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END OF STDUDIES DISSERTATION

Master's degree in organizational management

Implementing an internal project management mechanism

Case study: PED Division SONATRACH.

Submitted by:

Nour el houda MOULAY

Supervised by:

Pr.Amine FERROUKHI

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ABSTRACT

Over the years and more importantly in the recent managing projects have been used as a delivery mechanism to do business and accomplish objectives. No wonder it has become one of the fastest growing professions in the world.

Internal projects are characterized by organizational development and strong competition for internal personnel and management attention to guarantee the success of it and ensure a better performance, this study aims to investigate the impact of implementing an internal project management mechanism on the Sonatrach PED division project

Key words: project, internal project, management, project management.

RESUME

Au fil des ans et surtout dans les projets de gestion récents ont été utilisés comme un mécanisme de livraison pour faire des affaires et atteindre des objectifs. Pas étonnant qu'il soit devenu l'une des professions à la croissance la plus rapide au monde.

Les projets internes se caractérisent par un développement organisationnel et une forte concurrence pour le personnel interne et l'attention de la direction afin de garantir le succès de celui-ci et d'assurer une meilleure performance, cette étude vise à étudier l'impact de la mise en œuvre d'un mécanisme interne de gestion de projet sur le projet de la division PED de Sonatrach

Mots-clés : projet, projet interne, management, management de projet.

ملخص

على مر السنين والأهم من ذلك في المشاريع الإدارية الأخيرة استخدمت كآلية تسليم للقيام بأعمال تجارية وتحقيق الأهداف. لا عجب أنها أصبحت واحدة من المهن الأسرع نموا في العالم. تتميز المشاريع الداخلية بالتطور التنظيمي والتنافس القوي على الموظفين الداخليين واهتمام الإدارة من أجل ضمان نجاح هذه الأخيرة وضمان أداء أفضل، وتهدف هذه الدراسة إلى دراسة تأثير تنفيذ آلية داخلية لإدارة المشاريع على مشروع قسم PED في سوناطراك .

الكلمات المفتاحية: المشروع، المشروع الداخلي، الإدارة، إدارة المشاريع .

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➤ **LIST OF ABBREVIATION:**

Abbreviation	Signification
PMBOK	Project management body of knowledge
PMI	Project management institut
ISO	International organization for standarzation
PMMS	Project management methodologies
HRM	Human resources management
POSDCORB	Planning, organizing, staffing, directing, coordinating, reporting and budgeting
PM	project management
PMLC	Project management life cycle
IPM	Internal project management
EPM	External project management
ICOM	Inputs,Constarints,outputs,mechanism
KRA	Key results areas
KPI	Key performance indicators
RFQ	Request for quantification
AHP	Analytic Hierarchy Process
CMMI	Capability Maturity Model Integration
PED	petroleum engineering and development
SONATRACH	Société Nationale pour la Recherche, la Production, le Transport, la Transformation, et la Commercialisation des Hydrocarbures
LNG	Liquefied Natural gas
LPG	Liquefied petroleum gas
ENAGEO	Entreprise nationale des géophysiques
ENAFOR	Entreprise nationale de forage
EP	Exploration et production
TPC	Transport par canalisation
LS	Liquéfaction et séparation
RP	Raffinage et pétrochimie
C	Commercialisation
IP	Internal project

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General introduction

In its modern form, project management dates back to the early 1950s, although its roots go further back to the latter years of the 19th century. As businesses realized the benefits of organizing work around projects - recognizing the critical need to communicate and co-ordinate work across departments and professions - a defined method of project management emerged.

.Project management in recent years has proliferated, reaching new heights of sophistication. It has emerged as a distinct area of management practices to meet the challenges of new economic environment, globalization process, rapid technological advancement, and quality concerns of the stakeholders.

Realization of these objectives requires systematic planning and careful implementation. To this effect, application of knowledge, skill, tools and techniques in the project environment, refers to project management.

It is an ideal starting point if you need to manage projects at work or at home, while not necessarily being a formally trained project manager. It is also suitable if you are considering undertaking a project in the near future and are seeking to learn and apply essential project management knowledge and skills.

It provides a planning, realizes and provides projects of any kind, size, nature, type, and focuses on achieving the desired changes in accordance with a chosen methodological approach. In fact, change is the basic aspect, which would be managed.

It identifies and defines how to best manage change and the methodology serves as the “way” to systematically achieve changes in terms of time, cost and quality.

Getting to that result, successfully, is what project management is all about. At its core, then, it centers on the planning and control of everything involved in delivering the result - and it is a process that every person on a project team needs to embrace, understand and execute, no matter the experience level.

Therefore, in terms of project management, we should define the key terms and answer the following research question:

- **Research question:**

- **How the organizations can implement an internal project management mechanism?**

In order to answer to this research question we have suggested the following questions:

- What is the meaning of a project?
- How we define the term management?
- What's the definition of project management?
- What are the types of project management?
- What are the steps of internal project management mechanism?

- **Hypothesis:**

- **Principal hypothesis:**

The organizations can implement an internal project management by different steps: planning, organizing, financing, controlling.

- **Partial hypothesis:**

- A project is an activity to meet the creation of a unique product or service.
- The process of dealing with or controlling things or people.
- Project management is the process of leading the work of a team to achieve all project goals within the given constraints.

- The typologies of project management are internal and external project management.

- Steps of IPMM are: planning, organizing, financing and controlling.

- **Methodology:**

In this thesis, we will do a qualitative research as we are focusing on using data collected from interviews, observation and secondary literature connected to our subject. As we will get elaborate answers from our data collection qualitative research is the best option as we intend to analyze our data in depth.

- **Filed research:**

To better clarify our theme we had chosen to pass our practical side in the PED division of SONATRACH since it is the main field in the Algerian economy.

We had started our internship on May 16th until 30th of September 2021.

- **Purpose of the research:**

- It is one of the hottest topics in our time.
- To ensure on the importance of project management on the economic field.
- To develop a model of an internal project management mechanism.

- **Work plan:**

We have divided our work into three chapters, two theoretical chapters and one practical chapter.

Each chapter is spliced into two sections as follows:

Chapter 1: literature review and theoretical frame work

Section 1: literature review

Section 2: project management

Chapter 2: internal project management mechanism

Section 1: internal project management mechanism

Section 2: steps of internal project management mechanism

Chapter 3: field presentation and data analysis

Section 1: field presentation

Section 2: data analysis

Chapter 1:

Literature review and theoretical frame work

Introduction:

Project management is all about creating an environment and conditions in which to achieve Projects are becoming increasingly important. One of the reasons is because innovation is driven by projects and innovation is becoming increasingly important. Our economy has shifted from where competition between firms focused on operational excellence (becoming more efficient) to one a particular goal or objective - in a controlled manner with a team of people.

In this chapter, we are going to have a brief understanding about the essential elements of the project management, and for a better comprehension, we addressed to three important terms: project, management and project management.

That is why we have divided our chapter into two sections:

- Section one is talking about the literature review
- Section two is about project management

Section 1: Literature review

A lot of studies talked about project management especially PMBOK, PMI and ISO and other studies:

- The study of (Abdulla, Alhashimi, & Hamdan, 2019) evaluated the effect of Project Management Methodologies (PMMs) on project success in the oil and gas industry in the Kingdom of Bahrain. It also investigated the diverse project strategies utilized alongside their qualities and shortcomings. Mixed research methods were used to accomplish the goals of the study, it uncovered that project success is critically affected by the applied comprehensive PMMs, while supplemented PMMs have an insignificant effect on project success. This study suggested that the companies in the oil and gas industry in Bahrain have to focus more on project management methodologies and improve on them to achieve higher project success.

- (Abuazoom, Hanafi, & Ahmad, 2019) studied the impact of human resource management (HRM) practices have on project quality in the construction industry of Libya, the quantitative research method was used in this study, the study found that the key HRM practices significantly influence project quality performance, and it suggests that it's important to implement HRM practices to ensure project quality and the success of the organisation.

- Project management principles and techniques help to complete projects on time, within budget and to project specifications. At the same time, they help achieve the other goals of the organization, such as productivity, quality, and cost-effectiveness. The objective of project management is to ensure completion of projects and to meet agreed goals of time, cost and scope . (نصار, december 2020)

- (PISCOPO, 2014) talked about the difference between internal and external project and which one has a major impact on the organization his research was based on the success rate of the project either IP or EP he found that EPMs scored higher than IPMs in Human, Conceptual and Technical Skills, thus implying EPM have superior skills. The greatest difference was found in the ‘Human Skills’ possessed between an IPM and EPM; as outcomes found EPMs have a better understanding of what others really mean by their words and behavior.

(BACCARINI, The logical frame work mthod for defining project success, 1999)
Project management success-- This focuses upon the project process and, in particular, the successful Accomplishment of cost, time, and quality objectives. It also considers the manner in which the project management process was conducted

(CLARKE, 1999)also states that by targeting the main problems and issues using the key success factors as a focus could make a significant difference to the effectiveness of project management. In order to ensure that a project is completed successfully, project plans need to be updated regularly

- (DE WIT, 1988)and other writers distinguish between project success (measured against the overall objectives of the project) and project management success (measured against the widespread and traditional measures of performance against cost, time and quality). The second distinction is also important – it is the difference between success criteria (the measures by which success or failure of a project or business will be judged) and success factors (those inputs to the management system that lead directly or indirectly to the success of the project or business).

- (VERMA, 1996) writes that communication, teamwork, and leadership are vital components of effective project management, human resources and are necessary to accomplish project objectives successfully.

1. Definition of project:

The origin of the word “project” (from the Latin “pro”, meaning forward, and “jacere”, meaning throw) is “late Middle English (in the sense ‘preliminary design, tabulated

statement') and from the Latin 'projectum', meaning something prominent" (Walding et al., 2004). "A project is an individual or collaborative enterprise that is carefully planned to achieve a particular aim" (Oxford Dictionary, 1933). (EL TURFI, 2017, p. 10)

- A project is A temporary endeavor undertaken to create a unique product, service, or result", (PMBOK, 2017, p. 715)
- A project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. (PMI)
- A unique set of processes consisting of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective. (ISO21500)

It is clear that all the definitions agree as does the researcher's that a project is a pre-defined scope of activities that has a clear start and end date with a clear budget, the project start date could be as early as the date of inception and the completion should be the date when the goal or target is achieved, a project is considered a temporary effort having a start and a finish, and it's also characterized by its uniqueness of the planned outcome, resulting from the successful execution of the project .

2. Project characteristics:

A project has several characteristics:

- Projects are unique,
- Projects are temporary in nature and have a definite beginning and ending date,
- Projects are completed when the project goals are achieved or it's determined the project is no longer viable. (PMBOK, 2017)

A successful project is one that meets or exceeds the expectations of the stakeholders In order for a project to be useful, effective and achieving its full objective, it must be clearly defined. Clearly defined projects share the following 5 criteria:

➤ Specific: The project must be specific. Being specific includes detailing out the project's structure, goals, benefits, milestones and costs. All these requires careful planning and inputs from the project team members involved and if necessary the external consultants or experts. Detailed reporting and planning including command structure, personnel list, communication avenues, Gantt chart and the project's costing should be drawn up to detail out the project's responsibilities, timeline, costs and work to be performed by the respective parties. Periodic project meetings should also be scheduled to discuss relevant matters pertaining to the project and any issues arising therefrom.

➤ Measurable

A clearly defined project must be measurable in terms of its benefits and achievements. This should not only be in terms of monetary benefits but also other tangible and intangible benefits derived from the project's execution. A clear and precise plan devised during the project's planning stage will enable objective measurements be executed to analyze the project's achievements and if any shortcomings.

➤ **Achievable**

A project will only be meaningful if it is achievable. Being too ambitious in planning for the project will not be helpful and may result in the project being unachievable. This may also lead to the project team morale being affected. All these unhealthy things may lead to the project's costs being overrun and timing of the deliverables being significantly affected.

➤ **Relevant**

The project needs to bring relevant benefits to the entity concerned. This may be in the form of reducing its overall production costs, increasing its operational efficiency or other specific purposes relevant to the entity. If it fails to address this, the project will not be beneficial to the entity and will ultimately result in a waste of resources to the entity and its stakeholders.

➤ **Time bound**

The final ingredient to ensure that becomes clearly defined is that it should be time bound. It means that the project should come with a time frame for its completion including its planning, development, execution, fine tuning before its full run instead of taking forever to be completed. Any adjustments to this time table should be clearly justified by the parties involved bearing in mind the costs involved in the project's execution, opportunity costs and finance costs related to the project. (SHAH RUL HJ AHMED).

3. Project typologies:

A. According to their activities

Organizational change projects: change within the company or in work procedures or tools

- Urban planning and social development projects.
- Research and development projects: the development and launch of new ones produce.
- Construction projects of buildings and public works;
- Military, industrial or commercial logistics projects;
- IT and software development projects;

- Artistic projects: the editing of a show, the shooting of a film or the organization an exhibition.

B. Depending on the project size:

The distinction between projects in this category is made by the "cost" factor.

- High-cost project: it includes large projects such as aircraft construction and basic infrastructure.

- Low-cost project: the small porter project as, the training of personal, the launch of a new product. Depending on their purpose:

C. Depending on the nature of the product services:

Transport project, telecommunication

D. Depending on the type of consumption of the project:

Economic project (production, the social project (health, education), the market production project and the non-market production.

E. Depending on the nature of the goods produced:

- Agri -food project, industrial project.

- According to the deliverable

F. According to (Aim, 2011) considers the criterion of the deliverable as a typology and like that we differentiates three main types of projects

- "Book" project

- "Product" project

- "Organizational" project (SENOUCI, 2017)

4. Management definition

- management is planning goals and specifying the purpose of the agency; organizing people, finances, resources and activities; staffing, training, and socializing employees; leading the organization and the staff; and controlling ,monitoring, and sanctioning when needed

- Management theory has also focused on Fayol's (1949) five functions of management—planning, organizing, commanding, coordinating, and providing feedback—and bureaucratic management, where there is a clear division of labor, rules, and procedures (Weber, 1947).

Peter F. Drucker defines, "management is an organ; organs can be described and defined only through their functions".

According to Terry, "Management is not people; it is an activity like walking, reading, swimming or running. People who perform Management can be designated as members, members of Management or executive leaders

Ralph C. Davis has defined Management as, "Management is the function of executive leadership anywhere

Henry Fayol, "To manage is to forecast and plan, to organize, to compound, to co-ordinate and to control." (DR. KARAM)

To conclude, we can say that various definitions of management do not run contrary to one another. Management is the sum-total of all those activities that determine objectives, plans, policies and programs; secure men, material, machinery cheaply put all these resources into operations through sound organization direct and motivate the men at work, supervises and control their performance and provide maximum prosperity and happiness for both employer and employees and public at large.

5. Characteristics Of Management:

Management is a distinct activity having the following salient features:

➤ Economic Resource :

Management is one of the factors of production together with land, labor and capital. As industrialization increases, the need for managers also increases. Efficient management is the most critical input in the success of any organized group activity as it is the force which assembles and integrates other factors of production, namely, labor, capital and materials. Inputs of labor, capital and materials do not by themselves ensure production, they require the catalyst of management to produce goods and services required by the society. Thus, management is an essential ingredient of an organization.

➤ Goal Oriented :

Management is a purposeful activity. It coordinates the efforts of workers to achieve the goals of the organization. The success of management is measured by the extent to which the organizational goals are achieved. It is imperative that the organizational goals must be well-defined and properly understood by the management at various levels.

➤ Distinct Process :

Management is a distinct process consisting of such functions as planning, organizing, staffing, directing and controlling. These functions are so interwoven that it is not possible to lay down exactly the sequence of various functions or their relative significance.

➤ Integrative Force

The essence of management is integration of human and other resources to achieve the desired objectives. All these resources are made available to those who manage. Managers apply knowledge, experience and management principles for getting the results from the workers by the use of non-human resources. Managers also seek to harmonize the individuals' goals with the organizational goals for the smooth working of the organization.

➤ **System of Authority :**

Management as a team of managers represents a system of authority, a hierarchy of command and control. Managers at different levels possess varying degree of authority. Generally, as we move down in the managerial hierarchy, the degree of authority gets gradually reduced. Authority enables the managers to perform their functions effectively.

➤ **Multi-disciplinary Subject :**

Management has grown as a field of study (i.e. discipline) taking the help of so many other disciplines such as engineering, anthropology, sociology and psychology. Much of the management literature is the result of the association of these disciplines. For instance, productivity orientation drew its inspiration from industrial engineering and human relations orientation from psychology. Similarly, sociology and operations research have also contributed to the development of management science.

➤ **Universal Application :**

Management is universal in character. The principles and techniques of management are equally applicable in the fields of business, education, military, government and hospital. Henri Fayol suggested that principles of management would apply more or less in every situation.

The principles are working guidelines which are flexible and capable of adaptation to every organization where the efforts of human beings are to be coordinated. (DR. KARAM)

6. Management Functions:

There is enough disagreement among management writers on the classification of managerial functions.

Newman and summer recognize only four functions, namely, organizing, planning, leading and controlling.

Henri Fayol identifies five functions of management:

Planning, organizing, commanding, coordinating and controlling.

Luther Gulick states seven such functions under the catch word "POSDCORB" which stands for planning, organizing, staffing, directing, coordinating, reporting and budgeting.

Warren Haynes and Joseph Massie classify management functions into decision-making, organizing, staffing, planning, controlling, communicating and directing. Koontz and O'Donnell divide these functions into planning organizing, staffing, directing and controlling.

7. Nature of Management :

Management has been conceptualized earlier in this lesson, as the social process by which managers of an enterprise integrate and coordinate its resources for the achievement of common, explicit goals. It has developed into a separate identifiable discipline during the past six decades. Practice of management as an art is, of course, as old as the organized human effort for the achievement of common goals. Management has also acquired several characteristics of profession during recent times. Large and medium-sized enterprise and elsewhere are managed by professional managers.

Managers who have little or no share in the ownership of the enterprise and look upon management as a career.

The nature of management as a science, as art and as a profession is discussed below:

7.1. Management as a Science:

Development of management as a science is of recent origin, even though its practice is ages old. Fredrick W. Taylor was the first manager-theorist who made significant contributions to the development of management as a science. He used the scientific methods of analysis, observation and experimentation in the management of production function. A perceptive manager, as he was, he distilled certain fundamental principles and propounded the theory and principles of scientific management. His work was followed by many others including Gantt, Emerson, Fayol, Barnard, etc. During the last few decades, great strides have been made in the development of management as a systematized body of knowledge which can be learnt, taught and researched. It has also provided powerful tools of analysis, prediction and control to practicing managers. The scientific character of management has been particularly strengthened by management scientists who have developed mathematical models of decision making.

7.2. Management as an art:

Just as an engineer uses the science of engineering while building a bridge, a manager uses the knowledge of management theory while performing his managerial functions. Engineering is a science; its application to the solution of practical problems is an art. Similarly, management as a body of knowledge and a discipline is a science; its application to the solution of organizational problems is an art. The practice of management, like the practice of medicine, is firmly grounded in an identifiable body of concepts, theories and

principles. A medical practitioner, who does not base his diagnosis and prescription on the science of medicine, endangers the life of his patient. Similarly, a manager who manages without possessing the knowledge of management creates chaos and jeopardizes the well-being of his organization.

7.3. Management as a Profession:

We often hear of professionalization of management in our country. By a professional manager, we generally mean a manager who undertakes management as a career and is not interested in acquiring ownership share in the enterprise which he manages.

8. Levels Of Management:

A company may have different levels of management, Levels of management refer to a line of demarcation between various managerial positions in an enterprise. The levels of management depend upon its size, technical facilities, and the range of production. We generally come across two broad levels of management, administrative management the upper level of management and operating management (the lower level of management).

Administrative management is concerned with "thinking" functions such as laying down policy, planning and setting up of standards. Operative management is concerned with the "doing" function such as implementation of policies, and directing the operations to attain the objectives of the enterprise.

But in actual practice, it is difficult to draw any clear cut demarcation between thinking function and doing function. Because the basic/fundamental managerial functions are performed by all managers irrespective of their levels or, ranks. For instance, wage and salary director of a company may assist in fixing wages and salary structure as a member of the Board of Directors, but as head of wages and salary department, his job is to see that the decisions are implemented.

The real significance of levels is that they explain authority relationships in an organization. Considering the hierarchy of authority and responsibility, one can identify three levels of management namely:

8.1. Top management :

Top management is the ultimate source of authority and it lays down goals, policies and plans for the enterprise. It devotes more time on planning and coordinating functions. It is accountable to the owners of the business of the overall management. It is also described as the policy making group responsible for the overall direction and success of all company activities.

8.2. Middle management:

The job of middle management is to implement the policies and plans framed by the top management. It serves as an essential link between the top management and the lower level or operative management. They are responsible to the top management for the functioning of their departments. They devote more time on the organization and motivation functions of management. They provide the guidance and the structure for a purposeful enterprise. Without them the top management's plans and ambitious expectations will not be fruitfully realized.

8.3. Lower or operative management:

It is placed at the bottom of the hierarchy of management, and actual operations are the responsibility of this level of management. It consists of foreman, supervisors, sales officers, accounts officers and so on. They are in direct touch with the rank and file or workers. Their authority and responsibility is limited.

They pass on the instructions of the middle management to workers.

They interpret and divide the plans of the management into short-range operating plans. They are also involved in the process of decisions-making. They have to get the work done through the workers. They allot various jobs to the workers, evaluate their performance and report to the middle level management. They are more concerned with direction and control functions of management. They devote more time in the supervision of the workers.
(DR. KARAM)

Section 2: Project management

Project management is important because it brings leadership and direction to projects.

1. Definition of project management :

Project Management (PM) is defined as “The application of knowledge, skills, tools, and techniques to project activities to meet the project objectives” (PMBOK, 2017),

PM can be implemented effectively and efficiently by the application of project management processes throughout the project (Spalek, 2014).

Effective PM enables groups, individuals, private and public organizations to meet their goals, stakeholder needs, improve chances of success, find viable solutions for problems and issues, timely response to risks, efficient use of resources, identify failing projects and attempt to recover or terminate them, improve management of constraints and balance their influence on the project. (BADEWI, 2016, p. 13)

However, poor PM will result in, missing deadlines, overruns in costs, low quality, repeated work, unnecessary project expansion, the negative impact on the organization reputation, stakeholders needs not met, and failure to achieve the goals of the project. (KERZNER, 2019, p. 27)

Project Management is an organized common-sense approach that utilizes the appropriate client involvement in order to meet sponsor needs and deliver the expected incremental business value. (K.wylsocki, 2011)

A project management life cycle (PMLC) is a sequence of five processes:

➤ Scoping:

This process group is involved with the activities required to define and authorize the project or a phase. One of the most important aspects of the Initiation process is the evaluation of the vision from a goal alignment perspective.

The decision to approve a project must also consider it in competition with other such proposals based on factors such as resource constraints, risks, technical capabilities, and so on.

➤ Planning:

This process group relates to the activities required to produce a formal project plan containing specified deliverable objectives, budget, schedule, and other relevant information to guide the subsequent ongoing effort. The principal goal of the Planning phase is to produce an accurate, measurable, and workable project plan that has considered the impact of all KAs.

This particular phase consumes the second highest amount of resources in the life cycle and its goal is to lay out a path for execution that can be reasonably achieved. The key output from this phase is a formal project plan outlining not only the scope, schedule, and budget for the project but also how the project will deal with Integrating the other areas of Quality, Human Resources, Communications, Risks, and Procurement.

A great deal of formal documentation is produced in the various planning activities.

➤ Executing :

This process group uses the project plan as a guiding reference to integrate all work activities into production of the project objectives. The actual project deliverables are produced in the execution phase. During this cycle, the PM has responsibilities including coordination of resources, team management, quality assurance, and project plan oversight. The initially approved project plan seldom, if ever, goes exactly according to the original vision. For this reason, it will be necessary to deal with unplanned variances, along with new work created by change requests that are approved by the project board. Another important activity is to communicate actual project results called work performance data. The ultimate execution goal is to deliver the desired result within the planned time and budget.

➤ Monitoring and controlling:

Monitoring and Control transcends the full project life cycle and has the goal of proactively guiding the project toward successful completion. As unplanned changes occur to schedule, scope, quality, or cost, the M&C processes work to determine how to react to the observed variance and move the effort back toward the approved targets. Much of this activity is driven by performance reporting, issues (deliverable variances or process issues), and the formal change management process. In addition, one of the most critical aspects of this phase is the risk monitoring process that involves monitoring various aspects of project risks including technical, quality, performance, management, organizational, and external events.

➤ Closing

Formal project closing involves a group of activities required to formally shut down the project and document acceptance of the result. Also, this step completes the capture of lessons learned for use in future initiatives. It is widely noted that the closing phase gets the least attention; however, the guide model requires that all projects formally close out the activity, including both administrative and third-party relationship elements. The basic role of this phase is to leave the project administratively “clean” and to capture important lessons learned from the effort that can be shared with other projects. In regard to third-party

agreements, it is necessary to view formal contractual closing as vital. Failure to execute final vendor status for the project can open-up future liability for the organization if a supplier later makes claims for nonperformance. If this occurs at some later time, the project organization would then have to scramble to rebuild the status with old records (often poorly organized) and missing team members. Similarly, documentation of lessons learned during the project has been found to provide valuable insights for future projects. (K.wylsocki, 2011, p. 27)

2. Project Management Benefits:

2.1. At the Macro Level:

Senior management often has great interest and motivation in implementing processes that will help them evaluate status of projects. Previous goals for this were methods that focused on increasing status visibility, improving cycle times, delivering defined results on schedule, and meeting defined budgets. Based on the data available at this point the importance of senior management in project success is recognized, but remains a tough item to resolve. (Brad. M. JAKSON, 2019, p. 22)

2.2. At the Micro Level:

At lower levels in the organization, there is frequent resistance to the discipline inherent in a formal project management approach because it is viewed as inhibiting personal flexibility. When pressured to conform, the local PM would likely describe his role as follows:

- Customizing the project work to fit the operational style of the project teams and respective team members.
- Proactively informing executive management of project status on a real-time basis.
- Ensuring that project team members share accurate, meaningful, and timely project documents.
- Ensuring that critical task deadlines are met.al order. (Brad. M. JAKSON, 2019, p. 22)

3. Project management typologies:

Internal project management (IPM) and external project management (EPM) are two different sides of the same coin, so to speak. Both help a company get things done within a set timeframe, budget, and specifications. There are some who believe that an IPM is better than an EPM, and there are also others who would rather go for an EPM over an IPM.

Let us first understand what the difference is between the two, and what advantages you can get from either. In-house or internal project management is when you get people from within the company to handle the monitoring of the projects of your business. These people come from your existing manpower pool and are handpicked to handle the management of projects due to the skill sets and capabilities that they have. External project management, on the other hand, is when you hire people from the outside to do the same thing, but on a project basis. They are often experts at managing projects because technically, that is what they are marketing themselves as.

Now, when it comes to figuring out which is better for your business, you first need to find out what the strengths and weaknesses of each are. You need to weigh the pros and cons of each to determine which type of project manager is ideal for your upcoming projects. It has been noted that IPM know the culture of the company, so there is a lower chance of conflicts between staff member occurring, as opposed to having an EPM working on some of the company's projects. This is just one thing though, so to get to the nitty-gritty, let us enumerate the benefits of each.

3.1. Internal Project Management:

IPMs already know what the company's goals and objectives are, which may make them try harder to get things done. They also have ample knowledge about the company's operations, making it easier for them to manage and execute the projects that are given to them to handle.

IPMs don't present the company with the possibility of data leaks as much since they are aware of the company's policies and processes regarding these security issues.

They take care not to create situations that will jeopardize the company that they are working in therefore they try their best to ensure that things are done without jeopardizing the company's bottom line.

3.2. External Project Management:

EPMs are usually more experienced and have the kind of skill set that companies look for in project managers. This is because this is their specialization and they sell themselves to those who need them by highlighting these particular skills and expertise.

They are more objective than IPMs, and when decisions need to be made for the sake of the project, they would not have any qualms about such decisions as long as the objectives of the project are met.

EPMs are more focused on what they need to do since they do not have to worry about issues that occur internally. They are not exposed to and affected by company politics,

making them more capable of getting these projects done according to defined guidelines and expectations.

It has also been said that IPMs are more reactive in how they handle projects, while EPMs are more proactive. The decision to go with one or the other is basically dependent on what the company expects, and other factors like cash flow, lack of qualified personnel within, and the general lack of manpower. Either way, both types do have their pros and cons and it is up to you to decide which one you feel will work best for your company. (Brad. M. JAKSON, 2019).

4. Project management tools

4.1. Network Diagrams

These diagrams are one of the most important tools in project management that can be used in the process of project planning.

Also known as an “Arrow” diagram, because the diagram consists of different arrows that can be used to connect different activities and also to display precedence. By using these arrows you can also show interdependencies between different activities of a project.

In the process of forming the Network Diagram, there are always some assumptions to be made. The first assumption to be dreamt up is that all pending or ongoing activities have been completed before starting new ones.

The second assumption that has to be made is that all the arrows used in the Network diagram indicate a logical priority. What that means is that the direction of the arrow is displaying the unique sequence that needs to be followed for the proper execution of activities.

The last but not the least assumption is that Network Diagrams have no choice but to start with a single event and end with a single event because there is no place for dual start and endpoints. (BADIRU, BADIRU, & BADIRU, 2019, p. 73)

4.2. Critical Path Method

CPM is an essential tool that is thoroughly used by project managers. This is because this tool can monitor and assess the progress of the project in real-time. It is to ensure that all the ongoing projects performed by the team are going to finish in time.

The Critical Path of the project is the longest sequence of activities performed on the network diagram. It is also characterized as having zero slack time for all activities that are involved in a particular sequence.

So, if there's the slightest delay in any activity, it will cause a delay in the overall project deployment.

Zero Slack time is bad but also good in some ways. Good because the project managers will remain more vigilant when they will know that the slightest error can hinder the progress of the project.

But while doing that, the project manager has to ensure that the activity in question does not become a critical path activity due to the reduction in the number of resources. (BADIRU, BADIRU, & BADIRU, 2019, p. 73)

4.3. Gantt Charts

Gantt chart is a visual representation of all the tasks related to your project scheduled overtime. They are used to plan projects of all sizes and shapes.

because they are an incredible tool to show the work that is scheduled to be done on a project on a specific day.

Here are some of the features of a project you can monitor on a Gantt Chart.

- The start and end dates of a project
- What are the project tasks
- Who are the team members involved in each project
- Who is working on each individual task
- What is the duration of each individual task
- How all of the tasks are linked or are they dependent on each other

people used to plan on paper or show all of the projections with colored blocks because there wasn't any digital solution available. Gantt charts changed all that.

You can also visit exhibitions where they celebrate the evolution of this amazing tool over time. (BADIRU, BADIRU, & BADIRU, 2019, p. 73)

4.4. Project Evaluation and Review Technique

The Project Evaluation and Review Technique, more commonly known as PERT is a form of Network Diagram PM tool that is also used to figure out the critical path of the project. This technique makes scheduling complex projects easier while creating realistic estimates of the duration of each individual activity.

It is a form of Network Diagram but it's different in a way that it uses three kinds of estimates rather than just one. The first estimate, also known as T-O, assumes that the activity will never falter and all the factors that are related to the activity are going to be in favor of it.

The second estimate, also known as ‘most likely’ assumes that the activity will eventually encounter some issues during the execution phase. It will also provide some contingency buffers to fix the issues.

The final estimate is known as the pessimistic estimate which assumes that whatever factor that can possibly go wrong and ruin the activity is bound to happen no matter what. (BADIRU, BADIRU, & BADIRU, 2019, p. 74)

4.5. Work Breakdown Structure

WBS is an amazing tool in the project management paradigm. It shows a hierarchical breakdown of work activities that are used to define the scope of the project. It is also used to identify all of the required deliverables that are needed in the development of the project.

Having all these details spread out in the open enables not just the project managers but also all the other stakeholders to understand the project scope. Also, it helps the teams to understand exactly what needs to be developed.

The beauty of WBS is that it divides the project deliverables and the work required into very small components that are easily manageable. The lowest level items also known as Work Packages can be monitored, assessed, controlled and easily cost estimated. (BADIRU, BADIRU, & BADIRU, 2019, p. 74)

4.6. Project Documentation

Lastly, project documentation is to conclude all of the work that we discussed above in one document. These documents provide all the details about the project and everything inside it. There are created to eliminate any confusion about the project and also prevent any conflict between the stakeholders on the status of the project. (BADIRU, BADIRU, & BADIRU, 2019, p. 74)

5. The Project Management Triangle

A project is a set of tasks undertaken to create a unique service within specified requirements. The process of project management possesses the following characteristics:

a) The first characteristic of a project is that it is temporary, in that it has a scheduled time to meet outcomes. The duration of a project may last from a couple of months to a couple of years and all projects must have an end.

b) The second characteristic is that a project uses its budget to acquire the necessary resources to conduct project work, including people, equipment, materials and any other tools utilized to complete an activity, produce an output, and achieve an objective. The required work to

accomplish the project activities is undertaken by the project team, who follow the details and plans.

c) The third characteristic is that a project will produce a unique service or product (the output), usually referred to as a “deliverable”. The tangible and quantifiable conditions of deliverables are agreed by the beneficiaries and donors before the project starts.

All projects are carried out under certain constraints – traditionally, these are cost, time and scope. These three important factors (commonly called “the triple constraint”) are often represented as a triangle each constraint forms the vertices, with quality as the central theme:

- The project must be carried out within the limits of the specified cost.
- The project must be carried out within the scheduled time period (Haughey, 2011).
- The project must meet the expected scope, not more than or less than that which was originally planned.
- The project must encompass every need of the client, notably adhering to the desired quality. (EL TURFI, 2017, p. 26)

6. Project Management Diamond

Achieving excellence in project management states that the project manager’s greatest challenge is effectively balancing the components of time, cost, scope, quality, and the Expectations for each which signifies this balance

The dimensions of the project diamond have a meaningful symbiotic relationship; for instance, when a user requests an additional report that was not agreed on in the requirement specifications, the scope and quality of the project change. This will change the other project components as well. As a result, the diamond shape will be skewed, graphically depicting a project out of control. The serious challenge is managing change while keeping the diamond’s shape intact. Project planning identifies the diamond’ elements, while effective and efficient change and expectation management allow for these elements to be managed throughout the project’s life cycle (Hamil, 2001). (EL TURFI, 2017, p. 27)

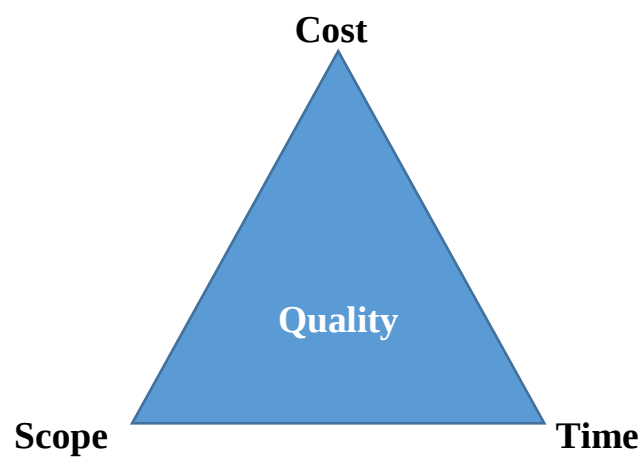


Figure01: project management triangle

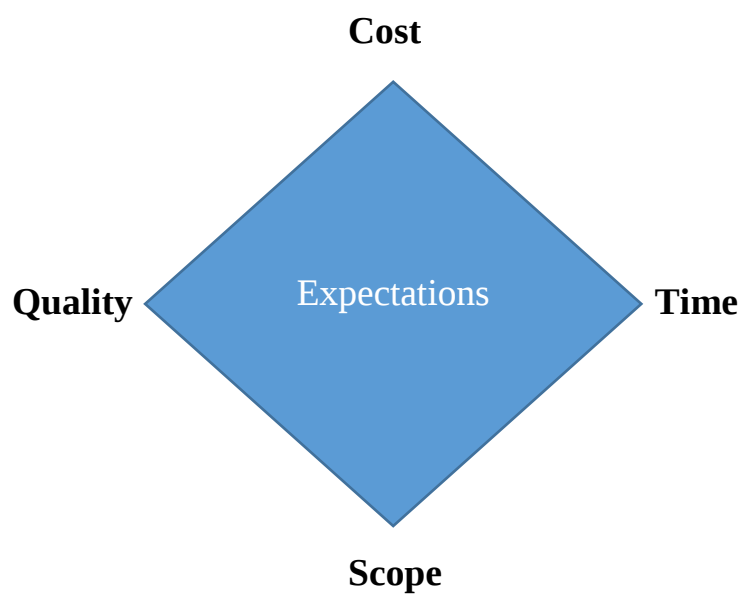


Figure 02:Project management diamond

Chapter conclusion

This chapter began by defining the key words project, project management, although the economic domain has principals and mechanism in order to achieve the planificated goals successively that are made by the organization from the beginning of the project.

The next chapter will highlight the existing project management best practices and review related studies, which demonstrate the project management mechanism practical steps into the next chapter.

Chapter 2:

Internal project management mechanism

Introduction:

Internal project management is recognized at the integration stage to be overlooked upstream in the project process through the stages of Design, Evaluation, Justification, and Integration.

Although it might seem that internal project management would be a cost-saving solution, this is often not the case for the reasons already discussed. Internal project managers are often hindered by a lack of objectivity and by organizational politics that complicate and extend projects well beyond their expected deadlines and budgets. There are also longer-term costs associated with hiring and maintaining full-time

This stage-to-stage systems process has been effectively applied to quality management, product development, and educational curriculum development.

Based on the above, our chapter aims to present an internal project management mechanism utilizing a qualitative integration model.

This chapter has been divided into two sections:

- Section one methodological approach of internal project mechanism
- Section two is about the steps of project management mechanism

Section 1: methodological approach of internal project mechanism

The first area in the internal project management is the rationale of making integration in the need to recognize and account for all the nuances that are downstream in project execution.

In the simplest of terms, integration means bringing everything together. The rationale for making integration the first area in the project management body of knowledge is the need to recognize and account for all the nuances that are downstream in project execution. If an element is recognized at the integration stage, it is less likely to be overlooked downstream in the project. For the purpose of enunciating integration in this focus book, we will use the DEJI systems model (Badiru, 2014) as the guiding framework presents the model.

Process through the stages of Design, Evaluation, Justification, and Integration. Design, in this context, can represent process design, concept formulation, plan generation, group decision, and so on. This stage then leads to the next stage of evaluation in which whatever is generated in the design stage is rigorously evaluated with respect to strengths, weaknesses, opportunities for enhancement, and threats to implementation. This stage-to-

stage systems process has been effectively applied to quality management, product development, and educational curriculum development.

Within the model's structure, sub-topics addressed include metrics, such as feasibility, affordability, desirability, reliability, practicality, and sustainability. The outer shell of the model covers focus on the end goal, implementation strategies, stakeholder engagement, utility assessment, data analytics, and articulation of decisions and conclusions. This sequential process is suitable for the application of the ICOM (Input, Controls, Outcomes, and

Mechanisms) process, shown in Figure 1.2. Thus, as a project moves along, each stage should take account of the input, process, and outputs elements of that stage. The following literary laws are applicable to any project environment and provision must be made to mitigate their adverse impacts:

- **Parkinson's Law:** Work expands to fill the available time or space.
- **Peter's Principle:** People rise to the level of their incompetence.
- **Murphy's Law:** Whatever can go wrong will.
- **Badiru's Rule:** The grass is always greener where you most need it to be dead.

(BADIRU, BADIRU, & BADIRU, 2019, pp. 3-4)

1. ICOM model elements:

The elements in the ICOM Model are explained in the following paragraphs:

1.1.Input:

Project activities start with the customer stating the requirements of interest. This serves as the input to the process. The inputs from the customers represent the objectives of the activities in question, thereby guiding the scope of work;

1.2.Constraints :

All activities are subject to some sort of constraints and controls. Constraints always exist and cannot be totally removed or avoided. What is needed is to mitigate any operational impediments associated with the constraints. Some of the constraints are financial (budget), time (deadlines), legal, environmental, and/or quality. If a constraint is recognized earlier on, the project will be better prepared to deal with it. Further, constraints may dictate the need to adjust the objectives. There are often compromises between the "wants" and "needs" of the customer versus the capabilities of performing organization;

1.3.Mechanism:

A mechanism is the specific way of accomplishing the objectives. This is where the “mechanics” part of the title of this book comes into play. The tools and techniques of project execution relate to «how» to pursue an objective.

Mechanisms move a project forward. The mechanisms are a combination of people, knowledge. (BADIRU, BADIRU, & BADIRU, 2019, p. 6)

In order to ensure a better project management mechanism a lot of researchers talk about incentive in project management

Incentives play an important role in construction contracts, The role of incentives, as presented by Ashley and Workman 1986, is to motivate the contractor to adopt the client’s project objectives. They hold that effective motivation in contracting requires the adoption, at least indirectly, of the client’s project objectives by the contractor.

This is the role of incentives in the contractual relationship. The incentives utilized by the client promote the contractor to adopt the client’s objectives to some degree. The effectiveness of this motivation process is measured in the resulting project performance as perceived by the client.

The basic principle of incentive contracting is simply to take advantage of a contractor’s general objective to maximize his profits by giving him the opportunity to earn a greater profit if he performs the expertise, talents, capital, policies, procedures, authorities, and technology; ncentivization is defined as “a process by which a provider is motivated to achieve extra ‘value-added’ services over those specified originally and which are of material benefit to the user. (GERALD, 2002)

These should be assessable against predefined criteria. The process should benefit both parties.” It creates a more proactive, cooperative relationship between the contracting parties and reinforces the cultural shift

- Design of Incentive Contracts
- Cost Incentives
- Schedule and Delivery Incentives
- Performance or Technical Incentives
- Multiple Incentive Contracts. (GERALD, 2002)

1.4.Output:

The output stage of ICOM specifies what will be achieved in the context of the specified objectives, needs, wants, and so on. It is essential that we confirm if the outputs satisfy the expectations of the customer. Overall, ICOM provides a clear direction on what

critical success areas to consider. It also guides the process of identifying key result areas (KRA) and key performance indicators (KPI).

Project integration management specifies how the various parts of a project come together to make up the complete project. (BADIRU, BADIRU, & BADIRU, 2019).

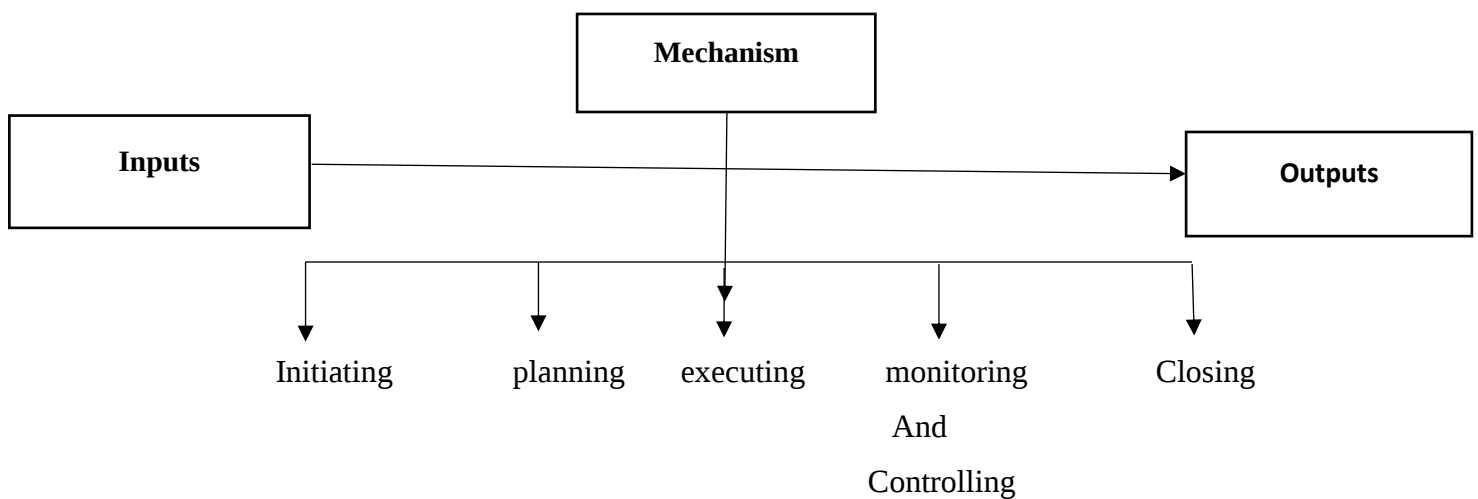


Figure 03: made by the student

The seven elements in the block diagram are carried out across the process groups recommended in PMI's PMBOK. Thus, under the knowledge area of Integration, the required steps are:

- Step 1: Develop Project Charter.
- Step 2: Develop preliminary project scope.
- Step 3: Develop project management plan.
- Step 4: Direct and manage project execution.
- Step 5: Monitor and control project work.
- Step 6: Perform integrated change control.
- Step 7: Close project.

Elements of mechanism Steps of integrating	Initiating	planning	Executing	Monitoring and controlling	Closing
Step 01	X				
Step 02	X				
Step 03		X			
Step 04			X		
Step 05				X	
Step 06				X	
Step 07					X

Table 01: made by the student

In addition to the standard PMBOK inputs, tools, techniques, and outputs, the project team may add in-house items of interest to the steps in each process group. Such in-house items are summarized below:

- Inputs: Other in-house (custom) factors of relevance and interest
- Tools and Techniques: Other in-house (custom) tools and techniques
- Outputs: Other in-house outputs, reports, and data inferences of interest to the organization. (BADIRU, BADIRU, & BADIRU, 2019, p. 8)

Figure 04 shows the details of project execution. For each step (presented as textual listing) in the project execution sequence, the inputs are presented. Then, the applicable tools and techniques are listed. Finally, the expected outputs are described.



Figure04: made by the student

2. Steps analyses:

a. **Step 01:** developing project charter

A project charter formally authorizes a project. It is a document that provides authority to the project manager and it is usually issued by a project initiator or sponsor external to the project organization. The purpose of a charter is to define at a high level what the project is about, what the project will deliver, what resources are needed, what resources are available,

and how the project is justified. The charter also represents an organizational commitment to dedicate the time and resources to the project.

The charter should be shared with all stakeholders as a part of the communication requirement of the Triple C approach.

Cooperating stakeholders will not only sign-off on the project, but also make personal pledges to support the project. Projects are usually chartered by an enterprise, a government agency, a company, a program organization, or a portfolio organization in response to one or more of the following business opportunities or organizational problems:

- Market demand
- Response to regulatory development
- Customer request
- Business need
- Exploitation of technological advance
- Legal requirement
- Social need

The driving force for a project charter is the need for an organization to make a decision about which projects to authorize to respond to operational threats or opportunities. It is desired for a charter to be brief. Depending on the size and complexity of a project, the charter should not be more than two to three pages.

Where additional details are warranted, the expatiating details can be provided as addenda to the basic charter document. The longer the basic charter, the less the likelihood that everyone will read and imbibe the contents. So, brevity and conciseness are desired virtues of good project charters.

The charter should succinctly establish the purpose of the project, the participants, and general vision for the project.

The project charter is used as the basis for developing project plans. While it is developed at the outset of a project, a charter should always be fluid. It should be reviewed and updated throughout the life of the project.

The components of the project charter are summarized below:

➤ **Project Overview:**

The project overview provides a brief summary of the entire project charter. It may provide a brief history of the events that led to the project, an explanation of why the project was initiated, a description of project intent and the identity of the original project owner.

➤ **Project Goals:**

Project goals identify the most significant reasons for performing a project. Goals should describe improvements the project is expected to accomplish along with who will benefit from these improvements. This section should explain what various benefactors will be able to accomplish due to the project. Note that the Triple C approach requires these details as a required step to securing cooperation.

➤ **Impact Statement:**

The impact statement identifies the influence the project may have on the business, operations, schedule, other projects, current technology, and existing applications.

While these topics are beyond the domain of this project, each of these items should be raised for possible action.

➤ **Constraints and Assumptions:**

Constraints and assumptions identify any deliberate or implied limitations or restrictions placed on the project along with any current or future environment the project must accommodate. These factors will influence many project decisions and strategies.

The potential impact of each constraint or assumptions should be identified.

➤ **Project Scope :**

Project scope defines the operational boundaries for the project. Specific scope components are the areas or functions to be impacted by the project and the work that will be performed. The Project Scope should identify both what is within the scope of the project and what is outside the scope of the project.

➤ **Project Objectives:**

Project objectives identify expected deliverables from the project and the criteria that must be satisfied before the project is considered complete.

➤ **Financial Summary:**

The financial summary provides a recap of expected costs and benefits due to the project. These Factors should be more fully defined in the cost-benefit analysis of the project. Project financials must be reforecast during the Life of the effort.

➤ **Project Approach:**

Project approach identifies the general strategy for completing the project and explains any methods or processes, particularly policies and procedures that will be used during the project.

➤ **Project Organization:**

Project organization identifies the roles and responsibilities needed to create a meaningful and responsive structure that enables the project to be successful. Project organization must identify the people who will play each assigned role. At a minimum, this section should identify who plays the roles of project owner, project manager, and core project team.

The project charter does not include the project plan. Planning documents, which may include a project schedule, quality plan, staff plan, communication hierarchy, financial plan, and risk plan, should be prepared and disseminated separately from the charter. (BADIRU, BADIRU, & BADIRU, 2019, pp. 9-13)

b. **Step 2: develop preliminary project**

➤ **Scope statement:**

Project scope presents a definition of what needs to be done. It specifies the characteristics and boundaries of the project and its associated products and services, as well as the methods of acceptance and scope control. Scope is developed based on information provided by the project initiator or sponsor.

A scope statement includes the following:

- Project and product objectives
- Product characteristics
- Service requirements
- Product acceptance criteria
- Project constraints
- Project assumptions
- Initial project organization
- Initial defined risks
- Schedule milestones
- Initial work breakdown structure (WBS)
- Order-of-magnitude cost estimate
- Project configuration management requirements
- Approval requirements. (BADIRU, BADIRU, & BADIRU, 2019, pp. 17-18)

c. **Step 3: develop project management plan**

A project management plan includes all actions necessary to define, integrate, and coordinate all subsidiary and complementing plans into a cohesive project management plan. It defines how the project is executed, monitored and controlled, and closed. The project

management plan is updated and revised through the integrated change control process. In addition, the process of developing project management plan documents.

The collection of outputs of planning processes and includes the following:

- Project management processes selected by the project management team
- Level of implementation of each selected process
- Descriptions of tools and techniques to be used for accomplishing those processes.
- How selected processes will be used to manage the specific project
- How work will be executed to accomplish the project objectives
- How changes will be monitored and controlled
- How configuration management will be performed
- How integrity of the performance measurement baselines will be maintained and used

- The requirements and techniques for communication among stakeholders
- The selected project lifecycle and, for multi-phase projects, the associated project phases

- Key management reviews for content, extent, and timing

The project management plan can be a summary or integration of relevant subsidiary, auxiliary, and ancillary project plans.

All efforts that are expected to contribute to the project goal can be linked into the overall project plan, each with the appropriate level of detail. Examples of subsidiary plans are the following:

- Project scope management plan
- Schedule management plan
- Cost management plan
- Quality management plan
- Process improvement plan
- Staffing management plan
- Communication management plan
- Risk management plan
- Procurement management plan
- Milestone list
- Resource calendar

- Cost baseline
- Quality baseline
- Risk register. (BADIRU, BADIRU, & BADIRU, 2019, pp. 19-21)

d. **Step 4:** direct and manage project execution

Requires the project manager and project team to perform multiple actions to execute the project plan successfully. Some of the required activities for project execution are summarized below:

- Perform activities to accomplish project objectives
- Expend effort and spend funds
- Staff, train, and manage project team members
- Obtain quotation, bids, offers, or proposals as appropriate
- Implement planned methods and standards
- Create, control, verify, and validate project deliverables
- Manage risks and implement risk response activities
- Manage sellers
- Adapt approved changes into scope, plans, and environment
- Establish and manage external and internal communication channels
- Collect project data and report cost, schedule, technical, and quality progress

and status information to facilitate forecasting

- Collect and document lessons learned and implement approved process

improvement activities

The process of directing and managing project execution also requires implementation of the following:

- Approved corrective actions that will bring anticipated project performance into compliance with the plan
- Approved preventive actions to reduce the probability of potential negative consequences
- Approved defect repair requests to correct product defects during quality process. (BADIRU, BADIRU, & BADIRU, 2019, pp. 23-24)

e. **Step 5:** monitor and control project work

No organization can be strategic without being quantitative. It is through quantitative measures that a project can be tracked, measured, assessed, and controlled. The need for monitoring and control can be evident in the Request for Quantification (RFQ) that some

project funding agencies use. Some quantifiable performance measures are schedule outcome, cost effectiveness, response time, number of reworks, and lines of computer codes developed. Monitoring and controlling are performed to monitor project processes associated with initiating, planning, executing, and closing and is concerned with the following:

- Comparing actual performance against plan
- Assessing performance to determine whether corrective or preventive actions are required, and then recommending those actions as necessary
- Analyzing, tracking, and monitoring project risks to make sure risks are identified, status is reported, and response plans are being executed
- Maintaining an accurate timely information base concerning the project's products and associated documentation
- Providing information to support status reporting, progress measurement, and forecasting
- Providing forecasts to update current cost and schedule information
- Monitoring implementation of approved changes. (BADIRU, BADIRU, & BADIRU, 2019, pp. 26-27)

f. **Step 6: integrated change control**

Integrated change control is performed from project inception through completion. It is required because projects rarely run according to plan. Major components of integrated change control include the following:

- Identifying when a change needs to occur or when a change has occurred
- Amending factors that circumvent change control procedures
- Reviewing and approving requested changes
- Managing and regulating flow of approved changes
- Maintaining and approving recommended corrective and preventive actions
- Controlling and updating scope, cost, budget, schedule, and quality requirements based upon approved changes

- Documenting the complete impact of requested changes
- Validating defect repair
- Controlling project quality to standards based on quality reports combining configuration management system with integrated change control includes identifying, documenting, and controlling changes to the baseline.

- Configuration Status Accounting:

This involves capturing, storing, and accessing configuration information needed to manage products and product information effectively.

- Configuration Verification and Auditing:

This involves confirming that the performance and functional requirements defined in the configuration documentation have been satisfied.

Under integrated change control, every documented requested change must be either accepted or rejected by some authority within the project management team or an external organization representing the initiator, sponsor, or customer. Integrated change control can, possibly, be controlled by a Change Control Board. (BADIRU, BADIRU, & BADIRU, 2019, pp. 29-31)

- g. **Step 7: close project**

At its completion, a project must be formally closed. This involves performing the project closure portion of the project management plan or closure of a phase of a multi-phase project. There are two main procedures developed to establish interactions necessary to perform the closure function:

- Administrative closure procedure: This provides details of all activities, interactions, and related roles and responsibilities involved in executing the administrative closure of the project. It also covers activities needed to collect project records, analyze project success or failure, gather lessons learned, and archive project information.

- Contract closure procedure: This involves both product verification and administrative closure for any existing contractual agreements. Contract closure procedure is an input to the close contract process. (BADIRU, BADIRU, & BADIRU, 2019, pp. 33-34)

Section 02: internal project management mechanism steps

To approach the information mentioned above and summarize the essential elements of each step, each step and its components are explained and summarized in tables

2.1. Components of step1: develop project charter

2.1.1. Inputs:

- Contract: A contract is a contractual agreement between the organization performing the project and the organization requesting the project.
- Project statement of work (SOW): This is a narrative description of products or services to be supplied by the project. For internal projects, it is provided by the project initiator or sponsor.

The SOW indicates the following:

- Business need based on required training, market demand, technological advancement, legal requirement, government regulations, industry standards, or trade consensus
- Product scope description, which documents project requirements and characteristics of the product or service that the project will deliver
 - Strategic plan, which ensures that the project supports the organization's strategic goals and business tactical actions.
- Enterprise environmental factors: These are factors that impinge upon the business environment of the organization. They include organizational structure, business culture, governmental standards, industry requirements, quality standards, trade agreements, physical infrastructure, technical assets, proprietary information, existing human resources, personnel administration, internal work authorization system, marketplace profile, competition, stakeholder requirements, stakeholder risk tolerance levels, commercial obligations, access to standardized cost estimating data, industry risk, technology variances, product lifecycle, and project management information systems.
- Organizational process assets: These refer to the business processes used within an organization. They include standard processes, guidelines, policies, procedures, operational templates, criteria for customizing standards to specific project requirements, organization communication matrix, responsibility matrix, project closure guidelines (e.g., sunset clause), financial controls procedure, defect management procedures, change control procedures, risk control procedures, process for issuing work authorizations, processes for approving work authorizations, management of corporate knowledge base, and so on.

2.1.2. Tools and techniques:

Project selection methods: These methods are used to determine which projects an organization will select for implementation, The methods can range from basic seat-of-the-pants heuristics to highly complex analytical techniques.

Project management methodology: This defines the set of project management process groups, their collateral processes, and related control functions that are combined for implementation for a particular project. It can also be a formal mature process or informal technique that aids in effectively developing a project charter.

Project management information system (PMIS): This is a standardized set of automated tools available within the organization and integrated into a system for the purpose of supporting the generation of a project charter, facilitating feedback as the charter is refined, controlling changes to the project charter, or releasing the approved document.

Expert judgment: This is often used to assess the inputs needed to develop the project charter. Expert judgment is available from sources such as the experiential database of the organization, knowledge repository, knowledge management practices, knowledge transfer protocol, business units within the organization.

2.1.3. Out puts

Project charter: As defined earlier in this chapter, a project charter is a formal document that authorizes a project. It provides authority to the project manager and it is usually issued by a project initiator or sponsor external to the project organization. It empowers the project team to carry out the actions needed to accomplish the end goal of the project. (BADIRU, BADIRU, & BADIRU, 2019, pp. 15-16)

Inputs	Tools and techniques	outputs
- Project contract (if applicable) - Project statement of work - Enterprise environmental factors - Organizational process assets - Other in-house (custom) factors of relevance and interest	- Project selection methods - AHP (Analytic Hierarchy Process) - Project management methodology - Project management information system - Expert judgment - Balance scorecard - Process control charts - Other in-house (custom) tools and techniques	- Project charter - Other in-house outputs, reports, and data inferences of interest to the organization

Table 2 made by the student

2.2. Composants of step 2: Develop preliminary project scope.

Project scope presents a definition of what needs to be done. It specifies the characteristics and boundaries of the project and its associated products and services, as well as the methods of acceptance and scope control. Scope is developed based on information provided by the project initiator or sponsor.

2.2.1. Inputs:

Inputs for STEP 2 are the same as defined for STEP 1 covering the project charter, statement of work, environmental factors, and organizational process assets.

2.2.2. Tools and techniques:

The tools and techniques for STEP 2 are the same as defined for STEP 1 and cover project management methodology, project management information system, and expert judgment.

2.2.3. Outputs:

The output of STEP 2 is the preliminary project scope statement, which was defined and described earlier. (BADIRU, BADIRU, & BADIRU, 2019, pp. 17-18)

Inputs	Tools and techniques	Outputs
- Project charter - Project statement of work - Enterprise environmental factors - Organizational process assets - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Expert judgment - CMMI (Capability Maturity Model Integration) - Critical chain - Process control charts - Other in-house (custom) tools and techniques	- Project scope statement

Table 3 made by the student

2.3. Composants of step 3: Develop project management plan

A project management plan includes all actions necessary to define, integrate, and coordinate all subsidiary and complementing plans into a cohesive project management plan. It defines how the project is executed, monitored and controlled, and closed. The project management plan is updated and revised through the integrated change control process. In addition, the process of developing project management plan documents the collection of outputs

2.3.1. Inputs:

Inputs to STEP 3 are the same as defined previously and include the preliminary project scope statement, project management processes, enterprise environmental factors, and organizational process assets.

2.3.2. Tools and techniques:

The tools and techniques for STEP 3 are project management methodology, project information system, and expert judgment, Project management methodology defines a process which aids a project management team in developing and controlling changes to the project plan.

The project management information system at this step covers the following segments:

- Automated system, which is used by the project team to do the following:
 - Support generation of the project management plan
 - Facilitate feedback as the document is developed
 - • Release the approved document
- Configuration management system, which is a subsystem that includes sub-processes for accomplishing the following:
 - Submitting proposed changes
 - Tracking systems for reviewing and authorizing changes
 - Providing a method to validate approved changes
 - Implementing change management system
 - Configuration management system, which forms a collection of formal procedures used to apply technical and administrative oversight to do the following:
 - Identify and document functional and physical characteristics of a product or component
 - Control any changes to such characteristics
 - Record and report each change and its implementation status
 - Support audit of the products or components to verify conformance to requirements
 - The change control system is the segment of project management information system that provides a collection of formal procedures that define how project deliverables and documentation are controlled.

Expert judgment, the third tool for STEP 3, is applied to develop technical and management details to be included in the project management plan.

2.3.3.output:

The output of STEP 3 is the project management plan. Control changes to the project management plan. (BADIRU, BADIRU, & BADIRU, 2019, pp. 19-20-21)

Inputs	Tools and techniques	outputs
- Preliminary project scope statement - Project management processes - Enterprise environmental factors - Organizational process assets - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Expert judgment	- Project management plan

Table 4 made by the student

2.4. Composants of step 4: Direct and manage project execution.

requires the project manager and project team to perform multiple actions to execute the project plan successfully. Some of the required activities for project execution are summarized below:

- Perform activities to accomplish project objectives
- Expend effort and spend funds
- Staff, train, and manage project team members
- Obtain quotation, bids, offers, or proposals as appropriate
- Implement planned methods and standards
- Create, control, verify, and validate project deliverables
- Manage risks and implement risk response activities

2.4.1. Inputs:

The inputs of STEP4 are:

- Project management plan

- Approved corrective actions: These are documented, authorized directions required to bring expected future project performance into conformance with the project management plan.
- Approved change requests: These include documented, authorized changes to expand or contract project scope. Can also modify policies, project management plans, procedures, costs, budgets, or revise schedules. • Approved defect repair: This is documented, authorized request for product correction of defect found during the quality inspection or the audit process.
- Validated defect repair: This is a notification that re-inspected repaired items have either been accepted or rejected.
- Administrative closure procedure: Documents all activities, interactions, and related roles and responsibilities needed in executing the administrative closure procedure for the project.

2.4.2. Tools and techniques:

The tools and techniques for STEP 4 are project management methodology and project management information system and they were previously presented.

2.4.3. Outputs:

The outputs of STEP4 are:

- Deliverables
- Requested changes
- Implemented change requests
- Implemented corrective actions
- Implemented preventive actions
- Implemented defect repair
- Work performance information (BADIRU, BADIRU, & BADIRU, 2019, pp.

23-24-25)

Inputs	Tools and techniques	outputs
- Project management plan - Approved corrective actions - Approved preventive actions - Approved change requests - Approved defect repair - Validated defect repair - Administrative closure procédure - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Process flow diagram - Other in-house (custom) tools and techniques	- Project exécution plan

Table 5 made by the student

2.5. Composants of step 5: Monitor and control project work

No organization can be strategic without being quantitative. It is through quantitative measures that a project can be tracked, measured, assessed, and controlled. Some quantifiable performance measures are schedule outcome, cost effectiveness, response time, number of reworks, and lines of computer codes developed. Monitoring and controlling are performed to monitor project processes associated with initiating, planning, executing, and closing.

2.5.1. inputs:

- Project management plan
- Work performance plan
- Rejected change requests

- Change requests
- Supporting documentation
- Change review status showing the disposition of rejected change requests

2.5.2.tools and techniques:

- Project management methodology.
- Project management information system.
- Earned value technique: This measures performance as the project moves from initiation through closure. It provide means to forecast future performance based on past performance.

- Expert judgment.

2.5.3. outputs:

- Recommended corrective actions: Documented recommendations required to bring expected future project performance into conformance with the project management plan.
- Recommended preventive actions: Documented recommendations that reduce the probability of negative consequences associated with project risks.
- Forecasts: Estimates or predictions of conditions and events in the project's future based on information available at the time of the forecast.
- Recommended defect repair: Some defects found during the quality inspection and audit process recommended for correction.
- Requested changes. (BADIRU, BADIRU, & BADIRU, 2019, pp. 26-27-28)

Inputs	Tools and techniques	outputs
- Project management plan - Work performance information - Rejected change requests - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Earned value management - Expert judgment - Other in-house (custom) tools and techniques	- Recommended corrective actions - Recommended preventive actions - Forecasts - Recommended defect repair - Requested changes - Other in-house outputs, reports, and data inferences of interest to the organization

Table 6 made by the student

2.6. Composants of step 6: Perform integrated change control

Integrated change control is performed from project inception through completion. It is required because projects rarely run according to plan.

2.6.1.inputs:

It includes the following items:

Project management plan

- Requested changes
- Work performance information
- Recommended preventive actions
- Deliverables

2.6.2.tools and techniques :

- Project management methodology: This defines a process that helps a project management team in implementing integrated change control for the project.
- Project management information system: This is an automated system used by the team as an aid for the implementation of an integrated change control process for the project. It also facilitates feedback for the project and controls changes across the project.

➤ Expert judgment: This refers to the process whereby the project team uses stakeholders with expert judgment on the change control board to control and approve all requested changes to any aspect of the project.

2.6.3.outputs :

- Approved change requested
- Rejected change requests
- Project management plan (updates)
- Project scope statement (updates)
- Approved corrective actions
- Approved preventive actions
- Approved defect repair
- Validated defect repair
- Deliverables. (BADIRU, BADIRU, & BADIRU, 2019, pp. 30-31-32)

Inputs	Tools and techniques	outputs
- Project management plan - Requested changes - Work performance information - Recommended preventive actions - Recommended corrective actions - Deliverables - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Expert judgment - Other in-house (custom) tools and techniques	- Approved change requests - Rejected change requests - Update project management plan - Update project scope statement - Approved corrective actions - Approved preventive actions - Approved defect repair - Validated defect repair - Deliverables - Other in-house outputs, reports, and data inferences of interest to the organization

Table 7 made by the student

2.7. Composants of step 7: Close project

At its completion, a project must be formally closed. This involves performing the project closure portion of the project management plan. There are two main procedures developed to establish interactions necessary to perform the closure function:

Administrative closure procedure:

This provides details of all activities, interactions, and related roles and responsibilities involved in executing the administrative closure of the project.

It also covers activities needed to collect project records, analyze project success or failure, gather lessons learned, and archive project information.

Contract closure procedure:

This includes both product verification and administrative closure for any existing contractual agreements.

2.6.1.inputs:

- Project management plan
- Contract documentation:

This is an input used to perform the contract closure process and includes the contract itself as well as changes to the contract and other documentation, such as technical approach, product description, or deliverable acceptance criteria and procedures.

- Enterprise environmental factors
- Organizational process assets
- Work performance information
- Deliverables, as previously described, and also as approved by the integrated change control process.

2.6.2.tools and techniques:

Project management methodology

Project management information system

- Expert judgment

2.7.3.outputs :

Administrative closure procedure:

- Procedures to transfer the project products or services to production and/or operations are developed and established at this stage.
- Actions and activities to define the stakeholder approval requirements for changes and all levels of deliverables
- Actions and activities confirm project has met all sponsor, customer, and other stakeholders' requirements.
- Actions and activities to verify the all deliverables have been provided and accepted.
- Actions and activities to validate completion and exit criteria for the project.

Contract Closure Procedure:

- Actions performed at this stage formally close all contracts associated with the completed project.

- Final Product, Service, or Result
- Formal acceptance and handover of the final product, service, or result that the project was authorized to provide
 - Formal statement confirming that the terms of the contract have been met
 - Organizational Process Assets (Updates)
 - Development of the index and location of project documentation using the configuration management system
- Formal acceptance documentation, which formally indicates the customer or sponsor has officially accepted the deliverables
 - Project files, which contain all documentation resulting from the project activities.
 - Project closure documents, which consist of a formal documentation indicating the completion of the project and transfer of deliverables.
 - Historical information, which is transferred to the knowledge base of lessons learned for use by future projects.
 - Traceability of process steps (BADIRU, BADIRU, & BADIRU, 2019, pp. 32-33-34)

Inputs	Tools and techniques	outputs
- Project management plan - Contract documentation - Enterprise environmental factors - Organizational process assets - Work performance information - Deliverables - Other in-house (custom) factors of relevance and interest	- Project management methodology - Project management information system - Expert judgment - Other in-house (custom) tools and techniques	- Administrative closure procedure - Contract closure procedure - Final product, service or result - Updates on organizational process assets - Other in-house outputs, reports, and data inferences of interest to the organization

Table 8 made by the student

Chapter conclusion

Project Management centers on following a process to ensure a project is executed successfully from kickoff to completion.

An efficient internal project management mechanism project managers have to decide on the format of the information and schedule a time to pass the information to team members and stakeholders. By doing this, stakeholders will regularly receive updates on project status which is an important activity of project managers.

Since the mechanism of an internal project requires the correct application of the steps mentioned above and to guarantee the success of it and a better performance in the organization.

So for a better clarification of the theoretical dimension the next chapter contains the practical progress of the theme.

Chapter 3

Field presentation and data analysis

Introduction:

In this chapter we have moved to the practical case to show efficiency and the application of an internal project mechanism, so will take place at the level of PED (petroleum engineering and development) and we were given a type of an internal project called project X

Our working procedures based on interviewing team members and the analysis of an internal oil project x.

We have divided our chapter into two sections:

- Section one is about the field presentation
- Section two is about analyses of the internal oil project

Section 1: field presentation

Our study is focused on oil project presented by SONATRACH precisely PED division

1.1. Presentation of SONATRACH:

For more than 50 years, SONATRACH has fully played its role as the locomotive of the national economy. Its mission is to develop Algeria's large hydrocarbon reserves. This major player in the oil industry, nicknamed the African major, draws its strength from its ability to be a fully integrated group throughout the hydrocarbon value chain.

Upstream, SONATRACH operates, in its own effort or in partnership with foreign oil companies, some of the most important deposits in the world in different regions of the Algerian Sahara: Hassi Messaoud, Hassi R'Mel, Hassi Berkine, Ourhoud, Tin Fouyé Tabankort, Rhourde Nouss, In Salah and In Amenas.

In terms of transport, the Group has an extremely dense network of pipelines that now extends over nearly 22,000 kilometers on the national territory. The Company has also built four oil loading ports: Algiers, Arzew, Bejaia and Skikda to allow the loading and unloading of large tankers with a capacity of 80,000 to 320,000 MT and LNG tankers.

In the Downstream, SONATRACH has six refineries operating in the territory and two petrochemical complexes, four LNG Liquefaction complexes and two LPG Separation complexes.

SONATRACH employs nearly 50,000 permanent employees and more than 200,000 people throughout the Group.

The Group has 154 subsidiaries and stakes, including fifteen 100% owned and working on a daily basis to enhance the country's oil and gas value chain. These include the National Geophysical Company "ENAGEO", the National Drilling Company "ENAFOR", the National Company of Major Petroleum Works "ENGTP", or the national company for the marketing and distribution of petroleum products "NAFTAL". (SONATRACH)

As part of its transformation of the Company, SONATRACH clearly shows its ambition to become one of the top five of the most successful and profitable national oil companies in the global energy industry. The key words of its new strategy are operational excellence and innovation to remain the banner of the Algerian economy. SONATRACH aims for a national integration rate of 55% by 2030.

As the main industrial investor in Algeria, SONATRACH actively participates in supporting the local industrial fabric. The group plans to make investments of more than \$59 billion by 2030, including \$45.8 billion in the Exploration and Production business, \$8.6 billion in refining and petrochemicals and \$2.3 billion in pipeline transportation.

By 2030, the Group aims for more than \$68 billion in additional revenues, of which 50% will contribute to national wealth and 50% will be invested in the renewal of reserves, production capacities, staff training and the development of expertise in the Company. (SONATRACH)

1.2. SONATRACH flow chart:

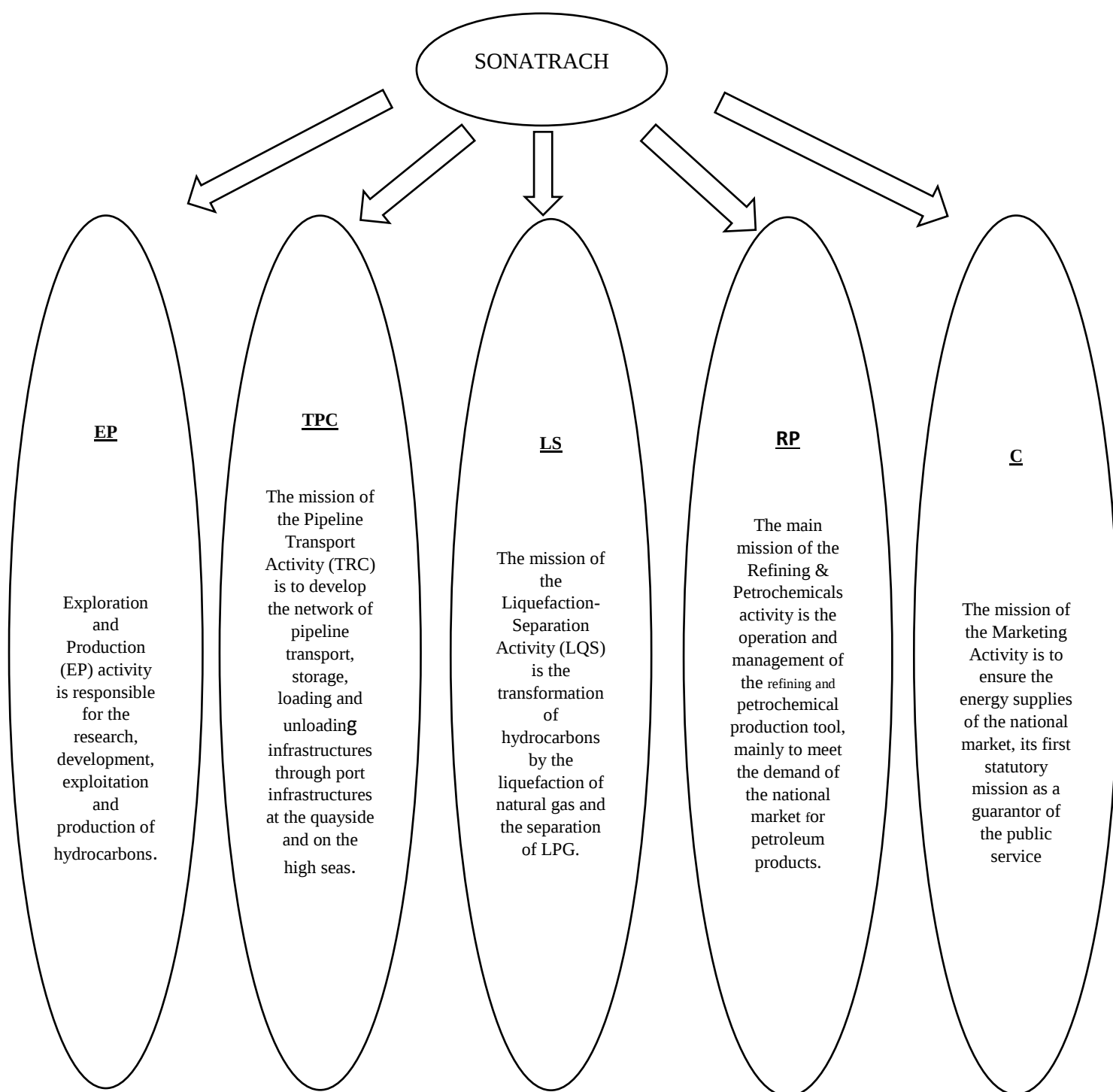


Figure 05 made by the student

1.3 EP Flow chart:

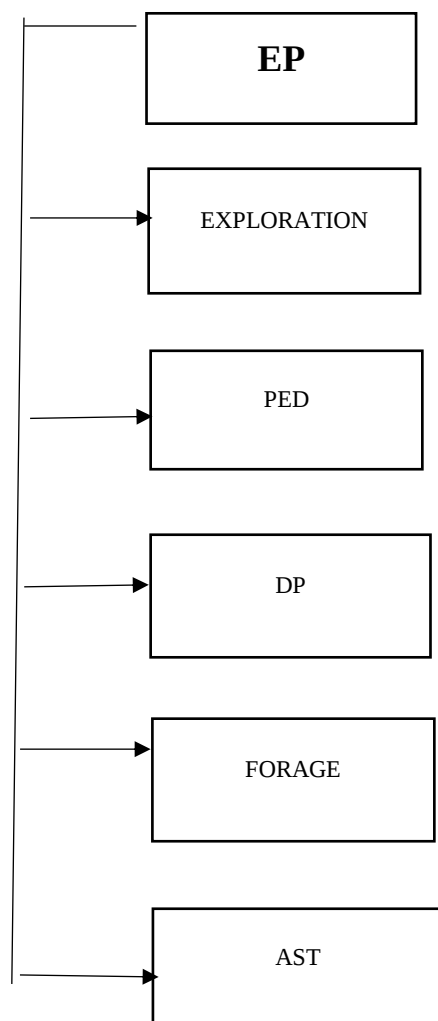


Figure 06 made by the student

After conclusion of a research and exploitation contract between SONATRACH and the Algerian State, a period of 7 years of research organized in 3 phases enters into force,

Exploration holds during this period to highlight a trap hydrocarbon accumulation in a geological situation called discovered, and then PED is responsible for setting up a strategy for the development of hydrocarbon fields called the development plan POD. (BOUGHABA & BENADROUCHE, 2021).

A POD is elaborated by making a multidisciplinary study in collaboration with several technical structure within PED to do this the coordination between the resources operating during a period not having to pass a constrained date which is the date of the end of contract. (BOUGHABA & BENADROUCHE, 2021).

1.3 PED presentation:

The PED (Petroleum Engineering & Development) is a division that deals with upstream activity within Sonatrach Company. As a structure involved in nearly the complete value chain E&P (Engineering and Production), the PED is the division of upstream activity that handles the largest variety of petro technical data. One of the major roles of the PED is to gather and store the relevant data generated by other divisions. This position puts the PED at the center of the interactions with various structures of upstream activity. (BOUGHABA & BENADROUCHE, 2021)

Thus, the PED has to fulfil missions such as:

- Basic engineering studies and definition of the options for development in each domain,
- Planning and following operations (drilling and work over) and production,
- Technological survey and implementation of new technologies (shorts radius, horizontal drilling, etc.),
- Design and definition of development plans and reserves exploitation (operated by Sonatrach and in association or combined actions),
- Realization of technical and economic studies following the policy of improvement of existing reserves or discovered reserves,
- Evaluation of the reserves in all oilfields throughout the Algerian territory, setting production and injection previsions on the basis of the situation of the reserves, of the level of development of oilfields and installation capacities,
- Estimation of opportunities as to the acquisition and development of assets through personal effort and/or joint projects in Algeria and Overseas. (BENMAHAMED & ERMINE, 2007, pp. 15-35)

1.3. Ped flow chart:

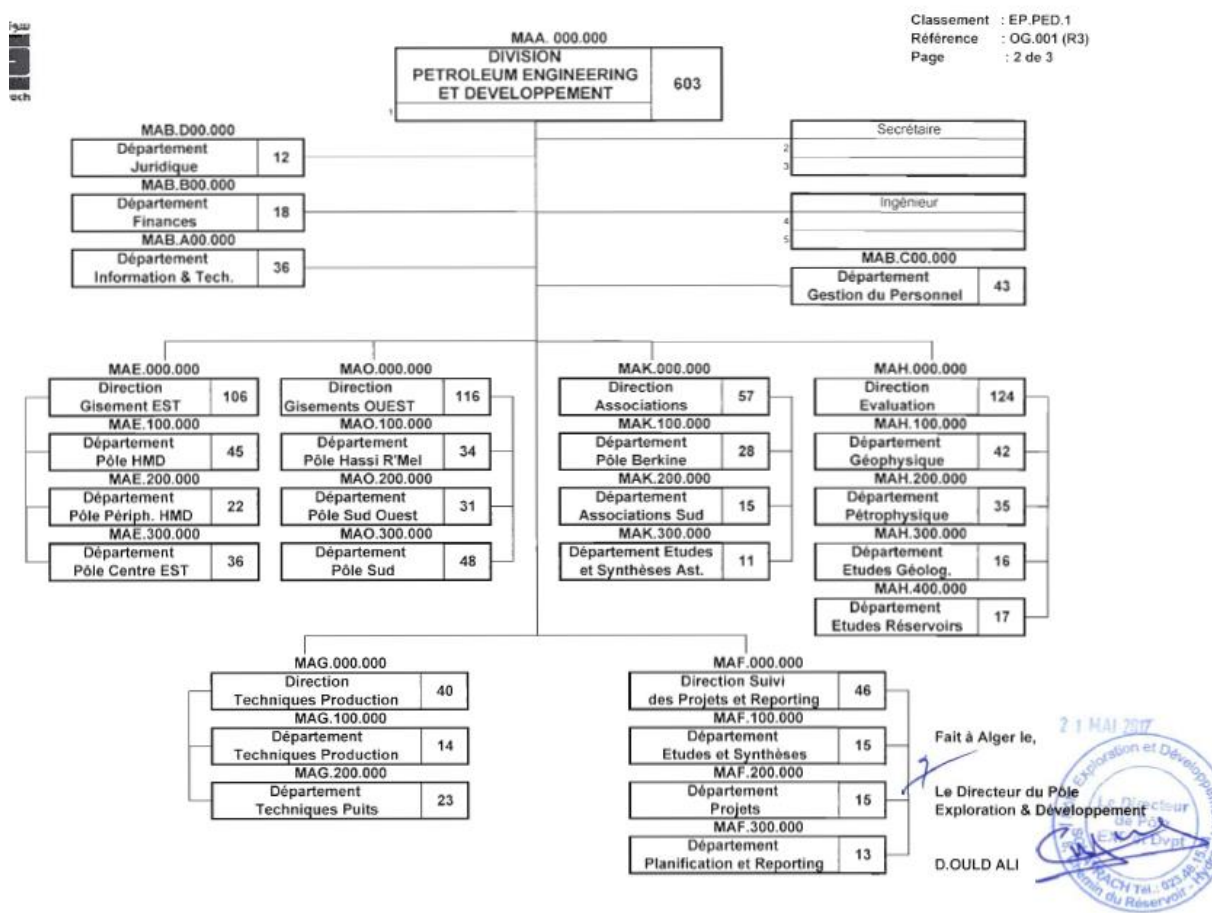


Figure 07ped division flow chart

Section 2: data analyses of an internal oil project:

To do the analyses of the internal oil project x we have chosen to started by interviewing team members at the ped division which is presented in the following table:

Name	Gender	function	duration
Assia SAOUDI	Female	head of project monitoring and reporting department	40 minutes
Kamila BENADROUCHE	Female	economic design engineer	2 hours
Salim BOUGHABA	Male	petrochemical engineer	2 hours

Table 09 made by the student

The oil and gas industry is usually divided into three major sectors:

- upstream (exploration and production) “Internal level project”
- midstream “medium level project”
- Downstream “external level project”. (SAOUDI, 2021)

1. Petroleum system:

A petroleum system is a unifying concept that encompasses all of the disparate elements and processes of petroleum geology, including: the essential elements (source, reservoir, seal, and overburden rock) and processes (trap formation, generation-migration-accumulation) and all genetically related petroleum that originated from one pod of active source rock and occurs in shows, seeps, or accumulations also called hydrocarbon system

Practical application of petroleum systems can be used in exploration, resource evaluation, and research. (BOUGHABA & BENADROUCHE, 2021).

2. Petroleum projects:

Petroleum projects cover day-to-day field development and extraction operations. They include processes such as establishing a reservoir’s stability and equipment functionality, and are often headed by petroleum engineers. Also important in petroleum

projects are equipment design, cost estimating and production monitoring and evaluation. (BOUGHABA & BENADROUCHE, 2021).

For the exploration phase, we use 3 methods:

1. Seismics methodology.
2. geology methodology.
3. drilling methodology. (SAOUDI, 2021)

3. Internal oil Project X presentation:

It is an internal oil project at the PED division, which started on Monday, august 21st, 2017 was delivered and achieved successfully on Thursday, november 11th, 2018 in a duration of 323,7 days.

On this project the team responsible of this project faced a 3 major problems:

1. estimate durations correctly
2. value the effort
3. meeting deadlines

so we tried to analyze the situation and find a solution that can solve this problems so we suggested to them to follow the ICOM model that is mentioned in the 2 chapters previously

On this project it contained a lot of elements that are shown in the appendices and explained in the following tables below :

4. Project X management mechanism:

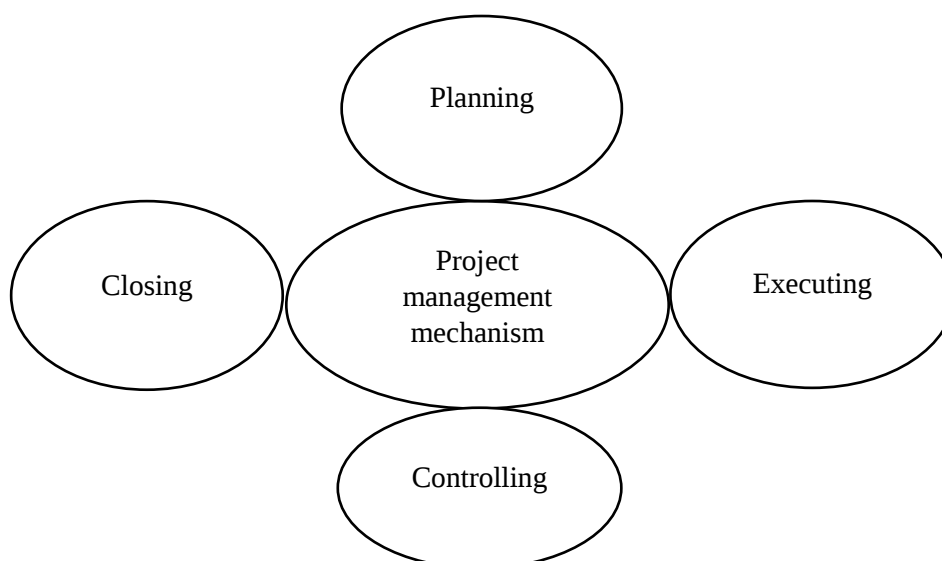


Figure08 made by the student

In this figure we have applied the project management mechanism on the x internal oil project to see if the project follows the steps mentioned above or not

The next part aims to describe our XIP then applying the steps (figure 8) in order to obtain IP success:

➤ **Initiating:**

The project design that is elaborated by PED division is presented in the following elements:

A. Project description:

Depending on the activities envisaged exploration and drilling, exploitation the project may include the following phases:

- Preparatory phase.
- Construction phase.
- Work phase.
- Demobilisation, closure and rehabilitation phase of sites.

B. Project functions:

- Energy source
- Supply
- Water supply
- Waste water management
- Domestic waste management
- Pollution. (BOUGHABA & BENADROUCHE, 2021)

C. Activities description:

- Civil works, average, quantity, period.
- Nature of activities, seismic, acquisition, drilling.
- Environnements travelled or occupied, délimitation, duration of occupation.
- Organization of periods and hours of activity.
- Use of chemicals that may pollute the environment. (BOUGHABA &

BENADROUCHE, 2021)

➤ **Planning :**

All the equipment and tools that are utilized in our IP are presented in the tables below:

❖ **Planification of phase one:**

Activities	Inputs
Preparatory phase	
Fields occupation	land use, population, heritage
site preparation clearing, water sounding	Soil, water, vegetation, fauna, wildlife habitats, wetlands.

Table 10 (BOUGHABA & BENADROUCHE, 2021)

❖ **Planification of phase two:**

Activities	Inputs
Construction phase.	
location of infrastructure pipelines, gas pipelines	land use, population, heritage, soil and mangrove subsoil
establishment of infrastructure in marine areas	Soil, water, vegetation, fauna, wildlife habitats, wetlands, use of fishing grounds, human activities, population, economy. employment
use of local materials	ecosystem, soil, corals
construction of road infrastructure and communication routes	Soil, water, air, vegetation, fauna, wildlife habitats, wetlands, Sediments, land use, heritage, landscape, economy, employment
transportation and movement of machinery and equipment	Soil, water, vegetation, fauna, wildlife habitats, wetlands, senore atmosphere, traffic and road safety, marine, population, employment

Table 11 (BOUGHABA & BENADROUCHE, 2021)

❖ **Planification of phase three:**

Activities	Inputs
Work phase	
seismic, drilling, and construction of storage areas	soil, landscape, sediment, water, air, sound environment, vegetation, wildlife habitats, traffic and road safety, population, employment
seismic, drilling, and construction of storage areas	soil, landscape, water, air, vegetation, wildlife habitats, traffic and marine safety, population, employment
transportation and movement of machinery and equipment	soil, landscape, sediment, water, air, sound environment, vegetation, wildlife habitats, traffic and road safety, population, employment
pollution and waste disposal	Soil, water, air, Sediments, landscape, economy, employment, Public health, fauna.
maintenance and repairs of infrastructure and equipment	Soil, water, wildlife habitats, sediment, vegetation, employment
presence of equipment	Soil, sediment, water, landscape, population, economy, employment, fauna, flora

Table 12 (BOUGHABA & BENADROUCHE, 2021)

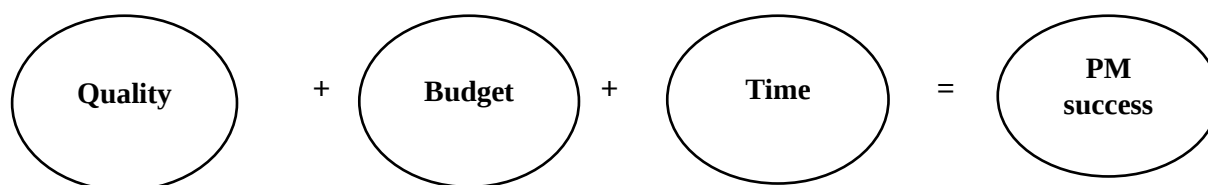
❖ **Planification of phase four:**

Activities	Inputs
Demobilisation, closure and rehabilitation phase	
abandonment or closure	Soil, Water, air, ,population, employment, aesthetics, land use,health,economy,landscape,fauna,flora
dismantling infrastructure	soil, , employment, subsoil, mangrove
Dismantling infrastructure in the marine zone	soil, water, vegetation, wetlands, wildlife habitats, use of fishing areas, human activities, population, economy, employment
site remediation	Soil, vegetation, aesthetics, population, employment, fauna, flora, landscape

Table 13 (BOUGHABA & BENADROUCHE, 2021)

At this phase it is all about planning the tools and all the equipment's that the project need in order to start the project on the appendix D it took from them about 323,7days to achieve and they calculated by using a tool of project management mechanism which is cpm and this stage is identical to one of the steps in the project management mechanism which is initiating.

after the initial planning stage, the first work plan must be verified and confirmed in three main ratings technical rating (quality, quantity, time) financial rating (budget, cost and expense) legal rating (legal side legal standards) to perform the following function:

**Figure 09:**Determining Project Management Success

Source: Kerzner (1987)

This stage will allow us to start executing the project and began to realizing it during the respect of this three essential elements which help us to execut the project properly

Basic principle	description
Quality	The product/service may not reach the required standard. This can be caused due to a lack of resources, limited budget or a difference in expectations.
Budget	Tight or unrealistic budgets can be problematic for the PM. Delays.
Time	High Project turnover, the reduction of resources deployed, change in personnel, a shift in priorities, and project task dependency can all cause issues to a PM.

Table 14 (BOUGHABA & BENADROUCHE, 2021)

After execution of internal project the managers should compare between their estimation and their realization which is monitoring and controlling by respecting the constraints and the information that was planned estimated and planned at first especially to avoid a lot of problems such as delays, turn over and a lot of wasting money

So the project managers need to Respect the information estimated before of each activity according to the division of work by applying the following equations:

Real duration $\leq$ estimate duration

Real budget $\leq$ estimate budget

Real costs $\leq$ estimate costs

In any project most of the difficulties faced are related to timing, budget, cost, quality which are considered as risks that we must take them in consideration

After the monitoring and the closing phase the closing phase comes after we know that any project has a began and an end so after respectin the previous steps and applying it correctly the closing phase comes after which the end of the project and a start for a new one ,a new challenges

Chapter Conclusion:

The emphasis of success originally focused on the project management domain with the main weight being on the delivery of the project. this success was defined on whether the project finished on 'time', within 'budget' and delivered with the desired 'quality'. (Kenzer, 1987)

The application of project management mechanism represents a key to success factor to the organization, it focuses the most on the triple constraints, which are: time, cost, and budget because these elements are the key attributes that must be handled effectively for successful completion and closure of any project.

On this chapter we tried to apply and analyze a project management mechanism on an internal oil project we have suggested a model to achieve internal project by following it steps so we can ensure the rate of the project successfully.

General conclusion

The last century of research and innovation has not only introduced and given definition to the concept of the project, a “temporary endeavor undertaken to create a unique product, service, or result” (Stackpole, 2010, p. 7), but has also forged the unique discipline of project management into global culture. From the forefathers of project management until now, the field has steadily grown and even produced mechanism, practices, and methods to help organizations utilize the best way for embarking on projects within their businesses. Project management mechanism have been used globally and worldwide associations such as the Project Management Institute have been created for the specific purpose of helping project management professionals grow in their knowledge of project management mechanism and implement best practices for project management within their organizations.

When projects are managed properly, there is a positive impact that reverberates beyond delivery of the stuff and also specially for the internal project in the organizations because The IP has a high success rate which according to Interviewee’s Responses is because of the informal communication channels, internal networks and the ability to adjust original plans.

Here are some suggestions and best practices in project management mechanism that help us handle an internal project:

➤ **A Clear Project Plan and Process**

The more multifaceted the project, there is more scope for chaos in the organization. That is where proper planning and the importance of project management comes in. The primary function of project management is to avoid confusion by outlining a clear plan and a process from the beginning to the end.

➤ **Establish Plan and Schedule**

Having agreed on a project schedule, sticking to it inculcates discipline required to avoid delays. A pre-determined process through the project lifecycle gives the project a clear path

➤ **Teamwork**

People are made to work in a team on a project, due to the benefits that accrue through sharing and knowledge of skills. It inspires team members to collaborate on a project.

➤ **Maximize Ressources**

It is well known that human and financial resources are likely to be expensive. One of the major problems that caused this project delay is when the PED division estimation, deadline and the effort valorization.

Our research aims to:

- ensure on the importance of project management on the economic field.
- develop a model of an internal project management mechanism.

We have found that project management is important as it comes up with a proper project plan for achieving the strategic goals.

Because projects are often complex and involve numerous stakeholders, having a project manager to lead the initiative and keep everyone on the same page is critical to project success.

- **Difficulties of the research:**

Due to the covid19 pandemic, we could not tackle this subject the way we wanted to and see every side of the information

The scope of this dissertation is limited also due to the classified document at the Sonatrach PED division

- **Theme suggestions:**

This project has just suggested and analyses if a project management mechanism is applied on internal project or not, however this project opens a lot of future themes and suggestions for the futures researchers especially on internal project such as:

- Considering a distinction has been found between an IPM and EPM, it will be interesting to investigate the wage structure and the recruitment process between the two types of PM.
- An in-depth study on the transformation of an IPM to EPM should be undertaken. This presents interesting research as it can test whether skills are developed or whether they are just latent.
- Knowledge management

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Appendices

Appendix A

Guide to untrusted interview

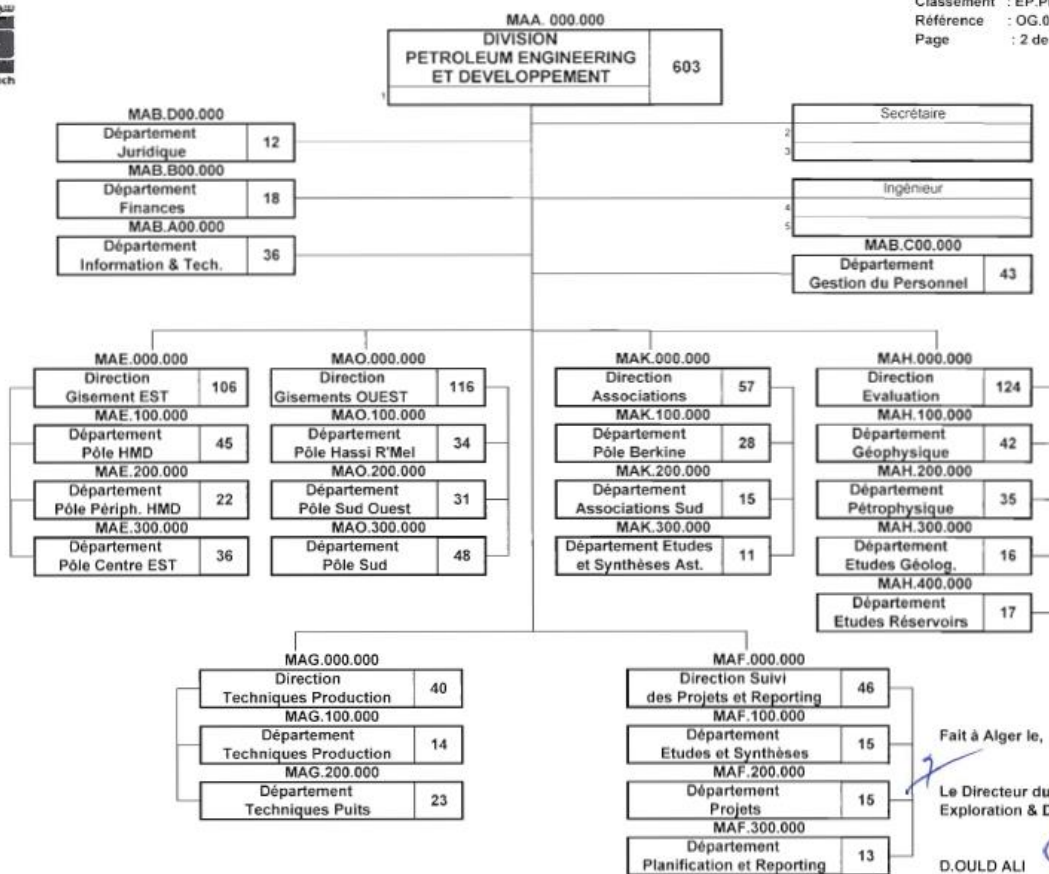
1. How do you realize your research in the oil field?
2. what models are used to do exploration
3. how to develop a development plan
4. What is PED?
5. What are the missions of PED?
6. What are the major sectors of oil and gaz industry?
7. What is a petroleum system?
8. What is a petroleum project?
9. What are the elements of an oil project design?
10. Can you describe to me in detail the major problems that you face in the project?

Appendix B

PED flow chart

19/02/2017
08h

Classement : EP.PED.1
Référence : OG.001 (R3)
Page : 2 de 3



Appendix C

Project new sheet

Fiche nouveau projet

Structure :

Intitulé du projet :

Phase du projet :

Période :

II/ Résumé de l'opportunité du projet :

Objectif : Bref aperçu sur l'opportunité et les objectifs du projet ou programme

III/ Descriptif sommaire du projet :

Nature : Développement, Récupération assistée

Situation actuelle : En phase de maturation / Appel d'Offres / Signature du contrat.

III/ Economie / Rentabilité du projet :

Investissement :	Montant estimatif du projet et niveau de certitude
Durée du projet :	

IV/ Planning du projet :

Phase	Planning du projet	
	Date de début	Date de fin
Maturation		
Appel d'offres		
Evaluation		
Signature contrat		
Entrée en vigueur		
Réception		
Réception définitive		

VI/ Commentaires particuliers :

VII/ Signature des responsables habilités :

Signature du Directeur de la structure
initiatrice du projet

Signature
Du directeur de la Division PED

Appendix D

Planning x project on Microsoft Excel

WBS	Nom de la tâche	Durée	Début	Fin	% achevé
0	Projet X	323,7 jours	Lun 21/08/17	Jeu 15/11/18	100%
1	PHASE 1: Collecte des données	20 jours	Lun 21/08/17	Ven 15/09/17	100%
2	PHASE 2 : Interprétation et Caractérisation sismique	240 jours	Lun 18/09/17	Ven 17/08/18	100%
2.1	1) - Interprétation structurale des gisements à partir des données de sismique et de puits	230 jours	Lun 18/09/17	Ven 03/08/18	100%
2.2	2.1) - Caractérisation sismique (Phase 1)	60 jours	Lun 15/01/18	Ven 06/04/18	100%
2.3	2.2) - Caractérisation sismique (Phase 2)	30 jours	Lun 09/07/18	Ven 17/08/18	100%
3	PHASE 3 : Etude Sédimentologique	255 jours	Lun 18/09/17	Ven 07/09/18	100%
3.1	1) - Descriptions de carottes	6 jours	Lun 18/09/17	Lun 25/09/17	100%
3.2	2) - Revue des corrélations	15 jours	Mar 26/09/17	Lun 16/10/17	100%
3.3	3) - Modèle de dépôt conceptuel	5 jours	Mar 17/10/17	Lun 23/10/17	100%
3.4	4.1) - Synthèse Intégration - Phase 1	5 jours	Mar 24/10/17	Lun 30/10/17	100%
3.5	4.2) - Synthèse Intégration - Phase 2	5 jours	Lun 03/09/18	Ven 07/09/18	100%
4	PHASE 4: Etude Péetrophysique - EF/RT	189 jours	Mar 31/10/17	Ven 20/07/18	100%
4.1	1) - Revue de l'interprétation existante	35 jours	Mar 31/10/17	Lun 18/12/17	100%
4.2	2) - Analyse des contacts	5 jours	Mar 19/12/17	Lun 25/12/17	100%
4.3	3.1) - Modèle pétrophysique (ElectroFaciès / Rock-Types) (Phase 1)	20 jours	Mar 19/12/17	Lun 15/01/18	100%
4.4	3.2) - Modèle pétrophysique (ElectroFaciès / Rock-Types) (Phase 2)	10 jours	Lun 09/07/18	Ven 20/07/18	100%
5	PHASE 5: Modélisation Statique	138,7 jours	Lun 09/04/18	Jeu 18/10/18	100%
5.1	1) - Construction du modèle structural	40 jours	Lun 09/04/18	Lun 03/09/18	100%
5.2	2) - Construction du modèle fin et remplissage	30 jours	Lun 04/06/18	Jeu 27/09/18	100%
5.3	3) - Détermination des STOOIP	5 jours	Jeu 27/09/18	Jeu 04/10/18	100%
5.4	4) - Propositions d'implantations	10 jours	Jeu 04/10/18	Jeu 18/10/18	100%
6	PHASE 6: Rapports et présentations	278,7 jours	Lun 23/10/17	Jeu 15/11/18	100%
6.1	1) Workshop Interprétation sismique et definition du pilote d'inversion	3 jours	Lun 23/10/17	Mer 25/10/17	100%
6.2	2) Workshop résultats du pilote d'inversion sismique	2 jours	Lun 12/02/18	Mar 13/02/18	100%
6.3	3) Présentation des résultats des études sédimentologique et pétrophysique	1 jour	Mar 16/01/18	Mar 16/01/18	100%
6.4	4) Presentation des résultats des phases d'interpretation et de caracterisation sismique	2 jours	Lun 20/08/18	Mar 21/08/18	100%
6.5	5) Présentation finale	2 jours	Jeu 18/10/18	Lun 22/10/18	100%
6.6	6) Rapport final	18 jours	Lun 22/10/18	Jeu 15/11/18	100%

