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Theme

The role of knowledge management infrastructure in building sustainable competitive advantage in learning organizations, Case study

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Dedication

I dedicate this work:
To the soul of my late father
To my mother who never stopped praying for me
To my husband Abd El Kader for his love, encouragement and support in achieving my goals
To my children, Ibtissam, Mohammed, Yahia, and Tesnim for their help and support in difficult times
To all my family
To all my friends

Abstract

This thesis aims to define the role of knowledge management infrastructure in building sustainable competitive advantage in learning organizations, using the case study of AMENHYD spa, Company for the Study and Realization of Hydraulic Works and Environmental Development Works in Algeria. In order to gather the necessary information, the qualitative and quantitative research method was used. For that purpose, a several interviews with company leaders was conducted. In addition, two questionnaires were distributed. Through the first questionnaire, we tried to identify the organizational culture of the company, and the extent to which it consolidates the values of knowledge management. The second questionnaire contributed to confirm the data collected through interviews and documents, and highlighting the role of knowledge management infrastructure in building a sustainable competitive advantage in the company. The first questionnaire was distributed to a random sample of 333 employees from all administrative levels. In order to achieve the objective of the second questionnaire, it was distributed only to the senior executives in the company (the target population). Hence, we analyzed and discussed results of the collected data and tested the hypotheses. The results of the research indicate that the company emphasizes the knowledge management infrastructure (organizational culture, organizational structure, and information technology) to varying degrees, and has a lack in the KM processes capabilities. In addition, the company works on enhancing the building blocks of sustainable competitive advantage (efficiency, quality, innovation, and customer responsiveness). Moreover, the study shows that the knowledge management infrastructure has a positive role in building sustainable competitive advantage in the company, but the latter need to develop knowledge management processes capabilities to preserve this position in the market, and become a learning organization. In order to achieve this goal, we provided the company with a set of recommendations, including a roadmap.

Key words: Knowledge management, Knowledge management infrastructure, Sustainable competitive advantage, Learning organizations

الملخص

تهدف هذه الأطروحة إلى تحديد دور البنية التحتية لإدارة المعرفة في بناء ميزة تنافسية مستدامة في منظمات الأعمال المتعلمة ، باستخدام دراسة الحالة لشركة AMENHYD spa ، وهي شركة لدراسة وتنفيذ الأعمال الهيدروليكية وأعمال التنمية البيئية في الجزائر. لجمع المعلومات اللازمة، تم استخدام أسلوب البحث النوعي والكمي. من أجل هذا الغرض ، تم إجراء العديد من المقابلات مع قادة الشركة. بالإضافة إلى ذلك تم توزيع استبيانين. حاولنا من خلال الاستبيان الأول التعرف على الثقافة التنظيمية للشركة، ومدى ترسيخها لقيم إدارة المعرفة. ساهم الاستبيان الثاني في تأكيد البيانات التي تم جمعها من خلال المقابلات والوثائق ، وإبراز دور البنية التحتية لإدارة المعرفة في بناء ميزة تنافسية مستدامة في الشركة. تم توزيع الاستبيان الأول على عينة عشوائية مكونة من 333 موظفاً من كافة المستويات الإدارية. ولتحقيق هدف الاستبيان الثاني ، تم توزيعه فقط على الاطارات السامية في الشركة (المجتمع المستهدف). ومن ثم ، قمنا بتحليل ومناقشة نتائج المعلومات التي تم جمعها واختبرنا الفرضيات. تشير نتائج البحث إلى أن الشركة تركز على البنية التحتية لإدارة المعرفة (الثقافة التنظيمية ، الهيكل التنظيمي ، وتكنولوجيا المعلومات) بدرجات متفاوتة ، ولديها نقص في قدرات عمليات إدارة المعرفة. بالإضافة إلى ذلك ، تعمل الشركة على تعزيز اللبنات الأساسية للميزة التنافسية المستدامة (الكفاءة والجودة والابتكار واستجابة العملاء). علاوة على ذلك ، تظهر الدراسة أن البنية التحتية لإدارة المعرفة لها دور إيجابي في بناء ميزة تنافسية مستدامة في الشركة ، لكن هذه الأخيرة تحتاج إلى تطوير قدرات عمليات إدارة المعرفة للحفاظ على هذا المركز في السوق ، وتصبح منظمة أعمال متعلمة. من أجل تحقيق هذا الهدف ، قدمنا للشركة مجموعة من التوصيات ، بما في ذلك خارطة الطريق.

الكلمات المفتاحية: إدارة المعرفة، البنية التحتية لإدارة المعرفة، الميزة التنافسية المستدامة، منظمات الاعمال المتعلمة.

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Introduction

Introduction

Over the past few decades, there has been a rapid shift towards a knowledge-based economy, where knowledge and information are the most valuable assets. Hence, organizations are faced with the challenge of managing vast amounts of information and knowledge, which can be difficult to use effectively. Therefore, knowledge management (KM) is a critical tool for organizations that want to remain competitive and achieve long-term success. By managing effectively their knowledge assets, organizations can create value, innovate, respond to change, and improve efficiency, which contribute to their growth and sustainability. Knowledge management involves the systematic management of knowledge to support organizational goals and objectives. Beside, a learning organization is an organization that has the ability to learn from experience and adapt to change in its environment. It is characterized by a culture of continuous learning, where individuals are encouraged to share their knowledge and experiences with each other. Learning organizations recognize that knowledge is a critical resource and strive to create an environment that supports its creation and sharing.

The development of knowledge management infrastructure is essential for organizations that are interested in managing their knowledge effectively. A well-designed knowledge management infrastructure requires careful planning and implementation and must be aligned with the organization's goals and objectives. A knowledge management infrastructure is a set of tools, processes, and practices that enable the effective management of knowledge within an organization. By developing a robust knowledge management infrastructure that includes organizational culture, organizational structure, and information technology, organizations can create a culture of continuous learning and improvement, support innovation and decision-making, and respond more quickly to change in the marketplace.

Sustainable competitive advantage (SCA) refers to an edge that enables an organization to maintain its market position over an extended period of time, despite the challenges and competition that may arise. In a learning organization, sustainable competitive advantage is achieved through the continuous improvement. KM infrastructure plays a critical role in building sustainable competitive advantage by providing the foundation for effective knowledge management within an organization. KM infrastructure facilitate knowledge sharing across the organization by providing tools and platforms for employees to collaborate, share information, and learn from each other. This helps organizations to preserve valuable intellectual property and avoid the loss of knowledge

when employees leave the organization. In addition, effective KM infrastructure promotes a culture of continuous improvement, experimentation and collaboration, which enables employees to develop and test new ideas. This leads to the development of innovative products and services, improved customer satisfaction and loyalty which differentiate the organization from its competitors and provide a source of SCA.

Research problematic

For the reasons mentioned above, the aim of this study is to investigate the role of knowledge management infrastructure in building sustainable competitive advantage in learning organizations, and explore its reality in an Algerian company, which is AMENHYD spa Company. Thus, we raised the following problematic:

What is the role of knowledge management infrastructure in building a sustainable competitive advantage in learning organizations? What is the reality of this role in AMENHYD Spa Company?

Research questions

In order to address the problematic mentioned above, we raised the following research questions:

1. What is knowledge management infrastructure and what are its dimensions?
2. What are the building blocks of sustainable competitive advantage in learning organizations, and what is the role of distinctive competencies?
3. What is the contribution of knowledge management infrastructure to strengthening the building blocks that achieve sustainable competitive advantage in learning organizations?
4. What is the reality of knowledge management infrastructure and it role in building a sustainable competitive advantage in AMENHYD spa Company?

Hypotheses:

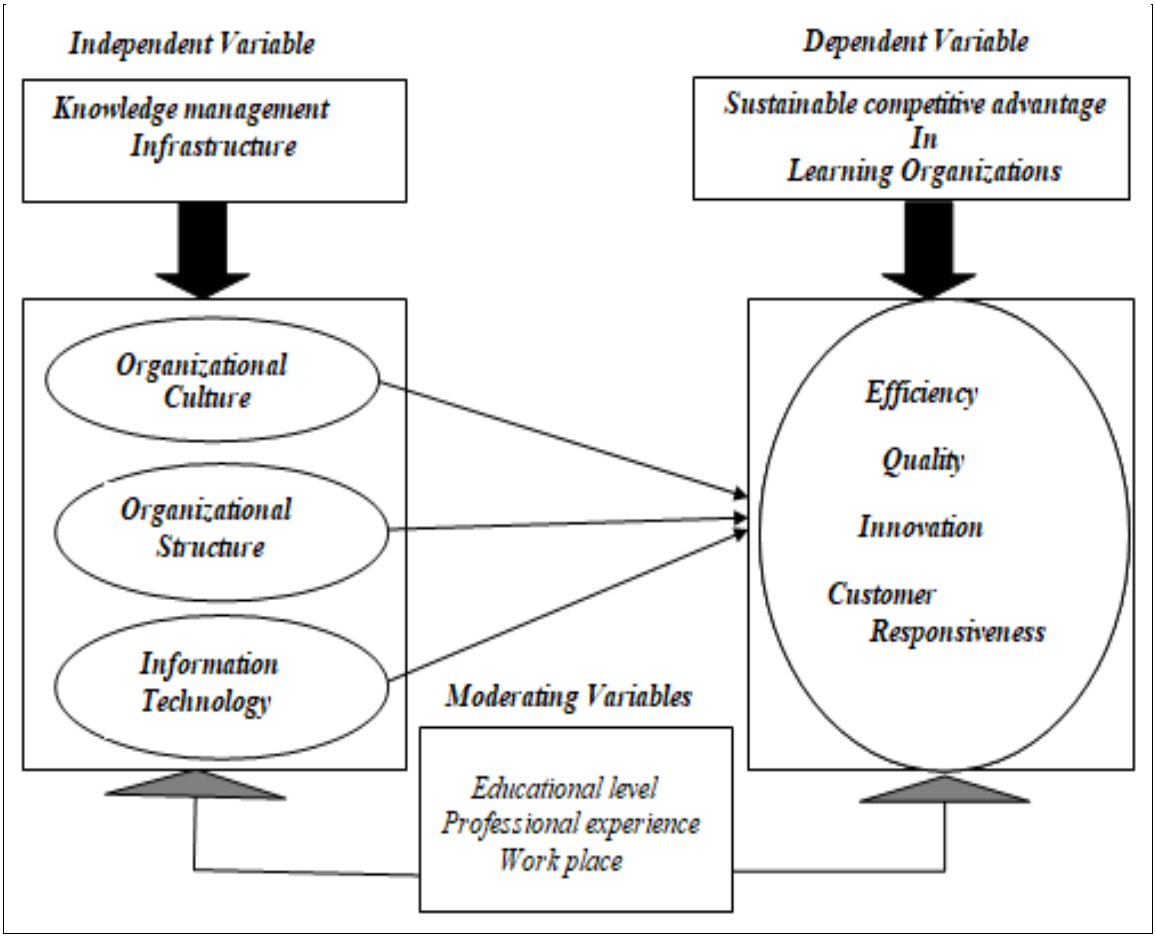
In order to test the role of knowledge management infrastructure in building sustainable competitive advantage, we suggested the following hypotheses:

The first hypothesis: Learning organizations seek to build a sustainable competitive advantage by providing knowledge management infrastructure that ensures the development of knowledge management processes capabilities.

The second hypothesis: Although organizations focus on knowledge management infrastructure (KMI) with the lack of knowledge management processes (KMP), it achieve a sustainable competitive advantage, to maintain it, organizations require the simultaneous development of KM capabilities (KMI and KMP).

The third hypothesis: Organizations seek the acquisition of new knowledge (patents) from exterior research and development centers, as an alternative approach to building a competitive advantage in order to keep pace with the increasing mobility of scientific knowledge.

Research model



The scope of the study:

We carried out the applied study at the level of AMENHYD spa Company, which is a company that studies and performs hydraulic works and environmental development works. This company is characterized by high capabilities in the field of engineering, technological development, and finding unique solutions for each project. In addition, the company is interested in research and development and building distinctive

competencies. Therefore, it can be considered the most appropriate company to do this study.

Reasons for choosing the research topic:

The rationale behind choosing the topic of this research can be summarized in the following points:

1. Knowledge management infrastructure and sustainable competitive advantage are critical factors in strengthening the position of organizations in a dynamic and highly competitive economic environment.
2. Lack of research concerning the role of an infrastructure that guarantees the effective application of knowledge management and building a sustainable competitive advantage.
3. Lack of awareness of the Algerian company of the importance of knowledge management and the provision of the necessary infrastructure for it.
4. Algeria's new orientation towards adopting knowledge economy through the establishment of a delegated ministry for knowledge economy and emerging enterprise.
5. Suggesting and recommending improvement of the capabilities of the company under study in this field.

Significance of the research:

The importance of the study is embodied in the importance of the two variables:

1. Sustainable competitive advantage is a strategic goal that all organizations seek to achieve, because it guarantees their continuity.
2. Knowledge management contributes significantly to enhancing knowledge sharing, creativity, innovation, and creating distinctive competencies that achieve high performance of the organization and realize sustainable competitive advantage.
3. Providing a strong infrastructure for knowledge management is essential to ensure the effective application of knowledge management, including the ability to build a sustainable competitive advantage.

Objectives:

The efforts made in the subject of knowledge management infrastructure and its role in building a sustainable competitive advantage in learning organizations are relatively few, especially in Algeria. Therefore, this study aims to the following:

1. Highlighting the dimensions of knowledge management infrastructure as well as the building blocks of sustainable competitive advantage in learning organizations.
2. Determine the role of knowledge management infrastructure in building sustainable competitive advantage in learning organizations.
3. Discover the reality of knowledge management infrastructure in the company under study and it role in building sustainable competitive advantage.
4. Provide the necessary recommendations to overcome the shortcomings in this field for the company under study.

Methodology:

This study is a descriptive and case study research. Thence, we relied on the deductive approach with its tools of description and analysis. We described the research variables by collecting relevant literature (books, articles, conferences...). The data was collected and analyzed on the basis of the quantitative and qualitative method, so we conducted several interviews with the leader in the company under study; in addition, we distributed two questionnaires, the first aimed at discovering the organizational culture of the company, while the second aimed at studying the dimensions of the two variables and find the correlation.

Previous studies:

There are many studies that dealt with the infrastructure of knowledge management as well as the sustainable competitive advantage. Below we present the most intersection studies with our studies:

1. Kang, H., (2018), **An application of 'building blocks of competitive advantage' approach to the U.S. cereal market leaders**, International Journal of Management Studies, 25(2), 1-17.

This paper focused on the application of a strategic analytical approach, "Building Blocks of Competitive Advantages", to analyze and compare the sources of competitive advantage for two market leaders in the U.S. breakfast cereal industry, Kellogg's and General Mills. Various literatures were reviewed in order to gain an understanding of the industry, and the roles played by these companies. As expected, Kellogg's and General Mills have similar sources of competitive advantage; however, these companies have shown different ways of developing competitive advantage. This study was carried out in an attempt to stimulate efforts and provide direction on the conceptual development of the sources for competitive advantage.

* This study differs from our study in that it studies one variable, which is the sustainable competitive advantage, trying to highlight its basic building blocks.

2. Mahdi, O.R., Nassar,I., Almasafr, M.K., (2018), **Knowledge management processes and sustainable competitive advantage: An empirical examination in private universities**, Journal of business research, 94(2).

In this study, researchers looked at how and why sustainable competitive advantage (SCA) can be created by knowledge management processes (KMP) from the educational environment's KBV and RBV. The respondents of this study are comprised of 525 academic leaders with varying positions from 44 private Iraq universities. The results show a significant relationship between KMP and SCA.

* Although this study falls in the same context as our study, it differs from its in that it examined the role of knowledge management processes in achieving sustainable competitive advantage at the university level, while we studied the role of knowledge management infrastructure in building sustainable competitive advantage in economic company.

3. Torres, A.I., Ferraz, S.S., Santos-Radrigues, H., (2018**), The impact of knowledge management factors in organizational sustainable competitive advantage**, Journal of intellectual capital, 19(2), pp. 453-472.

The purpose of this paper is to empirically test the relations among different knowledge management (KM) factors, such as human capital (HC), processes and information systems (IS) on organizational sustainable competitive advantage (CA), within the SMEs context. Structured questionnaires were distributed to CEOs and managers of Portuguese organizations through an electronic survey. The measurement model results identify and validate the dimensions of HC, processes and IS representing the KM construct. The structural model results demonstrate that HC and processes have a direct and significant impact on organizational CA, on the customer and financial dimensions, respectively. IS indirectly and significantly influence organizational CA, mediated by HC and processes.

* While this study examined the relationship between knowledge management factors and competitive advantage in the context of small and medium enterprises, we tried in our research to study the role of knowledge management infrastructure in building a sustainable competitive advantage in learning organizations.

4. Hajimohammadi, M., Bazrkar, A., Vafaei, S., (2019), **Creation a sustainable competitive advantage for organizations through the implementation of knowledge management with the help of modern**

information technology, International journal of educational research and innovation, 12, pp. 203-216.

This study assesses the mediating role of modern information technology on the relationship between knowledge management and sustainable competitive advantage. The results show that the information technology and knowledge management have a positive and significant impact on the creation and development of a sustainable competitive advantage for organizations. It was also found that modern information technology an important mediating role on the relationship between knowledge management and sustainable competitive advantage.

* This study differs from our study in that it studied the role of knowledge management in creating a sustainable competitive advantage through the mediating role of modern information technology, while we tried to study the role of knowledge management infrastructure (information technology is one of its dimensions) in building a sustainable competitive advantage.

5. Tsetim, J.T., Adegde, O.B., Agena, R.J., (2020), **Knowledge Management Infrastructure Capabilities and Innovativeness of Small and Medium Scale Enterprises in Benue State, Nigeria**, Saudi Journal of business and management studies, 5(3), pp. 216-225.

This study was conducted to examine the relationship between KM infrastructural capabilities and innovativeness of SMEs in Benue state, Nigeria. The study adopted the survey design. The population for this study consisted of 1370 employees from 14 SMEs in Benue State. Five hundred and eighteen (518) employees from the selected SMEs (i.e. 37 from each) made up the sample size for the study. A self-administered-adopted questionnaire was employed to collect quantitative data for hypothesis testing. The result of Analysis revealed that all the infrastructural dimensions (technology, culture and structure) significantly relate with SMEs Innovativeness. The result of multiple regression analysis showed a higher effect of cultural infrastructural dimension followed by technology and structure with a low effect though positive.

* The difference lies in the fact that this study linked the knowledge management infrastructure to innovation only, which is a basic building block among the 4 basic building blocks for building a sustainable competitive advantage, in addition to limiting the study to small and medium enterprises, while, in our study, we tried to discover the role of the knowledge management infrastructure in building Sustainable competitive advantage (efficiency, quality, innovation, and customer responsiveness).

6. Aviv, I., Hadar, I., Levy, M., (2021), **Knowledge Management Infrastructure Framework for Enhancing Knowledge-Intensive Business Processes**, sustainability, 13(11387), pp. 1-32.
This paper explores how modern KM infrastructures can support knowledge-intensive business processes (KIBPs). This study's essential contribution is the conceptual KM infrastructure framework (KMIF) developed based on grounded theory research. This infrastructure provides a systematic and robust approach, starting from the ground up, for structuring organizational knowledge assets across a range of KIBP environments. We define operational knowledge procedures directly involved in KIBPs, adding a layer to KM infrastructures beyond the formal knowledge procedures. In this study, researchers proposed a conceptual model which suggested an interconnection between two building blocks: the operational block and the formal block, in a way that provides a multidimensional perspective on organizational KM infrastructure. The result was Various KM infrastructure components can guide organizations in customizing the framework to their business needs and organizational context. Knowledge-intensive organizations can use the KM infrastructure components and framework as a KM roadmap for KIBPs. The framework of this study contributes to the integration of KM into the operational work environment of KIBPs by demonstrating that the construction of a KM infrastructure necessitates a conceptual framework that considers both technological and social elements.
* We adopted the same independent variable, but the dependent variable was different. In addition, the researchers in this study proposed a model and tested its validity.

7. Hammad,A.J., Najim, S.N., ABED, W.D., (2022), **The impact of knowledge management infrastructure in achieving organizational excellence: An exploratory study of the opinions of a sample of teachers at the university of Tikrit**, World economics & finance bulletin, pp. 212-221. https://www.scholarexpress.net/

The research aimed to study the role of knowledge management infrastructure (culture, technology, structure, human resources) in promoting organizational excellence (the superiority of appropriate strategy, superiority of leadership, superiority of services, business results). The study tried to answer the main question of the study problem (what is the role of knowledge management infrastructure in achieving organizational excellence). The study population included (2207) teaching staff at Tikrit University, as a random sample of (326) teachers were chosen. The study reached a set of results, the most important of which is that there is a correlation and effect relationship between the study variables.

* We adopted three dimensions of knowledge management infrastructure, which are the dimensions repeated in most studies, which are organizational culture, organizational structure, and information technology, while this study added a fourth dimension, which is human resources. In addition, the two studies differed in the dependent variable.

8. Regina,C., Raharjo, S.T., (2022), **The role of research and development on sustainable competitive advantage**, The international journal of business management and technology, 6(6), pp. 1-8.

The Objective of this research is to analyze the role of R&D in achieving sustainable competitive advantage. The results of this research indicate that supporting factors of R&D strategy have a significant role to the performance of the R&D business as well as the company, and as a step in achieving a sustainable competitive advantage.

* This study differs from our study in that it is a theoretical study on the one hand, and on the other hand, it is concerned with the role of research and development (innovation) in building a sustainable competitive advantage, which is a small part of our study.

Thesis outline:

This thesis starts by a general introduction and presentation of the target problematic. It consists of four chapters:

The first chapter is entitled: **Conceptual framework of knowledge and knowledge management infrastructure.** It contains the definition of knowledge, knowledge management, and defines the dimensions of knowledge management infrastructure.

The second chapter is entitled: **KMI as critical key to Sustainable competitive advantage in learning organizations**. This chapter defines the concept of sustainable competitive advantage, and its building blocks; gives a brief overview about learning organizations; and the contribution of KMI in building SCA in learning organizations.

The third chapter is entitled: **Research methodology. It** gives an overview about AMENHYD spa Company, and outlines the empirical research design, the method used as well as the research instruments and documents.

The fourth chapter is entitled: **Results and Discussion.** It analyses collected data and discusses the results, tests the hypotheses and suggests a roadmap for knowledge management project.

The thesis ended by a conclusion, which discusses the main findings of the study, followed by a set of recommendations.

Chapter I

Interest in knowledge is growing as an important organizational resource because of its impact on wealth creation, excellence, creativity, goal achievement and as a modern means of adapting to the demands of the environment characterized by continuous and rapid change. In light of the above, knowledge management as a new management concept has become an imperative that ensures the continuity of organizations in an economic environment that depends on renewable knowledge and innovation. Therefore, knowledge management has become a factor that determines the success or failure of organizations.

The successful implementation of knowledge management requires the existence of an adequate infrastructure in the organization that can support and facilitate knowledge management activities and processes. It is not possible to implement knowledge management without the availability of an organizational culture that supports knowledge sharing, and without a flexible organizational structure that allows for the effective transfer of knowledge, and without information technology that facilitates the storage and retrieval of knowledge and its sharing.

In this chapter we will try to cover the basic concepts of knowledge and knowledge management and then talk in detail about the infrastructure of knowledge management through the following points:

I.1. Knowledge
I.2. Knowledge management (KM)
I.3. knowledge management infrastructure (KMI)
I.4. KMI as support of KM implementation

I.1. Knowledge

Knowledge is considered one of the most valuable assets of modern organizations. In which it is becoming a real asset for individuals and organizations. It is the vital and effective tool by which organizations are able to perform their tasks and activities in order to achieve their objectives efficiently. Furthermore, knowledge generates innovations and transforms them into products and processes. The increased focus on organizational knowledge and knowledge management stems from the transition to the knowledge economy, where knowledge is seen as the main source of value creation and sustainable competitive advantage.

I.1.1. Knowledge definition

Several authors have tried to differentiate between knowledge, information and raw data, and metacognition leading to the concept of wisdom. Some authors like Ackoff have tried to distinguish data, information, knowledge, individual wisdom as individual competence, and collective wisdom as capability (Ackoff, 1989, p. 3). In order to be more precise about the basic concepts it is important to give some definitions.

Data is raw and without context, can exist in any form, is simple and has no meaning beyond its existence (Groff & Jones, 2003, p. 2).

Data is a set of objective and discrete facts about events. It can be plain text, numbers, images or sounds. In an organizational context, data are described as structured records of transactions. As for information is data put in perspective and in a meaningful context. Information is relevant and is organized for a specific purpose. When data has been processed and presented in a way that is meaningful in specific decision-making or learning contexts, we have information (Davenport & Prusak, 1998, p. 2).

Therefore, data are the raw material on which information depends, so that at the beginning data are meaningless facts and after processing and placing them in a specific context, they turn into information used to access knowledge.

Knowledge is derived from information, but it is richer and more meaningful than information. It includes familiarity, awareness and understanding gained through experience or study, and results from making comparisons, identifying consequences and making connections. Some experts include wisdom and insight in their definitions of knowledge. Today's organizations contain a great deal of knowledge. However, in the application of knowledge management principles and practices in organizations, knowledge is not the end, but the means. What organizations

are trying to do is to use their knowledge to improve what they do. (Servin & De Brun, 2005, p. 3)

Knowledge is information combined with experience, context, interpretation and reflection. It is a valuable form of information that is ready to be applied to decisions and actions. The underlying implication of this conceptualization is that knowledge can be an independent entity apart from a 'knower'. Therefore, it is assumed that knowledge can be codified, formatted and stored for later retrieval. Knowledge is seen as being shaped by experience through interaction with the physical world and perceptions derived from verified phenomena and analyses (Kapofu, 2014, p. 3).

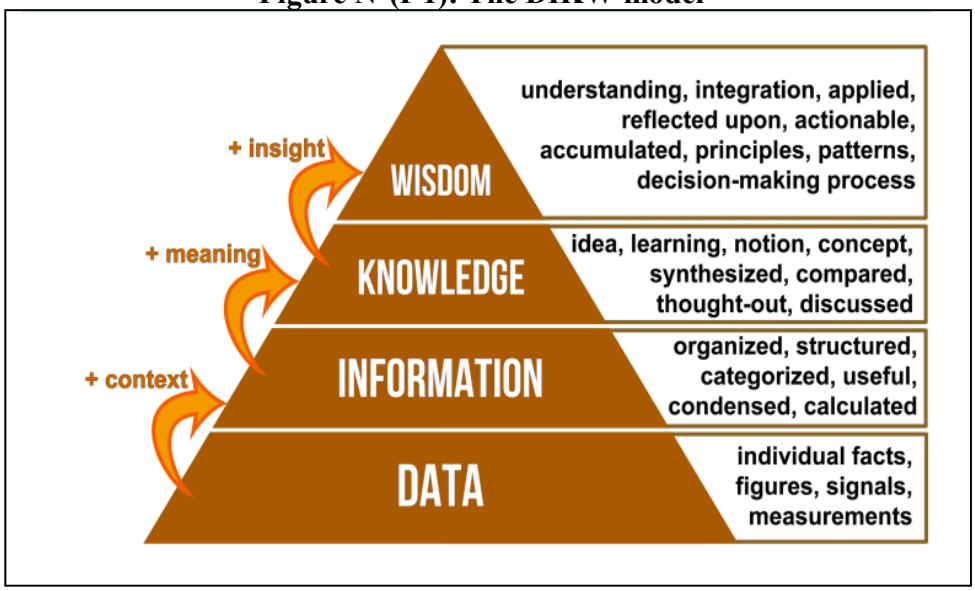
Wisdom is an action-oriented concept designed to apply appropriate organizational knowledge in the planning, decision-making and implementation (or action) stages. Therefore, we define wisdom as the ability to make the best use of knowledge to set and achieve desired goals, and wisdom learning as the process of discerning knowledge-based judgments and actions (Bierly, Kessler, & Christensen, 2000, p. 601).

Wisdom is defined in the common sense as a deep understanding of people, things, events, and situations that confers the ability to choose or act in order to produce optimum results with minimum time and energy. For an individual (individual wisdom), wisdom is similar to the common notion of competence, or expertise. This competence includes a combination of knowledge, skills, and behaviors used to improve performance. Wisdom at the collective level (organizational wisdom) is a specific capability for that organization. According to Grant, organizational capacity is the result of knowledge integration, complex productive activities of teams, and depends on the potential of the organization to develop and integrate the knowledge of many individual specialists (Ermine, Mouradi, & Bruhel, 2012, p. 37).

In the end, we conclude that the relationship between knowledge and wisdom is complex. Generally speaking, knowledge is necessary but not sufficient for wisdom. One would not be considered wise if one were not knowledgeable, but knowledge does not always make one wise.

The DIKW (Data, Information, Knowledge, and Wisdom) model (shown in figure N°I-1) is one of the most famous in the literature on information and knowledge. The most popular graphic representation for DIKW is a pyramid; this presentation implicitly assumes that the highest elements in the pyramid require the lower elements to be defined. This model is then a chain in which information is the result of data processing, knowledge is the result of information processing, and wisdom is the result of knowledge processing (Ermine, Mouradi, & Bruhel, 2012, p. 36).

Figure N°(I-1): The DIKW model



Source: (Cannas, Tedeschi, Atzorti, & Lunesu, 2019, p. 41)

Alavi and Leidner (2001) note that knowledge can be viewed from five different perspectives: (Vorakulpipat & Rezgui, 2008, p. 18)

- A mindset perspective emphasizing knowledge and understanding through experience and study.
- An object perspective defining knowledge as something to be stored and manipulated and a process of both knowing and doing
- Process perspective focusing on the application of the exercise.
- Conditional perspective emphasizing a condition of access to information.
- Capacity perspective considering knowledge as a capability with the potential to influence future action.

These different views of knowledge lead to different perspectives of knowledge management and a different perspective on the role of systems in supporting knowledge management. The following table summarizes this difference.

Table N° (I-1): Knowledge perspectives and their implications.

Perspectives		Implication for knowledge management (KM)	Implications for knowledge management systems
Knowledge vis-à-vis data and information	Data is facts, raw numbers. Information is processed/interpreted data. Knowledge is personalized	KM focuses on exposing individuals to potentially useful information and facilitating	KMS will not appear radically different from existing IS, but will be extended toward helping in

	information.	assimilation of information.	user assimilation of information
State of mind	Knowledge is the state of knowing and understanding.	KM involves enhancing individual's learning and understanding through provision of information.	Role of IT is to provide access to sources of knowledge rather than knowledge itself.
Object	Knowledge is an object to be stored and manipulated.	key KM issue is building and managing knowledge stocks.	Role of IT involves gathering, storing, and transferring knowledge.
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creation, sharing, and distributing knowledge.	Role of IT provide link among sources of knowledge to create wider breadth and depth of knowledge flows
Access to information	Knowledge is a condition of access of information.	KM focus is organized access to and retrieval of content.	Role of IT is to provide effective search and retrieval mechanisms for locating relevant information.
Capability	Knowledge is the potential to influence action.	KM is about building core competencies and understanding strategic know-how.	Role of IT is to enhance intellectual capital by supporting development of individual and organizational competencies.

Source: (Alavi & E. Leidner, 2001, p. 111)

I.1.2. Knowledge resources and characteristics

In the light of the knowledge-based economy, knowledge is considered the most important resource because it is the only resource that multiplies when it is shared, and it has several characteristics that distinguish it from other resources. It also stems from organizational and environmental roots that form the sources from which we obtain knowledge. The following is an illustration of that.

I.1.2.1. Knowledge resources

Given the general trend towards more composite knowledge, where new products and processes usually combine many technologies from several scientific disciplines, it is important to understand that today's companies can hardly learn and innovate in isolation. While in large companies' information and knowledge are still mainly transferred through

functional interactions between R&D, production, marketing and organization departments and functional teams (Capello, 1999); small and medium-sized companies increasingly need to rely on external knowledge sources. Accordingly, knowledge sources can be divided first into internal and external sources, internal sources of knowledge can provide companies with radical and revolutionary innovations, but the associated innovation process is more iterative, time-consuming, costly and risky. An organization's R&D creates new knowledge from internal sources based on experience gained from its own internal research and information gathered through organizational learning throughout its research projects. On the other hand, external knowledge can be acquired outside the organization, for example in competitive markets or through inter-organizational links (Tayaran & Schiffauerova, 2012, p. 48). Additionally, they can acquire it externally by cooperating with customers and suppliers, as well as with other companies, or by forming partnerships with public, semi-public and private institutions. In terms of geographical location, these external actors may be located in the geographical vicinity (locally), somewhere in the country (nationally) or elsewhere (internationally) (Svetina & Prodan, 2008, p. 280). These two sources therefore complement each other, but one can influence the performance of the other.

I.1.2.2. Knowledge characteristics

The most prominent feature of knowledge, compared with physical resources and information, is that it is born of human interaction. It is not a self-contained substance waiting to be discovered and collected. Knowledge is created by people in their interactions with each other and the environment. While physical resources such as capital, raw materials, and manufacturing equipment can only be used by their owner and depreciate with use, knowledge does not decline in value, can be reproduced and shared by multiple users, and is broadly available. Moreover, the value of physical resources can increase when combined with knowledge (Nonaka, et al., 2008, pp. 6-7).

The nature of knowledge as a management resource differs greatly from that of physical resources. The attributes of knowledge are such that it does not lose value when used by a large number of people, so it is a revenue-increasing resource; it transcends time and space, whether in the form of objects, writing, or traditions passed on through generations, so it is an infinite resource; it is produced and consumed simultaneously, making knowledge production and consumption interconnected and inseparable; and its value is born of the creation of new types and combinations of

knowledge, creating value through recategorization (Nonaka & Takenchi, 1995).

We often talk of knowledge as an asset. But compared to other assets, such as physical assets and finance, it has some distinctive characteristics: (Knowledge Management)

- Non-depleting: unlike other resources that are managed because of their scarcity value, the more knowledge is used, the more is generated; we all know about 'information overload'!
- Win-win sharing: if you share your knowledge with another person, the first person does not lose it Chunkable and portable: it can be summarized, compressed or divided in manageable units for easier transfer and management
- Transferable: it can move from place to place; explicit knowledge, in particular, can easily be distributed via networks to many people
- Mobile: it tends to leak and diffuse, either as people move jobs, talk or through technical reproduction and transmission
- Substitutable: in many situations it can replace physical and other forms of resource; thus telecommunications reduces the need for travel or physical transport (of documents).

I.1.3. Knowledge taxonomies and life-cycle

One of the critical steps before embarking on any knowledge management initiative is to understand the concept of knowledge, in order to be able to identify the sources of knowledge in the organization and answer the fundamental questions that will guide the design of knowledge management initiatives. Only with a conceptual clarity of knowledge and an awareness of its different types and taxonomies can knowledge managers begin to develop an effective knowledge management initiative for their organization. These initiatives are also linked to the so-called "knowledge life cycle", which is the central organizational framework through which knowledge management practices are developed, as well as enhancing the organization's capacity to produce and integrate its knowledge, thus enhancing and accessing valuable organizational knowledge.

I.1.3.1. Knowledge taxonomies

Taxonomies should be treated as an integral part of the organization's knowledge management strategy and where the strategy is implemented as a project, taxonomies are a key task that must be planned and implemented by teams with the necessary knowledge and skills. To understand the role of knowledge in the organization, scholars in the area of epistemology have

made distinctions between the different kinds of knowledge and have proposed various taxonomies of knowledge.

Explicit versus tacit knowledge

Nonaka has identified two dimensions of knowledge in organizations: tacit and explicit. According to Nonaka, the tacit dimension of knowledge is rooted in action, experience and involvement in a specific context. Tacit knowledge is composed of both cognitive and technical elements. The cognitive element refers to an individual's mental models consisting of mental maps, beliefs, paradigms and views. The technical component consists of concrete skills, crafts and competences that are applied to a specific context. The explicit dimension of knowledge is articulated, codified and communicated in symbolic form and/or in natural language (Alavi & E. Leidner, 2001, p. 110).

Zack's taxonomy of knowledge

Michel Zak distinguishes three types of knowledge: core knowledge, advanced knowledge, and innovative knowledge. Zack defines core knowledge as the minimum level of knowledge required just to "play the game". As core knowledge is widely distributed among industry members, the firm's long-term competitive viability is not assured by possessing it. Advanced knowledge allows a firm to differentiate itself from other firms, thereby avoiding a head-on competition. Advanced knowledge thus enables a firm to be competitively viable. Innovative knowledge is the knowledge that enables a firm to be ahead of its competitors and to significantly differentiate itself from them. In addition, innovative knowledge often enables a firm to change the rules of the game itself. Zack cautions that knowledge is not static and what is innovative knowledge today will become the core knowledge of tomorrow. (Zack, 1999, p. 123).

Aguayo's categories of knowledge

Aguayo (2004) divides knowledge into two categories. Substantive knowledge refers to knowledge of the subject matter that is specific to a field (e.g. knowledge of salmon farming — how to grow and cultivate salmon for maximum production and quality). Entrepreneurial knowledge refers to knowledge of how to monetize or commercialize substantive knowledge (e.g. knowledge of how to promote and market for maximum profit). He then defines a knowledge-based organization to be one in which there are many more substantive knowledge experts for each entrepreneurial knowledge expert. Aguayo's typology recognizes that the person that has good ideas often requires a person that has good business acumen in order to reap financial rewards from the ideas (Lee, Foo, & Goh, 2006, p. 156).

Lundvall and Johnson's taxonomy of knowledge

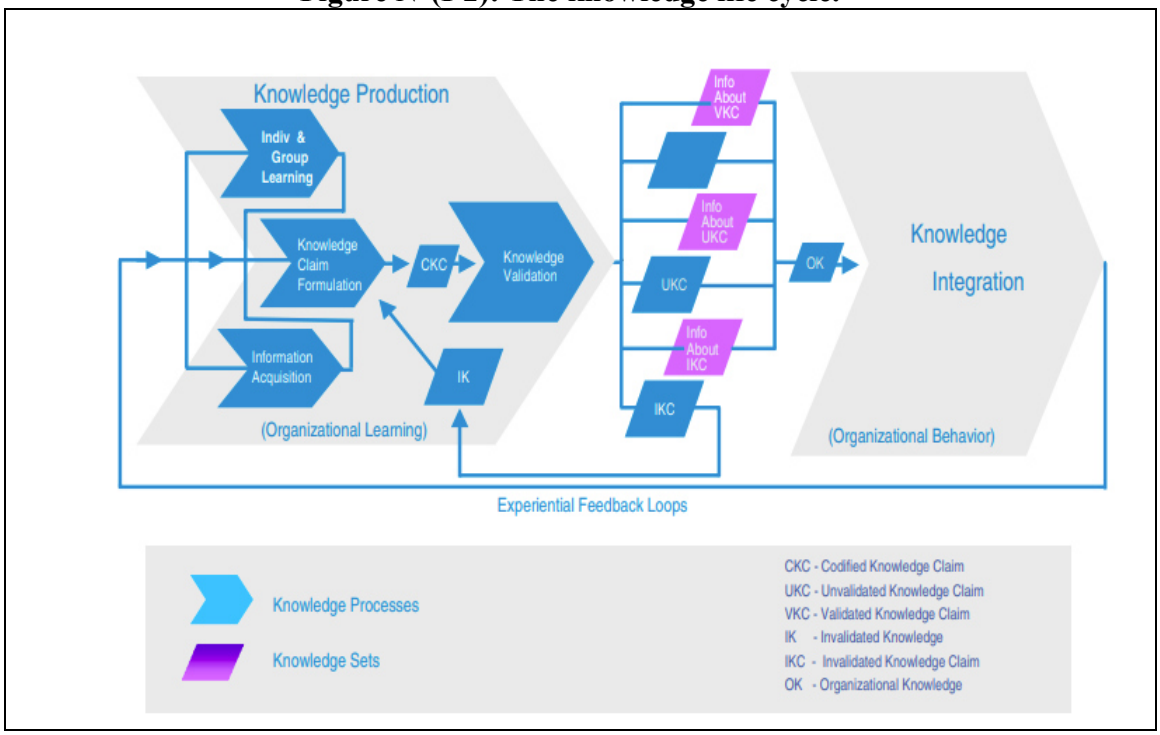
Lundvall and Johnson (1994) propose know-what, know-why, and know-who. Know-what refers to facts, and is characterized by its ability to be broken down into bits. Know-why refers to knowledge about causality, and eliminates the need for trial and error. Know-why is especially important for technological development in science-based areas. Know-how refers to skills or the capability to do something. Know-who involves knowledge about who knows what and who knows to do what. Know-who also includes the social skills that enable cooperation and communication with coworkers and collaborators (Lee, Foo, & Goh, 2006, p. 156).

I.1.3.2. Knowledge life-cycle

McElroy said that there are two generations of knowledge management, so that the first generation KM considers that valuable knowledge already exists and all we need is to capture it, codify and share it. Therefore, it does not focus on the production of knowledge, but on its integration. The second generation KM focuses on the production and integration of knowledge through individual and shared processes that have regularity to them. This process can be described at the organizational level as the knowledge life cycle (KLC), which is the most important basis for second generation thinking, which considers that knowledge management is designed to have impact on the KLC, and if it is not, then it cannot be considered as knowledge management (Mc Elroy, 2003, p. 5).

The KLC shown in Figure (I.2) was designed by a group of active members of the Knowledge Management Consortium International (KMCI), and it should be noted that KLC is a framework rather than a model, in the sense that it shows how knowledge is produced and incorporated into the organization (Mc Elroy, 2003, p. 7).

Figure N°(I-2): The knowledge life cycle.



Source: (Mc Elroy, The knowledge life cycle: An executable model for the entreprise, 1999, p. 2)

The knowledge life cycle illustrated in Figure N° (I.2) is "expressed" at the level of an organization. In other words, it describes the dynamics of knowledge generation, integration and use at the level of the whole organization. However, embedded in the organizational process are individuals and groups who also learn, and whose learning patterns can also be described as a KLC. Indeed, individual and group learning, in itself, is explicitly presented as a sub-process in the knowledge process since their learning contributes to the direction of organizational learning. Below we provide a brief explanation of the terms in the figure (Mc Elroy, The knowledge life cycle: An executable model for the entreprise, 1999):

- **Knowledge Production:** A process by which new organizational knowledge is created, synonymous with organizational learning.
- **Individual and Group Learning:** A process involving human interaction, knowledge claim formulation, and validation by which new individual and/or group knowledge is created.
- **Knowledge Claim Formulation:** A process involving human interaction by which new organizational knowledge claims are formulated.
- **Information Acquisition:** A process by which an organization either deliberately or serendipitously acquires knowledge claims or information produced by others external to the organization.

•**Codified Knowledge Claims:** Information that has been codified, but which has not yet been subjected to organizational validation.

• **Information About Validated Knowledge Claims**: Information that attests to the existence of validated knowledge claims and the circumstances under which such knowledge was validated.

• **Information about Unvalidated Knowledge Claims:** Information that's attest to the existence of unvalidated knowledge claims, and the circumstances under which such knowledge was tested and neither validated nor invalidated.

• **Information about Invalidated Knowledge Claims:** Information that attests to the existence of invalidated knowledge claims and the circumstances under which such knowledge was invalidated.

• **Organizational Knowledge:** A complex network of knowledge and knowledge sets held by an organization, consisting of declarative and procedural rules (validated knowledge claims).

• **Knowledge Integration:** The process by which an organization introduces new knowledge claims to its operating environment and retires old ones. Knowledge Integration includes knowledge transmission, teaching, knowledge sharing.

• **Experiential Feedback Loops**: Processes by which information concerning the outcomes of organizational learning activities are fed back into the Knowledge Production phase of an organization's knowledge life cycle as a useful reference for future action.

I.2. Knowledge management (KM)

The knowledge economy means that companies need to rethink the way they manage, retain, develop, learn and reward people. As a result, organizations face a new business environment: global competition, knowledge-based products and services, rapidly evolving technology, and better informed customers and employees. These developments will require new organizational designs and structures, new forms of work, new management styles, changing organizational values and culture. It emphasizes the need for formal information and knowledge management. Knowledge management therefore addresses this need to manage knowledge as a critical resource within the business environment.

I.2.1. Knowledge management concept

Knowledge management can be seen as an integrated discipline that seeks to improve individual and organizational performance by maintaining

and leveraging the present and future value of knowledge assets. Knowledge management is a structured effort to make knowledge accessible and share not only explicit factual information, but also the tacit knowledge that exists in an organization to support the organization's strategy (Rus & Lindvall, 2002, p. 60).

KM is defined as the processes that help the organization to gain, organize, generate, and disseminate knowledge, as well as to transfer important information and expertise that the organization possesses to various management activities, such as decision making, problem solving, learning, and strategic planning. (Abualoush, Masa'deh, Bataineh, & Alrowwad, 2018, p. 283)

The first definition considered knowledge management as an integrated system that seeks to improve individual and organizational performance, and talked about explicit and tacit knowledge, while the second definition considered knowledge management as a set of processes that contribute to transforming important knowledge in the organization into various administrative activities.

KM has been defined as a strategy for managing organizational knowledge as a corporate asset and harnessing processes such as creation and acquisition, storage, share and dissemination, retrieval and use of tacit and explicit knowledge (Ahmadi, Momeni, & Ahmadi, 2013, p. 61)

This definition added the strategic dimension of knowledge management, while Knapp sees in the following definition that it is an art that seeks to transform intellectual assets into permanent value for stakeholders.

Knapp defined it as the art of transforming information and intellectual assets into enduring value for an organizations clients and its people (Allameh, Zare, & Rezadavoodi, 2011, p. 1212).

The goals of KM are the leveraging and improvement of the organization’s knowledge assets to effectuate better knowledge practices, improved organizational behaviors, better decisions and improved organizational performance (King, 2009, p. 4).

Based on the analysis of the previous definitions, we present the following definition of knowledge management: “Knowledge management is an organizational administrative process that deals with all kinds of knowledge inside and outside the organization. Through the accumulated experiences and intellectual assets of the organization, knowledge management seeks to improve the overall performance of the organization and achieve a sustainable competitive advantage, and therefore Knowledge

management is a stabilizing factor for an organization in a highly competitive environment.

I.2.2. Knowledge management solutions

The rapid changes in knowledge management are largely the result of the great advances we have seen in information technology. Information technology facilitates knowledge exchange and accelerates its growth. They enable the flow of information at higher speeds and with greater efficiency. As learning accumulates over time, it becomes possible to develop knowledge management applications that best enhance these mechanisms by deploying advanced technologies, so that knowledge management systems use a variety of knowledge management mechanisms and technologies to support knowledge management processes.

I.2.2.1. Knowledge management processes

To implement knowledge management, organizations need to define and implement a number of processes, which help to acquire, organize, share and use the knowledge they need to achieve their goals. There are so many of these processes that there is no one-size-fits-all, so the organization's choice of operations depends on the nature of that organization.

Gonzalez and Martins (2017) studied 71 scientific articles on knowledge management, and their findings indicate that knowledge management processes consist of four stages: acquisition, storage, distribution and use of knowledge. In the acquisition stage, the topics studied are organizational learning, knowledge initiation, creative process and knowledge transfer. In the storage phase, the focus is on information technology. While in the distribution phase, studies focus on the topics of social communication and participation through information technology. Finally in the usage phase, we address form of use, dynamic capability, and recall (Gonzalez & Martins, 2017)

Knowledge acquisition:

The acquisition relates to the intra-organizational process that facilitates the creation of tacit and explicit knowledge, starting from individuals and integrating the organizational level as well as the identification and absorption of information and external knowledge source (Gold, Malhotra, & Segars, 2001).

The process of acquiring knowledge focuses its attention on the learning process, so that through the accumulation of experience, organizational procedures are developed within the organization and the accumulation of tacit knowledge. This accumulation makes the organization

able to develop innovations and suggest technological developments (Anand, Oriani, & Vassolo, 2010). The cumulative process depends on the organization's absorptive capacity, which is the organization's ability to recognize, absorb and apply the value of a given knowledge in order to gain a competitive advantage. Organizations with a high absorptive capacity are able to exploit environmental opportunities. The process of acquiring knowledge requires providing spaces and conditions for sharing experience and expressing mental models of individuals through dialogue, organizing knowledge and integrating explicit knowledge (Gonzalez & Martins, 2017, p. 253)

Knowledge storage:

The storage, organization, and retrieval of organizational knowledge, also referred to as organizational memory, constitute an important aspect of effective organizational knowledge management. Organizational memory includes knowledge residing in various component forms, including written documentation, structured information stored in electronic databases, codified human knowledge stored in expert systems, documented organizational procedures and processes and tacit knowledge acquired by individuals and networks of individuals (Alavi & E. Leidner, 2001, p. 118). Knowledge storage involves both recording and retention of both individual and organizational knowledge in a way so as to be easily retrieved. Knowledge storage utilizes technical infrastructure such as modern informational hardware and software and human processes to identify the knowledge in an organization, then to code and index the knowledge for later retrieval. A knowledge repository allows many people to search for, and retrieve codified knowledge without having to contact the person who originally developed it. This saves on time and other organizational resources and thus improved performance (Caroline, Mugun, & Loice, 2015, p. 3).

Knowledge distribution:

Knowledge distribution refers to the process by which new information from different sources is shared and can eventually lead to the creation of new knowledge, understanding and information. However, this process of sharing requires the organization to mobilize itself to create a 'sharing environment'. The most effective way of disseminating knowledge and best practice is through systematic transfer. It is about creating a knowledge sharing environment (Gonzalez & Martins, 2017, p. 255). The process of knowledge distribution will be based on three aspects: the exchange of experience and knowledge between individuals through social contacts, with a view to sharing tacit and explicit knowledge; sharing knowledge through communities of practice; and the dissemination of

explicit knowledge supported by IT. Regarding explicit knowledge, it can be shared by IT systems, but also through social interaction of people (Agrote, Mcevily, & Reagans, 2003) .

Freeze & Kulkarni (2007) explain that there is a continuum in which some tacit knowledge is converted into explicit knowledge. There is a domain of knowledge referred to by the authors as implicit or tacit knowledge that is potentially explicable, but also still rooted only in individual expertise, dominated by a group or community. In this perspective, communities of practice (CoPs) are examples of groups whose individuals have an intense exchange of knowledge (Freese & Kulkarni, 2007). Communities of practice facilitate the learning process, knowledge dissemination and identity formation in organizational groups. These groups develop a common identity and a social context that supports the sharing process. CoPs are coordinators of learning, giving meaning to the work of individuals and to the identity of the group through the active participation of its members. Thus, the integration of three aspects - learning, meaning of work and identity - generates legitimacy for groups (Hwang, Sinh, & Agrote, 2015). Thus, it is clear that the process of knowledge distribution does not only involve IT related to the dissemination of explicit knowledge, but also involves organizational routines that allow direct contact between individuals in order to disseminate the tacit and implicit part of knowledge.

Knowledge use:

Use/reuse is the representation of the ultimate goal of knowledge management efforts, which is to apply relevant know-how, past experiences and individual knowledge to new situations.

This step enables staff and stakeholders to use established knowledge to effectively solve an organization's problems. All the basic elements of knowledge management should be aimed at the effective application of individual and organizational knowledge. Since effective knowledge translation is the only way to adapt knowledge to observable results, knowledge is practically the most important practice for successful knowledge management (Jahanian & Bidhendi, 2013, p. 221). Knowledge application aims to make the organization's activities more appropriate for use. Knowledge use is the goal of knowledge management, and this means investing in knowledge. Effective knowledge application is the cornerstone of organizational innovation, as innovation is essentially seen as the process by which the organization follows a set of activities designed to enable it to use and apply the knowledge created and learned to: develop new products/services, systems, technologies and processes; solve new problems;

improve overall performance and productivity; and change all aspects of its business (Abualoush, Masa'deh, Bataineh, & Alrowwad, 2018, p. 284).

I.2.2.2. Knowledge management systems

Traditionally, most research in strategic information technology has focused on the ability of IT to add economic value to a business, either by reducing a company's costs or by differentiating its products and services. A key argument in this line of reasoning is that the competitive use of IT has the potential to provide sustainability and competitive advantage.

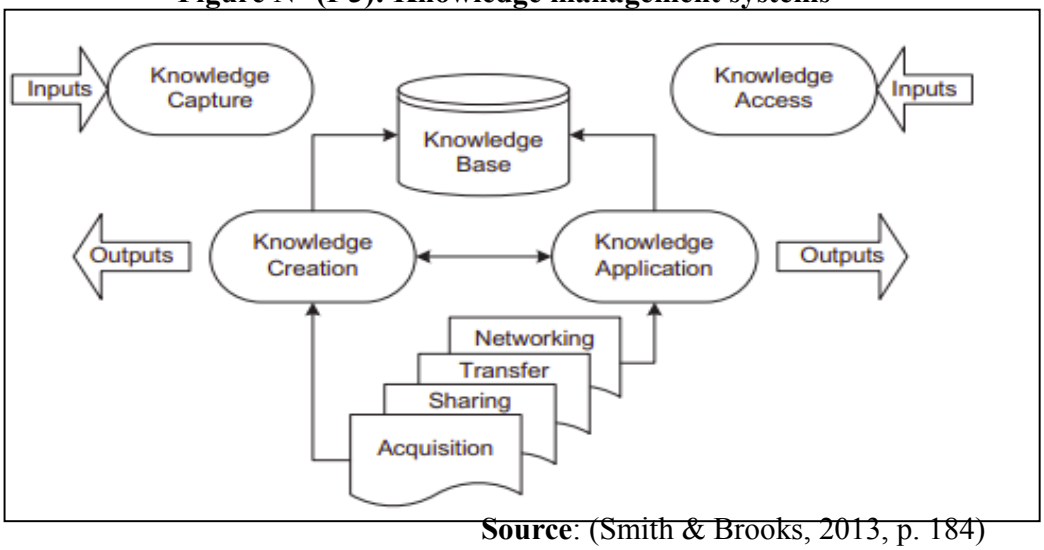
Knowledge management systems (KMS) are considered enabling technologies for effective and efficient knowledge management (KM). The main purpose of KMS is to apply past knowledge to present activities, thus leading to increased levels of organizational effectiveness. Thus, a KMS is the technological part of a KM initiative that also includes person-oriented and organizational instruments to improve the productivity of knowledge work. KMSs are developed to support and improve knowledge-intensive tasks, processes or projects (Maier & Hadrich, 2011, p. 780).

Knowledge management systems (KMS) are applications of the organization's information and communication systems (CIS) to support the various KM processes. They are not usually technologically distinct from CIS, but involve databases, such as 'lessons learned' repositories, and directories and networks, such as those designed to connect organizational participants with recognized experts in a variety of thematic areas. A significant difference between many knowledge management systems and the organization's CIS is that the KMS may be less automated in that it may require human activity in its operation. Whereas information systems generally require humans to make choices in the design phase and then operate automatically, KMS sometimes involve human participation in the operation phase (King, 2009, p. 5).

There are a number of perspectives on KMSs, and different typologies of such systems have been developed in the literature. In fact, a first approach to providing taxonomy of KMSs is to distinguish them in terms of the location of knowledge and the extent to which knowledge is structured. Smith & brooks (2013) consider that knowledge management system supports the creation, capture, storage, and dissemination of information within an entity. The justification of the development of the knowledge management system is for employees to have ready access to an organization’s knowledge base of facts, sources of information, and solutions. For example, having a common repository to a database on lessons learned will allow others to learn from past experiences. Sharing the

information can lead to more effective outcomes, and produce new or improved knowledge (Smith & Brooks, 2013, p. 183).

Figure N° (I-3): Knowledge management systems



Source: (Smith & Brooks, 2013, p. 184)

The input function is achieved by collecting knowledge and accessing it through a knowledge database, which has the ability to generate new knowledge for use. The framework's output function allows for knowledge to be shared among groups, and acquired by groups or individuals. The output also facilitates the transfer and linkage of knowledge among groups and within and between internal and external entities. The overall knowledge management system can be achieved by developing existing systems that have been adapted to perform knowledge management functions. Thus, knowledge management systems can be applied in a wide range of collaborative and hierarchical societies; virtual organizations and networks; And entities in which participants and individuals are active in extracting and generating new knowledge for the benefit of organizations (Smith & Brooks, 2013, p. 185). Becerra-Fernandez (2000) also proposes a classification of KMS in terms of the dimensions of knowledge (tacit/explicit) and the degree of codifiability they require. Benbya & Belbaly argue that the main important distinction between the different existing KMSs remains that between the tacit and explicit dimensions of knowledge. Consequently, KMSs can be classified into three categories: dynamic systems, process-oriented systems and integrative systems: (Benbya & Belbaly, 2005, p. 5)

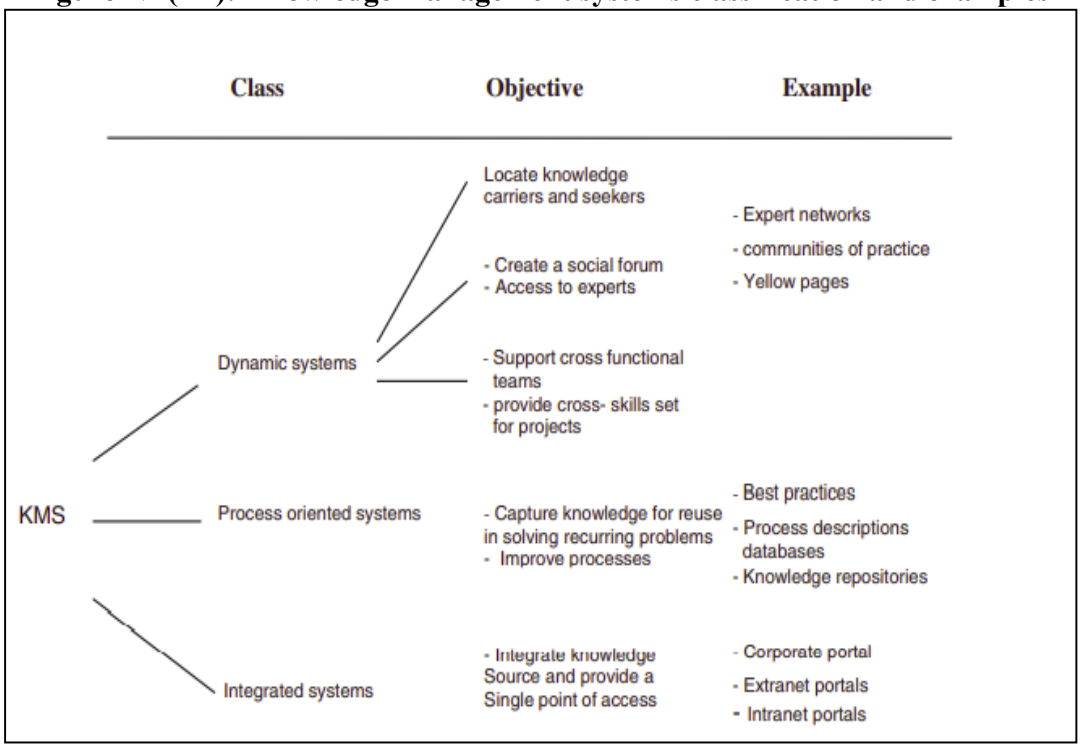
Dynamic knowledge management systems: dynamic KMS support mainly interactive communications between experts or team-based management and are consequently more concerned about the tacit dimension of knowledge. This category includes: expertise location or what's called 'yellow pages'

that capture and inventory the knowledge, experience and backgrounds of the firm's experts and act as connectors between knowledge and expertise seekers and holders; communities of practice that provide a social forum to groups of people who deepen their knowledge and expertise by interacting on an ongoing basis.

Process-oriented knowledge management systems: Organizations with significant intellectual capital require eliciting and capturing knowledge for reuse in new problems as well as recurring old problems. They focus mainly on the technical side of knowledge and can be an important support for new product development. These systems include: lessons learned systems, processes description databases, knowledge repositories and best practices databases.

Integrative knowledge management systems: While the preceding KMS categories focused mainly on one dimension of knowledge over the other—either tacit knowledge or more explicit knowledge. Today, most contemporary approaches to KMS design rely on an integrative perspective on managing both explicit and tacit knowledge dimensions because it offers unrestricted possibilities for uniformly accessing knowledge across a variety of sources. This is the case for the corporate portal which integrates different applications from collaboration tools to a database supporting knowledge embedded within business processes**.**

Figure N° (I-4): Knowledge management systems classification and examples



Source: (Benbya & Belbaly, 2005, p. 5)

The first approach considered that knowledge management systems can be achieved by adapting them to support knowledge management processes, and in the second approach, researchers see that knowledge management systems are designed according to the type of knowledge (implicit and/or explicit). From our point of view, we see that knowledge management systems based on the type of knowledge (the second approach), are part of the knowledge management systems based on processes (the first approach), so we find that each sub-system in the first approach depends on the three sub-systems found in the second approach. For example: a knowledge acquisition system needs dynamic systems for acquiring and generating tacit knowledge, process-oriented systems for acquiring and generating explicit knowledge, as well as integrated systems.

I.2.3. Knowledge management foundation

KM mechanisms are seen as any deliberate intervention to support the creation, storage, sharing and application of knowledge. When an organization selects mechanisms, it will also choose a certain mode of knowledge conversion. This choice has consequences, as the mechanisms that support the conversion of tacit and explicit knowledge are relevant to the performance of the organization.

KM mechanisms and technologies work together and influence each other. KM mechanisms depend on technology, although some mechanisms do so to a greater extent than others. In managing KM mechanisms and technologies, it is important to recognize these interrelationships between mechanisms and technologies. In addition, it is important to achieve an appropriate balance between the use of technology and social or structural mechanisms.

I.2.3.1. Knowledge management mechanisms

Knowledge Management Mechanisms are organizational or structural means used to promote knowledge management. They enable knowledge management systems, and they are themselves supported by the knowledge management infrastructure. Knowledge Management Mechanisms may (or may not) utilize technology, but they do involve some kind of organizational arrangement or social or structural means of facilitating knowledge management. Examples of Knowledge Management Mechanisms include: learning by doing, on-the-job training, learning by observation, and face-to-face meetings (Virkus, 2011).

There are several KM mechanisms, and authors interpret them in different ways. Grimaldi and Rippa (2011) developed a framework that can be used to select the KM technologies. They are divided into technological

mechanisms and non-technological mechanisms table N° () (Oliveira, Maçada, & Curado, 2014, p. 232).

Table N° (I-2): knowledge management mechanisms.

Non-technological KM mechanisms	Technological KM mechanisms
Communities of practice – individuals united by a common interest and expertise to share knowledge. **I**nformal conversation – conversation between employees. **M**eetings and phone calls – conversation among employees face-to-face. **B**rainstorming – informal meetings intended to generate ideas, with the aim of solving problems or identifying opportunities. **B**est practices – activities or methods adopted by an organization to capture the best way to do something. **C**reative rooms – space in the organizations to allow employees to be imaginative, inventive and innovative. **L**essons learned – regular meetings to discuss successes and failures in relation to a process and product, providing learning and identifying lessons that can be useful for other situations. **M**entoring – an individual with more experience in the organization contributes to the personal development of individuals with less experience in the organization. **O**rganizational newsletter/newspaper – private broadsheet for internal distribution. **S**taff mobility (between offices, teams and activities). **S**torytelling and activities carried out in teams. **T**raining – individual or group training, either face-to-face or at a distance.	**B**log – electronic diary published on the Web. **E**lectronic discussion forum – it allows people to post messages and comment on other messages. **E**-mail – asynchronous exchange of electronic messages. **E**xpert systems – it is a software that attempts to provide an answer to a problem. **I**nstant messaging – synchronous exchange of messages from people connected to the Internet. **I**ntranet – a private network that uses the Internet protocol. **R**epository – information system for the storage and dissemination of organizational knowledge. **S**imulation programs – a software that replicates real-life situations. **V**ideoconference – telecommunication technologies (audio and video) that allow talking and seeing each other while in different locations. **V**oice mail messages – a person receives a prerecorded message and then is able a return message – means of storing knowledge that is jointly constructed by individuals. **Y**ellow pages/directories of experts – identifying people with knowledge on a specific topic.

Source: (Oliveira, Maçada, & Curado, 2014, pp. 233-234)

I.2.3.2. Knowledge management technologies

Knowledge Management Technologies are information technologies that can be used to facilitate knowledge management. Knowledge Management Technologies are intrinsically no different from information technologies, but they can focus on knowledge management rather than information processing. Knowledge Management Technologies also support knowledge management systems and benefit from the knowledge management infrastructure, especially the information technology infrastructure. KM technologies constitute a key component of KM systems (Becerra-Fernandez & Sabherwal, 2015, pp. 50-51). Technologies that

support KM include artificial intelligence (AI) technologies including those used for knowledge acquisition and case-based reasoning systems, electronic discussion groups, computer-based simulations, databases, decision support systems, enterprise resource planning systems, expert systems, management information systems, expertise locator systems, videoconferencing, and information repositories including best practices databases and lessons learned systems (Virkus, 2011).

The Table N°(I- 3), resume the most important technologies that can provide a wide range of support for knowledge management activities.

Table N°(I-3): Contribution made by technologies to KM activities.

Technologies	Contribution
Communication technologies	Such as e-mail and video conferencing are particularly useful for knowledge transfer activities. They can also make a significant contribution to knowledge creation activities, where success often depends on communication between many people and/or across different locations.
Collaboration technologies	Combine different communication technologies with other tools (such as virtual whiteboard and brainstorming tools) and make them available In one single interface. Consequently, they can also contribute significantly to knowledge transfer and knowledge creation activities. Workflow management systems support structured forms of collaboration, in particular knowledge maintenance.
Document management	Content management systems play a major role in integrating content, since they act as a collection point for all documented knowledge. Classification schemes are one way of organizing this content. One of the core functions of these types of systems is the simplified maintenance of large amounts of data.
Adaptation and presentation technologies	Include personalization tools, visualization tools and automatic recommendation tools that forward relevant content. All these tools help facilitate knowledge transfer.
E-learning environments	The strengths of e-learning environments lie primarily in the integration of different content and in helping users both to understand this content and communicate with each other, leading ultimately to further knowledge transfer.
Content generation tools	Include authoring tools and technologies for automatically generating new content. They provide support for knowledge creation and knowledge integration. Specialized tools are also

	available to help with the handling of the complex structures encountered in organizing knowledge.
Artificial intelligence	Is now being increasingly used in knowledge management applications. these technologies are of most benefit to knowledge organization activities, for example, the automated classification of document.
Networking technologies	Rarely take centre stage in knowledge management initiatives. However, they provide the necessary infrastructure for many activities, and are particularly important for knowledge transfer.
Hardware	Provide the necessary infrastructure for all the other technology groups already mentioned.

Source: (Wissensmanagement forum, 2003, p. 22)

I.2.4. Knowledge management strategies.

The main issue in the implementation of knowledge management is how knowledge management supports the achievement of the organization's goals. Some previous research has focused on the alignment between the knowledge management strategy and the business strategy.

A knowledge management strategy is simply a plan that describes how an organization will manage its knowledge better for the benefit of that organization and its stakeholders. A good knowledge management strategy is closely aligned with the organization's overall strategy and objectives (Servin & De Brun, 2005, p. 25). In addition, the knowledge management strategy may change because of cha nges in organizational activity characteristics. Selecting what kinds of KM strategies to use is dependent on the company's desired purposes, the limited resources, and even the company's performances.

Organizations focus on two fundamental dimensions when establishing knowledge management strategies (Hansen & Nohria, 1999). One dimension focuses on the ability to help create, store, share and use the explicitly documented knowledge of an organization. The strategy in this dimension focuses on the codification and storage of knowledge. In general, knowledge can be codified via information technology. Codified knowledge is more likely to be reused. Another dimension emphasizes the sharing of knowledge through interpersonal interaction. The strategy in this dimension uses dialogue through social networks, including professional groups and teams (Swan, Newell, & Robertson, 2000). It helps to share knowledge through person-to-person contacts (Hansen & Nohria, 1999). This strategy attempts to acquire internal and opportunistic knowledge and share it informally. Knowledge can be obtained from experienced and qualified people (Jordan & Jones, 1997).

In knowledge management literature, there are three views of KM strategy: Focused view, balanced view, and dynamic view (table N° I-4). Focused view proposes that a company should focus one strategy. In contrast, balanced and dynamic views insist that a company should utilize both strategies. Focused and balanced views fail to consider the dynamic nature of knowledge (Choi & Lee, 2002, p. 175).

Table N° (I-4): Some studies on knowledge management strategies.

View	Researcher	KM strategy categories
Focused	Hansen & All (1999)	Codification, personalization
	Swan & All (2000)	Cognitive, community
Balanced	Jordan & Jones (1997)	Tacit-oriented, Explicit-oriented
	Zack (1999)	Conservative, aggressive
Dynamic	Singh & Zollo(1998)	Codification, experience accumulation
	Choi & Lee (2002)	System, human

Source: (Choi & Lee, 2002, p. 175), with modification.

I.2.4.1. Focused view:

A focused view proposes that companies should pursue one strategy predominantly.

A. Codification, personalization strategy.

Hansen and All (1999) explained that a company's knowledge management strategy should reflect its competitive strategy, and they suggested two types of strategy for knowledge management, codification strategy and personalization strategy. The codification strategy opens up the possibility of achieving scale in knowledge reuse and thus of growing the business. A codification strategy is a way to codify, store, and reuse knowledge. Knowledge is codified using a "people-to-document" approach: It is extracted from the person, who developed it, made independent of that person, and reused for various purposes. A personalization strategy focus on dialogue between individuals, not knowledge objects in databases. Knowledge that has not been codified (and probably couldn't be), is transferred in brain-storming sessions and one-on-one conversations. To make their personalization strategy work, organizations invest heavily in building networks of people (Hansen & Nohria, 1999).

B. Cognitive, community strategy.

A central assumption in the KM literature is that technology enables effective knowledge sharing. However, this privileges a view of information processing where knowledge is seen as cognitive capabilities (inputs) that can be processed using technology to produce certain outputs. This equates knowledge with the skills and cognitive abilities of individuals "A cognitive

model". In contrast the community model emphasizes the importance of relationships, shared understandings and attitudes in the formation and sharing of knowledge in innovation processes. Moreover, it is precisely the sharing of knowledge across functional or organizational boundaries, through the use of cross-functional and cross-organizational teams, that is seen as the key to the effective use of knowledge for innovation. Considering knowledge as constructed through processes of social interaction between communities of practice means that issues of social networking, power and social inclusion/exclusion come to the fore. Therefore, a crucial feature raised by these cases is the importance of social coordination and networks (formal and informal) in knowledge management (Swan, Newell, & Robertson, 2000, pp. 8-9).

I.2.4.2. Balanced view:

The balanced view suggests that companies should strike a right balance between the two strategies.

A. Tacit-oriented, explicit-oriented strategy.

This refers to the orientation adopted within the organization for the storage of knowledge, i.e. whether knowledge is mostly held explicitly, in the form of databases, documents etc., or tacitly, in the heads of employees. Tacitly held knowledge may be obvious in principle, but may not be clear for some reason, e.g. it may take too long to codify on paper. Some companies attempt to codify tacitly held knowledge by codifying it in 'lessons learned databases' that articulate the assumptions and processes followed to provide a particular solution to a problem. It is difficult, if not impossible; to write down everything one knows about a particular subject. Explicit systems tend to record what was done, but not why it was done or the context in which the action took place. Explicit knowledge also tends to acquire a kind of legitimacy that tacit knowledge does not have (Jordan & Jones, 1997).

B. Conservative, aggressive strategy.

Combining the knowledge exploitation vs. exploration orientation of the firm with its internally acquired vs. externally acquired orientation towards knowledge sources provides a more complete picture of a firm's knowledge strategy. Firms oriented toward exploiting internal knowledge exhibit the most conservative knowledge strategy, while unbounded innovators (those who closely integrate knowledge exploration and exploitation without regard to organizational boundaries) represent the most aggressive strategy. In knowledge-intensive industries, firms that pursue an

aggressive knowledge strategy tend to outperform those competitors who pursue less aggressive knowledge strategies over time (Zack, 1999, p. 139).

I.2.4.3. Dynamic view:

The dynamic view suggests that firms align their strategies with the characteristics of knowledge.

A. Codification, experience accumulation strategy.

Accumulating knowledge refers to direct experiences related to the task at hand. Accumulating knowledge refers specifically to the tacit absorption of wisdom provided by mere exposure to several relatively similar events. The other key notion of explicit articulation and codification of experiential knowledge incorporates. It is also linked to the notion of capacity as a recombination of existing knowledge. The tools underlying the construction of knowledge codification can take the form of manuals, plans, computer models, guidelines and other means that could describe what to do in a certain context situation ('know-what'). If sufficiently advanced, these tools could also provide a description of how to do it ("know how") and possibly why it makes sense to do it in that way ("know why"). These codified tools are generally available to multiple individuals and thus facilitate the dissemination (and, in part, the imitation) of accumulated knowledge (Singh & Zollo, 1998, pp. 15-17).

B. System, human strategy.

Choi and Lee (2002), suggested two types of knowledge management strategies, system strategy, human strategy, which it's align along with knowledge characteristic (tacit/explicit). KM system strategy emphasize codified knowledge in knowledge management processes, and focus on codifying and storing knowledge via information technology, with Attempts made to share knowledge formally. The KM system strategy within the framework of tacit knowledge contributes to create networks through IT (video conferencing, groupware, and virtual reality), and facilitate face-to-face meeting. As for explicit knowledge it contributes to codify knowledge using traditional information processing technologies. The KM human strategy emphasize dialogue through social networks and person-to-person contacts, and focus on acquiring knowledge via experienced and skilled people Attempts made to share knowledge informally. On the other hand, The KM human strategy within the framework of tacit knowledge focus on community of practice, discussion group, help task, and person to person. As for explicit knowledge it helps transmit of new created concepts, and breakdown of concepts using face-to-face meeting (Choi & Lee, 2002, pp. 174-176).

I.3. Knowledge management infrastructure (KMI)

Any organization wishing to embark on the implementation of knowledge management needs to identify the factors affecting knowledge management and provide the necessary foundation for this. KMI has the power to drive knowledge management within the organization. They persuade individuals to share their knowledge and experience with others by providing an appropriate environment for the organized and pure growth of organizational knowledge. The term KM infrastructure refers to KM enablers by some authors. Based on different studies, three key knowledge management and organizational efficiency enabling factors are identified. They are technology, structure and culture.

I.3.1. Knowledge management infrastructure definition

The knowledge management infrastructure is seen as a prerequisite for strengthening the knowledge management processes within an organization. It represents the long-term basis for knowledge and information management in the organization. The knowledge management infrastructure is defined as the knowledge development mechanisms within the organization that stimulate the knowledge creation and generation process (Abualoush, Masa'deh, Bataineh, & Alrowwad, 2018, p. 281). Knowledge management infrastructure is the building blocks of KM for improvement and effectiveness of all organizational functions relating to implementation of best KM systems. The importance of knowledge management infrastructure lies in the fact that successful implementation of knowledge management requires adequate infrastructure in the organization. Knowledge management infrastructural capability create collaborative environment which push the components of KM to interact one another and becomes the facilitator between KM applications and problem solving. Knowledge management infrastructure is the foundation upon which knowledge management activities are constructed (Tsetim, Adegbe, & Agema, 2020, p. 217). The KMI includes the organizational resources that organizations possessed and the predetermined conditions when implementing KM activities. Knowledge management can only be promoted in the case that the organization possesses these conditions and resources. According to, knowledge management infrastructure is seen as the mechanism followed by the organization in order to develop its knowledge and stimulate creation, sharing and protection of knowledge within the organization. KMI also refers to those factors which support the activities of KM in organizations and help to create competitive advantage in organizations (Awaja, Awaja, & Raju, 2018).

I.3.2. Knowledge management infrastructure dimensions

On the basis of various studies, three key factors for knowledge management and organizational effectiveness are identified. Table N°(I-5) shows the list of KMI according to various study, and there are three factors that exist in most references. These are organizational culture, organizational structure and information technology. An organization wishing to implement knowledge management must identify these elements and therefore provide the necessary infrastructure. KMI also encourages staff to share their knowledge and experience with others and to let organizational knowledge develop simultaneously and systematically (Allameh, Zare, & Rezadavoodi, 2011, p. 1216).

Table N°(I-5): Knowledge management infrastructure.

Authors	KMI
(Gold, Malhotra, & Segars, 2001)	Technology, Structure, and Culture.
(Kim & Lee, 2004)	Culture, Structure, and Information technology.
(Yeh, Lai, & Ho, 2006)	Corporate culture, People, Information technology, Strategy, and Leadership.
(Zaim, Tatoglu, & Zaim, 2007)	Technology, Organizational culture, Organizational structure, and Intellectual capital.
(Mills & Smith, 2011)	Technology information, Organizational culture, and Organizational structure.
(Becerra-Fernandez & Sabherwal, 2015)	Organizational culture, Organizational structure, Information technology infrastructure, Common knowledge, and Physical environment.

Source: Author elaboration based on the references mentioned in the table.

I.3.2.1. Organizational culture

An organization in a business in its activities would need human resource support to achieve the objectives set by the organization. To achieve these objectives, many elements considered important in achieving them are applied in the organizational culture of a company. Organizational culture is a meaningful system of meaning jointly adopted by the member that distinguishes the organization from other organizations. On this basis, it can be said that culture is a social and regulatory control of the organization on the basis of shared values and beliefs, thus becoming the norm of group work, and operationally called work culture as a guideline and behavior towards employees (Rumanti, Hidayat, & Yordy, 2015, p. 204).

Organizational culture is a set of values, beliefs, norms, meanings and procedures shared by the members of the organization. Organizational culture affects knowledge management by influencing the values of the members of the organization and their individual behavior in relation to

collective behavior. Organizational culture also affects knowledge transfer (Ahmadi, Momeni, & Ahmadi, 2013, p. 62).

Organizations need to foster an organizational culture that "values knowledge, values knowledge sharing and values innovation and risk-taking in knowledge development". Such a workplace culture is called a community of practice (E.Reynolds, 2005, p. 13).

A reward system is an important element of an organizational culture because, whatever their nature, rewards reinforce and transmit culture by providing a tangible indication of what the organization values. (Civi, 2000)has suggested that training is the best way to begin to induce a culture within organizations seeking to engender a more open collaborative environment. A common purpose and a sense of shared meanings help to build trust for sharing knowledge (Bechkly, 2003).

Trust is an important element and a key ingredient for the success of KM because, if the recipient of the knowledge is not convinced that the source is capable and trustworthy, it is unlikely that the knowledge of that individual will be accepted. Trust is essential for an organization as it enhances positive behaviors, encourages network relationships, reduces conflict and transaction costs and improves the creation of a good working environment (Issa & Haddad, 2008, p. 184).

Collaboration is the level of willingness that individuals exhibit to support each other (Lee & Choi, 2003) but is not achievable by a small number of individuals. Successful knowledge generation requires the joint efforts and collective wisdom of all the members of an organization. In addition, collaboration requires the continuous exchange of knowledge, skills, ideas, and values. At the same time, cooperation creates enthusiasm for knowledge sharing, and interest in acquiring valuable knowledge and expertise from other members (Ho, Hseih, & Hung, 2014, p. 738).

I.3.2.2. Organizational structure

Organizational structures deal with the way the firm is organized, and the way people relate to one another. Broadly speaking, there are two types of organizational structure, namely formal and informal. These two concepts are not independent, and the formal structure may greatly influence informal networks, both positively and negatively.

The official structure of the organization, which is normally displayed on an organizational chart, and which denotes the hierarchical relationships between members of the firm (Hajric, 2018, p. 110).Organizational structure comprises the organizational hierarchy, rules and regulations, and reporting relationships and is considered a means of coordination and control whereby

organizational actors can be directed towards organizational effectiveness. Knowledge management theorists largely conclude that changes in an organization's structure, such as moving from hierarchical to flatter networked forms, are essential for the effective transfer and creation of knowledge in the organization (Fattahiyan, Hoveida, Siadat, & Talebi, 2013, p. 4). The formal organizational structure must not be so rigidly enforced so as to stifle informal structures such as communities of practice, where knowledge sharing and creation may take place. It is the knowledge manager's job to understand the knowledge dynamics of the organization and to recognize how the formal and informal structures coexist (Hajric, 2018, p. 110).

The unofficial organizational structures are the ones that are created through informal networks, as a result of working within the organization. They represent the way people actually interact. Increasingly, the value of these informal structures is being understood, and the knowledge manager must learn to identify and support these networks. This process is closely related to KM, since knowledge flows and repositories (particularly tacit) are dependent upon these structures (Hajric, 2018, p. 111).

Decentralized structure has often an important effect on knowledge management success. High centralization inhibits interactions among organizational members, reduces the opportunity for individual growth and advancement, and prevents imaginative solutions to problems. On the contrary, decentralization facilitates internal communication, adoption of innovation, and higher levels of creativity. Chen and Huang (2007) indicated when the organizational structure is less formalized, more decentralized and integrated, social interaction is more favorable; and that social interaction is positively related to knowledge management. Therefore, it is expected that when the organizational structure is less formalized, less centralized, more complexity, and more integrated, KM is more favorable (Mohmondsalehi & Moradkhannejad, 2012, p. 522).

Teamwork is another aspect developed by organizations which promotes the integration of individuals and exchange of tacit knowledge. Through teamwork, less experienced employees have contact with a body of knowledge hitherto dominated by more experienced employees. Teamwork is also important for KM because it facilitates the integration of multi-disciplinary knowledge, facilitating the knowledge acquisition and utilization (Gonzalez & Martins, 2014, p. 134).

Table N° (I-4) presents the organizational initiatives related to team work. Teamwork members need to develop a state of mutual trust, a shared mental model, a shared identity and a cohesion state. The creation of

knowledge depends on a work context in which there is communication, collaboration and connection between individuals (Lee, To, & Ty, 2013)

Table N°(I-6): Main initiatives to teamwork.

Initiatives	Definition
Problem solving and improvement activities	Teams are composed of individuals with complementary multidisciplinary skills that promote the problem solving process.
Common language	The groups are formed by individuals who share a common vocabulary, facilitating dialogue and intensifying the flow of knowledge.
Operational autonomy	The groups have, especially when considered as mature, autonomy for decision-making in their scope of operation.
Knowledge sharing between individuals	Employee interaction facilitates the process of dissemination of tacit knowledge.
Identity of the employee against the group	This is about the cohesiveness and reliable state conquered by group member. It is also important the feeling of being part of a team by the individuals.

Source: (Gonzalez & Martins, 2014, p. 137)

While the success of knowledge management programs is important to organizations, the problem of successfully facilitating tacit knowledge exchange through appropriate technologies is one that management is still struggling with. One potential solution is facilitating communities of practice, which are gaining attention as vehicles to share tacit, practice-related knowledge in an informal, interactive, group-based form. Knowledge management practitioners and researchers recognize the importance of communities that foster collaborative learning in organizations and almost all knowledge management systems have a network component that facilitates connecting people in communities of practice (Goel, Junglas, & Ives, 2009, p. 128). As communities mature, they often settle into a pattern of regular meetings, teleconferences, projects, Web site use, and other ongoing activities. The familiarity of these events creates a comfort level that invites candid discussions, a community becomes a "place" where people have the freedom to ask for candid advice, share their opinions, and try their half-baked ideas without repercussion (Wenger, Mc Dermott, & Snyder, 2002).

I.3.2.3. Information technology (IT)

The IT infrastructure act as an enabler and to a large extent is responsible for the growing interest in the production and dissemination of information. IT infrastructure refers to the tools and resources that contribute to the acquisition, processing, storage, dissemination and use of information.

According to this definition, the IT infrastructure includes elements such as hardware, software and support staff (Lopez, Peon, & Ordas, 2009, p. 114).

Information technology is widely used to connect people with codified reusable knowledge, and it facilitates conversations to create new knowledge. IT enables an organization to create, share, store and use knowledge. Therefore, IT support is essential to initiate and carry out knowledge management (Lee & Choi, 2003, p. 188). Information technology plays an important role in supporting the organizational knowledge process. Information technology is tightly connected to KM because it helps distribute structural knowledge vertically and horizontally, as well as make it easily searched and utilized (Ho, 2009, p. 102).

Through the linkage of information and communication systems in organization, previously fragmented flows of information and knowledge can be integrated. These linkages can also eliminate barriers to communication that naturally occur between different parts of the organization (Gold, Malhotra, & Segars, 2001, p. 187).

Another important emerging technology related to knowledge management - business intelligence (BI) - is sometimes used interchangeably with KM. Although KM and BI are somewhat related, they are quite distinct. BI aims to provide decision-makers with valuable information and knowledge using a variety of structured and unstructured data and information sources through the discovery of relationships that may exist between these data and information sources (Sabherwal, 2007). Unlike KM, starts with information and knowledge as inputs, BI starts with data and information as inputs. KM incorporates knowledge capture, sharing and application in addition to discovery. On the other hand, BI focuses on accessing, analyzing and presenting data. The link between BI and knowledge is limited to knowledge creation (discovering patterns based on existing explicit data and information). Even in this respect, BI focuses directly on the discovery of explicit knowledge, whereas KM is concerned with the discovery of tacit and explicit knowledge. However, the results of BI can be, and often are, useful inputs to KM (Becerra-Fernandez & Sabherwal, 2015, p. 40).

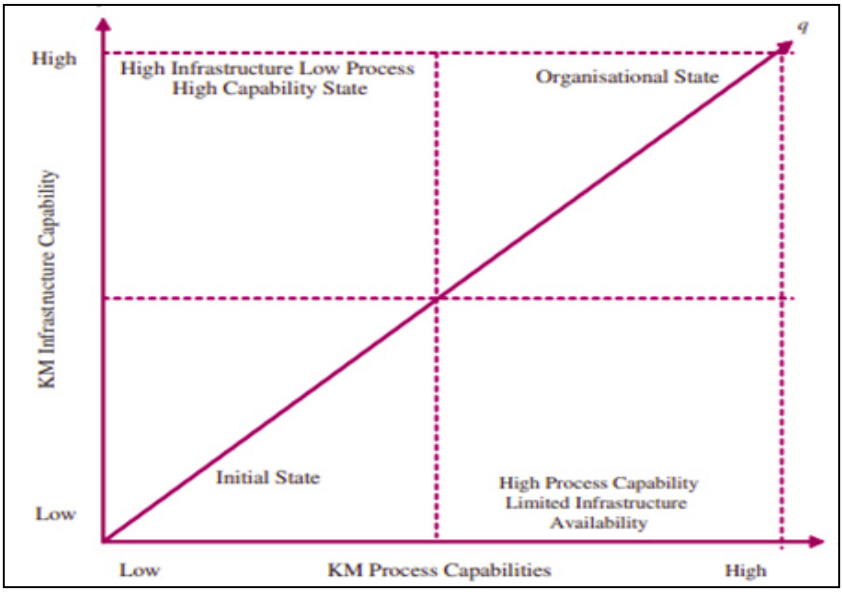
I.3.3. Knowledge management capabilities

In an organization, there are different levels of ability to apply and integrate resources to achieve corporate goals. Knowledge management has a function to foster the ability of the company to leverage the available knowledge through continuous learning in order to create new knowledge. Furthermore, knowledge management's ability not only adheres to the

ability to collect knowledge but also to protect knowledge and information to become a sustainable competitive advantage. It is therefore understandable that knowledge management capabilities have become a significant attribute of competitive advantage (Patma, Djajanto, & Mauludin, 2017, p. 233). To see KMC more systematically and comprehensively, Gold and al. (2001) identify the capabilities of KM consisting of two dimensions: knowledge infrastructure and KM processes. Knowledge infrastructure includes technology, structure, and culture; whereas KM process involves an organization's ability to acquire, convert, apply, and protect knowledge. Effective knowledge infrastructure is essential in KM processes which aim to store, transform, and transfer knowledge (Gold, Malhotra, & Segars, 2001).

Gold and all (2001) suggest that managers must first assess the underlying knowledge capability of the firm before setting milestones and expectations for knowledge management effort. Therefore, managers should be careful not to optimize one aspect of the knowledge management effort (Gold, Malhotra, & Segars, 2001). As noted by Davenport et al., this tendency to optimize one aspect of knowledge management can cause these projects to produce detrimental effects in customer service and innovation. In essence, a singular focus on process capabilities through reengineering and technology can rob the firm of rich knowledge resources, such firms likely suffer from an overemphasis on process capabilities. Likewise, firms may also overemphasize infrastructure capability, thereby losing efficiencies in the capture and transfer of knowledge (Davenport, Delong, & Beers, 1998). Clearly, managers seeking to establish effective programs of knowledge management must balance both the content of organizational knowledge (tacit and explicit) and capabilities to leverage knowledge (infrastructure and process). The outcomes of alignment in capability and content are key to realize the full benefits of knowledge management without suffering the negative consequences of imbalance between content and capability. Also, the firm must realize that knowledge management represents a collection of initiatives rather than a single project (Gold, Malhotra, & Segars, 2001).

Figure N° (I-5): Knowledge management capability framework.



Source: (Sandhawalia & Dalcher, 2011, p. 323)

As organizations implement KM initiatives, the KM infrastructure and processes develop. The framework presented in Figure N°(I-5) depicts the possible states organizations may encounter while implementing their KM programs. The characteristics of each state will be discusses below: (Sandhawalia & Dalcher, 2011, p. 323)

Initial state: An organization's KM program can be considered to be in the initial state when the organization is creating a knowledge vision and relating this vision to its strategic needs and other initiatives that already exist. During this state, the organization identifies the infrastructure required to support the initiative and the KM processes to be practiced. Within this state, management needs to communicate its knowledge vision across the organization, and make individuals aware of the KM program and its expected benefits.

High KM infrastructure capability: The KM program is in the state of high infrastructure capability when there is an emphasis on developing the infrastructure. In this stage, the knowledge vision is translated into action by means of mission and value statements to encourage the growth of knowledge within the organization. A knowledge culture of sharing and learning is promoted with individuals encouraged to participate and contribute. The organization reviews its policies and processes, and implements systems of rewards and incentives to motivate and reward knowledge sharing behavior. During this state, information technology support is developed in the form of repositories and collaborative

technologies to enable individuals within the organization to collaborate. Knowledge discovery technologies are developed to allow the organization to find new knowledge that is either internal or external to the firm. An organization's KM program could be considered to be in this state when individuals have access to infrastructure capabilities but do not avail themselves of its complete potential or capability, due to the lack of practicing knowledge processes.

High KM process capability: The KM program can be considered to be in the state of high KM process capability when there is an emphasis on practicing knowledge processes. Openness and trust characterize the organization's work environment and support knowledge sharing behaviors, which are included as an integral part of the training programs. Communities of practice evolve and individuals are encouraged to join and participate. Activities that establish an organization's KM program in a state of high knowledge process capability include identifying lessons learnt, best practices, benchmarking, brainstorming, group problem solving, mentoring and collaboration. The daily work processes support decision-making, feedback and interaction, which are made apparent in the team commitment. Therefore an organization would be in a state of high knowledge process capability and low infrastructure capability when the knowledge processes are practiced but do not receive adequate support in the form of infrastructure support.

Organizational state of KM: An organization will be in a state of organizational KM infrastructure and process capability when it achieves high availability of infrastructure capability to support frequent and regular practice of knowledge processes. In other words, knowledge processes are embedded in the daily routines, procedures and practices of the organization which posses the knowledge infrastructure to support them. This state is characterized by a vibrant mix of vision, strategy, leadership, organizational structure, culture, technology infrastructure, and knowledge processes of creation, storage, retrieval, transfer, application and sharing. Forums such as communities of practice evolve and the organizational structure, culture, and technology support them. Lessons learnt are captured regularly and made available across the organization, while best practices are implemented.

Nielsen (2006) argues that competitive advantage is based on the ability to continuously develop capabilities that form the basis of the products and services offered by organizations. To remain competitive, it is not enough to have resources and assets, as organizations must also have strong knowledge management capabilities to develop and sustain work practices and routines (Nielsen, 2006). Effective use of knowledge enhances competitive

advantage and improves organizational success. Knowledge management (KM) has become increasingly important as organizations realize that effective use of their vast and varied knowledge assets and resources gives them the ability to innovate and meet changing customer expectations. Organizations are developing knowledge management capabilities to help support a range of vital operational and innovative activities. The focus on organizational capabilities has created a concentration on developing and implementing the knowledge management processes and infrastructure needed to support day-to-day working practices (Sandhawalia & Dalcher, 2011). This is particularly true for organizations competing in dynamic and rapidly changing markets, as knowledge management capabilities enable organizations to respond to changing market conditions and gain and maintain competitive advantage (wheeler, 2002).

I.4. KMI to enable the implementation of knowledge management

Knowledge management is a vital strategic asset in organizations, especially in a highly competitive environment; it helps the organization to use new ways of acquiring and managing knowledge. The knowledge management infrastructure is considered the foundation of knowledge management, and it reflects the organization's culture, the organization's structure, the organization's information technology infrastructure. Unfortunately, many organizations lack the capacity to extract and share knowledge due to inefficient methods and inadequate infrastructure for managing their knowledge. Establishing the right infrastructure improves knowledge sharing and dissemination in organizations by adopting an appropriate culture and structure that enhances interaction, establishes a close relationship between employees and encourages employees to share and disseminate knowledge.

I.4.1. KMI and KM systems effectiveness

The benefits of using KMS are high because they include the ability of organizations to be flexible and to respond more quickly to changing market conditions, and the ability to be more innovative as well as improve decision making and productivity (Harris, 1996). KMS are expected to contribute to the competitive advantage of companies by supporting and enhancing organizational knowledge (Hansen & Nohria, 1999). Thus, KMS may ease the integration of dispersed knowledge, speed up the replication of best practices across time and place, and reduce costs of searching and transforming available knowledge for local use (Benbya & Belbaly, 2005).

Benbya and Belbaly (2005) argued that, while the potential benefits of a knowledge management system have been addressed in the literature, little is known about how to realize them in practice. In this context, he presented a study indicating the factors that work on the effectiveness of the knowledge management system as mechanisms, and the study concluded that there are three mechanisms that contribute to the effectiveness of the knowledge management system, which are cultural, structural, and managerial.

Cultural mechanism

Organizational cultures are central to the creation, sharing and use of knowledge and are increasingly recognized as a major barrier to the exploitation of intellectual assets (Gordon & Di Tomaso, 1992).Several researchers and consultants (Davenport & Prusak, 1998) have argued that creating a culture that values creativity, continuous improvement and idea sharing is necessary for successful knowledge management initiatives. Organizations do not have values apart from the values of their members. Furthermore, culture has proven to be a subtle and often difficult phenomenon to manage because of its dynamic interaction with basic organizational processes such as communications, decision making, change and power and thus its potential to facilitate and/or inhibit the adoption of new technologies (Schein, 1985).Trusting relationships and the confidence that comes from a community with common values and a shared history are the glue that has connected teams from geographically dispersed locations to solve specific problems, share feedback and experiences. Thus, establishing a culture of knowledge sharing remains both a cornerstone and a challenge (Benbya & Belbaly, 2005).

Structural mechanism

Many researchers emphasize the importance of structural mechanisms that integrate all the functional elements of the organization that support and facilitate knowledge management, such as a dedicated structure, rules and routines. When properties of units, properties of relationships and properties of knowledge fit or are congruent with each other, knowledge retention, and transfer increase. Experience can be structured to promote learning outcomes in firms. Where boundaries are drawn matters for knowledge creation, retention, and transfer. Embedding knowledge in transactional memory systems, short-hand languages, routines, technologies, and other knowledge repositories can promote knowledge retention and transfer in firms (Agrote, Mcevily, & Reagans, 2003).

Despite the structural differences that the researcher (Benbya & Belbaly, 2005)found during the study of four leading companies in the application of knowledge management, these companies use mechanisms to support the initiative by appointing steering committees, or a separate organizational unit responsible for knowledge management, as a knowledge transfer department, the organizational performance and learning team unit. Another structural mechanism which played a crucial role in the success of the overall initiative was the establishment of a key position named 'Systems operators', who were responsible for the coordination of knowledge sharing and acquisition within the business unit. In additionally, content experts or editors were responsible for the quality and update of knowledge within the systems. In the case of communities of practice, new roles were assigned to support communities, such as the global coordinator, who is responsible for the community, provides budgets and support for time, travel and technologies, or the community facilitator, who encourages and moderates discussions.

Managerial mechanism

In the workplace KMS and IT in general can only add value to an organization when they are used, and that value to individuals arises when use of the knowledge in the KMS enables them to perform their work in ways that are more efficient, more effective and/or more satisfying. Management support to KMS is critical for its success. If management spends a significant amount of resources on either purchasing or developing and implementing such technology, employees could interpret this as a signal of management's support for this ideal and act accordingly (Benbya & Belbaly, 2005).

Wenger and al. (2002) observe that recognition by peers, not financial rewards, is the primary motivator for community participation; and people who contribute regularly to a community often want their contributions to be recognized by the organization (Wenger, Mc Dermott, & Snyder, 2002). Benbya and Belbaly believe that finding the right balance between intrinsic and extrinsic rewards is a key in motivating employees to participate in the knowledge base (Benbya & Belbaly, 2005).

I.4.2. Role of KMI in developing KM process

KM infrastructure is necessary to maintain actual and valuable explicit and implicit knowledge in the organizational network. Organizations develop their KM infrastructure to respond quickly to the complexities of a fast-changing environment, which becomes a critical factor that intensifies the organizational competency by shortening the time required to develop

competencies. KM infrastructure supports KM processes by identifying which "knowledge is retrieved, applied, protected, and stored to become easy to use" (Aviv, Hadar, & Levy, 2021, p. 5).

The knowledge management infrastructure is the foundation of knowledge in the form of processes that help the organization to generate, create, acquire, test, organize, use and disseminate knowledge and to transform the organization's expertise into knowledge that is important for business activities, such as decision-making, strategic planning, learning and problem-solving. The organizational culture improves knowledge management, encourages its creation and generation, and facilitates its sharing and application among employees. It fosters the environment for the free flow of ideas. It is also the key to the ability of organizations to manage knowledge in the right way. Another vital role of organizational culture in knowledge management is the existence of a positive and knowledge-friendly culture in terms of productivity, participation and the establishment of a society based on knowledge sharing and effective networking in interpersonal relationships (Abualoush, Masa'deh, Bataineh, & Alrowwad, 2018, p. 287).

One of the most important and challenging aspects of KM is to enhance the development of a collaborative, trustworthy, emphatic and helpful organizational culture. It is because knowledge is a context-dependent social concept and a large part of organizational knowledge is embodied in social processes, institutional practices, traditions and values. Therefore, no matter how powerful the tools and functions of KM are, it is of no use without willing participants and a supportive social and cultural environment (Zaim, Tatoglu, & Zaim, 2007, p. 55).

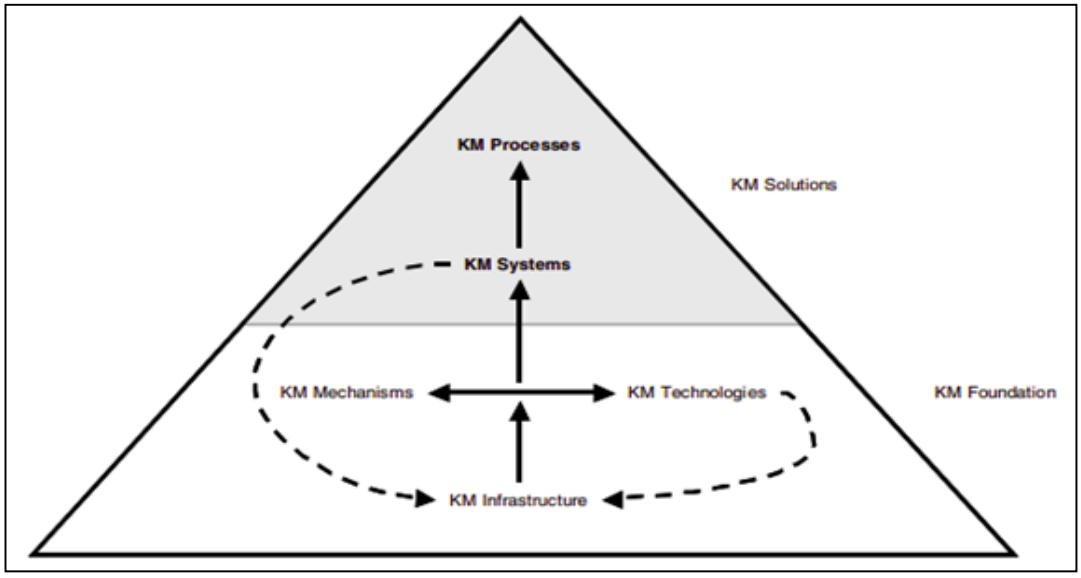
It has already been pointed out that organizational design is one of the most influential elements as far as the implementation of a knowledge management process is concerned. Given that knowledge is of vital importance to all firms and bearing in mind that the way in which they are organized determines the degree to which knowledge circulates both inside the organization and between the organization and its business environment, firms must adopt organizational structures which allow them to create and transfer as much knowledge as possible. It must be remembered that knowledge may sometimes not be taken advantage of as much as it should due to the organization model prevailing in the organization. In these cases, it is advisable to adopt organizational structures that do not stifle the organization, allowing knowledge to flow and materialize in actions that guarantee success for the company (Claver-Cortés, Zaragoza-Saez, & Pertusa-Ortega, 2007, p. 47).

There is never ending debate about the role that information technology play for knowledge management. IT is used as a medium for flow of knowledge that supports communication, collaboration knowledge seeking enabling collaborative learning. Duffy (2000) consider IT as playing its role in managing, storing and accessing documents and databases, but for any KM project to be successful IT professionals should be well aware about the various knowledge management processes. IT when integrated with KM processes becomes a major player in companies for KM processes (Chugh, Chugh, Punia, & Agarwal, 2013, pp. 690-691).

I.4.3. Role between KMI and KM solutions and foundation

Knowledge management depends on two broad aspects: KM solutions, and KM foundations, which are broader and more long-term. KM solutions refer to the ways in which specific aspects of KM (discovery, capture, sharing, and application of knowledge) can be accomplished. KM solutions include KM processes and KM systems. KM foundations are the broad organizational aspects that support KM in the short- and long-term. They include KM infrastructure, KM mechanisms, and KM technologies. Thus, KM solutions depend on KM foundations, as shown in Figure N°(I-6) (Becerra-Fernandez & Sabherwal, 2015, p. 41).

Figure N° (I-6): An overview of knowledge management solutions and foundation.



Source: (Becerra-Fernandez & Sabherwal, 2015, p. 42).

KM infrastructure, which is at the organizational level, supports KM mechanisms and technologies. KM mechanisms and technologies are used in KM systems, with each KM system utilizing a combination of multiple

mechanisms and multiple technologies. Moreover, the same KM mechanism or technology could support multiple KM systems. KM systems enable KM processes, with a KM system focusing on one specific KM process. Therefore, KM processes and KM systems are specific solutions for KM needs whereas KM infrastructure, mechanisms, and technologies are broader: KM mechanisms and technologies support multiple KM solutions, and the KM infrastructure supports (through KM mechanisms and technologies) all KM solutions. However, over time, KM infrastructure itself benefits from KM mechanisms and technologies as well as KM processes, as shown by the curved arrows in figure N° (I-6) (Becerra-Fernandez & Sabherwal, 2015, p. 43).

A recap

With the light of globalization, scientific and technological development, the economic environment has become more complex and dynamic, making it difficult for organizations to adapt to this environment. In this context, the interest of organizations in knowledge has increased as an essential resource for the organization, because of its impact on achieving excellence, innovation and wealth creation. However, the nature of knowledge as an intangible asset requires its management in a particular way within the organization. Knowledge management is about the different processes related to knowledge activities, to achieve the distinctive competencies; it requires the organization to have a supporting infrastructure for knowledge management and organizational learning, which is represented in the organizational culture, organizational structure and information technology.

Learning organizations strive to achieve sustainable competitive advantage, to ensure superiority in the competitive environment. Sustainable competitive advantage aims to create a system that outperforms competitors, in order to provide customer's surplus value, whether in terms of cost reduction or product differentiation. Distinctive competencies are the key to achieving sustainable competitive advantage, and this will be discussed in the next chapter.

Chapter II

Sustainable competitive advantage (SCA) refers to a company's ability to maintain a competitive edge over its rivals in the long term. In the context of learning organizations, SCA is achieved by continuously improving the knowledge and skills of employees through formal and informal learning opportunities. This allows the organization to adapt to changes in the market, improve processes and products, and stay ahead of competitors. A key aspect of SCA in learning organizations is the ability to transfer and apply new knowledge and skills to the organization's strategy and operations. By fostering a culture of continuous learning and development, a company can create a sustainable competitive advantage that is difficult for competitors to replicate.

Learning organizations are particularly well-suited to achieve SCA, as they are characterized by a culture of continuous learning and development, which is essential for building and maintaining a competitive edge. Learning organizations are able to quickly adapt to changing market conditions, customer needs, and emerging technologies. This allows them to stay ahead of the competition and maintain their competitive advantage. Innovation, quality, efficiency, and customer responsiveness are key factors in achieving sustainable competitive advantage in learning organizations. Organizations that excel in these areas are better equipped to meet the needs of their customers, produce high-quality products and services at a lower cost, and respond quickly to changing market conditions, which give them a significant competitive edge.

SCA in learning organizations can be achieved through the implementation of effective knowledge management infrastructure (KMI) and the adoption of organizational learning approaches. KMI, which includes organizational culture, organizational structure, and information technology, plays a critical role in building SCA by enabling the acquisition, sharing, and application of knowledge. Organizational learning approaches can also support SCA by promoting a culture of continuous learning and development, which is essential for building SCA.

In this chapter contain the following points:

II.1. Theoretical framework of sustainable competitive advantage

II.2. Sustainable competitive advantage basics

II.3. learning organization (LO)

II.4. A contribution of knowledge management infrastructure in building sustainable competitive advantage in learning organizations

II.1. Theoretical framework of sustainable competitive advantage

Sustainable competitive advantage is an important issue in business. It means that the organization has an advantage that gives it an edge over its competitors, and will continue to do for a long period of time.. Sustainable competitive advantages are a set of assets, characteristics, or capabilities that allow an organization to meet its customer needs better than its competition can. Sustainable competitive advantages are difficult to duplicate or replicate. A company must set lucid goals, strategies, and operations to sustain its competitive advantage over time. Maintaining a competitive advantage requires a company to continue focusing on all four generic building blocks of competitive advantage: efficiency, quality, innovation, and responsiveness to customers, and to develop distinctive competencies that contribute to superior performance in these areas.

II.1.1. Sustainable competitive advantage definition

The actual term “sustainable competitive advantage " emerged in 1985, when Porter discussed the basic types of competitive strategies that a firm can possess (low-cost or differentiation) in order to achieve a long-run sustainable competitive advantage. Sustainable competitive advantage is the key to business success. It is the force that enables a business to have greater focus, more sales, better profit margins, and higher customer and staff retention than competitors. It is the major driver of long-term business value. Researchers have introduced several concepts for sustainable competitive advantage. Sustainable competitive advantage is seen as a company’s own resources and capabilities must therefore be difficult to imitate, not easily substituted by other resources or capabilities (Coplin, 2002).

Sustainable competitive advantage is a business strategy based on firm’s resources that support firms to sustain their competitive advantage by outperforming others in a competitive market (Abdul Malek, et al., 2015, p. 74).

The first definition presented the sustainable competitive advantage as the firm's resources and capabilities that are difficult to replace, while the second definition considered it a business strategy that builds on the firm's resources, achieving an element of superiority over others.

Potential sources of advantage are superior skills and superior resources; in assessing ways to achieve sustainable competitive advantage (SCA), both competitor and customer perspectives should be considered (Day & Wensly, 1988). This definition added superiority to resources and skills, as well as taking competitors and customers into consideration to achieve sustainable competitive advantage.

Competitive advantage exists when a specific company performance constantly overpasses other companies in the same industry. A company can overpass others if profits are higher than the competitor's profits. The competitive advantage is deemed to be stronger when it persists for a longer period of time; those companies who are able to retain a competitive advantage for many years are considered to have a sustainable competitive advantage (Aly, W.O.;, 2016, p. 40).

This definition spoke of competitive advantage in terms of the superiority of the company in terms of performance and profits over other companies, and that maintaining this superiority is what ensures sustainability.

Gaining and maintaining sustainable competitive advantage and improved performance are a cause of the resources and capabilities brought to the competition. These knowledge resources and abilities, as a result of learning tactics entails an enhancement in responding abilities through a much broader comprehension of the atmosphere. A corporation can accomplish over average efficiency for an extended period of time if it follows organizational learning approaches that yield competitive advantage and are too hard to emulate (Aly, W.O.;, 2016, p. 48). It's important to mention that competitive advantage can be sustained only if capabilities creating the advantage are supported by resources that are not easily duplicated by competitors. A knowledge is just one of those resources because the competitive advantage based on knowledge is to do right things (be effective), but also to do the right things on the right way (be efficient) (Bratic, 2009, p. 44). The last two definitions add that companies achieve sustainable competitive advantage through knowledge resources and capabilities and the adoption of organizational learning approaches. Coyne (1986) added that to create competitive advantage The key is being able to predict the actions of others in the industry over time; by matching the firm's resources to the gaps and voids that exist in the industry. This advantage is sustained if competitors either cannot or will not take action to close the gap (Chowtupalli & Abdul Rafi, 2013, p. 114).

In 2008, Barney distinguished two types of competitive advantage: temporary and sustainable competitive advantage. According to him, competitive advantage typically results in high profits, but these profits attract competition, and competition limits the duration of competitive advantage in most cases, therefore, most competitive advantage is temporary. On the other hand, some competitive advantages are sustainable if competitors are unable to imitate the source of advantage or if no one conceives a better offering (Mahdi, Almsafir, & Yao, 2011, p. 9913). Barney argues that competitive advantage can be maintained when that advantage is

not imitable or when none of the competitors have been able to offer a better deal.

From all of the above we can say that Sustainable competitive advantages are company assets, attributes, or abilities that are difficult to duplicate or exceed; and provide a superior or favorable long term position over competitors.

II.1.2. Sustainable competitive advantage sources

A company has a competitive advantage over its competitors when its profitability is higher than the average profitability of all companies in its sector. It has a sustainable competitive advantage when it is able to maintain above-average profitability for several years. The main objective of the strategy is to achieve a sustainable competitive advantage, which in turn will lead to higher profitability and profit growth. What are the sources of sustainable competitive advantage?

We begin by defining some key terms:

Core competencies are described as the basic building blocks for a firm's corporate strategy. There are two essential attributes of core competence. First, a core competence must be a skill or capability of a firm rather than the mere ownership of a resource. Second, core competencies should be prominent in helping a firm achieve its purpose. In other words, a core competence is central to a firm's value-generating activities (Mooney, 2007, p. 111).

Distinctive competences: In 1957, the term "distinctive competence" was first used by Selznick to explain the style of a firm, refers to what a firm perform especially well comparing with rivals. Thus, distinctive competence is an aggregate of multiple activities that firms do to perform better than other rivals within a similar environment (Mhd Alhares, Ali-Agha, & Naji Jawad, 2017, p. 53). David (2015) defines the distinctive competencies as "a firm's strengths that cannot be easily matched or imitated by competitors and building competitive advantages involve taking advantage of distinctive competencies." (David, 2015, p. 93). Hill and Jones (2012) define distinctive competency as "a unique firm- specific strength that allows a company to better differentiate its products and/or achieve substantially lower costs than its rivals and thus gain a competitive advantage." (Hill & Jones, 2012, p. 108).

While core competencies are basically a list of things a company does well, distinctive competencies go further. A distinctive competency is not only something a company does well (a core competency) but also must be something no one else in the market is doing and couldn't easily replicate. In

other words, distinctive competencies are characteristics of an organization that are truly unique (Pragmatic institute).

Resources: Resources are financial, physical, social or human, technological, and organizational factors that allow a company to create value for its customers. Company resources can be divided into two types: tangible and intangible resources (Hill & Jones, 2012, p. 108). Tangible resources are physical entities, such as land, buildings, manufacturing plants, equipment, inventory and money. Intangible resources are non-physical entities that are created by managers and other employees, such as brand names, the company's reputation, the knowledge that employees have gained through experience, and the company's intellectual property, including patents, copyrights and trademarks (Hill, Jones, & Schilling, 2015, p. 83).

Capabilities: They refer to an organization's skills at harmonizing its resources and setting them to productive use. These skills exist in an organization's rules, routines, and procedures, that is, the style or manner through which it makes decisions and manages its internal processes to achieve organizational objectives (Mhd Alhares, Ali-Agha, & Naji Jawad, 2017, p. 54). Day & Wensley (1988) argued that superior skills are the distinctive capabilities of personnel that set them apart from the personnel of competing firms. Some of the benefits of superior skills arise from the ability to perform individual functions more effectively than other firms. For example, superior engineering or technical skills may lead to greater precision or reliability in the finished product (Day & Wensly, 1988, p. 2). Capabilities are intangible. They reside not so much in individuals as in the way individuals interact, cooperate, and make decisions within the context of an organization (Hill & Jones, 2012, p. 109). The capabilities do exist when the resources have been integrated with the aim to develop one or multiple tasks in the firm. Moreover, capabilities are usually acquired through the development, learning, and exchange of knowledge of the staff. Some examples of capabilities may be the human talent selection, marketing, research and development, and the employees' abilities and knowledge (Prieto-Sandoval, Jaca, Santos, Baumgartner, & Ormazabal, 2019, p. 1476).

Resource-based approaches to the theory of competitive advantage point towards four characteristics of resources and capabilities which are likely to be particularly important determinants of the sustainability of competitive advantage: durability, transparency, transferability, and replicability (See figure N° II- 1). (Grant, The resource-based theory of competitive advantage: Implications for strategiy formulation, 1991, pp. 124-127)

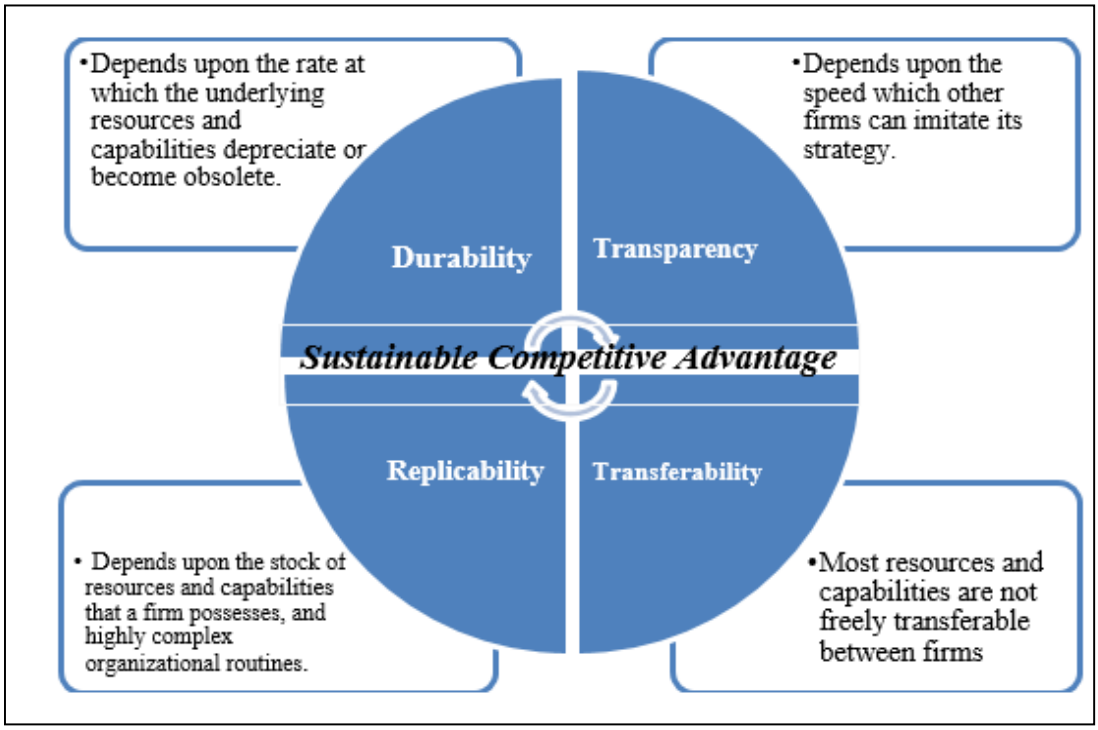
Durability: The longevity of a firm's competitive advantage depends on the rate at which the underlying resources and capabilities depreciate or become obsolete. The durability of resources varies considerably, with technological resources having a shorter lifespan than reputation. The firm capabilities have the potential to be more durable than resources. The management of these capabilities is critical to ensure their maintenance and renewal. Additionally, organizational culture can maintain competitive advantage through the socialization of new employees to support the maintenance of capabilities.

Transparency: The firm's ability to sustain its competitive advantage over time depends on the speed at which other firms can imitate its strategy. Imitation requires overcoming two problems: the information problem, which understands the rival's competitive advantage and how it's achieved, and the strategy duplication problem, which is acquiring the resources and capabilities to imitate the rival's strategy. A competitive advantage based on a single performance variable is easier to identify and replicate than one based on multiple capabilities, and a capability based on a complex coordination of resources is more difficult to replicate than one based on a single dominant resource.

Transferability: Once a firm or potential entrant has identified the sources of a rival's superior performance, imitation requires acquiring the necessary resources and capabilities to challenge the rival's competitive advantage. The primary source of these resources and capabilities is the markets for these inputs. However, most resources and capabilities are not freely transferable between firms, which makes it difficult for would-be competitors to acquire the resources needed to replicate the competitive advantage of an incumbent firm.

Replicability: Imperfect transferability of resources and capabilities limits the ability of a firm to buy in the means to imitate success. The second route by which a firm can acquire a resource or capability is by internal investment. Some resources and capabilities can be easily imitated through replication. Much less easily replicable are capabilities based upon highly complex organizational routines. Some capabilities appear simple but prove exceptionally difficult to replicate.

Figure N°(II-1): Characteristics of resources and capabilities creating SCA.



Source: By researcher based on (Grant, The resource-based theory of competitive advantage: Implications for strategiy formulation, 1991)

Competitive advantage is based upon distinctive competencies. Distinctive competencies arise from two complementary sources: resources and capabilities. The distinction between resources and capabilities is critical to understanding what generates a distinctive competency. A company may have firm-specific and valuable resources, but unless it also has the capability to use those resources effectively, it may not be able to create a distinctive competency. Additionally, it is important to recognize that a company may not need firm-specific and valuable resources to establish a distinctive competency so long as it has capabilities that no other competitor possesses (Hill, Jones, & Schilling, 2015).

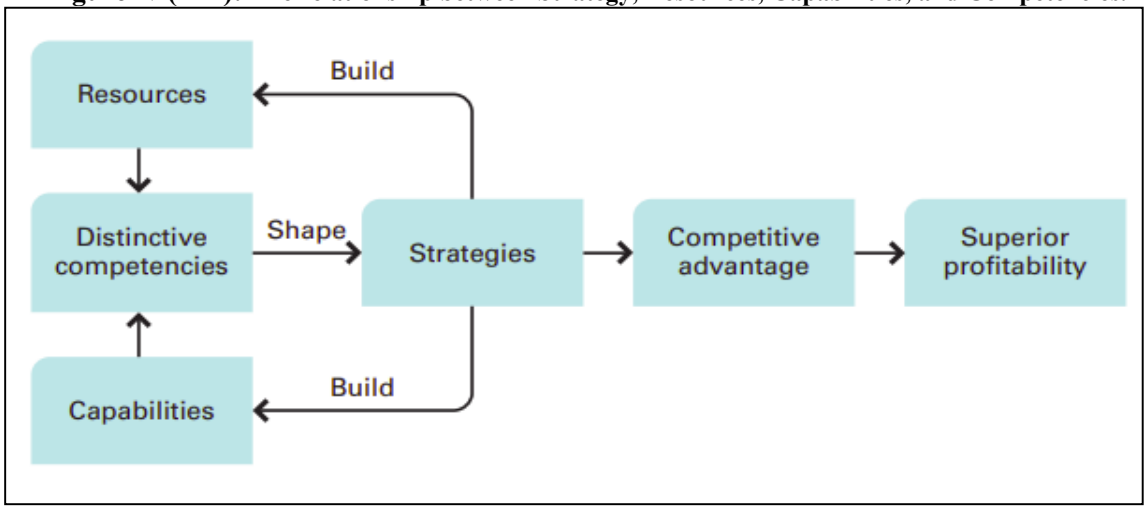
In summary, for an enterprise to have a distinctive competence, it must (at a minimum) have either a specific and valuable resource and the capabilities (skills) to draw on that resource, or an enterprise-specific capability to manage the resources. A firm's distinctive competence is strongest when it has both firm-specific and valuable resources and firm-specific capabilities to manage those resources.

Resources are particularly valuable when they enable a company to create strong demand for its products, and/or to lower its costs. Valuable

resources are more likely to lead to a sustainable competitive advantage if they are rare, in the sense that competitors do not possess them, and difficult for rivals to imitate; that is, if there are barriers to imitation. Like resources, capabilities are particularly valuable if they enable a company to create strong demand for its products, and/or to lower its costs. As with resources, valuable capabilities are also more likely to provide sustainable competitive advantage, if they are both scarce and protected from copying by barriers to imitation (Hill & Jones, 2012).

Figure N° (II-2) illustrates the relationship between a company's strategies, its distinctive competencies and its competitive advantage. Distinctive competencies shape the strategies that the firm pursues, leading to competitive advantage and higher profitability. However, it is also very important to realize that the strategies adopted by a firm may create new resources and capabilities or strengthen the firm's existing resources and capabilities, thereby enhancing the firm's distinctive competencies. Thus, the relationship between distinctive competencies and strategies is not linear; rather, it is a reciprocal relationship in which distinctive competencies shape strategies, and strategies help build and create distinctive competencies (Hill, Jones, & Schilling, 2015, p. 84).

Figure N°(II-2): The relationship between Strategy, Resources, Capabilities, and Competencies.



Source: (Hill, Jones, & Schilling, 2015, p. 85)

Establishing competitive advantage involves formulating and implementing a strategy that exploits the uniqueness of a firm's portfolio of resources and capabilities (Achieng, 2012). According to Grant the managers must select an appropriate strategy in order to use more effectively the resources and the capabilities of the firms (Grant, 1996). Strategy is concerned with matching an organization's resources and capabilities to the opportunities that arise in the external environment. Increasing emphasis on

the role of resources and capabilities as the basis for strategy is the result of two factors. First, as the organization's industry environment has become more unstable, internal resources and capabilities rather than external market focus has been viewed as a more secure base for formulating strategy. Second, it has become increasingly apparent that competitive advantage rather than industry attractiveness is the primary source of superior profitability. During the 1990's, ideas concerning the role of resources and capabilities as the principal basis for organization strategy and the primary source of profitability coalesced into what has become to be known as the resource-based view of the firm. In general, the greater the rate of change in an organization's external environment, the more likely it is that internal resources and capabilities will provide a secure foundation for long-term strategy (Achieng, 2012).

Grant (1991) thus asserts that firm's resources and competencies, on one hand provide the basic direction for a firm's strategy, and on the other are the primary source of profit for the firm. Consequently, the strategic planning should be divided into the following phases: (Toni & Tonchia, 2003, p. 950)

- Identify and classify the firm's resources, appraise strengths and weaknesses relative to competitors, identify opportunities for better utilization of resources;
- Identify the firm's competencies, and the resources inputs of each competence;
- Appraise the rent-generating potential of resources and competencies;
- Select a strategy which best exploits the firm's resources and competencies relative to external opportunities; and
- Identify resource gaps which need to be filled (invest in replenishing, augmenting and upgrading the firm's resources).

Strategic management must, therefore, be expected to retain differentiation for as long as possible by building strategies around distinctive competences (Colin & Fran, 2010, p. 23). Colin and Fran (2010) reported that protecting distinctiveness as patterns is usually easier than protecting 'single'' distinctive competences. ''Superior combinations of inputs can be more economically identified and formed from resources already used in the organization than by obtaining new resources (and knowledge of them) from the outside''. Therefore, core distinctive competences, by definition, cannot be purchased off the shelf but require strategic vision, development time, and sustained investment. They suggest that the only reasonable chance of developing (and even sustaining) distinctiveness is by putting strategies in

place to create new links between existing competences, in particular the creation of new self-sustaining feedback loops (Colin & Fran, 2010, p. 24).

II.1.3. Building blocks of sustainable competitive advantage

There are four factors that help a company build and sustain competitive advantage; Superior: Efficiency, Quality, Innovation, and Customer responsiveness. These are the generic building blocks of competitive advantage that any company can adopt, regardless of its industry, or the products and services it provides (Jones, George, Dejanasz, Dowd, & Schneider, 2010).

Superior efficiency: Efficiency is the measure of the amount of inputs required to produce a given amount of outputs. The fewer the amount of inputs required to produce a given output, the higher the efficiency level and the lower the cost of outputs (Jones, George, Dejanasz, Dowd, & Schneider, 2010).Inputs are basic factors of production such as material, labor, time, equipment, capital, technological skills and knowhow. Outputs are the goods and services that the business produces. It is one of the major sources of competitive advantage because it allows a company to increase the productivity of its employees and capital and thus reduce its cost structure. Superior efficiency is viewed from the perspective of the producers in an industry (Kang & Huh, Exploration of the sources of competitive advantage: UPS vs. Fedex, 2019).

A company can increase efficiency through a number of steps: exploiting economies of scale and learning effects, adopting flexible manufacturing technologies, reducing customer defection rates, implementing just-in-time systems, getting the R&D function to design products that are easy to manufacture, upgrading the skills of employees through training, introducing self-managing teams, linking pay to performance, building a companywide commitment to efficiency through strong leadership, and designing structures that facilitate cooperation among different functions in pursuit of efficiency goals (See table N° II-1) (Hill & Jones, 2008, p. 145).

Table N° (II-1): Primary roles of various functions to achieve superior efficiency.

Value creation function	Primary roles
Infrastructure (leadership)	**1**. Provide companywide commitment to efficiency. **2.** Facilitate cooperation among functions.
Production	**1.** Where appropriate, pursue economies of scale and learning economics. **2.** Implement flexible manufacturing systems.
Marketing	**1.** Where appropriate, adopt aggressive marketing to ride down the experience curve.

	2. Limit customer defection rates by building brand loyalty.
Materials management	**1**. Implement JIT systems. **2**. Implement supply-chain coordination.
R&D	**1.** Design products for ease of manufacture. **2.** Seek process innovations.
Information systems	**1.** Use information systems to automate processes. **2.** Use information systems to reduce costs of coordination.
Human resources	**1.** Institute training programs to build skills. **2**. Implement self-managing teams. **3.** Implement pay for performance.

Source: (Hill & Jones, 2008, p. 126)

Superior quality: Quality means producing goods and services that are reliable – they do the job that they were designed for and do it well. Providing high quality products creates a brand name reputation that, in turn, allows the organization to charge a higher price for its products (Jones, George, Dejanasz, Dowd, & Schneider, 2010). Agus (2008) has indicated that quality of a product or service is the degree to which the product or service meets specifications and needs of customers, and it is viewed as a fundamental source for firms to develop competitive advantage (Agus, 2008). A product is said to be of superior quality when customers perceive that its attributes provide greater utility than the attributes of products sold by competitors. When customers evaluate the quality of a product, they measure it against two types of attributes - those related to quality as excellence and those related to quality as reliability. As with excellence, reliability increases the value (utility) that a consumer derives from a product, and thus the price that the company can charge for the product and/or the demand for the product (Hill, Jones, & Schilling, 2015). The impact of high-quality products on competitive advantage is twofold. First the supply of high-quality products would increase its value (utility) to customers which provides the opportunity for companies to charge a higher price for their products. Second Greater efficiency and lower unit costs associated with reliable products of high-quality would improve competitive advantage. In contrast to superior efficiency, superior quality is viewed from the perspective of customers (Kang & Huh, Exploration of the sources of competitive advantage: UPS vs. Fedex, 2019).

Achieving superior quality demands an organization wide commitment to quality and a clear focus on the customer. It also requires metrics to measure quality goals and incentives that emphasize quality, input from employees regarding ways in which quality can be improved, a

methodology for tracing defects to their source and correcting the problems that produce them, a rationalization of the company's supply base, cooperation with the suppliers that remain to implement total quality management programs, products that are designed for ease of manufacturing, and substantial cooperation among functions (See table n° II-2). The philosophy underlying TQM, as articulated by Deming, is based on the following five-step chain reaction: (Hill & Jones, 2008, p. 127)

- Improved quality means that costs decrease because of less rework, fewer mistakes, fewer delays, and better use of time and materials.
- As a result, productivity improves.
- Better quality leads to higher market share and allows the company to raise prices.
- This increases the company's profitability and allows it to stay in business.
- Thus, the company creates more jobs.

Table N° (II-2): The roles of functions in implementing reliability improvement methodologies

Value creation function	Roles
Infrastructure (leadership)	**1.** Provide leadership and commitment to quality. **2.** Find ways to measure quality. **3.** Set goals and create incentives. **4**. Solicit input from employees. **5**. Encourage cooperation among functions.
Production	**1**. Shorten production runs. **2.** Trace defects back to source.
Marketing	**1.** Focus on the customer. **2.** Provide customers' feedback on quality.
Materials management	**1.** Rationalize suppliers. **2.** Help suppliers implement quality improvement methodologies. **3.** Trace defects back to suppliers.
R&D	**1.** Design products that are easy to manufacture.
Information systems	**1.** Use information systems to monitor defect rates.
Human resources	**1.** Institute quality improvement training programs. **2.** Identify and train "black belts"[1]. **3.** Organize employees into quality teams.

Source: (Hill & Jones, 2008, p. 129)

Superior Innovation: Anything new or better about the way an organization operates or the goods and services it produces is the result of

[1] A Black Belt should demonstrate team leadership, understand team dynamics and assign team member roles and responsibilities. Black belts have a thorough understanding of all aspects of the define, measure, analyze, improve and control (DMAIC) model in accordance with Six Sigma principles.

innovation. Successful innovation gives an organization something unique that its rivals lack (Jones, George, Dejanasz, Dowd, & Schneider, 2010). There are two main types of innovation product innovation and process innovation. Product innovation is the development of products that are new to the world or have superior attributes than the existing products. Process innovation is the development of a new process to produce products and deliver them to customers. Product innovation creates value through the development of new products and improving current existing products that customers perceive as having more value. This allows the option for companies to charge a higher price. Process innovation often allows a company to create more value by lowering production cost (Kang, An application of 'Building blocks of competitive advantage' Aproach to the U.S. cereal market learders, 2018). In the long run, innovation of products and processes is perhaps the most important building block of competitive advantage. Competition can be viewed as a process driven by innovations; because, by definition, they give a company something unique-something its competitors lack (at least until they imitate the innovation). Uniqueness can allow a company to differentiate itself from its rivals and charge a premium price for its product or, in the case of many process innovations, reduce its unit costs far below those of competitors (Kang & Huh, Exploration of the sources of competitive advantage: UPS vs. Fedex, 2019).

To achieve superior innovation, a company must build skills in basic and applied research, design good processes for managing development projects, and achieve close integration among the different functions of the company primarily through the adoption of cross-functional product development teams and partly parallel development processes. The primary role that the various functions play in achieving superior innovation is summarized in Table N° (II-3).

Table N° (II-3): Primary roles of various functions to achieve superior innovation.

Value creation function	Primary roles
Infrastructure (leadership)	**1.** Manage overall project (i.e., manage the development function). **2.** Facilitate cross-functional cooperation.
Production	**1.** Cooperate with R&D on designing products that are easy to manufacture. **2.** Work with R&D to develop process innovations.
Marketing	**1.** Provide market information to R&D. **2.** Work with R&D to develop new products.
Materials management	No primary responsibility
R&D	**1.** Develop new products and processes. 2. Cooperate with other functions, particularly marketing and manufacturing, in the development process.

Information systems	**1.** Use information systems to coordinate cross-functional and cross-company product development work.
Human resources	**1.** Hire talented scientists and engineers.

Source: (Hill & Jones, 2008, p. 142)

Superior Customer Responsiveness: Customer responsiveness allows a company to customize its offerings, improve response time, and provide superior service. To achieve superior responsiveness to customers, a company must be able to do a better job than competitors of identifying and satisfying its customers' needs. Customers will then attribute more value to its products, creating a competitive advantage based on differentiation. Improving the quality of a company's product offering is consistent with achieving responsiveness, as is developing new products with features that existing products lack. Another factor that stands out in any discussion of responsiveness to customers is the need to customize goods and services to the unique demands of individual customers or customer groups.

Customer responsiveness is an important differentiating attribute that can help to build brand loyalty. Achieving superior responsiveness means giving customers value for money. Taking steps to improve the efficiency of a company's production process and the quality of its products is consistent with this aim. Responding to customers' needs may also require the development of new products with new features. In other words, achieving superior efficiency, quality, and innovation are all part of achieving superior responsiveness to customers. In addition, there are two other prerequisites for attaining this goal; a tight customer focus and an ongoing effort to seek better ways to satisfy those needs (Hill & Jones, 2012, p. 106).

To achieve superior responsiveness to customers, a company needs to give customers what they want, when they want it. It must ensure a strong customer focus, which can be attained by emphasizing customer focus through leadership, training employees to think like customers, bringing customers into the company through superior market research, customizing products to the unique needs of individual customers or customer groups, and responding quickly to customer demands. Table N°(II-4) summarizes the steps different functions must take if a company is to achieve superior responsiveness to customers (Hill & Jones, 2008).

Table N° (II-4): Primary roles of various functions to achieve superior customer responsiveness.

Value creation function	Primary roles
Infrastructure (leadership)	**1.** Through leadership by example, build a companywide commitment to responsiveness to customers.
Production	**1.** Achieve customization through implementation of flexible manufacturing. **2.** Achieve rapid response through flexible manufacturing.
Marketing	**1**. Know the customer. **2.** Communicate customer feedback to appropriate functions.
Materials management	**1.** Develop logistics systems capable of responding quickly to unanticipated customer demands (JIT).
R&D	**1.** Bring customers into the product development process.
Information systems	**1.** Use web-based information systems to increase responsiveness to customers.
Human resources	**1.** Develop training programs that get employees to think like customers themselves.

Source: (Hill & Jones, 2008, p. 145)

Maintaining a competitive advantage requires a company to continue focusing on all four generic building blocks of competitive advantage—efficiency, quality, innovation, and responsiveness to customers—and to develop distinctive competencies that contribute to superior performance in these areas. Distinctive competencies shape the functional-level strategies that a company can pursue and those managers, through their choices with regard to functional-level strategies, can build resources and capabilities that enhance a company's distinctive competencies. Additionally, the ability of a company to attain superior efficiency, quality, innovation, and customer responsiveness will determine if its product offering is differentiated from that of rivals and if it has a low-cost structure. Companies that increase the utility consumers get from their products through differentiation, while simultaneously lowering their cost structure, create more value than their rivals, and this leads to a competitive advantage and superior profitability and profit growth (Hill & Jones, 2008, p. 111).

II.2. Sustainable competitive advantage basics

Sustainable competitive advantage is considered a criterion for successful organizations, due to their excellence in finding new and unique models that are difficult to imitate by competitors. There have been many theoretical approaches and differed in their view of the foundations of building a sustainable competitive advantage, as some of them focused on

the inside; Through resources, competencies and capacity building, others focused on the outside and taking into account the attractiveness of the industry, competitive position, and market. In addition, the success of organizations in gaining a sustainable competitive advantage depends on their ability to formulate and implement strategies that put them in a better position relative to their competitors.

II.2.1. Sustainable Competitive Advantage Approaches

In general, competitive advantage is a business concept that has been widely discussed by prior researchers. There are two main perspectives that address this concept, the inward-looking Resource-Based view (RBV) and the externally oriented Industrial organization theory (IO). RBV and the IO concurs in that competitive advantage is the competitive position a firm establishes as a result of superior profit compared to its competitors (Huang, Dyerson, Wu, & Harindranath, 2015).The fundamental deference between the approaches is how superior profit is created, namely the sources of sustained competitive advantage. The RBV perceives those superior returns and the competitive position of a firm stems from its idiosyncratic resources (Grant, 1996). In contrast, the IO asserts that superior profit is attained by a firm's stronger market position in an industry compared o its competitors (Huang, Dyerson, Wu, & Harindranath, 2015).

II.2.1.1. Industrial Organization theory

Using a structural analysis approach, Porter (1980) outlines an analytical framework that can be used in understanding the structure of an industry, He considers that a company's ability to gain a competitive advantage depends primarily on how well it positions itself and differentiates itself in the industry. Porter's Five Forces Model is an analytical tool to assess an industry's attractiveness and facilitates competitor analysis. The collective effects of the five forces determine the ability of firms in an industry to make profits, and embody the rules of competition that determine industry attractiveness, and help determine a competitive strategy to cope with and, ideally, to change those rules in the firm's favor (Tuan & Tuyet Mai, 2012, p. 54).

The five forces are comprised of factors that could affect the positioning of a firm in a particular industry, this includes The Bargaining power of Buyers; The Bargaining power of Sellers; The Threat of Substitutes; The Threat of Potential Entrants and; The Threat of Existing Competition. The relative importance of a threat depends from industry to industry (Goyal, 2020, p. 149). (See figure N° II-3)

Bargaining power of suppliers: Suppliers exhibit high power, when they are few in number, offer differentiated products (Goyal, 2020). The raw material suppliers provide the required goods and services. It indicates that there is an acute need to keep good and steady rapport with suppliers. Based on the industry vigor and dynamics, suppliers remain in the position to command their terms, establish prices and decide timeline availability. Strong suppliers can increase raw material costs without changing the volume of their own sales or decrease sale quantity (Pawar & Hole, 2019, p. 1439).

Bargaining power of buyers: This refers to the powers exerted by buyers on the firm. In certain industries, buyers exhibit high bargaining power, can capture more value by forcing down prices, demanding better quality or more service (thereby driving up costs) such as if the industry has a small number of buyers who purchase large volumes, these are particularly powerful in industries with high fixed costs. Buyers are also powerful in instances where industry products are homogeneous, and when the buyers do not face high switching costs (Porter M. , 2008).

Treat of new entries: The competitive threat is not only from dominant business players, but may come from likely new entrants. When the industry makes profits, it attracts new companies. Hence, it compels to improve with long term marketing and business strategies. Unless the barrier to entry prevails, new companies can easily enter the market and change the industry dynamics. The specific dynamics of the industry can restrict the entry of new companies and these are known as barriers to entry (Pawar & Hole, 2019).

The entry barriers can stem from various things like: (Dobbs, 2014)

1. Knowledge gained from patents and proprietary rights;
2. Having access to innovative infrastructure and technology;
3. Government drive on obstacles or economies of scale;
4. Need for very high initial investment;
5. Large costs for switching of loyal consumers;
6. Problems in securing raw materials and problems to access effective distribution channels.

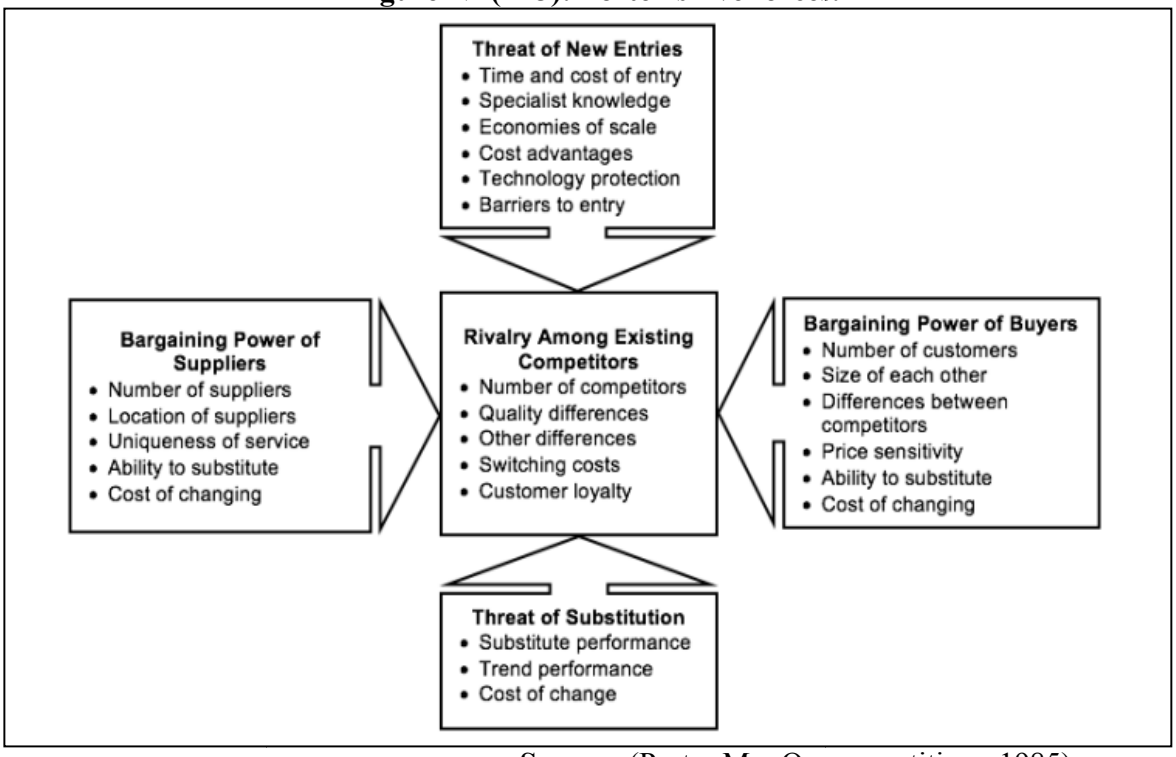
Treat of substitution: The threat of substitutes refers to the competition that is created in the market by substitute products and when the buyer faces a choice between products that can potentially offer the same level of utility. The threat of substitutes is high when there is an attractive price performance trade-off, or when the buyer has lower switching costs. This may seem fairly easy to remove but are quite complicated, as many-a-times, firms are not aware of all their potential substitutes (Goyal, 2020).

Rivalry among existing competitors: Rivalry among existing competitors takes many familiar forms, including price discounting, new product introductions, advertising campaigns, and service improvements. High rivalry limits the profitability of an industry. The degree to which rivalry drives down an industry's profit potential depends, first, on the intensity with which companies compete and, second, on the basis on which they compete (Porter M. , 2008).

High-competitive rivalry exists when: (Pawar & Hole, 2019)

1. Similar type products are available in one market;
2. The competitor companies maintain similar strategies;
3. The products have identical features, offering similar benefits;
4. Industrial growth is slow;
5. Low barriers exist for the new entry.

Figure N° (II-3): Porter's five forces.



Source: (Porter M. , On competition , 1985)

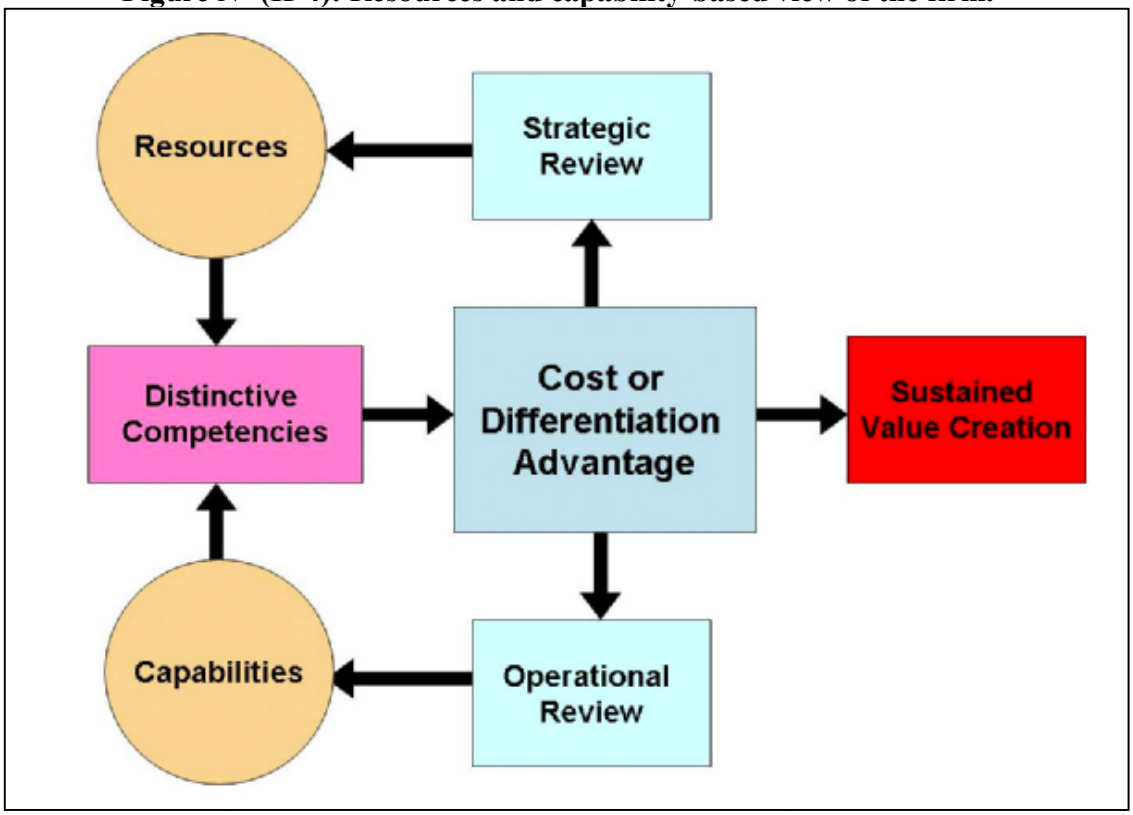
II.2.1.2. Resource based view

The RBV view suggests that the sustainable competitive advantage of a firm stems from the idiosyncratic resources that it controls (Grant, 1996). Firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge etc. controlled by a firm that enable the firm to conceive of and implement strategies that improves its efficiency and

effectiveness (Barney, 1991, p. 101). This model (Figure N° II-4) shows how resources and capabilities combine to create differentiation that forms the basis of a sustained competitive advantage. In order to create a true cost or differentiation advantage, Barney surmised that a firm's resources and capabilities must be: (Srivastava, Franklin, & Martinette, 2013, p. 49)

- **Valuable:** Resources that implement strategies that will improve the company efficiency or effectiveness that outperforms its competitors or reduces its competitive weaknesses.
- **Rare:** Resources that are hard to find, unique and cannot found by other companies.
- **Imperfectly Imitable:** Resources that are very hard to imitate, allowing sustainably because, without huge investment of limited resources, competitors find it difficult to enter the market.
- **Non-Substitutable:** Resources that have no real equivalence that itself is not rare or imitable.

Figure N° (II-4): Resources and capability-based view of the firm.



Sources : (Srivastava, Franklin, & Martinette, 2013, p. 49)

In literature, a common distinction is the notion that resources may be divided into two categories; assets and capabilities. An asset has been defined as anything intangible or tangible that a firm can use in its processes for creating, producing or offerings its goods or services to a market. In

contrasts, capabilities are defined as repeatable actions that transform inputs into outputs of greater value. Examples of assets are networking hardware, patents and software. Capabilities are often manifested in skills such as technical ability, creativity, or ability to collaborate. The concept of resources is therefore the collective assets and capabilities of a given firm (Wade & Hulland, 2004). The existence of capability heterogeneity within a population of firms is one of the principles of the RBV. Organizations are heterogeneous entities characterized by their particular and unique resource bases. The RBV of the firm presents an explanation for the heterogeneous competition based upon the premise that close competitors differ in an important and lasting way in their resources and capabilities. This perspective recognizes that the type, magnitude and nature of resources and capabilities are important determinants in their capacity to generate profit (Curado & Bontis, 2006).

The knowledge-based view of the firm is a recent extension of the Resource-Based View (RBV) of the firm and provides a strong theoretical underpinning for the organization learning and intellectual capital researchers. Knowledge is considered to be a special strategic resource that does not depreciate in the way traditional economic productive factors do. The nature of most knowledge-based resources is mainly intangible and dynamic (Curado & Bontis, 2006).

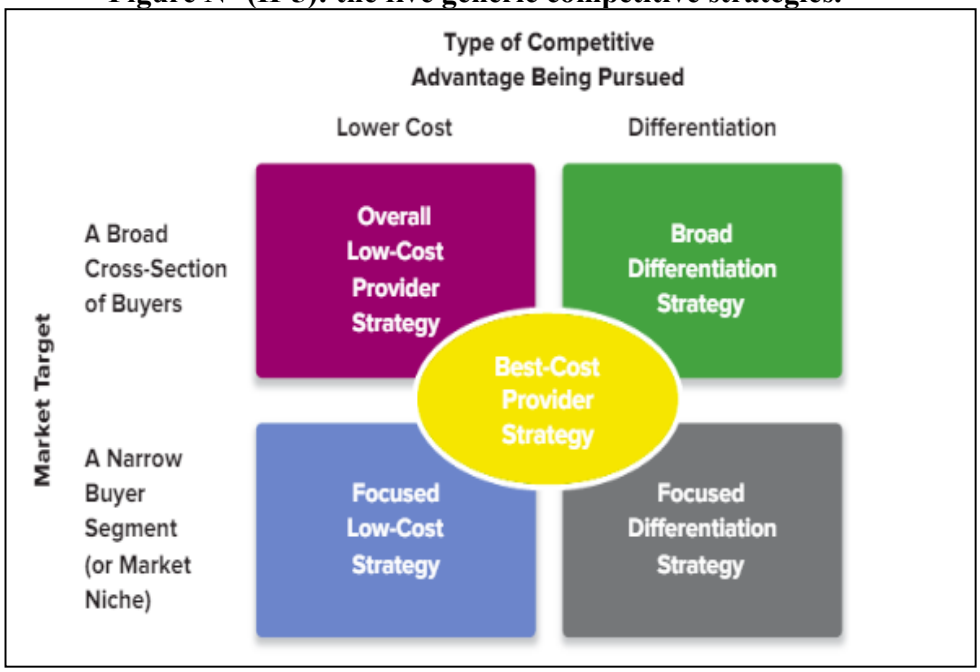
The KBV of the firm is an extension of the RBV of the firm because it considers that organizations are heterogeneous entities loaded with knowledge (Hoskisson, Hitt, Wan, & Yiu, 1999). The resource base of the organization increasingly consists of knowledge-based assets (Sveiby, 2001). Such knowledge or capability defines a firm's capacity to efficiently convert its inputs into valuable outputs. Thus, managers enhance the firm's capacity to produce efficiently by updating or advancing knowledge. Therefore, a common assumption and prescription in the strategy literature is that the boundaries of the firm should encompass these valuable competencies and core knowledge. By internalizing valuable knowledge or keeping this knowledge internal, the firm positions itself to both exploit and protect knowledge (Nickerson & Zenger, 2004). Knowledge resources are particularly important to ensure that competitive advantages are sustainable, as these resources are difficult to imitate and are the foundation for sustainable differentiation (Curado & Bontis, 2006).

II.2.2. Sustainable Competitive Advantage Strategies

As sustainable competitive advantage comes into being through the dynamic interplay between a firm and its external environment, sustainability thus, is more accessible in industries with more than one dominant strategy because competitors may not have the same options as the incumbent organization (Vinagan, Jayashree, & Marthandan, 2012, p. 31). There are countless variations in the competitive strategies that companies employ, mainly because each company's strategic approach entails custom-designed actions to fit its own circumstances and industry environment. The custom-tailored nature of each company's strategy makes the chances remote that any two companies-even companies in the same industry-will employ strategies that are exactly alike in every detail. However, when one strips away the details to get at the real substance, the biggest and most important differences among competitive strategies boil down to (1) whether a company's market target is broad or narrow, and (2) whether the company is pursuing a competitive advantage linked to low costs or product differentiation. Five distinct competitive strategy approaches stand out: (Thompson & Strickland, 1998, p. 135)

A low-cost leadership strategy, A differentiation strategy, A best-cost provider strategy, A focused strategy based on lower cost, A focused strategy based on differentiation (See figure II-5).

Figure N° (II-5): the five generic competitive strategies.



Source: (Thompson, Strickland, & Gamble, 2007, p. 150)

The figure N° (II-4) defines the 'generic strategy' choices that a company can follow. The relative position of a company within an industry is given by its choice of competitive advantage (cost leadership or/and differentiation) and its choice of competitive scope. Competitive scope distinguishes between firms targeting broad industry segments and firms focusing on a narrow segment. Generic strategies are useful because they characterize strategic positions at the simplest and broadest level. Each of these five generic competitive approaches stakes out a different market position. Each involves distinctively different approaches to competing and operating the business.

II.2.2.1. A Low-Cost leadership strategy

Cost Leadership is defined as "The ability of an organization to compete against major competitors based on low price" (Vinagan, Jayashree, & Marthandan, 2012, p. 34). Porter (1980) defined cost leadership as the achievement of "overall cost leadership in an industry through a set of functional policies aimed at this basic objective (Porter, 1980). According to Griffin (2005) low-cost strategy is a strategy in which an organization attempts to gain a competitive advantage by reducing its costs below the costs of competing firms (Griffin, 2005). An organization should be able to change all its activities which do not provide it with a cost advantage, rather they must find ways to reduce cost or even look for ways like mass production, input cost, economies of scale, raw materials access, input cost, technology, utilization of resources, and product design (Akan, Allen, Helms, & Samuel, 2006). Porter focuses through cost leadership on suitable overarching strategic planning and the pertinence of attaining lower costs than competitors. These are mainly obtained via focusing on efficiency (Porter, 1980). Without one or more of these advantages, the strategy can easily be simulated by Competitors. Successful implementation of this strategy also benefits from: (Tanwar, 2013, p. 12)

- Process Engineering Skills;
- Products designed for ease of manufacture;
- Continuous access to inexpensive capital;
- Close supervision of work;
- Tight cost control;
- Incentives based on quantitative targets;
- Always ensure that costs are kept as low as possible.

To understand how overall cost leadership strategy may generate superior profitability, it is necessary to identify the benefits of a low-cost position. As suggested by Porter "[a low-cost position] gives a firm a

defense against rivalry from competitors. A low-cost position defends the firm against powerful buyers because buyers can exert power only to drive down prices to the level of the next most efficient competitor. Low cost provides a defense against powerful suppliers by providing more flexibility to cope with input cost increases. The factors that lead to a low-cost position usually also provide substantial entry barriers in terms of scale economies or cost advantages. Finally, a low-cost position usually places the firm in a favorable position vis-à-vis substitutes relative to its competitors in the industry." Because scale economies and cost advantages tend to defend a firm against powerful buyers and suppliers and provide substantial entry barriers, achieving a low overall cost position often requires a high relative market share. In other words, cost advantages can create value for a firm by reducing the five threats of entry, rivalry, substitutes, suppliers and buyers (Minarik, 2007, p. 15).

II.2.2.2. A Differentiation strategy

Differentiation strategy is a strategy in which an organization seeks to distinguish itself from competitors through the quality of its products or services (Griffin, 2005). According to Porter, if product or service is unique, this strategy provides high customer loyalty. Therefore, if customers perceive the product or service as unique, they are loyal to the company and willing to pay the higher price for its products. Differentiation of product or service is an expression of individual and group creativity inside firms, which means that the risk of imitating differentiation is depended on firms' capacity to be creative in finding methods that make the product unique. Differentiation strategy referring to realizing higher incomes compared with competitors because of mark trust, quality, and perception that clients have for the company product (Islami, Mustafa, & Latkovikj, 2020, p. 4). R&D allows a firm to build technological capabilities which are viewable as one of the most important sources of sustainable competitive advantage. The longer it takes for a competitor to respond to a particular comparative advantage, the greater the opportunity for a firm to capitalize on the sustained advantages and to create new ones (Banker, Mashruwala, & Tripathy, 2014, p. 875). Successful differentiation requires that the strategy be rare and costly to imitate. And rare and costly bases for differentiation are sources of sustainable competitive advantage. In short, creative firms will always manage to differentiate themselves from competitors. As rivals try to imitate these firms' last differentiation move, creative firm will already be working on new moves and therefore they always remain one step ahead of competition (Minarik, 2007, p. 18). Firms focusing on differentiation, in

many cases emphasize the level of service and support. While a basic level of service and support may be easy to imitate, increasing these levels beyond the basic level involve substantial amounts of training. Also, this reflects in the attitude of employees toward customers which becomes entrenched in the organization culture and can be hard to duplicate. Companies that excel in developing close relationships with customers build customer loyalty for the long term. This is turn enables such companies to achieve sustainable financial performance in the long run (Banker, Mashruwala, & Tripathy, 2014, p. 876).

II.2.2.3. A Best-cost provider strategy

Best-cost provider strategies aim at giving customers more value for the money. The objective is to deliver superior value to buyers by satisfying their expectations on key quality, features, performance, service attributes and beating their expectations on price (given what rivals are charging for much the same attributes). When a company has the resource strengths and competitive capabilities to incorporate these up-scale attributes into its product offering at a lower cost than rivals, it enjoys best-cost status-it is the low-cost provider of an upscale product. As Figure 5.1 indicates, best-cost provider strategies stake out a middle ground between pursuing a low-cost advantage and a differentiation advantage and between appealing to the broad market as a whole and a narrow market niche. From a competitive positioning standpoint, best-cost strategies are thus a hybrid, balancing a strategic emphasis on low cost against a strategic emphasis on differentiation (upscale features delivered at a price that constitutes superior value) (Thompson & Strickland, 1998, p. 150).

A best-cost provider strategy works best in markets where buyer diversity makes product differentiation the norm and where many buyers are also sensitive to price and value. This is because a best-cost provider can position itself near the middle of the market with either a medium-quality product at a below-average price or a high-quality product at an average or slightly higher price. Often, substantial numbers of buyers prefer midrange products rather than the cheap, basic products of low-cost producers or the expensive products of top-of-the-line differentiators. But unless a company has the resources, know-how, and capabilities to incorporate upscale product or service attributes at a lower cost than rivals, adopting a best-cost strategy is ill advised-a winning strategy must always be matched to a company's resource strengths and capabilities (Thompson, Strickland, & Gamble, 2007, p. 151).

II.2.2.4. Focus strategy

The focus strategy aims at serving a particular target or segment of the industry well, as opposed to both overall cost leadership and differentiation strategies seek to achieve their objectives industry-wide. For example, a firm may choose to serve a particular buyer group, segment of the product line or geographic market. Thus, a focus strategy sets out to achieve a low cost or differentiation position, or both, from the perspective of its narrow market segment (Minarik, 2007, p. 19). The focus strategy has two variants: (a) In cost focus a firm seeks a cost advantage in its target segment; (b) Differentiation focus a firm seeks differentiation in its target segment.

Both variants of the focus strategy rest on differences between a focuser's target segment and other segments in the industry. The target segments must either have buyers with unusual needs or else the production and delivery system that best serves the target segment must differ from that of other industry segments. Cost focus exploits differences in cost behavior in some segments, while differentiation focus exploits the special needs of buyers in certain segments (Tanwar, 2013, p. 15). Focus strategies are most effective when consumers have distinctive preferences or requirements and rival firms are not attempting to specialize in the same targets segment. To achieve focused cost leadership/differentiation, following are measures that could be adopted by an organization to incorporate: (The institute of chartered Accountants of India, 2019)

- Selecting specific niches which are not covered by cost leaders and differentiators.
- Creating superior skills for catering to such niche markets.
- Generating high efficiencies for serving such niche markets.
- Developing innovative ways in managing the value chain.

The table (II-5) highlights the contrasting features of these generic competitive strategies.

Table N° (II-5): Distinctive features of the generic competitive strategies.

Type of feature	Low-cost leadership	Differentiation	Best-cost provider	Focused low-cost/differentiation
Strategic target	A broad cross-section of the market.	A broad cross-section of the market.	Value-conscious buyers.	A narrow market niche where buyer needs and preferences are distinctively different from the rest of the market.
Basis of competitive advantage	Lower cost than competitors	An ability to offer buyers something different from competitors.	Give customers more value for the money.	Lower cost in serving the niche (focused low-cost) or an ability to offer niche buyers something customized to their requirements and tastes (focused differentiation).
Product line	A good basic product with few frills (acceptable quality and limited selection).	Many product variations, wide selection, strong emphasis on the chosen differentiating features.	Good-to-excellent attributes, several to-many upscale features.	Customized to fit the specialized needs of the target segment.
Production emphasis	A continuous search for cost reduction without sacrificing acceptable quality and essential features.	Invent ways to create value for buyers; strive for product superiority	Incorporate upscale features and attributes at low cost.	Tailor-made for the niche.
Marketing emphasis	Try to make a virtue out of product features that lead to low cost.	Build in whatever features buyers are willing to pay for. Change a premium price to cover the extra costs of differentiating features.	Underprice rival brands with comparable features.	Communicate the focuser's unique ability to satisfy the buyer's specialized requirements.
Sustaining	Economical	Communicate the	Unique expertise	Remain totally

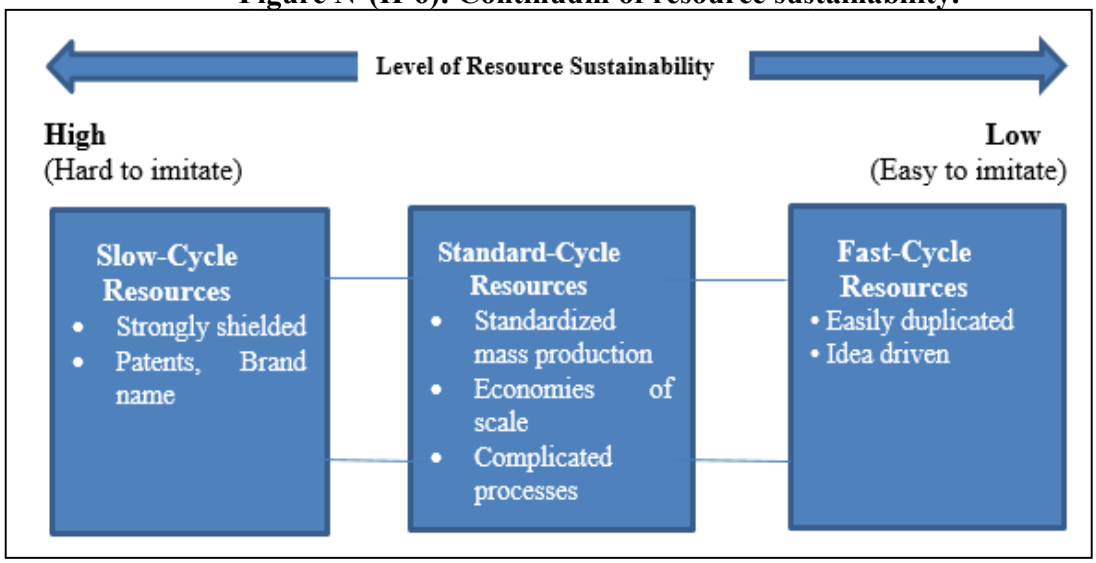
the strategy	prices/good value. All elements of strategy aim at contributing to a sustainable cost advantage- the key is to manage costs down, year after year, in every area of the business.	points of difference in credible ways. Stress constant improvement and innovation to stay ahead of imitative competitors. Concentrate on a few key differentiating features; tout them to create a reputation and brand image.	in managing costs down and product/service caliber up simultaneously.	dedicated to serving the niche better than other competitors; don't blunt the firm's image and efforts by entering segments with substantially different buyer requirements or adding other product categories to widen market appeal.

Source: (Thompson & Strickland, 1998, p. 137)

II.2.3. Barriers to imitation

Just because a firm is able to use its resources and capabilities to develop a competitive advantage does not mean it will be able to sustain it. An organization's resources and capabilities can be placed on a continuum to the extent they are durable and can't be imitated (that is, aren't transparent, transferable, or replicable) by another firm. This continuum of sustainability is depicted in figure N° II-6. At one extreme are slow-cycle resources, which are sustainable because they are shielded by patents, geography, strong brand names, and the like. These resources and capabilities are distinctive competencies because they provide a sustainable competitive advantage. The other extreme includes fast-cycle resources, which face the highest imitation pressures because they are based on a concept or technology that can be easily duplicated. To the extent that a company has fast-cycle resources, the primary way it can compete successfully is through increased speed from lab to marketplace. Otherwise, it has no real sustainable competitive advantage (Wheelen & Hunger, 1999, pp. 83-84).

Figure N°(II-6): Continuum of resource sustainability.



Source: (Wheelen & Hunger, 1999, p. 84)

If the search for a sustainable competitive advantage is the keystone of the strategy, then the primary objective is to succeed in protecting it, in particular by using a certain number of barriers. Recently, the flow of resources has reversed the logic of thinking by emphasizing the need for a company to rely on its resources and skills. The objective is then to analyze the resources of the company in order to make the most of them, to invest in complementary resources and to ensure that access to them is protected. In either case, the task is made difficult by competitors. Once a company is considered successful, its competitors will seek to emulate it. If they succeed, the company will lose its competitive edge. To avoid this risk, he might try to base his advantage on resources that cannot be imitated, or more emphatically on combinations of resources that cannot be imitated (Forgues & Lootvoet, 2006). Thus, indicates Porter (1996), even if a company succeeds in constant improvements in its operational efficiency, this will not be enough for it to generate a lasting competitive advantage, because of the rapid diffusion of best practices between companies. The imitation that competitors will inevitably engage in invariably leads to competitive convergence. A true strategy, he explains, relies on unique activities and is not imitable (Porter M. , What is strategy?, 1996). Arguably, the most effective barriers to imitation are achieved when competitors do not comprehend the competencies on which the advantages are based (Reed & DeFillippi, 1990, p. 90).

The first barriers to competition were identified in economics, on the basis of reasoning favoring the product final rather than how to make it. In

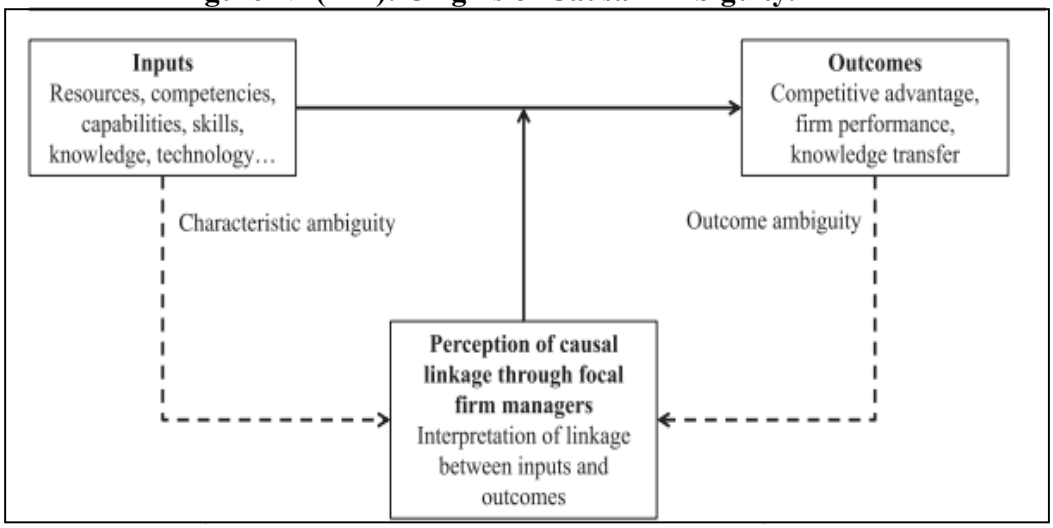
this context, a significant barrier to market entry is legal. A company protected by a patent, for example, benefits from a barrier to imitation. Insofar as its competitors will either be prevented from copying its product, or will only be able to do so at an additional cost due to the purchase of licenses. In either case, the company holding the patent will have a competitive advantage that will last as long as its patent is able to protect it (Forgues & Lootvoet, 2006).

Identified in the literature under the name of causal ambiguity, this pitfall has been the subject of several studies. For Lippman and Rumelt (1982), causal ambiguity is, along with property rights, one of the two brakes on imitation. Even if managers see which companies are successful, they find it difficult to identify the causes of their success (Lippman & Rumelt, 1982). Causal ambiguity refers to situations where the causal connections between actions and performance are unclear and hence the factors responsible for performance differentials are difficult to identify. Causal ambiguity limits competitive imitation because competitors do not know the underlying reasons for a rival firm's effectiveness and so they cannot identify what they should be imitating (Ambrosini & Bowman, 2010, p. 940). Causal ambiguity scholars seek to link the construct to firm-level performance; dependent variables include the sustainability of competence-based advantage and firm profitability. In other studies researchers focus on organizational constructs that explicitly or implicitly mediate the relationship between causal ambiguity and firm performance outcomes. These variables include knowledge transfer and development and the speed of diversification events (King, 2007, p. 162).

Inter-firm causal ambiguity raises the barriers to competitive imitation. A competitor's failure to identify or understand how a focal firm uses a key competency severely limits that competitor's options for closing the gap with regard to that competency. Inter-firm ambiguity may deter a competitor from even attempting to imitate a competency because decision makers may fail to recognize the value of the competency (Lippman & Rumelt, 1982). While the impact of inter-firm causal ambiguity on a focal firm's competitive advantage appears positive, the same may not be said regarding intra-firm causal ambiguity. Intra-firm causal ambiguity impedes successful reinvestment in a competency with regard to current opportunities in other parts of the firm or, over time, as new opportunities develop. Failure to understand the link between a competency and its performance outcomes blocks internal managers' ability to learn about and adapt that competency (King, 2007, p. 168).

The origins of causal ambiguity are subject to differing perspectives in the literature. Synthesizing, the literature shows that the characteristics of inputs and the properties of input-outcome relationships can potentially lead to perceptions of causal ambiguity. Input characteristics refer to particular properties of organizational resources such as tacit-ness, complexity, and specificity. Because organizational knowledge plays a pivotal role as an input variable, scholars also refer to ambiguity caused by such input characteristics as knowledge ambiguity. The properties of input-outcome relationships, such as the temporal or spatial distance between deploying a resource and achieving the outcome of resource deployment, or feedback delays, can also lead to perceptions of ambiguity. They obscure cause-effect linkages and lead to a lack of clarity in interpreting organizational outcomes (See Figure N° II-7) (Konlechner & Ambrosini, 2019) .

Figure N° (II-7): Origins of Causal Ambiguity.



Source: (Konlechner & Ambrosini, 2019, p. 5)

To conclude, it can be said that Inter-firm causal ambiguity arises from the tastiness within skills and routines underlying firm competencies, complexity among combinations of competencies and the specificity of assets within competencies. It can thus help sustain a competitive advantage because it is difficult for competitors to understand the relationship between a firm's inputs and its outputs.

II.3. learning organization (LO)

The concept of learning organization has gained importance over the past years as a source of competitiveness. Learning organizations are those organizations which continuously keep on learning to attain desired result and competitiveness. LO facilitates learning of all its members and this aim is to continuously transform itself in line with the environment needs (Farrukh & Abdul Waheed, 2015).

II.3.1. Learning Organization concept

For an organization to be considered a learning organization, several distinct key features need to be deliberately put in place and then maintained within the organization. According to Senge a learning organization is a place, in which people continuously deploy their capabilities, fulfill their true targets, in which new ways of thinking are supported and new common hopes are delivered, so organizations, in which people are learning how to learn together (Senge, 2006). Garavan argues that the learning organization represents a shift to the development of the organization and collective learning (Garavan, 1997). Learning within an organization stems from experience and reflection; be it through formal or informal learning, the important factor is that the individual and the organization develop the capacity to grow and expand in knowledge as a result of the learning (Smith, 2004). Jensen and Ramussen define a learning organization as "an entity exhibiting directed changes at the macro level and organizational learning refers to the persons changing from one knowledge state to another as a function of acting within a network of interacting people." At a micro scale, learning is at an individual level where skills and knowledge are acquired and at a macro scale, it is a collective effort of all skills and knowledge acquired by individual (Jensen & Rasmussen, 2004). Slater (1995) defines learning organization as an ability of an organization to create, acquire, interpret, transfer, and share knowledge, aiming at modifying its behavior to develop new knowledge. Thus, learning organization takes place through the sharing of insights, knowledge and mental models built on past knowledge and experience (Slater & Narver, 1995).

Many studies of learning organizations have attempted to diagnose the characteristics of learning organization. Although different authors stress different elements, the characteristics of the learning organization incorporated here have been proposed as important features by several authors: (Kontoghiorghes, Awbrey, & Feurig, 2005, p. 188)

- Open communications
- Risk taking

- Support and recognition for learning
- Resources to perform the job
- Teams
- Rewards for learning
- Training and learning environment
- Knowledge management

The learning organization is presented in the literature as an ideal—a desirable state towards which organizations should aim. Hence, organizational learning is the activity and the process by which organizations may eventually reach the ideal state of being a learning organization. This set of propositions implies that organizational learning is a means, and a learning organization is an end, though not a final objective in itself. Thus, not all organizational learning leads to a learning organization, but we would expect that some organizational learning needs to take place for an organization to evolve into a learning organization. When framed in this way, the learning organization becomes a strategic objective of an organization, and organizational learning is one of the required elements (Schwartz & Rist, 2017, p. 67).

Knowledge is a critical asset in every learning organization. Because learning is both a product of knowledge and its source, a learning organization recognizes that the two are inextricably linked and manages them accordingly. The units of knowledge production are both the individual and the collective. Learning organizations understand that while knowledge is created in the minds of individuals, knowledge development thrives in a rich web of social contact among individuals, groups, and organizations. A learning organization provides creative opportunities for this knowledge to be developed and shared with others through interpersonal contact and access to documentation (Serrat, 2009). Associated with the process and transformation of knowledge, there are linkages between KM with Organizational Learning and Learning Organization is: Learning Organization had to do with the mechanism of contextual to transform external knowledge to internal knowledge, while Organizational Learning is all about the learning process that transforms the local or individual knowledge into collective knowledge (Mundakir, 2016).

There are two main organizational learning; single-loop learning and double-loop learning. Single loop learning is one of the problem-solving processes. Individuals look at what options they have and fix the problem. They respond to changes internally or externally by discovering and amending mistakes to maintain the features of the organizational norm. The

activities to correct errors and solve the problems add to the knowledge-base or firm-specific competences or routines without altering the fundamental nature of the organization's activities (Argyris, May-June 1991). On the other hand, double-loop learning is the process of comparing the situation with the norm, questioning whether the norm is appropriate and justifying whether this is the best means of doing things. The process involves changing the knowledge-base or firm-specific competences or routines (Argyris, May-June 1991). Organizational learning purpose is to produce new knowledge and innovation related to continuous improvement. Moreover, double-loop learning has shown to be able to develop new organizational knowledge which is consequently integrated into learning organization model (Kantamara & Racthan, 2014).

From all of the above, it can be said that a learning organization is one in which people, individually and collectively, are constantly learning; In order to build capabilities, acquire and share knowledge, which qualifies them to face changes, improve continuously, and gain a sustainable competitive advantage.

II.3.2. Building blocks of learning organization

There are diverse views regarding the design of a learning organization. The current literature suggests that there are wide ranging theoretical perspectives that provide a basis for identifying a bundle or set of variables that define the management practices and building blocks of a learning organization. Through this study, we try to focus on four approaches to building learning organization, which we review as follows:

a- Systems thinking perspective:

Senge (1990) has identified five basic disciplines that can help business organizations become learning organizations. The five disciplines are: (Senge, The fifth discipline: The art & practice of the learning organization, 1990)

Building Shared Vision: Such a future vision promotes the authentic commitment of employees on the team towards attaining the set goals of the organization. By means of a shared vision, business managers develop comparable business views, and promote hard work and strategic planning. Through this way, it becomes feasible for organizations to mirror the future they desire to produce, which is usually constructive, and meant to inspire more positive visions.

Mental Models: Mental models as personal images of reality based on life experiences affect the behaviors, perceptions, actions and attitudes of people. Following the principle of mental model, better ideas develop when

they are shared between people. Thus, through continuous sharing and learning, knowledge becomes more meaningful and becomes shared in mental representations; consequently, creativity grows more rapidly.

Personal Mastery: Personal Mastery is the art of constantly clarifying and deepening of personal vision, of concentrating energies, of learning to be patient and of perceiving reality in an objective manner. Thus, Senge referred to this learning strategy as the spiritual foundation of a learning organization. Team learning enriches intellectual discourses, brings about better understanding regarding crisis management and facilitates the growth of knowledge and innovation among members of the team.

Team Learning: Heading towards building a sustainable learning organization start when employees see the need to work as a team, such that overall output is based on both the quality of individual effort and teamwork. The intelligence of an individual can never be the same with that of a team, in such a manner that workers' energy is fully maximized, resulting in unity of purpose, right understanding and shared vision.

Systems Thinking: It is this component that Senge thinks is the lever that holds the five disciplines together as a logical whole. It is a conceptual framework for exploring interrelationships that lie beneath interactions and complex situations. Thus, effective systems thinking requires farsightedness, developed through continuous learning and training, to act as a source of enlightenment and to provide a sense of direction, strongly required to sustain the business and keep it afloat.

b- Strategic perspective:

Goh (1998) argued that the more important is the need to explain how to become a learning organization, not what it is. In essence, being a learning organization requires an understanding of the strategic internal drivers needed to build a learning capability. From this standpoint, He synthesized the description of management practices and policies alluded to in the literature about learning organization, and concluded that learning organization have the following core building blocks: (Goh, Spring 1998)

Mission and vision: Clarity and employee support of the mission, strategy, and espoused values of the organization.

Leadership: Leadership that is perceived as empowering employees, encouraging an experimenting culture, and showing strong commitment to the organization.

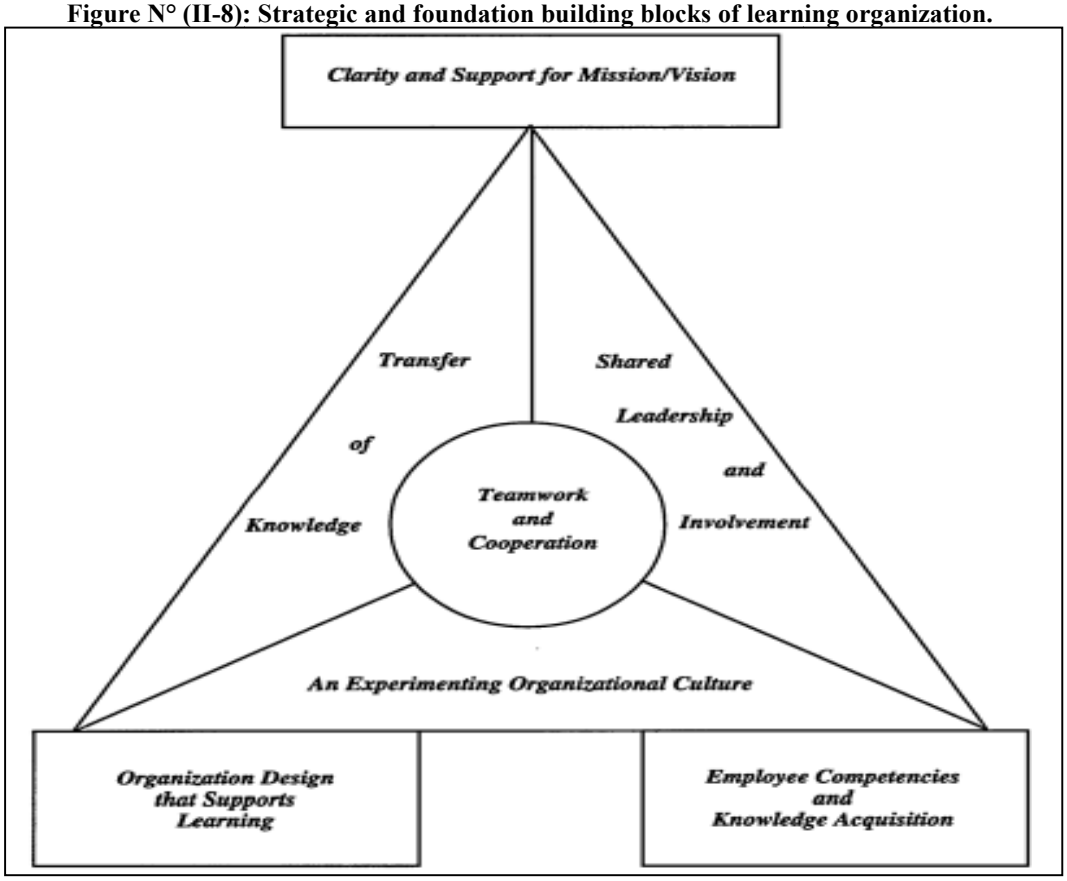
Experimentation: A strong culture of experimentation that is rewarded and supported at all levels in the organization.

Transfer of knowledge: The ability of organization to transfer knowledge within and from outside the organization, and to learn from failures.

Teamwork and cooperation: An emphasis on teamwork and group problem-solving as the mode of operation, and for developing innovative ideas.

Further, the strategic building blocks require two main supporting foundations. The first is an effective organization design that is aligned with and supports these building blocks. The other consists of the appropriate employee skills and competencies needed for the tasks and roles described in these strategic building blocks (Yang, Watkins, & Marsick, 2004, p. 33)

Figure N° (II-8): Strategic and foundation building blocks of learning organization.



Source: (Goh, Spring 1998, p. 17)

c- Learning perspective:

This perspective posit that the key aspects of the learning organization refer to the organization's provision of opportunities for employees to learn and acquire knowledge through their job experience (learning at work); to the creation of positive conditions within the organization that facilitate the learning of individuals through an atmosphere that enables and creates incentives for collaboration, reflection, and inquiry (learning climate); and to the structure of an organization that favors the flexibility to adapt to new circumstances (learning structure) (Ortenblad, 2001).

From the above conceptualizations of the learning organization, Garvin, Edmonson, and Gino (2008) posit three building blocks as necessary to create a learning organization. These building blocks are: (Garvin, Edmondson, & Gino, March 2008)

A supportive learning environment: in which employees feel safe disagreeing with others and presenting divergent and minority views. An environment that supports learning has four distinguishing characteristics; psychological safety, appreciation of differences, openness to new ideas, and time for reflection.

Concrete learning processes: characterized by well-established processes for the collection, interpretation, and dissemination of information, as well as for identifying and solving problems (a concept similar to organizational learning) For maximum impact, knowledge must be shared in systematic and clearly defined ways. Sharing can take place among individuals, groups, or whole organization. Knowledge can move laterally or vertically within a firm.

Leadership: that reinforces learning through its willingness to entertain alternative viewpoints, signal the importance of spending time on problem identification, knowledge transfer, and reflection, and engage in active questioning and listening. Thus, employees feel emboldened to offer new ideas and options.

Integrative perspective:

In this perspective, the learning organization is viewed as one that has the capacity to integrate people and structures in order to move toward continuous learning and change (Yang, Watkins, & Marsick, 2004). Watkins and Marsick (2003) provide an integrative model of a learning organization. They originally defined the concept of the learning organization as one that is characterized by continuous learning for continuous improvement, and by the capacity to transform itself. Therefore, their proposed learning organization model integrates two main organizational constituents: people and structure. These two constituents are also viewed as interactive components of organizational change and development (Watkins & Marsick, 2003). Watkins and Marsick identified seven distinct but interrelated dimensions of a learning organization at individual, team, and organizational levels. These dimensions and their definitions are described as follows:

Table N°(II-6): Dimensions of learning organization.

Dimension	Definition
Create continuous learning opportunities.	Learning is designed into work so that people can learn on the job; opportunities are provided for ongoing education and growth.
Promote inquiry and dialogue.	People gain productive reasoning skills to express their views and the capacity to listen and inquire into the views of others; the culture is changed to support questioning, feedback, and experimentation.
Encourage collaboration and team learning.	Work is designed to use groups to access different modes of thinking; groups are expected to learn together and work together; collaboration is valued by the culture and rewarded.
Create systems to capture and share learning.	Both high- and low-technology systems to share learning are created and integrated with work; access is provided; systems are maintained.
Empower people toward a collective vision.	People are involved in setting, owning, and implementing a joint vision; responsibility is distributed close to decision making so that people are motivated to learn toward what they are held accountable to do.
Connect the organization to its environment.	People are helped to see the effect of their work on the entire enterprise; people scan the environment and use information to adjust work practices; the organization is linked to its communities.
Provide strategic leadership for learning.	Leaders model, champion, and support learning; leadership uses learning strategically for business results.

Source: (Watkins & Marsick, 2003, p. 139)

Although there are different approaches and definitions of a learning organization, some common features can be identified. Firstly, all approaches to building a learning organization assume that organizations are organic entities like individuals and have the capacity to learn. More and more organizational researchers are realizing that an organization's capacity to learn will be the only sustainable competitive advantage in the future. Secondly, there is a difference between two related but distinct concepts: the learning organization and organizational learning. The learning organization construct normally refers to organizations that have displayed these characteristics of continuous learning and adaptation, or have worked to instill them. Organizational learning, on the other hand, refers to the collective learning experiences used to acquire (Yang, Watkins, & Marsick, 2004, p. 34)**.**

II.3.3. Sustainable competitive advantage and learning organization

The acceptance of competition and strategic change as a compound process leads to the notion that the firm's driving force results from an amalgam of imperatives shifting with time. Increasingly, these processes highlight the importance of learning at all levels to maintain a competitive edge. Langlois argued that competitive performance was linked to a firm's ability to adapt to major changes in the environment and, by implication, in its level of learning (Hosley, Lau, Levy, & Tan, 1994). Schwartz and Rist (2017) said that the concept of the learning organization is linked to competition and change. Learning faster than rival firms is seen as providing a competitive advantage in an increasingly rapidly changing environment. Learning as in the learning organization has become tantamount to focusing on change. Thus, a learning organization is one that learns continuously and transforms itself from within. Learning, and changing as the result of that learning, increases the organization's chance to survive in a constantly changing and competitive market (Schwartz & Rist, 2017, p. 68). From a practitioner's perspective, Ray Stata, Chairman of Analog Devices, makes a strong argument for the learning organization as a key to management innovation to maintain a competitive leading edge: "the rate at which individuals and organizations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries" (Stata, Spring 1989, p. 64).

Strategic management literature discusses the link between organizational learning and competitive advantage from the resource-based view (RBV) of the firm. The RBV posits that organizations can gain sustained competitive advantage through amassing and using strategic resources and capabilities, which are valuable, rare, difficult to imitate and non-substitutable. And a firm's potential for competitive advantage also requires a firm be organized to exploit its resources and capabilities. On the one hand, organizational learning is believed to be able to help firms amass and use these kinds of resources and capabilities. Additionally, recent literature suggests that organizational learning is an idiosyncratic and complex capability, which is difficult to imitate, replicate and transfer and which constitutes a source of competitive advantage (Makabila, Iravo, Gichuhi, & Kagiri, 2017, p. 143). A knowledge-based view provides a firm view of the relevance of knowledge as a key organizational factor and is one of the main determinants of a company's existence. To maintain knowledge, organizational learning is an important key to long-term organizational survival, performance, and continuous improvement. Moreover, one main objective of organizational learning is to share

knowledge within the organization and with different partners to retain this knowledge. Organizational learning helps organizations respond to environmental changes and adopt innovations that will improve their performance (Dewi & Pradhanawati, 2020).

An organization has a foundation for sustained competitive advantage when it possesses skills or resources that; provide superior value to customers, are difficult to imitate, and are capable of multiple applications. An organization provides superior value to customers when its culture and climate foster behaviors those lead to improvements in effectiveness or efficiency, which, in turn, provide additional benefits or lower prices for customers. Organizational learning is valuable to a firm's customers in this context because it focuses on understanding and effectively satisfying their expressed and latent needs through new products, services, and ways of doing business. This should lead directly to superior outcomes, such as greater new product success, superior customer retention, higher customer-defined quality, and, ultimately, superior growth and/or profitability (Slater & Narver, 1995, p. 66).

Organizational learning concerns with the way in which employees in an organization learn, address a task-related challenge, and increase their understanding of how they should learn. There some elements imbedded in the TQM that imply necessity for learning. TQM focus on motivation and personnel development and training. Infrastructure QM practices (include management support, customer focus, supplier relationship, and continuous improvement) facilitate many possibilities for employees to understand the dynamic of customer needs. In addition, infrastructure QM practices provide many opportunities for employees to share their experience and knowledge (Sisnuhadi & Abdul Nasir, 2013, p. 74).

As for innovation, learning may occur at the individual, group, organization and industry levels. As new outputs, innovations may come from new knowledge as well as from the combination of existing knowledge to create innovations, using combinative capabilities. Learning means integrating new knowledge or mixing existing knowledge in different ways, learning leads to newness, and thus to innovation. Innovation will be the by-product of a learning organization. A learning organization is a innovative organization. Organizational learning should be positively related to innovation. If a company is good at acquiring new knowledge and articulating existing knowledge with new knowledge or existing knowledge in a different way, this company should be good at producing innovations (product or process). Furthermore, the better the organizational learning process sis, the greater the capacity to develop

radical innovations (product or process) will be (Sebestova & Rylkova, 2011, p. 955).

From all this, it becomes clear to us the importance of transforming the organization into a learning organization, relying on knowledge management and continuous organizational learning to adapt to the dynamic business environment and achieve a sustainable competitive advantage.

II.4. Contribution of KMI in building SCA in LOs

Knowledge management infrastructure (KMI) plays a critical role in building sustainable competitive advantage (SCA) in learning organizations. KMI includes organizational culture, organizational structure, and information technology, which all contribute to the organization's ability to acquire, store, share, and use knowledge in a way that enhances its competitiveness by supporting the four generic building blocks of sustainable competitive advantage: innovation, quality, efficiency, and customer responsiveness.

II.4.1. A role of organizational culture in achieving SCA in LOs

Organizational culture plays a crucial role in achieving sustainable competitive advantage in learning organizations. A strong culture can help foster a positive and productive work environment, promote employee engagement and commitment, and enhance the organization's ability to adapt and innovate. In a learning organization, a culture that encourages continuous learning and development can also contribute to the acquisition of new knowledge, skills, and competencies that can be leveraged to create and maintain a competitive edge in the marketplace. Ultimately, a culture that aligns with the organization's goals and values can help to build a strong sense of identity and purpose among employees, which can lead to increased performance, productivity, and long-term success.

II.4.1.1. A role of organizational culture in achieving efficiency and quality

Topic of organizational culture and performance has attracted a great deal of concern among scholars and managers due to its impacts on positive organizational outcomes. Organizational performance is part of successful business entity as it has a long survival impact on organization effectiveness. Further Daft (2012) viewed that internal culture must fit with the needs of the external environment and organizational strategy. When this fit occurs, highly committed employees create a high-performance of organization that is tough to beat (Samad, Anuar Abdullah, & Abdulkafi Ahmed, 2013). The importance of culture is reflected in the generally accepted attitude that a real organizational culture (one that suits business conditions) leads to success, and greater efficiency and effectiveness of company's operations

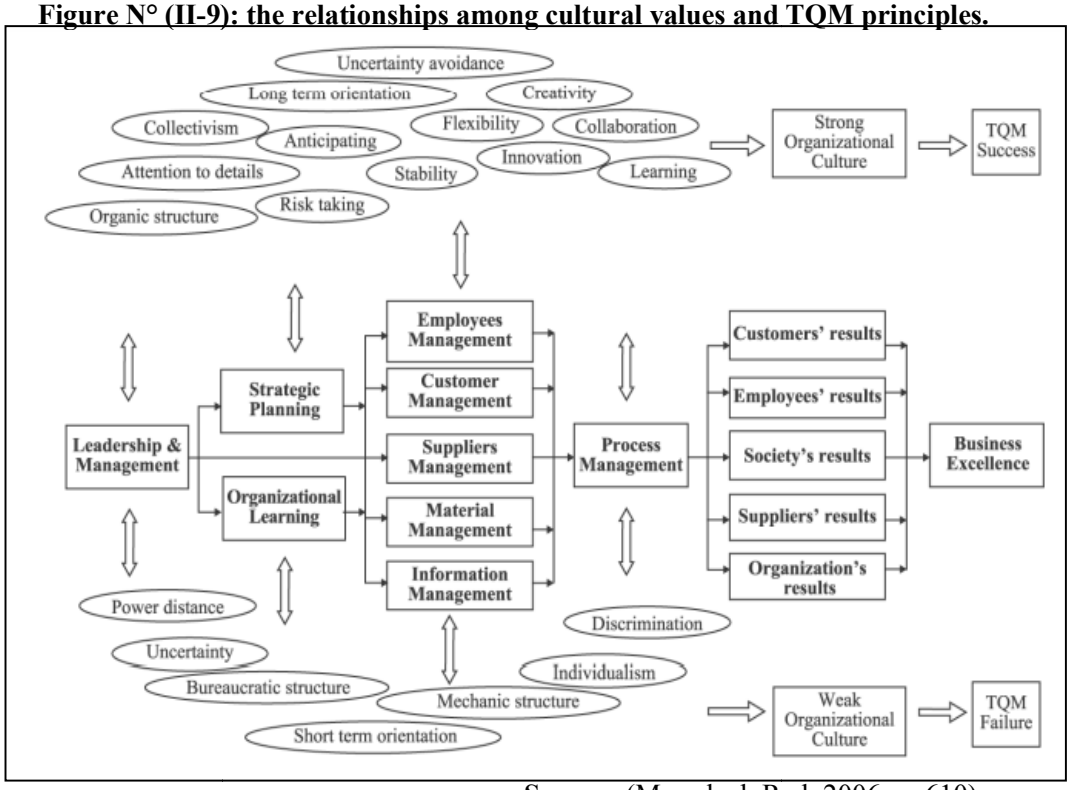
and to its growth and development. In order to successfully fit into the modern economic environment, some organizations have to change their organizational culture. Although changes can be a challenging and a long-term process for an organization, the rewards that follow are indisputable (Gavric, Sormaz, & Llic, 2016).

Positive development is easier to achieve when everyone is on a common path in the organization. Strong culture has almost considered as a driven force to improve the performance of the employees. It enhances self-confidence and commitment of employees and reduces job stress and improves the ethical behavior of the employees. Organizational culture helps the employees to understand the organizational events and objectives, which enhance the efficiency and effectiveness of the employees (Shahzad, Luqman, Rashid Khan, & Shabbir, 2012)**.**

We can say that the impact of organizational culture on employee behavior and performance is based on 4 important ideas. Firstly, having knowledge of the organization culture permits employees to understand the history and functioning of the organization. This knowledge provides information about projected future behaviors. Secondly, organizational culture raises devotion to the organization's philosophy and values. This commitment creates shared feelings of achieving common goals. It means organizations can achieve greater success only when employees share values. Thirdly, organizational culture, with its norms, deal as a control mechanism to direct behaviors toward expected behaviors and away from unfavorable behaviors. This can also be achieved by recruiting, selecting, and retaining employees whose values match with the values of the organization. This type of organizational culture may be linked directly to greater efficiency and performance than others (Mashal & Shafiq, 2014, p. 24).
Kanji (1996) asserts that TQM requires quality to be "a way of life" and "TQM is an organization's culture committed to delivering customer satisfaction through continuous improvement". So, If TQM means specific tools and methods of management that need to be applied, it also requires the appropriate culture that supports those tools and methods to make TQM more than just a program to be implemented. Organizational culture is the key to make TQM an organizational lifestyle; it is a guiding philosophy with an intellectual system that should be adopted by all employees in different organizational levels (Saadi, 2017). Implementation of TQM concept is not an easy task because it requires a total change in organizational culture, shifting of responsibility to management, and continuous participation of all in the quality improvement process. Implementation of TQM requires changes to the shared assumptions, frames of reference, and understanding

that most organizations have developed through interaction with their environment. These changes will impact basic beliefs and values that employees hold about work. Many companies have realized the importance of diagnosing of organizational culture prior to TQM implementation, so that they could reveal typical content components of the organizational culture supporting or constraining cultural change (Jancikova & Brychta, 2009, p. 89). Thus, organizational culture is a major variance-causing factor in TQM implementation programs that inhibits or allows the success of such a program. Thus, TQM programs are more likely to succeed if the prevailing organizational culture is compatible with the values and basic assumptions proposed by the TQM discipline. Moreover, TQM is a description of the culture, attitude and organization of a company that aims to provide its customers with products and services that satisfy their needs (Mosadegh Rad, 2006). The culture requires quality in all aspects of the organization's operations, with things being done right the first time, and defects and waste eradicated from operations (Guanming, Clarke, & Lehaney, 2000). TQM is the culture of an organization committed to total customer satisfaction through continuous improvement. In such a culture, resources, material, equipment and quality management systems are cost effectively implemented and fully utilized (Mosadegh Rad, 2006). Figure N°(II-9) indicating the relationships among cultural values and TQM principles.

Figure N° (II-9): the relationships among cultural values and TQM principles.



Source: (Mosadegh Rad, 2006, p. 610)

In fact, one of the most important factors in the success or failure of TQM implementation is the organizational culture (OC) (Coelho, Coelho, Mojtahedi, Kabirifar, & Yazdani, 2022). Several studies have identified the types of OC that are best suited for TQM implementation, and it has been shown that empowerment, employee commitment, teamwork, internal leadership and support from existing management in the clan culture, as well as customer orientation, continuous improvement, training and motivation found in clan and adhocratic cultures have been found to positively influence TQM (Krajcsak, 2018).In addition, studies have shown that the mixed culture involving clan dominance and adhocracy cultural characteristics is the most appropriate for TQM implementation. Conversely, some researchers have found that bureaucratic cultures, such as hierarchical and market cultures, fail to explain the successful implementation of TQM (Kargas & Varoutas, 2015).In this case, the market culture is oriented towards fixed goals and the search for the lowest transaction costs vis-à-vis suppliers, customers and workers, while the hierarchical culture deals mainly with high bureaucracy, which could sabotage the adoption of TQM (Krajcsak, 2018).In other words, clan and adhocracy cultures have been largely favored for the successful implementation of TQM ,Furthermore, each organization does not resemble only one culture, but rather a

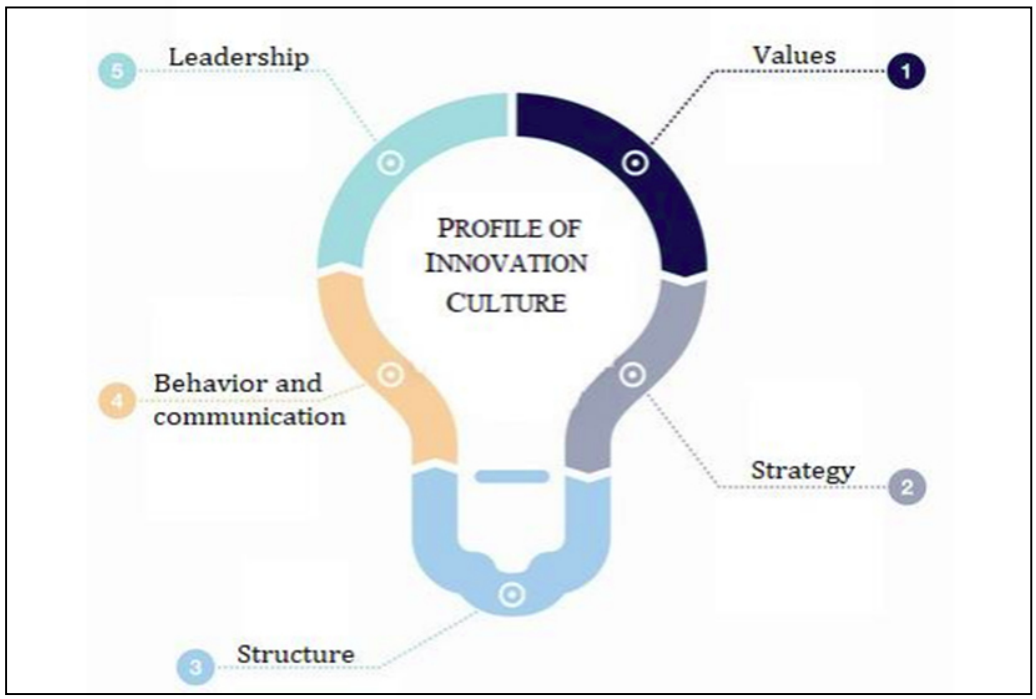
combination of cultures, some being more dominant than others (Coelho, Coelho, Mojtahedi, Kabirifar, & Yazdani, 2022).Furthermore, Cameron and Quinn have argued that TQM initiatives are often abandoned soon after initial implementation due to the failure of integration between TQM and cultural change (Cameron & Quinn, 2011). Therefore, to promote successful implementation and integration of TQM, many researchers recommend that organizations use organizational culture dynamically. To seize this opportunity, organizations need to have the ability to systematically identify and evaluate their organizational culture through a well-established framework (Coelho, Coelho, Mojtahedi, Kabirifar, & Yazdani, 2022).

II.4.1.2. A role of Organizational culture in achieving innovation

There is no doubt that innovation behavior is the key to sustainable competitive advantage, as it brings organizations to be more flexible and able to adapt to market changes. Therefore, the cultural values that support innovation behavior are important for business development. Appropriate adjustment of organizational culture can simplify the management of innovation processes in every organization. Innovative organizations that develop aspects of organizational culture are represented by the high level of performance during innovation development and implementation (Stacho, Potkany, Stachova, & Marcinekova, 2016, p. 771).

Organizational culture is a social variable and it defines the distinctive way in which people perform their tasks, treat clients, and solve problems and conflicts (Dauber, Fink, & Yolles, 2012). However, organizational culture does not consist only of people, but rather makes systems, procedures; organizational structure and individuals interact in a certain way. A culture of innovation is an organization's ability to identify, implement and develop new products and regular processes, making it the everyday life of organizations. Innovation itself does not last long, but the advantage of being able to innovate regularly can take a long time. To gain this advantage, a company needs to create a culture of innovation. An analysis of the characteristics of successful companies shows that they have developed organizational cultures where innovation is seen as everyone's responsibility and as a goal that employees at all levels try to do in their daily work. Summarizing the studies on the culture of innovation, the culture of innovation is defined with reference to the five determinants shown in the figure N° (II-10): (Ceausu, Murswieck, Kurth, & Ionescu, 2017, pp. 2396-2397)

Figure N° (II-10): Determinants of organizational culture for innovation.



Source: (Ceausu, Murswieck, Kurth, & Ionescu, 2017, p. 2397)

1- **Values**: freedom, risk taking, trust, openness, creativity, flexibility, lifelong learning;
2- **Strategy:** innovation as a strategic goal, strong customer identification, future orientation;
3- **Structure:** autonomy, flexibility, collaborative teams and group interaction, transparency;
4- **Behavior and communication:** support, tolerance of mistakes; opening up new ideas; the ability to adopt new ideas; rapid adaptation to market changes; trust relationships; emphasis on key competences;
5- **Leadership:** Focus on innovation management and modeling behavior that encourages innovation, such as risk-taking, innovation support and rewarding initiatives.

In context of knowledge process, knowledge sharing is a process involving people exchanging their ideas, opinions and proposing new ideas through discussion. According to Leibowitz & Yan (2004) knowledge sharing is an edge to create knowledge that will increase the employees' performance and innovation. Knowledge sharing is important to move the organization towards innovativeness. The innovation capability of an organization is generally the ability to access and use internal and external knowledge in developing and introducing new products, services, and

process. In this sense, trust is one of the most important knowledge sharing factors that will influence individual to share their knowledge and enhance individual competency towards innovation capability (Ghazali, Long, & Ghazali, 2014).

II.4.1.3. A role of organizational culture in achieving customer responsiveness

Customers can gain satisfaction only if they are consciously indulged by the organization either in terms of the quality of the product or service for which they are paying or at the expense of intangible psychosocial experiences from the organization's customer relation management (CRM) efforts. Diverse organizational cultural elements directly affect employees and, where positive, maximize customer satisfaction, resource conservation, and such positive customer relationships support (Ibrahim, 2019).

Many organizations have found out that when culture goals and customer service conflict, time and again culture wins out. Culture barriers such as resistance to change, lack of shared values or lack of teamwork could yield low results in creating the structure needed to manage a successful organization and provide excellent customer service (Shelia & Gbolahan, 2006, p. 8). Additionally, providing employees with the information and knowledge they need to immediately solve customer problems as opposed to needing managerial intervention will further increase customer satisfaction levels (Benko, 2001). Findings from Denison (2000), Denison and Mishra (1995), and Kotter and Heskett (1992), indicate that organizational culture can be a major driver to drive long-term organizational effectiveness, and that efforts to change the culture of the big picture may manifest not only in outcomes such as return on investment, assets or sales, but also in satisfaction clients (Gillespie, Denison, Haaland, Smerek, & Neale, 2008, p. 129). The type of culture may be decisive for organization's ability to serve its customers. For example, organizations with a humanistic culture value their members by displaying concern for their well-being, growth, and development and stress the need for cooperation. Such a culture is more effective than one that emphasizes power, control and competition. Employees in humanistic settings are more likely to be satisfied and loyal, hence employees are willing to get actively involved in their organizations, support major initiatives, changes, and become enthusiastic about providing customers with services of high quality. Consequently, the expectation is that organizational culture will impact on customer service orientation (Bello, 2007, p. 513).

The researchers (Gillespie, Denison, Haaland, Smerek, & Neale, 2008) found that customer satisfaction is enhanced through organizational culture that has the following characteristics (see table N° II-7):

Table N° (II-7): Denison model traits, indexes, and definitions.

Trait	Index	Definition
Involvement		**Employees are committed to their work, feel a sense of ownership, and have input.**
	Capability development	**T**he organization continually invests in the development of employees' skills in order to stay competitive and meet ongoing business needs.
	Team orientation	**V**alue is placed on working cooperatively towards common goals to which all employees feel mutually accountable. The
	Empowerment	organization relies on team effort to get work done **I**ndividuals have the authority, initiative, and ability to manage their own work. This creates a sense of ownership and responsibility towards the organization.
Consistency		**The existence of organizational systems and processes that promote alignment and efficiency.**
	Coordination/ Integration	**D**ifferent functions and units of the organization are able to work together well to achieve common goals. Organizational boundaries do not interfere with getting
	Agreement	work done. **T**he organization is able to reach agreement on critical issues. This includes the
	Core values	underlying level of agreement and the ability to reconcile differences when they occur. **M**embers of the organization share a set of values that create a strong sense of identity and a clear set of expectations.
Adaptability		**Organizational capacity to change in response to external conditions.**
	Creating change	**T**he organization is able to create adaptive change. The organization is able to read the business environment, quickly react to the
	Customer focus	current changes, and anticipate future changes. **T**he organization understands and reacts to the customer, and anticipates their future needs. It reflects the degree to which the
	Organizational learning	organization is driven by a concern to satisfy

		the customer. **T**he organization receives, translates, and interprets signals from the environment into opportunities for encouraging innovation, gaining knowledge, and developing capabilities.
Mission	Strategic direction Goals and objectives Vision	**The organization knows why it exists and where it is headed.** **T**here is a clear strategy that gives meaning, purpose, and direction. **L**eadership has ‘‘gone on record’’ to create agreement about ambitious, but realistic goals that are understood and measured. **T**here is a long-term vision that creates excitement and motivation and is not compromised by short-term thinking.
Mission	Strategic direction Goals and objectives Vision	**The organization knows why it exists and where it is headed.** **T**here is a clear strategy that gives meaning, purpose, and direction. **L**eadership has ‘‘gone on record’’ to create agreement about ambitious, but realistic goals that are understood and measured. **T**here is a long-term vision that creates excitement and motivation and is not compromised by short-term thinking.

Source: (Gillespie, Denison, Haaland, Smerek, & Neale, 2008, p. 117)

This organizational culture model provides a systems approach to impacting organizational effectiveness. By focusing on the system as a whole, companies may be better able to satisfy their customers, but in the process also identify areas in need of improvement with respect to their mission, the interaction among employees, and the systems and structures that encourage efficient operations. Each of the four organizational culture traits will relate to customer satisfaction, however, the trait of adaptability is related the most to customer satisfaction, as it involves the capacity to respond to changing market demands and even includes ‘‘customer focus’’ as one of its indexes. Together, adaptability and mission represent an external focus, which is the organization’s mission including goals and strategies to meet customer demands. Hence, the mission should also relate to customer satisfaction. In theory, the traits of consistency and involvement are more internally focused and at first glance may not seem to relate clearly to customer satisfaction. However, through the focus on building shared values, systems, and an infrastructure and maintaining employee functioning

and ownership, the organization is equipped to serve the needs of customers better in the long run (Famiyeh, Asante-Darko, & Kwarteng, 2018).

From all of the above, we can say that Organizational culture have a significant impact on the overall performance of a learning organization. A culture that encourages open communication, collaboration, and creativity can lead to the development of new ideas and solutions, which can help the organization to stay ahead of its competitors. For instance, when employees feel encouraged to share their knowledge and ideas, they are more likely to come up with innovative solutions that can help to improve the quality of products or services, increase efficiency, or enhance customer responsiveness. Additionally, a culture that promotes learning and development can help employees to acquire the skills and knowledge they need to stay current in their field. This can lead to increased productivity, improved performance, and greater job satisfaction, which can all contribute to a sustainable competitive advantage. In conclusion, organizational culture plays a critical role in achieving sustainable competitive advantage in a learning organization. A positive and supportive culture can promote quality, efficiency, innovation, and customer responsiveness, while also attracting and retaining top talent, fostering a positive reputation, and building long-term relationships with stakeholders.

II.4.2. Organizational structure as support of SCA in LOs

Organizational structure is an important aspect of any organization as it can have a significant impact on the ability to achieve sustainable competitive advantage in learning organizations. A well-designed structure can provide the necessary support for the efficient and effective flow of information, communication, and decision-making processes. In a learning organization, a structure that promotes collaboration and teamwork can facilitate the sharing of knowledge and ideas among employees, leading to increased innovation and adaptability. Additionally, a structure that allows for flexibility and quick response to changing market conditions can also give the organization a competitive edge. A good organizational structure can also create a clear chain of command and accountability that can lead to improved performance and productivity. Ultimately, an effective organizational structure can help to align the organization's goals and objectives with the actions and behaviors of its employees, thereby supporting the organization's ability to create and maintain a sustainable competitive advantage.

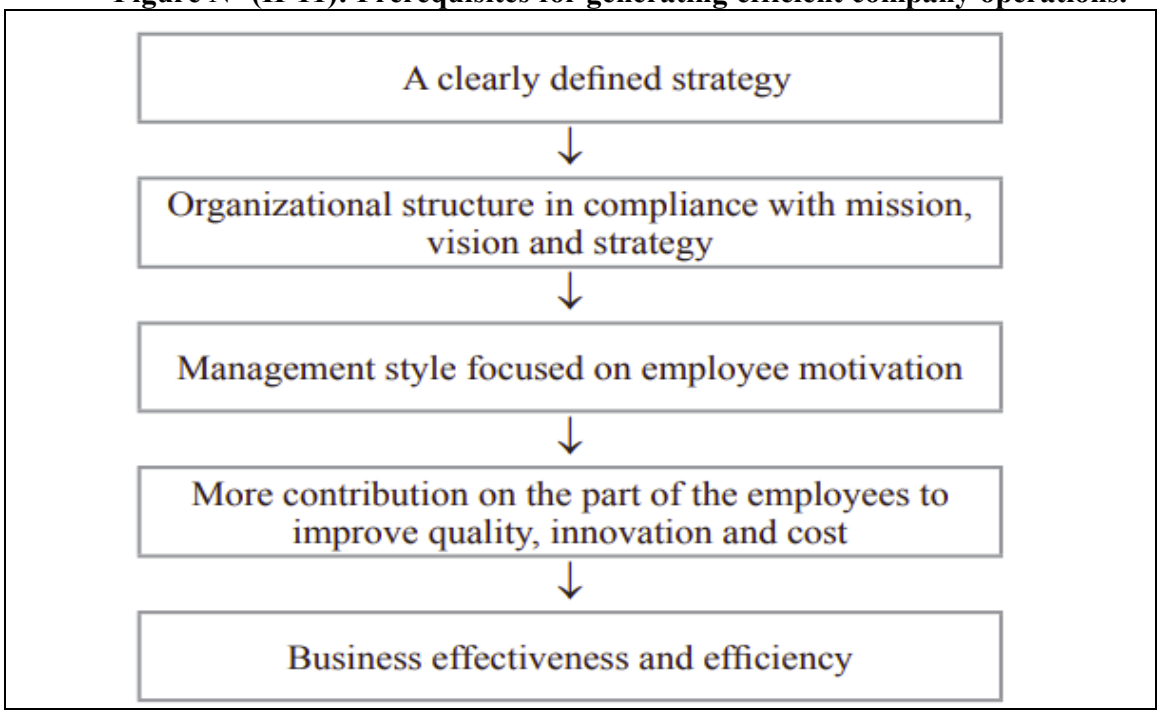
II.4.2.1. Organizational structure as support of efficiency and quality

Effective organizational structure facilitates proper working relationships among various sub-units in the organization, this definitely improve company efficiency within the organizational units. Wolf (2002), stated that structure has a direct effect on the success of an organization operational strategy. "Good organization structure influences the execution behaviors of a company (Zaki, Hussein, Sanad, & El-Khoriby, 2015). In addition, organizational structure plays crucial role in assisting the organization to achieve better performance. The achievement of any organization strategy depends profoundly on its uniformity with the organizational structure. Therefore, in order to improve their performance, most of the firms followed a successful firm by adopting their organizational structure, encouraging innovations and learning from their experience (Shukri & Ramli, 2015, p. 206). Structure not only shapes the competence of the organization, but also the processes that shape performance". Clemmer (2003), supported the idea that organizational structure shapes performance: good performers, in a poorly designed structure, will take on the shape of the structure. People in them become victims of "the system". This often comes from a sense of having no control over their work processes, policies and procedures, technology, support systems and the like. Moreover, Chen and Huang (2007), claimed that decentralized and informal structure will lead to higher performance. A suitable organizational structure may assist the project management team to achieve high performance in the project through gains in efficiency and effectiveness (Zaki, Hussein, Sanad, & El-Khoriby, 2015, p. 409). Bill said delegation is assigning responsibility and authority to someone in order to complete a clearly defined and agreed upon task while you retain ultimate responsibility for its success. Delegation improves efficiency when it allows work to be transferred to people whose skills are a better match for the work (Bill, 2007).

During the period between the 1960s and 1990s, a large number of authors based their research on analyzing the impact of organizational structure on the performance of companies. Summarized results have shown that companies with clearly defined strategies and organizational structures, as well as a leadership style focused on employee motivation, were more successful and efficient (See Figure N° III-3). An efficient organizational structure has emerged as one of the key competitive advantages and an important factor in a company's market success, especially if it is aligned with the company's mission, its competitive environment and the resources available (Mijuskovic & Spasenic, 2019). A large number of papers have identified organizational structure as an important factor in ensuring an

efficient and flexible organization that will be able to respond quickly and effectively to changes in the environment (Oliveira & Takahashi, 2012).

Figure N° (II-11): Prerequisites for generating efficient company operations.



Source: (Mijuskovic & Spasenic, 2019, p. 432)

An efficient organizational structure generates higher investments, implementation of more advanced technologies, higher motivation of workers to contribute to the improvement of product quality and higher productivity of work, all of which directly affects the improvement of business efficiency. In other words, a good organizational structure is a necessary, but not a sufficient prerequisite for the efficient operation of any company. It should always follow a strategy to improve performance. For the implementation of the strategy as a long-term plan of an organization, it is very important that there is an organizational structure that will pave the path for its implementation and performance improvement (Mijuskovic & Spasenic, 2019).

Douglas (2001) argued that for an organization to realize the value of a TQM implementation, it must have an internal organizational structure that is capable of fully supporting the implementation. Wherefore, the preferred structure for organizations that implement TQM, balances the need for control of activities with the flexibility needed to respond and adapt quickly to the changing marketplace. It is thus important to assess organizational structure when evaluating an organization's TQM implementation (Douglas,

2001). TQM requires a strong organizational structure to support top management, and at present, some organizations have their own quality department and corresponding departments, such as the quality assurance department, to name a few. Many researchers consider the quality department and middle management departments the true basis for the success of TQM, as it is the link between the top management (which sets policies) and the operators (the implementation of policies). The middle managers of the quality department are the true executive leaders of the implementation of TQM. They communicate the organization's quality policies, oversee their compliance, and have sufficient authority to create continuous improvement teams aimed at solving problems and managing available resources. In addition, senior and middle management must establish specific procedures for implementing TQM plans and programs through quality policies (Garcia-Alcaraz, et al., 2019). Jabnoun (2005) proposed that a TQM organization be decentralized and have low level of formalization. He also argued for the use of self-managed cross-functional teams to ensure process improvement. Further, using spinouts and outsourcing to reduce the horizontal complexity of an organization, and for reducing organizational layers to achieve a flat organization (Jabnoun, 2005, p. 228).

Quality programs and teamwork programs have been closely linked in theory and practice. In the context of TQM programs, work teams are said to facilitate information sharing, problem solving and to develop employee responsibility for managing quality performance. Forms of team working are seen to promote communication between employees and management, so facilitating the dissemination of the organizational quality mission. Team working also promotes communication and cooperation between employees in different areas of the organization, thus facilitating problem solving (Cooney & Sohal, 2004). Teamwork throughout any organization is an essential component of total quality management implementation, for which is necessary to build up trust and to gain communication improvement, which develops interdependence. Quality improvement teams (QIT) determine group of people with appropriate knowledge, skills and experience that are brought together to manage, especially to handle and solve a problem usually on a project basis, which are cross-functional and often multidisciplinary (Sofijanova & Gudeva, 2011)

If the company does not have superior resources and capabilities, the competitors can easily replicate what the company has been doing and any advantage would quickly disappear. Resources and capabilities form

distinctive competencies that enable innovation, efficiency, quality and customer responsiveness, all of which can be leveraged to create cost advantage or differentiation advantage. Competencies that reside in the culture of the firm help sustain competitive advantage, therefore, the phenomenon of firm's culture and its social complexity plays an important role in defining competitive advantage and the survival of many firms (Bagdanowicz, 2014).

From the above, we conclude that organizational structure also plays a crucial role in supporting sustainable competitive advantage in a learning organization. A well-designed organizational structure help to support quality, efficiency, innovation, and customer responsiveness by creating clear lines of communication, promoting collaboration and teamwork, and encouraging the sharing of knowledge and ideas. A flat and decentralized organizational structure can create a more agile organization, which can be better equipped to respond quickly to changes in the marketplace, such as new technologies or customer needs. This leads to increased efficiency, improved quality, and greater innovation. A structure that has clear and efficient communication channels make it easier for employees to share their knowledge and ideas, which lead to new innovations and improvements in products or services. Additionally, a structure that promotes collaboration and teamwork enable employees to pool their knowledge and skills to solve problems and create new opportunities for the organization. A structure that clearly defines roles and responsibilities also help to improve efficiency by reducing confusion and duplication of effort, which lead to a more productive workforce and faster response times to customer needs. A customer relationship management plays an important role in fostering customer responsiveness. This can be achieved by creating a structure that places customer-facing departments, and giving them the resources and autonomy, they need to effectively respond to customer needs.

II.4.2.2. Organizational structure as support of innovation

Innovation is considered a key factor in the establishment of new business and industry, economic development, firm performance and competitive edge (Kelay & Lynn, 2016). The formation of organizational structures, which make cross functional knowledge and resource sharing possible, is a critical element for companies; ensuring strategic decision-making, the resolution of disagreements, and the active and effective coordination of the process of innovation (Olson, Slater, & Hult, 2005). Organizational decision makers have the power to influence innovation within their company through their direct control of the structure of an

organization. The dispersion of control and responsibility within an organization are determined by its organizational structure, as are the grouping, coordination, and division of tasks amongst departments and employees in an organization (Kelay & Lynn, 2016).

Centralization indicates that all decisions are made under the authority of the senior executives of the organization. Miller argues that centralization implies that top managers make a complete decision about the organization that shows true capabilities and imposes significant time constraints on them. Therefore, over-centralization is an inverse relationship to intelligence gathering and information dispersal, as it reduces the beneficial discussion between the individuals that is important for generating new ideas (Saddique, Hayat, & Aamir Abbas, 2013, p. 56). In the central structure, sources of knowledge and information formation are obstructed. Provides information from lower levels to higher management; Thus, the quality and frequency of ideas, employee initiative and problem solving are reduced. This reduction will lead to lower levels of innovative performance, the consequences of which are lower development of products, processes and management. Additionally, employees who work within a centralized organization make fewer attempts to proactively find new and innovative solutions to problems (Kelay & Lynn, 2016, p. 129). Whereas, decentralization refers to the extent to which freedom of decision-making is pushed to lower levels of the organization. Decentralized organizations may be more effective, efficient, and adaptive because decentralization allows for flexibility, creativity, and responsiveness (Lin & Germaine, 2003, p. 1133). Decentralization gives more power and autonomy to lower-level staff to make decisions. A decentralized structure shows more control and a bottom-to-top flow of ideas, comments and decisions. Under decentralization, all members can act more quickly to make decisions and solve problems and control the situation. Decentralization offers several advantages for those organizations, which aim to have competitive strategies. Actually, structure of an organization should follow the strategy of the organization. If the organization follows innovation strategy, the organizational structure must be organic. It requires losing structure, low formalization, low specialization, and more decentralization (Darvishmotevali, 2019, p. 33).

Formalization is the degree to which formal rules and procedures govern decisions and business relationships. Rules and procedures provide a means to describe appropriate behaviors and address routine aspects of a problem. Rules enable people to organize their activities for their own benefit and the interest of the organization. Burns and Stalker (1961) refer to firms with very formal procedures as 'automated' and those with less formal

procedures as 'organic'. Membership companies encourage horizontal and vertical communication and flexible roles. The benefits of the organic form include rapid awareness and response to competitive and market changes, more effective information sharing, and reduced time between decision and action (Saddique, Hayat, & Aamir Abbas, 2013, p. 58). Formalization discourages idea generation due to the inflexibility of this mode, which constrains creativity. Formalization prevents difference from standard knowledge and from the tendency to seek difference. Flexibility within the system is facilitated by the low level of formality, and this flexibility is key to generating ideas (Kelay & Lynn, 2016, p. 130).

The most successful companies when it comes to product and process innovation are those whose organizational structures foster the development of knowledge through formal research and development processes and the development of knowledge based on experience, practice, and interaction between employees, clients, and suppliers. More flexible and agile structures are required, structures that allow interaction and communication between employees, without rigidly defined functional areas, and with functional integration instead. This “adhocratic” or organic structure would permit the development of knowledge based on practical experience and interaction, consequently leveraging the organization’s innovative capacity (Jensen, Johnson, Lorenz, & Lundvall, 2007). The main elements of innovation-oriented organizational structures that can withstand the instability of innovative environments are: (Marotti de Mello, Marx, & Salerno, 2012)

- decentralized decision making
- Low official status
- Mutual adaptation between teams
- Professionals specializing in their field, grouped by specialization
- Integrated units
- Flexible department/unit limits
- Project teams without unit coordination
- Collaboration with clients

III.4.2.3. Organizational structure as support of customer responsiveness

With the current state of the global economy and the aspect of globalization, the competition is becoming more and more fierce. This is all in the interest of the customer who is now more mindful, demanding better value than before and at lower prices. This puts companies under pressure, forcing them to constantly increase the quality of products and services that will create higher value for their customers than their competitors in other countries to stay competitive (Slater & Narver, 1995). In order to create this

superior customer value, most companies have to adopt a structure focused on responding to customer needs and delivering value to them. This type of organizational structure is called a 'customer-focused organizational structure'. We define a customer-focused organizational structure as an organizational structure that uses groups of customers related by industry, application, usage situation, or some other no geographic similarity as the primary basis for structuring the organization. The shift to customer-focused organizational structures is motivated by the need to come closer to the problems the customer is trying to solve. When an organization is structured focusing on their costumer`s business, there will be long-lasting relationship between the organization and the costumer. (Homburg, Workman, & Jensen, 2000, pp. 467-469).

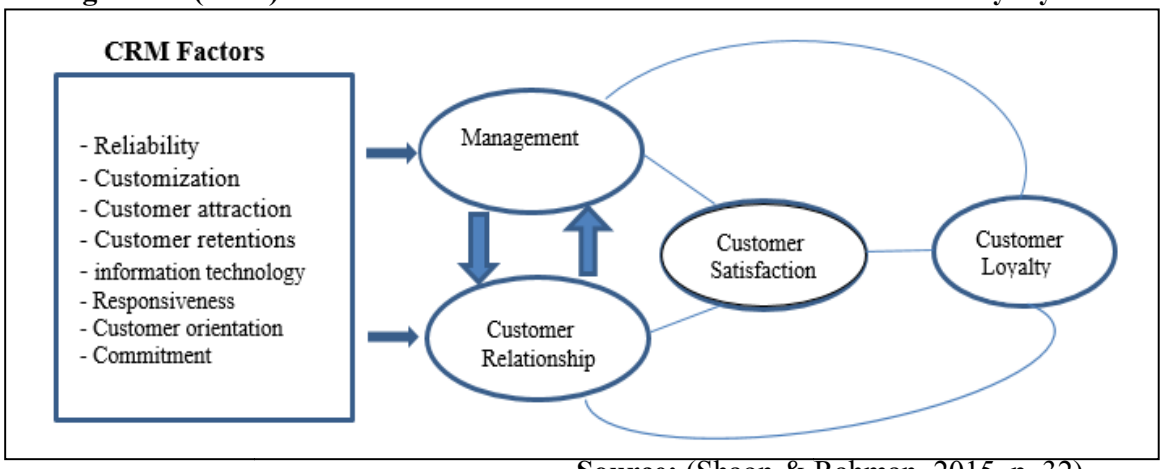
There are two possible effects of the two structural factors on customer satisfaction. One is a direct effect and the other an indirect effect through attitudinal factors. First, to enhance customer satisfaction, those who can understand customers' needs should be given the necessary authority to respond promptly to those needs. This implies that centralization of authority is not appropriate for prompt responses to customers; thus, this factor will negatively impact customer satisfaction. Another way to understand customers' needs and respond to them promptly is to have a flat hierarchical structure in the organization. Even if authority is centralized, prompt decision making in response to customers' needs is possible in a flat structure. In such cases, the flat organizational structure has a positive effect on customer satisfaction (Ueda, Matsui, & Ebine, 2017, p. 146). In addition to these informational effects, structural factors are also associated with employees' attitudes to work. Decentralization of authority and flat structures facilitate job enrichment and enlargement. Employees enjoy these work environments, and have a high commitment to the organization. Employees with high affective commitment tend to consider their organization empathically, work hard, and as a result, enhance customer satisfaction. Supervisors who frequently interact with frontline subordinates can acquire important information about customer needs, and increase customer satisfaction by responding to those needs (Ueda, Matsui, & Ebine, 2017, p. 147).

Customer Relationship Management (CRM) is the design of the organizational structure of the bilateral relationship with the customer. CRM is divided into three main sections: operational, analytical and relational. The results resulting from the implementation of CRM lead to the growth of the organization and its greater productivity. CRM, in effect, is the design of the organizational structure for connecting to the customer from the outside

in and vice versa and creating double-sided value through the process. Therefore, CRM is a key solution to realize information infrastructures that increase the power of responsiveness to compositional pressures so that the organization survives (Tohidi & Jabbari, 2012).

CRM is a technique that can help build long-term relationships with the customers and increase profits through efficient management systems and the application of customer-focused strategies. Customer relationship management is a customer-oriented marketing effort which is responsible for accumulating and managing customer details in order to serve the customers in the present and future (Shaon & Rahman, 2015). CRM itself is a learning process in which information is regularly updated and communicated with customers so that customer demand can be analyzed and appropriate response to the customer can be carried out (Alehojat, Chirani, & Delafrooz, 2013). Every firm tries to fulfill customers' needs, desires, wants, aims and expectations (Shaon & Rahman, 2015). (See Figure N° II-12).

Figure N° (II-12): CRM Effects on Customer Satisfaction and Customer Loyalty.



Source: (Shaon & Rahman, 2015, p. 32)

If an organization has a good CRM strategy, then customer satisfaction will automatically be increased. By using modern communication media, CRM can easily communicate with customers while fulfilling their expectations. Moreover, Customer loyalty is related to a service provider's ability to maintain its customers' loyalty and persuade them to recommend its services to potential customers. CRM helps organizations to build long-term relationships with their customer (Shaon & Rahman, 2015)

II.4.3. Contribution of information technology in SCA in LOs

Information technology (IT) plays a vital role in achieving sustainable competitive advantage (SCA) in learning organizations. IT enables organizations to access, process, store, and share large amounts of data and

information, which can be used to gain insights and make better business decisions. In a learning organization, IT can also facilitate the flow of knowledge and communication among employees, enabling them to collaborate and share ideas more effectively. Additionally, IT can be used to automate repetitive tasks, improve efficiency and productivity, and reduce costs. Advanced technologies such as Artificial Intelligence, Machine Learning, and Big Data analytics can also be used to gain a competitive edge by providing organizations with the ability to analyze large amounts of data and extract valuable insights. This information can be used to identify new opportunities, improve products and services, and create more personalized customer experiences. Furthermore, IT can also help organizations to be more responsive to changing market conditions and customer needs, by providing real-time data and feedback, which can be used to make quick and informed decisions. Overall, IT can provide organizations with the necessary tools and capabilities to create, access, and share knowledge, and to stay ahead of the competition in a rapidly changing business environment.

II.4.3.1. Contribution of information technology in efficiency and quality

Efficiency" is one of the main components of management and the most long-standing criteria of improvement of organizations' performance.

Information technology reduces operational expenses and increases efficiency of organizations from several aspects. Firstly, introduction of information technology reduces organizations' need for manpower so that use of automatic machines and robots in some cases obliterates the necessity for manpower completely. Secondly, information technology by providing rapid access to accurate information about issues such as inventory levels reduces operational expenses. And thirdly, it causes the waste level and time needed for production and, consequently, related costs to reduce as well (Nejadirani, Rasouli, & Behravesh, 2011, p. 227).

Adoption of IT in business processes has improved the overall operational efficiency of firms. In preceding years, the development of IT in areas such as manufacturing, multimedia, communications and electronic service networks as created new opportunities for firms thereby enhancing the way business transactions, processes, payment and delivery services operate. It has affected the business in the following ways: (ME, 2018, pp. 4-5)

1. Office Automation: Information technology is a vital and integral part of a business which has assisted the automation of several industrial and business systems.

2. Stores large amount of data: Business and commercial enterprises need to store, preserve and maintain large records as these records can be used for

various purposes. Availability, visibility and accessibility to files already stored has been made easier by information technology and can also be updated as at when necessary.

3. Improves Productivity: Computers have aided the automation of office tasks and procedures. This has improved the productivity of various enterprises.

4. Sharing of data and information: The networking of computers (intranet) and use of e-mail have also played their part in sharing of information. This helps functional roles of transaction execution, collaboration, coordination and decision Support in supply chain management possible.

5. Competitiveness: Information Technology proffers a reliable and economical means of conducting business electronically. Routine tasks can be automated. Customer relationships can be built on the platform of information technology with the provision of "round the clock support". IT successfully supports competitive strategies.

6. Security: Security is always a critical issue in organizations. In order to prevent unauthorized personnel's from gaining illegal access to company's information, virtually every organization has some security programs put in place to prevent such access. The basic attributes of a security program are integrity, availability and confidentiality which grants access to only authorized persons in an organization.

7. Cost Benefits: Companies now have a relatively large choice of suppliers as a result of the vast availability of internet-based information at their disposal which has led to a more competitive pricing. Information technology reduces transaction costs.

8. Marketing: Companies that use e-business platforms to conduct commercial activities can create brand awareness with their respective websites, thus, creating new opportunities for advertising and promotion of their products.

The value of IT to support quality management capabilities finds a basis in the resources-based view of the firm, which argues that to confer competitive advantage, an organization should acquire or develop resources and capabilities that contribute to positive performance, are not possessed by all competing firms, and are difficult to imitate or duplicate (Peteraf, 1993). The global competition has enhanced the role of quality in business world. These challenges and pressures have placed a renewed focus on quality improvement for the long-term survival of the organization. Many organizations are providing better products and services with the help of introducing Information Technology in Total Quality Management (Khanam, Siddiqui, & Talib, 2013). Victor et al. revealed that the

introduction of IT in QM has contributed greatly to: the enhancement of quality awareness, in the improvement of product quality and in reducing quality-related cost. Moreover, using IT in QM processes may result in improving operational performance measures such as reduced unit production cost, faster delivery, improved flexibility, and reduced cycle time (Victor, Mjema, & Mwinura, 2005). The various beneficial impacts that IT may have on QM are summarized in Table N°(II-8).

Table N° (II-8): Beneficial impact of IT on QM processes according to various authors.

Authors	Potential benefits of IT on QM
Dewhurst and al. (2003)	IT can be used to support the leadership role of senior management; to facilitate the dissemination of TQM values; and manage information on quality. IT helps in promoting good supplier relationship as companies can access the inventory systems of their suppliers and place orders automatically. IT has become a crucial instrument in managing relations with customers and thus improving quality. IT is used to facilitate customer surveys, perform sophisticated analyses of consumer needs, expectations and behavior, and for targeting specific consumers and products.
Victor et al. (2005)	IT helps leaders to communicate with their employees the right vision and mission towards quality, furthermore employees can do their work virtually anywhere and anytime that IT allows
Schein (1994) Dale and al. (1999)	Propounded that the capacity to innovate increases with the use of IT Computer-aided design technologies are a fundamental aid in the design process because of faster response to consumer needs and greater innovation, thus helping in these QM functions. Also found that, IT can enhance retrieval and analysis since access to different databases is made easier and the subsequent analysis is faster and more accurate with usage of IT.
Hameri and Nihtila (1997)	An effective new product design and development process requires information from different departments (production, marketing and R&D) and IT may aid the effective and speedy transmission of this information.
Dimancescu (1992)	IT promotes continuous quality improvement, since it is a fact-based management technique in which the use of up-to-date data is a prerequisite for identifying problems, their root causes, and the solutions.
Konstadt (1990) Mukhopadhyay and al. (1995) Lawler (1991	IT can be an enabler in the drive for continuous improvement. IT can enhance supplier relationship. For example, electronic data interchange can be used to place orders, send product specifications, design details. Organizations may apply IT to facilitate the interchange of information between different departments.
Jackson et al. (1995)	IT applications provide an automated means to gather, record, and act on ideas during meetings of workgroups.

Sa´nchezRodrı´guez and al. (2006)	An empirical investigation conducted in Spain on IT use in supporting TQM initiatives revealed that the sampled firms make considerable use of IT to support their TQM initiatives and that overall, such efforts generate significant positive gains on operational and quality performance

Source: (Lai Wai, Seebaluck, & Teeroovengadum, 2010, p. 595)

A summary of the benefits of IT as a support to QM can be inferred: (Lai Wai, Seebaluck, & Teeroovengadum, 2010)

- Improving costumer and supplier relationship;
- Increasing process control;
- Facilitating teamwork;
- Facilitating inter-departmental information flow;
- Improving design process and skills;
- Applying preventive maintenance;
- Measuring quality costs; and
- Improving the decision process in quality departments.

III.4.3.2. Contribution of Information technology in innovation

Innovation is a task that depends upon the individual members and the collective knowledge of the organization. As a process, at each stage, it involves problem identification, problem solving, and prediction and anticipation. Social interaction is the most essential element of the process, and the role of information technology is to structure it in a manner that while, on the one hand, encourages divergence of perspectives, on the other, convergence to valuable outcomes is attained (Adamides & Karacapilidis, 2006). The innovation process in general, and new product development in more particular, has been served by a number of diverse technologies under the umbrella of ICTs. At the individual participant, or designer, level, creativity enhancement and idea representation and processing systems have been developed and frequently used. In this category, one can include experimentation technologies such as simulation and rapid prototyping, which are employed at different phases of the innovation process with varying degree of detail (Thomke, 2003). in addition to database and internet solutions for technology and market scanning, tools for exploring and assessing the context (e.g., experimentation tools) and finalizing the form of innovation concepts (e.g., engineering design tools), the above processes require the support of collaboration technology that allows a rich expression and discussion of ideas/proposals under specific problem contexts. Furthermore, this technology should support the efficient storage and retrieval of codified knowledge, allow experimentation with ideas and potential solutions, as well as providing support for argumentation and

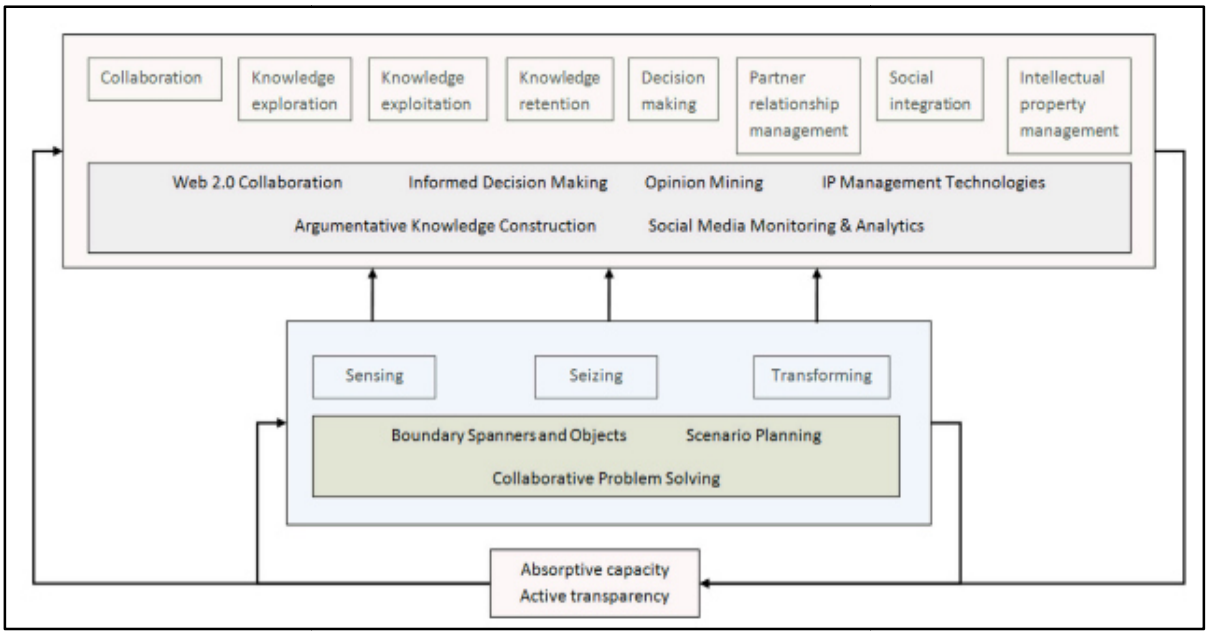
conflict resolution. Systems implementing these technologies in isolation, as well as integrated frameworks, being mainly focused on the engineering design phase, have been proposed and used in actual organizational settings (Sethi, Pant, & Sethi, 2003). It is recognized that structured information cannot replace tacit knowledge, understanding and learning, which are the most important resources of the innovation process, but it can greatly enhance it by helping to bridge the knowledge gaps that result from the discrepancy between the knowledge an organization possesses and the knowledge it needs to solve specific problems, including innovation and product development. In filling these gaps, the role of IT is not only to organize data in the form of useful information, but also to support the transformation of information into organizational knowledge. Moreover, since innovation is a social process involving diverse actors, there is an urgent need for Information and Communication Technology (ICT) to support knowledge flows between actors, in a way that promotes the creation of new knowledge. Since knowledge and information flows are the main determinants of successful innovation and new product development processes, their technological support can increase their efficiency and effectiveness, and thus their role as input-based competencies and sources of competitive advantage (Adamides & Karacapilidis, 2006).

Innovation has changed the way in which products and services are produced and availed to consumers. New technologies have enabled firms to produce and market in more subtle ways as compared to the traditional methods of production and marketing. New methods of value creation and product differentiation have been borne by the rapid changes in technological management in organizations. Organizations are facing very high pressure to maintain competition in rapidly changing environment. Technology has enabled firms to create new employment opportunities while at the same time enabling firms to be more efficient in production. Management of technology and innovation is important if firms have to have an upper edge over competitors (Pomaquero, Lopez, & Lopez, 2019).

Adamides and Karacapilidis (2017) discuss Information Communication Technology (ICT) for Open Innovation (OI) from capabilities perspective. They distinguish two types of capabilities for OI: strategic, which need to be developed so that the organization can take advantage of an OI strategy proactively, and operational for the efficient implementation of OI processes. ICT at the strategic level supports dynamic capabilities and related cognitive processes of managerial staff for developing and using the appropriate level of absorptive capacity and active transparency, whereas ICT as part of operational capabilities aims at

enhancing the day-to-day performance of OI activities. Through analysis of capabilities, they associate specific ICT with the functionalities required in the entire OI process. Paying particular attention to the issues of collaboration and sophisticated data analysis. In this context they proposed a capability-based framework for open innovation and its association with ICT. (See figure N°II-13) (Adamides & Karacapilidis, 2017) .

Figure N°(II-13): A capability-based framework for open innovation and its association with ICT



Source : (Adamides & Karacapilidis, 2017, p. 4)

In a generic capability's perspective, strategic level capabilities for Open Innovation are linked to the notion of dynamic capabilities (Teece, Peteraf, & Leih, 2016). More specifically, they relate to an organization's ability to innovate through the appropriation of the right knowledge by sensing the environment, seizing opportunities and transforming its innovation process and value propositions. Sensing is associated with exploration, while seizing both the exploitation of internalized environmental signals, ideas, concepts, technologies, as well as the exploration of the external environment to derive economic value from innovative products and/or services developed through transformation activities; while their effectiveness will depend on the level of absorptive capacity of the organization (Cohen & Levinthal, 1990).

Collaboration is the dominant characteristic of OI processes. From the technology point of view, compared to traditional groupware applications for brainstorming, argumentation and group decision support, the ICT-based open innovation systems differ in terms of the number of users (scale) and

goal of the system. This goal is largely supported by Web 2.0 technologies, which led to new knowledge sharing paradigms due to their inherent user friendliness, intuitive character and flexibility. At the same time, knowledge management plays an invaluable role in innovation, in that it fosters a knowledge-driven culture and assists in creating tools, platforms and processes for tacit knowledge creation, sharing and leverage (Adamides & Karacapilidis, 2017).

III.4.3.3. Contribution of information technology in customer responsiveness

Firms with a strong customer orientation pursue competitive advantage by placing the highest priority on the creation and maintenance of customer value. As such, these firms engage in the organization wide development of and responsiveness to information about the expressed and unexpressed needs of both current and potential customers. Because of the constantly refined market-sensing and customer-relating capabilities of the customer-oriented firm, it should be well positioned to anticipate customer need evolution and to respond through the development of new customer value-focused capabilities and the addition of valuable products and services (Olson, Slater, & Hult, 2005).

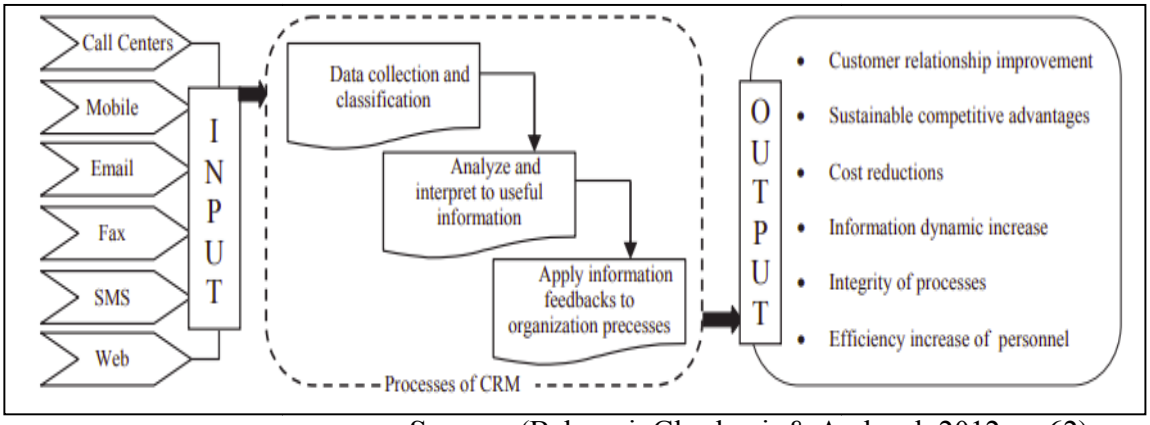
Research shows that higher levels of customer satisfaction have the potential to double or triple firm profits. To improve their customer satisfaction, firms are making greater use of IT tools in their internal and customer facing business processes. Managers consistently rank "improvement in customer satisfaction" as one of the prime motivations for making IT investments. Significant investments in IT applications in recent years indicate the industry belief that IT applications can streamline both internal and customer-interfacing business processes (Mithas, Krishnan, & Fornell, 2005).

Customer relationship management is based on customer data and is facilitated by the use of IT. In fact, CRM is a modern and developed tool for data mining of customer data which is supported by the use of various communication points in the system and creates a complete view of the customers. CRM is an example of relationship marketing that aims to build customer loyalty, establish lasting relationships and maximize customer value for the business. CRM requires more complex and enterprise-wide systems (Wehmeyer, 2005). Therefore, CRM is defined as IT-based customer relationship building programs. This comprehensive strategy strives to gain knowledge through the collection of customer data and analyses it with respect to customers through the effective use of IT and thus, establish an effective relationship with customers and create a common

customer-centric culture and eventually lead organizations to achieve long-term benefits (Bahrami, Ghorbani, & Arabzad, 2012)(See Figure N° II-14).

From a technological perspective, IT is considered an enabler that allows organizations to foster closer relationships with customers, analyze customer information and provide a coherent view of the customer (Chircu & Kauffman, 2000). CRM implementation can be viewed as the integration of strategic customer data utilization into a loyalty scheme through the use of IT. Improvement programs arising from new business processes, such as CRM, are directed by the IT, almost exclusively. When IT has been utilized properly, it can help to detain customers by better managing customers based on knowledge and initiating stronger relationship. Therefore, CRM often requires sophisticated IT support (Bahrami, Ghorbani, & Arabzad, 2012).

Figure N° (II-14): IT tools input to improve CRM.



Source: (Bahrami, Ghorbani, & Arabzad, 2012, p. 62)

Table N° (II-9) presents ways in which IT can enable marketing and operations functions of the firms via CRM applications. CRM applications are becoming more multifunction and vendors are forming partnerships and integrating CRM suites with existing applications, such as Enterprise Resource Planning (ERP) systems. CRM products are classified as either operational (e.g., for improving customer service, for online marketing, and for automating the sales force), analytical (e.g., for building a CRM data warehouse, analyzing customer and sales data, and continuously improving customer relationships), or collaborative (e.g., for building Web and online communities, business to business customer exchanges, and personalization services) (Karimi, Somers, & Gupta, 2001, p. 128).

Table N° (II-9): Elements of Customer Relationship Management Applications.

Customer focus	
Customer services	by providing customers and partners with easy access to accurate in-depth information directly over the Internet or through customer service, call centers, and technical support organizations.
Marketing Automation	by using lead generation, lead qualification, data analysis, campaign management, and encyclopedia software products.
Online Sales	by enabling online business-to-business and business-to consumer sales using contacts, opportunities, product configuration, and quotation software products for creating new retail channels; empowering existing distribution channels and salespeople to sell complex, configure-to-order products.
Operations focus	
Supply Chain Management	by facilitating the information flow throughout the supply chain from raw materials suppliers to retailers for better and more efficient inventory and production management, and faster response to customer demand.
Order Management	by enhancing the speed and accuracy of order processing and fulfillment for superior purchasing experience for customers and business partners.
Field Service	by using dispatch, spare parts inventory, and repair depot software products.

Source: (Karimi, Somers, & Gupta, 2001, p. 129)

CRM is about making each and every customer feel like they have a one-to-one relationship with company. Effective CRM gives company the opportunity to show its customers that: (Ahluwalia, 2022, p. 4478)

- It recognizes them.
- It understands them.
- It cares about their needs, queries and concerns.

It wants to deliver products and services that they need the most.

- it appreciates their business.

CRM will also benefit a company by allowing it to:

- Develop superior services and products that meet customers' identified needs.
- Enhance marketing towards the most profitable customers to improve it bottom line.
- Improve efficiency by providing support and services to customers online (For example, through frequently asked questions).

- Anticipate future business needs based on data on historic sales and service trends.

In general, IT achieves success by creating a competitive advantage. IT increases the organization's long-term competitiveness by increasing capabilities, reducing costs, and improving services. knowledge management, in addition to improving innovation performance, is also needed to create a competitive advantage for the organization. In order for an organization to have a competitive advantage, it needs to be able to continuously monitor the progress of its products and services. The advent and in-depth use of IT, particularly communication networks and the Internet, have brought a fast, safe, and convenient method of obtaining, sharing, and storing knowledge by increasing collaborations and reducing costs. Organizations need to know how to use this technology in their organizational activities and processes. Experience shows that implementing successful business strategies using IT has improved organizational efficiency and effectiveness (Bazrkar, 2020).

From all the above we conclude that Information technology have a significant role in building a sustainable competitive advantage in a learning organization by enabling improvements in quality, efficiency, innovation, and customer responsiveness. IT contributes to the improvement of the organization quality (their products and services) by automating processes and enabling more accurate data collection and analysis. This leads to better decision making and improved customer satisfaction. IT also help organizations to improve their efficiency by automating repetitive tasks, streamlining communication and collaboration, and enabling remote work. Moreover, IT support innovation by providing tools and platforms for idea generation, experimentation, testing, and collaboration. IT assist organizations to be more responsive to customer needs by providing real-time data on customer interactions, and enabling the organization to respond quickly to customer feedback. Additionally, IT is a support of "learning organization" by making it easier for employees to access knowledge and learns from one another. Thus, improve organizational learning and facilitate the development of new skills and capabilities.

II.4.4. Knowledge management infrastructure and learning organization

Learning organizations need knowledge management because knowledge is fundamental to the learning process (Chawla & Joshi, 2011). According to Vera and Crosman (2003), learning and knowledge are intertwined in an iterative process that is mutually reinforcing; while learning (the process) results in new knowledge (the content), knowledge

also influences future learning. Unless organizations are able to embrace shared learning and knowledge creation as continuous, mutually reinforcing processes, the use of learning or cognitive synergy to achieve competitive advantage cannot be achieved to its true potential. Therefore, it is important for organizations to provide appropriate opportunities for their employees to apply knowledge, which leads to learning and the creation of new knowledge (Vera & Crossman, 2003). Further, according to Joshi and al. (2008), to create a LO, it is critical that employees are motivated to learn and that they have the necessary system support to use and disseminate their newly acquired knowledge. This creation of a learning culture facilitates synergizing the interplay between knowledge management and a learning organization resulting in knowledge flow and learning from individual and team interactions. Therefore, work practices in learning organization are influenced by the organizational culture, technology driven communication and support from top management (Joshi, Jha, & Mahajan, 2008).

Successful learning organizations are those which are capable of learning faster than their competitors in development of new product and services, customer responsiveness, managing intellectual capital, processes and technology. Such rapid adaptation requires the efficient and effective use of knowledge (Chawla & Joshi, 2011).

Nowadays, there is an increasing consensus on the idea that organizations making the effort to introduce a culture which encourages communication among their members, experimentation and risk taking, and motivates employees to question fundamental beliefs and work patterns, will achieve a favorable working atmosphere for the development of their capacity to learn (Chang & Lee, 2007). Hall (2001) suppose that during the process of encouraging employees to want to learn, it is necessary for the existence of organizational culture to support the organization learning so that it is available to obtain, improve and transfer the required knowledge with ease (Hall, 2001). Chang and Lee (2007), argued that leadership, and organizational culture, comes with critical relationship to develop learning organization, and encourage employees to use the learning facilities (Chang & Lee, 2007).

Sustaining a management focused on learning requires, in most cases, a structure designed to proactively embrace initiatives aimed at a continuous and lasting learning process (Horbe, Moura, & Machado, 2021). Organizational structure reflects the way in which information and knowledge is distributed within an organization, which affects the efficiency of their utilization. Consequently, it substantially influences the distribution and coordination of the Organization’s resources, the communication

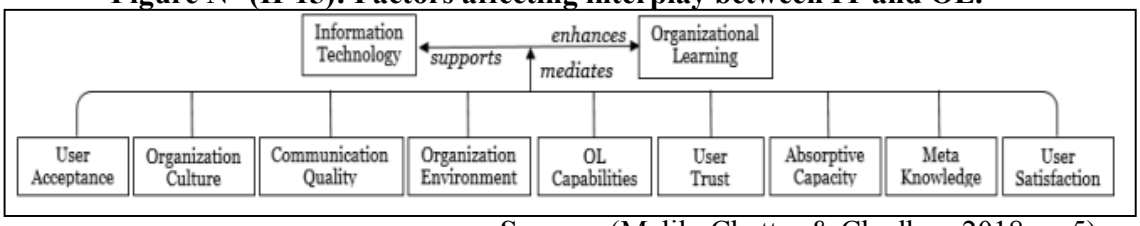
processes and the social interaction between organizational members. The organizational structure, through its dimensions can act as a facilitator or inhibitor of the ability to learn. Therefore, the configuration of organizational structure impedes or facilitates the capacity of the Organization to adapt to change, to learn, to innovate or to improve its ability to generate added value for its customers (Turi & Sorooshian, 2019).

The transformation into a learning organization requires fundamental changes to the organizational structure of an organization. Increasingly, learning organizations are shifting from a hierarchical structure to a matrix or even a network form of organizing. Compared to the organizational hierarchy, a matrix or network organizational structure is flatter and decentralized. In the matrix and network structures, information exchange and interpersonal communication take place not only vertically within the organization but also horizontally and diagonally across departmental boundaries. These new organizational structures greatly facilitate the learning processes by promoting multidimensional knowledge sharing and coordination, allowing for instant and multisource feedback and enlarging the breadth and depth of knowledge acquisition (Su, 2017). This means that organizational structure can be a highly influential element in the creation (learning), combination, grouping and integration of the knowledge generated by organizational members, which return it directly, making it a lever for competence creation (Turi & Sorooshian, 2019).

Information technology (IT) is an integral part of contemporary organizations which provides them a suitable platform for learning. Organizational learning (OL) is a way for continuous improvement of business processes and is achieved by management of tacit and explicit knowledge resources (Chadhar & Daneshgar, 2018). Organizations learn and improve if there is a mechanism for their employees to access the knowledge required to carry out their daily activities. IT provides such a mechanism within the organization and it can take different forms such as information systems, applications, hardware infrastructure and thus provides an infrastructure to acquire, retrieve and share data and information which, when processed in a specific context, becomes knowledge for its members. Therefore, IT acts as a facilitator of knowledge management and ultimately triggers organizational learning (Malik, Chetty, & Chadhar, 2018).

Figure N°(II-15) represents the factors that influence relationship of information technology and organizational learning.

Figure N° (II-15): Factors affecting interplay between IT and OL.



Source: (Malik, Chetty, & Chadhar, 2018, p. 5)

The figure illustrates the interplay of IT and OL by showing that IT enhances organization learning whereas OL supports information technology. There are also some factors that affect the interplay of IT and OL, such as: (Malik, Chetty, & Chadhar, 2018, p. 6)

User acceptance: Although organization leaning helps employees to gain skills and knowledge to use information technology but organizations cannot achieve required results if the employees are reluctant to accept that technology**.**

Absorptive capacity is ability of an organization to understand value of new external knowledge, assimilate the knowledge and apply it into its business activities.

Meta knowledge, knowledge exchange and knowledge structure, is more important than technical or professional competences to use an information system. If employees have no knowledge about contents structure of information system then it becomes itself a learning barrier.

User satisfaction is an important measure of effectiveness of an information system. It plays a critical role in learning, use or implementation of an information system within an organization.

A recap

Sustainable competitive advantage (SCA) is a key issue in business, it's a set of assets, characteristics, or capabilities that allow an organization to meet its customer needs better than its competition can. SCA is difficult to duplicate or replicate. Companies must set clear goals, strategies, and operations to maintain their competitive advantage over time; this requires them to focus on efficiency, quality, innovation, and responsiveness to customers, and developing distinctive competencies that contribute to superior performance. Theoretical approaches to SCA differ in their view of the foundations of building a sustainable competitive advantage, some focus on internal resources, competencies and capacity building, while others focus on external factors such as industry attractiveness, competitive position, and market. Organizations success in gaining SCA depends on their ability to formulate and implement strategies that put them in a better position relative to their competitors. The acceptance of competition and strategic change as a compound process highlights the importance of learning at all levels to maintain a competitive edge.

The role of knowledge management infrastructure in building SCA in learning organizations is vital. By providing employees with access to relevant knowledge, facilitating knowledge sharing and collaboration, and supporting decision-making and innovation, a well-designed KMI can help an organization improve its performance, productivity, and competitiveness.

Chapter III

In a highly competitive and dynamic economic environment, building a sustainable competitive advantage is usually complex, because it depends on valuable resources and capabilities that are difficult to imitate and replace. These resources and capabilities work to create distinctive competencies that contribute to building a sustainable competitive advantage, by enhancing efficiency, quality, innovation and responsiveness to customers. Knowledge management contributes decisively to building distinctive resources, capabilities and competencies. Therefore, organizations rely heavily on building a sustainable competitive advantage on the effective application of knowledge management, which depends on the extent to which a good infrastructure is provided that includes: organizational culture, organizational structure, and information technology.

Based on this context, we tried in the previous two chapters to present the theoretical framework for the concepts related to knowledge management infrastructure and sustainable competitive advantage. In addition, we reviewed previous empirical studies to determine the role of knowledge management infrastructure dimensions in building sustainable competitive advantage in learning organizations. Because the aim of the study is explore this role in an economic company, this chapter is divided in four parts:

III.1. An overview of AMENHYD spa
III.2. Research method
III.3. Research instruments and documents
III.4. Empirical research design

III.1. An overview of AMENHYD spa

AMENHYD works in one of the most important areas that Algeria is trying to develop, water treatment and environmental preservation, while allowing the creation of new economic sectors. And because water is involved in all aspects of development, and it boosts economic growth, AMENHYD through its solutions, contributes to expanding access to drinking water and basic sanitation services. It advocates the development and use of advanced water and wastewater desalination and treatment technologies and practices that reduce costs, reduce energy requirements and enhance environmental responsibility.

III.1.1. AMENHYD spa development

AMENHYD spa, a private company under Algerian law, created in 1988 and set up as a group in 2003, AMENHYD spa designs, produces and deploys tailor-made solutions for:

- Water mobilization.
- Waste recovery.
- Treatment of industrial pollutants.
- Civil and industrial construction.
- Civil and industrial deconstruction.

AMENHYD spa has an unequalled expertise and cumulative experience in Algeria in the fields related to the environment, with a turnover of 11 billion dinars and nearly 1995 employees as of 31 March 2022. It operates on behalf of both public authorities and industrial players.

AMENHYD spa has implemented a powerful engineering unit reinforced by engineering offices, subsidiaries of the group. By placing research and development and innovation at the heart of its business, including through major technological partnerships and a research and development laboratory, AMENHYD spa is committed to providing effective technological solutions to all its customers, public and industrial. On the other hand, the company is committed to reducing technological dependence on foreign engineering and industrial equipment, reduce its imports and boost local production. The company has set itself the objective of reaching a technological and industrial integration rate of 45% by 2025 and 65% by 2030; for this AMENHYD spa has created two units, in Hammadi and Boudouaou, specializing in the manufacture of process equipment and mechanical manufacturing. In addition, the company invests considerably in quality management; HSE and sustainable development, already certified ISO 9001 version 2008, and version 2015. On the other hand, AMENHYD spa manages all its projects, from study to construction to operation and

maintenance, which allows it to offer turnkey solutions to all its clients. Finally, AMENHYD spa has values that frame all its activities:

1- Adaptation and learning mastery: The Company ensures the transfer of technology and the enrichment of its know-how through each project.

2- Quality of work: The Company listens to its clients and is constantly concerned with their satisfaction.

3- Valuation of employees: The Company is committed to recognizing the contributions of each employee with equity and to promoting the conditions for their personal and professional development.

4- Socio-environmental commitment: The Company's employees are aware of the social responsibility they bear in the territories where they operate.

5- Innovation: Each project is unique. The company puts its know-how, its inventiveness and its mastery of technologies at the service of its clients.

- **AMENHYD spa Activities**

AMENHYD relies on its know-how and its innovative solutions which will enable it to manage its businesses successfully, to position itself as a long-term leader in its field of activity. The company's professions are summarized as follows:

Water management: Historically, the company carried out sanitation and water supply works. In 2007, the company took a strategic turn by building its first wastewater treatment plant. Activities in the field of water include: treatment, pipe transport, pumping and storage of drinking water, purification and reuse of wastewater. As well as the treatment of injection and industrial process water.

Waste management: The Company manages household and industrial waste. Its activities include:

- Sorting, recycling and recovery of biological or energy material from recoverable fractions;
- The elimination, by incineration and by burial of the residual fractions;
- Treatment and recovery of sludge;
- On-site and/or factory treatment of industrial waste, as well as decontamination and rehabilitation of polluted sites or soils.

Construction: AMENHYD designs and builds in a traditional way (reinforcement, concreting, and formwork), buildings and infrastructures that meet the needs of communities and industrialists. Thus and through ALCAHYD, the company assembles prefabricated construction elements in reinforced concrete to carry out hydraulic structures and public works, as well as to construct civil and industrial buildings.

Deconstruction: The company offers, designs and manufactures solutions for mechanical and manual demolition, industrial dismantling (factories, industrial piping, dismantling of equipment and production lines, etc.)

Equipment Manufacturing: The Company provides flexible, locally packaged solutions by manufacturing and integrating mechanical process, water treatment, and gas injection equipment.

- **AMENHYD spa Objectives**

  The company strives to induce the following strategic objectives

  - A leader in its field of activity;
  - A company opens to new activities;
  - An actor who contributes through his activities to the common well-being;
  - Integration and encouragement of skills, continuous training and internal mobility of personnel;
  - Realization of projects in the standards of quality, costs and deadlines with a view to the satisfaction of the relevant interested parties;
  - A company that evolves while taking advantage and allowing its partners to benefit from its experiences;
  - Recovery of as much waste as possible from equipment management activities (oils, tires, batteries) and its businesses;
  - Meeting the security conditions for people and property of AMENHYD and its partners.

  The company aims through its strategy projected to 2030:

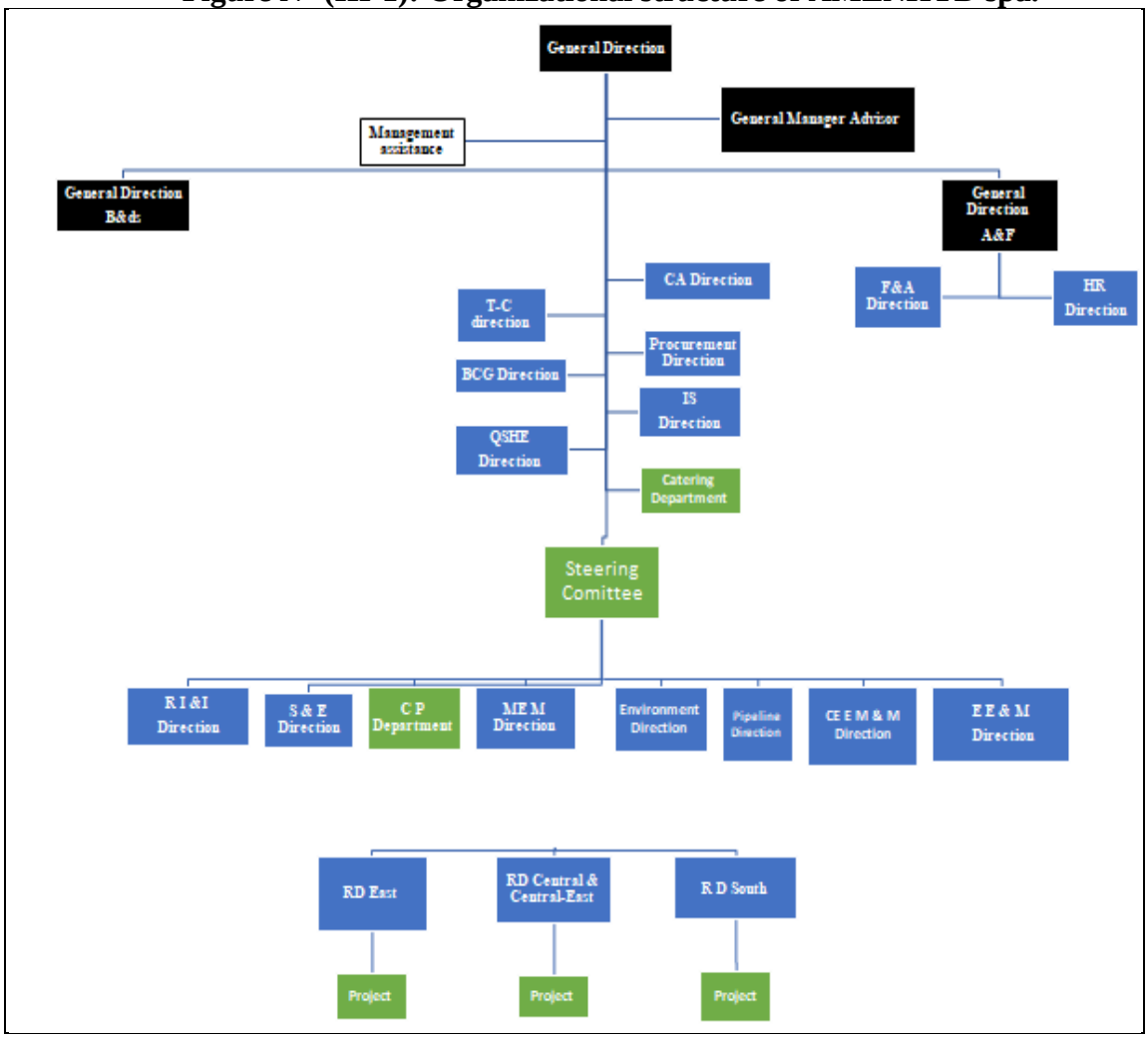
- To become the national leader in engineering design in the treatment channels (all types).
- Enhance water resources and protect the environment through reliable, innovative and digital solutions by means of: Solid partnerships, a high-performance team, and optimal processes
- To produce treatment equipment locally.
- To ensure, at the level of its projects, a decrease in operating costs, which will reduce the cost of portable, water compared to current costs.
- Reduce the investment costs of water treatment projects.
- To create an incubator of engineers specialized in water treatment, this trained and qualified human resources will be used to ensure the monitoring and operation of the treatment plants.

III.1.2. Organizational structure of AMENHYD spa

The company operates under a mixed functional hierarchical organizational structure, which is characterized by a degree of decentralization and combines multiple methods, so that the company uses functional centers to cover all business activities, and ranks employees according to their skills and experience; and focusing on teams, knowledge sharing and integration between business activities. In recent years, the company has moved towards greater flexibility and decentralization, to achieve adaptation and excellence in its business environment.

Figure N° (VI-1) shows the general organization of the company represented in the organizational structure.

Figure N° (III-1): Organizational structure of AMENHYD spa.



Source: AMENHYD spa organization manual.

The organization of the Company's structures, aiming for efficiency, rationality, initiative and greater accountability in the accomplishment of tasks, is based on the following principles:

- Singleness of command and coordination between the Central Functions, on the one hand, and between the regional departments & the Projects, on the other hand;
- Great autonomy of the Central and Regional Directions;
- Relations based on a management system by contractual objectives (performance contracts).

The general organization of AMENHYD spa is based on two levels which establish a sharing of roles between them:

- The one which is in charge of strategic management and design (Functional);
- The one which is in charge of operations and commercial management (operational).

A functional level: Concentrated at the Company's headquarters, the central level is made up of Central Structures/Activities whose missions are: Organization, Design, Planning, Coordination, Studies, Synthesis, and Control.

An operational level: This level is made up of the Regional Departments and Activities directly involved in supporting the Projects; they are loaded: Fulfillment operations; Logistical, technical support, etc.

In order to avoid multiplying the number of structures, these are reinforced by bodies that constitute additional forces of proposals at the service of all the company's activities. This creates a certain synergy effect. These bodies can be set up and shut down according to the needs expressed by the General Management. The bodies in question are:

a. Organization Committee:

The Organization Committee is a working group composed of the Budget and Management Control Director, the Human Resources Director and the QHSE Director. Its tasks are to examine, analyze and study:

- Elements of the Company's policy, particularly in terms of organization, quality management and human resources;
- Means and procedures likely to improve the management and performance of the Company, or any proposals and studies from the Heads of structures in this area;
- Draft training, recruitment, employment and career management plans;
- Draft collective agreements and remuneration and motivation systems;

  Projects for the organization and reorganization of different activities;

- The design and methodology for implementing the quality management system.

b. Steering committee

The steering committee is a group made up of process pilots, responsible for ensuring the proper functioning of the company, it is a decision-making structure, its role is to stimulate the dynamics of all the actors to improve the monitoring of their activities and validate the strategic choices and the optimization of financial resources. Its mission is to:

- Carry out preparatory work and feedback to the deliberative assembly;
- The validation of the choices and the monitoring of the smooth running of the company;
- Follow the milestones and reporting tools of the structures;
- Monitoring of the adequacy of the actions undertaken with the program initially selected;
- Identify the major risks of the company and set up a security system;
- Validate the strategic choices and the investments necessary for the proper functioning of the company in general and of the projects in particular;
- Analyze dashboards, performance indicators and compare the results obtained;
- Discuss the main problems and propose solutions.

From the presentation of the general organization of the Company, the presentation of the Central Structures that make it up follows. They are arranged by level, in the following order:

General Direction:

1. Budget and Management Control Direction: (BCG)

- To draw up the company's overall budgetary strategy and implement it in collaboration with the operational structures, while defining the resources required to achieve the objectives.
- To analyze the performance of activities in order to optimize their management and to provide the necessary tools to facilitate decision-making, in order to improve the relationship between the resources committed and the activity or results.

2. Technical-commercial direction: (T-C)

- Ensuring the prospecting and completion of commercial business by seeking sufficient coverage of the short and medium-term workload, in accordance with the company's strategic choices;

- To take charge of all studies related to its missions (market studies, price studies, development, etc.);
- Contribute to external communication with a view to improving the Company's brand image and strengthening its position on the market;
- Ensure a permanent market monitoring: current behavior and perspectives of its evolution in all its segments and components.

3. Contract Administration Direction: (CA)

- Manage the commercial contracts of customers;
- Ensure the recovery of receivables AMENHYD;
- Ensure the application of procedures and operating modes applicable to the company;
- Ensure the development of mutually beneficial relationships based on trust with our various customers and partners;
- Develop and transmit the contract to the client after publication of the award by the client;
- Ensure the follow-up of contracts with clients.

4. Civil Engineering Equipment Management and Methods Direction: (CEEM&M)

- Define the strategy of the civil engineering direction based on the global strategy of the company;
- To make available to the regional directions and construction sites all the methodologies, booklets and standards assigning good practices for each civil engineering work;
- To provide training in the implementation methodologies of formwork panels and civil engineering accessories;
- Assist the Technical-Commercial management in the submission of projects in the civil engineering field;
- Manage the company's activities in the civil engineering field and direct them more towards effectiveness and efficiency, particularly the preservation of its assets (formwork and all tools, etc.);
- Manage the interface between the regional directions, projects and the Civil Engineering Direction;
- Ensure the adaptation and improvement of production processes while using the new technologies displayed.

5. Pipeline Direction:

- To be a technical and organizational tool to help achieve the company's short and medium term objectives in the field of steel pipe construction and other types of materials for cost control;
- Plan, develop and adapt optimized construction methods ;

- Assist the technical sales management in the bidding process for pipeline projects;
- Contribute to the company's development strategy to enter new markets;
- Develop practices related to the Pipeline activity.

6. Studies and Engineering Direction: (S&E)

- Assist projects on technical aspects / implementation processes;
- Analyze and exploit contractual clauses;
- Participate in the preparation of offers;
- Coordinate between the construction and design structures;
- Participate in the preparation of budgets;
- Drawing up and transmitting to the General Direction the periodic reports and assessments of the structure's activity;
- Participate in the provisional acceptance of projects ;
- Take charge, together with the client, of anomalies linked to the execution plans;
- Drawing up technical and geotechnical studies for projects.

7. Electromechanical Engineering & Manufacturing Direction: **(EE&M)**

- Assist and participate in the elaboration of tenders with the technical-commercial management;
- Assisting regional and project management in the design and implementation of electromechanical activities ;
- Prepare the execution files;
- Preparing the budget for the company's electromechanical activities and setting up the necessary conditions for its implementation;
- Development and elaboration of adequate solutions to the offers related to the treatment of water and industrial waste;
- Drawing up and transmitting to the General Direction, the periodic reports and assessments of the structure's activity;
- Drawing up the quantitative budget for the solutions found;
- Validation, with the technical committee, of the solutions that have been developed based on the level of compliance and respect of the customers' requirements, normative requirements and other requirements that are necessary...;
- Ensure a permanent follow-up of the manufacturing process and the implementation /service of the sold solutions.

8. Material Equipment Management Direction: (MEM)

- Ensure the proper functioning of maintenance equipment, availability of equipment and machinery, identification and resolution of breakdowns;
- Satisfy requests for equipment from the various projects and regions;
- Provide the projects and regions with the equipment necessary for the smooth running of the work;
- To plan investment programs linked to the improvement of the organization in terms of quality, safety and productivity for the development of the company;
- Manage the interfaces with the departments and operational structures;
- Rationalize maintenance resources with a view to cost control;
- Monitor the environment and health and safety of the management and operational structures;
- To draw up and transmit to the General Management, the reports and periodic assessments of the structure's activity.

9. Environment Direction:

- Define the strategy of the environment direction;
- Contribute to the development of the load plan (participate in the submission of projects that fall within the field of the environment);
- Provide regional direction and construction sites with all the methodologies, booklets and standards assigning good practices in the field of the environment;
- Manage the company's activities transcribed in the environmental field and direct them more towards effectiveness and efficiency;
- Manage the interface between the regional directions, the projects and the environmental direction;
- Ensure the adaptation and improvement of production processes while using the new technologies displayed;
- Set up an engineering office specializing in the environment (management of household waste, management of special hazardous industrial waste, ecological engineering, impact and hazard studies of industrial installations, major industrial and technological risks, etc.);
- As part of national integration, establish a partnership with BIMECA Process for the manufacture of equipment for recycling and recovery of household and industrial waste.

10. Concrete Production Department: (CP Department)

- Make available to all production and construction activities, ready-mixed concrete as well as the materials necessary for their operation,

in the quantity and quality specified, and according to the established schedule;

- Respect HSE instructions;
- Ensure a working environment that complies with the standards and regulations in force;
- Follow the analysis of the objectives set by the hierarchy;
- Follow up and ensure the conformity of the equipment and the material used;
- Analyze and optimize production costs;
- Enrich the client portfolio;
- Ensure and improve customer satisfaction in terms of service quality and product quality;
- Manage and handle customer complaints;
- Meet the requirements of the technical clauses;
- Ensure the supervision and continuous training of staff.

11. Procurement Direction:

- Satisfy the requests of the projects and the structures of the company in supplies;
- Define the purchasing / subcontracting strategy in collaboration with the general management and ensure its implementation through a targeted choice of "products / services" and "suppliers / subcontractors";
- Sourcing: search for new suppliers / subcontractors / service providers adapted to the needs of the company's activity;
- Ensure the administrative management of stock movements and its optimization;
- Manage inventory operations and reconciliation with accounting;
- Ensure the maintenance, the maintenance in operation of the equipment, the material, the infrastructures and the buildings of the headquarters of the company and its annexes;
- Ensure the digital and physical archiving of company documents.

12. Realization of Investments and Infrastructures Direction: (R I&I)

- Implement the investment policy adopted by General direction;
- Preparation of the budget relating to the realization of real estate investments.

13. Catering Department

- Ensure the organization and management of collective catering operations at the level of our projects;

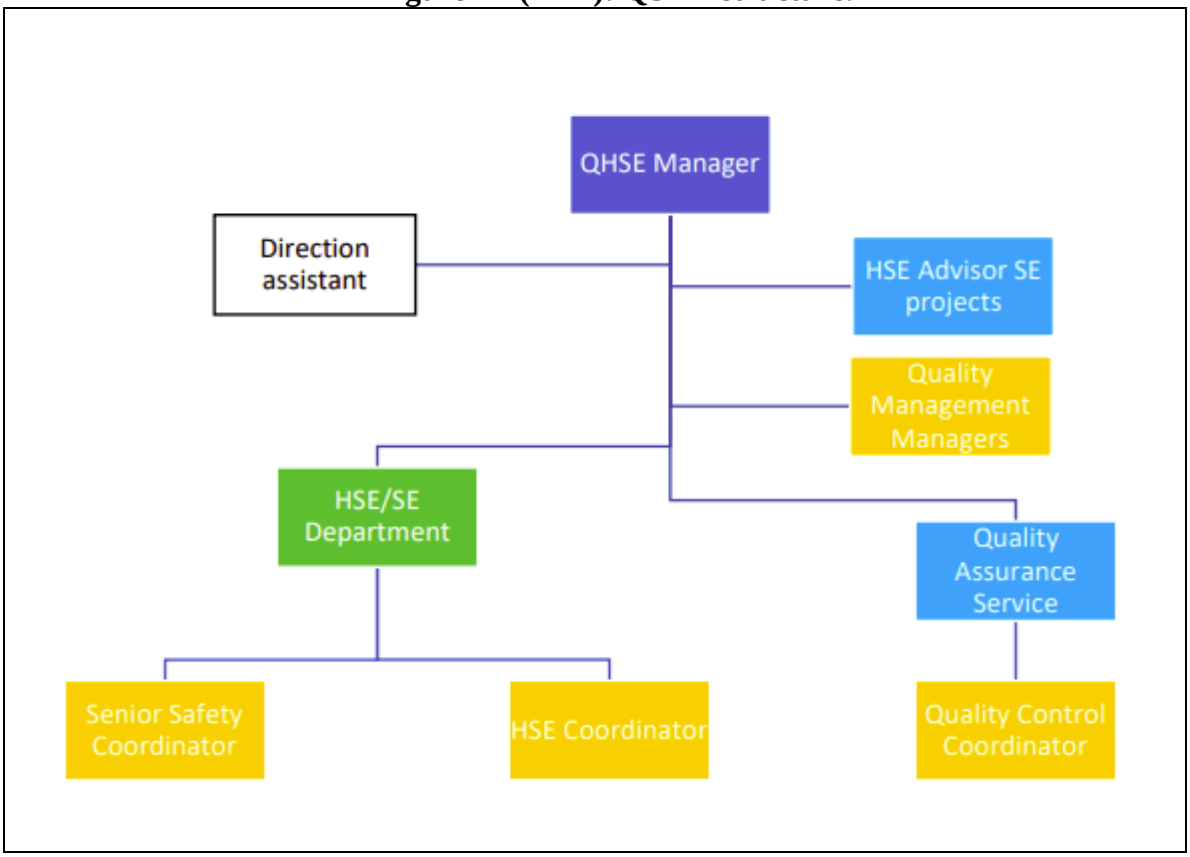
- Contribute to the organization of site facilities and living bases;
- Provide regional directions and projects with resources (human, kitchen equipment, barracks, etc.);
- Ensure the application of hygiene rules at the level of catering premises;
- Ensure the development of skills dedicated to the management of basic life and catering of the company;
- Ensure the support and organization of internal and external events of the company (visits of the authorities, seminars, meeting, snacks and others...).

14. Regional direction: (RD)

- Implement the strategy and the quality policy adopted by the general direction;
- Manage the quality management system implemented at the regional level and contribute to the achievement of the company's objectives;
- Establish and transmit to the General direction, the reports and periodic assessments of the activity of the structure.

15. Quality, Safety, Health and Environment Direction: (QSHE)

Figure N° (III-2): QSHE structure.



Source: AMENHYD spa organization manual.

Missions:

- Set up, on the basis of international standards, a Quality Management System applicable to all the activities present in the company;
- Design, maintain and constantly improve the Quality Management System according to the standards in force;
- Establish and send to the General direction, the reports and periodic assessments of the activity of the structure;
- Maintain and develop the Quality Management System to enable it to integrate, once the degree of maturity has been reached (effective and efficient), the dimensions relating to Occupational Health and Safety and the Environment;
- Preserve the health and well-being of workers, particularly those exposed to work classified as hazardous;
- Preserve damage to the environment that could be caused by the work or behavior of the Workers;
- Research and implement conditions aimed at eliminating the causes of work accidents.

a. Attribution in terms of the Quality Management System

- Implement the quality approach and ensure that it runs smoothly, through periodic assessments;
- Organize the documentary system of all the Processes, manage it by ensuring the harmonization and overall consistency of the management documentation of the Company's Activities;
- Define the rules for controlling the distribution of management documentation and monitor their application;
- Regularly improve the actors of the QMS to increase their efficiency in the management of their Activities;
- Organize the maintenance and continuous improvement of the QMS;
- Set up an internal audit system in accordance with the guidelines of the general direction in the matter;
- Develop annual internal audit programs, monitor their implementation and use the audit results;
- Propose to the General direction the axes and ways of improvement in all the fields of activity of the company (procedures, organization, technique, etc.);
- Assist the process pilots in the implementation of improvement plans, their evaluation and in the exploitation of the results;
- Supervise external audit operations.

b. Attribution in terms of Hygiene Safety-Health and Environment HSE

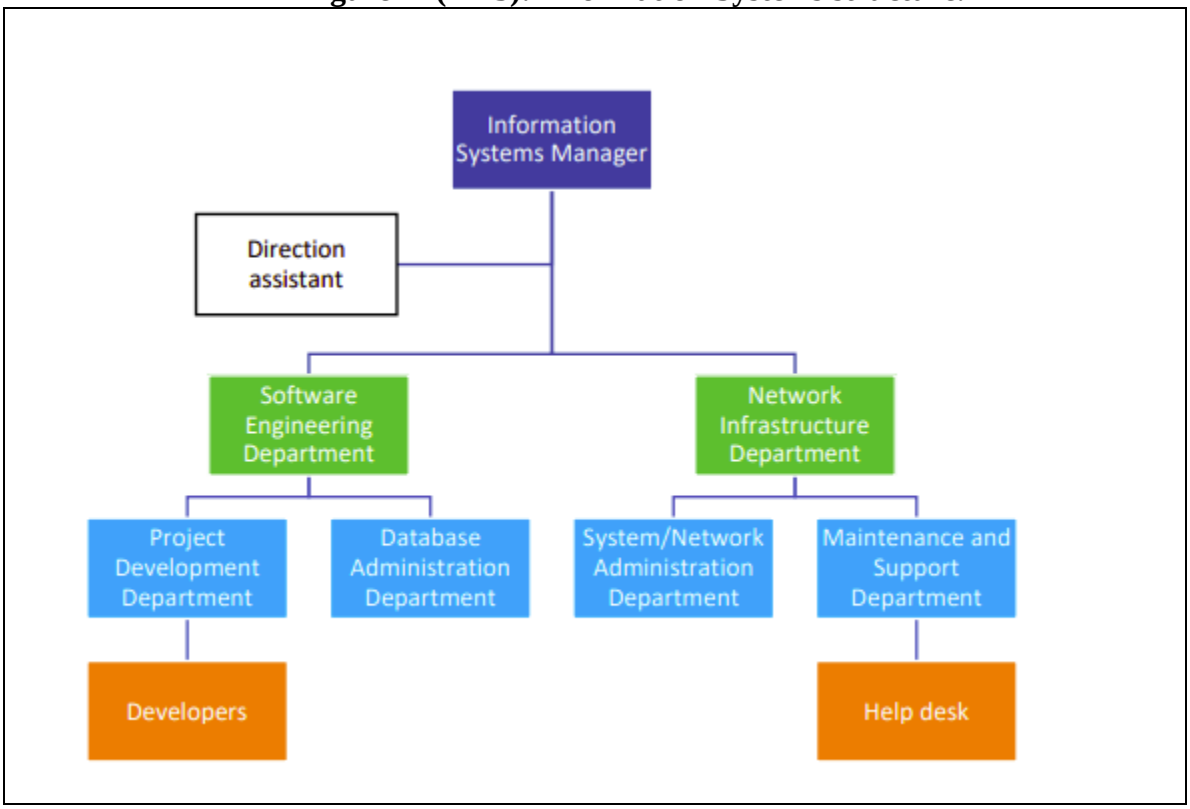
- Propose and implement the Company's HSE policy;
- Set up and feed the HSE information system to regularly assess the level of achievement of the objectives set;
- Ensure regulatory, legislative and normative monitoring related to HSE prevention;
- Write and check HSE documentation;
- Ensure the distribution of documentation related to HSE;
- Ensure compliance with health, safety and environmental instructions and rules in all places (workshops, storage areas, offices, etc.);
- Ensure regular verification of the condition of safety equipment.

c- Attribution in terms of the Internal Security of the SIE Establishment

- Continuously monitor, in terms of SIE, the internal security situation at company level;
- Report daily to the General direction on the situation relating to the Internal Security of the fixed sites and at the regional/project levels;
- Make available to the regional directors as well as the heads of the central directions or the projects, the various standards or safety instructions and ensure their deployment.

16. Information Systems Direction : (IS Direction)

Figure N°(III-3): Information Systems structure.



Source: AMENHYD spa organization manual.

Missions:

- Ensure the development of the company's information system;
- Manage the acquisition and implementation of computer software and services;
- Evaluate the state and operation of the IT tool within the company;
- Ensure the development of IT tools and the introduction of new technologies within the company;
- Improve the functioning of business applications using new technologies;
- Ensure the proper functioning of applications;
- Develop management applications;
- Ensure the administration of databases and application servers.

a. Attribution in terms of Software Engineering

- Supervise the project development department and the database and application server administration department;
- Validate requests for use, development or modification of applications;
- Ensure the consistency of all applications to be acquired or developed as well as the quality and security of the information system and the control of costs and deadlines;
- Maintain existing applications;
- Design and build new applications;
- Install, configure and optimize databases;
- Backup and restore databases;
- Ensure database security.

b. Attribution in the field of preservation and maintenance of Network Infrastructures

- Implementing new collaborative solutions;
- Ensure configuration and monitoring of the group's network interconnections;
- Install updates and new software;
- Solve problems encountered by hard and soft users;
- Ensure the installation and configuration of servers;
- Resolve incidents related to computer security.

General Direction Administration and Finance: (GDA&F)

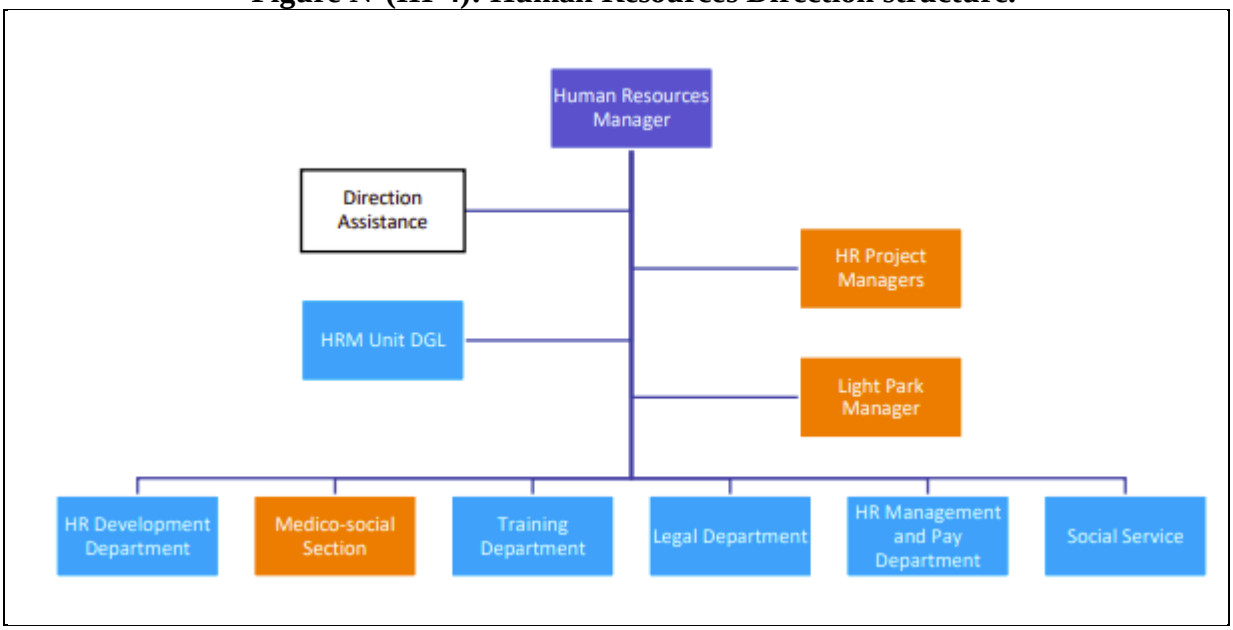
17. Finance and Accounting Direction: (F&A)

- Design, propose and implement a financial policy;

- Ensure the financial, accounting and tax management of the company;
- Ensure the financial balance of the company and propose all measures aimed at improving products, reducing costs, optimizing investments and limiting indebtedness;
- Ensure sound financial management and the safeguard of the financial interests of the company;
- Develop close relations with the banking system in order to seek the financing necessary for the operations to be undertaken by the company;
- Constantly seek the optimization of the company's taxation;
- Ensure the consolidation of records of all flows caused by the Company's activities in compliance with the standards and rules enacted in this area through cost control.

18. Human Resources Direction: (HR Direction)

Figure N°(III-4): Human Resources Direction structure.



Source: AMENHYD spa organization manual.

Missions:

- Define the human resource strategy according to the economic strategy of the company and the concerns collected from the management.
- Ensure the implementation of the budgetary policy assigned by the general management within the framework of the management of the human resources of the company.

- Break down this strategy into major HR issues and define an action plan to achieve them.
- Establish and transmit to the general management, the reports and periodic assessments of the activity of the structure.
- Make the necessary skills available to all of the company's activities, according to the planning adopted.
- Ensure the rational use of the company's human resources and the conditions of motivation that allow its fulfillment and harmonious development.
- Contribute to the definition and implementation of the company's human resources policy in terms of recruitment, remuneration, motivation, management of species.
- Guarantee the permanent adequacy between the human resource and the needs of the company's activities on the skills and workforce plan.
- Evolve; manage the regulatory system governing labor relations and remuneration systems.
- Improve the image of the company, enhance it and make it conform to its project, its vision, its ambitions and its determination.
- Communicate on the performances and the values of the company, both internally (to the Employees 'Employees' motivations) and external (in order to reassure the partners).
- Preserve and defend the interests of the company with third parties.
- Advise general management by bringing, to all its management acts and decisions, legal and regulatory clarification.
- Ensure all relations with legal, administrative bodies (taxes, CNRC, ONS, labor inspection, lawyers, notaries, bailiffs, gendarmerie, and security service).
- Ensure legal monitoring: Giving internal opinions on all business relations: staff, supplier customers, taxation as well as support for structures.
- Study the files on the legal level.
- Follow up pre-litigation files.
- Ensure to minimize the loss of the procedures opposing the company.

a. Attribution in the area of Human Resources Management

- Control all acts relating to the management of Human Resources on the basis of regulatory and budgetary references;
- Carry out the internal control of the Personnel Managers of the Fixed and Mobile Sites;

- Apply the conventional system and the Company's internal regulations and ensure their implementation at company level;
- Plan, monitor and formalize staff movements;
- Manage the files of all the Company's Executives;
- Pilot the management of the administrative career of the staff and apply the legislative and regulatory provisions relating thereto;
- Plan, organize, ensure, and monitor the operations of hiring and periodic medical visits according to Occupational Medicine conventions;
- Prepare mission orders, leave certificates, certificates and work certificates;
- Prepare employment contracts, endorsements and job descriptions;
- Manage the reception of new recruits and ensure their integration.

b. Attribution in terms of HR Development

- Initiate all studies aimed at the development and enhancement of Human Resources (compensation, motivation, working conditions, etc.) and forward management based on statistical analyzes carried out on the payroll, the workforce (turn-over, absenteeism, recruitment, internal climate, strikes, mobility...);
- Proceed with the selection and recruitment of Executives for all the Company's Activities;
- Develop periodic recruitment plans;
- Recruit the Company's Supervisory Staff;
- Put in place a system for locating and identifying people with high potential and bringing together the conditions relating to their development;
- Develop the Company's personnel evaluation systems and procedures;
- Periodically analyze the dashboard and lead the Human Resource Process Review;
- Establish the budget and ensure compliance;
- Put in place the tools necessary for planning and carrying out actions to develop skills and promote human resources;
- Identify strategic positions in relation to the Company's activity
- Provide job descriptions and update them;
- Develop and implement the basic tools of HRM (Repository of jobs and skills, recruitment plans, mobility plan, performance evaluation system, career path system, skills assessments, training plans);

- Provide advice and assistance to management in personnel management;
- Alert human resources to possible abuses (example: increase in absenteeism, deterioration of the social climate, etc.);
- Monitor the internal and external mobility of staff.

C. Attribution in matters of social activity

- Set up the occupational medicine conventions to the competent institutions

Participate with the HSE department in identifying dangers and the assessment of risks and professional diseases related to the activities of the company;

- Respond to all staff complaints;
- Ensure compliance with HR management procedures, internal regulations and regulations in force;
- Manage leave (illness, professional accidents), maternities and monitor the offices, in particular the bad weather of projects;
- Take charge of a regulatory component relating to the weather unemployment of the company in relation to CACOBAPTH;
- Establish CNAS/ CACOBAPTH contributions;
- Assist the HRM project in their investigations;
- Remove the CHIFAA card activation files;
- Check the writing and submission of the report and certificate of work accident on time;
- Establish social security documents (ATS/DRT);
- Enter on application the acts of social management.

D. Attribution in terms of training management

- Identify the training needs of the company's personnel;
- Develop projects of annual and multi -year training plans; Plan training actions;
- Follow up on the application of the training plans put in place;
- Ensure the follow-up of training on the plans of the educational organization (preparation of educational materials, reception of learners, and their care during all their stays), administrative management (convocation, establishment of certificates of participation, monitoring of 'Assiduity, etc.);
- Perform the evaluation operations of trained personnel;
- Manage the file of internal and external trainers and carry out their periodic evaluation;

- Manage relations with professional and institutional training partners;
- Design and develop relevant training programs in relation to the recommendations of career development and management plans;
- Respond to all staff complaints.

E. Assignment in terms of pay management:

- Manage the staff remuneration system;
- Regularly control the compliance of pay management acts in relation to regulatory, conventional, and internal procedures.

F. Attribution in the medico-social:

- Organize the medico-social missions of the company in terms of support, orientations and the conduct of the necessary medical expenses;
- Ensure the necessary social assistance for the needy of the company;
- Manage interfaces and relations with external medical institutions;
- Ensure the periodic conduct of the medical visits of all the employees of the company.

G. Attributions in matters of pre-litigation legal:

- Represent the company to public institutions which fall under the legal field, in particular the labor inspectorate;
- Follow the files of formalizations and advise business managers with regard to the care and the culmination of litigious files;
- Prepare the files of disputes relating to social, commercial, civil, property, administrative, and criminal law;
- Receive letters related to legal activity;
- Represent the company with justice auxiliaries.

h. Attributions in matters of litigation legal:

- Take charge of the company's dispute files and ensure their culmination at the level of the courts;
- Exchange requests with the opponents;
- Represent the company with the courts and attend hearings;
- Make calls to courts;
- Take care of the processing of social, and commercial files ;
- Withdraw the verdicts pronounced by the courts against or in favor of the entre;
- Request and follow the payment of judgments executed.

I. Contract manager and legal monitoring:

- Ensure legal, regulatory monitoring and communicate updates related to legal activity;

- Review the contract projects and report the risks appearing there.

General Direction Business & Development Strategy: (GDB&DS)

- Develop markets, diversify the company's activities;
- To determine the strategic orientations, the objectives to be reached and the means to be implemented, after analysis and evaluation of the various market components;
- Promote the company's brand image and detect new potential clients likely to bring new market shares to the company, new products/solutions to adopt in order to broaden its commercial offer and new partners with whom the company could collaborate;
- Validate, with the shareholders, the strategic development projects and ensure the proper deployment of the strategic map/plan;
- Lead the activities related to the implementation of BIM;
- Implementing the company's digitalization strategy;
- Elaborate the budget necessary for the implementation of the validated development plan;
- Accompanying and monitoring the level of achievement of strategic objectives;
- Carrying out the necessary feasibility studies: technical or financial, and drawing up the related guidelines;
- Supervising the partnership networks created and representing the company at external events;
- Analyze strategic trends and validate the related development action plans;
- Drawing up and transmitting to the General Management**,** the periodic reports and assessments of the structure's activity.

III.2. Research method

This study adopted a case study approach, using a mixed method: quantitative and qualitative. Quantitative research aims to count and measure phenomena (Minichello & Huberman, 1994). The measurement process is at the heart of quantitative research as it provides the fundamental link between empirical observation and the mathematical expression of quantitative relationships. It is most often carried out through a survey of a representative sample of the population, so that the results can be extrapolated to the whole population under study. Qualitative research is concerned with understanding the processes underlying various patterns of behavior. According to Minichello and Huberman (1994), qualitative research attempts to capture people's meanings, definitions and descriptions of events

(Minichello & Huberman, 1994). Qualitative studies are usually in-depth investigations, using a very limited sample. Qualitative research is usually based on one or more of four methods of information gathering: participation in the setting, direct observation, in-depth interviews and analysis of documents and materials (Neuman, 1994). Based on the different intentions of the two research methods, this study had elements that required both methods.

To determine the company's situation with regard to the study variables, we conducted interviews to identify its IT capabilities, organizational structure, communities of practice, quality, project management efficiency, research and development, training, level of response to customers, and knowledge management processes capabilities. We opted for a qualitative research method as we wanted to get answers to questions that shed light on the company's reality, which seemed best addressed through discussions with its leaders. For the evaluation of the organizational culture and the role of knowledge management infrastructure in building sustainable competitive advantage in the company, we chose a quantitative research method as we were interested in individual responses from participants. Thus, we used interviews and document research for the qualitative part of the research and two questionnaires for collecting the quantitative data of the research.

III.3. Research instruments and documents

As mentioned earlier, a case study methodology was chosen for this study. There are many instruments that help us to collect qualitative and quantitative data available in the case study methodology. The instruments related to this study are briefly described.

Interviews

Interviews are primarily used to collect qualitative data and are often conducted to uncover rich and complex information about an individual. The interactive face-to-face process can, under the guidance of an experienced interviewer, encourage the interviewee to share intrinsic opinions (Cavana, Delahaye, & Sekaran, 2001). A well-designed interview is based on six factors: The interview schedule; Listening; Interrogating; Paraphrasing; Probing; and Non-verbal behavior (Cavana, Delahaye, & Sekaran, 2001). To gather data on the reality of the company, we designed several interviews. Each interview was directed towards a specific leadership according to the requirements of the subject. In accordance with Cavana (2001), an interview guide was developed to ensure the quality and consistency of the discussion:

- Thank the interviewee for taking the time to participate in the interview.
- Explain the purpose of the research study and the interview.
- Conduct the interview on the basis of the prepared questions.
- Ensure that the interviewee has the opportunity to ask questions.
- Close the interview by thanking the participant and asking if it would be possible to contact him/her again in case of further questions.

Furthermore, this research phase also served as input for the questionnaire design and was used in the final analysis assist in understanding the role of knowledge management infrastructure in building sustainable competitive advantage in the company.

Questionnaires

The two questionnaires were based on questions related to the literature on the subject, such as the studies by (Lee & Choi, 2003), and (Denison, Hooijiberg, Pane, & Lief, 2012). Before distributing the questionnaires, we had experts (professors at the Faculty of Economics, Business, and Management Sciences of Chlef University and leaders from the company) evaluate them. Then, we modified the questionnaires based on their feedback before distributing them. We administered the first questionnaire during the interviews and the second questionnaire later.

The first questionnaire aimed to identify the company's overall organizational culture and the degree to which it supports knowledge management values such as trust, cooperation, and knowledge sharing. The second questionnaire helped to validate the data collected through interviews and document research. It also explored the correlation between the study variables and the role of knowledge management infrastructure in building a sustainable competitive advantage for the company.

Document Research

Document research is another research approach to gather data and information without asking questions of respondents. Document research can be used to support information which has been already collected through other methods such as interviews or questionnaires (Cavana, Delahaye, & Sekaran, 2001). Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge. Documents of all types can help the researcher uncover insights relevant to the research problem. Whereas, document analysis has served mostly as a complement to other research method (Bowen, 2009).

III.4. Empirical Research Design

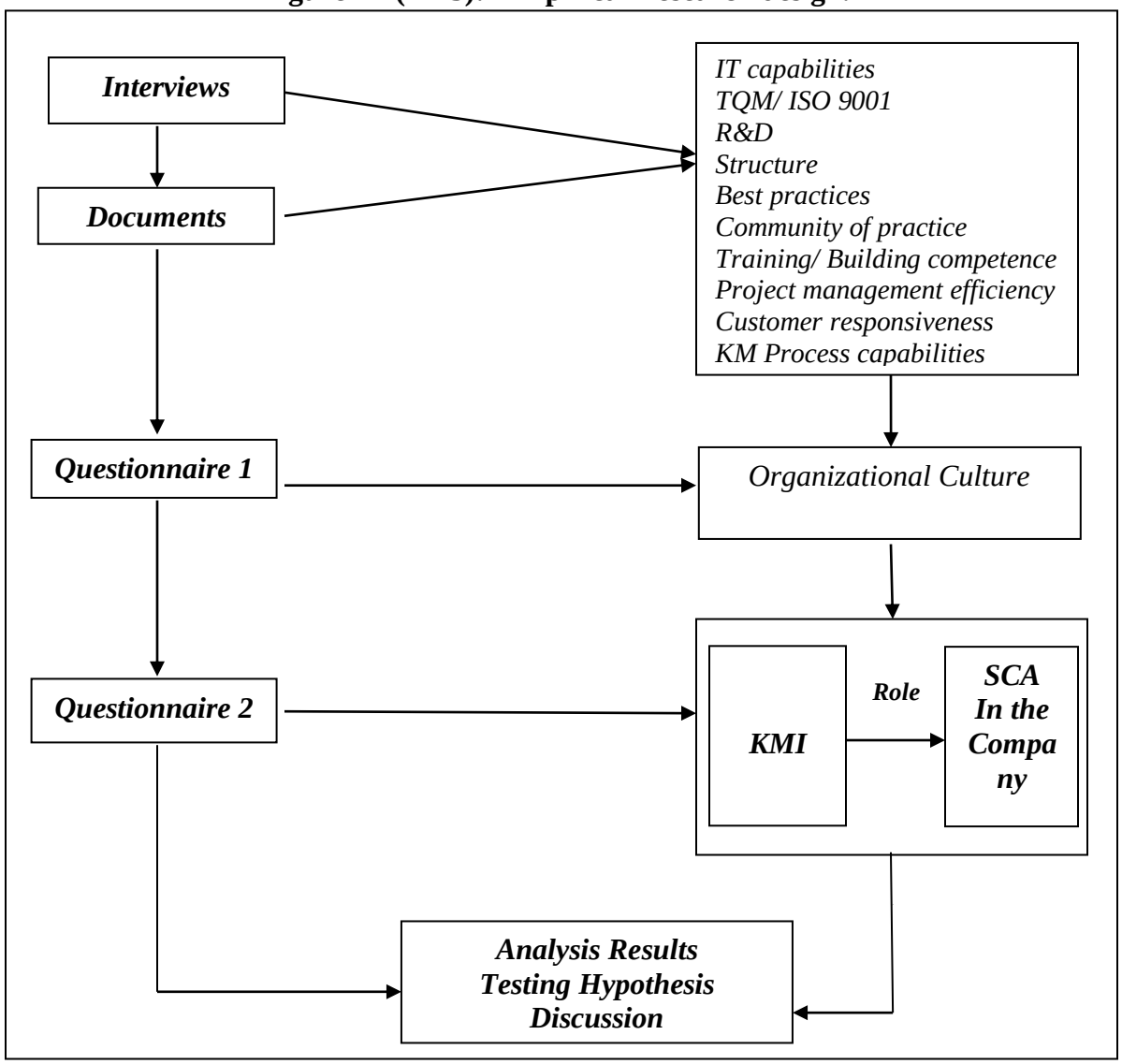
To achieve the objectives of the study, we devised the following applied study plan (See figure N° III-5)

- We visited the company multiple times and engaged in discussions with the leaders, including the DRH, DQHSE, and Development Manager, to explain the study's topic. Through their responses to our explanation, they demonstrated their interest in the subject and expressed a willingness to cooperate in this regard.
- We conducted interviews to gain insights into the areas of the company relevant to the study. The human resources manager directed us and scheduled appointments with individuals who could provide answers based on their respective specializations. We met with the Director of Information Systems, Director of Quality Management, Responsible of Development, Director of Human Resources, Human Resources Development Manager, and Training Department Manager.
- The first questionnaire was distributed, which focused on organizational culture, in order to identify the company's culture. The Director of Human Resources asked Mrs. Rashedi, to assist us in the process of distributing and retrieving the questionnaire, thereby facilitating our task.
- After analyzing the first questionnaire and interviews, we gained a better understanding of the reality of the company with regards to knowledge management, the infrastructure for knowledge management (including organizational culture, structure, and information technology), the building blocks of sustainable competitive advantage (efficiency, quality, innovation, and customer responsiveness), and the company's competitive advantage.

We designed the second questionnaire to include questions about the dimensions of knowledge management infrastructure and the building blocks of sustainable competitive advantage in learning organizations. Our aim is to establish the correlation between the two variables of the study, as well as the extent to which knowledge management infrastructure contributes to building sustainable competitive advantage in the company.

- Retrieving and analyzing second questionnaire.
- Using this information, we identified the level of knowledge management within the company and discussed the results.
- Testing Hypotheses.
- Discuss the results.
- Provide recommendations.

Figure N° (III-5): Empirical Research design.



Source: By researcher

"Despite this, it must be noted that the company has been subject to monitoring and judicial review since the end of 2019 due to accusations of illegal transactions which led to the arrest of its owners, the appointment by the court of an administrative administrator to oversee the company and a final decision will be made in June 2023, confiscating their private property and dismissing workers."[1]

[1] https://www.aps.dz/ar/recherche?searchword=%D8%A3%D9%85%D9%86%D9%87%D9%8A%D8%AF%202023&searchphrase=all/
https://www.echoroukonline.com/%D8%A7%D9%84%D8%B4%D8%B1%D9%88%D8%B9-%D9%81%D9%8A-%D8%AD%D8%AC%D8%B2-%D9%85%D9%85%D8%AA%D9%84%D9%83%D8
Retrieved 17/09/2023

Recap

In this chapter, we have provided an overview of the AMENHYD spa Company. Additionally, we have explained the experimental research design by defining the research methods (including quantitative and qualitative methods), the instruments used (interviews and questionnaires), and the documents utilized to gather information.

Chapter IV

This chapter describes and discusses the results of the research study. The first part provides a summary of the interviews, document research, and observations. The second part provides insight into the results of Questionnaire N°1, while the third part illustrates the results of Questionnaire N°2. The fourth part covers the testing of hypotheses, and the fifth part is dedicated to discussing the results. Finally, the roadmap for the knowledge management project is presented. Therefore, this chapter is organized into the following sections:

IV.1. Results of interviews
IV.2. Results of questionnaire N°1
IV.3. Results of questionnaire N°2
IV.4. Testing of hypothesis
IV.5. Discussion
IV.6. knowledge management project roadmap

IV. 1. Results of interviews

In order to uncover the reality of the company under study and gain more insight into important aspects directly and/or indirectly related to the subject of the study, a series of interviews was conducted with several company managers. These interviews revealed many facts that contributed to the analysis and discussion of the study's results. Additionally, since the cultural aspect is challenging to deduce or understand through a limited number of interviews (as it does not cover a large number of company members), an organizational culture questionnaire was distributed with the aim of identifying the predominant organizational culture in the company.

Interview N°1 with Manager of information system direction

Question N°1: What are the technological capabilities of AMENHYD spa?

Answer N°1: I believe that the company has a large capacity in information technology, because of the following:

1- The company is keen to allocate an adequate operating budget (subscription, service, etc.). Here is an operating budget presentation for the last 7 years.

Table N° (IV-1): Operating budget.

Year	Budget Million DA
2016	54
2017	58
2018	51
2019	57
2020	55
2021	56
2022	60

Source: director of information system direction

2- For tools, the company has a technical arsenal encompassing the world leaders in technical solutions: Bentley, Autodesk, Robot, Graph soft, Oracle..., these solutions cover all the disciplines targeted within the framework of the diversification of the group's activities.

3- The availability of the internet and the extranet makes it possible to link the company with its subsidiaries, and contributes to the sharing of information (See the Appendix N°1 p.202).

4- The IT team has developed an ERP management system "Enterprise Resources Planning", which aims to facilitate the management of all the activities of the company (HR, training, invoicing, stock...). In addition, the ERP contributes to the codification of all procedures and to the electronic archive (See appendix N°2 p. 203. and appendix N°3 p. 204).

5- The BIM (Building Information Modeling) project, which is a collaboration platform of management project. BIM helps the engineering team to integrate several work disciplines in the same project, and to do what is called clash detection which aims to detect anomalies automatically. BIM consists of two parts, Bentley software which makes the modeling calculations, and a platform developed by company' IT team which facilitates collaboration between all the elements concerned. Bentley software interfaces with ERP to facilitate project management. 18 BIM masters have had training abroad for the mastery of this technology. BIM aims to:
   - Improve the final product quality (project);
   - Reduce the rate of anomalies in project management (study, implementation);
   - Reduce the risk of error by at least 50%;
   - Reduce the cost of errors, and the cost of stopping the project when errors are produced.

6- The business intelligence project (BI) is a platform that helps the company makes the right decisions at the right time. The strength of BI lies in the fact that it can go from a recap to the details (time management, simulation, etc.). It contains:
   - Data analysis;
   - Company performance indicators. information alert (ex: out of stock);
   - Dashboards: the IT team develops dashboard programs that contribute to the creation of dashboards for all departments;
   - The update of the BI is done automatically through the ERP.

(Appendix N°4 p. 205 sown an example of dashboard)

Question N°2: Does the company systematically collect and codify knowledge (experience, skills...)?

Answer N°2: No, rather, we have a powerful information system that allows the identification, storage and distribution of information.

Question N°3: Can the company use business intelligence to establish knowledge management systems?

Answer N°3: Absolutely**.**

Interview N°2 With responsible of development

Question N°1: Does the company have the capacity to assess project risks and implement adequate response measures?

Answer N°1: Yes, the company has the ability to understand and manage the needs, expectations, priorities and interests of the company and customers.

And he adds, after the company approves the project, it forms what is called the project management team (there is a typical structure, which is modified according to the characteristics of the project, see Appendix N°5 P. 206). This team does the following:

1. The engineering study of the project, which allows presenting the real quantities of all materials used in the project without exception. At this stage, the team uses BIM, which is a collaboration platform of management project.

2. The planning officer studies the needs and presents the project budget.

3. The company presents some job offers to sub-contractors, and the priority in that is for the branches of AMENHYD group, provided that the conditions are met.

All this contributes to conducting a project study that is accurate and reduces errors.

Question N°2: Does the project team have the ability to manage project deadlines?

Answer N°2: Yes, and efficiently

Question N°3: Does this team have the ability to express and document clear and measurable project objectives?

Answer N°3: Yes, because the team is made up of highly qualified and experienced professionals in various disciplines. In addition, the members of the project team receive in-depth training which contributes to developing their capacities, particularly in the field of project management.

Question N°4: Does the project team have the capacity to handle project change requests?

Answer N°4: Yes, because the project management team (including the engineering team) is present daily on the site, and makes sure to find solutions to any problem or emergency requiring to change the study or the materials used in record time, which ensures continuity of work and reduces costs.

Question N°5: Does the company have the ability to direct quality assurance and quality control from projects to product and process?

Answer N°5: Regarding the project, AMENHYD spa is obliged to ensure the quality; otherwise it cannot compete and win the trust of its customers. Of course, the quality of the project comes from the quality of the products and the processes. Therefore, the company checks all the materials it uses in the implementation of the project. It tests the materials like cement, sand, iron...ext, in the laboratory, as for the materials like pipes, pumps..., they are examined at the factory level (whether the factory belongs to AMENHYD spa or not, inside or outside the country). The control is carried out by a

specialized commission made up of technicians from the company and technicians from the project owner. So, the company ensures the quality of the products, the processes, and the project.

Interview N°3 with Manager of QHSE

Question N°1: What are the objectives that total quality management seeks to achieve in the company?

Answer N°1: The role of this direction is to ensure the quality of the management system as a whole, quality of products, processes, materials used, human resources (skills), and the project. To achieve this objective, the direction has developed performance indicators for each process at the company, through which it can detect anomalies and imperfections, and find solutions. In this way, the company makes every effort to carry out its projects in accordance with quality, cost and deadline standards, with a view to the ever-increasing satisfaction of the interested parties concerned. Thus, the determination of the objectives of total quality management depends on the general strategy of the company. The monitoring and evaluation of the extent to which the objectives are achieved depends on performance indicators for each objective. At the end of each year, the company's total quality management submits the Management Magazine containing the results of the quality audit; analysis of the results and recommendations, in addition to the external audit carried out by the VARITAS (ISO 9001) institution. (See appendix N°6 p.207) The last audit of the VARITAS institution concludes that AMENHYD spa Company have zero non conformity (Appendix N°7 p.208).

Question N°2: How does Total Quality Management ensure process quality?

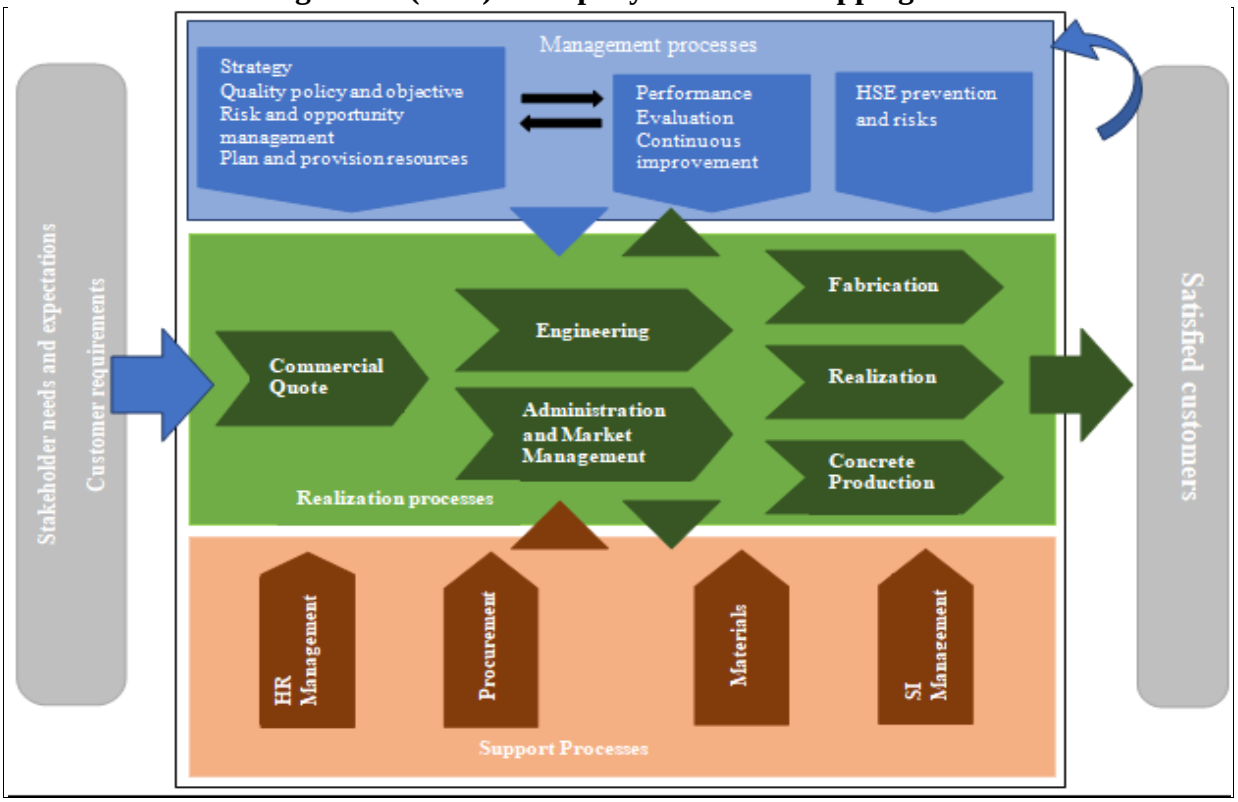
Answer N°2: There are three types of processes in the company: Management process; Production processes; Support processes (Appendix N°8 p. 210).

So Total Quality Management works to ensure quality of performance in all these processes using:

- AMENHYD spa procedures manual (procedures and operating modes related to the processes are developed) (Appendix N°9 p. 211);
- Measurement of processes performance indicators;
- Internal Audit;
- Processes management and review (SWOT analysis for each department).

He adds, from process quality assurance, the company meets the needs and expectations of stakeholders and customer requirements (See figure N° IV-1).

Figure N° (IV-1): Company Processes Mapping.



Source: Documents from QSHE Direction.

The company ensures the mobilization of the resources necessary for the implementation, maintenance and improvement of the quality management system based on the ISO 9001 standard. The company also has process performance indicators concerning customer satisfaction (See appendix N°10 p. 214).

- Assessment of internal and external customer satisfaction (Customer satisfaction rate);
- Customer complaint processing rate;
- Recurrence rate of customer complaints.

Question N°3: How are good practices determined?

Answer N°3: Whenever it becomes apparent that there is a better way to perform tasks effectively and efficiently in a particular activity, it is incorporated into the process. In addition, annually, the TQM reviews the tasks of each procedure/process and improves its content (adding tasks and/or deleting others), based on the evaluation of the practices and their effectiveness**.** For example, the training management procedure has 5 versions and the sales procedure has 10 versions (See appendix N°11 p. 216) Updating is not limited to procedures and processes, but extends to the company structure, so it makes changes in the company structure as part of

continuous improvement and adaptation to the current context. I put in your hands copies of the company structure for the years 2018, 2019, 2020 (see appendix N°12 p. 218)

Question N°4: Is there a department for knowledge management within the company structure?

Answer N°4: No.

Question N°5: Does the company plan to create this department in the near future?

Answer N°5: No. Because on the one hand, we believe that the company is currently achieving its strategic objectives in a satisfactory manner. On the other hand, we need to look more deeply into the issue of knowledge management, and we question its ability to achieve the company's strategic objectives. The company is looking to capitalize its knowledge through training, skills assessment and development, the establishment of engineering and management incubator, and teamwork, and it thinks this is enough for now.

Researcher's comment: However, all this does not allow for the transfer of individual knowledge (experience, competence, know-how) at the organizational level; because the company does not keep all this in knowledge repositories that allow it to be retrieved in time to benefit from it. In this way, the company develops the capacities of its members, but runs the risk of losing these skills and therefore this knowledge in one way or another.

Interview N°4 with HR Development manager

Question N°1: How are competencies evaluated in the company?

Answer N°1: The assessment of competencies in the company passed through three versions:

First evaluation version: Competencies are assessed by means of an application called "Application evaluation competences", which contains standard criteria. This application helps to identify the lack of competencies that the employee needs to do his/her job, and then the necessary training programs are determined.

Second evaluation version: The evaluation process has been developed by defining specific criteria for each job description. Individual interviews are conducted with all employees, during which the level of their skills is determined according to the scale of criteria (points depending on the level of skill). These results are recorded in the human resources database.

Third evaluation version: At this stage, the company seeks, in addition to developing skills and competences related to the performance of tasks (second version), to develop behavioral and leadership skills. For this

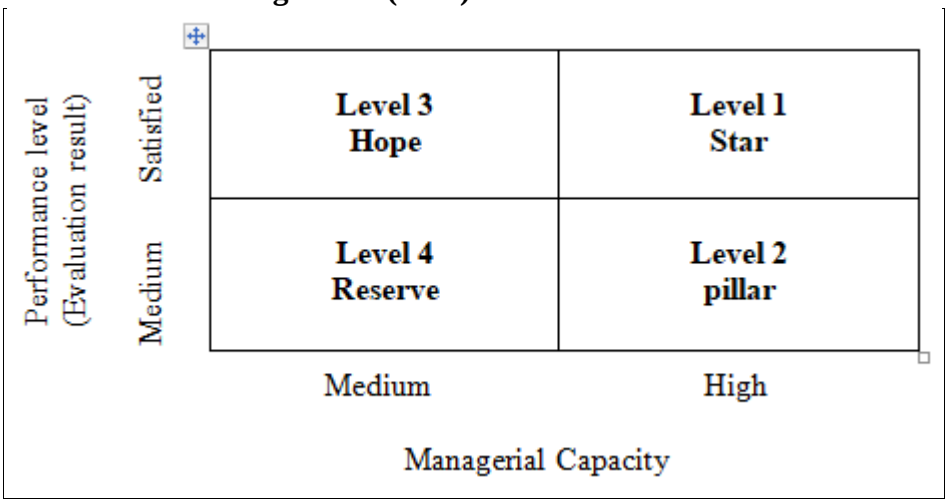
purpose, the company has added criteria for assessing managerial capacity. The aim is to see whether the company has members who are likely to occupy positions of responsibility in the future, and to detect high potential. The potential matrix is a competence analysis tool. It is used to identify employees who are likely to occupy a senior position following a staff assessment. The Matrix allows the positioning of employees along two axes:

a- Level of performance: The results of the annual competence assessment (see appendix N°13 p. 221).

b- Managerial capacity: Have a clear vision to define the objectives and plan the priority tasks by articulating the appropriate decisions to this vision, and this according to an evaluation grid (see appendix N°14 p. 223).

The combination between these two axes will give us a table (See figure N° IV-2) with four boxes, each of which has managerial characteristic.

Figure N° (IV-2): The Potentials Matrix.



Source: Document from HR development service.

Question N°2: Who among the employees is involved in evaluation and training?

Answer N°2: All employees involved in training, both permanent and temporary.

Question N°3: Don't you see that the training of temporary employees is an additional cost because they may leave the company after the end of the contract and not renew it?

Answer N°3: The Company cares about the quality of work, so it sees that the cost of training is less than the cost of errors that occur during work.

They add that the company is trying to build an incubator for engineers and leadership, helping it to maintain its competitive edge, which depends very much on the efficiency of the project engineering process, as well as on leadership skills in cooperation and teamwork.

Question N°4: Can you give me statistics about training in the company (allocated budget, consumed budget)?

Answer N°4: Yes. (We presented the statistic in the table below)

Table N°(IV-2): Statistic of training in the company.

Year	Allocated Budget Million DA	Consumed Budget Million DA	Consumption Rate
2016	17.6	19.4	110%
2017	16.7	16.2	96.8%
2018	17.6	20.9	118.3%
2019	15.9	15.5	97%
2020	33.0	15.4	46.7%
2021	14.6	13.8	94.5%
2022	16.0	11.6	72.5%

Source: Prepared by the researcher based on statistics from DRH

The statistics presented in the table N°(IV-2 **)** indicate that the company places a high priority on meeting training needs, even in cases where the allocated budget is insufficient. In such instances, the company seeks to supplement the budget shortfall with additional funds without reducing the number of trainees or training programs, as evidenced by the cases of 2016 and 2018. In the remaining years, the allocated budget was very close to the consumed budget for training, except for 2020 when the Covid-19 pandemic forced the company to shut down for several months, causing disruptions in the training process and resulting in only 46.7% of the allocated budget being utilized.

Interview N°5 with DRH

Question N°1: Are there so-called communities of practice at the company?

Answer N°1: Yes.

Question N°2: who participates in these communities of practice?

Answer N°2: Project leaders in addition to the regional director in which the project is implemented. These formal meetings pave the way for informal meetings between project leaders.

Question N°3: Are the meetings face-to-face or virtual?

Answer N°3: The Company holds monthly face-to-face meetings to monitor project progress, discuss problems, and find solutions through knowledge sharing. When projects involve different regions, virtual meetings are held to exchange experience and ensure effective project management and problem-solving. These meetings are encouraged by the company in an informal manner.

Question N°4: Tell me about the research and development unit in the company?

Answer N°4: AMENHYD spa established the Research and Development unit in 2018, and it developed over the years until it became a direction in 2022 under the name **"**General Direction Business & Development Strategy**"**, with 12 researchers (5 from the company and 7 experts and consultants from outside the company). The budget allocated to research and development has also evolved over the years (see Table N° VI-3). The research and development team conducted applied researches that have contributed to finding new solutions for projects design and implementation."

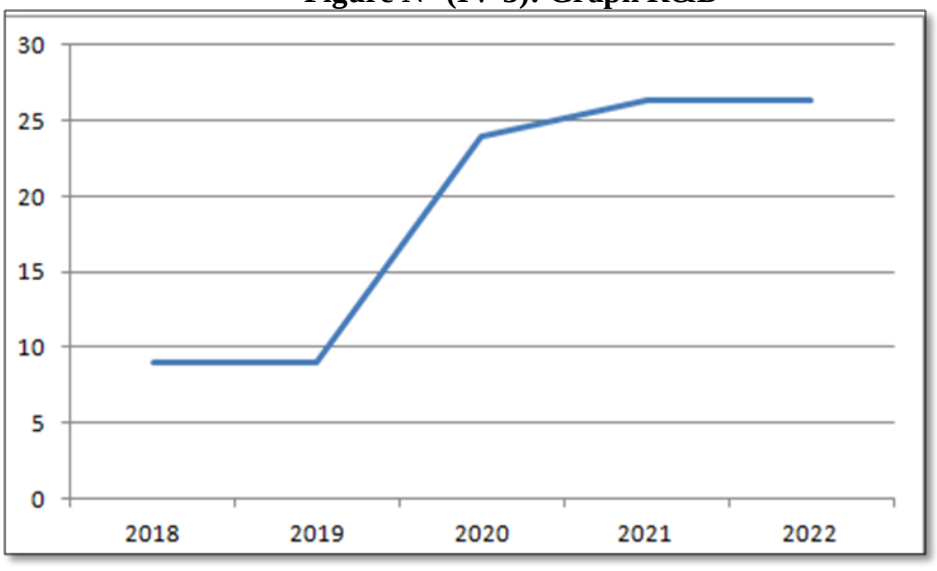
Table N°(IV-3): R&D budget.

Year	Budget Million DA	Percentage of the total budget %
2018	9	0.09
2019	9	0.09
2020	24	0.22
2021	26.4	0.24
2022	26.4	0.24

Source: Information from company.

The graph below shows more the level of interest in research and development in the company over the years, despite the small budget allocated to it.

Figure N° (IV-3): Graph R&D



Source: Prepared by the researcher based on the data given in the table

Question N°5: On what basis are employees remunerated?

Answer N°5: Achieve and/or exceed goals.

Question N°6: Is there a specific motivation system known to all company employees?

Answer N°6: Yes, but only for project staff.

Question N°7: Why?

Answer N°7: Because they are directly related to the achievement of the company's objectives in terms of carrying out projects with the required quality and cost and meeting delivery deadlines.

IV. 2. Results of questionnaire N°1

The study population consisted of 1995 members, divided into 3 work sites (Headquarters, Project, and Factory). The study sample was calculated as follows: $n= N/1 + N (e)^2$ Where n= the sample, N = the study population, e = the estimated sampling error: 0.05, so the sample was n = 333. We chose a random sample from the three work sites and from all administrative levels. We distributed 333 questionnaires, we recalled 327 questionnaires, we were canceled 5 of them, and therefore, the study was done on 322 questionnaires.

The questionnaire (see appendix N° 15 p. 224) consisted of two parts: The first section includes the personal information of the sample members (Educational level, Professional grade, Professional experience and Workplace). As for the second section, included questions related to organizational culture. We used the three-point Likert scale (Never, Sometimes, Always), and we used the statistical package for social sciences SPSS (frequency, arithmetic mean and standard deviation) (See appendix N°17 p.243) to read and analyze the answers of the study sample. The validity and reliability of the study tool was confirmed by using the root coefficient "Alpha Crombach", so that the tool is considered honest and stable if "Alpha Crombach" is greater or equal to 0.60. The value of "Alpha Crombach" was high and estimated at 0,925, this indicates the validity and reliability of the questionnaire; so, we can rely on it to analyze the results.

The level of effect is: the length of the field = 3- 1/3 = 1.66; meaning: From 1 to 1.66 weak, from 1.67 to 2.33 Medium, and from 2.34 to 3 high.

IV.2.1. Profile of respondents

Table N° (IV-4): Profile of respondents.

Personal characteristics	Evaluation	Frequency	Percentage %
Educational level	Under secondary	29	9
	Secondary	137	42.5
	University	136	42.2
	Post graduate	20	6.2

Professional grade	Senior executive	25	7.8
	Executive officer	101	31.4
	Mastery element	119	37
	Executive element	77	23.9
Professional experience	Less of 8 year	183	56.8
	From 8 to less than 16 year	109	33.9
	From 16 to less than 24 year	25	7.7
	More than 24 year	5	1.6
Work place	Headquarters	85	26.4
	Project	203	63
	Factory	34	10.6

Source: Prepared by researchers based on SPSS's output.

From the table N°(IV-4) we note that:

- 48.4% of the sample members have a high level of education, which is by nearly half the sample, and 42.2% have an average education and only 9% are low education, and this indicates that most of the sample members have the sufficient educational level to understand the subject of the questionnaire and answer it objectively.
- The presence of 101 executive officers (31.4 %) within the sample members (out of 103 executive officers in the institution) is an added value that contributes to giving more depth and objective answers to the questionnaire questions. It is also 37% (119) of the mastery elements is a logical percentage compared to the number of them present at the level of the company (521).
- 33.9% of members of the sample have more than 8 years of experience and 9.3% of them have more than 16 years of experience, along with 1.6% of them have more than 24 years of experience, meaning that 43.2% of the sample members have good knowledge of the company and its values, and they can give answers to express the reality of the organizational culture in the company.
- With regard to the workplace, the proportions in the table are logical rates because the number of workers at the level of projects is large compared to the headquarters or the factory. Thus, the sample can be considered balanced in relation to the distribution according to the workplace.

Table N°(IV-5): The results of testing the differences in the opinions of the sample members about the organizational culture according to personal variables.

	Source of variance	**Sum of squares**	**Degree of freedom**	**Mean of squares**	**Calculated F**	**Tabulated F**	**Significance level**
Educational level	Between groups	0.353	**3**	**0.118**	**1.209**	**2.63**	**0.306**
	Within groups	30.928	**318**	**0.097**			

	Total	31.281	**321**				
Professional grade	Between groups	1.043	**3**	**0.348**	**3.654**	**2.63**	**0.013**
	Within groups	30.239	**318**	**0.095**			
	Total	31.281	**321**				
Professional experience	Between groups	1.144	**3**	**0.381**	**4.023**	**2.63**	**0.008**
	Within groups	30.137	**318**	**0.095**			
	Total	31.281	**321**				
Work place	Between groups	0.28	**2**	**0.014**	**0.141**	**3.03**	**0.808**
	Within groups	31.253	**319**	**0.098**			
	Total	31.281	**321**				

Source: Prepared by researchers based on SPSS's output.

The results of the table N°(IV-5) emphasize that the calculated F was more than the tabulated F in the professional grade and professional experience; and the level of signification was less than (0.05). Therefore, the professional grade and professional experience had an impact on the depth and objectivity of the answers of the sample members. So the level of experience had a direct relationship with the objectivity of the answers. That is, the greater the professional experience, the more objective answers. As for the administrative level, the responses of senior executives and executive officers were more positive than the responses of the mastery and executive elements, and this is due to the nature of the leadership that always wants to give a good impression of the company in which he works, in addition to their more understanding of the goals and strategic orientations of the company.

IV.2.2. Statistical results of organizational culture

Table N° (IV-6): Arithmetic means and standard deviations of organizational culture items.

N°	Expressions	Standard deviation	Mean	Impact
In your company:				
1	There are common principles that everyone is committed to.	0.475	**2.34**	High
2	There is a climate of trust between the members.	0.438	2.26	Medium
3	Members give open and honest feedback to each other.	0.407	2.20	Medium
4	There is a high level of cooperation between the members.	0.479	2.32	Medium
5	There is a willingness to collaborate between teams and departments.	0.487	**2.38**	High
6	Members are willing to take responsibility for their professional mistakes.	0.486	2.27	Medium
7	Best professional practices are encouraged.	0.499	**2.34**	High

8	Best professional practices are integrated into its processes.	0.474	**2.34**	High
9	Members are encouraged to develop new ideas and working methods.	0.487	2.32	Medium
10	The sharing of knowledge (information, experience, skills...) between members in various professional fields is encouraged.	0.470	2.28	Medium
11	There is an incentive system that rewards knowledge sharing.	0.499	2.22	Medium
12	Teamwork as well as individual work is encouraged.	0.501	**2.34**	High
13	Team members revise their thinking as a result of group discussions or information gathered.	0.451	2.22	Medium
14	The leaders seek to develop the capacity of the members.	0.498	**2.34**	High
15	Leaders encourage members to apply the best available knowledge in their field.	0.470	2.28	Medium
	Total	**0.309**	**2.30**	**Medium**

Source: Prepared by researcher based on SPSS's output.

The results of the table **N° (IV-6)** indicate that there are several shortcomings, so the most important principles in the knowledge sharing culture came with a medium effect, of which the most important are: trust (2.26), cooperation between members (2.32), encouraging knowledge sharing (2.28) and incentive system that rewards knowledge sharing (2.22). These are seen as the cornerstones of building a supportive knowledge management culture. In addition, there are strengths in the company culture such as: encouraging and integrating best professional practices, cooperation between departments, encouraging teamwork and developing the capacity of members. Hence, it can be said that the company is moving towards improving its culture and needs more work in this respect.

Table N° (IV-7) summarizes the results in regard of knowledge management infrastructure and the building blocks of sustainable competitive advantage in the company.

Table N° (IV-7): The Company strengths.

Dimensions	Results
Organizational Culture (OC)	**1**. The company has common principles that everyone agrees to respect; **2**. The company promote the cooperation between teams and departments; **3.** The company promotes and integrates best professional practices into its processes; **4.** The company encourages teamwork as well as individual work;

	5. The leaders in the company seek to develop the capacities of the members; **6.** The company Work according to the principles of management by objectives.
Organizational Structure (OS)	**1.** The company makes changes in the organizational structure as part of continuous improvement and adaptation to the current context; **2.** The company encourage communities of practices; **3.** The company regularly writes the rules and processes in manuals; **4.** The company supports and encourages directions and departments to interact with each other.
Information Technology (IT)	**1.** The company has an adequate operating budget allocated for IT tools and services; **2.** The company uses technical solutions from world leaders in the field such as Bentley, Autodesk, Robot, Graph soft, and Oracle, which cover all the disciplines targeted within the framework of the diversification of the group's activities; **3.** The availability of the internet and the extranet helps link the company with its subsidiaries and facilitates information sharing; **4.** The IT team has developed an ERP management system that aims to facilitate the management of all the activities of the company and contributes to the codification of all procedures and to the electronic archive; **5.** The company has a BIM (Building Information Modeling) project, which is a collaboration platform for project management. BIM helps the engineering team to integrate several work disciplines in the same project and to detect anomalies automatically. BIM aims to improve the final product quality, reduce the rate of anomalies in project management, reduce the risk of error by at least 50%, and reduce the cost of errors and the cost of stopping the project when errors are produced. **6.** The company has a business intelligence (BI) project that helps the company make the right decisions at the right time. BI contains data analysis, company performance indicators, information alerts, dashboards, and is updated automatically through the ERP.
Efficiency	**1.** The project team has the ability to manage project deadlines and document clear and measurable project goals; **2.** The team has a high level of experience and training; **3.** The project management team can handle project change requests by being on site and finding quick solutions to any problems or emergencies that arise; **4.** The Human Resources Development Department evaluates competencies and determines training requirements by conducting individual interviews with all employees, during which their skill

	level is determined according to criteria specific to each job description; **5.** The manufacture of certain equipments helps to reduce costs.
Quality	**1.** VARITAS Audit 2021 confirms that the company has no anomalies and imperfections (ISO 9001); **2**. TQM ensure the quality of all processes in the company (The management process; The production processes; Support processes); (**Efficiency)** **3.** Annually, the TQM reviews the tasks of each procedure/process and improves its content (adding tasks and/or deleting others), based on the evaluation of the practices and their effectiveness**. (Best practices)** **4** The company involves a comprehensive approach to quality assurance, including a focus on meeting customer needs and expectations **(customer satisfaction indicators);** **5.** The company ensures project, product and process quality by carefully testing materials and conducting quality control through a specialized committee made up of company technicians and project owners.
Innovation	**1.** The company establish and develop Research and Development Department; **2**. Height (8) applied researches conducted by the department to find new solutions in project design and implementation; **3.** The factory contributes to the manufacture of numerous equipments used by the company in its projects; 4. The company has a technology monitoring system.
Customer Responsiveness	1. The company aims to achieve projects with high standards of quality, costs, and deadlines, to increase satisfaction among stakeholders; 2. From process quality assurance, the company meets the needs and expectations of stakeholders and customer requirements; 3. The company has the ability to manage client requests for changes in the project.

Source: Prepared by researcher based on results of interviews and questionnaire N°1.

In addition to what was stated in the table above, we can extract the company's weaknesses related to the subject of the study:

1. There is no knowledge management department within the company's organizational structure;

2. The company does not integrate the capitalization of know-how, despite its efforts to develop it;

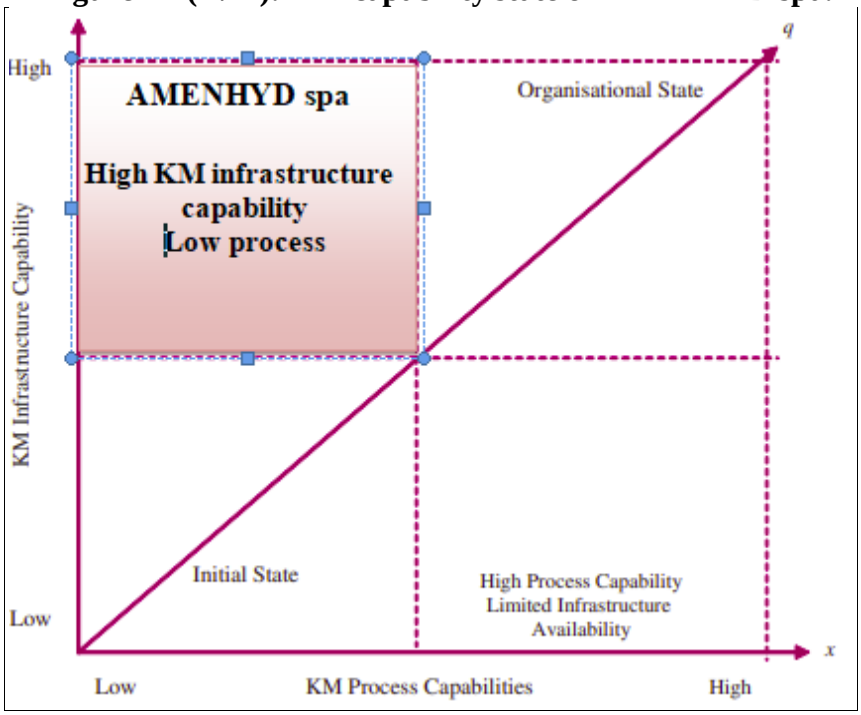
3. The company does not exploit its technological capabilities to develop knowledge management processes and systems;

4. The company needs to work more on the evolution of its culture towards knowledge sharing culture, trust, and collaboration between its members (especially at project level);

5. The company does not have an incentive system that includes all members, encouraging knowledge sharing.

Based on this information, we can determine the state of the company in terms of knowledge management capabilities, using a model of (Sandhawalia & Dalcher, 2011, p. 323) (See figure N° IV-4)

Figure N° (IV-4): KM capability state of AMENHYD spa.



Source: adapted from (Sandhawalia & Dalcher, 2011)**.**

The figure N° (IV-4) shows that The KM program in the company is in the state of high infrastructure capability because there is an emphasis on developing the infrastructure. The company's KM program could be considered to be in this state when individuals have access to infrastructure capabilities but do not avail themselves of its complete potential or capability, due to the lack of practicing knowledge processes. This implies that the company has invested in the necessary tools, technologies, and resources to support knowledge sharing and collaboration. The emphasis on developing infrastructure capabilities suggests that the company recognizes the importance of creating an environment that enables knowledge creation and dissemination. However, the high infrastructure capability state alone does not guarantee effective knowledge management. Individuals within the company must also actively engage in knowledge processes to realize the full potential of the infrastructure. While the infrastructure may provide

access to necessary capabilities, employees may not fully utilize them due to a lack of knowledge management practices. Thus, there may be room for improvement in terms of encouraging employees to engage with the available tools and processes to leverage the organization's knowledge management capabilities fully. Overall, the current state of the company's KM program is promising but requires further efforts to optimize its full potential.

From all the above, we conclude that:

The interviewee in the first interview discusses the information technology capacity of the company; and provides several points to support his belief that the company has a large capacity in this area. The interviewee provided specific details about the IT tools and solutions used by the company. They also highlight the benefits of a company's investment in information technology, such as improving the quality of the final product, reducing errors and costs, and facilitating decision-making. Overall, the interviewee's response indicates that the company has a robust IT infrastructure that supports its operations and decision-making processes.

In the second interview, the respondent provided details of the company's approach to operations and project management; he highlighted the company's efficiency in the area of project implementation. It is therefore clear that the company gains a competitive advantage by making its ability to implement projects distinctly, in terms of quality, efficiency and cost reduction while meeting delivery deadlines. This expresses the company's commitment to customer responsiveness and satisfaction. The project management team (especially the engineering team) plays a major role in achieving the company's competitive advantage.

The third interview provides insight into how Total Quality Management (TQM) is implemented and practiced in the company. The interviewee notes that the company aims to achieve projects with high standards of quality, costs, and deadlines, to increase satisfaction among stakeholders. The determination of the objectives of TQM depends on the general strategy of the company. This indicates that TQM is used to improve overall performance in the company. He also mentions that performance indicators are used to monitor and evaluate the extent to which objectives are achieved, indicating a focus on measurement and analysis in TQM. After, the interviewee explains how TQM ensures process quality, highlighting the use of a procedures manual, performance measurement, internal audit, and processes management and review. He also mentions specific process performance indicators, including customer satisfaction rates and complaint processing rates. This indicates that TQM in the

company involves a comprehensive approach to quality assurance, including a focus on meeting customer needs and expectations. And in his answer about best practices, he describes how good practices are determined, emphasizing continuous improvement and adaptation to the current context. The interviewee notes that when better ways of performing tasks are identified, they are incorporated into the process, and that annually, the TQM management reviews tasks and improves their content. This highlights the importance of flexibility and adaptability in TQM, as well as a commitment to continuous improvement.

The fourth interview provides valuable insights into how competencies are evaluated in the company. The interviewee explains that there are three versions of competency evaluation in the company. The first version involves using an application called "competences evaluation Application" which contains standard criteria to identify the lack of competencies that the employee needs to do their job. The necessary training programs are then determined based on this assessment. The second version consists of conducting individual interviews with all employees, during which the level of their skills is determined according to criteria specific to each job description. The third version seeks to develop behavioral and leadership skills and involves assessing managerial capacity using a Potentials Matrix. The interviewee confirms that the competence of all employees, whether permanent or temporary, is evaluated and that each has the right to training, according to the results of the evaluation. This indicates that the company places great importance on the development of its employees, regardless of their status within the organization. He also emphasizes the company's commitment to the quality of work and explains that the cost of training is less than the cost of errors that occur during work. This suggests that the company believes that investing in training, even for temporary employees, is a worthwhile investment in the long run. This contributes to developing the company's capabilities and improving its efficiency.

The fifth interview pointing that the company has communities of practice, which consist of project leaders and regional directors who participate in formal meetings to discuss project progress, problems, and solutions. This answer also highlights the importance of informal meetings and knowledge exchange between project leaders. This indicates that the company values collaboration and knowledge sharing among its employees.

The interviewee provides details on the format of the meetings in the communities of practice. The answer pointing that the company holds periodic face-to-face meetings to monitor project progress and discuss

problems, as well as virtual meetings for projects in different regions to exchange knowledge and experience. The answer emphasizes the informal nature of the knowledge exchange and the encouragement of the company for such exchanges. This indicates that the company values the importance of effective communication and collaboration among its employees. In another Answer, he describes the establishment and growth of the Research and Development Department in the company, highlighting the number of researchers in the department and the budget allocation for research and development. The answer also mentions the applied researches conducted by the department to find new solutions in project design and implementation. This answer indicates that the company places a strong emphasis on research and development as a means of innovation and improvement in its projects.

The KM program in the company is in the state of high infrastructure capability because there is an emphasis on developing the infrastructure and a lack of practicing knowledge processes.

As for the organizational culture questionnaire, the analysis of the sample and questionnaire results reveals several key insights into the company's culture and knowledge management practices. The fact that nearly half of the sample members have a high level of education, that indicates that the participants have the necessary knowledge and understanding to answer the questionnaire objectively. The results also show that respondents with more professional experience' provide more informed and accurate responses, because they are knowledgeable about the company and its values. The analysis of the questions which had a high impact indicates that the company has been successful in adopting many principles that align with knowledge management (cooperation between departement, teamwork, best practice, developing skills and capacities of members...), result the possibility to improvement.

Overall, the results suggest that company trend towards improving the culture to align with knowledge management principles. The respondents' medium effect implies that the company is making progress towards implementing these principles, which include knowledge sharing, trust, and cooperation among members. These insights provide valuable information that the organization can use to continue to develop its culture and knowledge management practices, ultimately leading to sustainability.

IV.3. Results of questionnaire N°2

In order to achieve the objective of the study, which is to determine the role of knowledge management infrastructure in building a sustainable competitive advantage in learning organizations, we prepared a

questionnaire (see appendix N° 16 P. 233) divided into two parts: the first part includes the personal information of the respondents, and the second part is divided into two parts, so that the first part includes questions related to knowledge management infrastructure; The second part consists of questions related to sustainable competitive advantage in learning organizations.

After submitting the questionnaire for review, the Human Resources Director and the Director of Development Department in the company assured us that the questions of the questionnaire, especially the part related to sustainable competitive advantage, can only be answered by senior executive, because the rest do not have the information to answer (because it is related to the strategic level). Therefore, after reviewing several books in statistics and consulting professors in the field, we came to define the study population or what is called "**The target population**", which Wu and Thompson (2020) defines as:" The set of all covered by the main objective of the study" (Wu & Thompson, 2020, p. 5). For that, the study population consisted of 73 senior executives. In order to conduct a comprehensive survey of the community, we distributed the questionnaire to the entire community. We retrieved 64 questionnaires, all valid for analysis. We used the three-point Likert scale, and we used the statistical package for social sciences SPSS (frequency, arithmetic mean, standard deviation, and Simple linear correlation) (See appendix N°18 p. 248) to read and analyze the answers of the study sample. The validity and reliability of the study tool was confirmed by using the root coefficient "Alpha Crombach", so that the tool is considered honest and stable if "Alpha Crombach" is greater or equal to 0.60. The value of "Alpha Crombach" was high and estimated at 0,923, this indicates the validity and reliability of the questionnaire; so, we can rely on it to analyze the results and test hypothesis.

To remind the level of effect is: the length of the field = 3- 1/3 = 1.66 meaning: From 1 to 1.66 weak, from 1.67 to 2.33 Medium, and from 2.34 to 3 high.

IV.3.1. Profile of respondents

Table N° (IV-8): Profile of respondents.

Personal characteristics	Evaluation	Frequency	Percentage %
Educational level	University	55	85.9
	Post graduate	9	14.1
	Other	0	0
Professional experience	Less of 8 years	36	56.3
	From 8 to less than 16 years	25	39
	From 16 to less than 24	3	4.7

	More than 24 years	0	0
Work place	Headquarters	22	34.4
	Project	34	53.1
	Factory	8	12.5

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-8), we can say that all respondents have a high level of education. 56.3% of them have less than 8 years of experience, which indicates the company's policy to renew leadership and give young talents an opportunity to assume senior positions. In addition, 39% of them have between 8 and 16 years of experience, which is a good level of experience, and 4.7% have more than 16 years of experience. All this indicates that the sample is a mixture of different generations and leadership experiences in the company, a mixture that makes the answers to the questionnaire more credible. With regard to the workplace, the proportions in the table are logical rates because the number of workers at the level of projects is large compared to the headquarters and the factory. Thus, the sample can be considered balanced in relation to the distribution according to the workplace.

IV.3.2. Results of testing the differences in the opinions of the respondents about the KMI and SCA in the company according to personal variables.

In the following, we study the impact of the personal characteristics of the respondents on their answers.

Table N°(IV-9): Results of testing the differences in the opinions of the respondents about the Organizational culture in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.041	**1**	0.041	0.329	**4.00**	**0.568**
	Within groups	7.694	**62**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	0.484	**1**	0.484	1.397	**4.00**	**0.242**
	Within groups	21.500	**62**	0.347			
	Total	21.984	**63**				
Workplace	Between groups	1.260	**1**	1.260	3.043	**4.00**	**0.086**
	Within groups	25.677	**62**	0.414			
	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-9), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Organizational culture.

Table N°(IV-10): Results of testing the differences in the opinions of the respondents about the Organizational structure in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.155	**2**	0.078	0.625	**3.15**	**0.538**
	Within groups	7.579	**61**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	1.024	**2**	0.512	1.490	**3.15**	**0.233**
	Within groups	20.961	**61**	0.344			
	Total	20.984	**63**				
Workplace	Between groups	1.486	**2**	0.743	1.780	**3.15**	**0.117**
	Within groups	20.452	**61**	0.417			
	Total	20.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-10), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Organizational structure.

Table N°(IV-11): Results of testing the differences in the opinions of the respondents about the Information Technology in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.062	**1**	0.062	0.503	**4.00**	**0.481**
	Within groups	7.672	**62**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	0.738	**1**	0.738	2.155	**4.00**	**0.147**
	Within groups	21.246	**62**	0.343			
	Total	21.984	**63**				
Workplace	Between groups	0.631	**1**	0.631	1.488	**4.00**	**0.227**
	Within groups	26.306	**62**	0.424			
	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-11), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Information technology.

Table N°(IV-12): Results of testing the differences in the opinions of the respondents about the Efficiency in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.020	**1**	0.020	0.161	**4.00**	**0.689**
	Within groups	7.714	**62**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	0.238	**1**	0.238	0.680	**4.00**	**0.413**
	Within groups	21.746	**62**	0.351			
	Total	21.984	**63**				
Workplace	Between groups	0.049	**1**	0.049	0.112	**4.00**	**0.739**
	Within groups	26.889	**62**	0.434			
	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-12), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Efficiency.

Table N°(IV-13): Results of testing the differences in the opinions of the respondents about the Quality in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.062	**1**	0.062	0.503	**4.00**	**0.481**
	Within groups	7.672	**62**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	0.738	**1**	0.738	2.155	**4.00**	**0.147**
	Within groups	21.246	**62**	0.343			
	Total	21.984	**63**				
Workplace	Between groups	0.631	**1**	0.631	1.488	**4.00**	**0.227**
	Within groups	26.306	**62**	0.424			

	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-13), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Quality.

Table N°(IV-14): Results of testing the differences in the opinions of the respondents about the Innovation in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.062	**1**	0.062	0.503	**4.00**	**0.481**
	Within groups	7.672	**62**	0.124			
	Total	7.734	**63**				
Professional experience	Between groups	0.738	**1**	0.738	2.155	**4.00**	**0.147**
	Within groups	21.246	**62**	0.343			
	Total	21.984	**63**				
Workplace	Between groups	0.631	**1**	0.631	1.488	**4.00**	**0.227**
	Within groups	26.306	**62**	0.424			
	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-14), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Innovation.

Table N°(IV-15): Results of testing the differences in the opinions of the respondents about the Customer responsiveness in the company according to personal variables.

	Source of variance	Sum of squares	Degree of freedom	Mean of squares	Calculated F	Tabulated F	Significance level
Educational level	Between groups	0.062	**2**	0.031	0.247	**3.15**	**0.782**
	Within groups	7.672	**61**	0.126			
	Total	7.734	**63**				
Professional experience	Between groups	0.738	**2**	0.369	1.060	**3.15**	**0.353**
	Within groups	21.246	**61**	0.348			

	Total	21.984	**63**				
Workplace	Between groups	1.298	**2**	0.649	1.544	**3.15**	**0.222**
	Within groups	25.639	**61**	0.420			
	Total	26.938	**63**				

Source: Prepared by researcher based on SPSS's output.

From the table N°(IV-15), we find that in all cases the calculated **F** was less than the tabulated **F** and the level of signification is greater than (0.05). Therefore, the personal variables didn't have an effect on the respondents' answers regarding the Customer responsiveness.

From all of the above, it can be said that the answers of the respondents were very similar, regardless of their place of work or their level of experience and education, and this indicates that their answers reflect the reality in the company.

IV.3.3. Statistical results of Knowledge Management Infrastructure (KMI) dimensions and Sustainable Competitive Advantage (SCA)

Table N° (IV-16): Arithmetic means and standard deviations of KMI and SCA.

Variables	Dimensions	Arithmetic Means	Standard deviations	Impact
KMI	**Organizational Culture**	**2.37**	**0.032**	**High**
	Organizational Structure	**2.40**	**0.178**	**High**
	Information Technology	**2.64**	**0.80**	**High**
Total		**2.47**	**0.081**	**High**
SCA	**Efficiency**	**2.72**	**0.018**	**High**
	Quality	**2.76**	**0.53**	**High**
	Innovation	**2.02**	**0.071**	**Medium**
	Customer Responsiveness	**2.62**	**0.074**	**High**
Total		**2.53**	**0.051**	**High**

Source: Prepared by researcher based on SPSS's output.

It is clear from table N°(IV-16) that the arithmetic mean values indicate agreement and to a high degree by the study sample members on the questions of the dimensions of the knowledge management infrastructure variable, and sustainable competitive advantage building blocks. The arithmetic mean of the knowledge management infrastructure was (2.47),

which is a high acceptance average. The arithmetic mean of the sustainable competitive advantage was (2.53) which is also a high acceptance average. The standard deviation values it was small in all cases, which indicates that the answers were consistent. Thus, it was realistic and accurate. In addition, these results reflect that the company has the basic requirements for successful knowledge management application, especially the information technology dimension, which came in the first place in terms of importance, with an arithmetic mean of (2.64) and a small standard deviation (0.080), as well as the basic building blocks for building a sustainable competitive advantage (Efficiency, Quality, Customer responsiveness), except for innovation, which had a medium impact. This stems from the fact that company is still in its infancy in this field, as the research and development cell was established in 2018, which is a short period. However, the medium impact of the innovation dimension indicates that the company has made important progress in this area and is on the way to improvement.

IV.3.4. Analyze the role of knowledge management infrastructure in building sustainable competitive advantage in AMENHYD spa

Below we test whether the knowledge management infrastructure plays a role in building a sustainable competitive advantage in AMENHYD Spa Company.

IV.3.4.1. Analyze the role of Organizational culture in building sustainable competitive advantage in AMENHYD spa

This part tests the following null hypothesis:

H0: There are no statistically significant differences of role for the organizational culture in building a sustainable competitive advantage in the company at the level of significance 0.05.

In order to test this hypothesis, we used simple linear regression.

Table N°(IV-17): Results of testing the role of organizational culture in building sustainable competitive advantage in AMENHYD spa

	Calculated F	Tabulated F	Coefficient of determination	Coefficient of correlation	Sign level	B	A
Role of organizational culture in building SCA	**133.457**	**4.00**	**0.683**	**0.826**	**0.000**	**- 0.627**	**1.332**

Source: Prepared by researcher based on SPSS's output.

It is clear from the table N°(IV-17), that the calculated **F** value reached (133.457) and is greatest than the tabulated **F** (4.00) at a significant level (0.000) that is less than (0.05) which is the level adopted in the study . It is also clear that there is a strong and positive correlation coefficient between organizational culture and sustainable competitive advantage, which

amounted to (**0.826**), and is confirmed by the coefficient of determination estimated at (**0.683**), which represents the explanatory power, which means that 68.3% percent of the change in achieving sustainable competitive advantage is due to organizational culture. Based on these results, we reject the null hypothesis and accept the alternative hypothesis which states that there is a positive role of organizational culture in building sustainable competitive advantage in the company. Based on the results of the table, we write the regression equation as follows:

$$\mathbf{Y= - 0.627+ 1.332 \times X_1}$$

This means that any change in organizational culture by one unit, lead to change in sustainable competitive advantage by (1.332) units.

IV.3.4.2. Analyze the role of Organizational structure in building sustainable competitive advantage in AMENHYD spa

This part tests the following null hypothesis:

H0: There are no statistically significant differences of role for the organizational structure in building a sustainable competitive advantage in the company at the level of significance 0.05.

In order to test this hypothesis, we used simple linear regression.

Table N°(IV-18): Results of testing the role of organizational structure in building sustainable competitive advantage in AMENHYD spa

Role of organizational structure in building SCA	Calculated F	Tabulated F	Coefficient of determination	Coefficient of correlation	Significant level	B	a
	1196.85	**4.00**	**0.951**	**0.975**	**0.000**	**1.659**	**0.362**

Source: Prepared by researcher based on SPSS's output.

Is clear from the table N°(IV-18), that the calculated **F** value reached (1196.85) and is greatest than the tabulated **F** (4.00) at a significant level (0.000) that is less than (0.05) which is the level adopted in the study . It is also clear that there is a strong and positive correlation coefficient between organizational structure and sustainable competitive advantage, which amounted to (**0.975**), and is confirmed by the coefficient of determination estimated at (**0.951**), which represents the explanatory power, which means that **95.1**% percent of the variance in achieving sustainable competitive advantage is due to organizational structure. Based on these results, we reject the null hypothesis and accept the alternative hypothesis which states that there is a positive role of organizational structure in building sustainable competitive advantage in the company. Based on the results of the table, we write the regression equation as follows:

$$\mathbf{Y= 1.659+ 0.362 \times X_2}$$

This means that any change in organizational structure by one unit, lead to change in sustainable competitive advantage by (0.362) units.

IV.3.4.3. Analyze the role of Information technology in building sustainable competitive advantage in AMENHYD spa

This part tests the following null hypothesis:

H0: There are no statistically significant differences of role for the information technology in building a sustainable competitive advantage in the company at the level of significance 0.05.

In order to test this hypothesis, we used simple linear regression.

Table N°(IV-19): Results of testing the role of information technology in building sustainable competitive advantage in AMENHYD spa

Role of IT in building SCA	Calculated F	Tabulated F	Coefficient of determination	Coefficient of correlation	Significant level	B	A
	75725.40	**4.00**	**0.999**	**1.00**	**0.000**	**0.829**	**0.643**

Source: Prepared by researcher based on SPSS's output.

Is clear from the table N°(IV-19), that the calculated **F** value reached (75725.40) and is greatest than the tabulated **F** (4.00) at a significant level (0.000) that is less than (0.05) which is the level adopted in the study . It is also clear that there is a strong and positive correlation coefficient (**1.00**) between information technology and sustainable competitive advantage, which express close correlation, and is confirmed by the coefficient of determination estimated at (**0.999**), which represents the explanatory power, which means that 99.9% percent of the variance in achieving sustainable competitive advantage is due to the change in information technology. Based on these results, we reject the null hypothesis and accept the alternative hypothesis which states that there is a positive role of information technology in building sustainable competitive advantage in the company. Based on the results of the table, we write the regression equation as follows:

$$\mathbf{Y = 0.829 + 0.643 \times X_3}$$

This means that any change in information technology by one unit, lead to change in sustainable competitive advantage by (0.643) units.

IV.4.2.4. Analyze the role of knowledge management infrastructure in building sustainable competitive advantage in AMENHYD spa

This part tests the following null hypothesis:

H0: There are no statistically significant differences of role for knowledge management infrastructure in building a sustainable competitive advantage in the company at the level of significance 0.05.

In order to test this hypothesis, we used simple linear regression.

Table N°(IV-20): Results of testing the role of knowledge management infrastructure in building sustainable competitive advantage in AMENHYD spa

Role of KMI in building SCA	Calculated F	Tabulated F	Coefficient of determination	Coefficient of correlation	Significant level	B	a
	3377.57	4.00	0.982	0.991	0.000	0.977	0.628

Source: Prepared by researcher based on SPSS's output.

Table N°(IV-20) confirm that the calculated **F** value reached (3377.57) and is greatest than the tabulated **F** (4.00) at a significant level (0.000) that is less than (0.05) which is the level adopted in the study . It is also clear that there is a strong and positive correlation coefficient (**0.991**) between variable of knowledge management infrastructure and variable of sustainable competitive advantage, and is confirmed by the coefficient of determination estimated at (**0.982**), which represents the explanatory power, which means that 98.2% of the variance in achieving sustainable competitive advantage is due to the change in knowledge management infrastructure and. Based on these results, we reject the null hypothesis and accept the alternative hypothesis which states that there is a positive role of knowledge management infrastructure in building sustainable competitive advantage in the company. Based on the results of the table, we write the regression equation as follows:

$$\mathbf{Y = 0.977 + 0.628 \times X}$$

This means that any change in knowledge management infrastructure by one unit, lead to change in sustainable competitive advantage by (0.628) units.

This implies that knowledge management infrastructure of AMENHYD spa has a strong and positive role in building its sustainable competitive advantage. This KMI perform a high level of readiness to achieve the effective implementation of knowledge management and to become a learning organization that contributes to ensuring the sustainability of its competitive advantage.

IV.4. Testing hypothesis

The analysis of interviews, documents research, and two questionnaires indicate that the company is aware of the importance of applying knowledge management, and seeks to do so by providing an infrastructure for knowledge management. The company has an arsenal of information technology (ERP, BI, and BIM). In addition, an organizational structure with a certain degree of flexibility, which encourages collaborative work within teams and groups, integrating best practices, and codifying processes and procedure, the Company also, has a training and evaluation

system that contributes to the development of the competencies portfolio. The organizational culture in the company needs to work more on consolidating the principles of knowledge management (trust, cooperation and knowledge sharing) at all administrative levels and workplaces. The company has been working for many years to build a competitive advantage by relying on its distinctive competencies in the field of engineering, project management, and entering the field of manufacturing equipment that it needs in implementing its projects. Despite all this, the company remains in the state of high knowledge management infrastructure capability. This may pose a threat to its progress in knowledge management project and keeping its competitive advantage; if it does not work to exploit these enormous capabilities in the effective application of knowledge management (develop both KM infrastructure and KM processes). However, the results confirm that the infrastructure provided by the company has a positive role in building its competitive advantage. From all of the above it can be said that:

The first hypothesis: Learning organizations seek to build a sustainable competitive advantage by providing knowledge management infrastructure that ensures the development of knowledge management processes capabilities.

This hypothesis is **rejected** because the company emphasis on developing the knowledge management infrastructure and a lack of practicing knowledge management processes.

The second hypothesis: Although organizations focus on knowledge management infrastructure (KMI) with the lack of knowledge management processes (KMP), it achieve a sustainable competitive advantage, to maintain it, organizations require the simultaneous development of KM capabilities (KMI and KMP).

This hypothesis is **accepted.**

The third hypothesis: Organizations seek the acquisition of new knowledge (patents) from exterior research and development centers, as an alternative approach to building a competitive advantage in order to keep pace with the increasing mobility of scientific knowledge.

This hypothesis is **rejected** because the Company relies on internal research and development.

IV. 5. Discussion

This part deals with the discussion of the research finding, present the limitations and suggest future research.

IV. 5.1. Discuss the finding

In this part, the results of data collection were summarized and discussed as follow:

The company has a good information technology infrastructure, which is sufficient to launch a knowledge management project, especially in business intelligence. This can contribute to activating knowledge management processes such as organizing, storing, retrieving, and distributing knowledge, and building knowledge bases. Additionally, the company's IT infrastructure has the ability to analyze existing information or knowledge (through dashboards) and provide new knowledge based on this analysis. This can help in making appropriate decisions at the right time.

The IT infrastructure that the company invests in contributes to reducing costs at both the project and activity/operations level, through the use of tools such as BIM for project engineering studies and ERP and BI for operations management. This enables the company to provide the right knowledge to the right person at the right time, as well as reduce errors in task execution and find appropriate solutions in a timely manner. As a result, the IT infrastructure helps minimize resource waste and meet delivery deadlines, leading to increased efficiency for the company.

The company has an organizational structure that combines various methods, characterized by a degree of decentralization with a focus on teamwork and integration between teams and activities. It is flexible to some extent, and the issuance of three copies in the last three years is evidence of that. This is an attempt by the company to adapt to the context in which it is located without compromising the workflow.

One of the most important points agreed upon by everyone (through interviews and the two questionnaires) is that the company incorporates best professional practices into its operations and improves them continuously when a better, more efficient and effective way to perform tasks appears. In addition, the company relies on the management by objectives (MBO) method, which contributes to raising the rate of work completion efficiently and effectively. The company monitors and rewards the employee according to their ability to complete assigned tasks on time.

The work in the project management team and engineering team depends on cooperation, trust, and the exchange of knowledge, experience, and skills, which the company encourages by rewarding the team for achieving the necessary quality and cost during project implementation while respecting the delivery time. This approach is crucial for building a supportive knowledge management culture in the organization.

The project management team, particularly the engineering team, is one of the company's strengths that directly contribute to achieving its competitive advantage. The sustainability of this advantage depends on the company's investment in training and continuously developing competencies. As a result, the company strives to create an incubator for engineers and leaders to enhance the long-term efficiency and quality of performance, reduce errors, deliver work on time, and lower costs. All of this makes the company a pioneer in its field of activities, as it accomplishes projects in a distinctive manner and at a lower cost.

Nevertheless, the company needs a special department for knowledge management within its organizational structure, which works on the organized collection of knowledge (all that has been learned by individuals, teams and groups within the company in terms of skills, experiences and behaviors), storing it, and the ability to retrieve and distribute it in a timely manner, which contributes to creating New knowledge and developing the company's distinctive competencies. The coordination between the various departments of the company, as well as the exploitation of all technological capabilities in it requires a clear objectives and strategy of knowledge management.

Despite the shortcomings in terms of organizational culture, the company has made significant progress and is on its way to improvement. However, the company encounters some difficulties in establishing an organizational culture that is consistent with the principles of knowledge management and continuous learning. Firstly, due to the nature of its work, the company moves to implement its projects from one region to another, and the distance between the regions makes it unable to keep all employees, especially the executive and mastery elements. The process of renewing a significant number of employees each time at the project level makes the task of cultural change rather difficult. Secondly, the company needs to develop policies within its strategic plans that emphasize the consolidation of the principles of trust and cooperation among members and encourage knowledge sharing. The orientation of culture towards cooperation, trust, and sharing experiences, skills, and knowledge requires the application of a system of material and moral incentives directly linked to the sharing of knowledge.

The company is known for its highly efficient total quality management system, which seeks to ensure the quality of the management system as a whole. This results in greater efficiency and responsiveness to customers. TQM relies on setting performance standards and indicators for each process in the company, in order to identify anomalies and

imperfections and find adequate solutions. Additionally, the company undergoes external audits carried out by the VARITAS institution (ISO 9001). The audit results for the year 2021 indicate that the company's operations were without imperfections (zero errors), indicating high quality. TQM includes indicators that measure the degree of customer satisfaction and the extent to which their needs are being met, such as the customer satisfaction rate, the rate of customer complaint processing, and the recurrence rate of customer complaints, which are evidence of the company's focus on customer responsiveness.

AMENHYD Spa has been focused on innovation in recent years and believes that innovation inevitably begins with having an idea. This idea can develop into an innovative solution if the right climate and tools are available. In this context, the company established a cell for research and development in 2018, which has evolved into a larger department in 2022. Although the budget allocated for research and development is small compared to the company's ambitions and position in the market, it has increased continuously over the years. Providing eight applied research projects that contributed to solving several problems the company faced in completing projects is considered a positive achievement.

The factory also contributes to the company's competitive advantage by providing a large number of equipment and materials necessary for completing projects. Some projects require equipment of certain sizes, which is why the factory provides tailor-made solutions. This saves the company costs and enables it to find unique solutions that are not available to competitors.

The project and engineering teams have high capabilities and skills that contribute to the company's competitive advantage. Therefore, it is essential for the company to focus on identifying, classifying, storing, and distributing knowledge at this level and strive to develop it. Since the company does not currently capitalize on its know-how, despite its efforts to develop it, it risks losing its competitive advantage. To address this, the company must use its technological capabilities to develop knowledge management processes.

The KM program in the company is in the state of high infrastructure capability because there is an emphasis on developing the knowledge management infrastructure and a lack of practicing knowledge management processes.

The second questionnaire confirmed the existence of a strong and positive correlation between the knowledge management infrastructure variable and the sustainable competitive advantage variable in the company,

and that each dimension of the knowledge management infrastructure has a positive role in building the sustainable competitive advantage in the company.

Based on the above, we can conclude that the company is currently focusing on providing an infrastructure for knowledge management at the expense of knowledge management processes. However, many researchers have emphasized that knowledge management capabilities depend on the simultaneous development of both knowledge management infrastructure and knowledge management processes. Therefore, managers in the company should be careful not to optimize one aspect of their knowledge management effort, as this may cause the company to lose its competitive advantage.

Furthermore, the results confirm that knowledge management infrastructure plays a positive role in achieving sustainable competitive advantage in the company. However, the company must also emphasize the development of knowledge management processes to maintain its competitiveness capabilities.

IV. 5.2. Limitation and suggestions for further research

This study has several limitations, which need to be taken into account in order to better understand the implications of this research. First, this study used a case study approach and therefore faces the criticism and limitations which are associated with this type research. Second, the study faced some obstacles due to the large size of the company and the presence of its workers in several locations, which made the information gathering process difficult. In light of the findings of this study, we suggest research to investigate the role of knowledge management capabilities (knowledge management infrastructure and knowledge management processes) in building sustainable competitive advantage in learning organizations.

IV.6. knowledge management project roadmap

The first and most important step to achieve effective knowledge management is to establish a knowledge management structure. Based on our understanding of the company's situation, we propose the formation of a Knowledge Management Committee, which would be a virtual committee comprising the Information Systems Manager, Human Resources Manager, QHSE Manager, and Business & Development Strategy Manager. This committee would be responsible for ensuring the proper implementation of the knowledge management project, and its mission would include:

- Appointing an employee in the QSHE department who would be responsible for managing the activities of the knowledge management project.
- Determining the goals of knowledge management, and initially focusing on a narrow scope such as "engineering," as it is one of the company's strengths that must be preserved. The objectives would revolve around acquiring, storing, and distributing all knowledge (expertise, skills, experiences, solutions to problems, etc.) related to engineering and project management.
- Developing a knowledge management strategy that aligns with the objectives.
- Validating the strategic choice.
- Identifying resources (financial, technological, and human resource).
- Coordinating between the various stakeholders to maximize the benefits of the knowledge management project.
- Creating and managing knowledge bases, which would serve as a centralized repository for storing information, data, and knowledge related to a specific topic or entity. The primary objective of the knowledge base is to provide users with fast and convenient access to knowledge, enabling them to solve problems, find answers, and make informed decisions.
- Developing knowledge management systems.
- Knowledge management repository and knowledge management systems help company to launch KM processes.
- Establishing communities of practice and e-committee of experts, which can be done using the company's wiki. A wiki is a web-based collaborative platform that enables users to store, create, and modify content in an organized manner. Wikis are commonly used for knowledge management, project collaboration and intranet applications. They are a great resource for businesses, teams and individuals who need to share information quickly and efficiently. By using wiki software, users can easily create new pages, upload images and documents, edit content, track changes and collaborate with others. This makes wiki platforms a great tool for businesses and teams to manage their digital knowledge resources.
- Adding enterprise questions and answers (Q&A) platform to the list of collaboration tools. Q&A is the most effective way to capture and share tacit knowledge. (For example: All Answered solution).
- Conducting a knowledge management assessment.

A recap

In this chapter, we attempted to uncover the reality of the role of knowledge management infrastructure in building sustainable competitive advantage in AMENHYD spa. To achieve this goal, we conducted several interviews with the company's leaders, reviewed documents, and distributed two questionnaires. Based on the analysis of the information we collected, we discussed the results and tested hypotheses. Ultimately, we concluded that knowledge management infrastructure has a positive role in building sustainable competitive advantage in the company. Thus, the company needs to effectively apply knowledge management (focusing on both KM infrastructure and KM processes) to maintain its competitiveness capabilities and become a learning organization. Based on our findings, we will present a knowledge management project roadmap and recommendations in the conclusion.

Conclusion

This study has examined the role of knowledge management infrastructure in building sustainable competitive advantage in learning organizations. Through a comprehensive review of the literature and empirical analysis, the study found that effective knowledge management infrastructure helps organizations to better acquire, create, share, and apply knowledge, which ultimately leads to improved organizational efficiency, quality, innovation, customer responsiveness. By investing knowledge management infrastructure that ensures the achievement of knowledge management processes capabilities, and fostering a culture of continuous learning, organizations can create a sustainable competitive advantage that enables them to thrive in an increasingly dynamic and competitive business environment.

Results

The empirical study we conducted in AMENHYD spa Company revealed the following results:

1. The company has a good IT infrastructure:
   - The IT team has developed an ERP management system "Enterprise Resources Planning", which aims to facilitate the management of all the activities of the company (HR, training, stock...). In addition, ERP contributes to the codification of all procedures and to the electronic archive.
   - The business intelligence project (BI) is a platform that helps the company make the right decisions at the right time. It contains: Data analysis; Company performance indicators; and Dashboards. The update of the BI is done automatically through the ERP.
   - The BIM (Building Information Modeling) project, which is a collaboration platform of management project. BIM helps the engineering team to integrate several work disciplines in the same project, and to do what is called clash detection which aims to detect anomalies automatically.
2. The company operates according to a quality system that guarantees:
   - The quality of the management system as a whole, quality of products, processes, materials used, human resources (skills), and the project.
   - Development of performance indicators for each process at the company level, through which it can detect anomalies and imperfections, and find solutions.
   - The integration of the best practices: Whenever it becomes apparent that there is a better way to perform tasks effectively

and efficiently in a particular activity, it is incorporated into the process.

- Updating the organizational structure of the company, so it makes changes as part of continuous improvement and adaptation to the current context.
- Customer responsiveness through editing process performance indicators concerning customer satisfaction which contain: Assessment of internal and external customer satisfaction (Customer satisfaction rate); Customer complaint processing rate; Recurrence rate of customer complaints.

3. The company relies on the principle of management by objectives in the management process.
4. The company enhances its competencies through a system of evaluation and training.
5. The company seeks to build an incubator for engineers and leadership.
6. The company is making progress in the equipment industry.
7. The company is doing well in establishing the principles of cooperation and shared values, and needs to work more on the principles of mutual trust and knowledge sharing.
8. There is no knowledge management department within the company.
9. The company does not integrate the capitalization of know-how, despite its efforts to develop it.
10. The company does not exploit its technological capabilities to develop knowledge management systems and processes.
11. The company does not have an incentive system that includes all members, encouraging knowledge sharing.
12. According to Sandhawalia and Dalcher Model of KM capabilities, the company's KM program is in the state of high infrastructure capability.
13. Knowledge management infrastructure contributes to building a sustainable competitive advantage for the company.
14. It is necessary for the company to advance in the implementation of knowledge management (enhance KM processes capabilities) in order to maintain its competitive advantage and transform it into a learning organization, especially since it has great capabilities that help it achieve this.

Recommendation

Organizations are more likely to realize the full potential of knowledge management if the necessary KM initiatives are translated into actions. For the company's progress in implementing knowledge management (enhance the KM processes capabilities) to maintain its competitive advantage and turn into a learning organization, and exploit the capabilities it has, we recommend the following:

1. Adopting a Knowledge management project roadmap (p. 178).
2. Expanding areas of research and development, and allocating a larger budget.
3. Seeking to obtain a trademark for equipment manufactured by the company.
4. Focusing on a culture that achieves the objectives of the orientation towards the application of knowledge management and continuous learning. This can be achieved through:
    - Leaders' commitment to the principles of cooperation and initiative to share their knowledge and experience.
    - Leaders' initiative to instill confidence among team members by adopting all practices that support this (as required by the situation).
    - Conducting psychological and technical tests during recruitment at project level, to ensure that candidate's values are aligned with the company's culture.
    - Expanding the incentive system to include, in addition to achieving the set goals, rewarding knowledge sharing.

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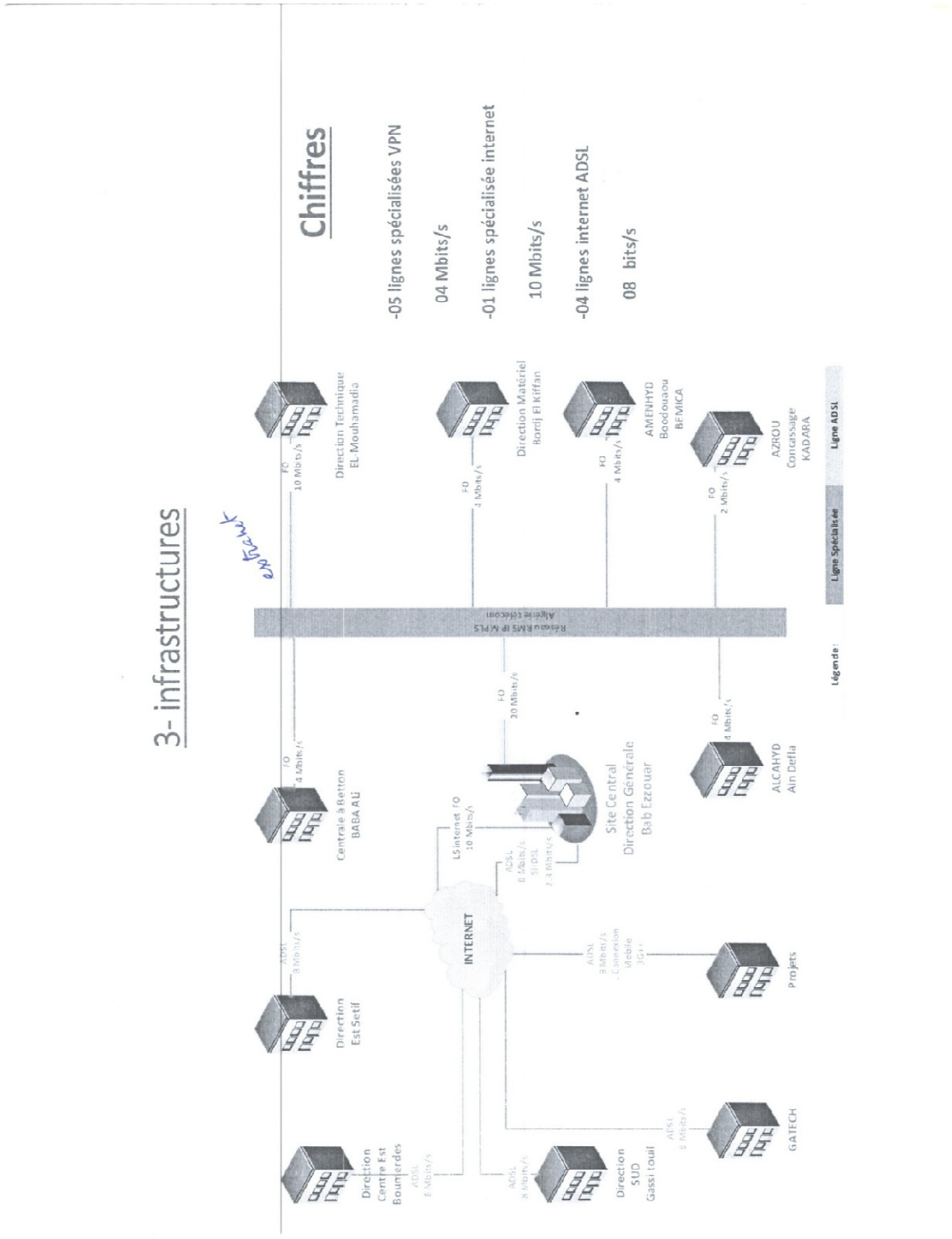
List of Appendices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Direction Matériel Borij El Kiffan
AMENHYD Boudouaou BEMCA
AZROU Concassage KADARA
Réseau RNIS IP MPLS Algérie telecom
Centrale à Beton BABA Ali
Site Central Direction Générale Bab Ezzouar
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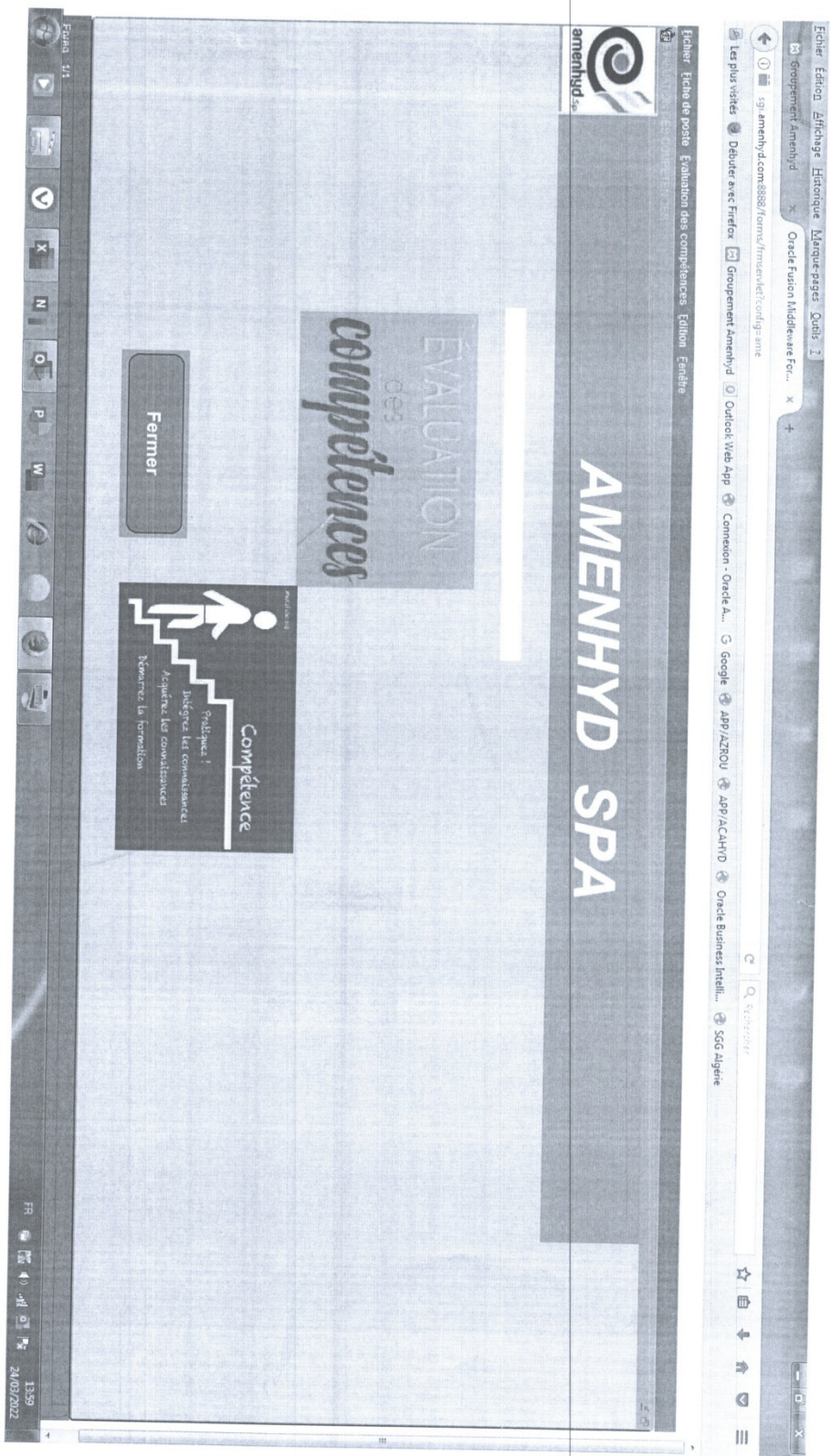
AMENHYD SPA
EVALUATION des compétences
Compétence
Fermer

ORACLE Business Intelligence
Evolution de Recouvrement
Recherche avancée
Administration
Aide
Déconnexion
Connecté en tant que weblogic
Recouvrement sommaire
Suivi des créances
Recouvrement en chiffre
Délai de Recouvrement
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3 242 686 686
3 980 578 713
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DIRECTION GENERALE
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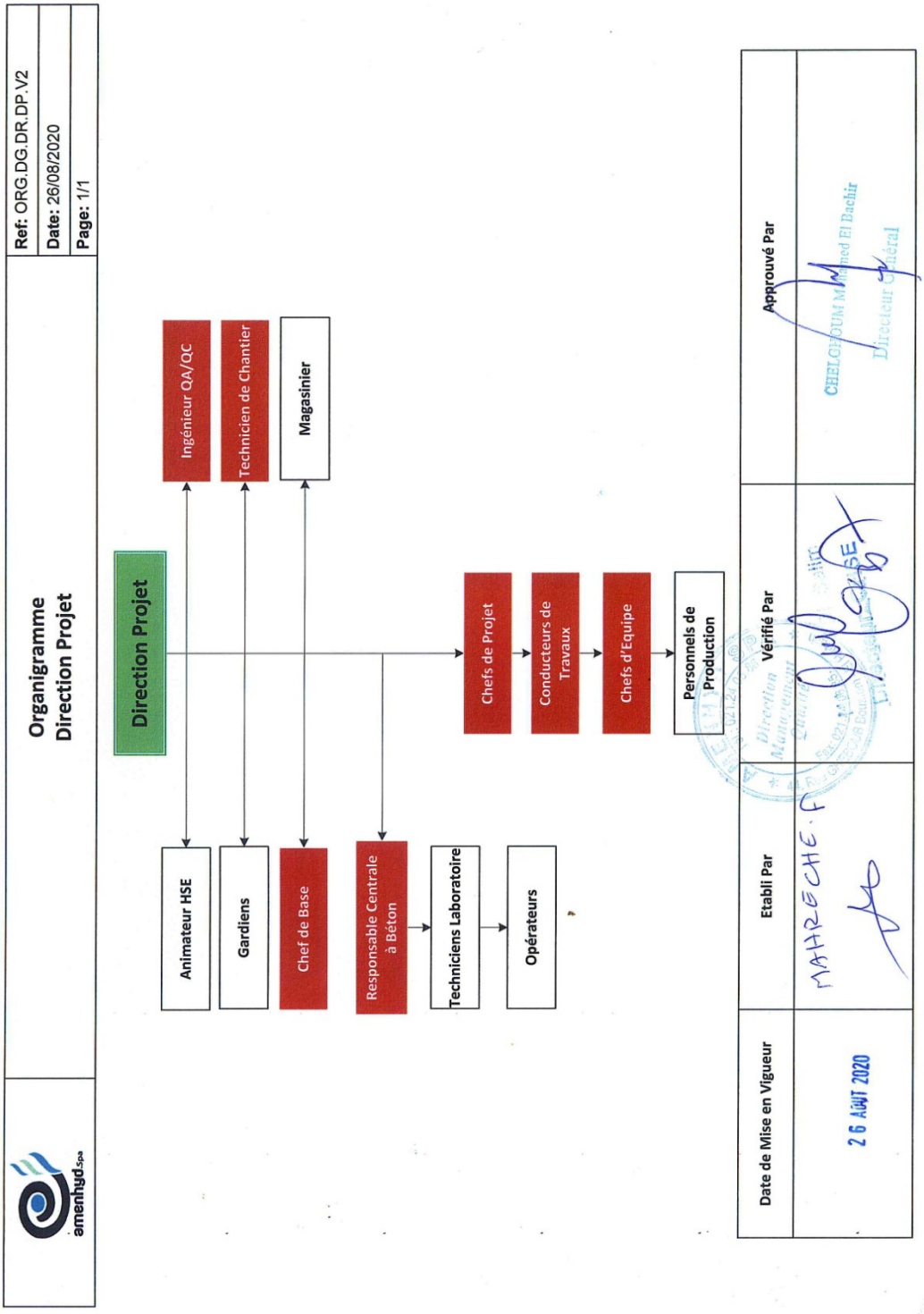
amenhyd Spa
Organigramme
Direction Projet
Ref: ORG.DG.DR.DP.V2
Date: 26/08/2020
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Direction Projet
Ingénieur QA/QC
Technicien de Chantier
Magasinier
Animateur HSE
Gardiens
Chef de Base
Responsable Centrale à Béton
Techniciens Laboratoire
Opérateurs
Chefs de Projet
Conducteurs de Travaux
Chefs d'Equipe
Personnels de Production
Date de Mise en Vigueur
Etabli Par
Vérifié Par
Approuvé Par
26 AOUT 2020
MAHRECHE.F
CHELGHOUM Mohamed El Bachir
Directeur Général

BUREAU VERITAS

AMENHYD SPA

Lot Boushaki F N°28 Bab Ezzouar, Alger, Algérie.

Bureau Veritas Certification Certifie que le système de management de l'organisme susmentionné a été audité et jugé conforme aux exigences de la norme :

ISO 9001:2015

Domaine d'activité

Etudes,réalisation des ouvrages hydrauliques, Génie Civil, des travaux d'aménagement environnementaux & fabrication des équipements de process.

Date de la première certification : **12 Janvier 2022**

Date d'expiration du cycle Précédent : **NA**

Date d'audit de Certification : **28 Juillet 2021**

Date de début du cycle de Certification : **12 Janvier 2022**

Sous réserve du fonctionnement continu et satisfaisant du système de management de l'organisme, ce certificat est valable jusqu'au: **11 Janvier 2025**

Certificat N ° AFR 22.00216 FR **Version: N °1** **Date d'émission: 12-01-2022**

UKAS MANAGEMENT SYSTEMS
0008

Adresse de l'organisme de certification: 5e étage, 66 Prescot Street, Londres E1 8HG, Royaume-Uni
Bureau local: Adresse: **Lot N° 94, Centre des Affaires de la commune de Bab-Ezzouar, Alger**

Des informations supplémentaires concernant le périmètre de ce certificat ainsi que l'applicabilité des exigences du système de management peuvent être obtenues en consultant l'organisme. Pour vérifier la validité de ce certificat, vous pouvez téléphoner au : 00 213 (0)21 60 57 28/90

Les Non conformités

00 Majeures.
00 Mineures

Conclusion du responsable d'audit

Le Système de Management Qualité de AMENHYD SPA

Est **en conformité** aux exigences du référentiel

ISO 9001 V 2015.

Nous recommandons au comité de certification, la certification du système de management qualité de l'entreprise .

Cartographie de l'entreprise

Manuel des procédures d'Amenhyd Spa

Les processus d'Amenhyd Spa:

Un processus est un ensemble d'activités interdépendantes ou d'interactions qui utilisent des intrants (éléments d'entrées) pour produire un résultat visé (produit et ou service).

Chaque processus est formalisé sur une fiche qui décrit les éléments d'entrée et de sortie du processus, ses activités sous forme de logigramme ainsi que ses indicateurs de performance.

Les procédures et les modes opératoires liés aux processus sont élaborés pour maîtriser le fonctionnement du processus, les enregistrements pour apporter la preuve que les processus ont été surveillés et mesurés conformément aux exigences du SMQ.

Il existe trois familles de processus à Amenhyd :

- Le processus de management,
- Les processus de réalisation,
- Les processus support.

Cartographie de l'entreprise

Manuel des procédures d'Amenhyd Spa

Les processus d'Amenhyd Spa:

N°	Type de processus	Libellé du processus	Référence du processus	Finalité
01	Management	Planification du SMQ	PCQ.SMQ.V	Décrit les dispositions mises en œuvre pour implanter maintenir et améliorer le SMQ. Il veille au bon déploiement de la politique qualité et la mise à disposition des ressources au sein de l'ensemble des Structures d'AMENHYD Spa.
02	Management	HSE	PCQ.HSE.V	Assurer la sécurité du personnel, des biens et de l'environnement, Promouvoir le respect des dispositions au sein des activités d'Amenhyd Spa en matière d'Hygiène, de sécurité au travail et de l'environnement
03	Réalisations	Commercial	PCQ.COM.V	Décrit les dispositions mises en œuvre pour répondre aux besoins d'acquisition et de diversification du plan de charge de l'entreprise dans le respect des exigences clients en se référant aux capacités de l'entreprise.

Cartographie de l'entreprise

Manuel des procédures d'Amenhyd Spa

N°	Type de processus	Libellé du processus	Référence du processus	Finalité
04	Réalisations	Travaux	PCQ.TRV.V	Décrit les dispositions mises en œuvre pour la réalisation travaux de produits / chantiers dans le respect des exigences réglementaires, client, produit et du SMQ. Il spécifie les dispositions d'études, planification, travaux, suivi de production et contrôle de gestion.
05	Réalisations	Fabrication	PCQ.FAB.V	Satisfaire les besoins de fabrication en équipements ou leurs composants selon la qualité et les délais définis, conformément aux normes en vigueur et dans le respect des textes réglementaires applicables
06	Réalisations	Engineering	PCQ.ETS.V	Décrit les dispositions mise en œuvre pour les activités relatives aux études ainsi que leur suivi, les étapes de planification, désignation, vérification, revue et validation et maîtrise des modifications des livrables d'études sont comprises dans ce processus

Cartographie de l'entreprise

Manuel des procédures d'Amenhyd Spa

N°	Type de processus	Libellé du processus	Référence du processus	Finalité
09	Support	Matériel	PCQ.MTR.V	Décrit les dispositions mise en œuvre pour l'optimisation de l'utilisation du matériel, sa maintenance et son rendement.
10	Support	Procurement	PCQ.PRC.V	Décrit les dispositions en vigueur dans l'Entreprise dans le cadre de la : -Mise à disposition de la fourniture et de la matière première conformément aux spécifications dans les l'expressions de besoins émises, sur le plan de la qualité requise, dans les délais de livraison, des quantités demandées et à moindre cout. - Veiller à la préservation des produits au niveau des magasins et lieux de stockage.

amenhyd Spa	TABLEAU DES INDICATEURS DE PERFORMANCE DES PROCESSUS	Réf : IMP.SMQ.15.V3
		Date : 02/01/2014
		Page : 3/1

Processus : Travaux

N° IP	Attente de l'organisme (Objectif recherché)	Libellé de l'indicateur	Objectif Quantifié	Mode de Calcul	Fréquence de mesure	Sources des données
01	Réalisation des Travaux	Taux de rentabilité [CPI]	T ≥100%	Charges allouées x 100 / Charges réalisées	Mensuelle	Application
02		Délais de réalisation des projets [SPI]	D ≥ 95%	Charges allouées x 100 / Charges Prévues	Mensuelle	Application
03		Taux de réalisation du budget	T ≥ 95%	Chiffre d'affaire Réalisé x 100 / Chiffre d'affaire Prévu	Mensuelle	Application
04	Qualité du produit	Taux de Traitement des réclamations clients	T ≥ 90%	Nombre de réclamations clients traitées x 100 / Nombre de réclamations identifiées	Mensuelle	Retour Chantiers /Projets
05		Taux de récurrence des réclamations clients	T ≤ 3%	Nombre de réclamations clients répétées x 100 / Nombre de réclamations identifiées cumulées	Mensuelle	Retour Chantiers /Projets
06		Taux de Traitement des non conformités	T ≥ 90%	Nombre de non conformités traitées x 100 / Nombre de non-conformités identifiées	trimestriel	Application

Moyens :

- ✓ Suivi des rendements et des ressources attribuées par le manager des ressources,
- ✓ Tenue mensuelle de la réunion de coordination au niveau des régions et prise d'engagement de satisfaction des besoins exprimés,
- ✓ Investir dans la formation métiers et sur les méthodes de résolution de problème,
- ✓ Suivre les travaux de reprise et veiller au traitement de leurs causes racines,
- ✓ Affectation des QA/QC au niveau des sites de projets,
- ✓ Renforcement de l'équipe d'élaboration des avenants par des ingénieurs techniques

Pilote du Processus
(Nom-Prénom et fonction)
(Date & visa)

Pilote du S.M.Q
(Nom-Prénom et fonction)
(Date & visa)

amenhyd Spa	TABLEAU DES INDICATEURS DE PERFORMANCE DES PROCESSUS	Réf : IMP.SMQ.15.V3 Date : 02/01/2014 Page : 1/1

Processus : Planification du SMQ

N° IP	Attente de l'organisme (Objectif recherché)	Libellé de l'indicateur	Objectif Quantifié	Mode de Calcul	Fréquence de mesure	Sources des données
01	Evaluation de la Satisfaction des clients Internes et Externes	Taux de Satisfaction Client	T≥ 80 %	Σ 8 Critères x 100 80 NB : chaque critère est noté de 0 à 10	Annuelle	Pilote de Processus / Pilotage DQHSE
02	Maitriser l'évaluation de l'atteinte et de l'efficacité des Objectifs de la Politique Qualité	Taux de réalisation des Objectifs Qualité	T ≥ 80 %	Σ Objectifs (+) x 100 Nbr Total Objectifs	Annuelle	Pilotage des Processus
03	Maitriser le suivi de contrôle d'efficacité du SMQ mis en œuvre	Taux de réalisation du Programme d'audit interne	T ≥ 80 %	Nombre **A.A** Réalisées x 100 Nbr **A.A** Prévues	Semestrielle	Pilotage des Audits Internes

Moyens :

- Renforcement des actions de formations et de sensibilisation
- Elargissement de la liste des auditeurs internes
- Recrutement des responsables management qualité au niveau régional
- Désignation des correspondants qualité pour chaque processus

Pilote du Processus
(Nom-Prénom et fonction)
(Date & visa)

Pilote du S.M.Q
(Nom-Prénom et fonction)
(Date & visa)

AMENHYD Spa Am□gement - Environnement - Hydraulique

Entreprise d'□de et de r□isation des ouvrages hydrauliques et des travaux d'am□gement environnementaux

Société par action au capital social de : 3 654 724 000 DA

ISO 9001 BUREAU VERITAS Certification

FICHE D'EVALUATION DES COMPETENCE
EVALUATION ANNEE 2021

Nom et Prénom:
Date d'entrée:
Poste de travail: *CHEF MAGASINIER*

A)- Evaluer les missions appropries au poste de travail

Missions et Taches	Niveau de competence	Qualite travail	Respect delai	Note Globale	Niveau d'atteinte %	Commentaire
Participer aux dossiers de la réforme :						
* Contrôler la réforme et la sortie physique du stock des pièces qui ne sont plus utilisées	3,00	1,00	1,00	5,00	83,33	
Assurer le suivi des investissements (materiel informatique, petit materiel portatif, ..., etc.) :						
* Satisfaire les besoins soit par le transfert ou par l'achat	2,00	1,00	1,00	4,00	66,67	Tâche dépondre aussi au service Appro
* Etablir et saisir les bons de transfert	3,00	1,00	1,00	5,00	83,33	
Classer, enregistrer et archiver les dossiers	3,00	1,00	1,00	5,00	83,33	
Vérifier la conformité des documents relatif à la gestion des stocks	2,00	1,00	1,00	4,00	66,67	Nécessite une formation dans le gestion des stock
Assurer le réaprovisionnement du stock	2,00	1,00	1,00	4,00	66,67	Tâche dépondre aussi au service Appro
Contrôler qualitativement et quantitativement les marchandises réceptionnées	2,00	1,00	1,00	4,00	66,67	Nécessite une amélioration sur le volet qualité
Veiller sur le chargement et le déchargement de la marchandise	3,00	1,00	1,00	5,00	83,33	
Etablir les fiches de stocks et les fiches casiers	2,00	1,00	1,00	4,00	66,67	améliorer l'utilisation des fiche de stocks
Effectuer des controles quotidiens sur la marchandise	3,00	1,00	1,00	5,00	83,33	
Etablir les rapports justificatis sur les écarts constatés en cas de d'endommagement, de perte ou de vole	2,00	1,00	1,00	4,00	66,67	Nécessite une formation dans le gestion des stock
Participer aux inventaires annuels ou/et tournants	3,00	1,00	1,00	5,00	83,33	
Etablir le registre de réception des produits	3,00	1,00	1,00	5,00	83,33	
Note Moyenne des Taches et interpretation:					**76,00**	**Résultat Satisfaisant**

Légende de l'évaluation des Tâches et Missions:

A-Niveau de compétences professionnelle
1-Ne répond pas aux attentes
2-Necessite une amélioration
3-Répond aux attente
B-Qualité du travail fourni
0-qualité médiocre
1-Qualité moyenne
2-Bonne qualité
C-Respect des délais:
0-Hors délais
1-Dans les délais

B)Evaluer les compétences necessaire pour réaliser les missions appropries au poste de travail

Savoirs	Compétences requises	Niveau requis	Niveau acquis	Niveau attente %	Commentaire
Savoir Théorique	Avoir des connaissances en gestion des stocks	2,00	1,00	50,00	Nécessite une formation dans la gestion des stocks
Savoir Théorique	Maitriser les méthodes de classification des stocks (ABC et 20/80)	2,00	1,00	50,00	Nécessite une formation
Savoir Théorique	Avoir des connaissances sur les techniques de stockage (stockage en bloc au sol, stockage en racks à profondeur simple, stockage en racks à profondeur double, stockage en carrousel, ..., etc.)	2,00	2,00	100,00	
Savoir Théorique	Avoir des connaissances sur les types de stocks (stock de sécurité, stock d'alerte, stock dormant, stock spéculatif, stock périssable ou non périssable, ..., etc.)	2,00	2,00	100,00	
Savoir Faire	Avoir un esprit d'analyse et de synthèse	2,00	1,00	50,00	Nécessite une formation
Savoir Faire	Maitriser l'outil informatique	2,00	1,00	50,00	Nécessite une formation " Excel ...
Savoir être	Avoir le sens de communication	3,00	2,00	66,67	Nécessite une formation " Communication"
Savoir être	Avoir le sens de l'organisation	3,00	3,00	100,00	
Savoir être	Disponibilité	3,00	3,00	100,00	
Note Moyenne des prérequis et interpritation:				**74,00**	**Résultat Satisfaisant**

amenhyd.Spa	PROCEDURE GESTION DE LA FORMATION	Réf : PRQ.FOR.26.V5 Date : 04/12/2019 Page 09 sur 09

VI. Evolution du document

Date	Version	Etat	Commentaires
20/05/2012	V1	Initial	Création
02/11/2014	V2	Révision	-Définition des actions non soumises à l'évaluation a froid. - Application et déploiement des nouvelles dispositions de la procédure maitrisent des documents et enregistrements.
14/06/2016	V3	Révision	-Amélioration de contenu -Intégration de la fiche synthèse d'évaluation à froid des actions de formation
20/06/2017	V4	Révision	Amélioration de contenue de la procédure
04/12/2019	V5	Révision	Adaptation de la procédure pour répondre aux nouvelles dispositions de la norme ISO 9001 V 2015. Ajout des éléments d'entrées pour l'élaboration du plan annuel de formation Modification de la rubrique de l'évaluation à froid et définition de la durée des séminaires qui ne sont pas soumis aux évaluations à froid.

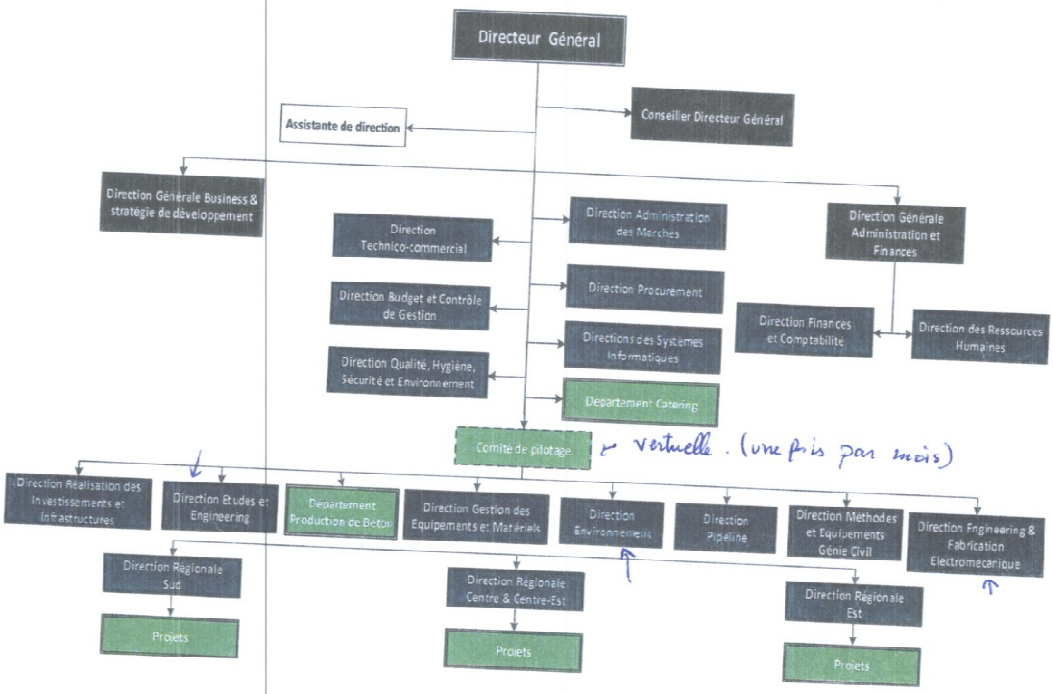
VII. Annexe

Néant.

amenhyd
Organigramme
Direction Générale
Ref: ORG DG V7
Date: 24/06/2018
Page: 1/1
Directeur Général
Assistante de direction
Directeur Général Adjoint
Direction Budget et Contrôle de Gestion
Direction Générale d'Administration et Finances
Direction Comptabilité et Finances
Direction des Ressources Humaines
Direction Juridique
Direction Administration des Marchés
Recherche et Développement
Directions des Systèmes Informatiques
Comité de pilotage
Direction Qualité, Hygiène, Sécurité et Environnement
Division Technico-commercial
Direction Technique
Direction Technico-commercial
Direction Procurement
Direction Environnement
Direction Pipeline
Direction Régionale
Projets
Direction Gestion des Equipements et Matériels
Direction Methodes et Equipements Génie Civil
Direction Electromécanique
Date de Mise en Vigueur
Etabli Par
Vérifié Par
Approuvé Par

7. Macrostructure de l'entreprise Amenhyd Spa

L'organisation générale de l'Entreprise est représentée par l'organigramme qui suit :



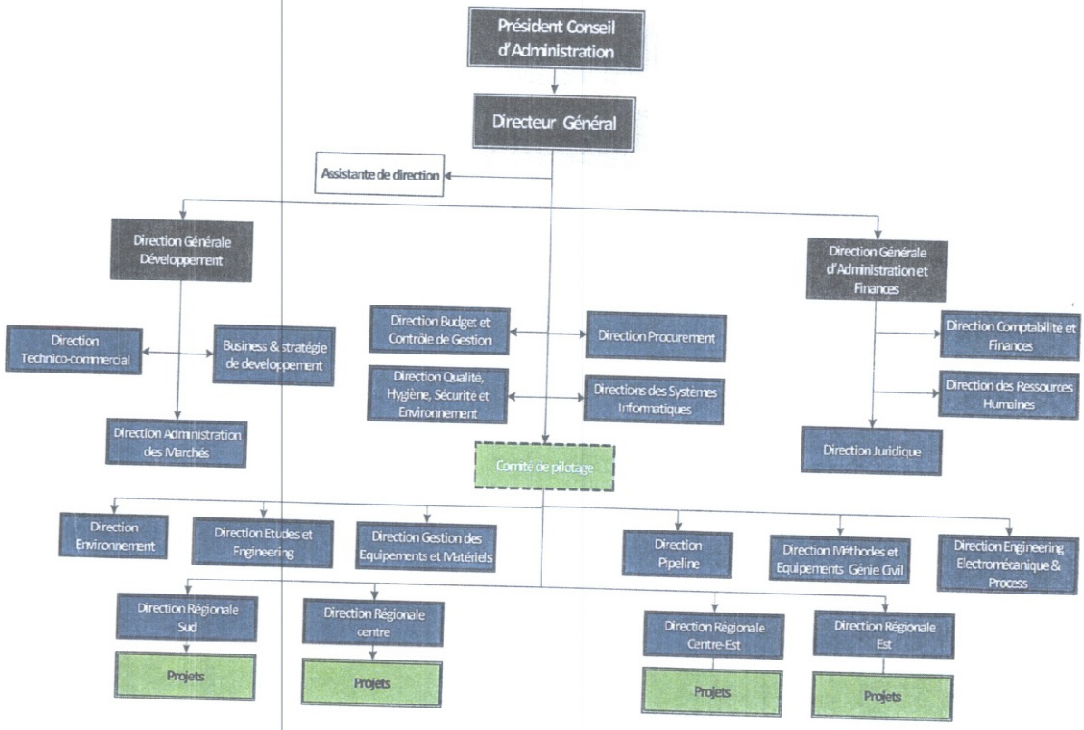
virtuelle . (une fois par mois)

2020

el d'organisation d'Amenhyd Spa [12]

7. Macrostructure de l'entreprise Amenhyd Spa

L'organisation générale de l'Entreprise est représentée par l'organigramme qui suit :



Manuel d'Organisation d'Amenhyd spa JUIN 2018

2019

AMENHYD Spa Am□gement - Environnement - Hydraulique

Entreprise d'□de et de r□isation des ouvrages hydrauliques et des travaux d'am□gement environnementaux

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EVALUATION ANNEE 2021

Nom et Prénom:
Date d'entrée:
Poste de travail: *CHEF MAGASINIER*

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Etablir le registre de réception des produits	3,00	1,00	1,00	5,00	83,33	
			Note Moyenne des Taches et interpretation:		**76,00**	**Résultat Satisfaisant**

Légende de l'évaluation des Tâches et Missions:

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2-Necessite une amélioration
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Savoir être	Disponibilité	3,00	3,00	100,00	
		Note Moyenne des prérequis et interpritation:		**74,00**	**Résultat Satisfaisant**

AMENHYD Spa Am□gement - Environnement - Hydraulique

Entreprise d'□de et de r□isation des ouvrages hydrauliques et des travaux d'am□gement environnementaux

Société par action au capital social de : 3 654 724 000 DA

FICHE D'EVALUATION DES COMPETENCE

EVALUATION ANNEE 2021

Nom et Prénom:
Date d'entrée:
Poste de travail: ***CHEF MAGASINIER***

Légande de l'evaluation des Prérequis:

0-pas de connaissances
1-Connaitre les éléments de base et leur application a des situations simple ou répetitive / comprendre les principaux en jeux et problémes liés a la compétence
2-Maitrise des connaissances essentielles avec capacite de leur mise en oeuvre pratique dans le contexte ordinaire de l'administration/réaliser des actes simples et certains actes complexes.
3-Maitrise total théorique et pratique/réaliser des actes complexes ou tous les actes
4-Etre capable d'améliorer la maniere de réaliser tous les actes et, eventuellement, former dans le domaine

C)Résultat de l'evaluation:

	Capacite Manageriale	Commentaire
Fréquence Moyenne Evaluation Messions et Taches %	76%	
Fréquence Moyenne Evaluation Compétences requises %	74%	
Fréquence Moyenne Globale	75%	
Interpretation	Résultat Satisfaisant	

Légende de résultat:

-de 0% a 49% : Insufisant.
-de 50% a 69% : Moyen.
-de 70% a 89% :Satisfaisant
-de 90% a 100% : Tres Satisfaisant

D) Validation des résultats

	Responsable hiérarchique	Evalué
Nom et Prénom		
Fonction		
Date et Visa	31/01/2022	

AMENHYD

Aménagement-Environnement-Hydraulique
Entreprise d'études et de réalisation des ouvrages hydrauliques et des travaux d'aménagements environnementaux

SGS cofrac

GRILLE DE DETECTION DE LA CAPACITE MANAGERIALE

Non :

Prénom :

Fonction :

A) - Critéres d'appréciation

Compétence	Fréquence	Commentaire
Communication : Aisance dans les relations humaines	2	
Leadership : Entrain et rayonnement : optimisme, bonne humeur, Charisme, influence positive sur le groupe	3	
Gestion de l'équipe : Capacité d'adaptabilité à de nouveaux Environnements professionnels	1	
Gestion des tâches : Capacité de prévision, de planification et D'organisation	4	
Gestion stratégique : Capacité de décision : analyse, synthèse et prise de décisions délicates	3	

Légende :

1 - Capacité Managériale Faible

2 - Capacité Managériale Moyenne

3 - Capacité Managériale Elevé

4 - Capacité Managériale Très Elevé

B) - Résultats de l'évaluation

	Capacité Managériale	Commentaire
Fréquence Moyenne	2,6	
Légende	Capacité Managériale Moyenne	

C) - Validation des résultats

	Responsable hiérarchique	Salarié
Non et prénom		
Fonction		
Date et visa		

Université Hassiba Benbouali de Chlef
Faculté des Sciences Economiques, Commerciales et de Gestion

Questionnaire

Dear members of AMENHYD spa:

As part of the preparation of a PhD in Management, specializing in Human Resource Management, at the University of Chlef, we are interested in conducting a study entitled:

"The Role of Knowledge Management Infrastructure in Building Sustainable Competitive Advantage in learning Organizations ."

« Le rôle de l'infrastructure de gestion des connaissances dans la création d'un avantage concurrentiel durable dans les organisations apprenantes »

To this purpose, we are submitting a questionnaire to you to enable us to analyze the organizational culture of the company. We would be grateful for your answers and thus your contribution to the realization of this scientific research topic.

My sincere greetings

By:
Amina Kouadri Boudjelthia

Under the supervision of:
Pr. Achour Mezrig
D. Sarra Bouguessri

University year: 2021/2022

First part

Personal and professional variables: Please check (X) the box that accurately reflects your current situation:

Level of Education:

Less than secondary ☐ University [1] ☐

Secondary ☐ Post Graduate[2] ☐

Professional grade:

Senior Executive ☐ Mastery Element ☐

Executive officer ☐ Executive Element ☐

Professional Experience:

Less than 8 year ☐ From 8 to less than16 year ☐

From16 to less than 24 year ☐ More than 24 year ☐

Works place:

Headquarters ☐ Project ☐ Factory ☐

[1] DUEA, License, Ingénieur, Master
[2], Magistère, Doctorat

Second part

Please tick (X) in the box that accurately reflects your agreement:

It should be noted that the term "member" here refers to all employees of the company.

N°	Organizational culture	Never	Sometimes	Always
In your company:				
1	There are common principles that everyone is committed to.			
2	There is a climate of trust between the members.			
3	Members give open and honest feedback to each other.			
4	There is a high level of cooperation between the members.			
5	There is a willingness to collaborate between teams and departments.			
6	Members are willing to take responsibility for their professional mistakes.			
7	Good professional practices are encouraged.			
8	Good professional practices are integrated into its processes.			
9	Members are encouraged to develop new ideas and working methods.			
10	The sharing of knowledge (information, experience, skills...) between members in various professional fields is encouraged.			
11	There is an incentive system that rewards knowledge sharing.			
12	Teamwork as well as individual work is encouraged.			
13	Team members revise their thinking as a result of group discussions or information gathered.			
14	The leaders seek to develop the capacity of the members.			
15	Leaders encourage members to apply the best available knowledge in their field.			

Université Hassiba Benbouali de Chlef
Faculté des Sciences Economiques, Commerciales et de Gestion

Questionnaire

*Chers membres d'**AMENHYD spa** :*

Dans le cadre de la préparation d'un doctorat en gestion, spécialisé en gestion des ressources humaines, à l'Université de Chlef, nous sommes intéressés par la réalisation d'une étude intitulée :

"The Role of Knowledge Management Infrastructure in Building Sustainable Competitive Advantage in learning Organizations ."

« Le rôle de l'infrastructure de gestion des connaissances dans la création d'un avantage concurrentiel durable dans les organisations apprenantes »

Pour cela, nous vous soumettons un questionnaire nous permettant d'analyser la culture organisationnelle de l'entreprise. Nous remercions pour vos réponses et donc votre contribution à la réalisation de ce sujet de recherche scientifique.

Mes sincères salutations

par :
Amina Kouadri Boudjelthia

Sous la supervision du:
PH. Achour Mezrig
D. Sarra Bouguessri

Année universitaire : 2021/2022

Première partie

Variables personnelles et professionnelles : Veuillez cocher (X) la case qui reflète précisément votre situation actuelle :

Niveau d'éducation :

Moins que secondaire ☐ Universitaire [1] ☐

Secondaire ☐ Etude supérieure[2] ☐

Grade professionnel :

Cadre supérieur ☐ Élément de maitrise ☐

Cadre ☐ Élément d'exécution ☐

Expérience professionnelle :

Moins de 8 ans ☐ de 8 à moins 16 ans ☐

De 16 à moins 24 ans ☐ De 24 ans et plus ☐

Lieu du travail :

Direction générale ☐ Projet ☐ Usine ☐

[1] DUEA, License, Ingénieur, Master
[2], Magistère, Doctorat

Deuxième partie

Veuillez cocher (X) dans la case qui reflète fidèlement votre accord :

Il est à noter que le terme « membre » fait ici référence à tous les salariés de l'entreprise.

N°	Culture Organisationnelle	Jamais	Parfois	Toujours
Dans votre entreprise :				
1	Il existe des principes communs que tout le monde s'engage à respecter.			
2	Il existe un climat de confiance entre les membres.			
3	Les membres donnent des commentaires ouverts et honnêtes les uns aux autres			
4	Il existe un niveau élevé de coopération entre les membres.			
5	Il ya la volonté de collaborer entre les équipes et les départements.			
6	Les membres sont prêts à assumer la responsabilité de leurs erreurs professionnelles.			
7	Les bonnes pratiques professionnelles sont encouragées.			
8	Les bonnes pratiques professionnelles sont intégrées dans ses processus.			
9	Les membres sont encouragés à développer de nouvelles idées et méthodes de travail.			
10	Le partage des connaissances (Informations, expériences, compétences…) entre les membres dans divers domaines professionnels est encouragé.			
11	Il existe un système d'incitation qui récompense le partage des connaissances.			
12	Le travail d'équipe ainsi que le travail individuel est encouragé.			
13	les membres de l'équipe révisent leur réflexion à la suite de discussions de groupe ou d'informations recueillies.			
14	Les dirigeants cherchent à développer les capacités des membres.			
15	Les dirigeants encouragent les membres à appliquer les meilleures connaissances disponibles dans leur domaine.			

جامعة حسيبة بن بوعلي الشلف

كلية العلوم الاقتصادية والتجارية وعلوم التسيير

استبيان

أعزائي أعضاء مؤسسة ***AMENHYD spa***

في إطار الإعداد للدكتوراه في علوم التسيير ، تخصص إدارة الموارد البشرية ، بجامعة الشلف ، نهتم بإجراء دراسة بعنوان: **"دور البنية التحتية لإدارة المعرفة في بناء الميزة التنافسية المستدامة في منظمات الأعمال المتعلمة".**

"The Role of Knowledge Management Infrastructure in Building Sustainable Competitive Advantage in learning Organizations ."

من أجل ذلك، نرسل لكم استبيانًا يسمح لنا بتحليل الثقافة التنظيمية للشركة. نشكركم على إجاباتكم و مساهمتكم في انجاز هذا البحث العلمي.

نحن نثق بآرائكم وستكون هذه الآراء موضع اعتزاز وتقدير.

تقبلوا منا فائق الشكر و الاحترام.

من أعداد:

أمينة قوادري بوجلطية

تحت إشراف:

أ.د. عاشور مزريق

د. صارة بوقسري

السنة الجامعية: 2022/2021

القسم الأول

المتغيرات الشخصية والوظيفية :الرجاء وضع إشارة (X) في المربع الذي يعكس بدقة الوضع الحالي :

المستوى التعليمي:

☐ اقل من ثانوي ☐ ثانوي ☐ جامعي[1] ☐ دراسات عليا[2]

الرتبة المهنية:

☐ إطار سامي ☐ إطار ☐ عنصر تحكم ☐ عون تنفيذ

الخبرة المهنية :

☐ أقل من 8 سنوات ☐ من 8 إلى أقل من 16 سنوات ☐ من 16 إلى أقل من 24 سنة ☐ من 24 سنة فأكثر

مكان العمل:

☐ الإدارة العامة ☐ المشروع ☐ المصنع

[1] DEUA, License, ingénieur, Master
[2], Magistère, Doctorat

القسم الثاني

الرجاء وضع إشارة (X) في المربع الذي يعكس بدقة مدى موافقتك على انطباق كل من الفقرات التالية على طبيعة الوضع في مؤسستك:

وتجدر الإشارة إلى أن مصطلح " الأعضاء " هنا يشير إلى جميع موظفي الشركة.

الرقم	عبارات الثقافة التنظيمية	لا يحدث أبداً	يحدث أحياناً	يحدث دائماً
في مؤسستك:				
1	يوجد مبادئ مشتركة يلتزم بها الجميع.			
2	توجد ثقة متبادلة بين الأعضاء.			
3	يقدم الأعضاء ملاحظات صريحة وصادقة لبعضهم البعض.			
4	يوجد مستوى عال من التعاون بين الأعضاء.			
5	يوجد استعداد للتعاون بين الفرق والأقسام.			
6	الاعضاء على استعداد لتحمل مسؤولية أخطائهم المهنية.			
7	يتم تشجع أصحاب أفضل الممارسات المهنية.			
8	يتم بدمج أفضل الممارسات المهنية في عملياتها.			
9	يتم تشجع الاعضاء على تطوير أفكار وطرق عمل جديدة.			
10	يتم تشجع مشاركة المعارف (معلومات، خبرات، مهارات...) بين الأعضاء في مختلف المجالات المهنية.			
11	يوجد نظام حوافز يكافئ تشارك المعرفة.			
12	يتم تشجع العمل ضمن فرق العمل بالإضافة للعمل الفردي.			
13	يقوم أعضاء الفريق بمراجعة تفكيرهم كنتيجة لمناقشات المجموعة أو معلومات تمّ جمعها.			
14	يسعى القادة إلى تطوير قدرات الاعضاء.			
15	يشجع القادة الاعضاء على تطبيق أفضل المعارف المتاحة في مجال عملهم.			

Université Hassiba Ben Bouali de Chlef
Faculté des Sciences Economiques, Commerciales et de Gestion

Questionnaire

*Chers membres d'**AMENHYD spa** :*

Dans le cadre de la préparation d'un doctorat en gestion, spécialisé en gestion des ressources humaines, à l'Université de Chlef, nous sommes intéressés par la réalisation d'une étude intitulée :

"The Role of Knowledge Management Infrastructure in Building Sustainable Competitive Advantage in learning Organizations".

"Le rôle de l'infrastructure de gestion des connaissances dans la création d'un avantage concurrentiel durable dans les organisations apprenantes".

Pour cela, nous vous soumettons un questionnaire nous permettant d'analyser la capacité de gestion des connaissances d'une entreprise.

Nous remercions pour vos réponses et donc votre contribution à la réalisation de ce sujet de recherche scientifique.

Mes sincères salutations

par :
Amina Kouadri Boudjelthia

Sous la supervision du :
phr. Achour Mezrig
D. Sarra Bouguessri

Année universitaire : 2022/2023

Première partie

Variables personnelles et professionnelles : Veuillez cocher (X) la case qui reflète précisément votre situation actuelle :

Niveau d'éducation :

Universitaire [1] ☐ Etude supérieure[2] ☐ Autre ☐

Expérience professionnelle :

Moins de 8 ans ☐ de 8 à moins 16 ans ☐

De 16 à moins 24 ans ☐ De 24 ans et plus ☐

Lieu du travail :

Direction générale ☐ Projet ☐ Usine ☐

[1] DUEA, License, Master, Ingénieur
[2] Magistère, Doctorat

Deuxième partie

Veuillez cocher (X) dans la case qui reflète fidèlement votre accord :

Il est à noter que le terme :
« Manager » fait ici référence à tous les chefs (d'équipe, de groupe, département, projet…)

N°	Eléments	Jamais	Parfois	Toujours
I. Infrastructure de Management des Connaissances de l'Entreprise				
I.1. Culture organisationnelle				
Dans votre entreprise :				
1	Il existe des normes et des valeurs communes que tout le monde s'engage à respecter.			
2	Il existe un climat de confiance y compris confiance professionnelle entre les managers.			
3	Les managers sont satisfaits du degré de collaboration avec les autres.			
4	Les interactions entre les managers pour générer et partager des connaissances sont encouragées.			
5	Les managers prennent le temps de parler de manière informelle aux membres.			
6	Les décisions sont prises lors de réunions.			
7	Il existe un système d'incitation qui permet aux managers de récompenser les collaborateurs pour avoir développé de nouvelles idées.			
8	Les managers utilisent les compétences et les talents des membres pour améliorer la performance.			
9	Les managers sont prêts à déléguer les pouvoirs.			
10	L'amélioration continue est priorisée.			
11	L'accent est mis sur la satisfaction des besoins des clients lors de la planification.			
I.2. Structure organisationnelle				
Votre entreprise :				
01	A une structure organisationnelle flexible.			
02	Soutient et encourage les départements à interagir entre eux.			
03	Rédige les règles et les processus dans des manuels.			
04	Fournit les équipements et ressources nécessaires pour faire votre travaille.			
05	Encourage beaucoup plus la coopération que la compétition entre structures (directions,			

	départements, services, équipes, etc.)			
06	Est organisée pour vous aider efficacement à répondre aux besoins actuels et futurs des clients.			
07	Fournit les informations importantes via les canaux formels.			
08	A des objectifs clairs à long terme convenus avec tous les membres engagés à les atteindre.			
I.3. Technologie de L'information				
Votre entreprise :				
01	Dispose de nouvelles technologies de l'information (NTI) suffisantes.			
02	Dispose d'une veille technologique.			
03	Dispose des ressources humaines qui ont des capacités techniques pour utiliser ces technologies.			
04	Utilise les NTI pour mieux stocker et codifier les connaissances.			
05	Dispose de NTI qui permet de récupérer et d'utiliser les connaissances codifiées.			
06	Utilise les NTI qui aident à la prise des décisions.			
07	Dispose de NTI qui permettent aux membres de collaborer avec des parties prenantes (clients, consultants, fournisseurs …).			
08	Dispose de NTI qui facilitent la recherche de nouvelles connaissances utiles à l'entreprise.			
II. Éléments constitutifs de l avantage concurrentiel durable de votre entreprise				
II.1. Efficacité				
Dans votre entreprise :				
01	Il existe un modèle de gestion de projet conforme à toutes les normes intégrant, méthodes, outils de pilotage, système documentaire…			
02	Le portefeuille projet est équilibré.			
03	Les projets sont priorisés en fonction de leurs adéquations avec la stratégie de l'entreprise.			
04	Des équipes projets interservices sont constituées pour chaque projet.			
05	Chaque projet fait l'objet d'un budget et d'un plan de financement propre (l'entreprise connait et sait activer les financements spécialisés).			
06	Il y a des projets collaboratifs.			
07	La fabrication de certains équipements utilisés dans les projets contribue à réduire les coûts.			
II.2. Qualité				
Votre entreprise :				

01	A la capacité d'orienter l'assurance et le contrôle de qualité des projets vers le processus et le produit.			
02	Investit dans la formation pointue en gestion de projet des membres de l'équipe de projet.			
03	A la capacité d'améliorer ses processus (management, réalisation, et support).			
04	Utilise adéquatement un système d'évaluation et de suivi des activités et des livrables de l'ensemble de projets.			
II.3. Innovation				
	Dans votre entreprise :			
01	La créativité est une pratique/comportement courante (Séance de créativité, Brainstorming…)			
02	Un système de veille complet est mis en place (veille technologique, choix des sujets à étudier en priorité, processus de collecte d'information…)			
03	L'ensemble des processus de développement est outillé (maquettage, prototypage, réalité virtuelle, logiciels d'aide à la décision).			
04	La gestion des compétences intègre la capitalisation des savoir faire.			
05	Les connaissances acquises au cours des projets font l'objet d'un module de formation dispensé dans toute l'entreprise.			
06	La propriété industrielle (PI) est intégrée à la stratégie (PI est un outil de protection mais aussi d'éveil, l'achat de brevet et licences peut également ouvrir des possibilités de développement).			
II.4. Ecoute Client				
Votre entreprise :				
01	A mis en place un processus de co-conception : contractualise avec ses partenaires pour la phase de conception.			
02	Dispose d'un CRM (Customer Relation Management) qui permet le suivi permanent avec ses clients.			
03	Alimente son portefeuille clients avec l'intégration des connaissances du client et de sa perception de produits de l'entreprise.			
04	A l'habilité de gérer les demandes de ses clients de changement dans les projets.			
05	Intègre les points de vue de ses clients dans le processus de prise de décision.			

University of Hassiba Ben Bouali - Chlef
Faculty of Economics, Business & Management Sciences

Questionnaire

Dear members of AMENHYD spa:

As part of the preparation of a doctorate in management, specializing in human resources management, at the University of Chlef, we are interested in carrying out a study entitled:

"The Role of Knowledge Management Infrastructure in Building Sustainable Competitive Advantage in Learning Organizations".

For this, we have developed a questionnaire aimed at obtaining the information necessary for our study, and you have been chosen to answer the questions of the questionnaire, so we hope for your collaboration. We thank you in advance for your contribution to the realization of this study. We inform you that this information will only be used for scientific research purposes and without revealing your identity.

Sincerely

By: ***Under the supervision of:***

Amina Kouadri Boudjelthia ***Ph. Achour Mezrig***
D. Sarra Bouguessri

University year: 2022/2023

First part

Personal and Professional variables

Please put (X) the box that accurately reflects your current situation:

Level of Education:

University [1] ☐ Post Graduate [2] ☐ Others ☐

Professional Experience:

Less than 8 years ☐ From 8 to less than16 years ☐

From 16 to less than 24 years ☐ From 24 years and more ☐

Work place:

Headquarters ☐ project ☐ Factory ☐

[1] DUEA, License, Master, Ingénieur
[2] Magistère, Doctorat

Second part

Please put (X) in the box that accurately reflects your agreement:

Note that the term:

"Member" here refers to all employees of the company.

"Manager" here refers to all leaders (team, group, department, project, etc.)

N°	Elements	Never	Sometimes	Always
I. Knowledge management infrastructure of the Company				
I.1. Organizational Culture				
In your company:				
1	There are common standards and values that everyone agrees to respect.			
2	There is a climate of trust, including professional trust, between managers.			
3	Managers are satisfied with the degree of collaboration with others.			
4	Interactions between managers to generate and share knowledge are encouraged.			
5	Managers take the time to talk informally to members.			
6	Decisions are made in meetings.			
7	There is an incentive system that allows managers to reward members for developing new ideas.			
8	Managers use the skills and talents of members to improve performance.			
9	Managers are ready to delegate authority.			
10	Continuous improvement is given priority.			
11	The emphasis in planning is on meeting the needs of customers.			
I.2. Organizational Structure				
Your company:				
01	Has a flexible organizational structure.			
02	Supports and encourages departments to interact with each other.			
03	Writes rules and processes in manuals.			
04	Provides the equipment and resources needed to do your job.			
05	Encourages much more cooperation than competition between structures (directorates, departments, services, teams, etc.)			

06	Is organized to help you effectively meet current and future customer needs.			
07	Provides important information through formal channels.			
08	Has clear long-term objectives agreed with all members committed to achieving them.			
I.3. Information Technology				
Your company :				
01	Has sufficient new information technology (NIT).			
02	Has a technology watch in place.			
03	Has the human resources with the technical capacity to use these technologies.			
04	Uses ITNs to better store and codify knowledge.			
05	IT used in your business facilitates decision-making.			
06	Has NTI that allows codified knowledge to be retrieved and used.			
07	Has NTIs that allow members to collaborate with stakeholders (clients, consultants, suppliers, etc.).			
08	Has NTIs that facilitate the search for new knowledge useful to the business.			
II. Building blocks of sustainable competitive advantage of the Company				
II.1. Efficiency				
In your company:				
01	There is a project management model that complies with all the standards integrating, methods, steering tools, documentation system...			
02	The project portfolio is balanced.			
03	Projects are prioritized according to their relevance to the company's strategy.			
04	Interdepartmental project teams are set up for each project.			
05	Each project has its own budget and financing plan (the company knows how to activate specialized financing).			
06	There are collaborative projects.			
07	The manufacture of some of the equipment used in the projects helps to reduce costs.			
II.2. Quality				
Your company:				
01	Has the ability to focus project quality assurance and control on the process and product.			
02	Invest in advanced project management training for project team members.			
03	Has the ability to improve its processes			

	(management, implementation, and support).			
04	Appropriately uses a system for evaluating and monitoring the activities and deliverables of the project set.			
II.3. Innovation				
In your company:				
01	Creativity is a common practice/behavior (Creativity session, Brainstorming...)			
02	A complete monitoring system is put in place (technological monitoring, choice of subjects to be studied in priority, information collection process...)			
03	All development processes are equipped with tools (modeling, prototyping, virtual reality, decision support software).			
04	Competence management integrates the capitalization of know-how.			
05	The knowledge acquired during the projects is the subject of a company-wide training module.			
06	Industrial property (IP) is integrated into the strategy (IP is a protection tool but also a monitoring tool, the purchase of patents and licenses can also open up development opportunities).			
II.4. Customer responsiveness				
Your company:				
01	Has a co-design process in place: contracts with partners for the design phase.			
02	Has a CRM (Customer Relation Management) which allows permanent follow-up with its customers.			
03	Develops the customer portfolio by integrating the customer's knowledge and perception of the company's products.			
04	Has the ability to manage client requests for change in projects.			
05	Integrates the views of its clients into the decision-making process.			

Questionnaire N°1

Case Processing Summary

		N	%
Cases	Valid	322	100.0
	Excluded[a]	0	.0
	Total	322	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.906	15

niveau education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	moin que secondaire	29	9.0	9.0	9.0
	secondaire	137	42.5	42.5	51.6
	universitaire	136	42.2	42.2	93.8
	etude superieure	20	6.2	6.2	100.0
	Total	322	100.0	100.0	

grade profess

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	cadre sup	25	7.8	7.8	7.8
	cadre	101	31.4	31.4	39.1
	element maitrise	119	37.0	37.0	76.1
	element execution	77	23.9	23.9	100.0
	Total	322	100.0	100.0	

experience prof

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	moins de 8 ans	183	56.8	56.8	56.8
	de 8 à moins 16 ans	109	33.9	33.9	90.7

	de 16 à moins 24 ans	25	7.8	7.8	98.4
	de 24 ans et plus	5	1.6	1.6	100.0
	Total	322	100.0	100.0	

lieu du travail

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	direction	85	26.4	26.4	26.4
	projet	203	63.0	63.0	89.4
	usine	34	10.6	10.6	100.0
	Total	322	100.0	100.0	

```
COMPUTE CULT=(q1 +  q2+q3 + q4 + q5 + q6 + q7 + q8 + q9 + q10 + q11 +
q12 + q13 + q14 + q15 ) / 15.
VARIABLE LABELS  CULT 'CULTURE'.
EXECUTE.
DESCRIPTIVES VARIABLES=q1 q2 q3 q4 q5 q6 q7 q8 q9 q10 q11 q12 q13 q14
q15 CULT
  /STATISTICS=MEAN STDDEV.
```

ANOVA

CULTURE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.353	3	.118	1.209	.306
Within Groups	30.928	318	.097		
Total	31.281	321			

```
ONEWAY culture BY p2
  /MISSING ANALYSIS.
```

ANOVA

CULTURE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.043	3	.348	3.654	.013
Within Groups	30.239	318	.095		
Total	31.281	321			

```
ONEWAY culture BY p3
  /MISSING ANALYSIS.
```

ANOVA

CULTURE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.144	3	.381	4.023	.008
Within Groups	30.137	318	.095		
Total	31.281	321			

```
ONEWAY culture BY p4
  /MISSING ANALYSIS.
```

ANOVA

CULTURE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.028	2	.014	.141	.868
Within Groups	31.253	319	.098		
Total	31.281	321			

Descriptive Statistics

	N	Mean	Std. Deviation
Dans votre entreprise, il existe des principes communs que tout le monde s'engage à respecter.	322	2.34	.475
Dans votre entreprise, il ya un climat de confiance entre les membres.	322	2.26	.438
Dans votre entreprise, les membres donnent des commentaires ouverts et honnêtes les uns aux autres	322	2.20	.407
Dans votre entreprise, il existe un niveau élevé de coopération entre les membres.	322	2.32	.474
Dans votre entreprise, il ya la volonté de collaborer entre les équipes et les départements.	322	2.38	.487

Dans votre entreprise, les membres sont prêts à assumer la responsabilité leurs erreurs professionnelles.	322	2.27	.486
Votre entreprise encourage les bonnes pratiques professionnelles.	322	2.34	.499
Votre entreprise intègre les bonnes pratiques professionnelles dans ses processus.	322	2.34	.474
Votre entreprise encourage ses membres à développer de nouvelles idées et méthodes de travail.	322	2.32	.475
Votre entreprise encourage le partage des connaissances (Informations, expériences, compétences…) entre les membres dans divers domaines professionnels.	322	2.28	.465
Dans votre entreprise, il existe un système d'incitation qui récompense le partage des connaissances.	322	2.23	.494
Votre entreprise encourage le travail d'équipe ainsi que le travail individuel.	322	2.34	.501
Dans votre entreprise, les membres de l'équipe révisent leur réflexion à la suite de discussions de groupe ou d'informations recueillies.	322	2.22	.451

Les dirigeants de votre organisation cherchent à développer les capacités des membres.	322	2.35	.498
Les dirigeants de votre organisation encouragent les membres à appliquer les meilleures connaissances disponibles dans leur domaine.	322	2.28	.470
CULTURE	322	2.2981	.309
Valid N (listwise)	322		

Questionnaire N°2

Case Processing Summary

		N	%
Cases	Valid	64	100.0
	Excluded[a]	0	.0
	Total	64	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.923	49

Descriptive Statistics

	N	Mean	Std. Deviation
culture	64	2.3693	.03189
structure	64	2.3965	.13829
IT	64	2.6426	.07989
Eficiency	64	2.7165	.01786
Quality	64	2.7617	.05326
Innovation	64	2.0156	.07101
Ressponsiveness	64	2.6156	.07393
Valid N (listwise)	64		

Niveau education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	université	55	85.9	85.9	85.9
	etude superieur	9	14.1	14.1	100.0
	Total	64	100.0	100.0	

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moins de 8 ans	36	56.3	56.3	56.3
	de 8 à moins 16 ans	25	39.1	39.1	95.3
	De 16 à moins 24 ans	3	4.7	4.7	100.0
	Total	64	100.0	100.0	

Lieu de travaille

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Direction generale	22	34.4	34.4	34.4
	Projet	34	53.1	53.1	87.5
	Usine	8	12.5	12.5	100.0
	Total	64	100.0	100.0	

culture

ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.041	1	.041	.329	.568
	Within Groups	7.694	62	.124		
	Total	7.734	63			
Experience	Between Groups	.484	1	.484	1.397	.242
	Within Groups	21.500	62	.347		
	Total	21.984	63			
Lieu de travaille	Between Groups	1.260	1	1.260	3.043	.086
	Within Groups	25.677	62	.414		
	Total	26.938	63			

ANOVA structure

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.155	2	.078	.625	.538
	Within Groups	7.579	61	.124		
	Total	7.734	63			
Experience	Between Groups	1.024	2	.512	1.490	.233
	Within Groups	20.961	61	.344		
	Total	21.984	63			
Lieu de travaille	Between Groups	1.486	2	.743	1.780	.177
	Within Groups	25.452	61	.417		
	Total	26.938	63			

ANOVA IT

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.062	1	.062	.503	.481
	Within Groups	7.672	62	.124		
	Total	7.734	63			
Experience	Between Groups	.738	1	.738	2.155	.147
	Within Groups	21.246	62	.343		
	Total	21.984	63			
Lieu de travaille	Between Groups	.631	1	.631	1.488	.227
	Within Groups	26.306	62	.424		
	Total	26.938	63			

ANOVA Efficiency

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.020	1	.020	.161	.689
	Within Groups	7.714	62	.124		
	Total	7.734	63			
Experience	Between Groups	.238	1	.238	.680	.413
	Within Groups	21.746	62	.351		
	Total	21.984	63			
Lieu de travaille	Between Groups	.049	1	.049	.112	.739
	Within Groups	26.889	62	.434		
	Total	26.938	63			

ANOVA Quality

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.062	1	.062	.503	.481
	Within Groups	7.672	62	.124		
	Total	7.734	63			
Experience	Between Groups	.738	1	.738	2.155	.147
	Within Groups	21.246	62	.343		
	Total	21.984	63			
Lieu de travaille	Between Groups	.631	1	.631	1.488	.227
	Within Groups	26.306	62	.424		
	Total	26.938	63			

ANOVA Innovation

		Sum of Squares	Df	Mean Square	F	Sig.
Niveau education	Between Groups	.062	1	.062	.503	.481
	Within Groups	7.672	62	.124		
	Total	7.734	63			
Experience	Between Groups	.738	1	.738	2.155	.147
	Within Groups	21.246	62	.343		
	Total	21.984	63			
Lieu de travaille	Between Groups	.631	1	.631	1.488	.227
	Within Groups	26.306	62	.424		
	Total	26.938	63			

ANOVA Responsiveness

		Sum of Squares	df	Mean Square	F	Sig.
Niveau education	Between Groups	.062	2	.031	.247	.782
	Within Groups	7.672	61	.126		
	Total	7.734	63			
Experience	Between Groups	.738	2	.369	1.060	.353
	Within Groups	21.246	61	.348		
	Total	21.984	63			
Lieu de travaille	Between Groups	1.298	2	.649	1.544	.222
	Within Groups	25.639	61	.420		
	Total	26.938	63			

Descriptive Statistics

	N	Mean	Std. Deviation
Il existe des normes et des valeurs communes que tout le monde s'engage à respecter.	64	3.00	.000
Il existe un climat de confiance y compris confiance professionnelle entre les managers.	64	2.03	.175
Les managers sont satisfaits du degré de collaboration avec les autres.	64	2.00	.000
Les interactions entre les managers pour générer et partager des connaissances sont encouragées.	64	2.97	.175
Les managers prennent le temps de parler de manière informelle aux membres.	64	2.03	.175
Les décisions sont prises lors de réunions.	64	2.00	.000

Il existe un système d'incitation qui permet aux managers de récompenser les collaborateurs pour avoir développé de nouvelles idées.	64	2.00	.000
Les managers utilisent les compétences et les talents des membres pour améliorer la performance.	64	2.03	.175
Les managers sont prêts à déléguer les pouvoirs.	64	2.00	.000
L'amélioration continue est priorisée.	64	3.00	.000
L'accent est mis sur la satisfaction des besoins des clients lors de la planification.	64	3.00	.000
culture	64	2.3693	.03189
Valid N (listwise)	64		

	N	Mean	Std. Deviation
A une structure organisationnelle flexible.	64	2.05	.213
Soutient et encourage les départements à interagir entre eux.	64	2.94	.244
Rédige les règles et les processus dans des manuels.	64	3.00	.000
Fournit les équipements et ressources nécessaires pour faire votre travaille.	64	2.05	.213
Encourage beaucoup plus la coopération que la compétition entre structures (directions, départements, services, équipes, etc.)	64	3.00	.000

Est organisée pour vous aider efficacement à répondre aux besoins actuels et futurs des clients.	64	2.05	.213
Fournit les informations importantes via les canaux formels.	64	2.05	.213
A des objectifs clairs à long terme convenus avec tous les membres engagés à les atteindre.	64	2.05	.213
structure	64	2.3965	.13829
Valid N (listwise)	64		

Descriptive Statistics

	N	Mean	Std. Deviation
Dispose de nouvelles technologies de l'information (NTI) suffisantes.	64	3.00	.000
Dispose d'une veille technologique.	64	2.05	.213
Dispose des ressources humaines qui ont des capacités techniques pour utiliser ces technologies.	64	3.00	.000
Utilise les NTI pour mieux stocker et codifier les connaissances.	64	3.00	.000
Dispose de NTI qui permet de récupérer et d'utiliser les connaissances codifiées.	64	2.12	.333
Utilise les NTI qui aident à la prise des décisions.	64	2.05	.213
Dispose de NTI qui permettent aux membres de collaborer avec des parties prenantes (clients, consultants, fournisseurs …).	64	2.92	.270

Dispose de NTI qui facilitent la recherche de nouvelles connaissances utiles à l'entreprise.	64	3.00	.000
IT	64	2.6426	.07989
Valid N (listwise)	64		

Descriptive Statistics

	N	Mean	Std. Deviation
Il existe un modèle de gestion de projet conforme à toutes les normes intégrant, méthodes, outils de pilotage, système documentaire…	64	3.00	.000
Le portefeuille projet est équilibré.	64	2.02	.125
Les projets sont priorisés en fonction de leurs adéquations avec la stratégie de l'entreprise.	64	3.00	.000
Des équipes projets interservices sont constituées pour chaque projet.	64	3.00	.000
Chaque projet fait l'objet d'un budget et d'un plan de financement propre (l'entreprise connait et sait activer les financements spécialisés).	64	3.00	.000
Il y a des projets collaboratifs.	64	2.00	.000
La fabrication de certains équipements utilisés dans les projets contribue à réduire les coûts.	64	3.00	.000
Eficiency	64	2.7165	.01786
Valid N (listwise)	64		

Descriptive Statistics

	N	Mean	Std. Deviation
A la capacité d'orienter l'assurance et le contrôle de qualité des projets vers le processus et le produit.	64	3.00	.000
Investit dans la formation pointue en gestion de projet des membres de l'équipe de projet.	64	2.05	.213
A la capacité d'améliorer ses processus (management, réalisation, et support).	64	3.00	.000
Utilise adéquatement un système d'évaluation et de suivi des activités et des livrables de l'ensemble de projets.	64	3.00	.000
Quality	64	2.7617	.05326
Valid N (listwise)	64		

Descriptive Statistics

	N	Mean	Std. Deviation
La créativité est une pratique/comportement courante (Séance de créativité, Brainstorming…)	64	2.00	.000
Un système de veille complet est mis en place (veille technologique, choix des sujets à étudier en priorité, processus de collecte d'information…)	64	2.05	.213
L'ensemble des processus de développement est outillé (maquettage, prototypage, réalité virtuelle, logiciels d'aide à la décision).	64	2.05	.213
La gestion des compétences intègre la capitalisation des savoir faire.	64	2.00	.000

Les connaissances acquises au cours des projets font l'objet d'un module de formation dispensé dans toute l'entreprise.	64	2.00	.000
La propriété industrielle (PI) est intégrée à la stratégie (PI est un outil de protection mais aussi d'éveil, l'achat de brevet et licences peut également ouvrir des possibilités de développement).	64	2.00	.000
Innovation	64	2.0156	.07101
Valid N (listwise)	64		

Descriptive Statistics

	N	Mean	Std. Deviation
A mis en place un processus de co-conception : contractualise avec ses partenaires pour la phase de conception.	64	2.05	.213
Dispose d'un CRM (Customer Relation Management) qui permet le suivi permanent avec ses clients.	64	2.03	.175
Alimente son portefeuille clients avec l'intégration des connaissances du client et de sa perception de produits de l'entreprise.	64	3.00	.000
A l'habilité de gérer les demandes de ses clients de changement dans les projets.	64	3.00	.000
Intègre les points de vue de ses clients dans le processus de prise de décision.	64	3.00	.000
Ressponsiveness	64	2.6156	.07393
Valid N (listwise)	64		

Correlations

		sustainable comp	culture
Pearson Correlation	sustainable comp	1.000	.826
	Culture	.826	1.000
Sig. (1-tailed)	sustainable comp	.	.000
	Culture	.000	.
N	sustainable comp	64	64
	Culture	64	64

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	culture[b]	.	Enter

a. Dependent Variable: sustainable comp

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826[a]	.683	.678	.02917

a. Predictors: (Constant), culture

b. Dependent Variable: sustainable comp

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.114	1	.114	133.475	.000[b]
	Residual	.053	62	.001		
	Total	.166	63			

a. Dependent Variable: sustainable comp

b. Predictors: (Constant), culture

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.627	.273		-2.298	.025
	culture	1.332	.115	.826	11.553	.000

a. Dependent Variable: sustainable comp

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	structure[b]	.	Enter

a. Dependent Variable: sustainable comp

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.975[a]	.951	.950	.01149

a. Predictors: (Constant), structure

b. Dependent Variable: sustainable comp

Correlations

		sustainable comp	structure
Pearson Correlation	sustainable comp	1.000	.975
	structure	.975	1.000
Sig. (1-tailed)	sustainable comp	.	.000
	structure	.000	.
N	sustainable comp	64	64
	structure	64	64

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.158	1	.158	1196.853	.000[b]
	Residual	.008	62	.000		
	Total	.166	63			

a. Dependent Variable: sustainable comp

b. Predictors: (Constant), structure

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.659	.025		66.010	.000
	structure	.362	.010	.975	34.596	.000

a. Dependent Variable: sustainable comp

Correlations

		sustainable comp	IT
Pearson Correlation	sustainable comp	1.000	1.000
	IT	1.000	1.000
Sig. (1-tailed)	sustainable comp	.	.000
	IT	.000	.
N	sustainable comp	64	64
	IT	64	64

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	IT[b]	.	Enter

a. Dependent Variable: sustainable comp

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000[a]	.999	.999	.00148

a. Predictors: (Constant), IT

b. Dependent Variable: sustainable comp

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.166	1	.166	75725.409	.000[b]
	Residual	.000	62	.000		
	Total	.166	63			

a. Dependent Variable: sustainable comp

b. Predictors: (Constant), IT

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.829	.006		134.157	.000
	IT	.643	.002	1.000	275.183	.000

a. Dependent Variable: sustainable comp

Descriptive Statistics

	Mean	Std. Deviation	N
sustainable comp	2.5274	.05138	64
KM infrastructure	2.4695	.08108	64

Correlations

		sustainable comp	KM infrastructure
Pearson Correlation	sustainable comp	1.000	.991
	KM infrastructure	.991	1.000
Sig. (1-tailed)	sustainable comp	.	.000
	KM infrastructure	.000	.

N	sustainable comp	64	64
	KM infrastructure	64	64

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	KM infrastructure[b]	.	Enter

a. Dependent Variable: sustainable comp

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.991[a]	.982	.982	.00695

a. Predictors: (Constant), KM infrastructure

b. Dependent Variable: sustainable comp

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.163	1	.163	3377.592	.000[b]
	Residual	.003	62	.000		
	Total	.166	63			

a. Dependent Variable: sustainable comp

b. Predictors: (Constant), KM infrastructure

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.977	.027		36.588	.000
	KM infrastructure	.628	.011	.991	58.117	.000

a. Dependent Variable: sustainable comp

Correlations

		sustainable comp	culture	structure	IT
Pearson Correlation	sustainable comp	1.000	.826	.975	1.000
	culture	.826	1.000	.790	.810
	structure	.975	.790	1.000	.975
	IT	1.000	.810	.975	1.000
Sig. (1-tailed)	sustainable comp	.	.000	.000	.000
	culture	.000	.	.000	.000
	structure	.000	.000	.	.000
	IT	.000	.000	.000	.
N	sustainable comp	64	64	64	64
	culture	64	64	64	64
	structure	64	64	64	64
	IT	64	64	64	64