft).
- Group ASMIDAL (Production, Marketing And Development Of Fertilizers, Ammonia And Derivatives).

## **2.5 The Corporate Human Resources Department**

In an increasingly competitive economic environment, Success at Sonatrach is defined by its capacity to develop and engage its technology and human resources. This strategy is part of its continuous effort to improve its performance and competitiveness. Although Human Resources planning is an integral part of Sonatrach's strategy and contributes to the development of the company's operations. It identifies the needs of the employees and the opportunities for them in terms of employment and skills.

The study of KM was in the corporate human resources department and particularly in training and human resources planning department, However

the training department is a major Company priority. Thus, the Company devotes significant resource to training.

Sonatrach has two training centers:

- ▶ **Company Development Center (CPE):** CPE intervenes in management techniques, management, languages, trainers' training, finances and legal, computing and information systems and HSE.
- ▶ **Algerian Petroleum Institute Corporate University (IAP-CU):** provides operational trainings at international level in energy and mines fields, and more particularly in oil upstream, hydrocarbons transportation, transformation and refining as well as oil economy.

The Corporate Human Resources Department is organized as follows:

- **A Regulatory and Social Monitoring Department:**
  - A Department of Studies and Regulations.
  - A Labour Relations and Social Monitoring Department.
  - An Internal Control Department.
- § **A Compensation Department:**
  - A Classification and Compensation Department.
  - A Performance Management Department.
  - A High Potential Management Department.
- § **A Head Office Personnel Management Department:**
  - An Executive and Expatriate Management Department.
  - A Personnel Management Department Headquartered.
  - A Career Management Department.
- **A Training and Human Resources Planning Department:**
  - A Forward Planning Department.
  - A Training Engineering and Reporting Department.
  - A Training Management Department.
- § **A Social Affairs Department (Asl).**
- § **A Communication And Public Relations Department (Cmr).**

- § **The Algerian Institute Of Petroleum (Iap).**
- § **A Mission Unit.**
- § **Two Assistants.**

### **2.5.1 The Corporate Human Resources Department's**

The management and development of the Group's human resources. The establishment and implementation of occupational health policies and procedures. The management of social affairs and communication policies.

### **2.5.2 The Corporate Human Resources Department:**

is organized as follows :

#### **The Regulatory and Social Monitoring Department:**

The development and updating of internal regulations related to human resources. The preparation and implementation of studies related to collective bargaining. The management of social relations within the Group.

#### **The Compensation Department:**

The implementation of the remuneration policy and its follow-up. also The definition of the roles and responsibilities of the various functions related to the model rules and contributions. and control over the process of identifying and recruiting employees in the model rules and contributions.

The creation and implementation of annual and mid-term salary plans and variable compensation plans. The monitoring and analysis of the components of compensation, both in terms and rules of attribution.

#### **A Head Office Personnel Management Department:**

The management and administration of personnel in accordance with the policies and procedures of the Company, its directors and its employees. The development and monitoring of the employment exchange process. The preparation and implementation of all the stages of the job exchange.

Implementation of the recruitment plans and reports of the Training and Human Resource Planning Department.

**A Training and Human Resources Planning Department:**

The Human Resources orientation note and the Annual Plan are developed in collaboration with the relevant human resources structures of the Company. The annual human resources reports are also executed as part of the corporate reporting process. The preparation of annual forecasts and other documents related to the planning and implementation of human resources processes.

**The Forward Planning Department:**

The elaboration of the company's training and employment policies and strategies, in line with the goals and initiatives of the SONATRAH Group. The development and implementation of training programs in collaboration with the group's training centers and other educational institutions.

The work of the Company's planning and training committees and the coordination of various aspects related to human resources. The elaboration of the annual and mid-term plans in line with the strategic objectives of the General Management.

**Training Engineering and Reporting:**

The development of educational programs adapted to the needs of the company and its affiliates. The establishment and implementation of training partnerships with international organizations and universities. The elaboration and update of training catalogs.

**Training Management Department at the headquarters :** has the following

The quantitative and qualitative needs analysis and the elaboration of training plans for the structures under the responsibility of the Head office. The establishment and follow-up on the training actions taken by the personnel under the Head Office's supervision. The management and administrative procedures for the training of the structures in Algeria and abroad.

### **The Social Affairs Department:**

The Social Affairs division is responsible for the management of the company's budget and assets, as well as the development of social programs and activities for workers and their dependents.

### **The Communication and Public Relations Department's :**

The management and implementation of the Group's communication strategy and procedures. The development and implementation procedures for promoting internal communication and external communication to various audiences. The elaboration and implementation measures related to the sponsorship and patronage policy.

### **The Algerian Institute of Petroleum:**

Developing and maintaining a peer-of-quality in various areas of the organization's activities. The establishment of collaborations and partnerships with international universities and institutions. The development and sharing the company's values and culture.

### **The Missions Unit:**

The management of missions and travel in Algeria and abroad.

### **The Assistants:**

Coordinate the processing of various files related to the Human Resources Department of the DCP. Support the Executive Director in the preparation of reports and other documents related to the activities of the department.

ORGANIGRAMME DE LA DIRECTION  
CORPORATE RESSOURCES HUMAINES

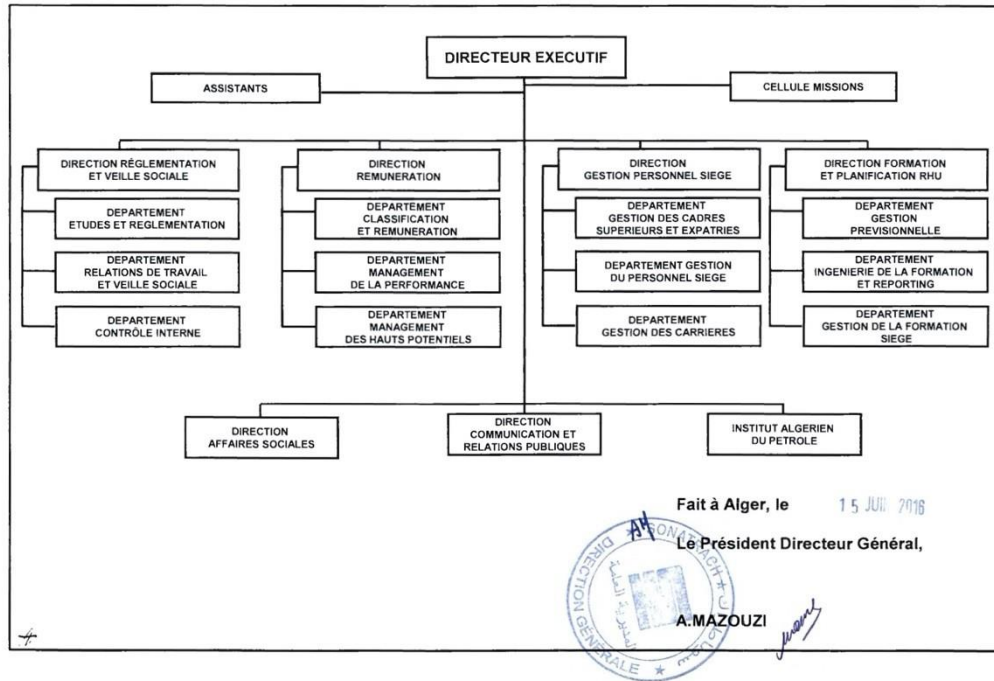


Figure 9 The Corporate Human Resources Department

## 2.6 Overall

Sonatrach, plans to spend \$40 billion on developing existing fields over the next five years, its CEO said. its ambition to become one of the top five leading and most profitable national oil companies in the global energy industry. As part of its strategy, which is based on the SH2030 plan, the Group will be invested in the renewal of reserves The target is to install 22,000 MW of new renewable energy capacity by 2030.also the Group aims invest in production capacity, staff training and development of expertise in the Company. This strategy is focused on continuous improvement in operational efficiency and innovation, as well as on increasing the Group's profitability by 20% by 2030.

# Chapter 3

## KMS Implementation

## Chapter 3 KMS Implementation

Effective knowledge management involves the identification, acquisition, and dissemination of knowledge that can provide strategic advantage to an organization. This process must be done in a manner that is consistent with the organization's goals and objectives. "You can't manage knowledge nobody can. What you can do is to manage the environment in which knowledge can be created, discovered, captured, shared, distilled, validated, transferred, adopted, adapted and applied" (Collison and Parcell, 2004).

This chapter will include two sections that are declined as follows:

- The first section will highlight the various findings and perspectives taken from the interviews conducted by the employees of the company. the research is based on descriptive and analysis, It also contains the interviews and answers by using a qualitative approach.
- The second section will highlight the various findings and perspectives taken from the interviews conducted by the employees of the company. By implementation the Knowledge Management System that we created.

## **Section 1: Presentation Analysis**

### **1.1 Overview of existing**

Our study was in the Human resource department, the objective of the study was for analyzing the process of learning organizations inside the company, how the flow of information inside the company and how knowledge management doing. Although the investigation was by interviews, and the analysis was by the observation for what we notice problems in the company and by the documents we examined.

### **1.2 The Interviews**

The objective of the interviews was for collecting all data about problems, gap process and all knowledge about the work inside the company the company.

#### **1.2.1 The Interview guide**

To explore more about the process of organization learning and knowledge management, by taken note on objective, vision, problems and feedbacks inside Sonatrach group, the guide was elaborated beforehand. The first one with work in Internal Control Department in HR the interview was unstructured the all interview was about the learning process also by the organization structure and the function of the organization.

Overview the questions was:

- How does the organization work?
- What are the activities of Sonatrach?
- How an organization's learning was in the past, and how is it in the present day?
- How does the flow of information in the company occur?
- How can we improve the organization learning?

The interview was to explore more about Sonatrach as an organization and the department of HR, and Sonatrach has a strong and huge structure have more than 250 thousand employees, more than 20 departments. We gained rich information from that interview, and we explored every activity and sector in Sonatrach. Sonatrach is large company have 5 main activity, all department focus on those activities.

The HR department is responsible for the career of the employees, and the need of the employees, also is responsible for the training for the worker. What we noticed is some departments work in open spaces like SPE and HSE departments and others work in enclosed spaces like the HR department. the HR department is responsible for training for the employees, they have training center like IAP, specialized for all what about engineers and chemical, also Sonatrach start training with E-learning and begin toward to digitizing the training sector.

Sonatrach every year planning for new strategies and analyze for the needs of knowledge for their employees, to increase the knowledge inside however Sonatrach works for encouraging all employees to start training. Also, Sonatrach has some politics to encourage and motivate all workers to reduce any waste of energy or cost.

Second interview was about the organization structure and how the development of the organization learning by time, also we did search how the process of organization learning, the interview was organized with my supervisor

The second one was with employee in SPE the interview was structured also, the questions of the interview was :

- How would you have implemented knowledge management?
- Why the project was canceled?
- Where did the idea of implementing knowledge management come from?
- What actions have they made toward the project?

The interview was all about the project of implementation of knowledge management and how the progress of it was, beginning with the project was canceled after 2 weeks of the start, the project was recommended by BCG Consulting Group, to start implementing the knowledge management.

The third one was with Project Management Manager in HSE the interview was semistructured the discussion was about organization learning how knowledge management in the company and the vision of the company:

The questions was :

- How you views the process of the work in the company?
- How the flow the information inside the company?
- How much progress have they made in digitalization?
- How will be the future activities of Sonatrach?
- About cultures and the mindset of the employees?
- Why some work in open spaces and others not?
- How are they sharing knowledge from managers to their employees?
- How Sonatrach view sharing knowledge with other enterprises and universities?
- How do you evaluate the level of expertise and knowledge in the Sonatrach?

The interview was semistructured the focus on the mindset of the employees and the culture inside, Sonatrach has strategies' for the future and the future of the knowledge of the employees, the flow of the information based on the interaction of the employees more than technologies, Sonatrach still works on the progress of the digitalization, to encourage the flow of the information inside. However, Sonatrach still has some resistance to change inside some of it with the mindset, that Sonatrach work on SH30 the objective is for implementing the new mindset and culture for the company that helps the company for the future strategies and plan.

### **1.3 observation from the answers and the workplace**

After conducting interviews, I came across several points that indicated the knowledge management does not exist within a company. Instead, the company relies on its affiliated institutes for its learning needs.

The sharing of knowledge is still done by the employees themselves. Although the company has a policy that obligates employees to share knowledge without

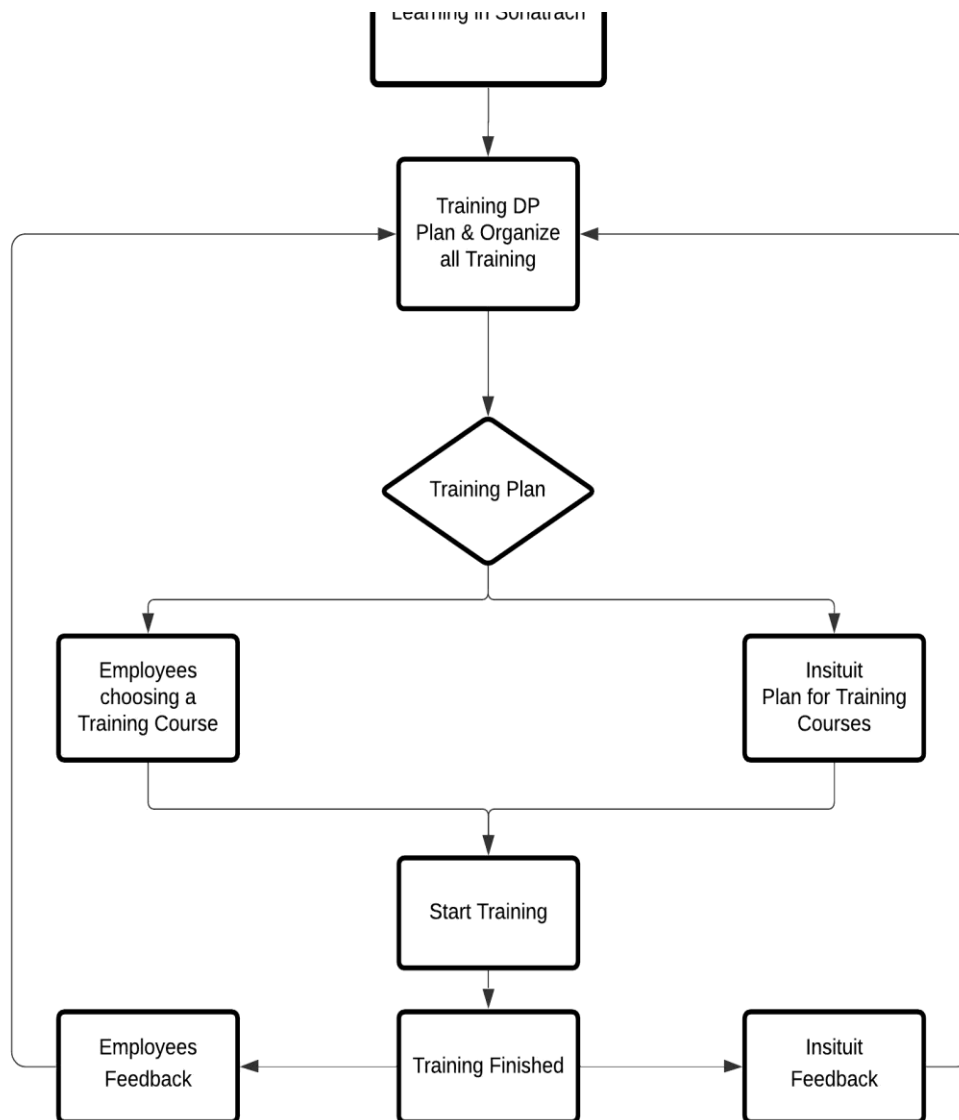
a plan, this is only disseminated through collective working and under the supervision of their managers. Otherwise, there is some department working in open space and other departments that are not. therefore for the last one, it is difficult for managers to share their knowledge within these departments.

#### **1.4 The Knowledge management project in 2010**

In 2010, BCG offered advice on the importance of knowledge management for the company and on how to improve it. However, the project stopped only two weeks later after its creation.

#### **1.5 The process of organization learning**

The knowledge-creating in the company process begins with the SPE department creating the company's needs and then submitting a plan to the Training and Human Resources Planning Department. This department then prepares the topics and organize all the session after sends it to the various workers and institutes. The workers choosing their training courses and institutes then prepare the topics for the training sessions, when the two are prepared the training start, however after the training finish, the workers and institutes send all the feedbacks to the department.



### Learning Process in Sonatrach

**Figure 10** Learning Process in Sonatrach source : ourselves by Observation and Interviews

Sonatrach obligates all employees to take three training courses in a year, for increasing the training courses taken by employees and to raise the level of knowledge in the company ‘however after analyzing reports of training by the managers, they find all employees take the training courses in the last month of the year. They view that obligation make all employees taken courses just to complete all the process and paper for administration.

## 1.6 My general observation on the company

Generally, knowledge sharing depends on teamwork in the company, also on the competence of the managers, and that's why the organizational learning and knowledge management in the company is outdated, and there are other things that I found in my observation at work :

- Bureaucratic
- The office plan with papers and archives.
- The company does not have a knowledge management system.
- There is no objective or vision for knowledge management.
- Difficulties in sharing knowledge with employees.
- There is no digitalization in the company (however, they are still at the Beginning of project SH ONE for implementing an ERP (SAP)).
- No motivation for working.
- Boring office environment.
- No Mapping Work Processes.
- Outdated practice and mindset.
- Resistance to change.
- Boring environment

In general, Sonatrach has other positive points, which make a lot of effort to provide the best possible environment for its employees and invest more in the safety of its employees throughout Algeria.

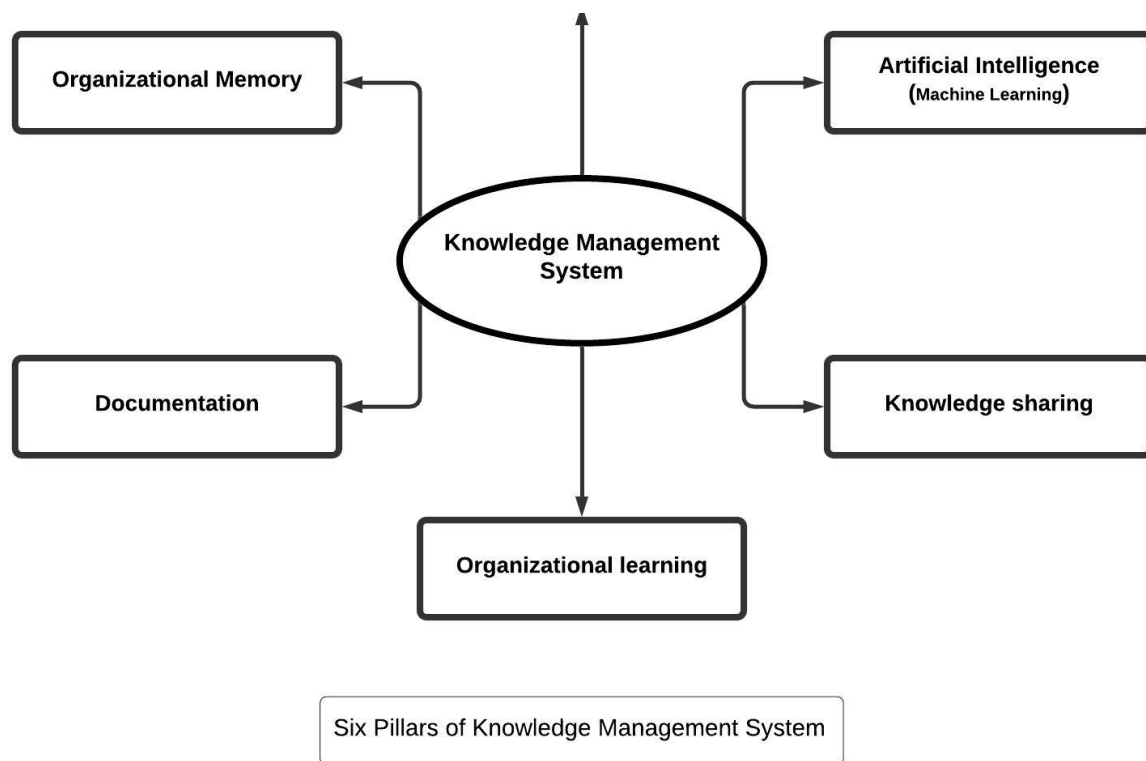
## Section 2 Implementing KMS

In this section, we will highlight the various findings and perspectives taken in the interviews conducted with the employees of the company. To give a proposition for implementing the Knowledge Management System that we created.

A knowledge management system is a combination of Knowledge Management and an information system, that stores and retrieves the information to improve processes and enable collaboration. It can also be used to center a knowledge base on a specific topic or subject.

Based on many research and study of KMS by (Soliman and Spooner, AND Nonaka and Takeuchi, Peter Drucker, J. Liebowitz), we view Knowledge Management System stands on :

- Documentation
- Acquire
- Memory Organization
- Sharing
- Learning
- Artificial intelligence



**Figure 11** Six pillars of knowledge management system

Before we discuss the implementation of KMS, we began with the pillars of KMS for any Organization:

## **2.1 Six Pillars of KMS**

### **2.1.1 Documentation**

Knowledge is a type of component that can be easily accessed and managed within a document (Jay Liebowitz ). Its method of sharing tacit knowledge to explicit knowledge (Nonaka and Takeuchi 1995). therefore documentation supports various user activities and helps users develop and maintain a complete knowledge base for a KM program. It is also a good way to demonstrate how to share knowledge and effectively utilize it.

However, Documentation includes user guides, documents, rapports, archives, prototypes, knowledge maps, and tools that help users understand what they are expected to do with their work.

Nowadays companies use Enterprise resource planning to manage their work and the processes inside their organization. During my internship, Sonatrach began implementing an ERP system with a partnership with SAP company. With ERP, companies can document all their work processes and procedures in one place. Also, they can store all Images, files, the result of work, archives, videos, training courses, and knowledge of the work as data that can be used later.

The documentation focus on:

- Capturing all the work process with avoiding complexity.
- Archives and store all the document and organized.
- Stored Knowledge by Sonatrach, and training courses.
- Obligate all employees to document all Work Processes and Results.
- Give access to the work process for all departments, and allows all to give feedback and comments.
- Creating a platform intranet, to communicate and share knowledge with employees, like blogs and has to be all stored.
- Document all the best practices by Sonatrach.

## 2.1.2 Organization Memory

Documentation is a very important step to store and capture all information in place. It allows us to capture all knowledge that what we call organizational memory. The memory of an organization is its employees' experience with the organization's products and services. This intangible knowledge is the basis of the organization's operations.

Memory Organizational is base on two concepts storing and organize that data. Sonatrach, like all big company its employees have massive knowledge, and all the knowledge memory of the company is owned by its employees, and whatever they go, they go with all of the knowledge, therefore Knowledge should be stored and obtained from its employees by the company.

Memory Capitalization focus on:

- Creating the best practice.
- Creating the framework of their activities.
- Creating the best environment for sharing knowledge.
- With blogs and platforms, companies can help people share and exchange knowledge. Also with them, anyone can get feedback and help re-engineer or restrict that knowledge.

## 2.1.3 Acquisition (Knowledge Discovery)

“ amplification and articulation of individual knowledge at the firm level so that it is internalized into the firm ’ s knowledge base.” ( Malhotra 2000 , 334)

The acquisition process should be focused on all the information, and with the help of various technologies, we can acquire and apply knowledge Discovery. Furthermore using knowledge discovery to link the acquisition of knowledge from anywhere, by technology or reality, ex (Google Search Engine, events). Organizing the data by organizing it facilitate the function of discovery and we should separate the privacy and sensitive knowledge from others.

it may be beneficial for the company as it can help them get knowledge, without spending a lot of time and resources. Some companies prefer to use other methods for acquiring knowledge like open-source projects or courses (Kevin C, Awazu).

The acquisition should be a focus on :

- The objective of the company.
- Transparency and how much information are available.
- More data mean more knowledge we create.

#### **2.1.4 Sharing**

Sharing has two dimensions one in the reality, sharing by interacting with others, and communicating the second is by technologies as sharing videos, images, video calls, or webinars. The importance of sharing by the availability of knowledge.

However, sharing should be a focus on:

- A platform, sharing all the best practices and knowledge by Sonatrach. And allow access for all to recreate.
- A platform for e-learning.
- Messenger intranet with worker
- Create a place for brainstorming meetings.
- Coner for café breaks.
- The platform allows all universities to exchange knowledge with Sonatrach.
- Open Knowledge (Kevin C, Awazu).
- Encourage sharing culture.
- Not all knowledge is sensitive. The company should consider that.
- Sharing Sonatrach (problems, vision, information)..

#### **2.1.5 Organizational Learning**

Organizational Learning is a process that involves applying knowledge from past projects and activities to present-day challenges and the organization continues to learn collectively, our goal to be Sonatrach an Organizational intelligence.

Should be a focus on :

- Open knowledge (Kevin C, Awazu).
- E-learning.
- Platform, all can engage by sharing knowledge.

- Allow all user help for creating courses the company use.
- Encourage those who learn.

### 2.1.6 Artificial intelligence

The use of technology has become an integral part of our lives. AI objective is to make our lives easier. And these machines are capable of handling various tasks and processes with precision and accuracy. AI will help with Knowledge Discovery, by improving the understanding of variety of Data, allows knowledge creation and can predict all that can happen in the future. For our proposition

AI based on :

- The necessity of having Data
- Encourage using knowledge discovery.
- Predict problems and bugs.
- AI can also be used to make operations on oil and gas platforms safer.
- Should be connected by all platforms, data, and should allow it to access all information.

### 2.2 KMS Organization

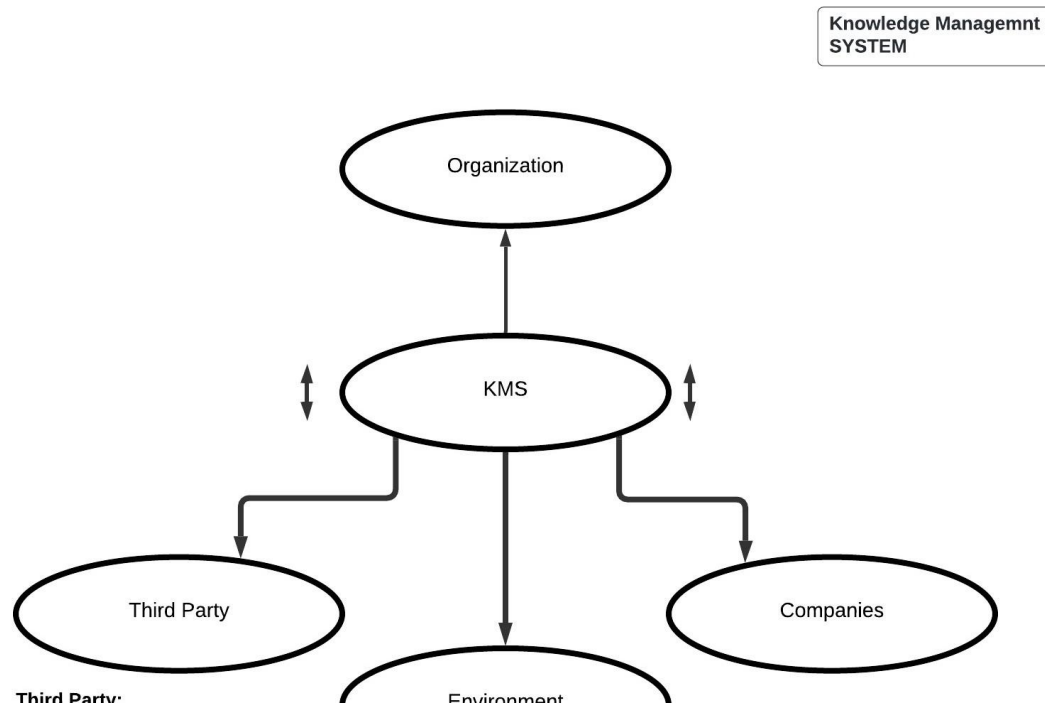


Figure 12 Knowledge Management System For Sonatrach Source: Ourselves

In this study, we propose a knowledge management system to implement inside the company. We consider knowledge is a crucial aspect for global companies. This system should be able to manage and develop knowledge creation.

The km in this study will help to link all activities inside the company and allows the company to connect with all other parties. Our goal create KMS It will help the company to work towards its objective and vision by respect all company values.

We start linking the three parties with the organization, including the third party, Environment, Companies, all those labels will be able to work together for one vision.

### **2.2.1 Kms in the organization**

Sonatrach invests by giving their employees the best qualities of education and training, they have managed to centralize all their works in one department, which is called the Training and Human Resources planning department. In that KMS we work to decentralize all organizations learning by all department can help with it.

### **2.2.2 Kms with Third party**

The third party consisted of Universities, Startups, and Incubators. The KMS we propose starts with the gap between universities and companies, many students without experience cannot start working just after finishing their studies. And no planning for interns from universities in the company. also many problems the company has without solutions, just because no one knows about it.

However, the contact with the start-up and incubators allows Sonatrach to get the latest technology and expertise in different fields, such as artificial intelligence and digitalization. Furthermore, bringing together various sections of universities, startups, and incubators, can facilitate many problems and solutions for the companies.

### 2.2.3 Kms with Environment

The environment includes all who can help the company by people who live in Algeria or outside of Algeria, also company Alumni. And many employees of Sonatrach have retired or changed their work status and now have huge expertise and knowledge or they work for other company and Sonatrach didn't benefit from them, for our proposition is linked all those to get what the company needs.

### 2.2.4 Kms with Companies

Many international companies have partnerships with Sonatrach and these companies have an obligation for sharing knowledge with the company, however, this always ends without knowledge sharing, because there is no plan for knowledge sharing and we propose a solution for that.

### 2.3 Implementing KMS Organization

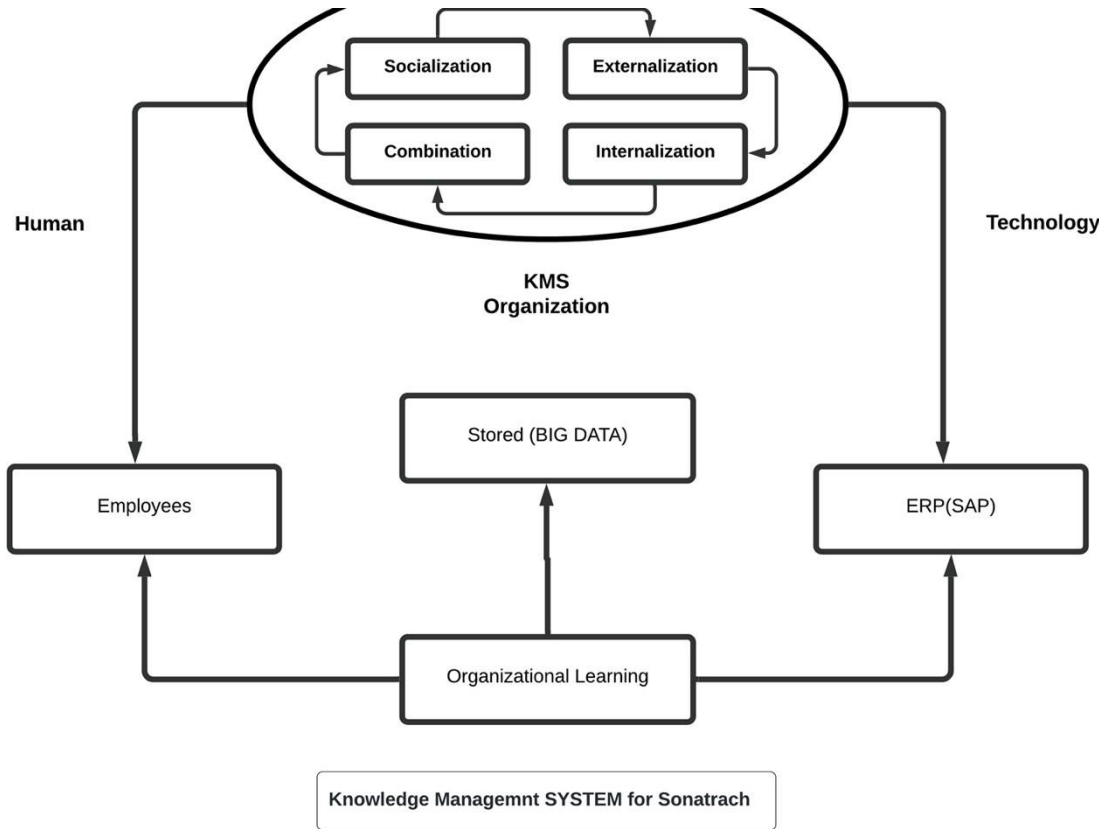


Figure 13 KMS Organization for Sonatrach

The implementation commences with integrating KMS in the Organization that stands by three-dimension: technology, human, organization ( Maryati, Yusof 2006).

### **2.3.1 KMS Knowledge Creation**

We began with insert the Knowledge Spiral in work activities. The knowledge spiral (Nonaka and Takeuchi), is the cycle between the four-mode of SECI Knowledge Conversion and may start from any mode. That will including all types of organizational activities. Soliman and Nonaka view human resource management and technology are the keys to implementing KMS in the company.

Our KMS Organization aims to achieve decentralization in knowledge creations in Sonatrach, by giving the chance for all to engage in improving Organization learning. The SECI Model will be the center of knowledge creation for the company by linking with all parties internal and external.

### **2.3.2 The SECI Model & Knowledge Conversion**

Our SECI model will focus on teamwork more than the individual, the SECI (Socialization, Externalization, Combination, Internalization) all four aspects will be explained how to integrated into the work environment.

#### **2.3.2.1 Socialization**

Socialization Comes from the social life inside the company by transferring tacit knowledge to tacit knowledge. This is very important for them as they can allow all employees to think as a group. for integrating Socialization, we should focus on the mindset of the employees and has to change to be able to accept a new culture and politics. “People with a fixed mindset stop improving, despite their talents, those with a growth mindset keep evolving” Carol Dweck. CEO of Microsoft supports changing the mindset by encouraging Know-how, curiosity, learning, and Repeat the cycle.

How to implement Socialization:

- Start set up the Open Space Work Environments.
- Places for a brainstorming meeting.
- Corner for coffee breaks.
- Sharing the culture of leadership and coaching.
- Integrate storytelling culture by acknowledging Sonatrach heroes and achievements.
- Integrate Trust culture.

### **2.3.2.2 Externalization**

Externalization by sharing tacit to explicit knowledge, sharing knowledge by Externalization is stating how they did their work and how they came to this conclusion. As a report, work process, work result, analysis result, archives. This method helps the employees create knowledge, that can be used by other people.

Externalization what should do :

- Documentation :
  - Mapping Work Processes
  - Obligate shared resource
  - Traceability
- Sharing knowledge via tutorial videos
- Archives
- Store.
- Sharing all types of knowledge.
- Acknowledge the person who shares.
- Obligate Sharing.

### **2.3.2.3 Combination**

Is sharing explicit to explicit knowledge, also its knowledge has been shared before for reused(Nonaka and Takeuchi), as for reuse some analysis result, prototype.

For Combination, we propose to Create platforms and tools for everyone to share knowledge inside the company and by Obligate shared resource that will help increase the amount of knowledge within the organization.

Combination will focus on:

- Creating a platform for a shared resource (Traceability of Data).
- Open Knowledge for external (Kevin C, Awazu).
- Take caution about sensitive information and knowledge.
- Use AI and ML for knowledge discovery.

#### **2.3.2.4 Internalization**

Is explicit into tacit knowledge by tools that help to share knowledge, and Sonatrach use this tools via events and training center.

Our proposition is:

- Creating more with employees Events with objectives for exchange knowledge
- Decentralize the Training center.
- Share books periodically.
- Creating Platform for E-Learning.

#### **2.3.3 KMS with organization, human and technology**

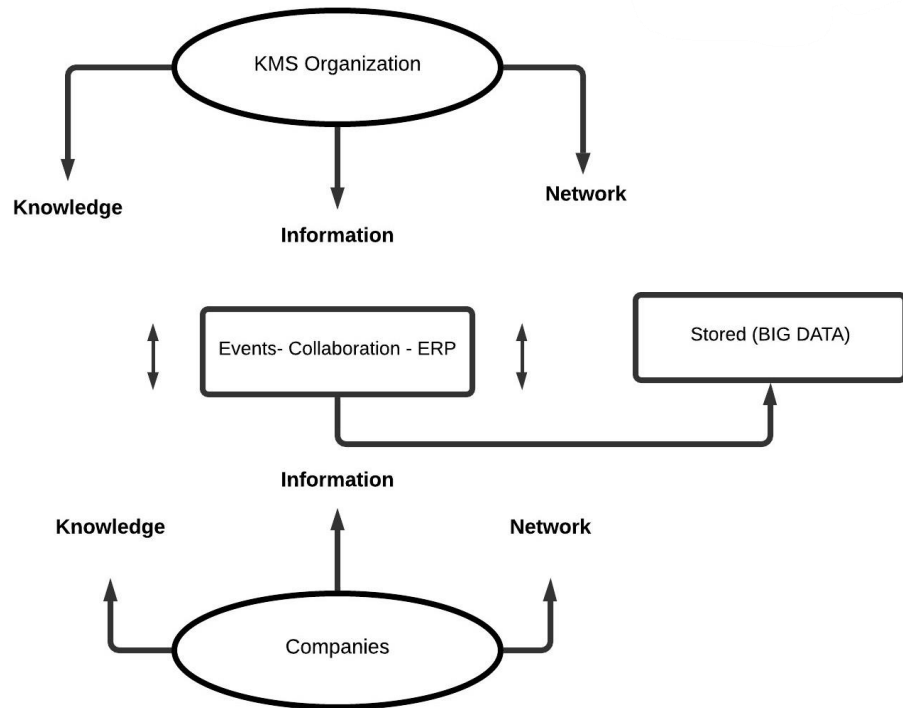
Overall All the employees should make their works visible and traceable to other employees. For ERP technology still in progress, however, it will make that connections easier and the information visible more. It will also help in the creation of KM and Organization Learning. Also, store all the DATA that the company has for reuse after. The goal is to find the best practices for all works and combine them with technology to improve them.

### **2.4 Implementing KMS Organization with the Companies**

Sonatrach has many partners with other companies and organizations, national and international, and in the contract have an obligation for exchanging knowledge with each other, although the problem there is no knowledge exchanging, this partnership was not beneficial for Sonatrach, as it gave them, however, Sonatrach didn't have any strategies for exchanging.

However, the KMS Organization needs to work with other companies in all activities and processes without making boundaries for information sharing.

This is very important for the organization to know what needs to be done to improve the efficiency and effectiveness of the work.



**Figure 14** KMS Organization for Sonatrach link with Companies source : ourselves

What should do by the company :

- Share Knowledge
- Share information
- Share problems with partners.

What should other partners do :

- Share knowledge.
- Share information.
- Helps Sonatrach to get other partnerships.

By the chart we view what the two organization do, that association will transfer the knowledge by :

- The integration of SRM & CRM will facilitate the distribution of information.
- Create Events for exchanging vision and knowledge, also it is a way to open up the mindset of the employees for some idea that it's difficult to impermanent like digitalization(Jay Liebowitz).
- Creating some fun activities for employees helps them interact and learn more about one another(Jay Liebowitz).
- Mapping all the processes of the activities by the partner.
- Store all information and data by a partner.
- All the cameras can help to require all knowledge or information for the company need.
- Obligate the worker in Sonatrach to analyze and report about all the work the partner does.

All activities formally and informally have to be organized and planned by the company, in a way that will help avoid all the bureaucratic. Also integrating all this data into one platform and use it for various purposes by knowledge discovery or capturing knowledge.

## 2.5 Implementing KMS Organization with the Third party

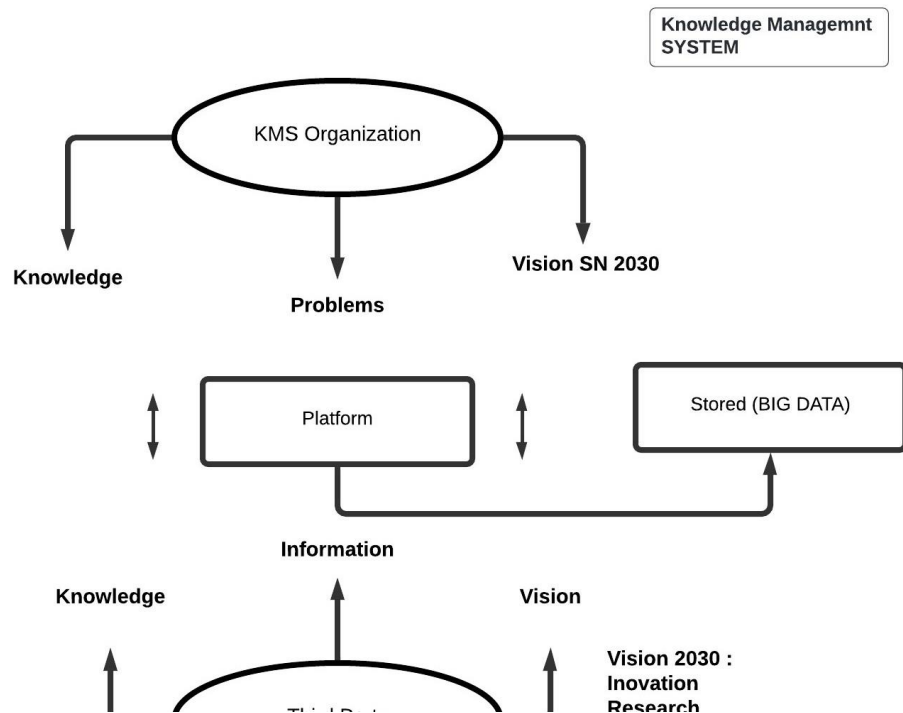


Figure 15 KMS Organization for Sonatrach link with Third Party

Universities have an enormous *capacity* of knowledge and huge potential to grow with it, however, Start-up and incubators own knowledge without the expertise and they have the ability of problem-solving and innovation, and the objective of Knowledge Management System aims to improve the efficiency and quality of knowledge creation in organizations and link all resources of knowledge with Sonatrach.

Sonatrach what should focus on :

- The company Should share the vision exactly and what its needs by research and innovation.
- Sharing all the Problems Sonatrach that can be solved by the third party.
- Creating a Platform for exchanging knowledge with the third party.

The Third-party should focus on :

- sharing all research that is done.
- Sharing all knowledge and vision that may Sonatrach benefit with.
- Sharing all solutions for Sonatrach's problems.

Creating a platform where all information and knowledge available, which facilitates limiting the gap between the third party and Sonatrach. to have efficient knowledge. however, there are other methods like events and challenges, and competitions.

## 2.6 Implementing KMS Organization with the Environment

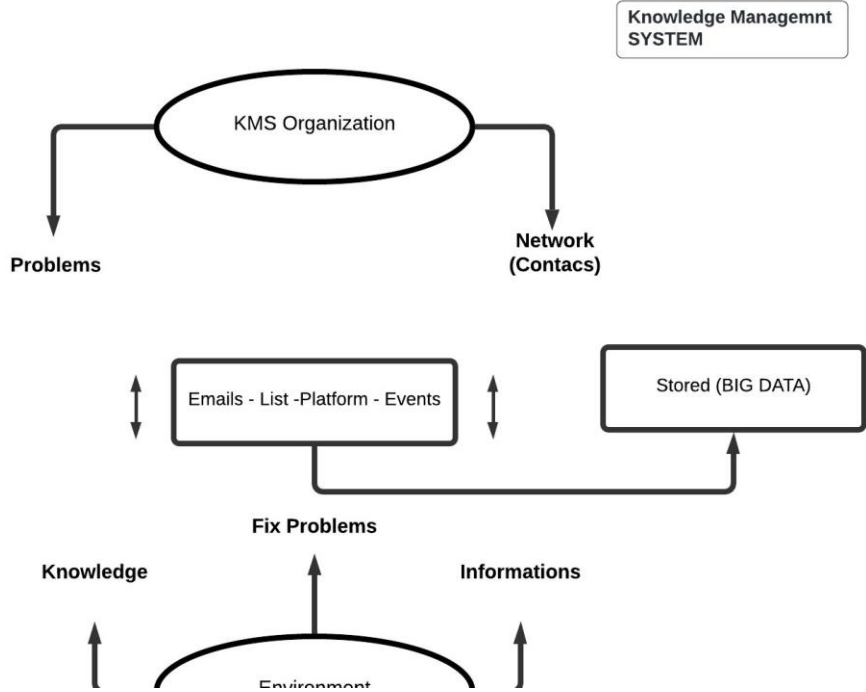


Figure 16 KMS Organization for Sonatrach link with Environment

Linking KMS ORGANIZATION with Environment by Its members are persons who live in Algeria, and who have worked in Sonatrach in the past. Sonatrach should store all the details about its employees, including their past work history, and the present .so they can contact and share information with them.

What proposition for Sonatrach to do is :

- Sonatrach Shares their problems activities and needs.
- Sharing *shortcomings* in contracts or partnerships may others help.

What Sonatrach do expect from Environment :

- Sharing knowledge.
- Gives solutions and information.

The more Sonatrach can be contacted the more information and knowledge Sonatrach Acquire, Email will facilitate that link.

## **2.7 KMS In Overall**

Knowledge Management System will oversee by three departments SPE, Human Resources, and Information System. Each department will in charge of the functions of the KMS. First SPE for planning and organizing, Human Resources on Memory Capitalization, Organization Learning, and Documentation, and Information System on Share, Acquire, Store, and Artificial Intelligence (Knowledge Discovery).

In closing, Knowledge management systems are tools that help organizations to manage their information, KMS is designed to support various users in communicating and sharing knowledge with each other.

# Conclusion General

Finally, based on Algeria are one of the leaders in hydrocarbon industries, the contentions of developing and learning should never stop. And building the best environment for organizations to learn and avoiding any type of previous practice that inhibits learning and improving, also increase the resistance to change.

The question of the study: What is the most effective way to implement a knowledge management system on the largest company in Algerians. After examining all problems we found Knowledge Management didn't exist. Therefore we commence creating a system that helps in knowledge creation, managing, organizing, and oriented by the company.

Chapter one of this study was about literature review and the conceptual framework. In a literature review, we assembled all article are related and helped us written this study, began with the Nonaka and Takeuchi model, and the implementation of KM in the organization by human and resource department, the third was about Knowledge Management System, the last was about the relation between Knowledge Management and AI.

Chapter two was about the methodologies of this study and the organization of Sonatrach, we did use the inductive approach for this study and we used qualitative tools that helped us for the investigation which is an analytical and descriptive method, the investigation was by interviewing and observation, however, the chosen methodology of this research was enough and fair to both answer our problematic. Section two was about Sonatrach Organization through all details about the organization structure and the activities of Sonatrach.

The third Chapter was about the result of the dissertation, the result was create Knowledge Management system for Sonatrach and we detailed all in the Chapter three . The chapter was divided into two sections, the first section was about how the investigation include the guide of the interviews the observation, the section two was about the implementation of KMS.

Besides that we gave our suggestions and propositions based on our view for how the KMS should be, starting by link all parties with Sonatrach, we focused on Knowledge creation how can all involve in it, IT is the key for our implementation, , our KMS are based on six aspects which is :

- Documentation
- Acquire
- Memory Organization
- Sharing
- Learning
- Artificial intelligence

The limits of this research were the investigation faced some obstacles, started from the data collection process, because of the pandemic period the national companies gave 1 access for a week, that didn't help for our investigation, passed by, we struggled to reach the agent category because some of them didn't give the information that we need, the second limit was the complication and variation of our ways of investigation and the large of the company the study was not easy to be done in a short period.

In addition with the reach for our objective of creating KMS for Sonatrach company for our case of study, indeed the research, it may raise new questions for the implementation still not touch all activities and department in details that can open another research question the next research should take care of it.

This system provides tools and techniques that allow individuals to create, organize, and use knowledge, to accomplish the company's objectives. Support by the three-dimension of KMS: Technology, Human and Organization. ( Maryati, Yusof 2006 Soliman and Nonaka Nonaka and Takeuchi).

*“You can't manage knowledge nobody can. What you can do is to manage the environment in which knowledge can be created, discovered, captured, shared, distilled, validated, transferred, adopted, adapted, and applied.”(Chris Collison and Geoff Parcell)*

In overall, it may be concluded that Knowledge management systems will help employees create, capture, organize and distribute knowledge by decentralizing Organization Knowledge Creation that will facilitate implementing new ideas and new strategies.

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## **Website**

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Inductive Approach:

<https://research-methodology.net/research-methodology/research-approach/inductive-approach-2/>

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### **Figure and Table:**

Figure 1: J. Liebowitz Source: Knowledge Management In Theory And Practice

Figure 2: Atlaptcd From Nonaka & Takeuchi (1995). P.62

Figure 3: Jennifer Rowley source: The wisdom hierarchy

Figure 4: Adapted From Nonaka & Takeuchi (1995). P.62

Figure 5: Nonaka & Takeuchi (1995). The Knowledge-Creating Company P.71

Figure 6: Source ourselves

Figure 7: Source via website <https://sonatrach.com/organisation>

Figure 8: Source: via Sontrach Documents

Table 9: Source ourselves

Figure 10: Source ourselves

Figure 11: Source ourselves

Figure 12: Source ourselves

Figure 13: Source ourselves

Figure 14: Source ourselves

Figure 15: Source ourselves

Figure 16: Source ourselves

## Annex

The person who In charge of Internal Control Department in HR the interview was unstructured the all interview was about the learning process also by the organization structure and the function of the organization.

Overview the questions was :

- How does the organization work?

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- What are the activities of Sonatrach?

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- How an organization's learning was in the past, and how is it in the present day?

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- The timeline of Sonatrach's evolution?

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- how we can implement a knowledge management system?

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- how the flow the information inside the company?

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- How much progress have they made in digitalization?

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- How does the flow of information in the company occur?

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The employee in SPE the interview was structured also, the questions of the interview was :

- How would you have implemented knowledge management?

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- Why the project was canceled?

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- Where did the idea of implementing knowledge management come from?

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- What actions have they made toward the project?

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Who In charge with Project Management Manager in HSE the interview was semistructured the discussion was about organization learning how knowledge management in the company and the vision of the company:

The questions was :

- How you views the process of the work in the company?

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- How the flow the information inside the company?

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- How much progress have they made in digitalization?

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- How will be the future activities of Sonatrach?

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- About cultures and the mindset of the employees?

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- Why some work in open spaces and others not?

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- How are they sharing knowledge from managers to their employees?

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- How Sonatrach view sharing knowledge with other enterprises and universities?

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- How do you evaluate the level of expertise and knowledge in the Sonatrach?

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