



Higher National School of Management  
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Option : Strategic Management and Information Systems**

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# **Essaie of Knowledge Management From Knowledge engineering to Knowledge Base**

**Case : CM Consulting**

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## Acknowledgement

“

*ALL the thanks and praise to the all mighty for everything...I would like to thank my mother who is my pillar in this life, my brother, and a special thanks to Mme TOUMI for her help and every one who helped me in every way, thanks to all of you.*

”

## ملخص

باستخدام تقنيات إدارة المعرفة ، ستكون الشركة قادرة على الاستفادة من أصول المعرفة التي تعد رافعة أساسية لاكتساب ميزة تنافسية في سوق الأعمال اليوم. في هذه الأطروحات ، درسنا استخدام أساليب هندسة المعرفة حول كيفية اكتساب تحويل المعرفة وتخزينها في وسائط يسهل الوصول إليها في شكل قاعدة معرفية.

نتج عن هذه التجربة عملية اكتساب ونمذجة المعرفة المكتسبة في قاعدة المعرفة الإلكترونية .

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الكلمات المفتاحية: رسمة المعرفة ، هندسة المعرفة ، مشاركة المعرفة ، النمذجة .

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# Résumé

En utilisant des techniques de gestion des connaissances, l'entreprise sera en mesure de capitaliser sur ses actifs de connaissances qui sont un levier essentiel pour acquérir un avantage concurrentiel dans le marché des affaires de nos jours. Dans ces thèses, nous avons étudié l'utilisation des méthodes d'ingénierie des connaissances sur la façon d'acquérir des connaissances transformer et de le stocker dans des médias accessibles sous forme de base de connaissances.

Cet essai a abouti au processus concernant l'acquisition et la modélisation des connaissances acquises dans une base de connaissances électronique.

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**Mots clés : Capitalisation des connaissances, ingénierie des connaissances, le partage des connaissances, la modélisation.**

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# Abstract

Using knowledge management techniques the enterprise will be able to capitalise on her knowledge assets that are an essential lever for acquiring competitive advantage in nowadays business market. In this theses, we have studied the use of knowledge engineering methods on how to acquire knowledge transform it and store it in accessible media in the form of knowledge Base.

This essay resulted on the process regarding the acquisition and and modeling the acquired knowledge into a electronic knowledge base.

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**Keywords : Knowledge capitalization, knowledge engineering, knowledge sharing, modeling.**

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# Acronym list

**KM**            *Knowledge Management.*

**KEng**          *Knowledge Engineering.*

**KW**            *Knowledge*

**SQL**          *Structured Query Language.*

**MySQL**        *Open source relational database management system.*

# Introduction

With the development of the micro and macro economy, the company's vision has undergone tremendous changes. The only useful vision is based on production tools and labor in Taylor's sense.

Now, important levers have emerged outside of this vision : customer relations, information systems, business intelligence, Quality, new strategic activities (sales, marketing...). The company is constantly changing to respond to new The challenge of its competitive environment.

The digital environment enables data, information and knowledge to be captured and shared instantly for decision-making purposes within the organization. Advances in information technology (such as networks and Internet systems, collaborative computing, virtual interaction, and immersive environments) have completely changed the form and content of knowledge transfer, eliminated time and space constraints, and greatly improved the knowledge acquisition and sharing of multinational companies **[add ref]**.

Multinational companies need to formulate and implement appropriate knowledge management strategies to utilize the knowledge assets of the companies distributed on a global scale **[add ref]**. With a good knowledge management strategy, a company can specify the best way to manage its knowledge assets to take advantage of its benefits **[add ref]**.

From Algerian context, the lack of knowledge management and knowledge sharing in organisation is extremely not present or in a disorder and that is due to multiple obstacles that restrain an organisation here in Algeria whether in the public or private sector to construct a knowledge management framework or what is also known as a company knowledge capital. But does that mean that the lack of knowledge management in Algerian organisations stopped the progress of companies ? are there no solution for the preservation of the organisation intellectual capital ?

In fact, solutions exist for preserving organisational knowledge which are knowledge assets that are used by companies around the world : Expert systems, Knowledge base, Knowledge book...

By implementing an effective knowledge management strategy, the company will improved its awareness and understanding of the importance of knowledge management, cultivate a culture of knowledge tolerance, and achieved the company's overall goals.

# Problematic

As expressed above corporations around the globe and especially in Algeria are having tremendous problems on how managing their knowledge capital thus losing their most precious asset in the 21<sup>st</sup> century which is knowledge assets.

No longer excel files and physical papers are enough to encompass the corporations valuable knowledge, that being said a lot of questioning about how to integrate solutions to prevent valuable knowledge loss and that let us to the main question : **”How to transfer row valuable tacit knowledge using knowledge engineering techniques to have explicit Knowledge in form of Knowledge Base (a.i. knowledge EBook) as the company intellectual capital.”**

In this thesis we address the gap of company intellectual capital following the notable contributions to literature. To analyse the internal process of the organisation and capitalise the acquired knowledge in form of knowledge base or also called knowledge EBook.

The method followed in this thesis is to collect tacit knowledge through interviews and analyse the acquired knowledge using knowledge engineering techniques resulting in satirized usable knowledge as the company explicit and direct intellectual capital.

# Pertinence of the Research

The research interests are in theory and management :

- **On a theoretical level** : this work will allow us to reinvest in the knowledge we have acquired during our studies. During the academic course, this work will allow us to reinvest the knowledge we have acquired in the academic course, grasp concepts related to the subject of Knowledge management and ask questions around it. knowledge management, on the one hand raises questions surrounding it, on the other hand understands Methods, tools and correct methods of identifying techniques, Knowledge analysis, assessment and treatment in the context of public works projects.
- **At the management level** :
  - Research results can help managers, increase confidence and help build trust and that by riling on previous experiences.
  - Confidence contribute to the creation of value for the group.
  - Able to better understand Corporate Knowledge At different stages of the project, after identifying and assessing Critical Knowledge, Then, the project manager can adopt the appropriate strategy from management strategies.

### Theme Choice

Knowledge Management and the Knowledge the Knowledge Base are a fundamental pillar in the modern organizations management systems, it enables them to capitalize hidden and valuable (we can say the most valuable).

Assets of an enterprise, Knowledge, that can gain the organization huge amount of time, money and strategic advantage by the correct use of it.

### Research Objectives

The purpose of the knowledge management process is to share opinions, ideas, and experiences And information ; make sure these are available in the right place at the right time to enable Make informed decisions ; and improve efficiency by reducing the need to rediscover knowledge. The goals of knowledge management are :

- Improve the quality of management decisions by ensuring a reliable and safe way Knowledge, information and data are available throughout the service life cycle.
- Make service providers more efficient and improve service quality, increasing Improve satisfaction and reduce service costs by reducing the need to rediscover knowledge.
- Ensure that employees have a clear consensus on the value of their services provided to customers and realize the benefits through the use of these products service.
- Collect, analyze, store, share, use and maintain knowledge, information and data the entire service provider organization.

### Organization Choice

We chose CM Consulting organisation for its importance in managing and using information related to each client to deliver a adequate product which is a information system related to the wanted organisation.

### Overview of the related work

This section reviews previous research on managing intellectual assets in organizations while maintaining a global perspective. Starting from the previous research on the challenges of knowledge management on a global scale, we summarized the relevant research on global knowledge management models and strategies, and highlighted the contribution of our research. Here are some studies :

- **Inkpen and Ramaswamy, 2005; Jasimuddin, 2007** have investigated knowledge management challenges in a global context and ways to mitigate these challenges. For example, Inkpen and Ramaswamy (2005) studied the attributes of knowledge in organizations and analyzed the transaction problems caused by knowledge

embedded in various global environments. In addition, they regard knowledge as the source of global corporate innovation and discuss how companies can develop organizational culture to use knowledge to promote innovation from all markets where the company is dispersed. From the process perspective of knowledge management.

- **Klahr (1997)** identified and explored the important issues of managing knowledge assets derived from customer knowledge bases in order to effectively create and transfer valuable knowledge on a global scale.
- **Wang (2007)** studied how three external factors, namely social influence, alternative knowledge sources and national culture, influence the use of global knowledge management systems through personal beliefs.
- **Leidner, Alavi, and Kayworth (2006)** compared the culture and knowledge management methods of two organizations, and studied how organizational culture affects knowledge management and how knowledge management evolves in the organization. Recent research has proposed some global knowledge management models in specific environments. For example, Pawlowski and Bick (2012) developed the Global Knowledge Management Framework (GKMF), which integrates the elements and influencing factors for managing knowledge assets distributed on a global scale.
- **Joël Muzard [2012]** states each individual in an ad-hoc group becomes like a neuron an organization that weaves a new “cognitive” web that enables the emergence of new ideas and solutions in real time.... These ideas, which are based on a new the epistemology of knowledge...”. The notion of knowledge is evolving in organizations, a development that relies heavily on the notion of intellectual capital, in opposition to the industrial era that favoured tangible goods.
- **Adler. P [1989]** when knowledge is the critical resource, knowledge management is the critical task.
- **Jean-Louis Ermine[2008]** ”after being evacuated a little too much fast as a fashion phenomenon, it comes back in force in companies, because it addresses real substantive issues, which are only growing with the globalization, the ageing of the population, the knowledge.”

## Structure of the research

The first chapter called literature review and conceptual framework is divided in sections as follow :

- follows the literature review of the previous researches relevant to this thesis.
- encompasses the core subject this thesis is about, starting by definitions and following the knowledge engineering and knowledge acquisition ending with knowledge documentation.

## **Introduction**

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The second chapter focuses on the methodology adapted to accomplish this research. The third and last chapter discuss the results obtained by applying some of the knowledge engineering and knowledge acquisition techniques to the host organization to create a knowledge book in form of activity diagram.

# **Chapitre 1**

## **Conceptual Framework & Literature Review**

### Literature Review

**d'Adler. P [1989]** : "When knowledge is the critical resource, knowledge management is the critical task."

**Lundvall [2000]** : "We argue that the knowledge-based economy is a category of the historical growth economy, marked by an increased importance of knowledge production, processing and distribution processes."

**Moulier-Boutang [2007]** considers cognitive as the third form of capitalism, succeeding those of the mercantilism and the industrialist, this passage towards the cognitive from the collective intelligence, the new resource (knowledge), the sharing of knowledge, to replace the muscular strength proper to industrial capitalism. As it stresses "We have indeed entered a mode where the reproduction of goods complex (biospheres, noospheres, i.e., cultural diversity, the economy of the mind) and the production of new knowledge and innovations, such as living reorientation of investment towards intellectual capital (education, training)..."

All these words fall to some extent within this concept of knowledge, including : knowledge identification, knowledge bases. In this social and technical context, our academic research focuses on this new form of management : knowledge management that has often been seen and experienced by companies as artificial and inevitably disappearing a few years.

According to **Jean-Louis Ermine[2008]** "after being evacuated a little too much fast as a fashion phenomenon, it comes back in force in companies, because it addresses real substantive issues, which are only growing with the globalization, the ageing of the population, the knowledge."

As shown in the "Knowledge Management with the MASK methodErmine-2003" which the author is the first to introduce this concept of knowledge Book in the same book (Knowledge Management with the MASK method Ermine), Jean-Louis Ermine the author and Father of the concept shows that the it is a complex process but necessary and that takes several tasks(page 11 of Jean-Louis Ermine Knowledge Management with the MASK method).

### Conceptual Framework

#### KEY Concepts

- Leadership is essential. Senior management must Possess the effort of knowledge management. This manager is usually called the chief Knowledge Officer (CKO), if the task is all-encompassing, or Chief Information Officer (CIO) or other senior manager You can take it as an additional responsibility.

Regardless of Who will play this role, it involves getting support at all levels of the organization. In the story, Mary who started as a media Organization consultant, become CIO by default, thank you Support from senior management.

- Effective knowledge management. Potential benefits Knowledge management is numerous and may Benefit all types of businesses, especially those involved Information technology and service industry. Senior managers expect to implement KM in the enterprise Severe punishment? As shown in the stories of the two companies, in Optimal conditions, KM promises to reduce costs and improve Serve, improve efficiency and retain knowledge assets.
- Knowledge management requires training. Employees and managers Education is the foundation for everyone to function correctly The stages of the KM process. As the story shows, employees Managers must be trained to focus on the whole Even if they are dealing with a specific problem.
- Expectations must be managed. Implement a knowledge management plan Involves fundamental changes in how employees and managers work Interact, communicate, direct and complete tasks. forward Report route, responsibilities and management instructions Transform to meet the knowledge management needs of the company and employees Managers must be prepared for change. However, due to Most people are afraid of change, especially if it means destroying one The lifestyle they are used to, productivity can Unless you actively manage employee expectations, you will suffer losses.

As Mary's role in the story illustrates, an effective method is Demonstrate the process on clearly defined goals This is an easy victory—for example, cataloging digital image assets. Only after this success, the consultant was ready to persuade Employees and management need to follow the general Knowledge management practice.

- Practical knowledge management relies on technology. Each Steps in the knowledge management process, and tracking knowledge Assets can be enhanced through information technology.

For example, the information creation process is A ubiquitous word processor running on the PC, and effortlessly Network and related networks make acquisitions possible Working hardware. Similarly, storage and manipulation of huge Database server and software make data storage possible Software, so that the data in the user's hands can benefit from Handheld devices and wireless networks available anytime, anywhere, Get information anytime, anywhere.

- Knowledge management is a process, not a product; knowledge Management is a dynamic and evolving process, not A shrink-wrapped product. Knowledge is an organization A collection of static data that can be processed rather than stored In a database.

Typical knowledge management practices of modern enterprises Including gaining knowledge from customers and creating new Get income from existing knowledge

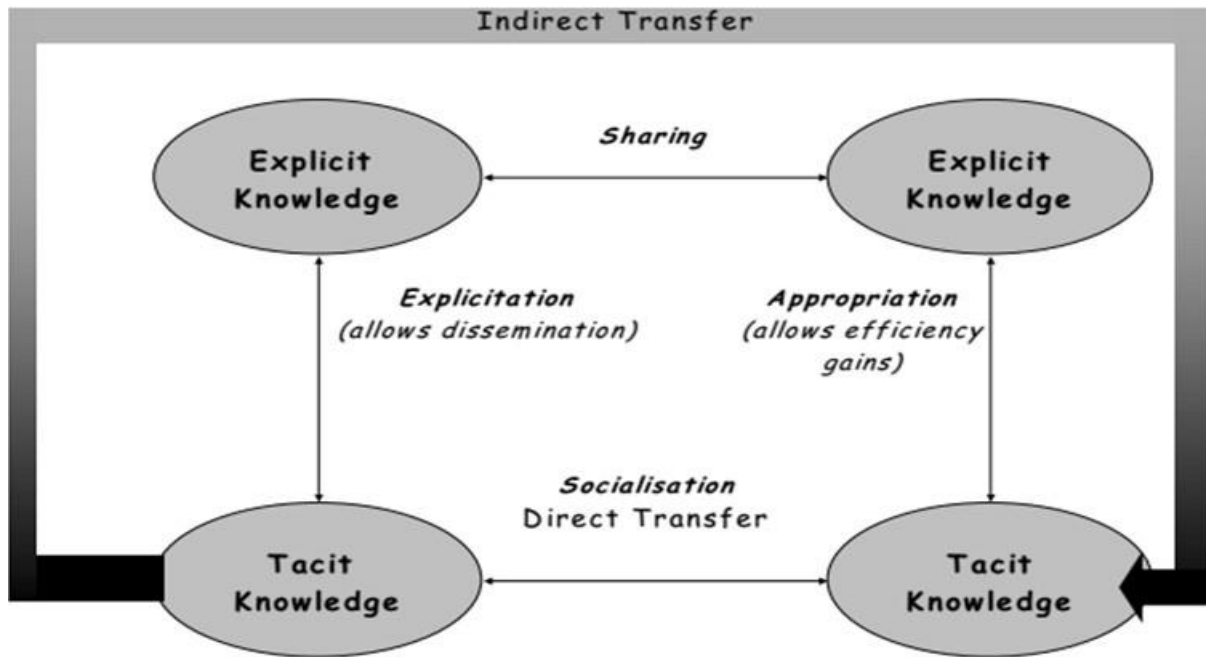


FIG. 1.1 : The Knowledge Capitalisation and Transfer Process.

and get employees' Reuse knowledge later and review predictive factors Successful knowledge management plan.

**Source :** Defining knowledge management : Toward an applied compendium John Girard, Online Journal of Applied Knowledge Management. A Publication of the International Institute for Applied Knowledge Management Volume 3, Issue 1, 2015

### The Capitalisation and Sharing Process

In order to simulate this process, we refer to the famous Nonaka and Takeuchi theory [Nonaka, 1995]. The theory considers two kinds of knowledge : tacit knowledge and explicit knowledge. Looking back at the theory, we can easily describe the capitalization and sharing process, also known as the "knowledge cycle" as shown in the figure 1.1.

**Source :** S. L. Kendal, M. Creen (auth.) - An Introduction to Knowledge Engineering-Springer-Verlag London (2007)

Direct transfer (socialization) is an unleading knowledge sharing process. Indirect transfer is another way of knowledge sharing. The first sub-process is knowledge acquisition (or explicit or acquisition).

In the next sub-process, knowledge is shared. Obviously, knowledge acquisition is valuable only when the involved knowledge is shared among relevant people in the organization. New information technologies (especially intranets) provide powerful tools for knowledge sharing, but this is not a sufficient condition : knowledge sharing is not obvious (knowledge is power !) and must be specifically designed to lead change.

The third sub-process is knowledge appropriation. Shared knowledge is used in an operational manner in the work environment to perform complex tasks and/or solve problem. Experiments and training are the classic levers of this sub-process.

There are two types of techniques that help to make knowledge explicit :

- Direct knowledge extraction, in which knowledge are extracted directly and dynamically from organization activity. DataMining, Textmining, tracability are some of these techniques.
- Knowledge capitalization, with which knowledge can be extracted by interviewing experts and from documents and modelled. Knowledge engineering methods are mainly used in this aim.<sup>1</sup>

## Data, Information & Knowledge

### Introduction

The Following will define knowledge and make its relationship to Data and information clearer.

### What is Knowledge ?

Knowledge is 'The explicit functional associations between items of information and/or data' (Debenham, 1988).

### Data, Information and Knowledge

Is Data the same thing as information ? What is Data ?  
First of all, before diving into the understanding of knowledge its a must to at least come close to establish definitions of Data and Information are.

Data (the plural of datum) are just raw facts (Long and Long, 1998). Data are streams of raw facts representing events before they have been arranged into a form that people can understand and use (Laudon and Laudon, 1998). Data is comprised of facts (Hayes, 1992) & Recorded symbols (McNurlin and Sprague, 1998).

We will note that data is often referred to as "facts"-usually "raw", and in the first quote, it is considered to be moving in "flow". Hayes's final quotation seems to define data as record symbols in more depth. Hayes actually continues to insist that data are not facts, and treating them in this way will produce "numerous perversions", for example, in the form of propaganda or lies-they are still "data". We don't need to accept or reject any

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<sup>1</sup>The second methode is whats is used in this theses to aquire Knowledge

definitions you encounter—just to be aware that there is no universally accepted data definition. Similarly, regarding the meaning of the word "information", we found that there are many attempts to define it in the textbooks of information systems and information technology. In many ways, the meaning of the words "data" and "information" will only become clearer when we approach the differences between them.

We have noticed earlier that information is usually considered data, processed or transformed into a form or structure suitable for human use.

Words such as "meaning", "meaningful", "useful"; and "purpose" are obvious here. We may also notice that information is considered an attribute of data. This means that without the latter, the former cannot exist. In the definition of information, you will see how the meaning of words becomes clearer when considering the differences between words and data.

For example, although the previous emphasis on the "primitiveness" of data, for human purposes, information is considered to be some kind of improvement on data. use.

In addition, the two words "knowledge" and "communication" are related to data and information. It is also worth emphasizing at this point that the interface between data and human interpretation of data is where the information determined by the "meaning" actually appears.

These two terms are still often used interchangeably, and no definition applies to all situations we may encounter. knowledge In ordinary language, the word knowledge is obviously related to information, but it is clear that they are not the same thing.

**So how do we define knowledge in the same flexible way that we have already derived the working definition of information and data?**

- the result of the understanding of information (Hayes, 1992)
- the result of internalising information (Hayes, 1992)
- collected information about an area of concern (Senn, 1990)
- information with direction or intent—it facilitates a decision or an action <sup>2</sup>

From the previous definition, it is clear that knowledge is what someone has after understanding the information. Usually, this understanding is carried out after establishing a detailed or long-term relationship with a known person or thing.

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<sup>2</sup>(Zachman, 1987).

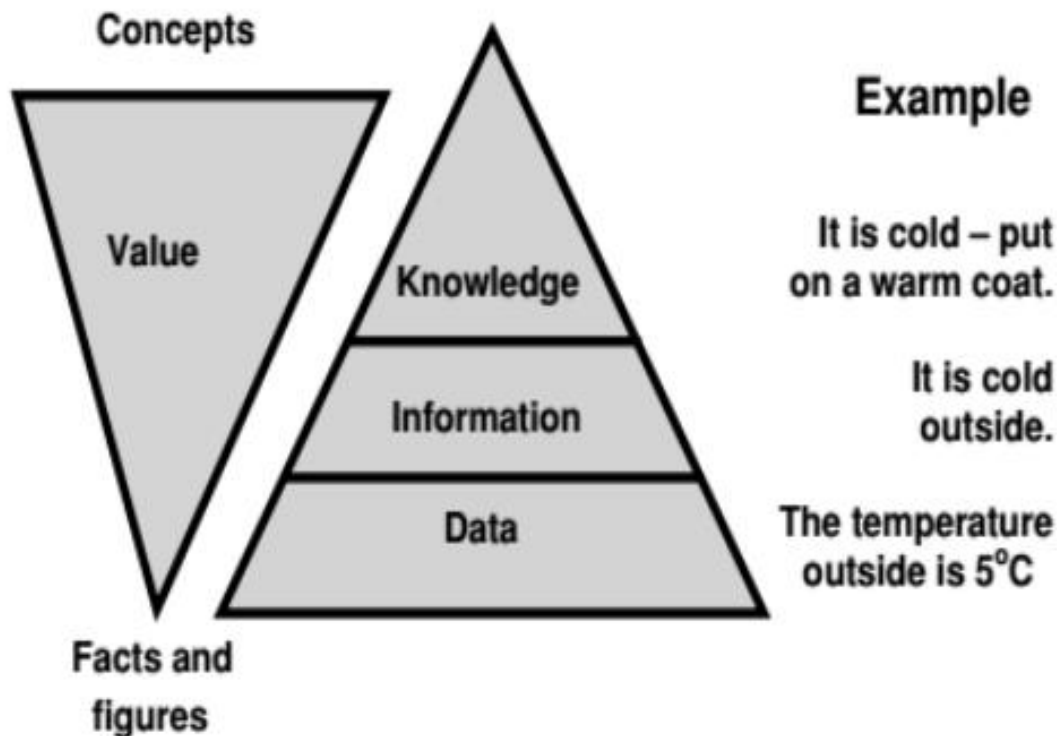


FIG. 1.2 : Data, Information and Knowledge

When information needs to be used for critical decisions, such a process can often be accelerated. The application of information to decision-making or areas of concern is particularly relevant to the situation of the organization. However, it needs to be clear that data, information, and knowledge are not static things in themselves, but are at various stages in the process of using data and transforming it into knowledge.

On this basis, they can be regarded as points in the continuum, from less useful to humans to more, just like we all move along the continuum from young to old, but we are in any Time can't be Defined as one of the two.

In other words :

It is 7 C—**data**.

It is hot —**information**.

It is hot outside AND if it is hot you should wear a light clothes —**knowledge**.

»From a knowledge engineering perspective, it is useful to consider knowledge as something that can be expressed as a rule or useful to assist a decision, i.e., “**IF it is hot outside THEN wear light clothes.**”

The perceived value of data increases as it is transferred into knowledge, because the latter enables useful decisions to be made.

### Types of Knowledge

Knowledge engineers usually deal with three types of knowledge :

- **Declarative knowledge** tells us facts about things. For example, the phrase "a light bulb needs electricity to emit light" is actually correct.
- **Procedural knowledge** provides alternative actions based on the use of facts to acquire knowledge. For example, people usually check the amount of water in the kettle before opening the kettle ; if there is insufficient water in the kettle, more will be added.
- **Meta-knowledge** is knowledge about knowledge. It helps us understand how experts use knowledge to make decisions. For example, when planning long-distance trips, knowledge about airplanes and trains may be useful, while when planning short-distance trips, knowledge about sidewalks and bicycles may be useful.

Knowledge engineers must be able to distinguish between these three types of knowledge and understand how to encode different types of knowledge into some form of KBS.

**Source** : S. L. Kendal, M. Creen (auth.) - An Introduction to Knowledge Engineering- Springer-Verlag London (2007)

## Knowledge Engineering & Knowledge Acquisition

### What is Knowledge Engineering

'Knowledge engineering is the process of developing knowledge based systems in any field, whether it be in the public or private sector, in commerce or in industry'<sup>3</sup>

- Today, knowledge engineering uses a modeling process to create a system that contacts experts with the same results without following the same path or using the same information source.
- The goal of knowledge engineering is to implement it into software that will make decisions that human experts would make, such as financial advisors.
- Knowledge engineering has been used in decision support software, and it is expected that at some point it will be used to make better decisions than human experts.

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<sup>3</sup>Debenham, 1988.

### Knowledge Engineering & Knowledge Management

The terms "knowledge management" and "knowledge engineering" seem to be used interchangeably with past data and information terms. The term "management" is related to the direction of executive administration, administration, and supervision. For engineers, it refers to layout, construction, or design or planning, usually related to more or less subtle skills and craftsmanship. The main difference seems to be that the (knowledge) manager determines the direction the process should take, while the (knowledge) engineer develops the method to achieve that direction.

Therefore, we should find knowledge managers who are concerned about the knowledge needs of the enterprise, such as discovering the knowledge needed to make decisions and take actions. They should play a key role in the design of the enterprise. Starting from the needs of the enterprise, they should formulate enterprise-level knowledge management policies.

On the other hand, if we are to focus on knowledge engineers, we should find that they focus on data and information representation and coding methods, data repositories, etc

Knowledge engineers will be interested in what technologies are needed to meet these needs. Knowledge engineers are likely to be computer scientists who specialize in the development of knowledge bases, but knowledge managers may be the chief information officer or the person responsible for information resource management.

### Process of Knowledge Engineering

- 1. Knowledge acquisition**
- 2. Knowledge validation**
- 3. Knowledge representation**
- 4. Inferencing<sup>4</sup>**
- 5. Explanation and justification.**

1. Knowledge acquisition involves acquiring knowledge from various sources, including human experts, books, videos, and existing computer data sources such as databases and the Internet.
2. In knowledge verification, use test cases to check knowledge to obtain sufficient quality.
3. Knowledge representation includes generating a knowledge graph, and then encoding the knowledge into the knowledge base.
4. Reasoning refers to the formation of links (or reasoning) in the knowledge in computer software so that KBS can make decisions or provide users with suggestions.

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<sup>4</sup>the act or process of reaching a conclusion about something from known facts  
<https://www.merriam-webster.com/dictionary/inference>

5. Explanations and demonstrations involve additional computer programming, mainly to help the computer answer questions raised by users and show how to use the knowledge in the knowledge base to draw conclusions.

## Skills of Knowledge Engineer

### introduction

This section introduces one of the most important figures in the field of knowledge engineering ; namely, knowledge engineers. Knowledge engineers are responsible for obtaining knowledge from human experts and then inputting this knowledge into some form of KBS. To carry out these activities, specific skills are required.

### Knowledge Required from Knowledge Engineer

First, knowledge engineers must extract knowledge from people (human experts) who can be put into a knowledge-based system (KBS). Then, this knowledge must be expressed in a format that can be understood by knowledge engineers, human experts, and KBS programmers.

Computer programs that process knowledge or perform reasoning must be developed, and software systems that are being produced must be verified. The knowledge engineer may be involved in the development of the program, or it may be delegated to another person. When developing these systems, knowledge engineers must apply methods, use tools, and apply quality controls and standards.

In order to carry out these activities, knowledge engineers must plan and manage projects, taking into account human, financial, and environmental constraints.

### Overview of Knowledge Engineer Work

Summarizing the above points, knowledge engineering includes the processes of knowledge acquisition, knowledge representation, software design and realization. In order to achieve the goal of designing KBS, knowledge engineers must :

- Get knowledge from experts to use in the system
- Use appropriate methods to represent knowledge in a symbolic and manageable form. This means that to obtain the title of knowledge engineer, we must truly apply professional and rigorous methods to product development. Engineers will also use various techniques to ensure that quality and work meet standards.

Knowledge engineering is a multi-stage process, traditionally a business handled by a series of professionals. Including psychologists, computer scientists, software engineers,

project managers, system analysts, domains (or disciplines) Experts and knowledge experts.

Knowledge engineers will participate in the following tasks :

- > Provide advice to experts on the knowledge required by the system Get knowledge from experts
- > Coding knowledge in some form in preparation for inclusion in the knowledge base
- > Input knowledge into the knowledge base of the computer system
- > Verify the knowledge in the knowledge base to ensure its accuracy
- > Train users to access and use the knowledge in the knowledge base.

Knowledge engineers have received technical training to extract knowledge from experts, just as system analysts and other experts are trained to obtain user needs. In addition to standard techniques, software including text editors and specialized knowledge representation languages <sup>5</sup> can help encode knowledge for inclusion in the knowledge base. Professional programs such as TEIRESIAS<sup>6</sup> help to verify knowledge and check for errors in the knowledge base.

### Summary

A knowledge engineer requires a variety of skills ranging from the technical to the managerial.<sup>7</sup>

## Knowledge Acquisition Introduction

In this chapter we will be looking at knowledge acquisition, i.e., the process of obtaining the knowledge to be stored in a form of knowledge-based system.

### What is Knowledge Acquisition

Knowledge acquisition (sometimes called knowledge inspiration) is the process of acquiring knowledge from human experts or expert groups and using this knowledge to build knowledge-based systems or other knowledge management systems. The expert system must contain the knowledge of human experts ; therefore, the knowledge acquisition process mainly involves discussions between knowledge engineers and human experts.

Obviously, knowledge acquisition courses should not be like visiting a dentist. The goal of a knowledge engineer should be Be as friendly as possible. Generally speaking, experts

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<sup>5</sup>such as KARL (Fensel, 1996))

<sup>6</sup>(Davis, 1993)

<sup>7</sup>S. L. Kendal, M. Creen (auth.) - An Introduction to Knowledge Engineering-Springer-Verlag London (2007)

will be happy to talk to anyone about topics they are interested in and will exhaust any knowledge engineers. However, this does not mean that the knowledge acquisition process is easy.

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### Methodes of Knowledge Engineer for Acquiring Knowledge

#### Interviews

Knowledge engineers can also use interviews as a method of acquiring knowledge from human experts, but they must also consider other sources of knowledge. Obviously, we need a series of knowledge acquisition methods, including computer tools. We also need to use a series of resources, such as printed documents and manuals.

#### Other Sources of Knowledge

Questionnaires are also valuable in many situations. Obviously there are considerable similarities between obtaining knowledge from experts to compile a knowledge base and obtaining information from system users to develop new or alternative information systems. Printed knowledge sources are very useful. Manuals, case studies, and textbooks may also be valuable in the specific context of knowledge engineering and acquisition of specific domain knowledge.

It is especially important for knowledge engineers to use these resources. In addition to detailed technical information, they can also be used to familiarize knowledge engineers with the subject. Therefore, when knowledge engineers conduct preliminary interviews with experts, they are already familiar with some terminology and have a basic grasp of the subject area. This prevents the expert's time from wasting by asking the expert to explain trivial information.

Although various types of documents provide useful background for specific areas of knowledge, there is no guarantee that the documents are complete or up-to-date. Therefore, one of the main methods of acquiring knowledge is still to use human experts, because they are more likely to understand the current state of knowledge in their particular field. From whom to get knowledge. Features expected by experts include :

- articulate
- motivated
- logical
- systematic.

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<sup>8</sup>How to capitalize knowledge with the MASK method ?*NadaMatta; Jean – LouisErmine; GrardAubertin; Jean – YvesTrivin*

### Conducting Interviews

To conduct a successful interview the knowledge engineer will need to :

- plan.
- use appropriate stage management techniques
- consider and use appropriate social skills
- maintain appropriate self-control during the interview.

Unlike dialogue, interviews should not be regarded as a natural form of interaction. They are the key process of acquiring knowledge, and time should be used as efficiently as possible. As mentioned above, interviews should be conducted in an organized and professional manner-even if the interview itself is unstructured. Compared with other forms of knowledge acquisition procedures, interviews have special advantages. Knowledge engineers can satisfy themselves and the experts, and they have mastered the opinions put forward by the experts. During the interview process, there are various techniques to help :

1. **First**, avoid ambiguity. Comparison words like bigger ; better, lighter, not It is always helpful, of course not accurate. What is bigger/better/lighter than ?
2. **Second**, remember that experts may miss key parts of the reasoning process. If some parts of the process may be complicated, the expert may Ignore some of these complexities to simplify the explanation so that knowledge engineers can understand them.

Similarly, when solving problems, experts may make a seemingly intuitive leap. In fact, these may be causal relationships that experts have noticed from years of experience in this field. However, because these steps are "intuitive" rather than explicitly reasoned, experts may forget them during the interview. For these two reasons, we need to consider how to ensure that the acquired knowledge is complete and accurate. Questions to help start the interview process include :

- Can you give me an overview on this topic ?
- Can you describe the last case you dealt with ?
- When you think about a problem, what facts or assumptions are you trying to establish ?
- When you start thinking about a problem, what types of things do you like to know about ?
- Leading on to find a little more detail ; tell me more about how this is achieved ?
- What do you do next ?

- How does that relate to . . . ?
- How, why, when, do you do that ?
- Can you describe what you mean by that ?

Closing an interview by reviewing the information obtained, and perhaps by alerting the expert to the need for further interviews, is also important.

Having considered interviews in general we will now look at four very common types of interview :

- Unstructured
- Structured
- Event recall
- Think aloud interviews

In this Decertation we will explain in the following below the Structured/semi-Structured interviews wich were used to conduct the interviews leading to this humble work.

9

### Structured Interviews

Structured interviews are the second major type of interview. It is used to obtain In-depth knowledge of specific areas. Knowledge engineers will have Some understanding of the field of knowledge from the orientation interview, so This interview will focus on providing detailed information about the field, involving more Questions from knowledge engineers. Some questions to the experts will Focus on why certain actions are taken to understand how experts Make a decision. Structured interviews are usually conducted after several unstructured Interviews have been conducted and the knowledge they contain has been analyze. The interview usually consists of three parts (see Figure).

**Part 1**, which lists the agreed sequence of topics and goals The interview is described by a knowledge engineer. This can motivate expert.

**Part 2**, is the place for discussion, that is, asking questions and Have the opportunity to answer by experts.

**Part 3** is an essential part of the quality assurance process, right Interview, knowledge engineers can check if they understand And get the correct answer.

The following are the characteristics of structured interviews :

- Focus on specific areas of knowledge

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<sup>9</sup>[Barthelmé et al,1998] Barthelmé F., Ermine J.L., Camille Rosenthal-Sabroux An architecture for knowledge evolution in organisations, European Journal of Operational Research 109, 414-427 (1998).

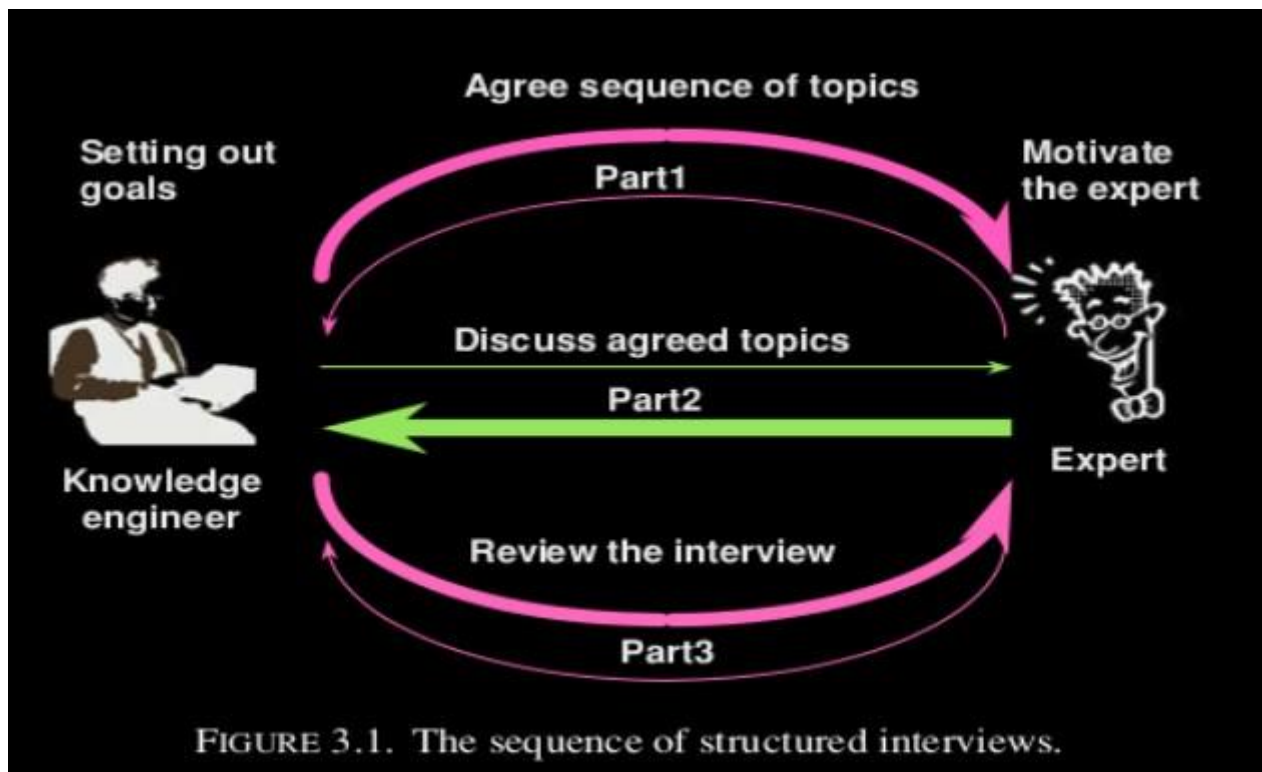


FIG. 1.3 : The sequence of structured interviews. <sup>10</sup>

- Relax so that experts can answer questions clearly at the appropriate time Level of detail
- Not hurried or slow, so as not to put experts under time pressure
- Interesting, so both knowledge engineers and experts can be related to the topic And increase the information retention rate of knowledge engineers.

## Documenting the Knowledge Acquisition Process.

Recording the results of the knowledge acquisition process is important because it allows The knowledge base that is finally developed for verification. If it's correct Follow the paperwork, it should be ok after developing the system Find out the details of the interview as a source of knowledge. knowing It will be possible to return and question the validity of relevant experts knowledge.

## Knowledge Capitalisation

### Introduction

Critical and strategic knowledge often appears Key knowledge is the default field, embedded in the mind of a set of key knowledge Knowledge workers. Knowledge is threatened (due to the departure of some people, because For example) and must be transferred to another person. Our proposal is to collect this knowledge Obtain a structured and tangible

"corpus of knowledge" in a clear form, Become an important resource for any knowledge transfer equipment. This is called "capitalization" because it Part of the intellectual capital is now intangible and turned into a tangible form. Therefore, these actions require a process of transforming tacit knowledge into explicit knowledge. This process, also called "externalization" by Unaka, is creation Organizational knowledge pointed out by Nonaka :

*"it is a process that is the quintessence of knowledge creation because tacit knowledge becomes explicit as metaphors, analogies, <sup>11</sup>*

### **Tools for Capitalisation : The Knowledge Models.**

Our method chooses to use a graphical model. This is a knowledge-based approach Use the knowledge model to elicit it. Knowledge modeling is a technique that originated from Used for artificial intelligence purposes in the 1970s and 1980s, it has now been greatly developed It constitutes a new type of engineering discipline, called "knowledge engineering". our Methods to use and adapt well-known knowledge models, and provide other improvements original. This is a method similar to CommonKADS <sup>12</sup>

In order to use templates to analyze, represent and construct knowledge capital, the method is based on About the theory of knowledge (applicable to engineering). Knowledge is considered Information that has a given meaning in a given context. So there are three Basic viewpoints of modeling knowledge : information, meaning and context (symbolic From the equation  $K = ISC$ ).

Each viewpoint is divided into three other viewpoints : structure, Function, evolution. This gave rise to nine viewpoints. For reference, three points of view Is classic : the structure is modeled by the data structure, and the function is modeled by the Data processing, and the evolution of appointments and "version control". Our approach focus Six other points of view. From the point of view of sense (sense, semantic), The structural aspect is modeled by conceptual networks, and the functional aspect is modeled by cognitive tasks And evolutionary aspects of lineage.

From the point of view of sense (sense, semantic), The structural aspect is modeled by the conceptual network, and the functional aspect is modeled by the cognitive task And evolutionary aspects of lineage. From the perspective of context (pragmatics), Phenomenon is used for structural modeling, activity is used for functional modeling, The evolution in the historical context. This is a simplified description of the models ; an exemple displayed in the figure below.<sup>13</sup>

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<sup>11</sup>(Nonaka Takeuchi, 1995)

<sup>12</sup>(Schreiber, et al., 1999)

<sup>13</sup>Knowledge Management with the MASK method, Jean – Louis Ermine

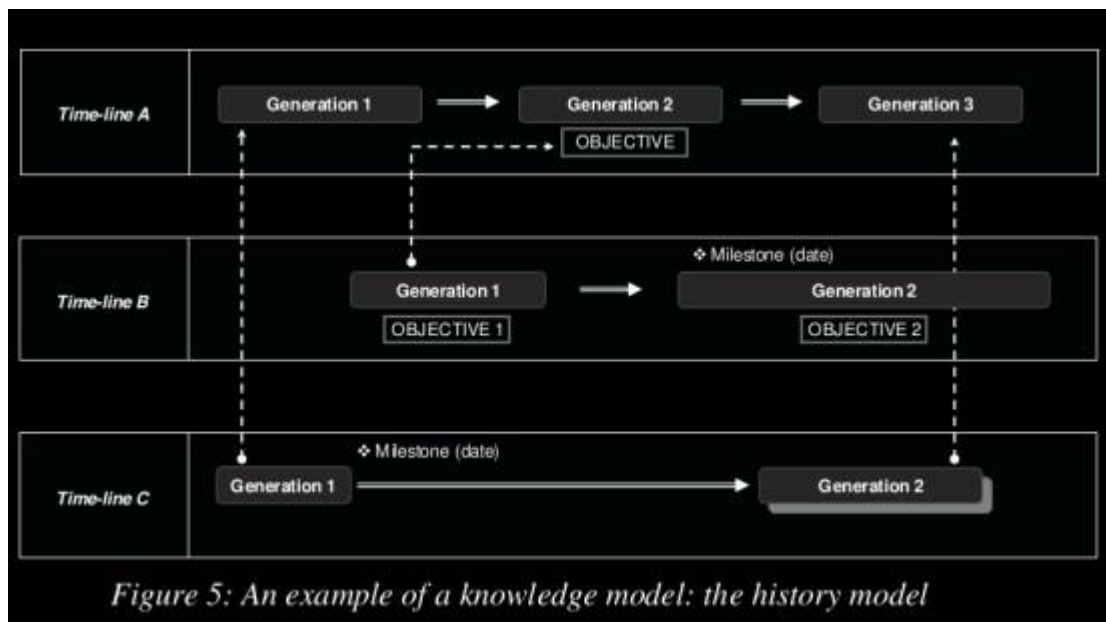


FIG. 1.4 : An example of a knowledge model ; the history Model <sup>14</sup>

An example as the picture 1.4 shows **Phenomenological model** This is a description of a professional field with general phenomena, which is basic Activity-related knowledge. These phenomena are events that need to be controlled, Knowing, triggering, optimizing, inhibiting or mitigating in related business activities.

**Activity model :** It is constructed by analyzing the activities of the system that uses or generates knowledge. this The activity model is broken down into the main stages of the business (sub-activities) Taking into account that these major stages phases being linked by the exchange of Data Flow...

### The Capitalisation Process

The final product of the capitalization process is called the "knowledge manual", Metaphorical terms refer to a set of structured knowledge elements, essentially Diagrams representing knowledge graphs and related texts, as well as publications, Electronic documents, reference materials and various documents, whether digitalized or not. this The development of knowledge books follows a specific process :

**Step 1: Framing** The purpose of the framing phase is to define the limits the knowledge domain on which the Knowledge Book is built on, to identify modelling phases that will be useful to the objective. It allows the feasibility of the project to be validated and a work plan to be set up.

**Step 2: The Realisation of The Knowledge Base.** The realization of knowledge books is a complicated process. It requires several tasks : Build a knowledge model with knowledgeable stakeholders. Interview knowledge holders provide a set of possible additional models Documents or references. Group some knowledge models and different elements Knowledge, the establishment of "knowledge blocks".

- Build consensus among knowledge contributors.

## **Chapitre 1. Conceptual Framework & Literature Review**

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- Design and produce knowledge Book. This is an important work in designing the structure and presentation of this book.
- Legitimise the Knowledge Book's content ; The knowledge capitalised in the book must be legitimised by Peer Committee composed of peers recognised by the company
- Approve the Knowledge Book.

The Knowledge Book must be finally approved by the hierarchy. This is important to ensure that the capitalised knowledge is well and truly recognized as the company's knowledge and that it must be used as such.

## **Chapitre 2**

# **Methodology of Research**

# Scope of Research

Broadly speaking, knowledge management (KM) refers to deliberate and continuous efforts to improve the use, transfer, and creation of knowledge in an organization. As a field of academic inquiry, it is a combination of a wide range of theories and structures borrowed from different disciplines and some original models and concepts specially developed to solve such problems. As we all know, knowledge management is a multidisciplinary field. Contribution subject areas include :

- Management Science
- Business.
- computer science.
- Organizational Science Library and Information Science psychology social science Planning and development.

The key themes of knowledge management are grouped in various ways, and one of the outstanding studies identified eight areas of knowledge management research :

Knowledge as the focus of corporate capabilities : business strategy and knowledge serve as "corporate capabilities" to provide competitive advantages. Sample topics : the core competitiveness of the company, the comprehensive capabilities of the company, the resource-based viewpoint, social capital, the expression of knowledge within the company, and dynamic capabilities.

Organizational information processing and IT support for knowledge management Focus : How the organization handles information and how information and communication technologies support the process. Sample topics : *organizational information processing, organizational memory, organization as an interpretation system, information processing behavior of managers, organizational structure, information systems.*

Knowledge exchange, transfer and replication Focus : *The knowledge transfer process in an organization involves complex dynamics of knowledge reconstruction and reorganization.* Sample topics : stickiness of knowledge, the role of social networks.

*Contextual learning and community of practice* Emphasis : The process of learning and knowledge sharing as contextual and context-dependent social phenomena. Sample topic : Situational learning practice community.

*Knowledge management practice* Focus : Inform management practices. Example topic : Anecdotes from the knowledge management programs of authors such as Thomas Davenport, Thomas Stewart, Peter Drucker, and James Brian Quinn, which provide insights for practitioners.

*Innovation and change* Focus : Innovation process. Sample topics : the economic aspects of innovation, the evolutionary perspective of economic change, the absorptive capacity of organizations, and the role of users in innovation.

*Philosophy of knowledge* Focus : the origin and nature of knowledge. Sample topics : tacit knowledge, organizational knowledge, knowledge types, organizational epistemology.

## Chapitre 2. Methodology of Research

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*Organizational learning and learning organization Focus* : Organization as a learning entity. Sample topic : organizational learning, learning organization

In addition to these research areas, each discipline has its own point of view on where knowledge management should provide value :

*strategic focus* Use knowledge as a *strategic resource* for sustainable competitive advantage Recognize that knowledge is the core factor in the regular innovation and development of an organization Apply the company's knowledge-based theory to explain their existence and other factors that determine scale and scope

*Accounting focus* Apply tangible value to the intellectual capital of the organization Treat human capital, structural capital, and relationship capital as different and manageable things

*Organizational Science Focus* Maximize organizational potential through knowledge transfer and protection Institutionalize individual and group learning to create organizational knowledge embedded in non-human knowledge bases, such as routines, systems, structures, cultures, and strategies

working out common sense in communities of practice through mutual engagement analysing social network relations between actors (ie individuals, groups of individuals, and firms), including weak and strong ties creating emergent knowledge and meaning through organisational sense-making.

1

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<sup>1</sup>1.Ponzi, L. J. (2002). The evolution intellectual development of knowledge management. Doctoral dissertation, Long Island University, NY. Retrieved March 22, 2005, from Proquest. 2. Subramani, M., Nerur, S. P., Mahapatra, R. (2003). Examining the intellectual structure of knowledge management, 1990-2002 – An author co-citation analysis. Working paper no. 03-03, University of Minnesota. Retrieved April 19, 2006, from [http://misrc.umn.edu/workingpapers/fullpapers/2003/0323\\_61503.pdf](http://misrc.umn.edu/workingpapers/fullpapers/2003/0323_61503.pdf) 3. Wenger, E.(1998). *Communitiesofprac Learning, meaning, andidentity*. Cambridge, UK : CambridgeUniversityPress

# Methodology

In order to answer our problem, we opted for a qualitative study according to qualitative research, "qualitative research is research that produces and analyses descriptive data, such as the spoken or written words and the observational behaviour of people".<sup>2</sup>

The qualitative research here is adopted and that is mainly because of the nature of the subject which we are dealing with and that is Knowledge.

## Methods and Measure Instruments

### Documentation Research.

For an optimum quality and quantity of information we've recolted from various books, articles and theses and that of respected scientific figures in the field of : Knowledge Management, also we worked on the internal host organisation private documentations. that permitted as to aquire the Knowledge needed for the elaboration of this theses beside other sources mentioned in the part below.

### Observation.

"Observing is a process including voluntary attention and intelligence, oriented by a terminal or organising goal and directed at an object to gather information"<sup>3</sup>

Through Observation we could determine the real, tangible aspect of the reality and not that have been told to us, indeed people tend to transform reality through their own understanding or simply how their minds tend to conceive it.

### Interviews.

The interview is "an oral, face-to-face relationship between two people, one of whom conveys to the other information on a predetermined subject. So, the interview consists of a questioning session addressed to a person or to or persons fortuitously chosen with the aim of collecting information to confirm or refute the research hypotheses"<sup>4</sup>

We've decided to take a qualitative approche regarding the conduct of the interviews and thus in order to collect first hand reliable information sets that after being processed will be the core of our work in this theses,

### Semi-directive interviews

Semi-directive interviews is a technique among others to centrise the interviewer around many central ideas predifined by the interviiwer to extract valable informations/knowledge

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<sup>2</sup>(Taylor and Begdan, 1984)

<sup>3</sup>(DE KETELE, 1980, p. 27)

<sup>4</sup>(CHABANI (S), and OUACHRINE (H) : Guide de Méthodologie de la recherche en Science Social , 2nd edition 2013, p.72)

wich is a qualitative approche structured in an interview guide.

### **Interviews guide construction.**

In order to conduct our interviews, we developed an interview guide, The guide allows the interviewees to answer flexibly and to confirm or deny certain facts. Thus, the interview guide is defined as : “A summary list of themes and questions to be addressed in a qualitative survey, which topics and questions to be addressed in a qualitative enquiry, specifying when and how to introduce them into the conversation.” This guide is provided to the interviewer to enable him/her to follow methodology, while observing appropriate behaviour during the interview.

The creation of the interview guide allows us to have a vision of both sides (management and system side) and it allows us to detect existing flaws and to better identify the problems in order to come up with meaningful solutions and recommendations.

### **Interviewed Population.**

For the good conduct of the thesis study and to ensure the objectivity of the work done, i realised a interview with two pearsons working at CM Consulting that are head of projects to different clients that are :

- Mr Abdessalem Mikentichi
- Mr Mokhtar

The selection process of the above workers was based on the work position that they are currently occupying and the relevance to my research study.

### **Information Analysis and Knowledge extraction.**

We chose content analysis because it seeks to report on what the interviewees said as objectively as possible.

”content analysis is a set of techniques of communication analysis aiming, by means of systematic and objective procedures for describing messages, to obtain indicators (quantitative or not) allowing the inference of knowledge relating to the conditions of production/reception of these messages” <sup>5</sup>

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<sup>5</sup>(Quoted by Evrard, Pras and Roux, 2000,pp.116) Bardin (1977)



FIG. 2.1 : CM Consulting logo

## **Host Organisation.**

### **Organism Presentation**

#### **Presentation**

CM CONSULTING is the specialist in Algeria for the implementation of SAP solutions, SAP Business One which is the primary focus of our local development strategy, but also has know-how in the implementation of the All-In-One solution and BI solutions.

#### **Services**

CM CONSULTING Proposes multiple services that are Knowledge Based that are :

- CM CONSULTING's primary vocation is ERP integration and organisational consultancy, but over the years, the experience and knowledge accumulated have enabled them to develop recognised skills through approaches and methodologies adapted to clients' businesses and contexts.
- The technical business unit is structured in three different and mostly complementary areas, namely IT development, support and network administration.
- With more than 60 SAP Business One, SAP R/3 and DxCare ERP implementation projects under its belt, CM CONSULTING has adapted the integration methodology dictated by its partner publishers to the context and business of its customers.
- CM CONSULTING's primary vocation is ERP integration and organisational consultancy, but over the years, our accumulated experience and knowledge have enabled us to develop technical skills that are recognised by clients, to whom have provided complementary solutions over and above the ERPs worked on.

### Solutions

*DxFamily* a set of applications to meet the needs of different health care professions CM CONSULTING markets the entire range of MEDASYS health solutions and has developed a connector to link MEDASYS solutions to SAP Business One, thus responding to the complexity of the business. CM CONSULTING was able to combine the business management offered by SAP Business One and the hospital management of DxCare by connecting the two solutions.

*DxCare* The flagship product of the range, it is a tool that facilitates the management of the hospital establishment. Based on a policy of unique patient identification, DxCare makes it possible to make all patient data reliable and centralise it.

*DxPlanning* An appointment engine allowing planning taking into account the constraints : establishment, doctor and patient.

*DxPharm* A pharmacy management tool that communicates naturally with DxCare, allowing visibility of dispensations by name and/or globally.

*DxImage* Stand-alone or connected to DxCare, DxImage allows the management of the radiology department. DICOM and HL7 certified product. NETIKA Stand-alone or connected to DxCare, NETIKA allows the management of medical analysis laboratories. DxCare EASYKITT DxCare EASYKITT, a pre-configured and lightened solution, keeping the quality of the main solution and designed to meet the expectations of the Algerian market.

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<sup>6</sup><https://www.cmconsulting-dz.com/en/solutions/medasys-sol4>

# **Chapitre 3**

## **Case Study**

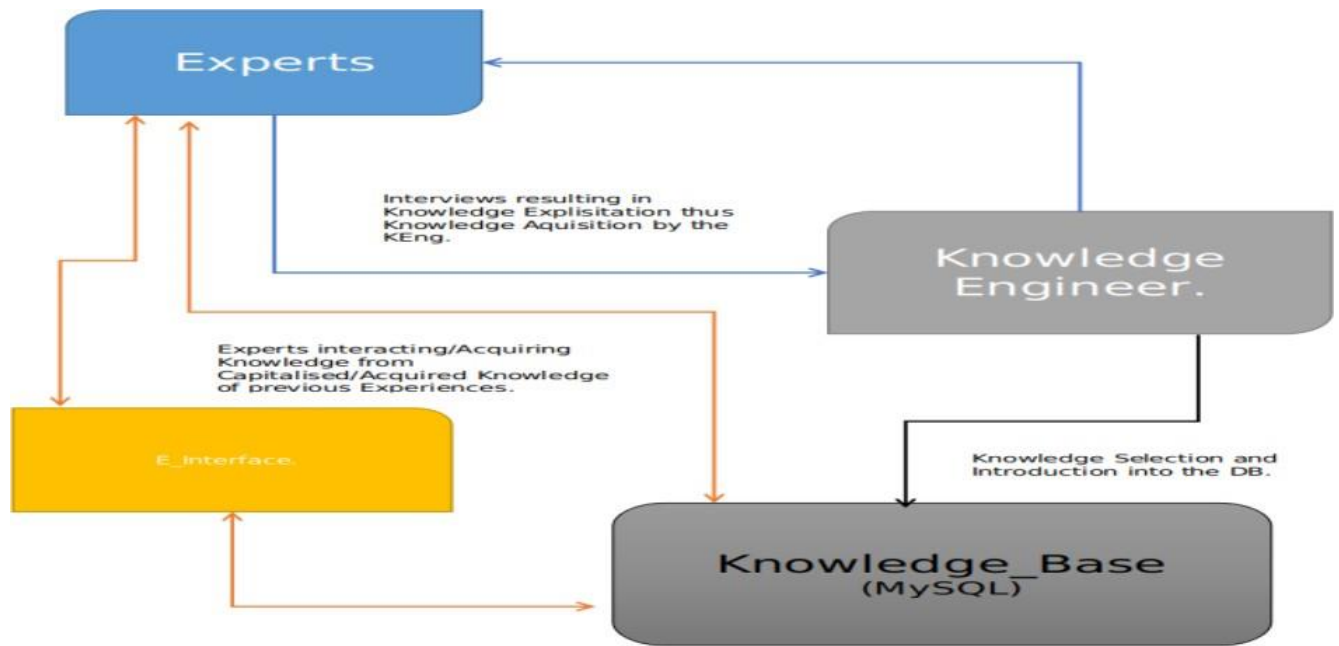


FIG. 3.1 : Activity Diagram UML of Knowledge Book realisation.<sup>1</sup>

## Knowledge Management in Host Organisation.

As noticed during my internship in the company the amount of knowledge exchanged between various actors of the enterprise is tremendous and in extreme importance, indeed the head of project which is the person in charge of the project exchange important knowledge (in this context it is knowledge that came from the client side needs analysis) with the software team.

As mentioned above we found that the knowledge take a critical place in the host organization thus a critical need for knowledge management framework to be implanted to clarify and structure the existing knowledge flow.

## Results Presentation :

### Knowledge Base (knowledge book) Overview.

the following Model 3.6 describes the Process of Knowledge Base creation.

**comment :** The above diagram in 3.6 explains the architectural backbone of the knowledge book also called the knowledge base using a user interface or without using one keeping a polished knowledge in a MySQL database called a knowledge base.

The Knowledge book (also called Knowledge Base) follows some steps which can slightly differ, but all respect the following customizable steps to acquire at the end a Knowledge Base which is a great source of knowledge that can be setup on premises (air-gaped) or having a web interface that the employees can interact with. the following steps and sub steps are followed to make the Knowledge Base :

- **Step1:** the acquisition and capitalization of Key corporate Knowledge (also known as knowledge and intellectual propriety) ; and that is done as explained in the previous sections, by the assessment and grouping of Key knowledge from key experimented employees following knowledge engineering methods to capitalize that Knowledge (experience).
- **Step2:** The standardization of the Acquired/collected knowledge through a modeling knowledge into categories for the organization and structuration of the Knowledge Base.
- **Step3:** The injection of the Capitalized and structured knowledge into a Data Base following the entity relationship rules and the architectural model
- **Step4:** Connecting the already existing Data Base/Knowledge Base to a Web interface or a graphical interface for on premises access.

Each mentioned step is a reflection of a group of processes that the knowledge engineer must handle carefully specially the interviews / knowledge-Acquisition/extraction side where the subtle but valuable information can be extracted.



However the Database creation and the injection of the knowledge models for knowledge base creation will need an expertise in Database Management...

### Interviews Outputs and Knowledge Base Architecture

Following several interviews with Mr. Abdessalem Mikentichi, I was able to understand and extract the Knowledge behind the Project Management and client handling Processes, thus it was a much of information to handle and to analyze I focused on the project handling side of it and that because of my interviewee and internal documentation availability and confidentiality of it, therefore we handled a small piece of information and made use of it into a model that can be transformed into a Knowledge Base.

The following are the interviews outputs regarding Project Handling only and that for the purposes of the study :

As you can see in the interview 3.3 (above is a small part of it, for this dissertation purposes ), many informations can be retracted from the interviewee but what is considered useful for this study is to categorize and fill up good knowledge about processes that already happened and thus creating a knowledge base of organizations project handling

	Interview Guide	
 <p>المدرسة الوطنية العليا للمناجمنت Ecole Nationale Supérieure de Management</p>	<p><b>Theme</b> : the collection and analysis of critical corporate knowledge and formalization in a Knowledge Base for the better handling of future project and that by relying on previous expertise found in the knowledge base.</p>	

TAB. 3.1 : Interview Guide

Interviewee	Title	Time of interview
Mr Abdessalem Mickentichi	Project Manager and sales representative at CM Consulting.	Variable in period of one month.
Mr Mokhtar	Head of Developers Team at CM Consulting.	45 min/ week
Mr Abdessalem Titah	Teacher at Ecole Polytechnique Oran and IAP Oran and also Dr in industrial Engineering specialty Knowledge Management.	Many hours the last three years

TAB. 3.2 : Interviewee

### Chapitre 3. Case Study

What is your role in the organization ?	I am one of the two project managers in CM Consulting.
What are your daily tasks ?	Meeting clients, analyzing their needs, and setting clear inquiries for the client needs.
What is the Knowledge associated with this process ?	The knowledge of the activity itself, the information system components and the integration of all corporate activities on the system.
What are the most frequently cited sources of new information ?	the client itself for its needs, in fact every client depending on his activity will inquire different applications or setups.
Which departments have a direct relationship with information handling ?	the project management department is the actor regarding information handling and analysis from the clients side however the software department take part in the knowledge and information process at the deployment/modification stage
How each project can be a source of new Knowledge to the corporation ?	Indeed it is a relevant question, in fact almost every project brings a piece of new knowledge to be added to our knowledge asset, you see every client have different needs that must be met by our team to fit his/her organisation.
Has the project management developed a Knowledge management plan ?	No, not yet but we are planning to...
What tools are used to assess and control the intellectual memory of the organization ?	To be honest, we don't give it such importance as we handle each project separately.
does it feel like doing the same mistakes sometimes, or not being able to refer to a manual or some sort of solution book a missing part of the organization ?	Yes, like searching the internet for common issues on windows PC (laugh)...but it would be great to have such a thing to save time and effort...
If you could summarize the kind of projects you handle with clients what would that be ?	We start by interviewing organization employees (some of them in strategic positions) of the clients' organization to set up the landscape of the work needed to be automatic and that needs a system handling, then we decide (with the client) which solution would work a standart SAP information system with pre-built modules or a custom one.
Custom, you mean you custom the SAP solution ?	Indeed, we provide the standard pack solution following with the customization of some parts of the information systems called applications, and that's regarding the organization functioning needs....
So if we could say that the project handling follows two channels the standard project and the customizable projects, but please tell me regarding the customizable projects did you see any patterns repeating itself regarding certain organizations in regards of issues when implementing ?	In fact we see similarities with organizations haing the same or close to the activity nature, for example the logistics firms will always need a fresh data of the shipments and the state of the warehouse so the system is considered as critical and must be redundant.

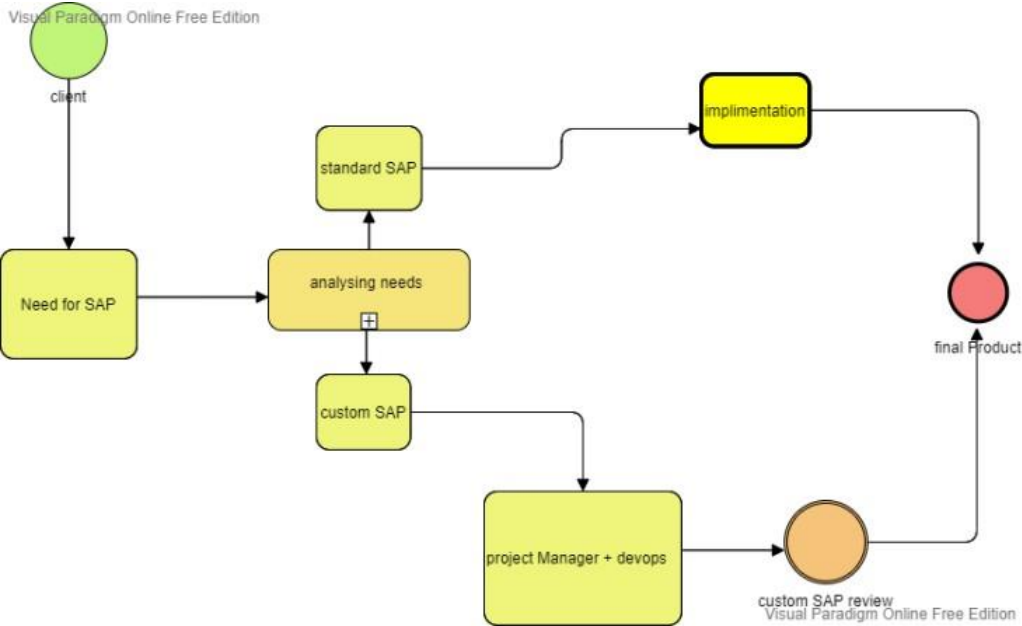


FIG. 3.2 : Main Process following clients inquiries Analysis and implementation. <sup>2</sup>

in the case of CM Consulting, where we can populate the knowledge Base with two aspects of the project Management Process, the Standard Project and the Custom Project implementation as shown in the diagram that follows.

As you can see the natural process of SAP solution implementation follows two main categories that can be the main categories in the knowledge base that will contain the knowledge for each category as a sub category (for example common problems may fit for both categories), the following explains the process of it.

**Using a modeling language to Modelise Capitalized KW**

From the conducted semi-directed Interviews, i was able to extract the standardized way to handle any project regarding CM Consulting, the Following diagram will explain the main process following the interviews conducted :

As shown above the same method was followed to standardize the acquired knowledge and that by analyzing the acquired knowledge and putting into modelised knowledge base ; with the use of modeling language as UML in each process and that to enable the injection of that knowledge into a data base to be a knowledge base.

**Knowledge Base Creation**

**Modelio**

Modelio is a UML modeling tool available on Windows, Linux and Mac platforms. It also integrates BPMN modeling, as well as support for requirement, dictionary, business rule and goal modeling. Modelio offers a range of tools that extend its functionalities, enabling the implementation of the MDA approach, among other things.

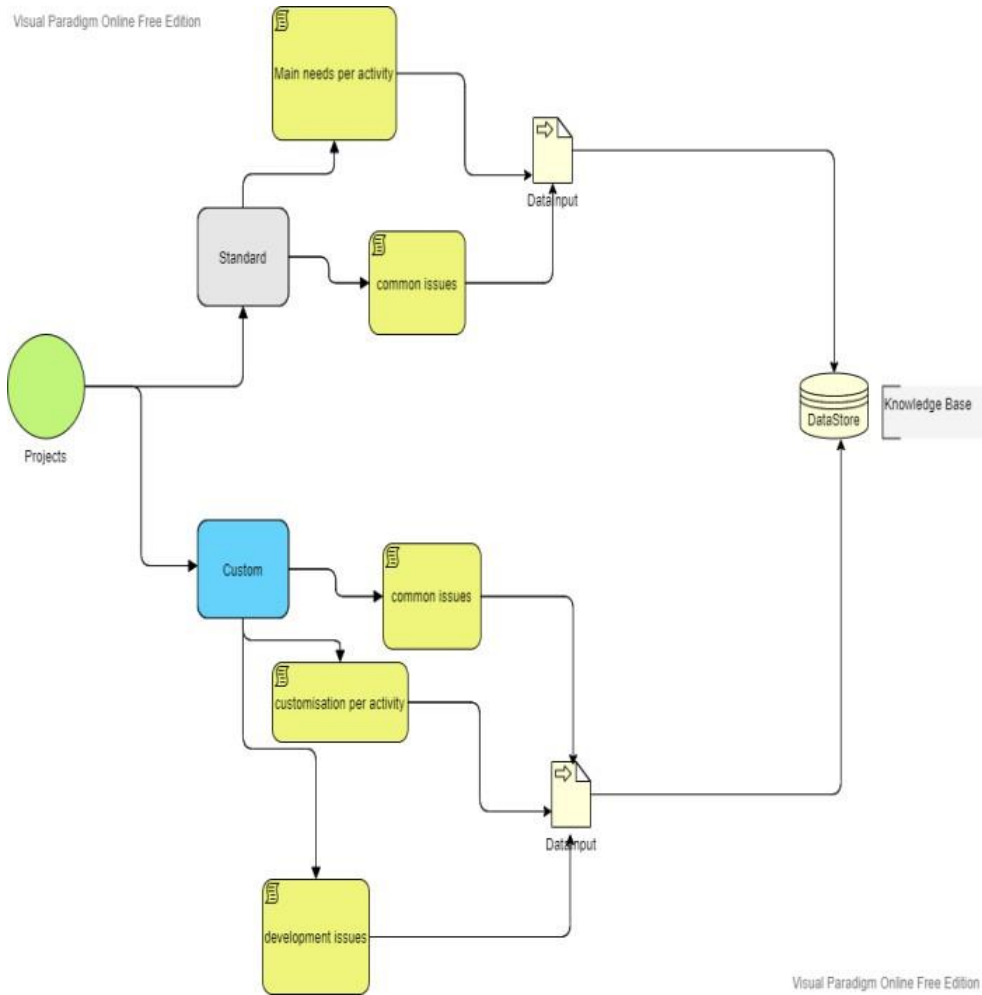


FIG. 3.3 : Activity Diagram UML of the CM consulting project handling process and categories. <sup>3</sup>

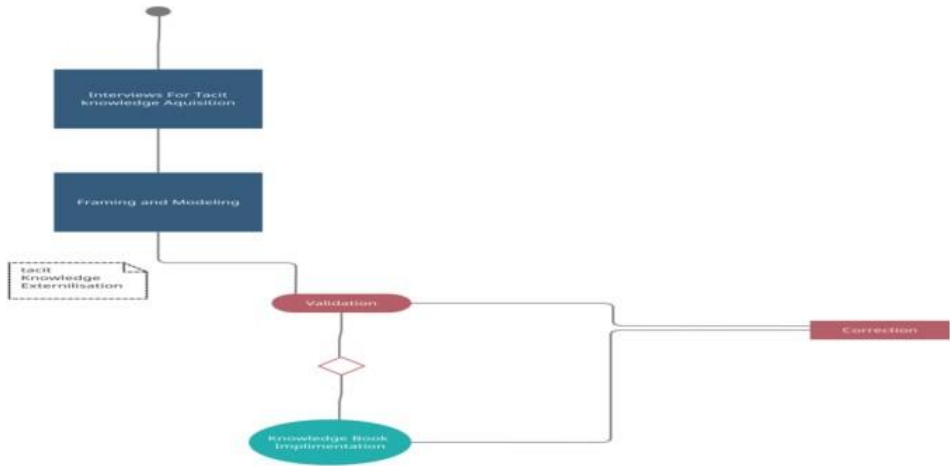


FIG. 3.4 : Interviews Handling process Model.

### MySQL

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, the abbreviation for Structured Query Language. A relational database organizes data into one or more data tables in which data types may be related to each other; these relations help structure the data.

SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database. In addition to relational databases and SQL, an RDBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups.

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB.<sup>5</sup>

### SQL :

SQL "sequel" ; Structured Query Language) is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS). It is particularly useful in handling structured data, i.e. data incorporating relations among entities and variables.

SQL offers two main advantages over older read-write APIs such as ISAM or VSAM. Firstly, it introduced the concept of accessing many records with one single command. Secondly, it eliminates the need to specify how to reach a record, e.g. with or without an index.

Originally based upon relational algebra and tuple relational calculus, SQL consists of many types of statements, which may be informally classed as sublanguages, commonly : a data query language (DQL), a data definition language (DDL), [b] a data control language (DCL), and a data manipulation language (DML).

The scope of SQL includes data query, data manipulation (insert, update and delete), data definition (schema creation and modification), and data access control. Although SQL is essentially a declarative language (4GL), it also includes procedural elements.<sup>6</sup>

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<sup>5</sup><https://en.wikipedia.org/wiki/MySQL>

<sup>6</sup><https://en.wikipedia.org/wiki/SQL>

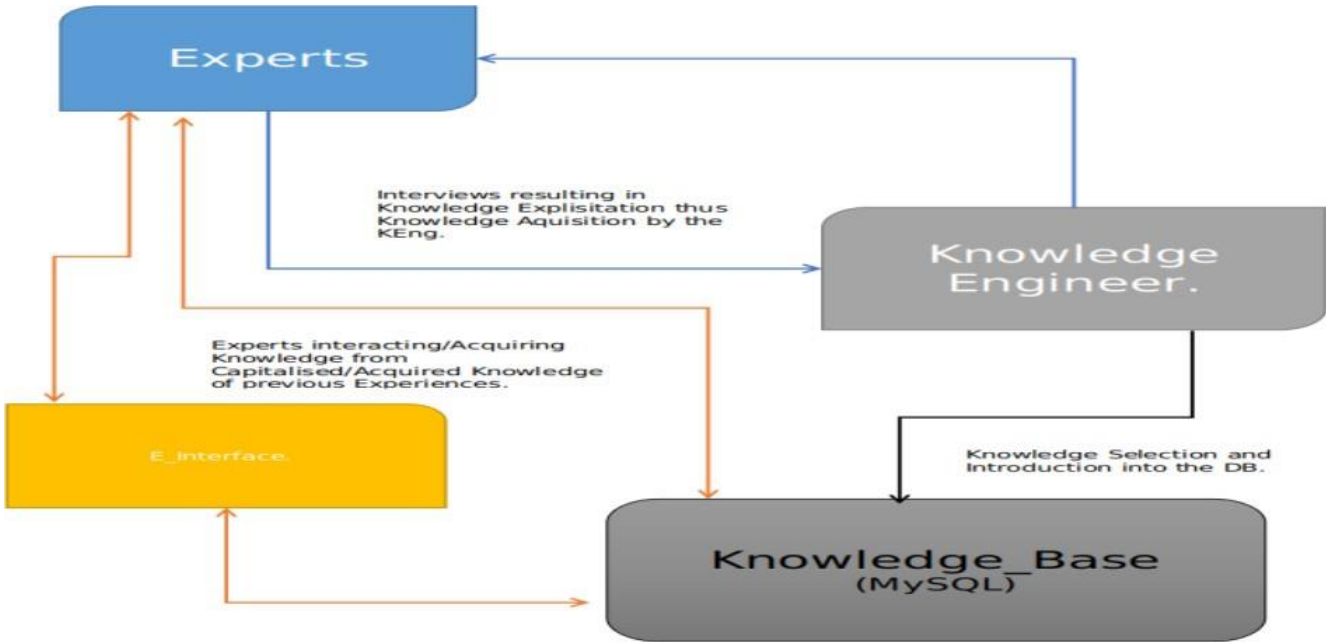


FIG. 3.5 : Overview on the Knowledge Base Main architecture.

7

### From raw capitalized Knowledge to KnowledgeBase.

Using the technologies mentioned above and the conceptual model, the Knowledge Base is created which is simply the transformation and standardization of company Key knowledge into a Data Base fit for utilization following the general architecture schema bellow.

**comment :** The above diagram explains the architectural backbone of the knowledge book also called the knowledge base using a user interface or without using one keeping a polished knowledge in a mysql database called a knowledge base. Examples of Knowledge base are found in modern companies like Microsoft where it stores the most common cybersecurity vulnerabilities called CVE.

The Knowledge Base we Developed is a SQL Data Base called A Knowledge Base That includes the Activity models of CM Consulting that they take as steps to elaborate any given project put and standardized in knowledge base.

In this chapter we have presented the structure of our knowledge book and the complete process of its realisation. This book simplifies the search for shared knowledge, it can be integrated into the factory’s information system, it can be used for learning and training, it can be seen as a problem solver, for innovation and creativity.

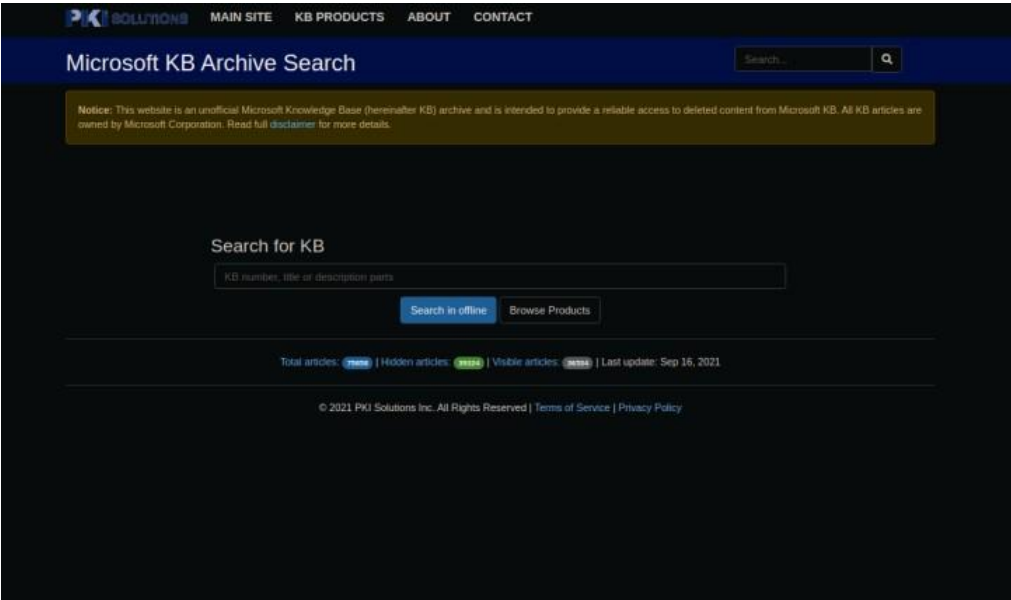


FIG. 3.6 : Microsoft archived Knowledge Base Interface.

# Conclusion

This dissertation aimed to facilitate the preservation and sharing of knowledge assets in a production system, and to achieve this objective it was necessary to understand what knowledge is, its purposes and different types, and to know the purpose of knowledge management and its impact on production systems. After a few interview sessions with the experts of the CM Consulting to externalise their tacit knowledge, we succeeded in building knowledge models.

We added these combined knowledge models to represent them in an electronic application called "Knowledge Book" which made the search for explicit knowledge user-friendly and the tacit knowledge available in the database to avoid the experts being called upon each time.

The knowledge book made it possible to :

- Ensures knowledge inheritance.
- Sharing of knowledge assets.
- Facilitates the search for any knowledge.
- Helps learning.

In addition to the knowledge available and unpacked from existing manuals, an electronic management component is integrated into the application to save employees time searching the documentation rooms when needed. An employee can search for information on manuals that are not knowledge and therefore do not exist in the knowledge book.

The developed knowledge book can be extended to other processes in the ,such as administrative processes, marketing, etc., or adapted for reuse in other production systems. What needs to change is the tacit knowledge models, as this is what makes the difference between production systems and is considered as a competitive advantage

# References

- Alexandre Besse, Jean-Louis Ermine, Camille Rosenthal-Sabroux, 1999, Modéliser l'organisation, les pratiques et les procédures pour la réalisation des livres de connaissances
- Ari Weinkle, 2017, Adobe Dreamweaver, Wikipedia
- Ben El Arbi Sabbar, Le Management des entreprises
- Claude Vogel, 16 Mars 2012, Les Méthodes de Modélisation, Kommunikation et Cie
- Jean-François Pilou, Septembre 2015, Knowledge Management (KM) - Gestion des connaissances
- Jean-Louis Ermine, 2008, Management et ingénierie des connaissances- Modèles et méthodes. Hermès-Lavoisier, pp.212
- Jean-Yves Buch, 2003, Le management des connaissances et des compétences en pratique,
- Ludovic Louis-Sidney, 2011, Modèles et outils de capitalisation des connaissances en conception : contribution au management et 'a l'ingénierie des connaissances chez Renault – DCT, Ecole Centrale Paris
- Mawloud Titah, Djamel Mouss, samia Aitouche, 2013, Externalisation des connaissances tacites en connaissances explicites : cas diagnostic industriel, mémoire de magister, université de Batna
- Mathias Chaillot, Jean-Louis Ermine, 1997, Le livre de connaissances électronique. Revue des Sciences et Technologies de l'Information - Série Document Numérique, Lavoisier, pp.75-98
- Michel GRUNDSTEIN, Juillet 2002, Le Management des Connaissances dans l'Entreprise
- Mohamed Bayad, juin 2003, Le management des connaissances : état des lieux et perspectives, XIIème Conférence de l'Association Internationale de Management Stratégique,
- NONAKA, I. 1994, A dynamic theory of organizational knowledge creation, Organization Science

## references

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- Olivier Roberget, 03 Juillet 2012 le knowledge Management à l'heure de l'entreprise, collaboratif-info
- PRAX Jean-Yves, 23 Mars 2012, les outils du knowledge management, communication et Cie
- PRAX Jean-Yves, 16 Mars 2012, Les Méthodes de Capitalisation du knowledge management, communication et Cie
- Priti Srinivas Sajja, Rajendra Akerkar, 2010, Knowledge-Based Systems for Development, article, Advanced Knowledge Based Systems : Model, Applications And Research, Vol. 1, pp 1 – 11
- Romain Bourdon, 2016, WampServer, Wikipedia
- Theme Junkie, 10 octobre 2011, Modeliosoft - Modelio passe à l'open source, IT Pro News France