



UNIVERSITY OF
LIVERPOOL

**Decision Making in the Oil and Gas Construction Project
Management: Structured VS Discretionary**

**A Thesis Submitted in Accordance with The Requirements of The
University of Liverpool for the Degree of Doctor of Business
Administration**

By

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No honor is like knowledge. No belief is like modesty and patience, no attainment is like humility, no power is like self-control, and no support is more reliable than consultation.

Ali ibn Abi Talib (c. 599-661)

Abstract

Background: *The oil industry in southern Iraq suffers from significant and unreasonable delays in construction project execution. The project's planning part goes to its final stages, but the implementation phase gets stagnated due mostly to delay in decision-making.*

Objectives/Amis: *Investigating the potential impact of five factors influencing the decision-making process; Project management methodology/system, organizational context, bureaucratic/procedural practices, project context, and the role of experience and competence. Developing an action plan for change through understanding the impact of these factors.*

Methodology: *An action research conducted by a native researcher utilizing a qualitative approach to inquiry through semi-structured interviews with eleven project management professionals in a major international oil and gas company in southern Iraq in addition to observation and field notes.*

Findings: *Findings presented direct and indirect linkage between project management methodology and delay in decision making. There was evidence of system impact on project leadership and lack of decision ownership regardless of project size and type. Findings also presented that the oil and gas industry attempt to mechanize project execution through standardized procedures with a weak matrix organizational structure where the design of such procedures best be left to field experienced individuals. There was also strong evidence of a relationship between the project organization and decision speed attributed to a significant impact on communication speed.*

Originality: *Aside from planning and project selection decisions, the execution decision research framework in this thesis broadens the human element decision-making understanding, thereby enabling project managers in identifying factors and attributes that optimize their decision-making process under standardized work requirements in a time-pressured and dynamic construction execution.*

Conclusion and Implications: *This thesis investigated five areas with a potential impact on execution decision-making in southern Iraq's oil and gas industry. Based on the empirical findings, Key practical implications identified and an action plan presented in this study, if applied, could have a substantial improvement in decision speed and accuracy.*

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I would like to dedicate this thesis to the people who have mattered most in my life and career. My mother, Fakhriya, the illiterate who wanted me to be a doctor, my wife, Iman, for her non-stop support, and my daughter, Mariam, for her inspiration and help in proofreading my writings. Lastly, to my professional Mentor Mr. Roger Naney who directed me to the project management fields and shaped my career, who have given inspiration, support, and a can-do attitude. I wish to thank generously Dr. David Higgins, my advisor on this thesis, who was ethical, professional, passionate, very sincere, and generous with his wealth of knowledge.

Declaration

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Nassiriya, Iraq, September 2020

Zeiad Alhachami

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Glossary

AHP: Analytic Hierarchy Process

AR: Action Research

ASCE: American Society for Civil Engineers

BOC: Basra Oil Company

CBA: Choosing by Advantage

CBR: Case-Based Reasoning

CII: Construction Industry Institute

CSR: Corporate Social Responsibility

DEA: Data Envelop Analysis

DRB: Decision Review Board

EPC: Engineering-Procurement-construction

EVA: Earned Value Analysis

FEED: Front End Engineering Design

FT: Fuzzy Theory

HSSE: Health, Safety, Security, and Environment

IEA: International Energy Agency

IOC: International Oil Company

IT: Information technology

LNE: Local Nationals employees

MAUT: Multi-Attribute Unitality Theory

MCDM: Multi-Criteria Decision Making

MOC: Management of Change

MoP: Management of Project

NDM: Naturalistic Decision Making

NGO: Non-Government Organization

NOC: National Oil company

OPEC: Oil Producing Exporting Countries

PLC: Project life cycle

PMBOK: Project Management Body of Knowledge

PMI: Project Management Institute

SGPMS: Stage-Gate Project Management System

SME: Subject Matter Expert

SOP: Standard Operating Procedure

TCN: Third Country National

TSA: Technical Service Agreement

TSC: Technical Service Contract

CHAPTER-1, INTRODUCTION

Background

Currently, oil and gas provide more than half of the world's energy needs and providing raw materials for petrochemical production. This commodity has created vast amounts of wealth for certain parts of the world and created an oil-based dynamic political international relation in the middle east. Oil and gas in Iraq are significant to Iraq's history, economy, and the country's domestic and international politics. Oil revenue provides more than 90% of Iraq's gross domestic product (Global policy forum, 2016; Jaffe, 2007), extraordinarily cheap to produce at less than \$10.57 per barrel (Scholl, 2018). Iraq has the world's fourth-largest proven oil reserve with nearly 150 billion barrels (IEA, 2016; OPEC, 2017). With much more of an undeveloped field where it could be the second or maybe the first with more than 200 Billion barrels when these fields are developed (Global policy forum, 2016; Jaffe, 2007). Also, Iraq has an estimated 3.75 trillion cubic meters of natural gas reserves, the 10th largest in the world (IEA, 2016; OPEC, 2017). Much of it is a mix of oil and associated gas, meaning gas found in oil deposits and oil and natural gas produced when oil is well drilled. Producing oil and capturing associated gas requires specialized infrastructure and extensive capital investment; this required Iraq's government to seek help from international oil and gas companies in developing its oil and gas fields.

Iraq nationalized its Oil industry in 1972 (Global policy forum; 2016; Jaffe, 2007). After several wars and international sanctions that ended in 2003, Iraq has begun an ambitious development program to develop its oil industry and oilfields infrastructure. The government of Iraq invited International Oil Companies (IOC) to invest in its vast oilfields through Technical Service Agreements and Contracts (TSA and TSC) to increase its oil and gas production. These contracts have terms of cost recovery (entire cost, direct and indirect, including personnel dedicated from the home office to the project), in addition to a 1% inflation rate and a specific dollar amount per each barrel produced (\$1.75 for the subject research location). This setting and nature of the contractual agreement is a source of higher bureaucratic practices for both sides. The IOS strives to justify cost and cost recovery, while the National Oil Company (NOC) sets rules and procedures to control cost. It is evident here the clash and difference between public/government-owned company culture and private work culture, perspectives, views, priorities, and work ethics and habits. The investigation of these differences is outside the scope of this research thesis. Major IOCs located in the US and Europe were keen to get back into Iraq, from which excluded due to the nationalization of oil and gas since 1972. Through the Ministry of Oil, the central government

maintains the legal control of these contracts awarded to the IOCs. Between 2008 and 2010, the Ministry of Oil signed twelve (12) long-term contracts with international oil companies to develop fourteen (14) oil fields. The majority of these oilfields are in southern Iraq, especially the southern three provinces of Thi Qar, Maysan, and Basra, as shown in figure 1 and figure 2.

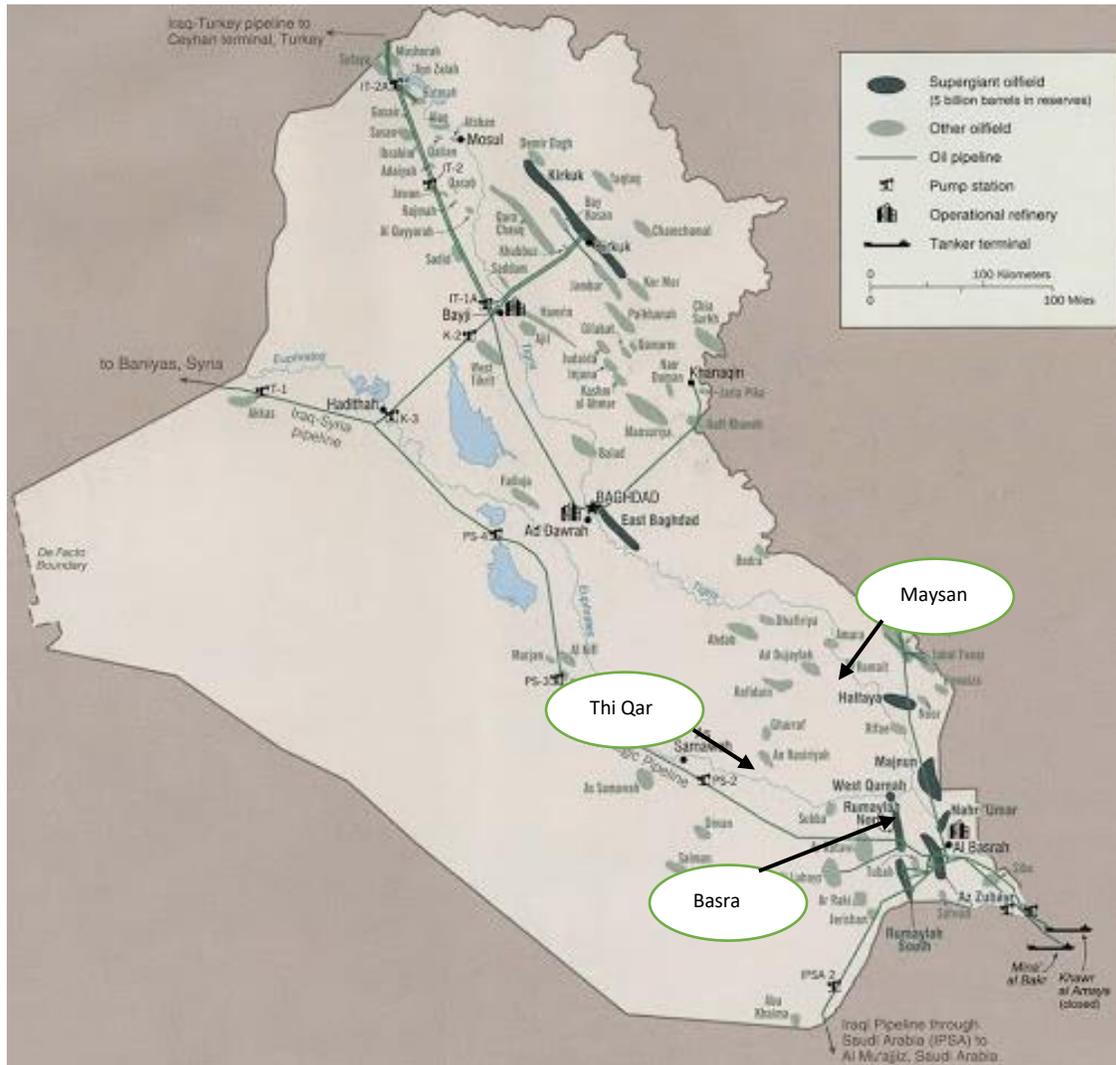


Figure 1 - Base map for Iraq's current oilfields locations

source: ©The energy consulting group (2015)

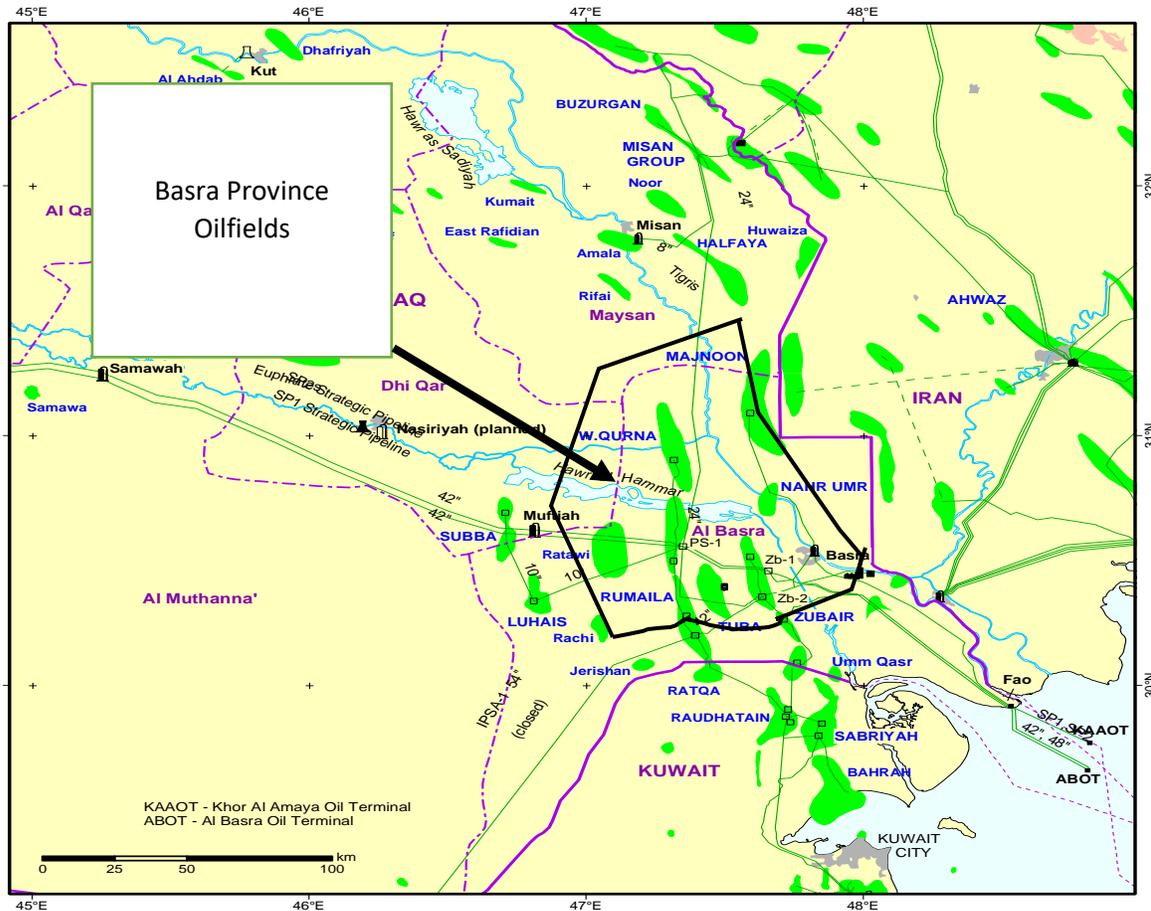


Figure 2 - Expanded view of Southern Iraq Oilfields – Basra Province

source: ©The energy consulting group (2015)

Under the first phase, IOCs were invited to develop further six giant oil fields that were already producing. In contrast, phase two contracts were signed to develop previously explored but not fully developed oil fields. As a result of these contract awards, Iraq targeted oil production when these fields are fully developed, around twelve (12) million barrels per day. To meet this target, Iraq's government must overcome many challenges, especially in rebuilding a war-damaged infrastructure and building new infrastructure to meet the expansion and the hoped-for increase in production. Figure 3 shows a sample of a construction site in an oilfield in southern Iraq.

In today's world, the O&G industry faces continuous economic, technological, and political changes. It is challenged by rapid development, particularly concerning evolving technology, globalization, international trade, global management, and modern management methods. These challenges have emerged due to organizations' multiplicity, workforce diversity and tasks,

working processes and procedures, technological breakthroughs, and the communications revolution. In addition to the emergence of a new economy that makes O&G prices more competitive and the production and delivery of such commodities are of great importance to customers. In addition to these challenges, renewable energy, electric vehicles, and new energy sources are new challenges to the O&G industry.



Figure 3 - New Degassing Station Construction site in Southern Iraq

Source: © Mariam Alhachami photo gallery (2017)

The life span of O&G as an energy source and its strategic value is under questioning. The majority of the transportation sector's future inclined toward electrical and more efficient use of fossil fuel; new technologies have made oil sand viable at affordable prices. The oil market is no longer in a shortage of oil; the price has been on the low side for a few years and may last since supplies are more abundant than demand. The past practice of making easy money by IOCs and oil-producing countries may not last long unless they optimize the cost of production and the way they conduct business. Conventional operations and project management in the O&G industry need more optimal and less costly means to withstand the new threats and challenges. While such developments create problems for any IOC to sustain its position, they could be opportunities to adopt a proper management philosophy and systems to address these challenges and achieve

cost-effectiveness. There need to be adaptability to change, customer satisfaction, cost efficiency, enhanced performance, modernization and sustaining and maintaining the workforce, and ensuring the application of up-to-date management systems. These challenges require a fundamental change to the traditional management style by disposing of bureaucratic management style and inferior decision-making methods and adopting new dynamic and agile ones.

Coming to this research subject and the type of chosen methods was a result of personal and professional reasons. It is imperative here to tell the story behind it and the researcher's background to demonstrate both experience and credibility and how objectivity was maintained while collecting, analyzing, and interpreting the data. The researcher's background and experience, over 28 years of engineering and project management, professional engineer (PE in the USA, which is equivalent to a chartered engineer in the UK, and PMI certified PMP), with diverse experience through different titles/positions in several industries mostly in the USA and the Middle East. The most recent being project manager in one of the largest IOCs in the world, managing a variety of onshore upstream projects, a portfolio of over 100 different size projects; each has its specifics and different context. A role that included team management, team coaching, mentoring, leadership, projects implementation, strategic and financial responsibility. The researcher earned his undergraduate degree in civil engineering from the University of Mosul in Iraq, a master's degree in structural engineering from Southern Illinois University, and postgraduate studies (Ph.D. level) in operation research at the University of Houston. Throughout years of managing projects, getting into uncharted territories with every project through various tasks as projects differ in their unique nature. It was concluded that a project manager is no different than a ship captain or plane pilot sitting in the leading seat to direct the project to a safe and successful delivery. The researcher's view on project management was mostly about leadership and decision-making, not underestimating other project management elements and technical aspects. The project journey from start to finish requires making several decisions to maintain the planned project track, move around challenges, accommodate for extra demands, and respond to changes. Witnessing numerous cases of success and failure of projects that were mostly related to decision-making were sober moments for the researcher on the importance of the decisiveness of decision making, especially during project execution.

An understanding of decision-making exists but was not in a schematized way. With an engineering background, the researcher's views of making a decision were deeply entrenched on positivist thoughts, numbers, and cost-benefits correlation of project parameters toward more optimal project delivery during the early professional practice. No comprehensive understanding of the decision-making process other than what relates to the project performance indices. This understating later was developed and changed through practice and education, and exposure to different means, systems, and decision paradigms. Deep interest in project management and management, in general, did not stop at practicing and learning from practice only; continuing formal and self-education contributed significantly to recognizing the role of decision making in project management. As a project manager, experiencing a delay under rigid bureaucratic practices creates a feeling of lack of efficiency during project execution, which conflicts with project management principles. This feeling, compounded with an introduction to decision-making theories during the DBA program, lead to recognizing the workplace problem. Studying decision-making, a missing piece the researcher was searching for; the researcher noticed that decisions were not made randomly, relying merely on parameters and indices. It is a cognitive process that goes through several phases of surveillance, judgment, and selection among alternatives to reach an optimal solution to a given situation (Frick, 2011; Thiel et al., 2012). Being a project manager with access to project management professionals and having the skills for interviewing people led to choosing the qualitative method through semi-structured interviews. Experience and passion in project management were an inspiration and motivation in serving as a base for identifying the workplace problem, which is illustrated in the next section.

Problem Statement and Research Topic

The idea of researching this subject was formulated from noticing many projects with unreasonable delay due to delay in decision making across the O&G industry in Iraq, which resulted in less than half of the production target set by the ministry of oil. To explore these delays and to further understand the lengthy decision-making process, notes were compiled and documented for events and instances where decision delay lead to project delay and observing the process from a researcher lens. After reflecting on the issue, the researcher started a reconnaissance process through discussion with several colleagues about the research idea and the subject in general, taking notes, reviewing relevant literature, and following developments of ongoing projects in the oilfield. Three senior managers in the organization with a high level of

education and experience supported the initiative. They volunteered to serve as an expert panel/supporting group to help the researcher in the research process and eliminate potential researcher's induced bias. Another reflection on the subject research, the problem statement identified, through a conceptualization process, three research questions were established in relevance to the potential areas to be studied. Before submitting a research proposal with ethics application, substantial relevant literature was reviewed to see what's covered in the field on this subject. Through literature reviews, it was found that most project management literature focused on tools, techniques, methodologies, and theories without adequate attention to the human element, which is the core of project management that develop and manage all these tools and techniques, systems, and resources. Also, most of the literature did not get fair coverage of the execution phase, which is the most dynamic part of the construction project.

The execution of construction projects in the O&G industry is dynamic and has its industry specifics and differences from other construction projects. Typical construction projects are prone to change and challenges during execution; uncertainty is part of the execution phase, and changes are expected. If not timely addressed and managed promptly, changes will lead to delay, cost overrun, damage to the owners-contractors relationship, and other stakeholders that may lead to disagreement, claims, dispute, and even legal action (Olaniran et al., 2015). Addressing change, especially field-related, requires quick and accurate decision-making that is the project's manager and the project delivery team's ultimate responsibility. Execution decision-making depends on several factors that could range from the type of organization, project management methodology, project contexts, the capacity and competence of the project manager and the project team, stakeholder's involvement, and more. Most IOCs adopt a project management system that consists of multiple gates and approval processes, as shown in Figure 6 in chapter 2. It is a delivery process that is decision-based with great emphasis on the Front-End Engineering Design (FEED) part of the project and less attention to the execution phase where the project manager viewed as an executor of a pre-arranged plan (Walkup and Ligon, 2006; Eweje, Turner and Muller, 2012). The focus of this research is on the execution phase and pertains to project-based organization. In this setting and this system, project managers and engineers face conflicts in making their decisions on the managerial scheme and Standard Operating Procedure (SOP) as required by the organization. At the same time, they prefer to make their decision based on their professional practice and expertise as subject matter expert (SME) schemas. Project managers

and engineers are frustrated with unreasonable delay and cost overrun during project execution due to the conflicts between what they trained for as professionals and what they required to adhere to organizational SOP. There are several consequences to these conflicts that range from an unreasonable and costly delay in project execution, dissatisfaction, morale and frustration effects among labor and contractors, and ethical client-related issues. The workplace problem to be addressed is the unreasonable delay in project execution due to a lengthy decision-making process in a giant oilfield in southern Iraq operated by an IOC. Several possible factors were identified for investigation, such as the project management system, formalities, bureaucratic processes, decision-making procedures, project contexts, project management professional level of competence and experience, the nature of the O&G industry, and more. The problem involves project management methodology, bureaucracy, formalities, communication issues, organizational issues, structural-based decisions, and professional/discretionary decisions. The interest in this subject is explained in the previous section. This research objective is to investigate the potential factors impacting the decision-making process, as described in the next section.

Research Aim

As action research, the main aim is change (Coghlan and Brannick, 2014) by proposing a practical action plan to enhance the decision-making speed, which requires a deep understanding of several factors impacting the current decision-making process. It is essential to explore and study project management professionals' opinions in the O&G industry regarding their perception of making decisions during the execution phase of oil construction projects to develop the needed knowledge. It shall cover the investigation of five potential elements that could have an impact on the decision-making process. The aim here is to find empirical evidence to understand the reasons behind the current delayed decision-making process to create change and a more efficient process that meets current global challenges and an effective decision-making process. When an understanding is developed of the impact of these factors, practical knowledge will emerge to serve as a base for possible practical implications. These implications could serve as the base for an action plan to be implemented to create the hoped-for change. There are questions to be answered and objectives to be met to develop a thorough understanding; these questions and objectives are explained in the following sections.

Research Objectives

The main objectives of this research are to study, analyze, and critique the currently practiced gated project management system and its process in addition to organizational setting and the role of procedures used in the process of decision making. It is also to explore the up-to-date project management literature and practices applied in other industries. Most industries recognize the dynamic nature of project management, especially during the execution phase, and allow for discretionary decision-making authority to the project manager. The project execution stage is dynamic and loaded with uncertainties that require agility, wisdom, experience, and quick judgment calls in making a decision (Soderlund, 2011). To understand the challenges faced by project managers in having conflict between what they are trained for as professionals and where they are required to adhere to an organizational structured decision-making process, there is a set of objectives to generate knowledge and ultimately understanding of the researched subject. These objectives seek to further explore the following:

- Review to the primary elements of the Stage-gate project management system in the oil and gas industry
- Investigate the impact of bureaucratic/structured decision making in project management according to organizational settings
- Explore the effectiveness of procedure used for the decision-making process
- Investigate the role of experience and how professionals make their decisions and on what bases

Research Questions

Because little is known about how the execution phase decision impacted, the research questions were designed to explore the IOC's decision-making process according to the currently adopted systems and practices. The goal is to gain insight into the factors influencing the decision-making process; thus, the research questions of this study are:

- What are the effects of the adopted project management system/methodology on decision-making?
- What is the impact of organizational settings on the decision-making process?

- How experience and experts utilized in the decision process in a large bureaucratic organization?

Research approach and the researcher's role:

As action research, this study relies on one type of data production: qualitative. The qualitative method is utilized through semi-structured interviews using an interview guide (see appendix C), participant-observer field notes, and personal observations. The aim here is to explore project management personnel's views and perspectives on the process of decision-making in a giant oilfield in southern Iraq. The researcher's position in the organization, experience, and managerial skills helped utilize semi-structured interviews, observe, take notes, and access available project records for data production. As for organizational knowledge, positionality, and prior experience in the field, this was a complementary tool to help develop and analyze qualitative data. It helped in allowing the researchers to observe and take notes before and during the research process. A research design utilizing a qualitative method was established (presented in chapter 3) to find answers to the established research questions. The research design relies on three sources of data; field notes, observations of a native researcher, and semi-structured interviews, in addition to utilizing a supporting group/expert panel made of three subject matter experts for data filtering/validation and triangulation. They also served as another lens to review raw data and provide views to eliminate the potential researcher's induced bias.

The researcher's role is an insider rooted in the organization relying on experience with pre-understanding of the field and the organization as an advantage. Recruiting participants were albeit challenges at the start of this research due to the high number of available candidates; that is why a selection criterion was set to choose among the most experienced and knowledgeable project management professionals. The inclusion and exclusion criteria (presented in chapter 3) helped narrow the number of potential recruits until reaching the targeted number with few declinations. The researcher was aware of the challenge of being native and the double roles of being an organizational member and a researcher simultaneously. This duality required the researcher to handle and manage politics, power, influence, and access issues. More than seven years in the organization allowed for awareness of biases and inclinations within organizational members' subconscious when observing the workplace, acting, and reflecting accordingly. Things that were of notice; maintaining the separate line between being an employee and a researcher

at the same time and not being selective irrespective of the inquiry (Coghlan and Brannick, 2014). To do so, the researcher was meticulous in avoiding bias through several measures such as data validation through triangulation, expert panel consultation, sense-making, reflective practice, and reflexivity. Things that were required by the organization in conducting this research were mostly related to organizational and individual privacy and keeping the IOC name undisclosed. Assurances granted as the insider role with knowledge of key organizational stakeholders facilitated the researcher's trust and confidence.

The IOC management did not agree to intervention action while projects are ongoing due to urgency in the 2017 – 2018 construction program and the potential cost associated with any interventions, creating some interruption to project execution. Also, there was a need for approvals and authorizations from corporate headquarter to alter the currently adopted global practices, which needs justification. The findings of this research are to be used as bases for the intended justification. They desired to develop an action plan based on this research to be applied after completing this research. The agreement was made on inducing action in presenting assumptions and what-if scenarios to assess participants' reactions to the planned change in a cycle of follow-up. Then, the proposed implication to be presented to management to get approval from the corporate headquarter in seeking an exception for altering global practices applied across branches in most of the world. It will be left to upper management and the IOC headquarter to decide where and when to use the produced action plan for extensive modification or geographically specific to the southern Iraq application. No significant obstacles were experienced in this research undertaken except a few logistical and scheduling issues that were handled jointly by the researcher and participants. Rescheduling interviews, change in the proposed interview place, and some delay in response to follow-up notes due to changes in participants' schedules and workload. Some other challenges are presented in the following chapters as each pertains to the chapter contents. Going as an insider allowed for utilizing pre-understanding of the problem instead of reconstructing it, 28 years of experience in the field, advanced knowledge about the current workplace, and observations were an added value to conducting this research from the inception stage of this research, observation and field notes made as a fundamental part of proposed action research. This was the basis for a project manager to recognize a workplace problem, reflecting on the organization's work as later developed into a research project. Undertaking a participatory approach, being an observer, an insider researcher

to generating knowledge from participants; at the same time having the position both in the research and the organization to carry out a reflexive approach, aware of bias, beliefs, and experiences (Creswell, 2013).

Limitations and Scope of the Research

A range of external and internal factors could impact the decision-making process; they could be cultural, organizational, system-related, human-related, and more. According to AR principles, identifying and limiting the topic to a practical and doable scope is step one (Mertler, 2009, p.30). This research's scope is limited to investigate the impact of project management methodology/system, organizational context, bureaucratic/procedural practices, project context, and the role of experience and competence. The investigation of these areas planned through studying and exploring project management professional opinions, thoughts, views, and perspectives on the currently adopted means and methods, and processes in making decisions as subject matter experts in the field. This research is not meant to prove or disprove other theories and hypotheses and not applicable to the entire O&G industry. This study could not be generalized to the whole O&G industry in different locations giving its local coverage; also, it could not be generalized to other oil-related sectors such as midstream and downstream. This study is focused on the construction execution phase in the upstream area of an oilfield in southern Iraq and presented in seven chapters. However, the transferability of this research could apply to where the same conditions exist for construction projects and the O&G industry.

This thesis is structured into seven chapters. A general introduction to the study in chapter 1 offered the background, problem statement, research questions, research aim and objectives, and the researcher's role. To shed light on the available body of knowledge related to the research problem, chapter 2 – provides a review of relevant literature related to project management, formalization, bureaucracy, and decision-making theories. It also provides a literature review based on the available body of knowledge by referring to the theoretical and empirical literature pertained to the main subjects. The third chapter is the research methodology that describes the epistemological, anthological, and adopted approach. Chapter 3 also presents the research process by detailing the primary data production process through semi-structured interviews and data analysis. Chapter 4 – shows the findings of the research from data analysis. It is organized according to the main study areas, as outlined in the research aim and objectives. In contract,

chapter-5 provides an integrated interpretative discussion on the findings by considering all the results and literature reviews in the thesis together. After chapter 5, a narrative and reflection on the scholar-practitioner progressive development and its application of knowledge developed throughout this research presented in chapter-6. The final part of this thesis is chapter-7, which provides the conclusion and the practical and professional implication, and their potential application in the field based on theory and practice in a proposed action plan. As this chapter is short and introductory, no chapter summary is needed. In the next chapter, a review of available relevant literature could shed light on the subject research problem; the literature review is related to project management, decision-making, bureaucracy and formality, and sub-sections pertaining to each of the three main subjects.

Hence: instead of I, the author decided to use “*the researcher*” instead to emphasize a research undertaking.

Chapter -2, Literature review

Introduction

Construction project runs through different stages with a life cycle. Still, the execution phase is loaded with uncertainties (Fischer and Adam, 2012), which requires a quick reaction to changes and managing the high number of stakeholders' expectations. The majority of project resources are utilized and consumed. It is the most dynamic phase of any project (Eweje, Turner and Muller, 2012), and it is when you make your most important decisions. Most IOCs follow a stage-gate project management system (SGPMS) in managing construction projects, which was initially introduced in North America in the 1980s incepted from the project life cycle to improve development time and deployment of new products into the market (Sabri et al., 2017). This system/methodology through multiple gates with certain tools and techniques aimed at making an optimal planning decision in terms of go/no-go, mostly in the project's FEED stage without adequate attention to the execution phase dynamic nature. Execution phase decisions are not only systems and tools and human-technology interaction. It involves a social and cognitive process that requires judgment, social skills, cultural awareness, technical expertise, and soft skills. Such decisions are mostly for bringing speedy solutions to problems encountered at the heart of the execution dynamics, executing the planned work, and managing stakeholders. The human element is the core of this process through technical skills and a wide range of social life aspects such as stakeholders' motives and analysis, sense-making processes, means and methods of communications, and the like. During project execution, project managers run into unexpected events or (critical events) that disturb the typical sequence of planned activity (Argyris and Schon, 1978 cited in Lindh and Thorgren, 2015, p.526). These events require them to combine experiences and new understandings while reconsidering preplanned thoughts and actions. In this situation, a project manager is not only an executor for pre-made plans; instead, the project manager should assume a leadership role with discretion in making quick and accurate decisions based on substantial experience. Project leadership is a multipart process influenced by personal, cultural, organizational, and other external and internal factors. Having project managers stuck with standardized decision-making procedures and bureaucratic process of seeking approvals deprive them of being true leaders.

With this background and as most traditional decision-making in project management literature, academic texts focus on middle management tools and techniques on planning, cost, feasibility studies, and economic issues. It is mostly centered on project selection, project planning,

prioritizing, and not covering the entire project life cycle to reasonably include the execution phase. No adequate attention is paid to the human factors and understanding how project managers decide during the project's execution and on what basis. This literature review aimed at exploring factors influencing the execution phase decision, such as the project management methodology/system used, which impacts how project organizations formed and how decision hierarchy structured. It also explores the impact of bureaucracy/formality and standard operating procedures in making a decision on project delivery and the project management team. To cover these factors, three areas related to execution phase decision making included in this literature review; the project management system/methodology, the current project management decision making theories and their application according to different types and sizes, and formalization/bureaucracy and its impact on project communication and timely decision making. The literature will also investigate the difference between decision-making based on expertise and professional knowledge and a current practice based on formal procedures, especially in large bureaucratic organizations.

Peer-reviewed literature from several sources was mostly utilized in searching for the proposed literature. The library of the University of Liverpool, google scholar, PMI website and publications, the American Society for Civil Engineers (ASCE) website and publications, several relevant books, and several other journals and internet-based professional associations. Word search such as; project decision, project leadership, construction execution phase, procedures, project delay, O&G projects, Iraq, and more used in the search for relevant literature. The abstract of each article reviewed, if found relevant, was saved for consideration while others were disregarded. The literature was later narrowed down through word search inside each article to its relevance and subject specifics and sorted into the three main categories. This chapter includes an introduction, a review of project management, a review of project decision-making and evaluation to formalization/bureaucratical practices, a review of expert decision making and the role of experts and experience, and a chapter summary. Each section consists of subsections that pertain to contributing elements to the main section.

Principles of Project management

Most scholars define a project as a complex, unique, one-time mission limited by time, resources, and budget and non-routine series of tasks to produce a unique product/result (Gray and Larson,

2008, p.5). On the other hand, project management, as defined by the PMBOK guide, is the process of applying knowledge, skills, tools, and techniques in managing the project's activities (PMI, 2017a; Eduardo and Sergio, 2010 cited in Sabri et al., 2017, p.1823). Project management consists of tools, techniques, technologies, aspects of operation research, resource management, and, most importantly, human resources management, including stakeholder's expectations management. Project management requires applying and integrating specific logical steps and activities dependent on each other in sequence or parallels. Each requires a decision to be made for optimal execution to achieve a determined goal or target. The project management field is evolving and developing to meet current global challenges where speed, economy, safety, and ethical compliance are the vital factors behind the success and failure of any project. Some organizations utilize a phased approach, especially in the O&G industry, to multiphase from start to finish by slicing the project into stages, see figure 4. The process is decision-based stage-gates, where the project delivery effort and challenges are reviewed. A go/no go decision is made whether to advance the project to the next stage, but heavily biased towards (FEED) part, where the most value created for the project (Walkup and Ligon, 2006 cited in Newman, Begg and Welsh, 2018, p.6). Each stage is tasked to a particular group in the organization and leaves the planned work executed by a specialized group in a mechanized project delivery system. Serrador and Pinto (2015) argue that excessive front-end planning in a traditional method similar to SGPMS is a source of disagreement and could cause delays in a changing environment. Serrador and Turner (2013) cited in Serrador and Turner (2015, p.1042), found a surprising "inverted U" relationship between planning efforts and project success; meaning that excessive effort and time spent on planning can be the same as too little in its negative impact on project's success. Sung-Hwan et al. (2018, p.1) state that recent studies indicate that the traditional methods in the O&G industry have critical limitations concerning resource insufficiency, calculation of activity length, and dealing with uncertainties. The SGPMS aimed at standardizing project processes to expedite the project's delivery through management approval gates of each step of the project. Despite the fast-tracking aim, the projects' execution is subject to a rigid control strategy, bureaucracies, and lengthy decision-making to obtain approval as one of the main reasons for O&G project delay and cost overrun (Ruqaishi and Bashir, 2014). Empirical evidence suggests that traditional rigid methods similar to the SGPMS currently adopted by IOCs can lead to significant rework (Winch, 2014).

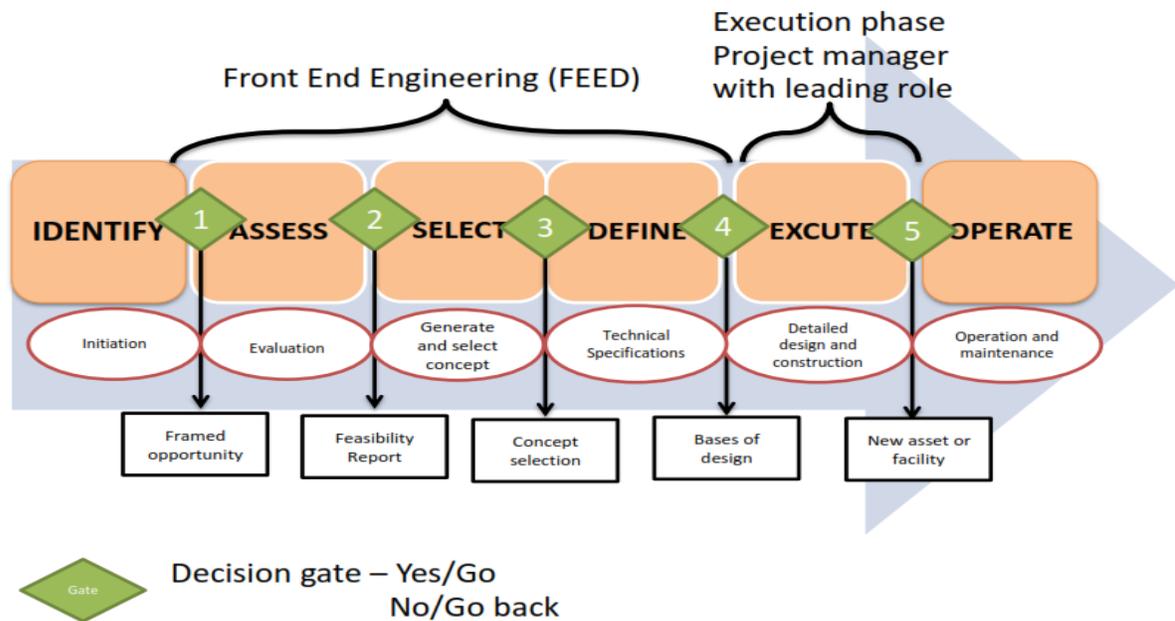


Figure 4 - Stage-Gate Project Management System Process

Sung-Hwan et al. (2018, p.4) acknowledged that the traditional methods of planning and executing projects are not optimal for project managers' current challenges. They see traditional project management systems as more focused on middle management tools and techniques, planning, cost, feasibility studies, and economic issues, leaving the dynamics of execution to preplanning without considering how to re-plan. The contemporary perspective in project management research is the three-domain perspective, which was initiated by the work of Morris on Management of Project (MoP) (Winch, 2014). This perspective focuses on the interface level between the project group or mini organizations that make up the project's integrated management. It concentrates on the internal project organization and sub-organizations and the internal relationship dynamics. The MoP concept allows less initial planning assuming that things will change contrary to traditional methods that require much detailed design and planning. Serrador and Pinto (2015, p. 1047) describe this method as a waterfall or rolling-wave planning as things change, especially with technological and political situations. It is iterative and not only plans and execution of what is planned; it is continuing planning and re-planning iteratively. Away from the traditional method, the alternate approach was manifested by practitioners to address

three main core issues; human-technology/tools interaction, stakeholders' collaboration, and responding to change while executing a planned work (Serrador and Pinto, 2015). The new approach does not, by any means, ignore the project's front-end planning/engineering and stresses the significance of end-user involvement in the project from the start along with the rest of the project's stakeholders. A review of the project life cycle is presented next, especially to the phases leading to execution to better understand this research subject.

– *Project life cycle*

The typical project consists of a series of stages/phases to pass through from start to finish (PMI, 2017b, p8). Projects start as an idea/opportunity. To turn this idea into a real product, there is a complete life cycle to be followed. There are four major stages (some scholars make it five through splitting the last phase into two). These are initiation, planning, execution, and delivering (commissioning and closeout), as shown in figure 5 (Gray and Larson, 2008). The guideline for these phases is to address; the value-added from the idea/opportunity, the integration of several inter-organizational functions, communication and alignment among stakeholders and the team responsible for managing the project, and the use of proper tools and techniques for the proposed project delivery method. The project management system followed by the O&G industry consists of five main stages/gates (1) inception/evaluation; (2) concept selection; (3) planning phase; (4) execution, (5) commissioning and closeout (Walkup and Ligon, 2006; Newman, Begg and Welsh, 2018). Decisions made during any of these phases affect the subsequent phase, and the decision in the following phase has its bases on the preceding phase. The project life cycle and its overlapping phases are shown in figure 5; the stages leading to project execution are explained separately in the following sections.

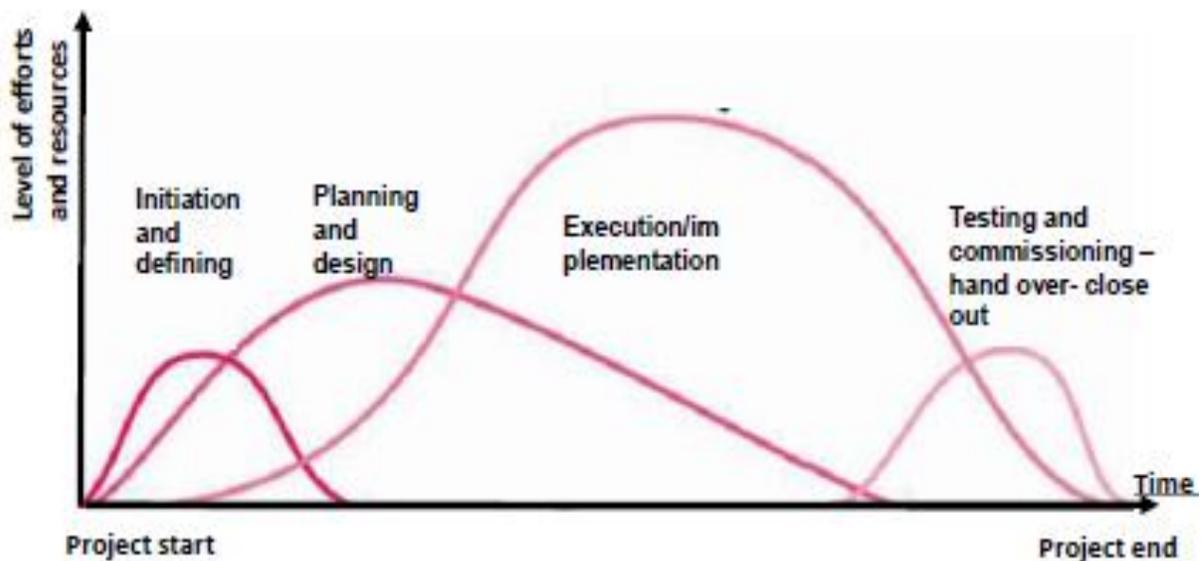


Figure 5 -Project Life Cycle

Source: © Gray and Larson (2008, p. 7)

– *The initiation and concept selection stages*

Within the initiation phase, the business need or opportunity is identified, a proposed solution raised, a project incepted, and a project team formed to execute and deliver the solution to the end-user. The concept selection meant to address several fundamental questions such as; is the project feasible? Can it be achieved? Is the project coming from a need or in alignment with the company’s strategic objectives? Who will be involved in this project (key stakeholders), and how would the project align with their strategic intents? (Newman, Begg and Welsh, 2018). Stakeholders identification and project team initial selection recommended, and a preliminary staffing plan is established (Walkup and Ligon, 2006). Preliminary full lifecycle risk factors identification and risk assessment are performed to inform future planning and staffing (Besteiro, Pinto and Novaski, 2015; AlKazimi and Grantham, 2015). The answer to these fundamental questions requires consideration of technical and non-technical issues.

According to Olaniran et al. (2015, p. 913), the inception part of the project is a fuzzy process due to the high level of uncertainty and the number of options presented and considered. It encompasses economic assessment, how to secure the needed supply chain, how to manage the

technology designed for the project delivery, project funding strategy, and the human resources required for the project organization depending on the project type, size, and complexity. Merrow (2012) has shown the importance of project definition on project success through regression analysis of project performance in the O&G industry. According to the same source, specific steps are to be followed to ensure the project is well defined, linking it with the overall corporate strategy and the end-user requirements. Sometimes, in an O&G project, initiation and concept selection are merged and called the identify or concept selection phase, or pre-gate 2 in the SGPMS. The Selection phase includes a disciplined innovation process to identify a wide range of development and economic concepts and an assessment process that captures the best available information (Walkup and Ligon, 2006; Gray and Larson, 2008). Once pre-gate-2 work is complete, a road map and broadly defined development plan for the project drafted, and a decision is made on whether to proceed with the next phase or not. Under the SGPMS, this decision was taken by a decision review board (DRB) or a committee composed of representatives of several departments and headed by a gatekeeper to move to the planning and design phase.

– *Planning and design*

Once the project is initiated and concepts are selected, the level of effort increases to make the necessary plans for implementing the project. A conceptual plan will have been set, but the plan details are not enough for the DRB to decide to start procurement and construction. Reaching an optimal level of defined details is the design phase's goal, initial schedule, conceptual cost, and identifying key stakeholders. According to (Walkup and Ligon, 2006, p.2; Olaniran et al., 2015, p. 913), some projects may require value engineering to ensure that the fully defined plans allow for optimal execution and operability. In that sense, the design phase is the link point between value identification and value delivery. The linkage between phases shown in figure 6, as every project consists of a complex set of tasks and processes that need to be identified and a sequence of planning for each task and its link with other tasks that must be determined to reach every stage's objectives (Besteiro, Pinto and Novaski, 2015). Detailed design requires iteration and back and forth deliberation to ensure the most effective and optimal means of implementation. Once the detailed design level and the project's documents reach a final stage, the DRB can decide to proceed with construction. The difference between this phase from the execution phase is the less uncertainty level than that of the execution phase, and that is why no project ended as planned. The execution phase is the most dynamic and uncertain part of the project (Soderlund,

2011), which requires agility, wisdom, experience, and quick judgment calls in deciding, as explained in the following section.

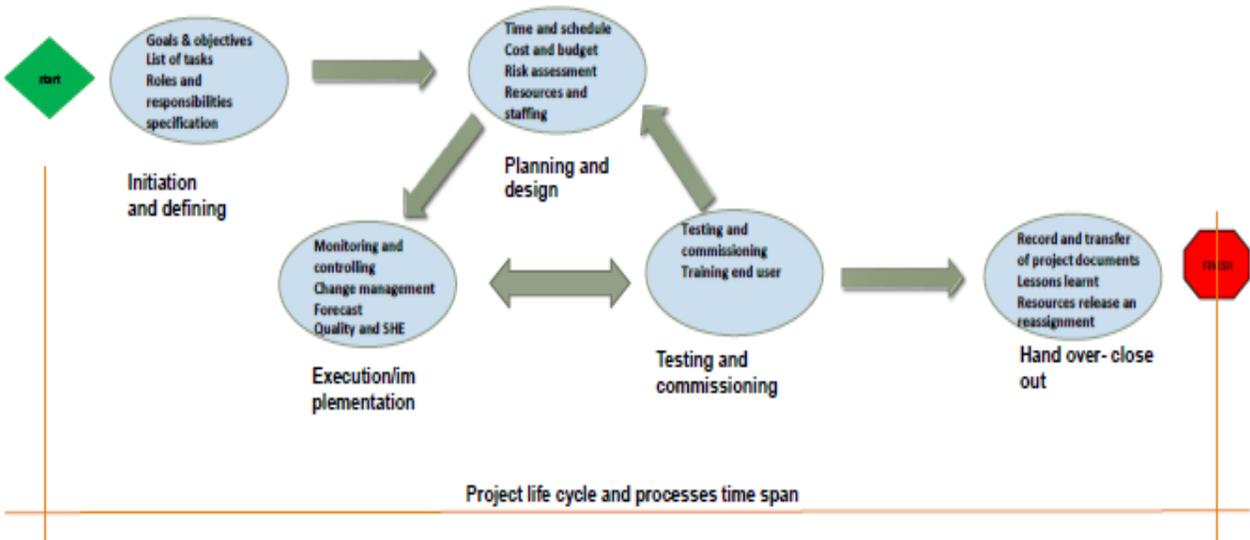


Figure 6 -Project process and life span

– *Execution phase and the challenges*

The execution phase is the most challenging in an O&G project since it is limited by the timetable and procurement requirement of critical supplies, material, or equipment on the project’s critical path (Cardenas, Voordijk and Dewulf, 2007). Olaniran et al. (2015, p. 912) consider alignment among O&G project execution stakeholders a significant challenge, requiring a consensus on major issues before making any decision. Stakeholders could include host country government, NOCs, surrounding communities, NGOs with interest in socio-economics, cultural, and environmental sustainability, employees (including the project delivery team), other intra-organizational functions, and operating IOC headquarter, and more. Project managers are usually placed under high time and cost pressure due to project economics and the connection between project and production that could be translated to cost and upper management contingencies on delivery time. This pressure produces systemic influences within projects and on the decision-making process. For example, it has been shown that time pressure can impair decision quality (Chu and Spires, 2001; Fischer and Adam, 2012). Thus, decision-making is the core for project execution, which could be a double-edged sword as time allowance is short, and delay is critical

to project performance indicators. Project managers caught in the middle of the diamond approach that represents five main success dimensions for projects:

- Efficiency in project execution
- End-user/customer usability and satisfaction
- Impact on the project team in terms of performance and morale
- Preparing for the future
- Organizational success

The execution phase is prone to change more than any stage in the project life cycle; it's part of project nature, especially in construction where even contracts differ from other legal agreements with anticipation for change regardless of the size and complexity of the project (Ezenta, 2015; Badiru and Osisanya, 2013). In construction, two things are well known as facts, change during the execution phase, and expected conflict between the owner and the contractor on these changes (CII, 2016). Sources of variation are many. They could come from the change in management priorities, design errors, unforeseen events, nature and weather conditions, market conditions, economic factors, labor disputes, political unrest, surrounding communities, socio-economic issues, and other possible causes. These sources mean that there will be changes for budgeted cost, planned schedule, and deliverables before the execution is complete, depending on the change's magnitude and significance. Change in projects requires scope management, cost management, schedule management, and stakeholder management, in addition to the technical aspects needed for implementing the required change (Doloi, 2013).

In the SGPMs, the execution phase could be gate 4-5, as shown in figure 4, and in most cases, at this stage, the scope is locked. The budget is set, and most of the time, there is no flexibility to accommodate significant changes (Ezenta, 2015). This scope and specification freeze could make a mismatch, which requires flexibility in making decisions to amend plans to address the unexpected changes/deviations since the budget allocated for the determined scope. According to Jergeas (2009), more than 50% of cost overrun in O&G projects take place due to reasons related to the execution phase. The Sakhalin Island project is another clear example of the impact of changes to project cost during execution (Westney Consulting Group, 2012). The project started at an estimated cost of \$10 billion and ended with \$22 billion not only because of value change but mostly due to execution delay caused as a consequence of the change. Olaniran et al.

(2015) provide another example of cost overrun with the Gorgon gas project in Australia with AU\$9 billion, representing a 40% increase in their original budget. Any addition, omission, altering, amending, modifying, and other kinds of revision to the project's deliverables or scope are considered deviations or changes that need to be addressed by the project manager. This process requires the project manager to communicate the change, document it, review and negotiate, obtain upper management and stakeholder's approvals, make new plans, amend existing plans, and implement the change. These steps require well-coordinated, accurate, and timely decisions and change management, which requires efficient and timely communication. According to Verbos and Miller (2013, p.151), communication flow and speed are the most influencing factors in information production, influenced and controlled by project organization, structure, and hierarchy, as presented in the following section.

– *Project Organization*

Project management organizational research has developed into considering project management as a function within larger organizations, which is influenced by its structure as a sub-organization from within and from the principal organization from which it originates. Meaning that the project management team is a function among other functions in principle organization (Serrador and Pinto, 2015); it could be extracted from a multi-mission organization with a certain degree of independence and autonomy with resources to achieve their targeted goals. Lam and Lundvall (2008, p.10) and Martínez-León (2011, p.544) identify two main organizational structures, mechanistic and organic, with different variables. The difference in specialization, standardization/formalization, centralization or decentralization, autonomy, and doctrine. The structure defines the level of authority, positions and roles, supervision, formal relationships among the project team and other departments, and sometimes with the external entities (Martínez-León, 2011; San Cristobal, Fernandez and Diaz, 2018). The structure also defines the level of authority in resource allocation and utilization, communication lines among team members, and, ultimately, the decision-making process. Lam and Lundvall (2008) argue that information processing and sharing knowledge and resources are factors of organizational structure and a corporate culture where both are vital for the decision-making process. Project organization in which personnel with different skills gathered to work together where business functions are represented in the project delivery team (Whitley, 2006). The project delivery team or project management organization differs according to the project management system used

and according to the mother organization from which the project team emerges. It is called a project-based organization, as Mintzberg (1983) cited by Whitley (2006, p.78) see such an organization is more focused on innovation as an adhocracy. The key to success is workflow coordination, which comes from harmony among the project team, although it is a changeable, dynamic, and fluid process.

Gray and Larson (2008, p.58) and San Cristobal, Fernandez and Diaz (2018, p.729) set three different types of project organizational structures. The functional organization, dedicated project team, or within a matrix structure as projects could be executed depending on factors such as cost, complexity, strategic value, and other organizational related considerations. Each type has its advantages and disadvantages, but empirical evidence shows that a dedicated team and strong matrix are more suited for construction projects (Gray and Larson, 2008; San Cristobal, Fernandez and Diaz, 2018). The functional organization, as shown in figure 7, set in a various temporary team coexist with a stable hierarchical form. Project managers serve as an information hub for the project history and chronology of events that lead to methods of execution selection. At the same time, other functions play a supportive role in the planning phase; personnel can be located on various organizational levels without explicit subordination. San Cristobal, Fernandez and Diaz (2018) argue that hierarchy replaces organizational hierarchy in this setting. In this situation, there are numerous temporary authority centers on different levels of the organization, and they can change when projects are completed. This organizational structure has several advantages, such as no need for change since all project teams come from within where they could be released back to their respective departments when the project is complete. This type of structure is not suitable for projects that require a diverse mix of people with different expertise. However, it works well for small projects that require diverse technical expertise (Gray and Larson 2008). The disadvantage of this setting is that; lack of loyalty since each member is loyal to their functional department and not to the project team, less focus due to the nature of having a core routine in each function outside the project tasks (San Cristobal, Fernandez and Diaz, 2018). Gray and Larson (2008) also add that this structure is slow, hard to integrate, especially in decision making since each of the functional members tends to have approvals and concurrence with their function, not only with the project leadership.

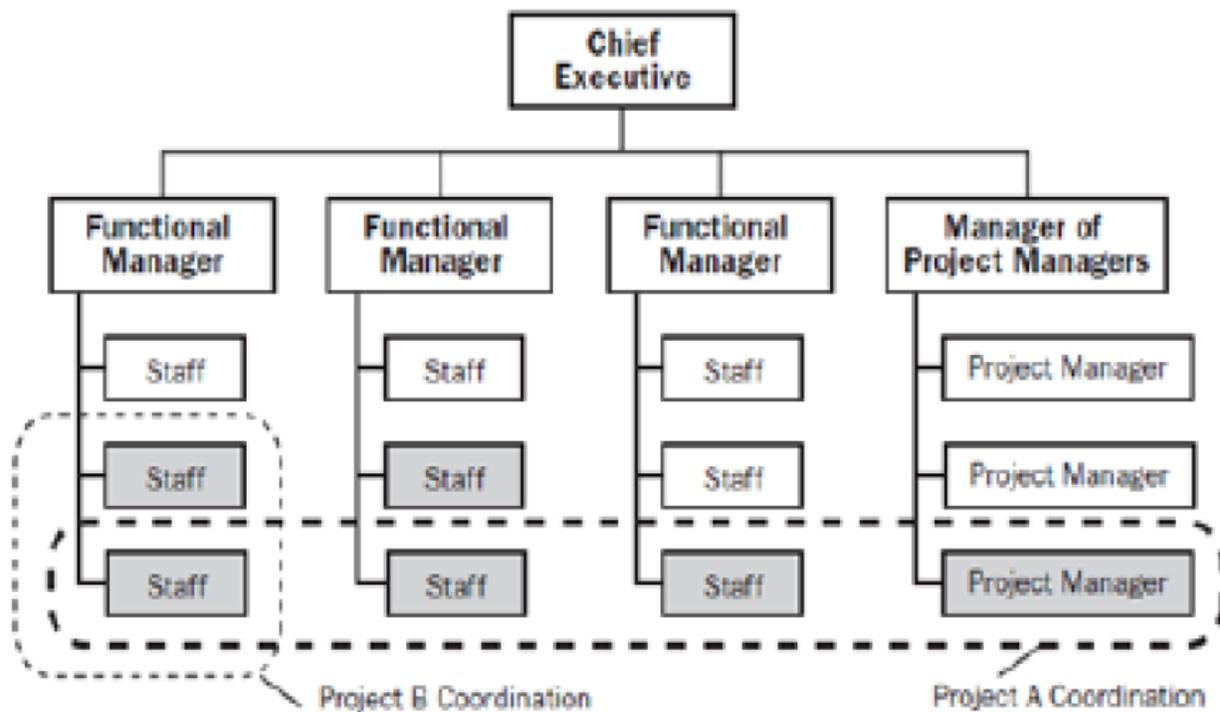


Figure 7 - Functional project organization

Source: © Gray and Larson (2008, p.59)

The other organizational setting is the dedicated project team, as shown in figure 8. According to San Cristobal, Fernandez and Diaz, (2018), project managers in this setting enjoy a high level of authority, which provides them with the needed leadership role to have robust project control where they are entirely responsible for the project execution. Team members are specifically assigned to the project and organized by task similarity, usually on a full-time basis with a strong sense of project identification and a good understanding of the project mission. The advantages of this setting are; less complicated and simple with a defined mission, fast in making decisions and in executing tasks, loyal and cohesive, and well-integrated (Gray and Larson 2008; San Cristobal, Fernandez and Diaz, 2018). The main disadvantages to this structure are; a costly setting where you have to keep the team busy, possible friction between the project team and the hub organization, less access to sophisticated technologies, and post-project staff re-assignment. However, empirical evidence shows that this setting is the best and most effective for construction projects (Gray and Larson 2008; San Cristobal, Fernandez and Diaz, 2018). Also, consideration of the project management team as a dedicated organization within a larger

organization to be more efficient in the project delivery process (Bakker, 2010; Serrador and Pinto, 2015).

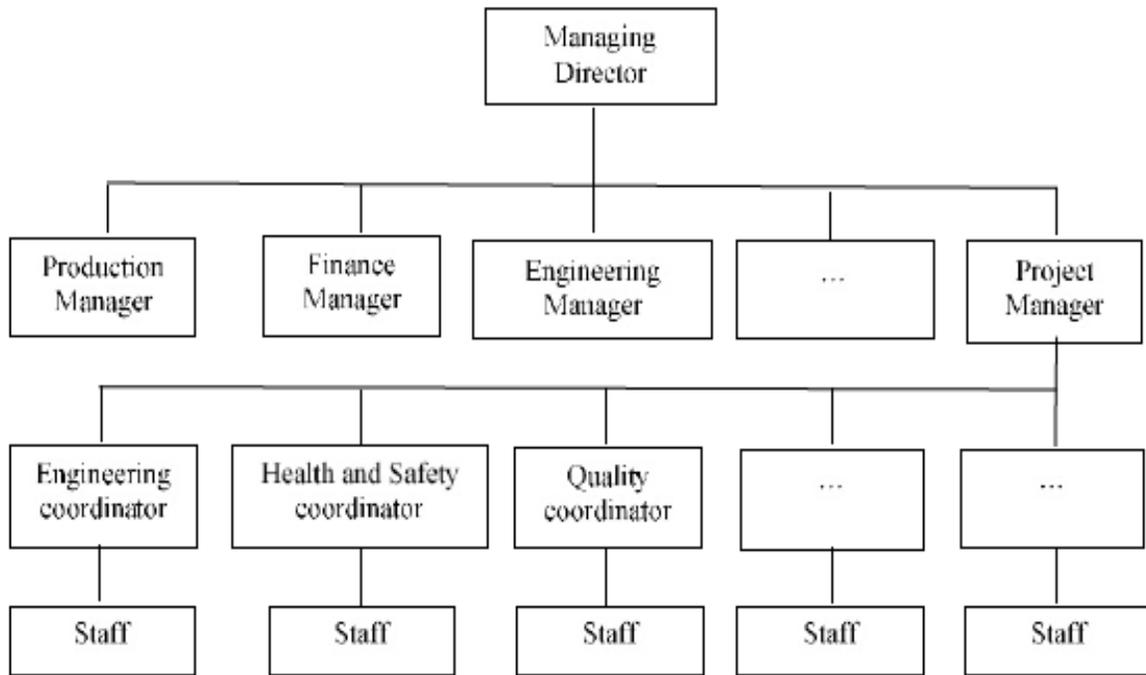


Figure 8 - Dedicated Project team project organization

Source: © San Cristobal, Fernandez and Diaz, (2018, p. 795)

The third project organizational structure is the matrix structure, as shown in figure 9, which could have three types: weak matrix, balanced matrix, and strong matrix. It is a combination of a project structure and line-and-staff structure, a combination of functional design and horizontal project teams (San Cristobal, Fernandez and Diaz, 2018). According to Rowlinson (2001, p. 670), a matrix is a two-way hierarchy, a mixed organization with multiple subordination and communication direction. In this structure, several functional areas are set up along the horizontal axis, and several projects along the vertical axis use the resources from the functional areas to execute a project. It is used in large organizations in a complex and dynamic environment or an international corporation with a global market (Rowlinson, 2001). In this setting, project managers share responsibility with program unit managers and work closely with other team members, sometimes competing for the same resources. Thus, a high level of communication and cooperation required between programmatic unit managers and project managers. A distinctive

organizational culture focused on collective forms of working and decision-making, compromise, and openness, is also needed. In some cases, it is necessary to decide whose authority, project, or functional manager, will be dominant or whether their jurisdiction will be equivalent.

There is no superiority among these organizational settings, as each could serve certain conditions. Still, the one that produces the least layers of communication lines is the smoothest for decision making (Cheng, Su and You, 2003). In complex projects, overlapping and shared responsibilities with dual roles are needed for specific tasks, which may require making both the dedicated team and the functional organizational structure inadequate for handling this type of problem. The matrix organization setting allows good disciplinary work and project integration and focus, but it comprises conflict and ambiguous authority meanings. A matrix structure is a compromise between functional and project organization, and it is not as staff challenging as the projectized organization. Kalu (1993), cited in San Cristobal, Fernandez and Diaz (2018, p.796), claim that matrix organizational structure is more suited for complex organizations. Mishra and Soota (2005) argue that functional organization is suitable only for continuous operations and routine tasks where coordination is not an essential part of task performance. In this setting, the specialists are grouped to perform just one function, but they are deprived of the project's big picture. Problems such as lack of authority and accountability may arise, which makes the decision-making process slow. In a dedicated project structure, team members in various disciplines report to a project manager. However, it is staff demanding but coherent, fast in communication, and delivery, which makes it best for construction projects (Gray and Larson 2008).

Each of these types has its strengths and weaknesses and suitability to the project specifics. Each of these three settings has its system of decision making through its structure and different level of project manager's authority and the development of a particular organizational culture, which is another factor in the decision-making process. The structural effect could result in organizational culture with two folds; internal for the project team and global for the entire corporation. The cultural role comes through corporate preference in having decentralized or centralized decision-making, which creates a programming effect in some organizations. The programming effect could also translate into guardian culture, which is a belief of must-have of

certain activities regardless of their need, such as setting schedules, holding meetings and conferences, regulations, and standard operating procedures (Keirse, 1998).

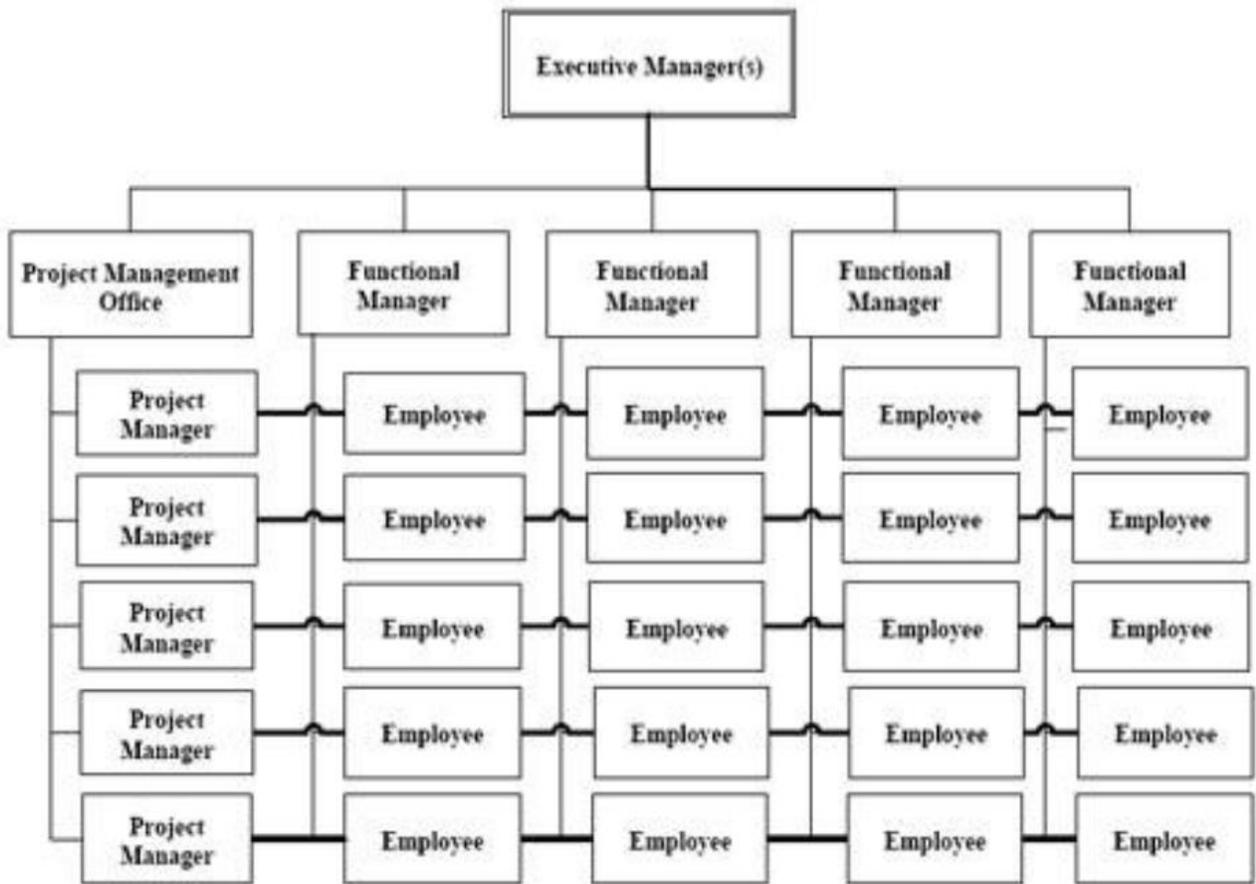


Figure 9 - Matrix structure project organization

source: © San Cristobal, Fernandez and Diaz, (2018, p. 795)

The effect of organizational setting could come to form physical and operational boundaries for decision-making; they can also reduce or increase complexity through the choices made in defining relationships, allocating responsibilities, authority, resources, and tasks (Eriksson and Kadefors, 2017; San Cristobal, Fernandez and Diaz, 2018). Eriksson and Kadefors (2017) see the structure that sets the hierarchy, number of organizational members, and cultivated culture impacts information flow and the level of leadership authority. These two issues are discussed in the following section.

– *Project Leadership and Organizational Culture*

Leadership in the project management field is the vital ability to motivate, optimize the team's performances, and encourage the project team to commit and achieve project goals. In simple words, leadership is exercised in getting the project team to practice their skills efficiently (Benator, 2003; Gehring, 2007; Zheng et al., 2019). According to (Barber and Warn, 2005, p.1032; Podgorska and Pichlak, 2019, p.869), project leadership is considered an essential aspect of project control. Regardless of software tools' availability, project control remains dependent on an outcome-focused leadership style and not problem-focused. Barber and Warn (2005, p.1033) state that the need for control and handling project deviations requires a departure from reactive behaviors, the firefighter style, where the focus is on tackling immediate problems. Instead, project managers must be proactive, visionary with big picture views, anticipate events, and ultimately prevent issues before turning into crises (Benator, 2003). Diagnostic tools and software aim to track project progress and deviations as they begin to arise and help the project manager maintain control.

A reactive leader will rely heavily on these tools to focus on specific problems unconnected and look for quick solutions (Barber and Warn, 2005). This type of leadership behavior will keep the project leader preoccupied with problem-solving in a firefighting style in a complex organizational system. Cooke-Davies and Arzymanow (2002), Gehring (2007), and Podgorska and Pichlak (2019) see project leadership as different from the way it's practiced in other professional disciplines due to three unique project characteristics. First, the project is a temporary endeavor without continuity for leadership development; the project team assembled to accomplish a temporary mission. Second, intra-organization matrix organization with multiple reporting lines where team members report directly to their function's line managers and temporarily to their project manager. In this situation, the project manager is responsible for the project deliverable but without full authority on the project team. The third challenge comes from the newly formed project organization and the ad-hoc nature of project team formation in a matrix structure where people have not worked together previously. Due to these challenges, a skilled project manager should have the ability to apply various approaches to project leadership augmented by an understanding of alternative approaches to leadership. Shao et al. (2016), cited in Zheng et al. (2019, p.889), argue that no style fits all in project leadership. Thus, project managers should

flexibly fulfill various roles to exert positive influences and tackle project challenges to achieve personal and project goals (Newell, 2016).

Moreover, they should adapt to the project's varied environment, which requires matching influence for the project-based organization in taking the risk and having the courage to enter new areas to innovate in addressing and solving dynamic problems and issues (Muller et al., 2018). Depending on the organizational culture, the relationship between the leadership styles and their mother organization's values or cultures (Chen et al., 2014). Cooke-Davies and Arzymanow (2002) establish empirical correlations between leadership and organizational cultures as each plays a role in affecting followers' perceptions and outcomes. This view is supported by Nguyen and Mohamed (2011) as they see leadership effectiveness tied to organizational culture through ways of thinking and the motivations or behaviors of followers influenced by the mutual impacts of both leadership and organizational cultures.

Organizational culture consists of sets of core values shared by an organization's members as a functionalist/materialist philosophy with a focus on the relationship between positions and structure (Nguyen and Mohamed, 2011). This set of behavioral variables refers to the underlying beliefs, values, and principles that serve as a foundation for an organization's management system and the collection of management practices and behaviors that both exemplify and reinforce those basic principles (Cooke-Davies and Arzymanow, 2002). Rose et al. (2008) explain through organizational structure how hierarchies work with each other and how workflows in the organization. Power structure deals with what kind of power is exercised by the organization, decision-makers authority, and how powerful they are. Ritual routines are the repetitive and routine management practices such as weekly meetings, department head meetings, a board of directors meeting, and the like, which creates programming and guardian culture. Stories are the narratives made by and about employees and their actions.

The mix of organizational structure, rituals, paradigms, power structure, control system, and others forms an interconnected web that represents the overall organizational culture as a cultural web. Corporate culture in international corporations could vary according to their structure, values, home base country culture, a local and national culture where they operate, the mix of its diverse workforce ethnic cultures, and values. In an open multi-cultural world, Rose et al. (2008) advise international corporations on considering what other cultures can offer to make

superior performances and not only restructuring their workforce and organization to their own organizational culture. Denison et al. (2004) see the difficulty faced by international corporations is mostly coming from applying theories and cultures from different geographical locations to other parts of the world. Examples are; American theories abroad, the Japanese philosophy of quality control and knowledge creation, or the European theories of joint ventures and organizational design. The difficulty comes from differences in cultural values and other culturally specific issues, although there may be some relatively universal dimensions such as individualism and power distance. Rose et al. (2008) provide an example of ExxonMobil, IBM, and Dupont in carrying their American culture wherever they go. While Mitsubishi, Hitachi, Sony, and Nissan bring their cultural baggage in the form of systems, procedures, formality, and means of management as they practice it in their home country. International companies operating in other parts of the world are always managed by an expatriate, mostly from the corporate home country, who brings their own home country culture, management style, and practice to where they operate. Although influenced by their national customs, expatriate managers in multi-national corporations expected to learn about the host country's values and culture and adapt to them. Still, there always be a trace of their own home country's culture (Rose et al., 2008).

Nguyen and Mohamed (2011) view leadership as an essential approach applied in accommodating organizational culture and cultural differences in the values fit between person and organization. According to social cognitive theory, an individual's behavior is the function of individual features and organizational characteristics, and the interactions between the individual and the environment (Burnes and Cooke, 2013). Thus, applying more adaptive leadership styles is becoming more critical for project managers, and effective leadership of projects has become a vital theme in project management (Muller et al., 2018; Zheng et al., 2019). Project managers tend to use different leadership styles according to the project's characteristics, their personality, and the conditions they face (Muller et al., 2018). According to project size and complexity, project managers mostly adopt a transformational or transactional leadership style (Zheng et al., 2019). Transformational leadership is defined as charismatic, visionary, and inspirational leadership behaviors that impact the team to extend their targets and perform beyond the expectations set in the general work (Podgorska and Pichlak, 2019). Transformational leadership covers four dimensions; idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. A project manager, as a leader, must induce passion as well as

reason. According to Gehring (2007, p.50), there is a wide range of available technical skills among project managers. Still, leadership skills and leadership understanding are not readily available only with experienced and talented project managers. Cooke-Davies and Arzymanow (2002) argue that organizational culture's social side effect exerts a strong influence on all the organization members undertaking projects in or for it, whether culture helps or hinders. Taken together, these two dimensions, the human and the technical, will merge in a corporate culture that either promotes good project leadership practice or that inhibits it.

The type of organizational culture coupled with a weak structure that limits leadership role could impact the decision deliberation process, which could be endless if not managed well (Ruqaishi and Bashir, 2014). Guardian culture and corporate programming in the belief that must have a set of activities such as meeting, schedule, committees, and others also is one of the factors influencing the project manager's leadership style. Whynacht and Duinker (2015) argue that meetings should be held to reduce communicants needed and address issues in one session instead of resulting in further meetings and discussions. Meeting and committees intended for having all or most stakeholders in one place to have a face-to-face conversation to focus on core issues and come up with a resolution. This could be accomplished by involving the right and most influential stakeholders and committee members, well-managed meetings concentrate on core issues without sideway discussion and distraction. There was a different view for Yang et al. (2014) on meetings and committees concerning the high number of stakeholders involved along with their expectations, which could be a downside to this decision-making setting if not managed well. Challenges could come from social pressure, the internal conflict of interest, and the coordination cost, such as time spent on coordinating meetings and time spent on deliberation and refinement of ideas. Whynacht and Duinker (2015) see the need for effective and charismatic group leadership and assigning roles and responsibilities in the decision-making process, which could place a sense of responsibility on the members and get them to be actively involved. Theoretically, lengthy deliberation and more input could produce a much better choice by capturing the group's brain synergy if it works smoothly. Still, group psychology and social behavior have their own effect on the way consensus is made and on the direction and the decision orientation. The group setting can be a double-edged sword when it comes to deciding as it allows members to share the responsibility for the consequences of the decision aftermath (Whyte, 1991), which eliminates decision ownership. It lures the individual to justify regret avoidance or sharing responsibility and

blame when things go the wrong way or when the outcome is not the desired one, especially in important decisions. The reliance on consensus gathering and feedback in committees forming for decision-making could significantly influence the individual thinking process. Smaller groups with harmony can be more effective in making better decisions and faster when there is a need to react to an imminent threat or capture an opportunity. Yang et al. (2014) argue that regardless of the benefits of the group brain synergy from meetings and committees, the main challenge comes from managing the high number of individuals as decision stakeholders added to internal and external project stakeholders, as discussed in the following section.

– *Project's Stakeholders*

In O&G construction projects, decision-making is painful deliberation for project managers due to the need for catering to various cultural, organizational, social, economic, resource allocation, and other factors (Newman, Begg and Welsh, 2018). These factors are mostly related to the surrounding environment, and the high number of stakeholders involved in the process (Berry, 2010); stakeholders' expectations and power play a great deal of influence on the decision process (Sebestyen, 2017). Ruqaishi and Bashir (2014) presented a similar view arguing that project managers tend to be mostly influenced by stakeholders and their attributes according to which project managers draw their decision-making strategies on how to manage stakeholders' expectations. In a worldwide survey of 69 project managers in the O&G industry, Eweje, Turner and Muller (2012) found that information on stakeholders has a substantial influence on project strategic value through their impact on decisions made throughout the project life cycle. Similarly, Yang et al. (2014) suggest assessing stakeholders' behavior, attributes, and expectations in the formulation of decision-making strategies. They also stress that stakeholders' legitimacy comes from the general assumption that their actions, whether they are entities or individuals, are appropriate and in compliance with social norms, values, and beliefs. Their urgency refers to the priority of attention needed to react to their concerns and the time-sensitivity of their calls. Stakeholders' power refers to as viewed by most scholars in the field as their ability to accomplish things, the resources they control, and their relationship and influence inside and outside the organizations (Yang et al., 2014). Stakeholders' behavior is their desire to threaten or cooperate with the project delivery team. Analyzing this factor can significantly help the project manager determine which of the stakeholders is positive or the contrary. Stakeholder management requires a great deal of social and practical wisdom from the project manager in predicting

individual behavior at the early stages instead of being reactive later. In any project, and especially in the O&G industry, the relationship with stakeholders influences how decisions made during the multiple phases of the project life cycle (Ruqaishi and Bashir, 2014). These stakeholders can range from host country partnering companies, local communities, employees, national governments, contractors and sub-contractors, internal departments, NGOs, and many others depending on the project's nature and scope (Mejlander-Larsen, 2017).

Decision-maker needs to create and analyze each of the stakeholders' profile to know about their demands, expectations, power, influence, and potential reaction towards decision outcome. Yang et al. (2014) argue that you cannot control your stakeholders. Still, you can manage them, and this fact needs to be well understood by decision-makers where negotiation and compromises could optimize and strengthen the project-related decision outcome. Sense-making, social skills, and experience are the primary tools that could be utilized by the project manager in addition to profiling in understanding and reacting to stakeholder's expectations and demands. In the construction world, stakeholders are considered and classified according to their power, legitimacy, proximity, and urgency (Olander, 2007). However, project managers are left with several questions to answer according to their expertise, social and political skills, and their phoretic capability to identify the most influential stakeholder that needs catering for; these questions. Who among stakeholders has a distinct behavior? What are the best decision-making strategies to approach each of the stakeholders? Answering these questions will enable the project manager to determine the stakeholders' distinctiveness and prominence or salience (Olander, 2007). Experience plays a significant role in managing stakeholders and the relationships with local communities and in the required extensive communication on projects in their areas where they think corporations are making profits at their expense. The quality of the relationship with local institutions is considered one of the major project's success factors. Also, the contractor-client relationship affects information flow and information feed to the project manager. Gathering and analyzing information about stakeholders, such as a pulse of external stakeholders (local authorities, business partners, local communities, and others), is of great importance. They must be viewed carefully since they are externally focused and see things differently. Being aware of external stakeholders and factoring this element into decisions, project managers found to be more effective in creating value for their choices (Olander, 2007; Eweje, Turner and Muller, 2012). Stakeholder theory requires the project manager to be aware of

potential economic, social, and political expectations of each of the stakeholders and events in the project vicinity that could impact their decisions' quality and efficiency.

– ***Managing Project Change***

Project changes and adjustments expected during all stages of planning, design, and construction due to different factors in any construction project regardless of the industry, project complexity, and project's magnitude (Hao, Neelamkavil and Thomas, 2008; Doloi, 2013; Shipton, Hughes and Tutt, 2014). Every project is prone to change no matter how well planned; as noted by Koontz in 1958, *"no effective manager makes a plan and then proceeds to put it into effect regardless of what events occur"* (Serrador and Pinto, 2015, P.1041). Construction project change/deviation is the difference between the contract value as initially agreed for a set of deliverables and the final cost and the amended list of deliverables (Hao, Neelamkavil and Thomas, 2008; Ezenta, 2015). Change or variation requires making modifications or amendments to the original contract, making some design changes, entering a negotiation with subcontractors and vendors, and obtaining stakeholders' buy-in to the proposed change. Consequently, these changes can create delays, schedule slippage, and ultimately increase costs. Significant changes may cause substantial delays in the project schedule, require re-planning, extra design work, adjustment to the initial scope of work, re-estimation of work statement, and additional equipment, materials, labor, and time. According to Shahi (2012, p.3), changes could come from poor decisions or decisions based on incomplete information, disturbing the workflow. Time wasted and the cost incurred are considerable challenges to the project manager in adjusting the project plan and bringing the project back on track. Suppose changes are not addressed promptly through quick and accurate decisions. In that case, they can lead to disagreements among stakeholders, cause substantial cost and schedule overrun, and could damage the project's targeted goals.

IOCs adopted traditional project management systems to manage project changes by the management of change (MOC), not considering the difference between MOC and project variation change management. The MOC is standard procedures consisting of a broad and long checklist that is not designed for construction only. Conventional management of change is associated, mostly, with a shift in an on-going process with the aim of creating efficiency to specific organizational performances. It may require applying and testing new technologies and new techniques driven by external factors such as new technologies, competition, or the need to

comply with the new legislation. According to Creasey (2007), cited by Ezenta (2015, p.7), traditional change management is the tool, techniques, and process necessary to manage people to adapt to the proposed change. Construction change/deviation, regardless of their impact and size, constitute a change to the initial project plans, which is not similar to traditional change management. It is mostly associated with managing the re-planning of the project to accommodate the difference within a limited timeframe; otherwise, there will be consequences that may lead to further change and further consequences. It is more of a problem solving to bring the project back to its original plan or re-plan and adjust according to the changes. In some instances, the change could be positive when a creative engineer or a project manager can find means and methods to bring some savings, whether in time or cost, to the project while executing a pre-planned work (Shipton, Hughes and Tutt, 2014). Hallgren and Maaninen-Olsson (2005), cited in Serrador and Pinto (2015, p.1042), argue that the solution to execution phase changes is not through sophisticated planning but through methodologies that enable actions and prompt decisions to resolve these deviations. These methodologies require flexibility to allow the project manager and his/her team to be iterative in re-planning and adjust the project while executing.

According to Motawa et al. (2007) cited in Shipton, Hughes and Tutt (2014, p.789), change management is an essential part of project management, a framework ensuring that any needed changes are attained within the allocated budget or a value-added to the project. One of the key aspects of change management in construction is using procedures that could be part of a construction contract. A set of a standardized mechanism by which the parties can handle change, documenting change, demonstrating transparency and accountability, but the cost judged as one of the key factors in decision-making about changes in most of these procedures (Shipton, Hughes and Tutt, 2014; Olaniran et al., 2015). The procedures help to facilitate, but by no means ensure, more proactive ways of managing change. Heravi and Charkhakan (2014) views on changes are that they should be proactively reduced, predicted, and efficiently managed. Project management practice takes place in a range of social agenda, stakeholder relations, politics, and power (Winter et al., 2006; Olaniran et al., 2015). Thus, procedures should be designed so that implementation should subsidize rather than weaken the effectiveness of management of the work. Shipton, Hughes and Tutt, (2014) argument is that despite the good intention of having procedures, change management sometimes is used as an investigation tool that distracts some of the project resources from their project assignments. It is more of a structured way to carry out the change

without much creative technical knowledge. They become a boundary between different professional disciplines engaged in the project execution. In most instances, in the O&G industry, procedures distract project managers from their leadership role and force them to become more procedural enforcement agents (Alagba, 2014). Managing project change requires making a decision, a process influenced by the execution phase dynamics, affected by a chain of subsequent phases decisions, and several factors, as discussed in the following section.

Project Decision

According to Berry (2010, p.35), a typical decision-making process involves identifying a problem or opportunity, exploring scenarios of alternative solutions and optimal outcomes, examining and choosing among alternatives, making the decision, and implementing it. According to Courtney (2001, p.18), the process is divided into three phases; “intelligence, design, and choice.” Surveillance for potential problems for information, search for alternatives in the design phase, and deciding through analyzing an optimum selection among available options. Verbos and Miller (2013) argue that decision-making is a cognitive diagram that relies on the individual mental map in choosing among alternatives as a multipart process influenced by personal, cultural, organizational, and other external and internal factors. It could be taken individually or in a group setting through meetings, conferences, task force, or team consultation settings. Accordingly, as illuminated by prospect theory, this mental map/model or framing influences the type of data gathered and perceptions made and how it is scrutinized in an excessive form (Courtney, 2001). Framing and mental models lead the individual to a heuristic explanation of apparent risks of the problem or the opportunity that could take place in the sense-making process. Information feed, availability, quantity, quality, and timeliness have an enormous impact and require quick analysis, especially when the decision-maker is time-constrained. Haider (2016) argues on human cognition limit to being rational and inductively thinking at all the time, through prospect theory, which is an offshoot of descriptive theory. Prospect theory illuminates decision-making under uncertainty and risk, which more realistically reflects the construction project's execution phase. As time pressure is one of the main factors affecting project managers in construction execution, information timeliness works as data quality since their delay may lead to information expiration. It becomes relatively old to the problem on hand (Fischer and Adam, 2012). According to Woiceshyn (2011, p.9), under certain constraints, decision-makers either rely on intuition or reasoning; in both cases, they go through a dynamic process in analyzing a large amount of

information in a short time switching from intuition to reasoning and vice versa. Several factors influence this process; individual skills, nature, training, personality, social skills, and more; each could represent a source for bias in one way or another (Saaty, 2008). After framing, prospect theory implies that an evaluation process follows through optimizing or maximizing expected outcomes, especially in projects where measurable terms such as cost, time, and other tangibles to be considered in monetary terms (Schiozer, Ligerio and Hayashi, 2010; Haider, 2016). At this stage, the decision-maker under challenging aims; meeting stakeholders' expectations, complying with organizational norms, maximizing value, and satisfying professional standards and ethics. Erdogan, Saparauskas and Turskis, (2016) state that including additional organizational members may help in this process and increase the chances for a successful outcome. Berry (2010), contrary to Erdogan, Saparauskas and Turskis (2016) views, argue that researchers, through empirical evidence, found the process of engaging a high number of stakeholders while project teams under time constraints are tough and counterproductive. After these processes, the outcome is a decision, implementation, and assessing the outcome.

In most cases, project decision is a conscious, binding resource allocation to achieve the desired objective; it involves thinking, judgment, and deliberate action to accomplish a particular task or objective (Miller and Lessard, 2000). Making a project decision is not an easy task; in fact, it is challenging and requires an analysis coupled with a professional judgment with significant risk (Wideman, 2010; Schiozer, Ligerio and Hayashi, 2010; Rolstadas et al., 2015; Erdogan, Saparauskas and Turskis, 2016). Project decisions are decisive, their consequences are sometimes great and grave, they could lead to success or failure, and they could determine organizational and individual fates. Such decisions could be classified into routine and non-routine depending on the task and project type, industry, and organizational culture and structure (Schiozer, Ligerio and Hayashi, 2010). There are several reasons stated by Virine and Trumper (2008) that make the process challenging. These reasons stem from the project nature, project problems that involve multiple objectives, decision-makers' challenges in dealing with uncertainties and being required to predict potential problems proactively. Also, project management problems can be multifaceted, and the number of alternatives can be substantial as most projects include a high number of stakeholders, each with different objectives and preferences. According to Wideman (2010, p.01), there are three approaches; the intuitive approach, the advocacy-based approach, and the decision analysis approach. In the latter case, choices are made based more on the

analysis results, requiring applying tools and techniques as part of a tested theory. Project decision theory was incepted from economic theory as a set of options evaluations and optimization processes (Virine and Trumper, 2008). This theory does not consider the possibilities or effects of moderating or intervening factors that make decisions reference-dependent. The classical evaluation criteria commonly used are mostly economic and measurable benefits such as costs, benefits, timeliness, and acceptability to significant stakeholders (Berry, 2010). Choosing by Advantage (CBA), Analytic Hierarchy Process (AHP), Fuzzy Theory (FT), Data Envelop Analysis (DEA), and Case-Based Reasoning (CBR) are utilized on a case by case projects and in different phases of the project life cycle as decision aid theory (Rolstadas et al., 2015).

There are applications of the expected utility theory in the O&G industry with some success and has been used as a model for normative decision-making, which is when to make decisions systematically and not on how to decide (Mackie et al., 2007; Eweje, Turner and Muller, 2012). Utilizing the normative approach in making decisions weakens project managers' reaction to uncertainty. They become programmed in making computed decisions based on formalities where rules and procedures employ behavioral models that make members follow a set of formal steps in making their decisions. This approach, according to Bolfikova et al. (2010), creates a type of system thinking, which is perceiving a larger picture in integral parts of the reality in which these parts exist, reacting to something without knowing the connecting dots with other parts of the existing reality. This approach is different from personal mastery, which is creatively approaching things without being reactive to events in two primary directions; what is essential to us and non-stop learning on how to perceive current reality more clearly. Any out-of-the-box problem requires creative thinking, which is not covered in the collection of rules and procedures for making decisions. The alternative to normative decision theory is the descriptive decision theory, which deals with how individuals genuinely go through the process of decision making or how they naturally make decisions (Eweje, Turner and Muller, 2012). Descriptive decision theory is built on the assumption that decision-makers make their decisions by choosing the means to satisfy their primary and most essential needs. According to this theory, these needs come first regardless of the amount of data required for making a choice. According to Kurt Liwen's theory, behavior is a function of a situation and the individual mental map (Burnes and Cooke, 2013). By nature, humans rely on experience, instinct, and a rule of thumb or heuristics when faced with time limits, challenges, and vagueness; they approach it by simplifying the challenge. When the

situation involves uncertainty and out-of-the-box thinking, people tend to simplify the challenge by relying on heuristics or rules of thumb entrenched in their acquired knowledge and past experiences (Eweje, Turner and Muller, 2012). In this case, the quantity, quality, and timeliness of information (information feed) available to the decision-maker, past experiences, and knowledge about the relevant subject will significantly affect how they model this process's possible outcome. Saaty (2008) argues that too much information could lead to distraction and delusion. However, information gathering and analysis help make the judgment as humans, in general, believe that more information helps to decide correctly. The information flow could take two directions, vertically within a construction team, such as requests for information, requests for a decision, explanations, and progress reports (Senaratne and Ruwanpura, 2016).

In contrast, information such as notices, policy manuals, staff regulations, progress reviews, and instructions flow downward. It could also get horizontal direction according to the organization type and the number of internal and external stakeholders involved in the project. Flyvbjerg (2007) argues that inadequate, unreliable, or misleading information and conflicts between decision-making policy and planning as the main challenges in this process. Brady and Davies (2014) establish links between information quality and quantity that comes from communication within the project team and the quality of the decision outcome. The decision-maker aims to minimize unknowns (Verbos and Miller, 2013) by evaluating differences between what happened and what could happen to what is expected to occur.

Pinto and Winch (2016, p.240) draw a similarity between project decision making and supply chain by adding value to project decision-making along the project life cycle and calling it a project decision chain; they do have similar attributes. The chain starts with the project life cycle as decisions made during different stages of the project contribute to value-added in later stages and contribute to key performance indicators such as cost, schedule, and quality end-product. The decision chain for an O&G project triggered by authorization decision in a gated system, which could include the selection of work process (choice between multiple options), list of tasks to be performed, and execution of these tasks based on schedule and budget (Eweje, Turner and Muller, 2012). The execution plan of each project assembles steps for taking which task at which sequence, which means that there are different types of decisions to be made by the project manager (Pinto, Patanakul and Pinto, 2016); selection decisions, authorization decisions, and

planning decision. The selection decision pertains to finding the best of the optimal alternative among several options, which may require value or ranking for each choice. The go/no-go decision (authorization decision) is yes or no, mostly related to moving from one stage of planning to another step or authorizing spending on certain phases of the design process. While planning decisions is based on forecasts and assumptions to optimize the outcome. During the conceptual phase of projects, decision-makers follow heuristic decision rules as tools for an optimal decision (Williams, 2010). This phase is fuzzy, and data are scarce, and many assumptions are made. Most of the time, decisions are made in this stage without a formal process and rigorous analysis, although this is dependent on project complexity. Velasquez and Hester (2013) argue that FT is an offshoot of multiple classical decision theories that deal with inaccurate information and uncertain conditions. This theory's logic considers scarce data in the evaluation process of available data, allowing imprecise input into complex problems. This theory's disadvantage is the difficulty of developing the fuzzy systems, which require several attempts and simulation before utilizing it in actual terms. This theory has been established and applied in engineering, mostly in the conceptual phase, due to the hypothetical and imprecise data, which can embrace vagueness. However, this theory requires an iterative way to be tested and applied, which requires time and makes it unsuitable for urgent matters and reaction to field changes.

During the design phase, designers have the time to select among alternatives and cater to client needs (internal or external). They see the choosing by advantage (CBA) method as more appropriate for the project's detailed design stage (Arroyo, Tommelein and Ballard, 2014). CBA compares the advantages of options where decision-makers need to identify which factor will create a big difference among alternatives and not their importance to the decision-maker (Rolstadas et al., 2015). In this method, the decision is based on the advantage that one option has on other options and no need for double counting. The process of decision making, according to CBA, takes five steps in addition to defining factors and criteria for evaluating qualities of alternatives; these steps are; setting, innovation, decision-making, reassessment, and action and implementation. The design phase should provide enough details for planning the execution phase knowing that projects are full of surprises and operate in an environment of uncertainty (Pinto, Patanakul and Pinto, 2016). A risk management plan is needed to identify, analyze, and respond to risk factors that may arise during subsequent project phases. The sum of all of the decisions made on this stage can serve as the integrated project plan with defined goals,

objectives, scope, work breakdown structure, a logic of tasks network, schedule, cost estimate/budget, and risk mitigation plan (Williams 2010; Arroyo, Tommelein, and Ballard, 2014). Clarke (2010) argues on the sources of challenges faced by project managers during executing planned work as they face issues such as; diverse workforce, regulatory issues, organizational changes, situational constraint, time constraints, cost constraints, resources management, and other project performance indicators. These challenges could significantly impact the sensemaking process. According to Rolstadas et al. (2015), AHP and CBA as decision aid are both MCDM methods that can handle multiple factors by assigning weight to alternatives' importance. Still, none of them has a clear way of factors interrelation management. They require consideration of specific context for all judgments since each factor's significance depends on decision context, and expert judgment in setting scales for priorities is required (Saaty, 2008). AHP utilized pair-wise evaluations in comparing options placing criteria and weight to each alternative (Velasquez and Hester, 2013). With no background and experience, it wouldn't be easy for individuals or groups to agree on the importance of a given factor even if the factor agreed upon among stakeholders will always be a risk of missing the essence of alternatives. Users of MCDM need to maintain a collaborative environment and avoid any conflicting trade-off of general categories.

Most of the execution phase decisions are problem-solving in nature; there is a difference between problem-solving and non-problem-solving decision-making process (Bolfikova et al., 2010). It is a complex and dynamic process that involves many stakeholders depending on the project's size and complexity, uncertainties, complex daily work environments, and interpersonal conflict, which can negatively impact decision-making performance (Stenmark and Mumford, 2011). This view is supported by Arroyo et al. (2014) as they concluded that during the construction phase, the rationale is not clear, decisions are not documented, formal decision making is rarely applied, and many stakeholders with different opinions are engaged in the process. As all projects have risks, project decisions are associated with risk, and decisions made during project execution are meant to mitigate risk or capture an opportunity. Risk management could lead to plan changes that require a high level of knowledge and creative thoughts than what the original plan has had required (Fischer and Adams, 2012). The areas of challenge to project managers when it comes to decision making in executing the project, according to Miller and Lessard (2000), are:

- Health, safety, security, and environmental (HSSE);
- Procurement and contractual management;
- Compliance with regulation, in oil and gas works, the host government decision mechanisms are mostly politically driven and unclear, which leads to complicating matters on information accuracy.
- Socio-economics and public relations management;
- Stakeholders interface management;
- Logistical issues
- Project control and governance;
- Managing the project delivery team
- Organizational culture and local cultures differences
- Natural and environmental unforeseen events

If not addressed, these challenges could be the leading failure factors in any projects, exceptionally with large-sized projects where most of these factors are political and social with potential to the decision made by project managers and impact decision-makers. All the decision aid and decision theories are meant to help the project manager decide through a complex cognitive process. The mental operation that translates perception and description into a standardized format does not automatically work when it comes to the process of choice under time pressure, especially during executing construction (Fischer and Adam, 2012). Experience, technical knowledge, practical wisdom, and social skill are vital for project managers in making execution decisions (Burnes and Cooke, 2013; Brady and Davies, 2014; Arroyo, Tommelein, and Ballard, 2014). The next section shall explore the part of the experience and how experts make their decisions based on their practical judgment in a natural way as naturalistic decision making.

Expert, Experience, and Naturalistic decision making (NDM)

Most management research on decision-making and Western investigators are strongly focusing on reason. At the same time, research has also shown that reasoning is only part of the decision and not the whole story (Salas, Rosen and Granados, 2009). An essential part of the decision-making process is experience and intuition, which are fast, effective, and plays a significant role in making decisions. Intuition may not work the same under all circumstances and could be a source of error; therefore, it is important to know under which conditions intuition could be more

productive and when it is likely to lead to judgment error. Expert decision-making that is built through considerable practice; is a domain-specific intuition, an expert-based intuition, or professional intuition. Professional decision-making paradigms are based on the profession's virtue that sets its standards and even codes of ethics (Frick, 2011); it applies to different occupations such as; doctors, engineers, lawyers, teachers, and other trades. Espinoza (2013) argues that profession and specialty are part of the individual identity. It takes precedence on other factors during practice where the individual is believed to be part of particular trade and category of expertise. Morris (2014), cited in Pinto and Winch (2016, p.240), views the profession as the ownership of a discrete body of knowledge, the knowledge needed to reach the level of competency.

Experts' decision-making is not a routine or mechanical process; it is a cognitive process that requires thinking and reflecting; it is not merely following a process or procedure (Frick, 2011; Thiel et al., 2012). As experienced people have the knowledge and capability to use intuition as an advantage, they rely on their well-organized knowledge base, although it should not be alone. Naturalistic Decision Making (NDM), as Zsombok and Klein (2009) argue, is about the actual occurrence of the decision process and not on how it should be, just like real life vs. laboratory. NDM is how cognition, in general, works under complex sociotechnical circumstances, not only through option generation and selection process. It is incepted from studying how firefighters make their decisions. They do not evaluate an option, they do not conduct utility analysis when there is a high stake, and no time to perform any of the typical; it is how people really make their decisions. It deals with decision-making under uncertainty, risk, time pressure, and several other conditions that cannot be simulated in a lab or experimental environment or a procedure.

According to Zsombok and Klein (2009), pattern recognition is one of the central processes fundamental to expert decision making, which works through comparing the situation with experience to search for potential similarities. The expert performance was found to be specific to the discipline with specialized information/knowledge, while the novice performance was mostly relying on reasoning strategies (Salas, Rosen and Granados, 2009). Thus, defining experience or expertise could be; achieving a high level of performance through field-specific knowledge and different performance apparatus acquired from long periods of practice. Expert decision-makers utilize expertise and intuition related to skill (expertise-based intuition), although

Dane (2008) sees differences between the two. Scholars have questioned the accuracy of intuition; it was found that under certain conditions, intuition could be very accurate (Zsombok and Klein, 2009). What effect intuition accuracy is an array of factors that range from the problem's nature, the decision maker's character, and work or decision environment. Dane (2008) argues that intuition is more accurate and beneficial when the issue is complicated and ambiguous, while logic could be applied quickly and more effectively than intuition when the task is simple with low risk. Expert decision-making theory centered on how experts decide after applying their moral and professional codes to a given situation before other considerations (Thiel et al., 2012). Bolfikova et al. (2010) believe that the extent of personal mastery of an expert tied with the knowledge accumulation from situations the expert has been through and their effect on the additional process, events, and how it deposited in his or her memory. This mandates the individual to look back to past situations and behind the external look of the present problem in a natural continuous way with efficiency, not in the speed of reaction only but with the process that does bring something creative and new.

Expertise is a source of effective decision-making that utilizes intuition, especially in complex situations where it lies in the human learning memory; it is an individual processing style for decision-making modes (Salas, Rosen and Granados, 2009). It relies on an automatic input without the need for conscious awareness, while the output of intuition is a feeling that could be called (gut feeling), which serves as the basis for an expert decision and judgment. According to Salas, Rosen and Granados, (2009, p.3), intuition is cognition that is different from awareness and reasoning, one of the two human information processing systems; one conscious and calculated while the other is unconscious and intuitive. Intuition is a phenomenological knowledge acquired through inherent learning built-in without conscious awareness produces judgment based on very intricate chronological patterns and intangible correlations. In contrast, deliberative thinking can help the individual evaluate among alternatives or situations and uncover new data that could be used by the intuitive system. It is essential to recognize how individuals develop to become experts and develop an expert-based intuition to understand how they make their decisions. Zsombok and Klein (2009) explain that professionals develop through five stages, starting from a novice to an advanced starter, then competent, then proficient, and finally becoming an expert in their field. Throughout these stages, they acquire and retain knowledge through the repetition of tasks they perform over time until they become proficient in performing their duties.

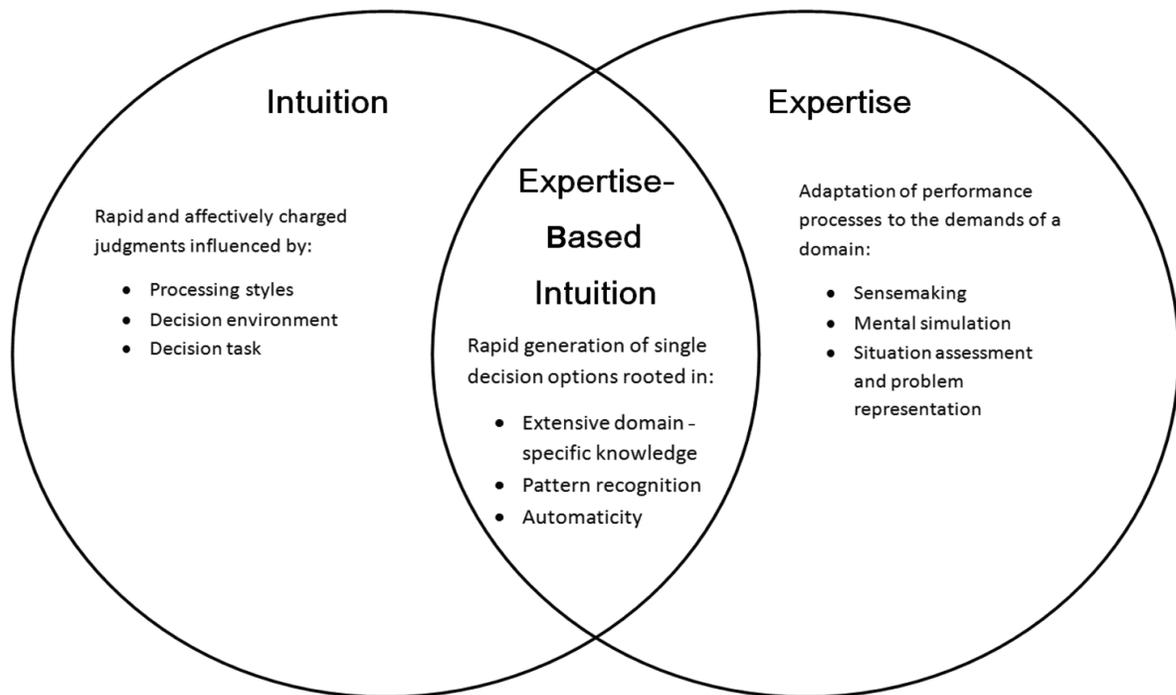


Figure 10 - Venn diagram depicting the overlap and distinction between intuition and expertise

source: © Salas, Rosen and Granados, (2009, p.4)

Dane (2008) sees this development as developing situational awareness and instantaneous intuitive response to conditions during dynamic tasks under time constraints through judgment and tactical maneuvering around problems and practicing cognitive challenges. Empirical evidence supports the assumption that the human brain can capitalize effectively and quickly on experience, especially in decision making (Burnes and Cooke, 2013; Brady and Davies, 2014; Arroyo, Tommelein, and Ballard, 2014). The project manager's experience developed in different shapes and types. Technical expertise, which relates to the amount of technical knowledge acquired and retained from years of practice. Procedural experience in understanding organizational and industry rules, regulations, localized expertise, techniques and strategies, and soft skills experience relates to dealing with the human element. Expert-based intuition is the overlap of both intuition and experience, as shown in figure 10.

Rolstadas et al. (2015) argue that knowledge developed from decisions made during past projects can help the project manager compare similarities between situations and assist in making a quick decision with a high likelihood of success. Subject matter experts (SME) in their field should have

the know-how and all necessary competencies to make the necessary decisions that suit situations they face during the project execution phase. Empirical evidence shows that applying sense-making, emotion regulation, self-reflection, forecasting, and information integration serve as great tools in aiding project managers in making sense of complex and ambiguous situations (Thiel et al., 2012). Organizational behavior and decision-making literature conclude that learning and developing experience is a crucial player in the decision-making process, and there is a positive correlation between exposure and decision quality and outcome (Dane, 2008). Organizational learning starts with a process of detecting and correcting errors (Argyris, 1977). The concept of organizational learning has since developed through generating, acquiring, and transferring knowledge and modifying organizational behavior to reflect new knowledge and visions (Von Zedtwitz, 2002). Identifying and correcting errors could be performed in a single loop, illustrated by Argyris (1976) as a thermostat-like function when switching on and off on a set temperature without knowing why. If the why is answered, then the process becomes not only detecting errors, it evolves into questioning the underlying policies and goals as well as its program and moves into further inquiries. That is a second and more comprehensive inquiry that is called double-loop learning. At the basis of all learning is the individual, in this context, team learning may have an essential role in distributing, processing, and interpreting individual experience for organizational memory and knowledge (Von Zedtwitz, 2002). Hyunjung, MacDonald, and Andersen, (2013) argue that Argyris and Schön (1978) concept of “double-loop learning” is effective for project managers in developing experience, especially when they are confronted with dynamic and complex problems. Single-loop learning occurs when a management team modifies its strategy or action based on results from its previous actions. Double-loop learning goes further and involves modification of the management team’s mental model or the theory that underlies the action and develops new knowledge and experience. Double-loop learning is what allows organizations to be proactive or generative in their decision-making (Hyunjung, MacDonald and Andersen, 2013). As the importance and role of knowledge and experience are reviewed, the next section shall explore the potential impact of formalities, procedures, and other bureaucratic practices on applying experience in making project decisions.

Formalization/Bureaucracy, communication, and decision making

Bureaucratic organizations such as large IOCs, as characterized by Spangler et al. (2014, p.1085), are typical of being a web of functions, a specialty of labor, plenty of rules, red-tape, protocols, procedures, authority, and multiple layers of bodies. They are hierarchical in structure, with a division of labor, managed through a very formal structured chain of command communication processes. Senior management in such an organization falls under a paradox of behavior and system complexity in emphasizing control in avoiding agency-risk, which could come from organizational complexity due to its network of authorities and their links and associations. As large corporations, IOCs have two main principles in the decision-making process; external, which relates to stockholders, the public, media image, and internal that is related to its division of labor and the power and politics inside the organization (Spangler et al., 2014). Farazmand (2010, p.246) identifies four major components of the decision-making process in large bureaucratic organizations; “context, structure, participants, and a decision outcome” as there are multiple stakeholders and divisions involved and having an interest in an issue. Thus, bureaucratic decision-making mostly structured and based on computed/functions and not well suited for dynamic situations and creative thinking. It could well serve specific industries such as manufacturing, military, and other public sector institutions (Farazmand, 2010; Martínez-Leo’n, 2011), where decisions are routine in nature. Such organizations need a stable environment with a top-down structure (hierarchy); the vision comes from the top. Information is filtered, allowing members a partial view according to specialty and functions. These organizations also require to be highly formal in communication and instruction to maintain control and adherence to internal and external rules and regulations in a centralized way. The organizational relationships are, therefore, become complex where managerial intervention is continually required for problem-solving and decision making (Spangler et al., 2014). While organic and knowledge-based organizations (such as project-based organizations), decisions based through debates, discussions, and conferences in well-coordinated steps with quick reaction to change and dynamic work environment.

Formalization means standardization of work sequences through standard operations (SOP) instruction or procedure with specific job descriptions with rules and regulations (Robbins and Decenzo, 2001). Bureaucratic organizations utilized intensive written SOPs and clear rules, which make the discussion about conducting any task limited, impairing employee’s capacity in the

development of creative solutions. Salazar-Aramayo et al. (2013) argue that SOPs are over-utilized in the O&G industry; therefore, having procedural knowledge and experience with these procedures and how to satisfy the system requirement could be either a hinder or an aid to the project manager. Kock and Aubry (2019, p.396) state that there is a threshold level for formalization; once breached, it will have a negative effect contrary to its aim. They also found that informal networks, teamwork, and harmony among the project team are more critical success factors in boundary spanning. Formality can help set the legal framework for roles and responsibilities where individual responsibility is covered by fulfilling their part of the decision-making process. Simultaneously, skills and experience are the keys to capturing opportunities for cost savings, timely delivery, and providing creative solutions to instantaneous problems during construction (Fischer and Adam, 2012). This could also be dependent on the organizational structure (Mintzberg (1983), cited in Mart'inez-Leo'n, 2011, p.545), roles and responsibilities organized through coordination and formal work allocation with levels of authority to control and coordinate work activities to make an integral work from collective tasks.

Consequently, positions or job roles are set according to their level of authority. Scholars' argument on formalization is two folds; pro bureaucracy scholars view it as useful even in innovation but not in the generation part; it is a mechanical way of execution, keeping the thinking and creativity outside to others to do. The other opinion is that formalization and bureaucracy are ineffective when dealing with change, creativity, intuitive thinking, and organizational loyalty and complexity. Adler and Borys (1996) argue that early studies conducted by Kornhauser, Ritti, Bailyn, Raelin, and others in the 1970s and 1980s suggested that knowledge-based professions such as engineering, scientist, physicians, and the same require a high level of autonomy. They need freedom in the way they think, plan, and decide, but bureaucratic practices hinder their ability to be creative and innovative. Engineers and scientists may not like to be limited by rigid rules and procedures. Still, they want to organize and formalize the routine part of their work, such as safety checks, quality checks, and the like, in a procedural way.

A bureaucratic structure is more suited for the routine task and not well suited to deal with change and creativity or out-of-the-box thinking. On the other hand, decentralized or organic structures treat organizations as a social place. It comes through continuing social interaction, flat, teamwork-oriented, and decision making takes horizontal direction based on expert knowledge

instead of the top-down used by the bureaucratic structure based on position authority (Kock and Aubry, 2019). This type of structure is more suited for managing people and technology, dynamic organization, adaptable to change, complex environmental and social conditions, and best suited for ambiguity (Adler and Borys, 1996; Kock and Aubry, 2019). It is based on participatory management, empowerment, and trust-based culture. Having the advantage of both structures could create a hybrid organizational structure that could take the shape of bureaucracy with organic task force mission-oriented sub-organizations such as project team with discretionary authority. This setting could provide efficiency, trust, stability, enough dynamics, and knowledge creation.

The literature illuminates the difference between the structured/bureaucratic decision-making model and discretionary/SME decision-making mode. Thus, factors influencing two modes of decision making were explored in this literature review, the two modes are discretionary and structured. Project managers poses ownership of their projects, they are involved in the day-to-day conversations, meetings, correspondence, decisions, and stand for the success or failure of their projects. When problems arise, it's wise to trust their judgment on the best way to move forward and make sure that their voice is strongly heard in the decision-making processes. Professionals, in general, possess autonomy in the performance of their work and the authority to make independent decisions on certain technical issues, such as what tasks to perform, how to carry them out, and what the aim of the work should be. Contrary to that, bureaucratic practices in large corporations require project management professionals to follow a set of rules and procedures in making their decisions. A discretionary decision means a decision requiring the exercise of professional judgment, most likely to mature when the decision-maker has accumulated information, knowledge, training, and experience unique to the discipline or area of specialty and other sets of codes and standards (Frick, 2011). This mode of a decision may require deviation from mandated guidelines and organizational procedures according to the granted discretionary authority and it may go beyond or adds to structured guidelines with or without deliberation. It must conform with professional and organizational standards or objective measurements contained in applicable ethical, and organizational regulations. The second mode is structured decisions which mean having processes in place to handle a situation assuming recurrence of similar situations, more of mechanical compliance with rules and procedures or (SOP). Structured decisions are more suited for repetitive and routine issues, decision-makers

typically follow a defined procedure for handling them to be efficient. This approach is best viewed as a decision-focused process that helps people understand a problem and overcome common human errors in judgment that could come from mental shortcuts or an imbalance between emotional responses to the problem and more reasoned or deliberative analyses; also from over-simplification of the problem. Mitigating error risk, through this decision mode, can be addressed through decision structuring tools that help people evaluate the steps taken, identify or understand the available options, and then address the often difficult tradeoffs inherent in choosing among alternative solutions to the problem (Hammond, Keeny and Raiffa, 1998). Therefore, decisions making process in large bureaucratic organizations are becoming complex and wicked for the project manager as it involves conflict between what they desire as professional and what they are required as organizational members. Complexity must be managed; there is a need to fill the control and complexity gap. Could it possibly be a well-trusted, technically competent, and well-trained individual? Can a bureaucratic system delegate enough authority to that individual in making discretionary decisions as the situation requires? The two questions are not adequately addressed by the current literature. No adequate attention is given to the human element of project management, especially to the development of practical wisdom or phronesis (Holt, 2006) and rhetorical practices where project managers can act as leaders whenever the situation dictates. Mechanizing work and having a specialized workforce hinders the presence of an expert and the creation of knowledge and limits it to procedural and organizational knowledge. At the same time, standardization, formal communications, and rigid procedures reduce creativeness and the production of new skills.

Chapter Summary

This chapter dedicated to reviewing relevant literature, several aspects related to the researched problem presented. The chapter started with an introduction highlighting the importance of particular subjects and the literature search strategy. Project management methodology, phases of a project, project organization, leadership and culture, the execution phase challenges, and the links and impacts of each explored. The project decision and the decision-making process are examined according to currently available literature in the field. Factors of influence identified, experience, and bureaucracies were found to be of significance and thus investigated. The next chapter shall illustrate the research method and the basis of choosing a qualitative approach to inquiry.

Chapter 3 – Research Methodology

Introduction

The research was carried out utilizing qualitative method and data coproduced through semi-structured interviews, field notes, and participant-observer observations. The workplace problem is related to the unreasonable execution phase delay in a construction project in the O&G industry in southern Iraq due to delay in decision making. The researcher's role is an insider, a project manager in the same organization with a pre-understanding of the work environment, the oilfield, understanding the challenge of being native, and the native researcher's duality. This contrast required the researcher to handle and manage politics, power, influence, and access issues. It also needed to maintain a separate line between being an employee and a researcher simultaneously and not being selective irrespective of the inquiry (Coghlan and Brannick, 2014). The advantage of being an insider allowed for awareness of biases and inclinations within organizational members when observing the workplace, acting, and reflecting. It allowed for utilizing pre-understanding of the problem instead of reconstructing it. Knowing key stakeholders and their roles, having access to them, experience in the field, and seven years of advanced knowledge about the workplace with observations and field notes added value to this research. As a participant-observe, the researcher was part of the study, having first-hand information, a member of the project management team, which enhanced and broadened positionality and provide exceptional insights (Forsey, 2010). Undertaking a participatory approach, being an observer, an insider researcher to generating practical knowledge from participants; at the same time having the position both in the research and the organization to carry out a reflexive approach, aware of bias, beliefs, and experiences (Creswell, 2013). This chapter is devoted to documenting the research method utilized in this thesis, starts with an introduction, and presents philosophical choice, research design, methodology, data capture method, data validation, ethics, and participants' recruitment process and their privacy protection measures.

Philosophical Choice

In establishing a research plan and strategy, understanding positionality and philosophical issues are crucial and useful (Sikes, 2004; Jackson, 2013). They underpin the overall research design, the type of evidence looked for, the mean through which the evidence is interpreted, and the method for data production and analysis. It also provides an understanding of other alternative research designs and helps in choosing the appropriate method for the specifics of the research problem

(Holden and Lynch, 2004). A paradigm or theoretical framework is the way through which knowledge is studied and interpreted, which sets the intent, motive, and the research expectation during the research planning cycle (Mertens, 2005). Paradigm provides bases to the interpretive framework for knowledge produced. It could be positivist (and postpositivist), constructivist/interpretivist, transformative, emancipatory, critical, pragmatism, and de-constructivist.

Influenced by engineering education and practice, the researcher's views during his early practical life correlate to natural science with numbers, statistics, natural science laws, etc. Throughout years of practicing project management and life experience in general, which included organizations' social settings and human resource management, this view changed when dealing with the human element and social contexts. From personal experience, project management is not only tools and techniques; but it is also a people-oriented practice where interaction, soft skills, motivation, organizational issues, and other social factors play a significant role in this practice (Olander, 2007). The human element is the core of construction project management and project management in general. It thus draws upon social science, which requires an understanding of the human-to-human interactions process in individual and group settings (Shipton, Hughes and Tutt, 2014). Researching the stated workplace problem requires an understanding of the social construct in its natural environment. It also needs an in-depth look at how to research, what to study, and why research. According to Tracy (2013; P:42), the interpretive/constructionist paradigm is mostly concerned with meaning finding and seeking an understanding of social and human situations. The interpretive/constructionist paradigm's primary focus is on the way humans make meanings of their surroundings and in the understandings of the fundamental meanings attached to organizational life when personal work in a group under specific requirements (Hickson, 2016). This theory, contrary to positivism, which is concerned with objective reality, involves members' or second-order theory theories, which is very much dependent on people. It helps uncover multiple subjectivities related to humans and the workplace they operate, taking into consideration human-to-human relations, organizational politic, human-system interaction, and how power is used or misused (Kelemen and Rumens 2008; Hickson, 2016). This paradigm emphasizes the difference between human and physical phenomena; it focuses on studying meanings, interaction, and human-related phenomenology (Mackenzie and Knipe, 2006).

Pragmatist paradigm focus on the research problem as central through multiple approaches to developing understanding (Holden and Lynch, 2004; Mertens, 2005; Mackenzie and Knipe, 2006). According to Tracy (2013, P. 29), the researcher employs various paradigmatic approaches depending on the research's specific goal, which is more common among contemporary scholars. This is in line with Easterby-Smith, Thorpe and Lowe, (1991) views on management researchers adopting a pragmatic approach by combining methods focusing on the problem under research. The research design in this chapter is based on a pragmatist approach focusing on how and what of the research problem (Creswell, 2003) and views drawn from interpretive and human-related Phenomenology philosophies. Ontologically, the researcher's thoughts on human-related behavior and knowledge are relativism. Considering rigid systemic requirements and organizational issues influence the project human element decision-making regarding how and what, the research design draws from the Phenomenology approach to research. The production and analysis of data will also draw upon the constructionist/interpretivist philosophy, coupled with the fundamentals of critical reflection (Fook, 2002 cited in Hickson, 2016). A narrative approach to inquiry through interviews, observation, and field notes (including project record), which, according to Tracy (2013, P.29) fundamental to human experience, shall be the primary source of data production as explained in the research design and data production sections.

Research Design and Strategy

This research aims to create an action plan to make a change and solution to the delay in decision-making. Following AR principles and processes in identifying and limiting the researched problem/topic, gathering information, reviewing relevant/related literature, developing a research plan, conducting research according to the research plan and collecting data, analyzing the data, developing an action plan for the intended change, sharing and communicating the results, and reflecting on the process (Mertler, 2009). The problem was identified and limited to practical and doable scope, contexts, aim, and objectives were developed, research questions were formulated, and the native researcher's position, as explained in chapter 1. A project manager, positioned among a team of project management professionals in real life with a monitoring position to re-plan and re-adjust as the research develops. An organizational member, understating the problem, having pre-assumptions regarding the protentional factors affecting the decision process delay, and access to stakeholders related to the research problem. As outlined by (Coghlan and Brannick, 2014), this positionality is advantageous; the researcher is

immersed in the organization with built-in knowledge of the organization. Reviewing relevant literature and scholarly arguments in chapter 2, along with the established research questions, required a plan to produce the needed data. This thesis is not meant to test an existing theory; this study is inductive, rather than deductive, and theory building, rather than theory testing. There is a need for practical knowledge and quality and factual data to further interpret findings in the academic literature attempting to build a theory. As such, the research strategy is built on the emergence of qualitative data from field notes, observations, and semi-structured interviews to discover and understand the individual and shared sense of meaning regarding the decision-making process and practices. The study is also focused on factors that affect the different interpretations gathered from participants. Still, the emphasis here is on understanding the individual and shared meaning rather than explaining underlying mechanisms or identifying causal effects.

This study adopts an inductive position with the emergence of data through cycles of interviews and field notes, and observations to extract and gather practical and applicable information that could help understand the research subject. The research design was developed to encompass several elements; context, data production, raw data feedback, data analysis, planning and adjustment, implementation, assessment and evaluation, and monitoring. The research design and researcher positionality, which encompassed data production sources and how the researcher positioned the overall research process, are shown in figure 11 and will be discussed further in this chapter. The goal is the participatory cogeneration of practical knowledge through contextually embedded data. To attain this goal, several research questions were established to explore the following further:

- What are the effects of the adopted project management system/methodology on decision-making?
- What is the impact of organizational settings on the decision-making process?
- How experience and experts utilized in the decision process in a large bureaucratic organization?

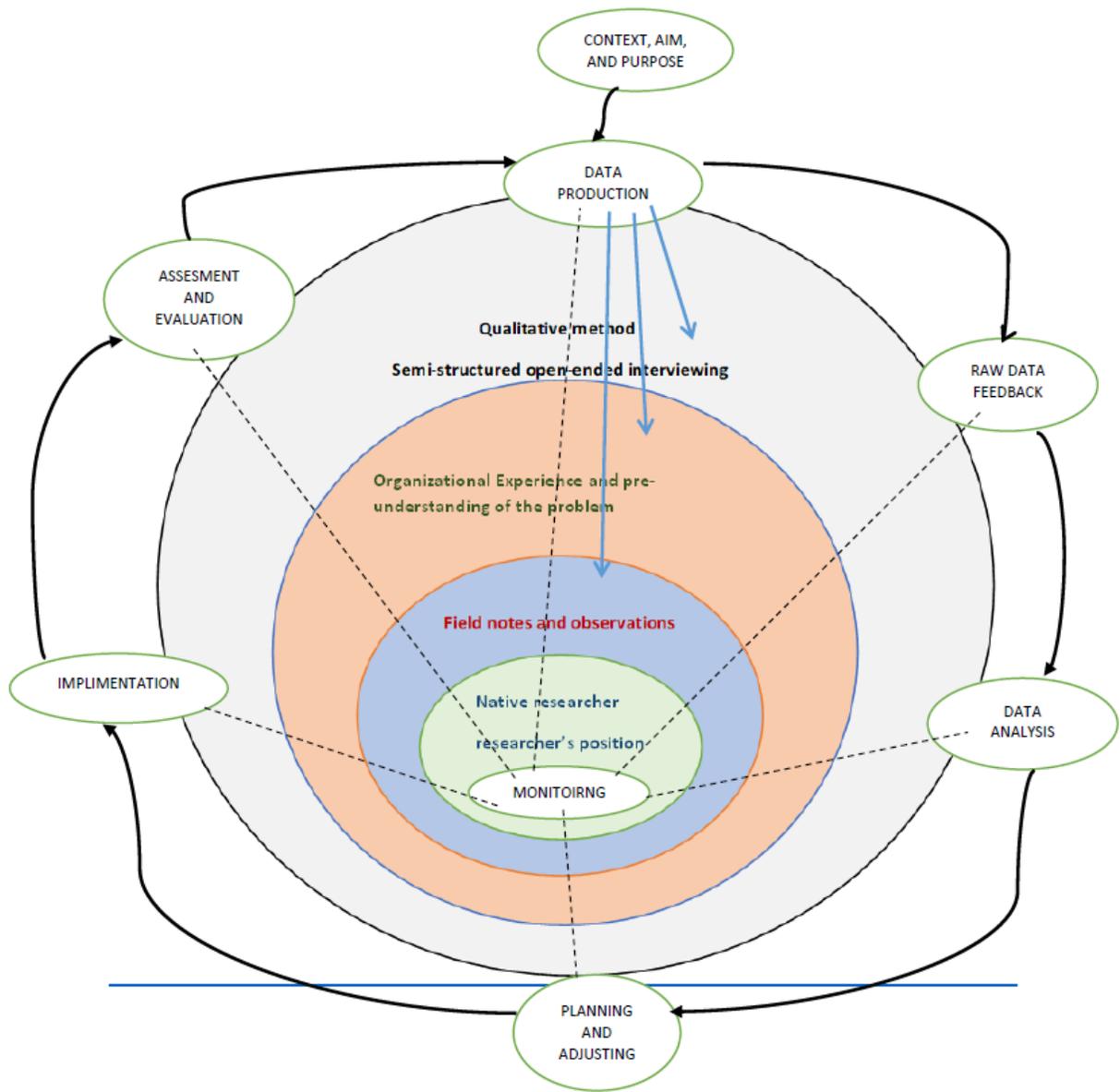


Figure 11-Research design and researcher's positionality

The objectives set forth require comprehensive understanding through collecting a wide range of actionable knowledge, which is a product of engaging in the experiential learning cycle of experiencing and reflection, conceptualizing, and problematizing in the problem's natural environment (Coghlan, 2001).

Based on the epistemological and ontological stance, the chosen method is qualitative, and data collected through three sources. Semi-structured interviews with 11 project management

professionals utilizing an interview guide (see appendix C). Fieldnotes as part of available project records and the researcher's diary, such as events where decision delay affected project execution, contractors' complaints, field staff issues with decision making, and events of significance, were part of the researcher's depository and project record, prior and during the research undertaking. Observations of the organization and the construction project execution phase were noted earlier and during the research process, both documented, in addition to access to project documents and records. The researcher's observation included a wide range, meetings debate, decision deliberation, reaction to field unexpected changes, communication flow, review of correspondences scripts, contractors, and field staff reaction to work delay and stoppage related to decision delay and more. A supporting group/expert panel added an active engagement in reviewing raw data to produce feedback and data filtering. The research design relies on reflecting on action, filtering data, creating more questions, obtaining more responses and feedback, and cyclically validating data to each step with a continuous monitoring process granted by the researcher's positionality.

Planning and adjusting took place in each of the steps mentioned earlier, relying on organizational experience and pre-understanding of the problem. A sequence of steps preceded the intended action for conducting the interviews and what could follow with each interview. Implantation - taking action as the first iteration with the first interview. The result of the first interview was discussed with the supporting group after reflecting on the outcome, and feedback emerged from the supporting group discussion and the reflection process. A follow-up question and explanations to be addressed, and an adjustment to be made for the next interview without altering the interview guide (see appendix C). Action research, as defined by Coghlan (2001), is a research approach that aims to create a theory about the action that comes through a cycle of thoughtful planning, taking action, assessing and evaluating the response, and adjusting to the plan, and further action. As shown in figure 11, this research planned to go through several cycles to understand that it will be iterative, interactive, and open to challenges. The monitoring process is expected to be a rolling wave-like process, cyclical and iterative, that shapes up and evolves with time. The research plan and design considered some risk factors such as access, ethical issues, participants' schedules, where most of them work on rotation bases (6 weeks in and two weeks out) for international staff. In contrast, local-national staff availability was subject to their commitments.

Methodology

The researched workplace problem and its research question are more related to how and what to learn from project management professionals, which involves unmeasurable ambiguous qualities that relate to human factors such as thinking, perceptions, opinions, and feeling. The research interest and professional focus are to understand how the decision-making process under standardized bureaucratic measures affects decision-making speed and accuracy to react to execution phase dynamics and changes. The literature is scarce about project management human elements in general, the execution phase nature, and the execution phase decision-making processes and theories. Following the concept of Van Maanen (1988) that people are meaning finders as they can give sense and make sense of events around them (Miles, Huberman and Saldana, 2014), and knowing that there are different means and approaches to researching a workplace problem subjectively or objectively. The research plan aimed to produce data made of opinions, perceptions, ideas, and feelings that cannot be quantified. It could come from conversational means such as interviews, storytelling, observation, notes, and other narrative means linked to themes, perspective, and textual analysis. This research planned to construct an authentic view by allowing participants to share their stories and experience individually or at an organizational level through observation, conversation, storytelling, and evidence (Thorpe and Holt, 2008; Tracy, 2013). A research problem is suited to either a quantitative or qualitative methodology according to the type of data to be produced and the researcher's philosophical background and preferences (Saunders, Lewis and Thornhill, 2019). Deciding on following a qualitative or quantitative approach was dependent on the study's nature and purpose, availability of required information, and the type and quality level of the intended data.

This thesis is part of management research where there is no standardized research process since the nature of the management problem is social in nature, and the inquiry is problem-focused (Anderson and Gold, 2015). This requirement indicates that a scholar-practitioner approach to actionable knowledge creation must come through a social understanding of usable knowledge with a higher level of rigor as the research method is the different means and schemes used by the researcher to extract the new information (Rajasekar et al., 2013). Qualitative research provides a greater worldview and broader theoretical lens through which the researcher can better view the subject target for research (Creswell, 2013).

The research method is qualitative research with a semi-structured interview as a primary tool for gathering rich data. The native researcher positionality, being an organizational member and a project manager living within the IOC's daily routines, where the research was conducted. In this participation role, the researcher spent over nine months conducting interviews, focusing groups, following up, taking notes, observing the workplace, participating and observing meetings, decision deliberation, reviewing communication text, project documents, and procedures and field scripts notes. The approach provided a richness of data capture to help uncover actionable findings and refine these emerging research insights into actionable knowledge. The main reasons for selecting qualitative research for this thesis are:

- The researcher is a project manager within the organization, a native to the workplace problem, can easily interact with participants, observe and document activities, events, and observations, with a theoretical lens for the subject workplace problem.
- The research is designed to be inductive, emergent, and interpretive, allowing for an outpouring of data where qualitative research offers multiple views of the problem as an interpretive means of inquiry.
- Qualitative research is an inductive process where data originate from bottom-up and over cycles and iterations until themes and patterns, and further insight leads to sorting key factors controlling and affecting the decision-making process.
- The qualitative method helps produce abundant and quality data, which is needed for this research as designed.

The qualitative method enables the researcher to produce and deal with the wealth of data representing perceptions, ideas, and words rather than statistics and numbers (Creswell, 2013). It does help in responding to and exploring the nature and type of human motives and provides understanding to research questions through others' perceptions, opinions, and behaviors. Therefore, the qualitative method is expected to produce descriptive data on how project management professionals perceive their surrounding environments and events in their own views (Shipton, Hughes and Tutt, 2014). The main objective in mind is whether the meaning found from participants through qualitative data is accurate and trustworthy. Since this research aims to explore and investigate certain social reality features related to project execution decision-making through behavior, perception, and opinions of research participants on decisions made

during the execution phase of a construction project, a qualitative data capture method was selected to achieve this aim. Given the organizational setting, and to obtain the kind of needed data, selecting the research method opted to rely on narration, participant-observer field notes, and observations as an optimal way for data production. The next section shall address the data capture method,

Methods of data capture

As an AR research, this study relies on one type of data production: qualitative through semi-structured interviews, participant-observer field notes, and personal observations. Organizational knowledge and prior experience in the field were used as complementary tools to help in the generation, validation, and analysis of qualitative data. The primary data capture method is semi-structured interviews as an approach to inquiry and as a framework of understanding a sample of project management professionals in its natural environment and organizational culture of a project-based organization. This approach includes the native participant-observer element of being part of the research and environment since the researcher is part of the organization with prior knowledge and part of the team. Well-managed in-depth semi-structured interviews using an interview guide (see appendix C) instead of a rigid interview format. Instead of challenging participants' ideas with sets of questions, themes and topics were allowed to emerge throughout an open discussion with participants. Following the principles of active interviewing and the co-creation of meaning, making participants as questionnaire answerers only to be avoided. Instead, they were allowed to elaborate, share their stories, and discuss their issues openly through open-ended conversations with evolving stories by asking questions that generate more questions. Semi-structured interviews allow progressing from a primary question to probing responses to understand the respondent's remarks. Cooper and Schindler (2002) recommend three main elements to be followed in making the qualitative method more effective. In-depth semi-structured interviews which follow open-ended questions and follow-up questions, interaction with participants and observation of their organization, and a framework for documenting and extracting new concepts as they emerge from the research process. Scholars have complimentary views on the semi-structured interview as one of the best approaches to capture rich and comprehensive qualitative empirical data (Sandelowski and Barroso, 2003). One of its main advantages is allowing the researcher to observe facial expression, body language, and additional details to emerge from the researcher-participant interaction. It

allows for entering unexpected areas as the conversation evolves, enables the researcher to identify the purpose of the interview, the ability to modify and add to questions, and produce bulky but more precious data. From organizational knowledge and experience in conducting interviews, the data production plan and techniques were thought of cautiously and assessed carefully. Semi-structured interviews were chosen as a data capture method to build upon prior knowledge and to find the in-depth facts from project managers and project engineers in their views as mutual motivation to gather rich and comprehensive data.

As a research aim, when designing research and when choosing a research method, it is the quality of data, richness, and what's called data saturation. Data saturation could be reached when there is no additional information emerge from new participants, which means all the necessary themes and patterns have been gathered through enough information from what has been done (Fusch and Ness, 2015). It also means there is none or little difference in the information to be collected from additional participants. Initially, there were 15 candidates for interviews, but data saturation was attained at the 9th interview, and two more interviews did not yield any subnational difference. The full description of interviews is explained in chapter 4. The qualitative research methodology was utilized, engaging 11 project management professionals from the same IOC in a giant oilfield in southern Iraq. Participants were recruited based on their experience in executing projects and length of service in the industry through a recruitment process with inclusion and exclusion criteria, see Appendix B. The research interviews conducted following an interview guide as shown in Appendix C with a focus on specific areas to uncover the factor influencing the delay in the execution phase decision making; these six main topics/areas were:

Section I – Participant's Profile. Voluntary information about participants' experience, age, work in another industry, experience with the oil and gas sector, educational background, etc. General participants' biography is vital for studying decision-making from different backgrounds.

Section II – SGPMs critique. All discussion here is about the currently adopted project management methodology/system and its pros and cons concerning decision making.

Section III – Organizational structure and organizational culture. Discussions in this section were related to the effect of organizational structure and corporate culture on

leadership, decisions, and how project managers are affected by these factors, and how they react to it.

Section IV – Project-related issues. It is all about individual perspectives on the project's main constraints and ways and means to achieve the project's objectives, the difference in project nature and size, and its relation to decision-making.

Section V –Decision-making formalities/procedures and bureaucratic practices. How decisions are made in compliance with organizational norms/procedures and their effect on professional desire and vice versa. And the role of experience under such formalities, how SMEs utilize and apply their expertise, and how they cope with rigid and procedural requirements.

Section VII – General discussion. A casual conversation about the oilfield, organization, project, and general discussion for the participant to share any story, general thoughts, and open dialogue.

In addition to interviewing and interactions with participants, as an employee of the organization, observations and participation in daily project execution activities and field notes/project records served as means for gathering additional data to validate data produced from interviews. Semi-structured interviews and open conversations were the primary sources of data. Additional data was collected and provided from the researcher's direct observations, field notes, accessible projects' records, casual conversation, and storytelling style with other organizational members. Issues that were subject to observation included a wide range, meetings debate, decision deliberation, reaction to field unexpected changes, communication flow, contractors and field staff reaction to work delay and stoppage related to decision delay and more. Field notes were documented as part of the researcher's diary prior, and during the research process, notes pertained to decision delay effected project execution, contractors' complaints, field staff issues with decision making were part of the researcher's depository before and during the research project. The data production process was iterative. The researcher moved from one stage of the research process to another with a supporting group/expert panel discussion and raw data filtering, feedback, reflection, follow-up questions, and addressing additional questions and inquiries. The full data production details are explained in chapter 4. The multiple views and

sources of data production helped in data validation with full compliance with ethical standards, as the next section illustrates.

Data Validity and Ethics

The perspectives of quantitative research are rigor, and trustworthiness as it places emphasis on exploring individual experiences, describing phenomena, and developing theory (Vishnevsky and Beanlands, 2004 cited in Cope, 2014). The meaning of qualitative evidence is assessed through the research's validity and trustworthiness (Van Maanen, 1988). Trustworthiness is one-way researchers can convince themselves and readers that their research findings are worthy of consideration (Lincoln & Guba, 1985). Lincoln and Guba (1985) refined the concept of trustworthiness by introducing the criteria of credibility, transferability, dependability, and confirmability to parallel the conventional quantitative assessment criteria of validity and dependability. While others have presented wide and flexible measures to fulfill trustworthiness in qualitative research according to their epistemological and ontological stances (Tracy, 2010), the researcher has chosen to use the original, widely accepted, and easily recognized criteria introduced by Lincoln and Guba to demonstrate trustworthiness in this research. As the data in this research was produced from field notes, interview scripts, observations, and project records, collecting repeated examples and applying a theoretical lens can help the researcher find meanings embedded in the data. The produced data was validated following the four criteria presented by Lincoln and Guba (1981) and Lincoln and Guba (1985): credibility, dependability, confirmability, and transferability (Guba and Lincoln, 1981 cited in Guba and Lincoln, 1982, p.376), in addition to authenticity which was added by Guba and Lincoln in (1994) (Cope, 2014). Actions such as prolonged engagement, persistent observation, peer discussion (through supporting group), and data triangulation were taken to overcome distortions to gain a high degree of acquaintance and to come to value critical characteristics and eliminate irrelevant ones. Triangulation whereby three sources of data, different perspectives, and different means are placed against one another to cross-check data and interpretation (Guba and Lincoln, 1982). Reflection and referential adequacy materials such as project records, documents, audio recordings, and other raw materials were utilized to test interpretations made. Member checks whereby data and interpretations are continually checked with participants from which data were produced; done continuously throughout the study and again at the end when the findings

assembled. This process covered all stages of the research process in addition to ethics compliance measures to maintain an authentic and valid research process.

Following the research proposal approval and ethics board approval of the research, the researcher started a recruitment process with inclusion and exclusion criteria for a target of 15 participants. The details of the recruitment process are explained in the participant and recruitment process section in this chapter. Privacy assurance documents were reviewed and signed jointly before conducting interviews; see Appendix B. Eleven semi-structured interviews were conducted in English as all participants were fluent in English, although limited explanations were done in Arabic to local-national participants. For privacy reasons, the name of participants, the organization, and the oilfield description removed from the data to avoid revealing the organizations and participants' identities. During the interviewing process, the conversation/data were audio-recorded via a digital device and later transcribed into text with full protection under interviewees' full consent, except one who preferred not to be recorded. In this case, this individual interview took a longer time than others to allow for writing participant's responses. All digital formats were stored on a passworded computer and hard copies and writings in a locked desk drawer for privacy protection. Since there were actions and interaction, understanding ethics is imperative to the researcher's role and the research outcome. A comprehensive understanding of ethics dynamics was maintained during the study's course and cycles to maintain rigor and authenticity. For research data validity and ethical compliance, the researcher was continually asking: "what is reality? What's knowledge? What's a theory"? (Cunliffe, 2004), to avoid potential bias and inclinations through reflection on own thought and action. It was achieved through reflective practice employing reflection and reflexivity on questioning and understanding of reality as a thinking base in testing initial assumptions and discourses (Cunliffe, 2004). Continuing sense-making, sense-giving, discussion, collaboration, stories, and further literature reviews informed the research process during all phases of this research. Assumptions regarding the prior understanding of the delay in decision-making and pre-assumptions managed through neutrally gathered data with a researcher-minded objective in learning more and raising more questions to the participant and even the researcher's own thinking produce valid data (Coghlan and Brannick, 2014). The full interviewing process and its details are described in depth in chapter 4.

Qualitative data production could be subject to biases from both sides, the participants and the researcher, and that could make qualitative evidence difficult (Basit, 2003). It could be the researcher who may perceive the notion about the evidence discovered during the investigation, unconscious mistakes in the conversation with the participant that could yield an expected answer. Participants could have biases about the researcher and his researched problem, or they could have particular views about their organization. Thus, and as stated above, qualitative data capture could well extend beyond conversation, interviews, and texts or observations. Participants were a good source for validation, acting as verifiers and evaluators for most of the study's findings through what has been labeled "*member checking*" (Miles, Huberman and Saldana, 2014). During initial data analysis cycles, preliminary results were presented individually to seven participants for cross verification; they provided comments and concurrence as the researcher went into another data analysis cycle. The participants' feedback was mostly in commenting on a summary of findings, evaluating the conclusion's accuracy, and verifying researcher interpretations.

Feedback and validation took place during data collection, too. When a finding begins to take shape, the researcher tried to check it out with new participants and the expert panel. The delicate issue here, of course, is that of introducing bias. Feeding things back during this study may slightly change some participants' perspectives. The reasons for seeking feedback during and after data analysis was for one thing, as recommended by (Miles, Huberman and Saldana, 2014), "you know more, you also know better what you do know—you are less tentative." The research data underwent a triangulation process cycle, as shown in figure 12, to have valid and trusted data. The triangulation was between participants' input, discussion with the supporting group, and notes and observation, with a reflexive practice that resulted in new questions raised and addressed by participants. First, gathering raw data from semi-structured interviews, after recording each interview, a written transcript made, then a reflection process on the outcome of each interview transcript. This reflection process produced additional thoughts and generated more questions about the raw data. A supporting group/expert panel was consulted, and the raw data and the issues raised from the first step were discussed, keeping the full privacy of participants. Another reflection process was carried out on the feedback and comments from the supporting group. New ideas and questions come out from this step to be checked. Field notes and participant-observer observations, in addition to reflection, were used to cross-check both

row data and supporting group comments, which generated additional views, ideas, and follow-up questions. Continuing literature review illuminated the researcher’s mind on the researched topic and allowed for mapping out relevant questions and possible subsequent questions. Questions and clarification were sent to participants via emails, phone calls, and skype meetings as a follow-up process; in some cases, they were addressed face-to-face when availability allowed. This process was cyclical and iterative through multiple cycles until valid data emerge, as shown in figure 12, it is the emergent and cyclical nature of the qualitative approach.

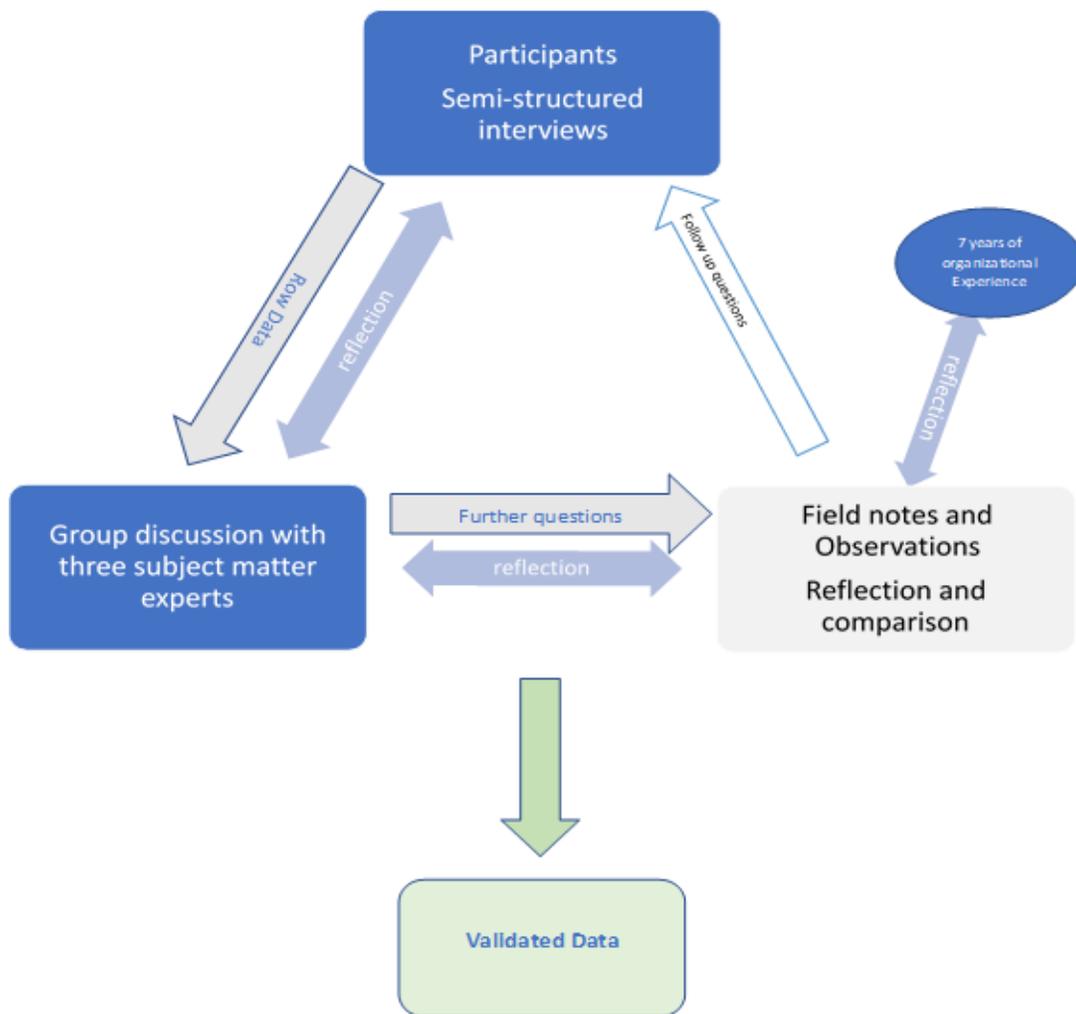


Figure 12 - Data validation plan and research cycle

Data validation was a rolling wave-like process, cyclical, iterative, and cautiously thought of steps to maintain ethical standards and rigor that shaped up and evolved with time. It is a re-education process through participants' interaction with the researcher; in diagnosing, fact-finding, and voluntary engagement that contributed to basic knowledge, and that is what's needed for the problem at hand. Participants were an excellent help for conducting this research through their active interaction and genuine desire to have a common outcome; the next section shall shed light on participants and their recruitment process.

Participants and the recruitment process

This research focuses on developing actionable knowledge related to the human side of decision-making in project management and its application to investigate the impact of five potential areas according to the research design. These areas are social and organizational and related to the project management system, organizational factors, bureaucratic decision-making practices, project nature and type, and experience and its applications. Thus, studying these areas requires a qualitative exploration of many human-related factors and the production of massive and bulky data to be later analyzed (Anderson and Gold, 2015). The research design relied on three sources for data capture, semi-structured interviews, field notes, and native researcher's observations, in addition to a supporting group made of three subject matter experts used for data validation and the generation of further follow-up questions. The organization where the research was conducted is one of the largest IOCs globally (name not disclosed for privacy reasons), working with an Iraqi national oil company on the development of a giant oilfield in southern Iraq. The IOC divides the field into three geographical locations where hydrocarbon processing facilities are located, A, B, and C. The project management team in the IOC is divided into two groups. One group is working on large development projects and more than \$20 million in value (major Projects). In comparison, the other group was tasked with low complexity projects and any project less than \$20 Million in value (minor projects).

The recruitment process for potential interviewees went through inclusion and exclusion criteria to find at least 15 candidates from project management professionals involved in the execution phase of construction projects. The reason behind targeting project managers and project engineers engaged in the execution process was to produce information from the individual who would have the best overall view of the project decision-making process. The research design is

inductive, and the sample size was chosen to help develop the needed data for inductive research (Saunders, Lewis and Thornhill, 2019). The sample size was initially selected for multiple reasons; to represent each of the three locations under study, representation for the two-different project departments, and practicality considering the research duration. The research population was recruited from three locations in the giant oilfield; it is divided by hydrocarbon stations, A, B, and C, to have broad representation. An email note was sent to candidates inviting them for voluntary participation explaining the research aim with the assurance that it will be a unanimous process. Some of the explanation was conducted face-to-face as the researcher is part of the project team. A brief questionnaire was included in the email notes explaining the eligibility for participating in the research. The questionnaire included length of service, years of experience in the O&G industry, decision-making capacity, and being part of the execution phase project's team, see appendix B. Among 21 invitees, four did not reply, 17 expressed interest, but only 13 met the selection criteria. Two more potential candidates were contacted and added to the participant to complete the targeted number of 15 for this study. All invitees were thanked for their desire to participate in the research and assured of their anonymity, including their organizations and projects' identity. Inclusion criteria (15 -25) years of experience, involved in the project execution phase, and part of the decision-making circle. The exclusion criteria were less than 15 years or more than 25 years of O&G industry experience and non-involvement in the execution phase. The reason behind this experience bracket is two folds; the minimum of 15 years of experience was chosen for maturity level reason as project manager maturity (from researcher perspective) starts around 15 years and the number and type of project they work on. The maximum of 25 years was selected for another reason as most individuals with more than 25 years of experience become less interested in change as the IOC grants voluntary retirement after 30 years of service. Interviewees were coming from two project groups and represent the geographical coverage of the entire oilfield. All participants have experienced how projects and project-based organizations are functioning in the IOC and very familiar with the SGPMS. All participants are part of decision-making groups and committees or decision approval seekers. Participants' details and demography are shown in chapter 4 and Appendix A. The research engaged project managers and project engineers holding different positions in a single organization in the upstream/production oil and gas sector in Southern Iraq.

Chapter Summary

This chapter explained the chosen method and its justification based on the stated philosophical assumptions and explanations. It also addressed the data capture method, ethics, validation, and participant and their recruitment process. In short, this chapter is all about; the researcher's philosophical stance, the justification of the chosen method, and the kind of qualitative research design followed by the researchers—participants' selection and recruitment process, their inclusion and exclusion criteria. The next chapter shall show how the research plan was carried out in the field, the details of the data production process, the exhaustive process of data analysis, and the findings that resulted from this process.

Chapter 4 – Findings

Introduction

As the problem statement described in chapter 1, which is the lengthy process in decision making and the unreasonable delay in project execution and its consequences, this thesis, through the stated research questions, explores an understanding of the potential impact of specific factors on the decision-making process. The potential areas could be related to the adopted system, organizational context, project context, bureaucratic measures used, and experience and competence. The organization where the research was conducted is a multinational O&G corporation with a global presence in more than 100 countries (name not disclosed for privacy reason), currently working on the development and operation of a giant oilfield in Southern Iraq. In this chapter, the process of data capture, the thematic analysis process, and the results of a qualitative thematic analysis of the study are presented. A native researcher captured the empirical data through semi-structured, qualitative interviewing of project management professionals, field notes, and observations. From this study emerged empirical data that explained factors relating to the execution phase decision-making process. Also present were the factors relating to the impact of current bureaucratic practices imposed by the IOC and the adopted project management system and its SOPs. This chapter focuses on the discovery of key themes and sub-themes that emerged during the study. These main themes captured the elements that contributed to the overall delay in the decision-making process, and if enhanced, they could significantly improve the decision speed and quality. The aim is the development of actionable knowledge from the understanding and translating it into acting on key factors and key processes to create enhancement to the decision-making process. Themes and subthemes were initially interrelated, but further analysis resulted in three main themes and three subthemes. The main themes in the study were; 1) the project management system, which induced other subthemes related to project organizational structure and project type and size, 2) bureaucratic measure adopted by the IOC, which impacts the means of communication as a subtheme, and 3) experience and how it's affected by the adopted SOPs and its role in the decision practice. The chapter structure is an introduction, participants' demographics, description of data and data capturing process, thematic analysis of data, finding themes/categories, and sub-themes.

Participants' Demographics

The IOC employs professionals and a workforce from different countries with different cultures and backgrounds. Western employees called (Western Expat), Iraqi employees in the field called (Local Nationals employees or LNE) while the rest were called (Third Country Nationals or TCN). This classification was not the subject of this research; rather, the company's employee classification as they get compensated and treated according to their class. The demographics of the interview population reveal a typical workforce of an international company with three Western Expat, three TCN, and five LNE, which is an excellent spread of interviewee backgrounds with some interesting findings as noted below. The engineering and procurement organization, engineering contractors, construction contractors, and vendors are not included in this study as it pertains to the formalized decision-making within the IOC. Table 1 shows the demographical details of the research participants. Figures 4.1 and figure 4.2 in Appendix A show the participants' ethnic background and educational backgrounds. In contrast, figure 4.3 in appendix A shows their positions in the organization, figures 4.4 and 4.5 in Appendix A show experience (overall experience, oil and gas experience, and decision-making experience) and age.

All participants have experienced how projects and project-based organizations are functioning in the organization and very familiar with the SGPMS. Most of the participants were in the middle to senior-level positions in their respective disciplines with an average total experience of 21.72 years and average expertise in oil and gas for 16.82 years; average execution decision-making experience was around 13.27 years. Participant's ages ranged from 37 to 58, with an average of 46.27 years of age—five participants belonged to the minor projects department, while six were from major project departments. Data boundary was determined to see the application and variation from procedures to the difference in a project in value or size. Gender issues are not part of this research; although there was only one female among the research population, the nature of the construction in the O&G industry, especially in the Middle East, heavily employs male professionals. Educational background was, minimum of BS in engineering with one with MS in petroleum engineering, one with MS in chemical engineering, one with MS in mechanical engineering, one with MS in international business, and one Ph.D. in Industrial engineering. The interviewees were composed of three senior project managers, two project managers, three senior project engineers, and three project engineers. Participants' demographics details are shown in table 1 and Appendix A.

Participant	Age	Total years of experience	experience in the oil and gas	ethnic background	Educational background	Type, sizes, and cost of projects you worked on?	past decision-making experience (years)
1	57	24	10	Iraqi	BSC in civil engineering	Large size, \$20 M plus	16
2	50	28	19	Western Expat	BS in petroleum engineering,	variable minor projects, \$1M to \$20M	15
3	54	31	25	expat- Caucasian	BSC Mechanical Engineering - MS in international business administration -	variable minor projects, \$1M to \$20M	20
4	48	20	20	Iraqi	BSC Mechanical Engineering	Large size, \$20 M plus	20
5	51	20	10	Expat-Middle Eastern	PhD in Industrial engineering	Large Size, Major project	7
6	42	18	18	Canadian - Expat	MS in civil Engineering,	variable from \$1M to \$50M	10
7	52	33	18	South Asian	Master's in mechanical Eng.	Opex projects, \$50K to \$20M	18
8	37	15	15	Iraqi	MS in Chemical Engineering,	I have worked on major and minor projects, currently on \$20M - \$50M	8
9	39	16	16	Western Expat	BS in Chemical Engineering,	Maintenance projects/Opex	10
10	41	19	19	Iraqi	BS in Mechanical engineering	Opex, small size projects	12
11	38	15	15	Iraqi	BSC in electrical engineering	Major projects	10

Table 1 - Participants' Demographics and Background

Research Data and Description of Data Production Process

Upon ethics board approval, the researcher started research implementation in organizing and compiling field notes/project records, observations, and through conducting eleven semi-structured interviews. As a native researcher, being part of the organization and positioned in a reflexive position as a researcher and organizational member, the initial observation and field notes/project records were collected and compiled before and during the inception phase of the research process. The field notes/project records represent events, incidents, and issues of significance as facts. Field notes were documented as part of the researcher's diary and available project record prior, and during the research process, notes pertained to incidents where decision delay affected project execution, contractors' complaints, field staff issues with decision making were part of the researcher's depository prior, and during the research project and issues of significance. In addition to field notes, expert opinions, publications, and public information from the government of Iraq and National oil companies were added to validate field notes and project records. Observing social constructs such as meetings, decision deliberations, complaints, feelings, reactions to execution phase changes, and dynamics were the researcher's own lens. Issues such as; project organizational settings meetings debates, decision deliberation, response to unexpected field changes, communication and correspondences flow, contractors and field staff reaction to work delay and stoppage related to decision delay, and more were part of the researcher's observations. To have a third source of data, semi-structured interviews were used to have the voice of individuals affected by the research problem. The three sources of data were utilized to help the researcher in identifying themes and in establishing relationships that tie a complex situation that causes individuals or group to act in a certain way and in the understanding of the cultural and societal mechanism that make up the researched organization, a chain of logic (Creswell, 2013). The details of the participants' recruitment and interviewing process were presented in chapter 3. Data produced and organized to cover the five areas (see Appendix C) related to project execution and several subsequent questions and follow-up clarifications and questions. A general open discussion was also part of the data production techniques where participants could express what they have in mind with back and forth questions and answer through an open-ended conversation. The main reason for interviews was to produce and extract first-hand information from participants on how they make decisions, how they feel when making decisions, what they prefer during the execution phase in terms of authority and technicality.

Also, to know what kind of challenges they face when having variations, changes, and non-routine requirements during the construction phase of the project that needs quick action and quick decision-making process.

All interviews were conducted outside of the work area, mostly at the cafeteria/coffee shop, and a few at the participant's camp cabins, as presented in chapter 3. It was intended to provide the interviewees with comfort to activate the exchange of information with full compliance with ethical measures, as explained in chapter 3. On average, each interview extended to over an hour and fifteen minutes, while in one case extended for almost two hours. Clarification and follow-up questions for new or subsequent questions for data validation were conducted via phone calls, skype calls, and email notes. The first part of the interview was to open the conversation to chat about some primary demographical data such as an area of specialization, age bracket, number of years of experience, education, etc. This information was collected voluntarily with confidentiality. The unbiased aim of collecting this information is to help understand the characteristics of the participants, which could have some connection and impact on the studied topic and the quality and trustworthiness of the data produced (Saunders, Lewis and Thornhill, 2019). It is not suggested here that there is a direct relationship between a participant's demographics and the interview results. Much rather, the intention here is to disclose that a wide range of subject matter experts was available to the researcher, which represents an excellent opportunity for tapping into a wealth of their wisdom, knowledge, and experience. The views obtained and information produced from these individuals provided the needed information and data strength and richness of this research, adding credibility to the generated data and the entire research process.

The data production began with basic questions and biographical data collection that evolved into an open-ended conversation about five main areas mentioned above. After that, the interview progressed to exploring the interviewee's experience related to the five study areas. The conversation moved smoothly from biographical information into a discussion about the SGPMs, organizational matters, project-related context, procedures and bureaucracies, experience, application in the IOC, and decision-making practices. Finally, there was an open discussion about general issues related to the upper management, the O&G industry, and whatever participants wanted to share and discuss. Interviewees explained the general concept of what they desire to do and what the company requires them to do. In short, the interview instrument used as the

guideline for the actual interview format, and this same basic start format was used during each interview. Utilizing an interview guide, a list of basic open-ended questions asked during an in-depth conversation; these questions were designed to extract information about each of the five areas. For example, how do you see the SGPMs concerning the execution phase decision? As a project manager, when and at what phase of the project do you like to be involved? What're your preferred means of communication, and what can you recommend for speedy communication during project executions? What kind of means do you prefer to use in reacting to urgent demands and changes during the execution phase? How do you value using an SOP in construction decisions, and is that what you prefer, or you prefer something else? And so on. Questions served as a discussion starter on the topic, depending on the participant's response and engagement. Once the researcher listened to the response, another question was raised based on the first answer, and another subsequent question until enough coverage was attained. This process followed in each of the five areas in every interview. Basic questions were the same and asked to each participant, in the same manner, to see each participant's view about the same issue separately.

Upon completing interviews, data transcribed into text and organized in tables format. Each of the main study subjects was placed across to participants from each of the interviews in a master table. A native researcher's observations, field notes, and comments were added in particular columns across from each study area, and notes and remarks were placed at the bottom of each section/subject. After reflecting on the collected data from an interview, a group of three experts (highlighted in chapter 1) utilized as a supporting group consulted in discussing raw data, keeping full privacy of participants. This process took place after the first interview as it was a pilot interview and followed with every three interviews until all interviews were completed. After discussing interviews and how they went with the expert panels, new issues were raised as suggestions for follow-up and further clarification in a quest for more information on specific areas. A follow-up on additional information and clarification was done with each interviewee using participant's contacts in the form of either further questions or amendments to answers only when considered incomplete. Participants addressed the follow-up questions through emails, phone calls, and skype calls/meetings. This process was also used during data validation after discussing raw data with an expert panel/supporting group in addition to the researcher's reflection, observation, and field notes. Raw data were validated through a triangulation process

described in chapter 3 and analyzed through several cycles, reviews to a written transcript, and listening to the audio recording. Field notes and participant-observer observations, in addition to reflection, were used as a filter to both raw data and supporting group comments in generating additional views, ideas, and follow-up questions. Data analysis took place through several cycles and steps during and after data production completion, as presented in the next section.

Analysis Approach to Research Findings

This section will illustrate how the produced data was thematically analyzed, beginning with data sorting, organizing, notes, and comments. The thematic analysis identifies themes and patterns within qualitative data through different means and approaches (Maguire and Delahunt, 2017). This kind of analysis aims to find themes and patterns of interest concerning the research questions. It is not only summarizing the data into smaller groups but rather making more meaning and interpretation of the data that reflect or could be classified within one main category later refined into distinct themes and subthemes. Themes could be semantic, which means either explicit through meanings of the data or latent, which looks beyond the direct description of data meaning and more into an interpretation of meanings (Braun & Clarke, 2006 cited in Maguire and Delahunt, 2017, p.3352). The thematic analysis in this thesis was data-driven and inductive with an aim at identifying, analyzing, and reporting themes within the captured data. The process consisted of a reflexive process in finding meanings representing participants' input during research interviews. The data analysis process went through a break-down of the raw data collected, analyzing, validating each part of it in several cycles as action research. For this qualitative research findings to be of value, data presented in a form that is suitable and familiar with human modes of knowing, acting, valuing, and doing of the reader, participant, and the researcher (Sandelowski and Barroso, 2003). Narrative analysis techniques in which larger narrative, descriptive, and rhetorical storylines were applied with constant comparison analysis techniques to transform data into broader theoretical categories. Another useful technique used in this research is visual display through tabulating and color-coding in facilitated viewing patterns in data; data represented in tables, color codes, and excel sheets displays that show similarities and differences among research findings. MS Excel was used due to mastery and familiarity, NViVO was considered, but Excel was much helpful in its multiple features and research's familiarity.

The analysis process took five steps, as the captured data was bulky and ambiguous, which is typical qualitative research data (Fusch, and Ness, 2015); it was mostly audio recording and text that represent participants' perspectives, field notes, and observations. The first step was made through several reviews and reading of transcript texts and multiple times listening to audio recording to become familiar with the available data. The second step was generating initial coding by assigning color codes to words and phrases that mean or reflect similar meanings. Words, statements, expressions, notes, and comments that said or echoed something in common were given a defined color. Color coding helped in organizing the bulk of data into a group of data items. An open-ended approach to the coding process was used; transcripts of raw data were examined and utilized preliminary as concepts to sort and orientate the clustering of a key concept. As shown in figure 13, words, phrases, and statements concerning the project management system/methodology given a blue color; organizational related provided brown color; anything related to bureaucracy and bureaucratic procedures is given a green experience-related context given red color. Initial color-coding processes resulted in four data items as mentioned above; these four data segments were then sorted in tabulated format and helped in establishing emerging patterns. It was a context-specific process to separate and cluster data into groups according to specific categories they relate to. The third step was searching for and establishing initial themes from the four separate data items. As defined earlier, a theme is a pattern that captures something significant or entertaining in the data with some meanings related to the research question. Themes are characterized by significance and repetition in the data; this process allowed for gathering the colored descriptors into table format and started to generate initial areas that were considered as potential themes. These areas were: project management system related, project organizational related, project nature related, bureaucracy and communication related, and individual experience and professionalism.

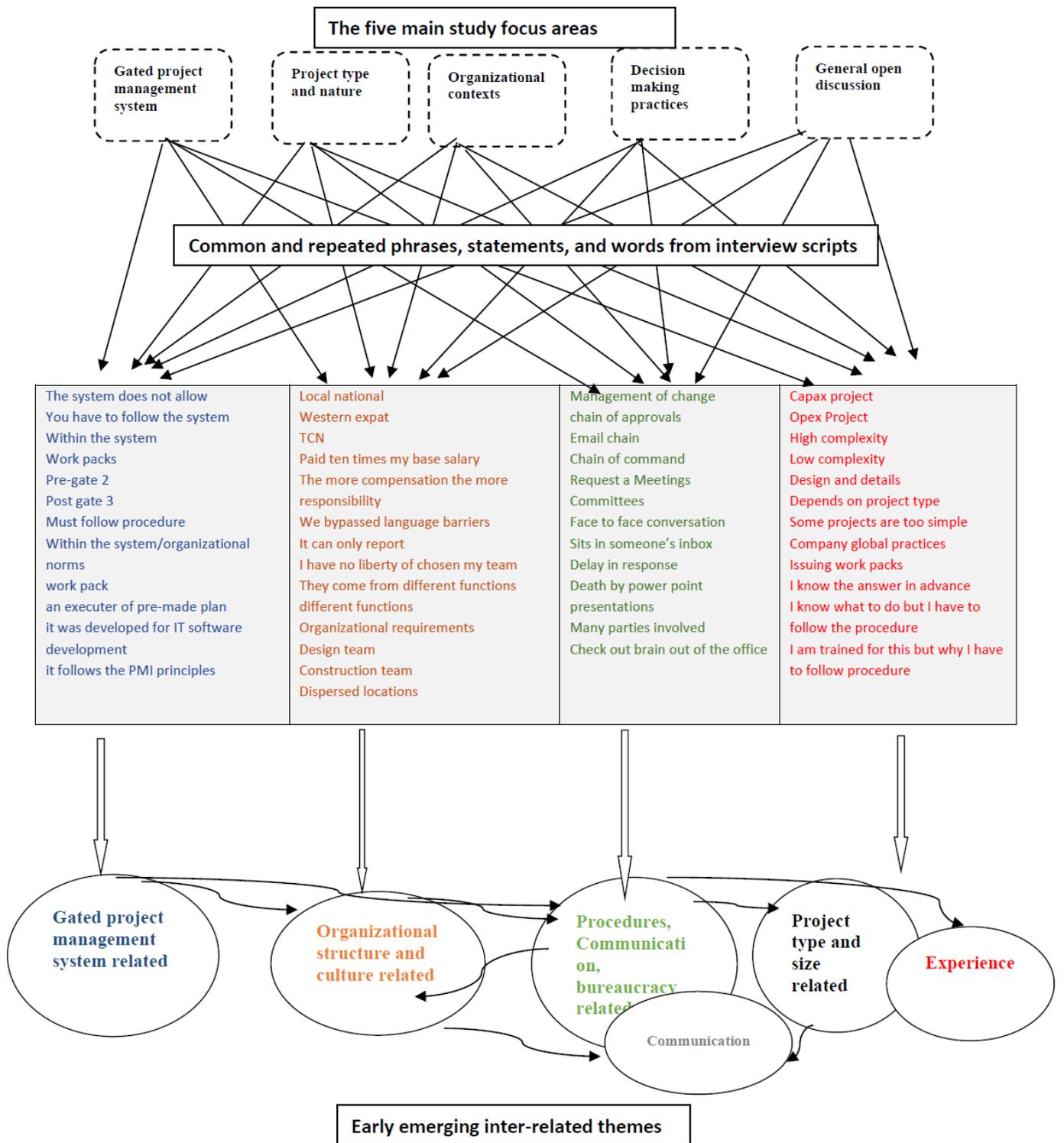


Figure 13 - First cycle of thematic data analysis

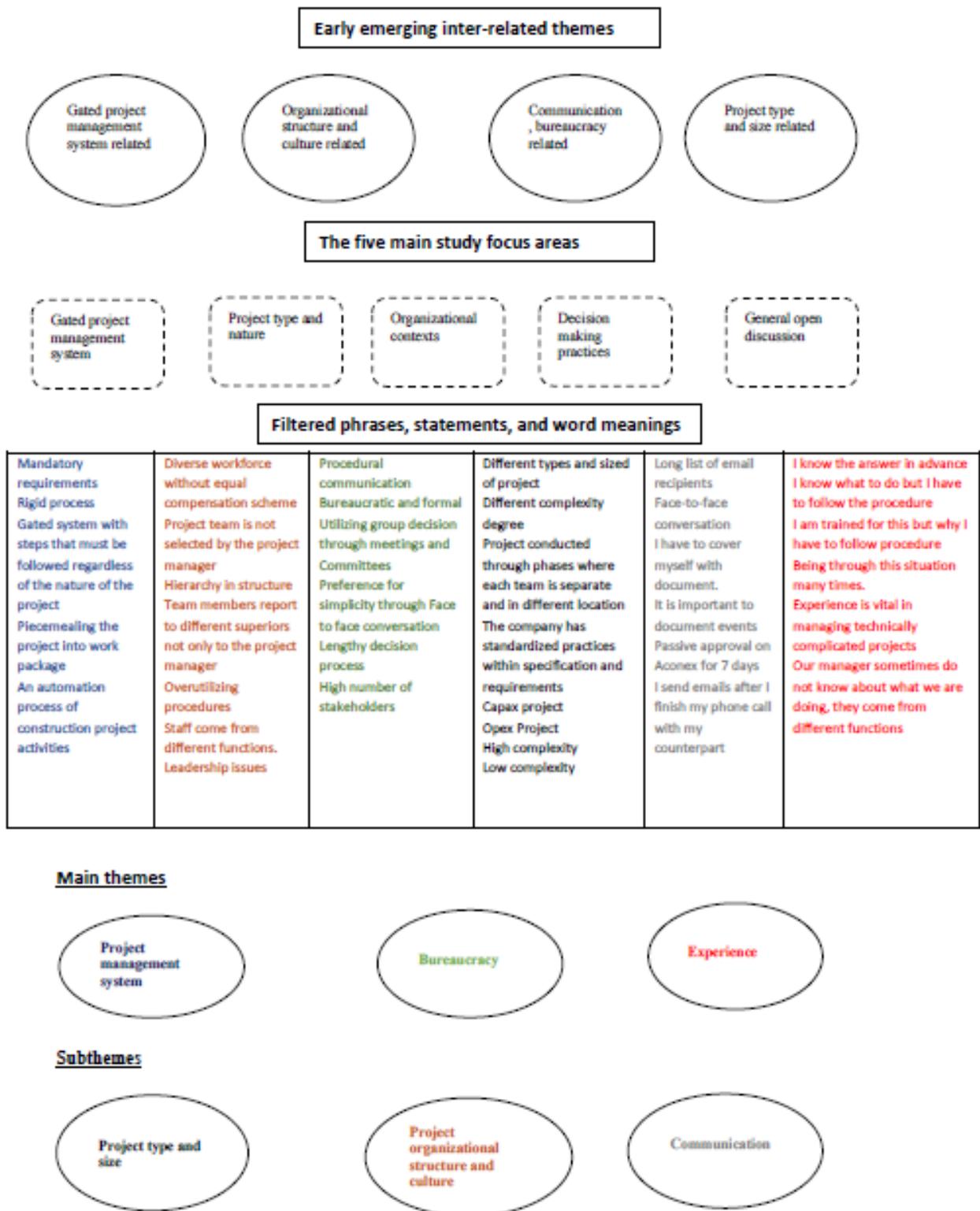


Figure 14 - Second cycle of thematic data analysis

Fourth, as shown in figure 14, another review of the initially established themes was made and rearranging some of the descriptors and resorting to some phrases and statements. The initially defined themes went through a reverse cycle of filtering and clustering reiterations, which provided emerging sets of descriptors organized into smaller coded groupings or sub-themes. This repetitive cycling provided a set of codes for further analysis and sorting. Each data group is then investigated as a data subset, within the subset of project management system data, any project word or phrase, or a complete response that has something related to project type and nature highlighted in black. In contrast, anything related to organizational communications, project information flow, and other types of communication context highlighted in gray; the rest was left as initially colored. This process also involved a revisit to the entire data set to find similar concepts. The same applied to bureaucracy data items where communication emerged as a subtheme. At the same time, experience and individual context remained separate, but there were some addition and omission from the initial data codes made in the first cycle. This process took several cycles until a more coherent definition of coded groupings emerged. In this step, it was imperative to utilize critical reflection in raising several questions; Do themes make sense? Is there enough data support for these themes? Is there too much information fitted into a theme? Is there any overlap among themes? Are they coherent and distinct themes? Is there any subtheme within a theme? Are there other themes within the data? (Maguire and Delahunt, 2017). It was useful to gather together all the data that is relevant to each theme; it was done through the cut and paste function in MS Excel and through separate tables.

Eventually, at the fifth step, defining and clustering major themes and subthemes and describing each in writing, as presented in the following sections. It was the final refinement of the themes, and the aim here is to recognize the 'essence' of what each theme is about (Braun and Clarke, 2006); what is the theme saying? Are there any further subthemes? How do they interact and relate to the main theme? How do the themes relate to each other? This final cycle of coding resulted in three main themes and three subthemes. Major themes were; project management system, bureaucracy, and experience, while the three subthemes were; project organizational structure and the culture it creates, project nature, and communication. The iterative and emergent nature of this coding process is not easy to represent. Still, the analysis cycles and iteration are described in Figures 13 and 14; themes are presented in the following paragraphs

and associated findings to show the overall data structure generated by this thematic analysis (Gioia, Corley and Hamilton, 2013).

Theme 1 - Project Management System

The project management system and its relationship to the decision-making process were discussed in-depth with the participants. It is the process used by the project delivery team in executing a project, from planning through close-out, it is a group or combination of interrelated, independent, or interacting elements forming a collective entity called the system (Badiru and Osisanya, 2013). Nine out of eleven participants see the gated project management system focuses on the project's early stages and less on the execution process. The other two were working on major projects and see the system functioning well but expressed reservation that it is lengthy and does not provide agility and freedom to project managers. It is noted as a FEED-focused system, extended time spent (relative to project span) on planning regardless of the size and nature of the project. Almost all participants see the system as a sound system for the project's planning but only provide a plan to be executed, which is left to the project manager as an executor. One senior project manager stated that this system is not meant for a construction project but was initially developed for software development, saying:

“The Stage-Gate project management system originally derived from the PLC (Project Life Cycle); this process was created by IT in the development of Software.”

The system does not only split the project into phases but also breakdown the execution phase into work packages. It was observed and noted that work packs are usually a package with deliverables issued by an engineering team as part of several work packages that makes up the project. These work packs are pieces of the overall project meant to create concurrent work for speedy execution purposes. In terms of decision making, the work pack development and issuance comes from engineering while participants' general perspective is that;

“no one knows best about how to sequence these work pack than the field staff; engineering guys are sitting in the office without proper input and involvement from execution team, which leaves the site-specific knowledge out of the planning contingencies”. Most participants profoundly echoed this statement.

Regarding the project management system and leadership role, several participants echoed their feelings indirectly. Still, one project manager from minor projects clearly stated when asked, do you feel like a true leader in your project manager position?

“I cannot control everything related to the project; there are things and procedures that are required by the company to follow. Although we practice leaderful practice, I see my role is mostly managerial in nature than a real leader.”

The general view expressed by participants on the SGPMS concurred that it is well designed for large size and highly complex projects, especially during the planning phase. It helps significantly in planning for a complex project, but for small projects, it is more of adding complexity to the simplest project. It allows for concurrent work and in managing several projects, keeping the project team busy but lengthy in the process. Some participants stated that for a small project, it is a waste of time to go through very protracted routine stages where the project could be planned for and executed in a simple process. For simple projects, the gated cycles sometimes take more time than needed for the project execution duration. The system, according to most participant's views, is an excellent tool for planning when time is on your side under some certainty. Otherwise, when time is critical and high uncertainty due to the time it takes and the number of stakeholders involved in the planning and decision-making process. The system is known to involve many stakeholders who require the project manager to gather them and manage their expectations and communication, which sometimes leads to many meetings, debates, and increase difficulty in communication effectiveness and control. This process is lengthy by default and results in several revisions and recycling of the same thoughts and ideas. The main theme and presented evidence show the impact of the system design and requirement on the decision process during the project execution phase. Table 2 shows the key findings for this theme, key researcher's observations, key findings from participants' input, and key field notes.

Key findings of theme 1 – Project management system		
Researcher's key observations	Key Findings/Participants' views and input	Key Field notes
<ul style="list-style-type: none"> • Several groups in several sessions engaged in project planning through series of meetings, conferences, and reviews. Many functions and personal are involved in the, reviews, interference, and a gate keeper for the go/no-go decision making. • Man-hours spent on planning exceeds the reasonable estimated project planning time especially for small and low complexity projects most of the time while the case is different with large and complex projects. • Despite conservative estimates, multiple risk assessments, and slacks, deadline repeatedly missed and project mostly come late on schedule. • Higher system related frustration were coming from minor projects team while there were less complaints from major projects team. • A sense of project mechanization. An assembly of steps taken regardless of the different type, size and complexity of the project with minimal freedom for accommodating for any requirements for agility and reaction to quick changes. • The process of work-package works well for simple projects due to the low number of packages but it extend the time spent waiting on packages issuance and on the number of stakeholders. If any interrupted will have a domino effect on the rest of work packages in most of the times. The case is different with multidiscipline and technically complex projects. • The SGPMS applied generically. No fit for purpose approach utilized to accommodate differences among different projects. • Lack of geographical tailoring and consideration for a universal system application in locations 	<ul style="list-style-type: none"> • FEED focused system, emphasizes on the planning phase. The stage-gate project management system is a great planning tool for large size and technically complex projects with very detailed process to discuss and plan different stages of the project from concept to close out. • The system consists of great tools for planning, but lengthy and leaves the project manager as an executer of pre-made plans, mostly made by others. • In many cases for large size and technically complex projects and due to substantial planning time, the planners do not live the entire project cycle as the project evolves, they either move to another project or another position. • The general view expressed by participants on the gated project management system is that it is well designed for large size and highly complex projects especially during the planning phase. • Participant stated that for a small project it is a waste of time to go through a very lengthy routine stages where the project could be planned for and executed in a simple process. For simple projects, the gated cycles sometime takes more time than what's needed for the project execution duration. • The system intended for speedy projects delivery while participant indicated otherwise; "the system works well when you have plenty of time and otherwise when you are time constrained" • The system breaks the project into several phases which result in an execution plan for construction that is theoretically integrated. It consists of routine stage/gate, and steps that must be taken regardless of the nature of the project. • Project managers complained of not having the needed out of the system freedom and agility to respond to changes and re-planning. • The system breakdown the execution phase into work packages that make up the entire project in sequences. Complaints from minor projects about work package issuance and sequencing and about the need for tailoring and fit for purpose to consider the dynamic nature of construction project. 	<ul style="list-style-type: none"> • Across both minor and major projects, several project planning/FEED stage schedule revisions and delays and some cases of out of date plans. Rework is recorded on many projects. • Between 2014 and 2018 a total of 5 projects got cancelled after lengthy planning process due to forecast expiry on political and/or socio-economic issues. • In a one year period, more than 65% of projects reported to have project management man-hour/cost overrun between 10% to 147%, • For the past 7 years, project load was averaged at 42 minor projects and 6 major projects. In one year period, 36 project were executed in minor project with some delay. In major projects two long term development projects (\$200M Plus) still going but with minor schedule delay. • Complaints were reported regarding misalignment due to geographical positioning of teams that are supposed to be integral to each other. • Three main long term contractors working inside hydrocarbon processing facilities officially complained from delays when the IOC make changed to the project scope. The delay mostly related to decision delays to be made for the intended change. There were several others who experienced the same but did not raise formal complaints to maintain contractor-client relationship. • Tow effluent water and oil recycling projects took more

<p>that are not permissive for such system application.</p> <ul style="list-style-type: none"> • Uncertainty level in southern Iraq is much higher than other parts of the world due to political and socio-economic issues. • Multi-functional teams' conflict with the system assumptions due to lack of harmony which is difficult to attain due to several intra-organizational factors. • Project managers spend majority of their time on reviews, reports, developing PowerPoint presentations, and enforcing procedures. • Project personnel are much disciplined and in compliance with company requirements on formal and procedural work. 	<ul style="list-style-type: none"> • The system is time and risk sensitive and more suited for ideal situations. Risk mitigation sometimes require repeated cycle of re-planning and significant interface and coordination. • High number of involved departments with formal and procedural communication. The system is known to involve many stakeholders which require the project manager to gather them and manage their expectation and communication which sometimes leads to more than the needed meetings, debates, and increase difficulty in communication effectiveness and control. • The system has some impact on project management leadership; participants feeling more loaded with administrative and managerial work than being leaders. • The SGPMs allows for program management and portfolio of project, it has been applied by the IOC for these two purposes. 	<p>than 18 months to close and pay the final contract payment due to no decision.</p> <ul style="list-style-type: none"> • Management tasks Project manager (through official communications) to focus on execution parts of the project according to planning while direction of project related shifts and changes is incremental without full information sharing between project team and upper management. • Instruction issued to different function with the assumption that each function and department do its role in harmony with involved parties.
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Table 2 - Key findings of theme -1

– **Theme 1.1 - Organizational structure**

In this sub-theme, one can see how the project team structured within the IOC and the implication of the project organizational structure. From field notes and observation, the project organizational structure was found to be a matrix structure; from the participants' view, it was noticed as a weak matrix. Participants have stated that the project organization is composed of different functions/departments, and most of the time, they have no liberty in selecting their team members; a project manager from minor projects said;

“I do not have full authority on some of my team as they report to their departments; for example, the HSE guy report to the HSE manager and come to serve temporarily on the project. My only choice is to ask for his replacement if I have any problem with him, and sometimes this is not healthy for the project as it creates delay”.

Since contractors are part of the project delivery team, participants asked about having any role in contractor selection; the question was asked again in a different form on whether they have any role in setting the criteria for the contractor selection. They have some ways of

recommending the requirements. Still, the whole selection process and prequalification are left to the procurement department to set the full criteria for the contractor to qualify for bidding on the project or for awarding the job to them. It is a formalized process based on technically presented documents and the lowest bid price without negotiation or rigorous examination of past contractor's experience. A project engineer from major projects stated:

"If you do not have a role in contractor selection, then you do not get the vehicle you asked for to drive through your journey; you will get a vehicle but not the one you believe it can get you through without giving problems along the way."

Participants have different views on the organization, although explained to them through follow-up questions that the question pertains to the project's organization. However, most participants do not see the current organizational structure helping the project team in making quick and efficient decisions. There is a mix of organizational loyalty since members come from different departments/functions. They have multiple lines of reporting, their function, and temporarily to the project manager during the project life span. It is structured in a way not suited for efficient decision-making. On the current organizational structure, there were different responses from participants on this issue. The one that attracted the researcher's attention most was a statement by a project manager from minor projects:

"your project organization is like your work family. If you get along well with your organization, then you can have harmony and work in concert; otherwise, your life would not be as smooth and easy as you desire. Currently, this situation is not what I wish for. There are some issues in our organization, such as pay differences among expat and their country of origin and between expats in general and local nationals even as they possess the same qualification, perform the same job, and are held accountable for the same responsibilities."

In general, there was a consensus among participants that the way the project organization is structured impacts the sense of responsibility and accountability, which impairs communication among the project team and their performances.

On the relationship between organizational structure and the speed of decision-making, four participants stated that it is not helping. The researcher's observation shows very lengthy correspondences among the project team to get all aligned on any issue, although electronic communication is disseminated quickly and easily. The high number of involved stakeholders

takes a long time to get a middle ground, which requires changes to the proposed approach initially adopted. Hence, another cycle in an email chain starts, and so on. Field notes show a delay in the decision-making process, and complaints have been made by contractors about waiting a long time for the IOC to come up with a decision when project changes occur. At the same time, two participants see the organizational structure as suited for a quick decision. Five participants disagreed with having a relationship with the current organizational structure and decision-making speed; instead, they related decision speed to management priority and attention. The implied general statement from participants was;

“if the decision is related to upper management priority, then you can have enough attention among involved parties, and you can get it fast,”

In concurrence with observation, they related decision speed to stakeholders' type and number, where some could slow the process, and others could help speed it up. This issue is related to the number of stakeholders created by the organizational structure and mostly tied to stakeholder's expectation management; some could be supporters while others could be otherwise if the desired decision is not in their favor. When the discussion shifted to the current organizational difficulties related to decision-making, the input to this question was the most diverse, yet, almost every participant has a different view. These views encompassed difficulty in communication, stakeholder alignment, attention, urgency, experience, the system, procedural knowledge, management, and more. Table 3 shows the key findings for this sub-theme, the principal researcher's observations, key findings from participants' input, and key field notes.

Key findings of theme 1.1 - Organizational Contexts		
Researcher's observations	Key Findings/Participants' views and input	Field notes
<ul style="list-style-type: none"> • High professional standards and disciplines workforce within the project teams. Procedures and guideline enforcements comes in a chain of authorities. • Division of labor of a functional organization applied in a project-based organization. • High number of stakeholders engaged with most decisions on most project activities. • Project manager feel less authorized to have control over a matrix organizational structure, a sing of hindered leadership role. • Individuals with the same qualifications but from different employee classification fill the same position with different pay. Sense of unfair compensation among LN employees and TCNs. • Systemic work with upper management involvement on setting priorities and intervention • Human resource allocation is not per-project need or per-project's manager desire. Positions filled temporarily and procedurally with over populated project organization. Personnel change are common in the IOC in addition to rotational work schedule. 6 weeks onsite and 2 weeks offsite. • Although there were language barriers, cultural differences, there was no major complaints observed on cultural difference among team member, but there was staff classification according to their country of origin. Cultural differences were observed on the upper management level and very minimal on lower levels. 	<ul style="list-style-type: none"> • Multi functions joining the project team with multiple reporting lines; to the project manager and to their department managers. • Complaints from project managers on not having full authority on team as they report to their departments, for example, the HSE specialist report to the HSE manager and come to serve temporarily on the project. • Organizational structure has some impact on decision making speed, management priority and attention drives the speed of decision making. • Upper management involvement is required when there is an urgent need "if the decision is related to management priority then you can have enough attention among involved parties and you can get it fast" • Participants' views on the project organization is an essential element in project execution but concerns were mostly on vague positions that create more problems than adding resources to the project and lack of full harmony; "Your project organization is like your work family. If you get along well with your organization, then you can have harmony and work in concert otherwise your life would not be as smooth and easy as you desire" • Several participants indicated that they have to fill positions within the project organization procedurally even if their role is limited or sometimes needed for a very short period of time, each specialized in certain part without freedom to touch on others role, but the players are too many, "you have so many other departments than projects to be involved in any decision you try to make" • Pay difference and classification of employees despite holding the same title with the same credentials. Local nationals are at the bottom of the pay scale. "You can have the same qualifications and same position with the same responsibilities, but your compensation differs based on your country of origin" • Decision speed impacted by stakeholders' type and number where some could slow the process and others could help speed it up. Org-structure is not the main driver for speedy decision, it is management attention and priorities. 	<ul style="list-style-type: none"> • Two sub-organizations managing two different categories of projects; Minor and major as classified according to project cost and complexity level. • Engineering teams are located in the UAE performing design and work packs issuance while procurement team spilt in three countries (UAE, Iraq, and corporate headquarter), there are work overlap among the three procurement teams. • Email notes indicated team members communicate vertically and horizontally to the project organization and to their function. • The project organization is a sub-organization within the overall IOC but does not have its independence from other functions in terms of decision making • Project team composed of members that come from different departments with potential positions identified at gate 2 stage and names listed after gate 3. • Multiple lines of reporting and subordination noticed from organizational structure charts. • Generic organizational structure/setup used for different projects with difference in team numbers. • Departmental division within a sub-organization. • Several clashes between different stakeholders were documented and resulted in plan change and rework. Differences on issues extended to differences between departments, sometimes on internal politics.

Table 3 - Key findings of theme -1.1

– **Theme 1.2 - Project contexts**

In this subtheme, a significant variance among projects in terms of size, nature, complexity, and other attributes was evident. The procedural requirement was the same despite the differences among projects and their different nature. Two sets of different sizes and complexity projects, managed by two separate teams in the field. As explained in chapter 1 and chapter 3, there are minor and major projects according to size and complexity executed to operate and develop the oilfield. The minor project team manages any low complexity project and projects with less than \$20M in value, while the Major project team manages high complexity and any more than \$20M value projects. Early estimates and complexity matrices determine whether this project will be managed by the minor projects team or the major projects team. At the same time, there are small projects that fall within a program assigned to either team and executed by the same team, even if it does not fit the set criteria. The same delivery system and procedures were applied to both projects despite the difference. Project changes and the dynamics of construction execution were the main concerns to participants regarding the need for speedy decision-making. Participants identified several sources of project change and expressed several concerns on the cause of project changes during the execution phase. They see change coming from; poor FEED, quality design work issues, stakeholders' requirements, communication issues with remote design teams, and the site and environmental unknowns. It was stated by participants in a general sense that:

people who make the construction work pack are not sitting in the field; they are either at the corporate headquarter or at another location. They only ask for surveys and information from field staff but do not have the big picture and how to get it done in the field's people preferred way. Even if they concede to field staff demands, this will require extensive back and forth communication.

- General statement from interviewees

On the subject of the best way to reduce or eliminate sources of project changes. Participant's views mostly focused on; interface and communications, whether it is related to defined scope, clear scope, limiting the number of stakeholders, or others. It all gets to communication-related efficiency or enhancement if you want to reduced changes during project execution.

"Get the design and construction team in the same location where both meet each other and see the same thing, and you will see the difference," A project engineer from minor projects stated.

All participants indicated a desire for participation in the project design; some participants stress the importance of being involved in the early stages of the project as key to successful execution. They do not review the final details of the design to be issued for construction. There was general agreement among participants that they feel more comfortable knowing the project's history when they execute the project, but when the FEED process takes a longer time than required, key personnel change during this process. It becomes more difficult for project engineers and project managers to know the chronology of events that lead to the final decision made on how to execute the project. On procurement issues and contractor's selection, seven out of eleven (five from major projects and two from minor projects) stated that they do have some role in contractors' technical evaluation of contractor's proposals while four said otherwise—Sr. Project managers and project managers have limited roles in selecting contractors while the rest of the process is left to procurement, another department in the IOC to handle the selection criteria. Project management staff set the main guideline and standards for particular requirements to have the contractor qualified to construct specific projects. However, the final say-so and decision left to the procurement department who has no detailed knowledge about the project nature, and they only measure the contractor's qualification through a checklist of paperwork and legal requirements. Several participants shared stories of incompetent contractors selected through the procurement department through the checklist process but did not perform accordingly onsite.

When asked how to improve the decision-making process? All input, whether explicit or implied, was focused on one main thing, which is enhancing interface and coordination, simplicity, and reducing or better managing stakeholders. Interface between the design team and the project management team, among all stakeholders during the early stages of the project and not exaggerating planning. Instead, this process is better simplified to have the team focused instead of being distracted by many things. The collective agreement among participants is simplicity; even with forms and procedures, they need to be simplified. Table 4 shows the key findings for this sub-theme, principal researcher's observations, key findings from participants' input, and key field notes.

Key findings of theme 1.2 - Project contexts		
Researcher's Observations	Key Findings/Participants' views and input	Field notes
<ul style="list-style-type: none"> • An array of different sizes, value, and complexity projects with different aims, some for long term development while others for operational needs. The same sub-organization through two teams is managing different projects. • Numerous changes and variations which is considered more than typical for construction project as they normally have changes during execution • Sources of changes were normal for a typical construction project while geographical dispersed teams were something specific for lack of alignment • Many sources of changes are avoidable, mostly communication if enhanced could reduce changes • Breaking the project into pieces requires high level of interface and detailed communication. Any lack of efficiency in each of the two lead to missing the big project picture by project team. • Managing several contractors according to their discipline working on the same project where there could be on prime contractor managing others as subs. This case was observed on minor projects while the case was different with major projects where most of their contracts are EPC. • Managing projects through long term call-off contracts was observed, which means the contractor is the same but the projects could vary according to need. • Most EPC contracts were managed by Major project team while call off and other contracts were managed by minor projects. The same project management system used for all projects 	<ul style="list-style-type: none"> • A great variance among projects in terms of size, nature, complexity, and other attributes was evident while the procedural requirement was the same despite the differences among project and their different nature. • Project changes and the dynamics of construction execution was the main concerns in terms of the need for speedy decision making. • Participants attributed project change during the execution phase mostly to; Poor FEED and design quality, high number of stakeholders, design team not having the real picture of project's site conditions where remote teams do the design most of the time, in addition to the site and environmental unknowns. • Communication as it implies from participants' responses, whether it is related to defined scope, clear scope, limiting the number of stakeholders or other. It all gets to communication-related efficiency or enhancement if you want to limit or reduced changes during project execution. • Concerns regarding geographically dispersed teams in executing construction projects as the teams issuing work packs not knowing the true conditions on the ground which require an extensive back and for the communication" • Knowledge of project's history from inception to execution is an essential factor for project execution. when the FEED process takes longer time than required and key personnel change during this process it becomes more difficult for project engineers and project manager to know the chronology of events that lead to the final decision made on how to execute the project • The contractor is part of the project delivery team and the selection process is vital for interviews; "If you do not have a role in contractor selectin then you do not get the vehicle you asked for to drive through your journey, you will get a vehicle but not the one you believe it can get through without giving problems along the way". • Several participants shared stories of incompetent contractors that were selected through the procurement department through the checklist process but did not perform accordingly onsite. 	<ul style="list-style-type: none"> • Projects are divided into major and minor, major project are any more than \$20M in value or high complexity while minor are any less than \$20M and low complexity. • Minor projects managed as a semi-portfolio while major projects are treated as independent projects. • Same procedure applies to different types and sizes of project and almost the same organizational requirements applied to every project once its defined as a project • In 2017, major projects reported less delay impact as percentage of the overall project schedule than minor projects, this is relative to project schedule as percentage. • In 2017 alone, delivery time of 27 out of 36 projects in minor projects section expired due to lengthy planning and re-planning process while major projects reported less delay impact as percentage of the overall project schedule than minor projects. • There was no project executed without some changes during execution as the MOC and as built record show. • Across both minor and major projects, several project planning/FEED stage schedule revisions and delays and some cases of out of date plans. Rework is noted on most of projects • Project team in some cases miss the project overall sequence of execution and sometimes execution sequence comes from engineering not construction crew • Lengthy planning process effect the project information retention and relies mostly on documented history which is made of summery of events not the entire story • Project team has no major role in contractors' selection. It is procurement procedures based on low bidders with several failed projects due to contractors' bad performances.

Table 4 - Key findings for theme -1.2

Theme 2 - Bureaucracy in Decision-making Practices

From this theme, the IOC is a large bureaucratic organization that develops webs of multi-levels control and utilizes project managers as a key agent in enforcing much-formalized rules and procedures. This process keeps the flow of information controlled through hierarchical boundaries. From different responses, views, and opinions from participants, it was clear that the emphasis more on control, which was only superseded by safety and security. Consequently, positions or job roles are set according to their level of authority. Common phrases from interview scripts were;

“delegation of authority (DOAG) level, getting approval, I can recommend and wait for upper management, it must be approved by management, SOP, within the organizational norms.”

The IOC nature of high emphases on control was evident as project management personnel trained and directed to focus on these three performance indices as key success measures. They top it with safety as the prime measure of project success. Successful project considerations concentrate on cost, schedule, and quality, and all stressed the safe execution of the project as the leading indicator for having a successful project. Nine out of eleven participants view safety, cost, and schedule as the primary concern. At the same time, two project managers disagreed as they placed the operability of the finished product as their primary factor in measuring the project's success, stating that for an IOC, your primary objective is the long-term benefits of the project. Defining a successful decision and its meaning was an exciting topic for participants. Range from following rules and procedures, having a safe outcome, following organizational norms as some participants believe that these norms and procedures are made to achieve the right decision. Two participants, a project manager for minor projects and a senior project engineer from major projects, had fascinating definitions, which were;

“all decisions made with the result in mind - will this decision lead to safer, cost-effective, quality improvement and schedule adherence for the project?”. The other was “a decision may be right, or wrong, but the successful decision is the one which leads to the right things and ultimately works in the interest of the organization.”

There was unanimous agreement among participants on the use of management of change (MOC) as a mandatory requirement by the organization in addressing changes during project execution, which, as they indicated as lengthy and did not serve the project team in reacting to quick and

speedy changes. A Project manager from minor projects pointed out that MOC is a misunderstood term and practice in the oil and gas industry, as MOC is more related to process change and in changing the human factors in it. MOC is not meant to be variation order or change order management stating:

" MOC and its use in the oil and gas industry is misunderstood. MOC should not be used for changes within a project unless the change impacts the process and final product. For project variations, project change/variation management must be applied, not the MOC."

The process of decision-making is mostly approval seeking in nature to authorize an option; thoughts focused on the best and easiest way to pass-on what to suggest or recommend to superiors; the idea is to get it approved and not about being creative in your solutions. Participants' natural feelings when making a decision were a mix of; anxiety, how to face management with the truth, importance of the decision and outcome, thinking of proper procedure to follow, how to sell the idea to upper management, and how to protect me. The most interesting response from a Sr. project engineer was:

"when thinking about making a decision, you have to look at all the options and alternatives, the expected outcome and consequences, the risk involved in it, and how to evaluate it and mitigate or control it. Good decisions that satisfy your professional standards are not easy and sometimes risky; your job could be in jeopardy".

Eight out of eleven stated that they know the answer to a decision before following the decision chain procedure/SOP according to organizational requirements with a pre-defined answer. Thus, they do know in advance that the procedure is only a waste of time. Four (three from major projects and one from minor projects) have an answer that implies that regardless of knowing the answer, the systems must be followed even if you know what you should do. Here is an agreement of an attempt to standardize the decision process not necessarily for documentation purposes only but mostly to comply with procedural requirements than saving time and resources. In other words, you are not making the decision; you are following the paperwork, filling in a standardized format, and making some suggestions and alternatives for upper management to endorse and authorize or reject your proposal or to choose from your provided options. Table 5 shows the key findings for this theme; researcher's observations, key findings from participants' input, and key field notes.

Key findings of theme 2 - Bureaucracy in Decision Making Practices		
Researcher's observations	Key Findings/Participants' views and input	Field notes
<ul style="list-style-type: none"> • The IOC is a well-known large sizable International organization with hierarchy and clear division of labor. Adherence to procedures is mandatory even if they are not effective. Upper leadership changed three times, they are all Western. • Traditional focus on the three project performance indicators, safety, cost, schedule, in project management. • The answer to a problem that needs a decision is known most of the times through field knowledge and experience. • Meeting minutes contains ample details for discussions and point of action. Documenting meeting minutes take sometimes more than an hour of administrative work. It's sent to all meetings participants to review and comments prior to final. • Superiors need to be involved in any non-routine decision and hold the green light according to their level of authority. Procedures and guideline enforcements comes in a chain of authorities. • There is wealth of diverse knowledge and expertise among project management teams. Multiple layers of approvals required for making any decision. • Procedures sometime include irrelevant requirement that must be followed. Time consuming process without necessity. • PTW are generic, although in three different categories, they have more than 10 pages in addition to supporting documents, filling and processing PTW for simple tasks an average of four hours. Contractors spend substantial time filling paperwork • Sense of fear of overlapping other's authority, a sense of unionized labor behavior. 	<ul style="list-style-type: none"> • High emphasizes control and compliance with rules and procedures which only superseded by safety and security. Upper management involvement is required most of the times. Abundant rules and procedures where every project activity must be authorized through specific form and permit to work. • Safety first, project management team are only focusing on following organizational norms and procedures in their decision making. Not much attention to operability and the project's strategic goals of the finished product as their main factor in measuring the project's success. • MOC and its use in the oil and gas industry is misunderstood. MOC should not be used for changes within a project unless the change impacts the process and final product. For project variations, project change/variation management must be applied, not the MOC. • The thinking process for pre-decision among participants was mostly focused on how to convince upper management on the way they want the decision to go and on how to sale the idea to stakeholders and on how to stay within organizational norms and procedure. • The IOC did not emphasize decision making training among project management professionals, but the knowledge and know-how of decision making is available within the team. Reliance on procedures and formal means of check lists are utilized instead of tacit knowledge. Substantial training on control and compliance. • Regardless of knowing the answer to the given problem, the procedures must be followed even if you know what you should do. You are not making the decision, you are following the paperwork, filling in a standardized format, and making some suggestions and alternative for upper management to endorse and authorize or reject your suggestion or to choose from your provided options • Audit concerns are main driver for paperwork and procedural compliance among participants 	<ul style="list-style-type: none"> • Multi-step authorization process to make a decision. Procedural communication and very formal • A quality check sheet consisted of 200 pages, for most of project the contents are irrelevant but must be checked as N/A • Reports are mostly focused on Traditional project management performance measures. • The project management team are only utilized as reporters and monitors of project events • Procedures are set for control purpose on the expense of experience although in most of the time procedures are generic and not fit for purpose. • Interface agreement written officially and to be signed instead of meeting meetings agreements • Decision are made through chain of command with multiple approval process. On some forms, six to four signatures needed for approval • There many procedures and forms to be filled for project activities. Overutilization of standardized procedure • Permit to work (PTW) procedures, 10 pages, is a must for every single activity within the same project daily. • An average of MOC from is 8 pages not including supporting documents which must be filled and processed regardless of the project type and size.

Table 5 - Key findings of theme -2

– **Theme 2.1 - Communication**

This theme illustrates communications means and management in the IOC, which is the functional interface between individuals and groups within the project environment where the success of a project is directly related to the effectiveness of project communication. Nine out of eleven participants prefer to communicate face-to-face, while two participants from major projects stated that it depends on the case and the issue to be expressed. Project personnel sees face-to-face communication speedier and more efficient. Two participants cited almost meaning the same thing:

“Although face-to-face live communication is not documented, it is best since it involves voice tone with facial expression, body language, and your teammates are next to you. You can get things done quickly but not documented as required.” A statement from a project manager from minor projects.

Another statement from a senior project engineer from major projects:

“When you send an email to someone, that individual will not know about the subject until he or she opens his email and read it, then depending on his or her priorities and workload, the issue will have a ranking and priority. He or she will answer you based on their rank and priority; they set for the issue to be addressed. If there is any lack of understanding, then you have to follow up with another email explaining the gap. Meaning, there are other answers and other emails. This process is well documented but lengthy and inefficient; that is why you see us sitting in front of the computer screen for a good portion of the day and leaving some site-related issues; this is another load”.

Establishing committees for addressing particular project-related non-routine issues is a common practice in the IOC. These committees are mostly composed of three to four individuals from different functions and departments, headed by a senior individual without additional voting power, just an administrator. Regarding using committees and meetings as a tool for decision-making, four out of eleven see having meetings as a useful tool for making a decision. Two from major projects were reluctant in their answer as they do not see this applies to all cases, five (four from major projects and one from minor projects) with a mixed feeling response, recognizing that procedures must be followed. Meetings can help only get ideas from others on how to solve an issue and share responsibility for the decision outcome. The following statement could be the summary of and conclusion of participants statements:

When it comes to speed, meetings are good at having all stakeholders, whenever possible, in one place with face-to-face communication to discuss and resolve an issue. Still, sometimes it does drag into a debate and further meetings due to disagreement. If you can have all involved parties/stakeholders be in the meeting at one time, it is excellent, but if you can't, then this means you must have multiple sessions if some do not attend.

In general, there was no consensus on the benefit and efficiency of having a meeting for every need for making a decision. It was observed that participants do not prefer having a meeting for simple things that could be solved by simple verbal communication among the project team. Instead, leaving them to essential matters when you have all involved parties' attention makes the meeting more meaningful and useful in solving the problem and coming with a decision. If meetings become routine, then there is no difference between critical and non-critical issues.

Regarding how you commonly communicate with your upper management? Nine out of eleven stated utilizing formal means of communication in writing to communicate decisions with their superiors. Few participants use verbal communication via phone or during the meeting, but they back it up with follow-up emails or meeting minutes to document what they have communicated. There is no difference among participants on the importance of the relationship and effective communication between the project team from an owner side and the contractor. Some see contractors as the primary delivery vehicle that makes things happen on site. Some see the relationship as an excellent factor in influencing decisions during the execution phase of the project. In general, all agree on having a good and positive relationship with contractors. Having a relationship with the local community is vital to project success and to have a smooth and peaceful life during execution. The approach to this may be different among participants; some prefer reaching this relationship level by providing benefits such as employment or some substantive issues to the local community. Others see protecting community interest as the key to having a good relationship with the local population; the common theme here is that this relationship is vital to project success. Table 6 shows the key findings for this sub-theme; researcher's observations, key findings from participants' input, and key field notes.

Key findings of Theme 2.1 - Communication		
Researcher's observations	Key Findings/Participants' views and Input	Field notes
<ul style="list-style-type: none"> Lengthy and very formal means of communication. Mostly intended for documentation. Formal communication and documentation added to multiple reporting levels. Communicating with external interties comes in from and must be signed by upper management. Communication with contractors must go through procurement as the communication agent and the link between the contractor and the project team except for technical matters, schedule, and anything that doesn't have cost impact. Over utilization of meetings was observed, calling for a meeting is first step prior to most project related issues that requires a decision. Management informed through multiple and different level project reports, daily, weekly, and monthly. Communication complexity increases with an increase in the number of communication channels or stakeholders. Team attentions is more towards daily meetings with active participation while weekly and monthly meetings are no more than briefing managers on progress with minimal attention from project team "I sent an email note". This is the illusion of getting communication accomplished. Project managers complains from high number of emails with an average of more than 50 per days. Project managers and project team are overwhelmed with administrative activities Emails communication with a note of (please reply by no later than (date). 8 in 10 recipients took all the allotted time when replying Information recycling in meetings, project processes such as when an invoice issued and faces a delay; there is a lengthy information recycling due no multiple parties involvement. When meeting repeated for the same issue, discussion evolve and attendees dwell further despite prior agreements on certain points. 	<ul style="list-style-type: none"> Formal communication is great for documentation and compiling lessons learned but it is lengthy since you have many stakeholders involved Face-to-face with follow documentation is the preferred mean of communication for project execution. Group decision-making through committees and guidelines for decision deliberation and presenting management with options to approval or reject. Participant perspective on meeting as good platform for decision making in getting all stakeholders at one place at one time although it is not always possible, and if managed well and not allowed to evolve into a series of meetings. They also believe that meeting and group decision making provide protection in sharing responsibility. Time is spent mostly on reports and documentation. Project manager and project management team spend majority of their time on formal and managerial communication. Participants do not prefer having a meeting for simple things, they better left for important matters when you have the attention of all involved parties. If meetings become routine, then there is no difference between critical and non-critical issues. A desire for more freedom and simplicity in communication was evident among all participants Tendency of accomplishing communication through initiating an email note of a memo. Practice of cover yourself. Local national employees and contractors expressed some language barriers especially with contractual documents which display a high level of legal language. 	<ul style="list-style-type: none"> Charts, histograms, diagrams and PP presentations are widely used in meetings and video conferencing. Formal communication are enforced and followed through written correspondences, reports, memos, etc. Individuals try to protect themselves from any aftermath or consequences through documenting their communication with others. On documents share platform (Aconex), no final approved documents unless all addressed parties endorse. If not, there is a one week passive approval which has to be consumed if someone is not responding to their messages. On a document share platform, the "TO:" mostly includes around three individual while the "CC:" is mostly more than ten. In few cases the "TO" line exceeded ten while in few cases the CC exceeded 14 individuals. Any project change, any deviation from the planned execution method a committee and meeting are called for Formality is required for documentation purpose. Intra-team communication documentation is practiced heavily. Daily, weekly, and monthly construction meetings are routinely conducted. These are part of the project plan and expected schedule, actual meetings in several projects were more than double the planned for meetings. Complaints on high number of included individuals in communication and delay on replies was part of contractor's correspondences.

Table 6 - Key findings of theme -2.1

Theme 3 - Experience

This theme shows the application, utilization, and the role of experience in the decision-making in two folds: procedural expertise and technical and managerial expertise. Every participant has a different view and response regarding utilizing their experience in making a decision and reacting to execution phase changes. They do have the ideas and the answers according to their expertise and technical knowledge. However, some see their reaction differ depending on the nature of the problem. At the same time, they state that they must follow organizational norms and procedures, which means filling a long list of standardized paperwork that may not be relevant to the problem but only checking the box and covering yourself. Participants admitted that this process is lengthy, but it documents the change and protects the project manager or engineer from being the only responsible party for the change and the expected consequences. When asked what's your preferred way as an expert in addressing the problem or reacting to change, the common theme of answers was:

“There is knowledge, there is experience, and there is a desire to apply personal expertise if the system allows, there is even desire to use others expertise if the system permits” – general statement from participants

All participants expressed the importance of experience. It is of great importance not only to make a decision or to know the outcome, the expectation, and the consequences of the decision. It does help even within a bureaucratic system through procedural knowledge. Some participants also stated that knowing people's social habits could help select the proper way of approaching them and sell the ideas of the decision they want them to adopt or persuade them to particular options. Some stated that experience is indispensable when it comes to dealing with difficult and complex situations. Data suggest that individuals with a length of service were feeling more comfortable with bureaucratic procedures. In contrast, data suggest participants with fewer years of service have less desire for following the bureaucratic procedures and want to see some change to the routine. Surprisingly, there was agreement among all participant that implies:

“procedural and group decision-making provide protection when something goes wrong, although following irrelevant and lengthy procedure most of the time means to check your brain out of the worksite.”

General discussion with participants revealed fascinating findings. In a project execution phase, where flexibility and freedom of decision-making are required, a significant amount of time is spent on documentation and procedures that are most of the time with pre-known results. Participants expressed frustration with the system while they think following the system is a protection mechanism to avoid finger-pointing, blame, and regret. It is noted that the traditional decision-making model makes the project engineer and project manager no more than an executor who reports a problem and suggests solutions, not necessarily a decision-maker. This setting implies a lack of consideration of the opportunity lost, cost of lost time brought on by delay, and extended project duration, not to mentioning the potential litigation and contractual issues. Project management professional desires with the gated project management system, which grants an extended time for project planning, is the freedom during the execution phase where they can manage bringing the project to speedy, safe, and successful delivery. In general, from the open discussion with participants, the researcher discovered contradictions among participants on the procedural requirement which they are trained for and are required to follow and their desire to have the freedom of making their own decision based on their professional knowledge. Some participants see that procedures are established for the intention of coming with a right and optimal choice; at the same time, they blame the procedures and bureaucratic paperwork for slow decisions. This implies that the participants in need of modified procedures can be mid-way, satisfying compliance with organizational norms but faster than the current process. That is why they see the key is enhancing communication to get the same process but quicker.

When mentioning upper management, some participants expressed significant ties and relationships with their superiors at the same time; they complained from one issue that the IOC is practicing rotating and cross-positioning managers from one department to another. They are positioned as department heads without emphasizing their experience, relevance, and technical knowledge of the department they are appointed to lead. This practice is well known in the organization and meant to create leaders in the organization as they learn the company's works of different functions. However, while they learn, employees suffer, and project decision is delayed and impacted. Some participants indicated that:

“in some situations, our superiors did not know the project construction process, and yet they are the gatekeeper when it comes to yes or no on any decision related to the project.”

There was a shared sense among research participants that mechanizing/standardizing work and having a very specialized workforce hinders the presence of an expert and knowledge creation. They also asserted that this practice limits the application of tacit knowledge, reduces creativeness, and the production of new skills. In many cases, the IOC utilizes consultants and third-party recommendations for technical issues related to project changes, especially when it comes to changes that alter the design. Participants see this as extreme in cases when they do possess the needed expertise, and such straightforward in-house expertise could fill the need. Still, they admit this to liability transfer and risk management as the IOC wants to transfer the liability to the third party. Table 7 shows the key findings for this theme; researcher’s observations, key findings from participants’ input, and key field notes.

Key findings of theme 3 - Experience		
Researcher's observations	Key Findings/Participants' views and inputs	Field notes
<ul style="list-style-type: none"> • There is a wealth of diverse and competent in-house expertise, but not fully utilized for technical decisions making. • Tacit knowledge is applied through procedural knowledge and social interaction with team mates and upper management • Procedural experience in more applicable since decision are controlled by procedures • A sense of unhappiness among team members with exposure to other industries with procedural process • Years of service means procedural knowledge in knowing the IOC inside – out • Good decisions could come from following the procedures and more protection is provided through documentation but this process is lengthy. Lack of decision-making training except procedural means. • Team members are unhappy for not utilizing their tacit technical knowledge. • Procedural enforcement serves as a quality check for decisions made by inexperienced personnel but experienced individuals are widely present in the project organization. • The overutilization of SOPs requires the development of procedural knowledge. Conflict appear with non-routine tasks through procedures where creativeness is required • Lesson learned is the main knowledge management technique used by the IOC. 	<ul style="list-style-type: none"> • A common agreement on this statement: “there is knowledge, there is experience, and there is a desire to apply personal expertise if the system allows, there is even desire to use others expertise if the system permits” • Experience in general does help even within a bureaucratic system through procedural knowledge, experience is indispensable when it comes to addressing difficult and complex situations. • Individuals with a length of service were feeling more comfortable with bureaucratically procedures due to procedural knowledge and being used to the system throughout their years of service. While participant with fewer years of service have less desire for following the bureaucratic procedures and want to see some change to the routine. • The common feeling among project engineers (the youngest segment) following procedure rigidly most of the time means to “check your brain out of the worksite”, while it is added knowledge to long serving participants. • Participant agree that procedures are made for the intention of coming with a good and optimal decision, at the same time procedures and bureaucratic paperwork is reason for delayed and lengthy decision. A feeling for the need for modified procedure that can be mid-way, satisfying compliance with organizational norms but faster than the current process. • Participant see the key to speedy decision is enhancing communication and the approval process speed and efficiency, if they have to follow the current procedure and process. • Cross training practice places, sometime, places managers who do not have knowledge about the project construction process and yet they are the gatekeeper when it comes to yes or no on any decision related to the project. • Mechanizing/standardizing work and having specialized workforce in project organization hinders the presence of an expert and the creation of knowledge while standardization and formalization through standard operating procedures reduce creativeness and the creation of new skills. • Feeling of technically underutilization was expressed by participants, a desire for more technical engagement and more active role was also expressed. 	<ul style="list-style-type: none"> • Outsourcing technical decision making through consultants and third party in addition to EPC contracts. • Recruitment focus on ready to hit the ground highly paid personnel without strong will to invest in the individual for the long term. The IOC recruit employees with emphases of prior IOC experience more than their technical experience. • Training is mostly focused on safety, security, information security, control, and organizational norms and procedures. • Delay and time consumption in the decision-making process with any technically issues while managerial issues require upper management involvement • Some managers were appointed without prior experience in their position to be later transferred to another positions • Standardizing tasks through procedures • Reliance mostly on lessons learnt for knowledge management and less attention to individual tacit knowledge. • Lesson learned documentation is mandatory in every project close-out documents.

Table 7 - Key findings of theme -3

Chapter Summary

Chapter 4 presented the data capturing process and what went through it, how data was gathered, sorted, and analyzed through thematic analysis. The thematic analysis conducted through five steps was presented in this chapter. Findings were presented according to themes that emerged from the data analysis process and presented in three main themes and three subthemes. They were initially interrelated, but further analysis resulted in having three main themes and three subthemes, as shown in this chapter. A thorough discussion of these findings with insights from the literature review, personal experiences, and professional practice from practical and theoretical perspectives shall be presented in the next chapter.

CHAPTER 5 - DISCUSSION

Introduction

This chapter will examine and further discuss several elements from findings to develop an understanding of the impact of these elements on the execution phase decisions. A discussion of findings provided in chapter 4 in search of answers to the research questions posed in chapter 1. Specifics for the research questions are drawn from chapter 4 findings and their effect on execution phase decision-making and the overall project success. The discussion in this chapter will utilize insights from the literature review, personal experiences, and professional practice in construction project management in the O&G industry. The chapter includes the basis for building actionable knowledge for enhancing the decision-making process in the construction execution phase in the O&G project. It will also discuss other general findings, which have generated some exciting promise for further inquiry in the field of decision-making and project management that shall be addressed in the next chapter. The chapter starts with a brief introduction (this section), presents the decision-making model for execution phase dynamic non-routine tasks currently adopted by the project organization within the IOC. The other sections in this chapter were aimed at discussing findings (chapter 4) in a quest for answers to research questions; SGPMS suitability for decision making for different size and complexity project, the impact of bureaucratic and rigid requirement and procedures, and the best way in formulating enabling procedures, and finally the role and utilization of experts and experience under rigid and procedural environment. Each section consists of subsections to illustrate an in-depth discussion of the main section elements. This chapter's discussion leads to building actionable knowledge for enhancing decision speed, which is presented in chapter 6.

Current Decision Model

The IOC utilizes guidelines in making project decisions as a decision tool when faced with a situation not covered by standard procedures, which is the case with construction execution; these guidelines and practices reflect the structured use of CBA decision theory. The decision model relies on a group setting through meetings and committees. Whatever is recommended by this committee is subject to a review, endorsement, input, and approval from other functions, and ultimately reviewed and sent to upper management for approval before moving on with implementation. As shown in figure 15, the process starts from recognizing a non-routine need, problem, change, or opportunity by the site engineer or any team member that is not covered by

SOPs; they then contact the project manager who, in turn, communicates the project department manager. The manager will set several names (typically four, chaired by a person without additional voting power) from different disciplines as a committee to address the issue; the committee will come up with several recommendations; these alternatives are sent to other departments and stakeholders for review and endorsement. After functional review and approval with signatures, it gets back to the department manager, who sends it to upper management for approval. Once approved, it is back to the project's department manager, who instructs his project manager and his team on what to do.

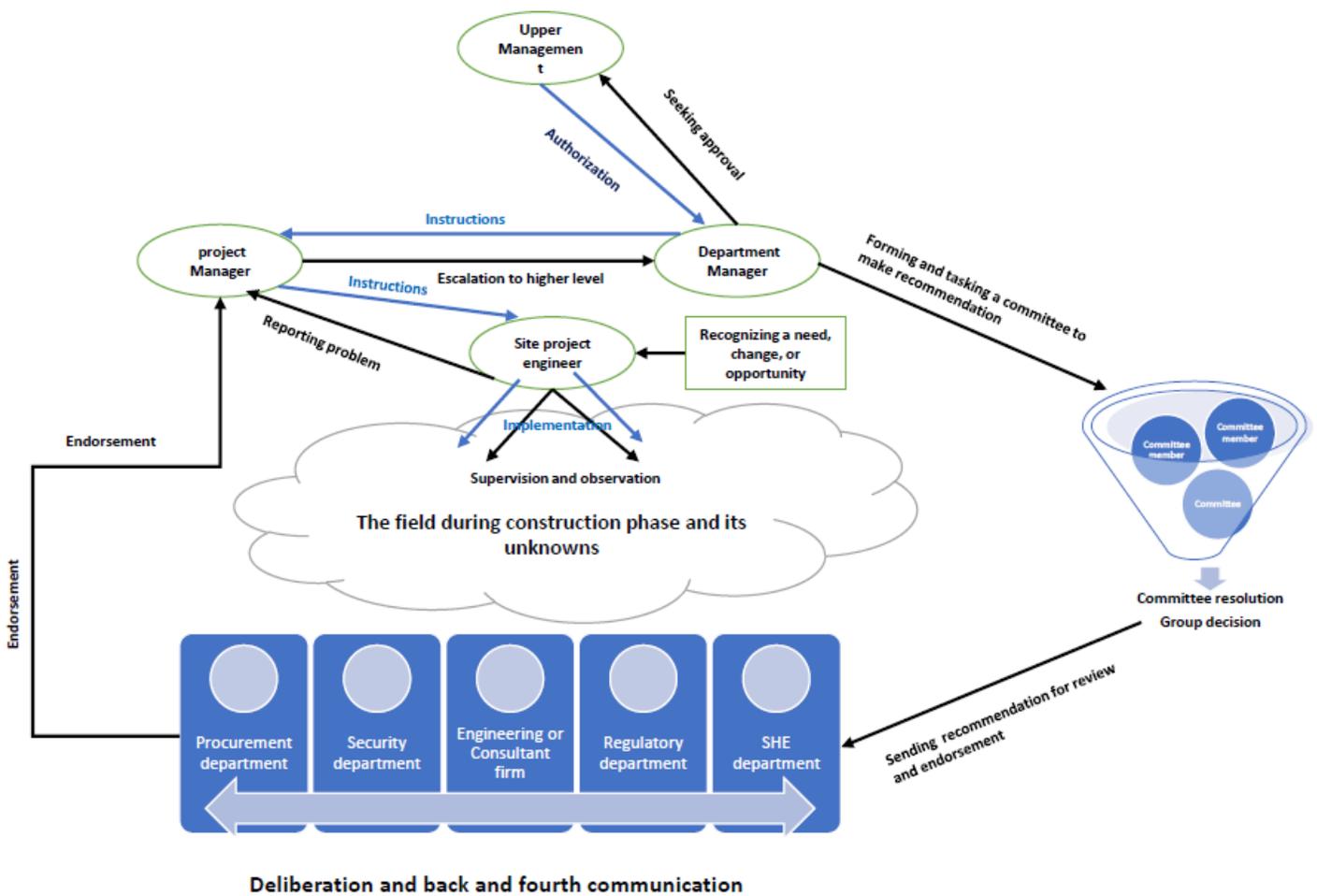


Figure 15 - Current project execution decision process and stakeholders

The IOC Model of procedural/formalized and systemic decision-making is very much risk avoidance-focused and slow in nature. According to Martinsuo and Lehtonen (2007, p. 58), systemic decision making is more effective with development process management and inefficient with project or portfolio management. Upon the decision model analysis process, and through observing the IOC decision making and investigating its processes with participants. This research finds that the normative decision-making approach is heavily utilized by the IOC (Mackie et al., 2007; Newman, Begg and Welsh, 2018), limiting the project's team ability in dealing with changes uncertainty. The model focuses on how to make a decision based on a set method and not a natural flow of what the situation requires. Theoretically, it sets the decision dialogue process, but practically it is more of decision advocacy in informing the decision-maker about the status of the situation. The project team presumably does most of the decision analysis while decision making is left to upper management to say yes or no (Newman, Begg and Welsh, 2018). It focuses on a structured process in a group setting and applies less emphasis on the individual decision process where decision ownership is dispersed among the group and the layers of individuals involved in the analysis. It creates mental focus adjustments to approving authority to limit the time spent on the deliberation about the proposed alternatives where the deliberation takes place at a lower level. Thus, circumventing model elements through loopholes and procedural experience allowed the interviewees to adopt the decision-making process to meet the needs of time constraints. The decision dialogue process does not always occur. Instead, project teams sometimes adopt an advocacy position and promote their selected alternative to the decision-maker. This finding tends to support the position held by the emerging paradox perspective on organizational effectiveness (Bourgeois and Eisenhardt, 1988; Sun et al., 2020). The paradox perspective suggests that high performance requires the simultaneous mastery of seemingly contradictory or paradoxical organizational skills (Hart and Banbury, 1994; Sun et al., 2020).

Projects involve many decisions that have to be made based on incomplete information, assumptions, personal experience of project stakeholders, and project delivery team (Shahi, 2012). Personal mastery is required during project execution to make quick and fit-for-purpose decisions. During project execution, decisions are made during a very dynamic condition that requires speedy analysis of available complex information and a series of conscious interrelated decisions to accommodate any changes. Under uncertainty, humans, by nature, rely on heuristics,

rule of thumb, experience, intuition, and gut feelings to simplify challenges (Tversky and Kahneman, 1992; Eriksson and Kadefors, 2017). The sense and level of confidence are the main factors affecting decision-maker cognition during the critical time of analyzing information under time constraints and choosing among alternatives (Miller and Lessard, 2000). The IOC model is a lengthy and rigid process where procedural experience supersedes technical experience in decision making. Mixing personal mastery with procedural knowledge and bypassing some of the model elements were used by experienced personnel to save time and to direct decisions to their desired outcome.

Participants prefer to think concurrently in optimizing choice in maximizing the benefit of the decision outcome where given concession in one area should yield some positive outcome in another area to maintain win-win results of the decision made. Under the current organizational setting, they are required to adhere to rules and procedures which deal with them as part of an automated system, which is a clear definition of bureaucracy. If you follow guidelines and formalized processes just to make a simple project change, then your level of confidence as a leader will significantly be affected. If project managers are in full control, they could be more positive and recognize opportunities, while they tend to be more negative if things somewhat out of control or chaotic (Sun et al., 2020). This leads to an impact on decision accuracy, which is a factor of the right perception and forecast due to its psychological and sociological influence on human cognition. When project managers are stuck with bureaucracies, their energy will be mostly focused on common administrative tasks that are mostly routine, which, in turn, keeps them shielded from the big picture of the overall project direction (Eweje, Turner and Muller, 2012). When a project manager is deprived of a true leadership role, they shall be at the mercy of upper management and other functions for approval and involvement to help keep up with time and budget. That is what's currently adopted by the IOC as the findings suggest, the focus of project managers and project engineers mostly dedicated to routine managerial tasks in filling paperwork and following standardized guidelines and procedures that leave them as an executor and not as leaders in the field with minimal discretion. This could also be related to the adopted delivery system where procedural work and structured decision making are set accordingly; the next section shall discuss and investigate the role of the SGPMs and its impact on the decision-making process.

The SGPMS Suitability for Quick Decision-Making for Different Sizes and Complexity Projects

The purpose of this section is to examine the SGPMS suitability for quick and accurate decision-making for the execution phase, which is the stage between gate 4 and gate 5 for a project with different sizes and complexities. The system attributes are discussed by drawing upon the qualitative analysis of data, findings from chapter 4, and interactions between the main themes and subthemes emerging from that analysis. The project management system/methodology is the process used by the IOC and its project delivery team in executing a project, from inception to close-out. It is a system with aims at achieving the best in the planning and delivery of the project through means of guidelines, as shown in figure 16; it consists of several stages connected and controlled by gates and linked to the project supply chain (Salazar-Aramayo et al., 2013). The design of this system is based on establishing, organizing, and sequencing the procedures, activities, and products to be developed in project planning and implementation according to plan. According to Sabri et al. (2017, p. 1824), systematic project management is typically adopted by the O&G industry, especially for megaprojects, to enhance the decision-making process and overall project execution. The systematic process consists of sets of guidelines and requirements such as value-adding opportunity, multifunctional work integration, alignment, and collaboration among decision-makers, stakeholders, and project management team, in addition to consistently utilizing best practices, tools, and procedures. There are components or elements assembled with functional relationships to achieve the project objectives; it is made of components, attributes, and links. To qualify the system, it should have a functional relationship, the interaction between many elements, and a useful purpose. These relationships and their coordination require a high level of interface and synchronization, which requires permissive conditions and the environment. In order to achieve that, the human element becomes the core part of the system where it runs, controls, and manages the infrastructure that represents the envelope of operations and includes physical structures, energy, leadership, operating culture, and movement of resources. Technical skills, coupled with an understanding of a wide range of social life aspects, are required, such as stakeholders' motives and analysis, sense-making processes, power, means and communication methods, decision-making, and the like.

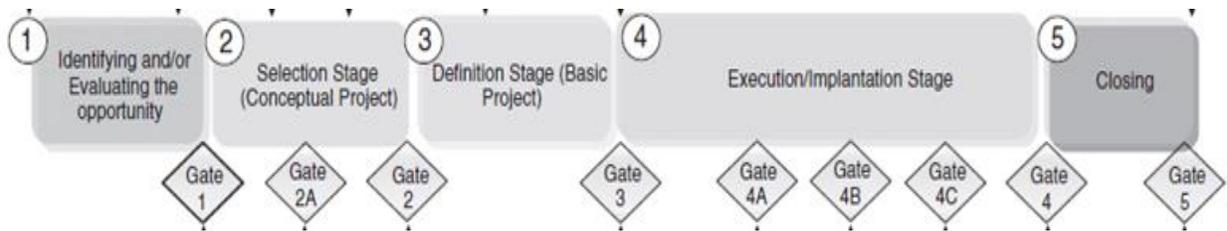


Figure 16 - The multiple gates of the adopted project management system

Source: © Salazar-Aramayo et al., (2013, p.594)

As in most of the O&G industry, the decision-making process, according to the SGPMs practiced by the IOC, mostly structured approach based on go/no-go and approval seeking in nature, where decision dialog and elaboration conducted via group setting under the form of review panels and committees (Newman, Begg and Welsh, 2018). The system's role in decision-making is direct through the multiple and cyclical reviews in the stages leading to the execution phase. At the same time, it impacts the execution decision indirectly through several factors. Project management methodology sets the project organization; the mean through which the project is executed, the organizational structure creates its own culture, and the information flow process according to the structure and cultivated culture. Also, the SGPMs has its adopted procedural measures, in addition to the high number of stakeholders. These factors were significant players in how project managers manage the execution and make their decision.

From theme 1, the gated project management system's primary aim is fast track and speedy project delivery. It is perceived as a kind of project mechanization in standardizing the project's steps and processes, built on the assumption that everything goes as the plan made with premade scenarios and assumptions for potential risks during the execution phase (Newman, Begg and Welsh, 2018). This system was not designed for a construction project but initially developed for software development, which was initially derived from the PLC (Project Life Cycle) (Walkup and Ligon 2006). The system pays excellent attention to the FEED stage, which is like product design, while the execution phase is presumed like a product deployment, although in construction lacks the testing stage. In a product deployment project, you would have the ability to amend some of the product features even after being tested and used by some end users.

Contrary to that, in construction, you have a physical asset on the ground with minimal freedom to make any changes after building it. The majority of participants indicated a sense of

mechanization; projects are divided into pieces on the assumption of harmonic and concurrent work. Any interruption to these interrelated pieces could create significant lost time due to the need for reprogramming, not only for a given part but for the entire sequence. They see the gated project management system focuses on the early stages of the project and less on the execution process with extensive time spent (relative to project span) on planning regardless of the size and nature of the project. The lengthy planning process sometimes leads to risk factors expirations and new risks as time passes; the premade scenarios and assumptions change with time (Serrador and Pinto, 2015). It could lead to the “inverted U” relationship between planning efforts and project success, as argued by (Serrador and Turner, 2015, p. 1042). For example, you plan for execution within nine months and assess your risk nine months prior; after nine months, all or some of the assumptions made could change due to time. No matter how detailed the plans and the risk assessment and mitigation measures, these risks do not come as expected since the execution phase is when reality hits the ground. Long-range planning increases the chance of erroneous forecast occurrence (Olaniran et al., 2015). Thus a continuing replanning is needed, which requires agility and freedom in the decision-making.

From theme-1 and themes 1.1 and 1.2, the system appears to be a sound system for the project’s planning but only provides a plan to be executed, which leaves the project manager as an executor. According to the system, several groups divide the project into smaller pieces to be integrated. The project plan to be made through multiple reviews and control gates to reach specific criteria to be approved by a gatekeeper with a go/no-go decision (Ibsen et al., 2007 cited in Sabri et al., 2017, p. 1824). The final project plan to be carried out by another group, which is the executors. Even the executors are led by a project management team composed of several functions from different departments such as HSE, compliance, procurement, construction, quality and inspection, logistics, and the end-user. It is perceived as a kind of mechanized assembly to project activities rather than a flexible and case-based execution method that accommodates any agility requirements and reaction to quick changes. The sense of project standardization was also noticed through execution work package issuance, which sometimes either creates confusion among the project team or a backlog when one work pack is changed or delayed in the execution. Work packs are usually a package with deliverables issued by an engineering team as part of several work packs that make up the project; these work packs are pieces of the overall project meant to create concurrent work for speedy execution purposes.

These work packs are sometimes divided by discipline and specialty items and sometimes are classified according to the project phases and construction sequence. Work pack issuance requires a great deal of interface and coordination, which requires all involved parties to be working closely. This process was noticed not to work well with geographically dispersed teams. In terms of decision making, the work pack development and issuance comes from engineering while participant noted in a general statement that;

“no one knows best about how to sequence these work packs than the field staff; engineering guys are sitting out of the country without proper input and involvement from the execution team, which leaves the site-specific knowledge out of the planning contingencies.”

The downside of the work packs strategy is that executing a work pack and coming back with a subsequent change impacts an already partially constructed facility, which happened numerous times, according to participants in this research. When using modularization as a construction strategy, intensive dynamic planning must start from the inception phase and a vast interface between different groups and work packs that are dependent on each other (Sabri et al., 2017). Any change to occur within any of these work packs will have a domino effect on all other related work packs, which means a significant risk of wasting time and resources. Thus, decision-making in this kind of construction strategy is of great importance and must be left to a very experienced and proficient professional with technical, leadership, managerial skills, and a high authority level. To offer an understanding of the project methodology's role in decision making, a discussion of some of the system attributes is presented in the following sections.

– ***High Number of Stakeholders***

It is known about O&G projects to involve many external stakeholders due to their economic, political, environmental, socio-economic impacts (Eweje, Turner and Muller, 2012; Newman, Begg and Welsh, 2018). The span of construction projects in the oil and gas industry includes; safety, health and environment (SHE), financing, procurement, socio-economics, government relations (host country), regulations, inspections, regulatory oversight, quality checks, compliance assessment, corporate alliances/partnership, human resources, hardware and software infrastructure, and more (Salazar-Aramayo et al., 2013). Added to that, the system setting through the gated reviews adds many internal stakeholders. Several other departments are involved, and several layers of individuals are also engaged from the planning to closeout stage. The

bureaucratical process of having layers of an involved individual does not help in the speed of decision. That's why the planning process takes significant time compared to the project life cycle. For example, when designing a facility, from the inception phase, the project team, construction, end-users, and operations and maintenance groups need to provide their feedback as critical stakeholders of the project before they decide to proceed with the project. As far as the project's technical aspects are concerned, the plant operations group needs to be involved to ensure that what is built will be operable and meet the standards and specifications set out. The plant maintenance group is engaged to ensure that access and safety provisions are incorporated into the facility's design. The construction team needs to provide feedback on the constructability of the design. Considerations, such as moving cranes, rigging equipment and vehicles, workforce density, and safety during execution, are crucial for them. From an execution perspective, the data shows that the above factors were significant to participants, especially during the FEED stage. From theme 1, project decisions and project managers tend to be mostly influenced by stakeholders and their attributes, according to which project managers draw their decision-making strategies on how to manage stakeholders' expectations. Project managers are required to analyze and manage stakeholders according to their legitimacy, power, and their expected actions, whether they are entities or individual, is appropriate, and in compliance with social norms, values, and beliefs (Olander, 2007; Yang et al., 2014). Stakeholders, through their behavior, could threaten or cooperate with the project delivery team. It requires a great deal of social and practical wisdom from the project manager in predicting individual behavior at the early stages instead of being reactive later. Participants have stated that their main problem with decision-making is the high number of stakeholders who need an assessment of their behavior, attributes, and expectations to formulate decision-making strategies. The number of stakeholders plays a great deal of influence on the decision process due to stakeholders' expected impact (Yang et al., 2014). According to Kermanshachi and Safapour (2018, p.381), the high number of stakeholders adds complexity to the project since it's a factor of the project's success. The high number of stakeholders make the decision-making time consuming and painful deliberation for project managers due to the need for catering to so many stakeholders related attributes such as cultural, organizational, social, economic, resource allocation, and other factors that are associated with the surrounding communities (Berry, 2010; Kermanshachi and Safapour, 2018).

When changes take place during execution, for the reasons mentioned earlier, the project team need to get back to the initiators of that part that need to be changed or amended to know the logic behind what was planned for, why, and what could be done without significantly altering the designed aim. This process is lengthy and involves several back and forth communication and collaboration. It delays the decision-making process when time is of great essence in the heart of the construction event that's mostly done by contractors—reducing the number of internal stakeholders, integrating reviews, and interface management required for such sequenced steps. If not, there will be numerous problems that aren't easily addressable. The high number of stakeholders could be a source of change and delay since any change needs an interface with engaged parties, which is lengthy when the number is high (Kermanshachi and Safapour, 2018). These issues are sensed from participants' points on the source of project changes during the execution phase, where they see most of the changes come from other functions involved in the project planning. For change source to be reduced, there must be a focus on communication with the high number of stakeholders as it implies from participants' responses, whether related to defined scope, clear scope, limiting the number of stakeholders, or simplicity in a general sense. It all gets to communication-related efficiency or enhancement if you want to reduce changes during project execution.

“Get all parties in one place, be a round table, where they meet each other, talk face-to-face, and see the same thing, and you will see the difference,” one participant stated.

Socio-economic forces constitute the macro or microeconomic factors that impact a local community (Mejlender-Larsen, 2017). Given the cosmopolitan societies in which the oilfield is located, communication on projects is affected due to people having different languages, cultural backgrounds, and experiences. Social forces such as attitudes and values among the locals regarding their welfare, unemployment, environment, and the sense of ownership, can impact projects positively or negatively depending on the way its managed. Although the IOC has specialized departments to deal with these socio-economic forces called Corporate Social Responsibility (CSR), the IOC, according to participants, in addition to field notes and observations, did not address the local community's needs and demands to a satisfactory level. From the researcher's records, the things done were very limited to providing work to unskilled labor without investment in the local community and its future. However, the oilfield is in the middle

of several impoverished villages, and the IOC is in the field for more than eight years. Another factor was the cultural clash between the IOC upper management and the national oil company. The IOC top management consists of western expatriates with western values and work culture and brings their cultural baggage with them despite the differences (Rose et al., 2008). Participants expressed a lack of cultural understanding of local needs at the upper management level. The majority of participants echoed a similar statement;

“We have more than double the oil production of this field, but what have we done to the people here? We did not improve their lives and did not make any positive impact”.

Having a relationship with the local community as a stakeholder is vital to project success, and for having comfort during project execution (Sebestyen, 2017), all participants agreed on this concept. As the local community is the main stakeholder in the oilfield, the IOC must have a comprehensive understanding and strategically cater to their legitimate concerns. Genuine CSR requires corporates to have a social agenda that promotes social progress and not only to mitigate reputation risk. However, this is not the current case in the researched oilfield where poverty, unemployment, and lack of community involvement are evident. It cannot be taken as the IOC have intentional or negligence in its ethical discipline strategies. Still, its approach is not simplified to understand the local populous needs and priorities. The IOC spent \$2 million on building a place to meet with the community on the oilfield edge but was hesitant to make a school or a small clinic that could have an immediate positive impact on their life. Therefore, CSR strategies must be balanced and inclusive of the IOC benefits and the local community as well. Since morality is proven empirically in favor of business in providing more opportunities, means for competition, and enhancing the business moral image, such strategies should include an obligation to people (Andrews, 1971, cited in McManus, 2011, p.219). They should not be built without such commitments.

Experience, practical wisdom, social skills, and cultural awareness play a significant role in managing the relationships with external and internal stakeholders and in the required extensive communication on projects (Yang et al., 2014). Gathering and analyzing information about stakeholders, such as a pulse of external stakeholders (local authorities, business partners, local communities, and others), is of great importance. Project manager’s awareness of local politics and events in the project vicinity does impact the quality and efficiency of their decisions (Olander,

2007). The quality of the relationship with local institutions is considered one of the major project success factors. Also, the contractor-project team relationships affect information flow and information feed to the project manager. Stakeholder management requires project managers to dedicate resources, whether time or human resources, to address their satisfaction as it is one of the project success measures (Oppong, Chan and Dansoh, 2017). Allocating resources depends on the type and number of stakeholders, which could drain project resources and impact project decision speed. On internal stakeholders; this depends on the project organizational structure and how project teams are organized. The next section shall present a discussion of the impact of the organizational structure on decision speed.

– ***The Project Organizational Structure***

The project organizational structure is the organization form that performs the scheduled task to achieve the project's objectives and disassembled after its mission. An efficient project organizational structure is the critical element for the smooth execution of a construction project through improved and efficient communication between the project team (Cheng, Su and You, 2003). Designing a project organizational structure should consider various factors such as the needed specialties, the interrelatedness between the project's functions, cultural values, experience, size and complexity of the project, etc. (San Cristobal, Fernandez and Diaz, 2018). The structure sets the information flow, communication channels, positions, relationships, level of authority, and other means through which decisions are made (Ilin et al., 2016). From theme 1.1, the project management system/methodology and its intention in mechanizing project activities were evident in the project organizational settings through the division of labor from different disciplines that need to work concurrently in harmony. If not, then any delay caused by any function will impact the rest as a domino effect. Project team selection starts at gate 2; a list of potential positions is identified as part of the project resources planning. A proposed organizational structure with these positions begins to take shape. These positions are filled by drafting personal from other functions/departments. The final project organizations take the form of a functional hierarchy with lateral and vertical reporting and authority, which are definite attributes of a matrix organization, as shown in figure 17. According to San Cristobal, Fernandez and Diaz (2018, p795), this type of structure requires a high level of communication and interaction between department managers and project managers. It is conducive to a distinctive

organizational culture focused on collective forms of working and means of decision-making where compromise and openness are required.

In some cases, it is necessary to decide whose authority, project, or functional manager, will be dominant or whether their jurisdiction will be equivalent to make this type of structure efficient. Otherwise, this structure will be weak, slow, and less active in executing the project; as Gray and Larson (2008) argued, a matrix structure is empirically found less efficient for construction projects unless it is a strong matrix. The structure's strength comes typically from the level of authority and leadership role of the project manager and the reporting and subordination mechanism (Benator, 2003; Gehring, 2007; Zheng et al., 2019). Participants echoed the sense of lack of full control over team members in their project organization; it was stated by a project manager from minor projects saying:

“I do not have full authority on some of my team as they report to their departments; for example, the HSE guy report to the HSE manager and come to serve temporarily on the project. My only choice is to ask for his replacement if I have any problem with him, and sometimes this is not healthy for the project as it creates delay”.

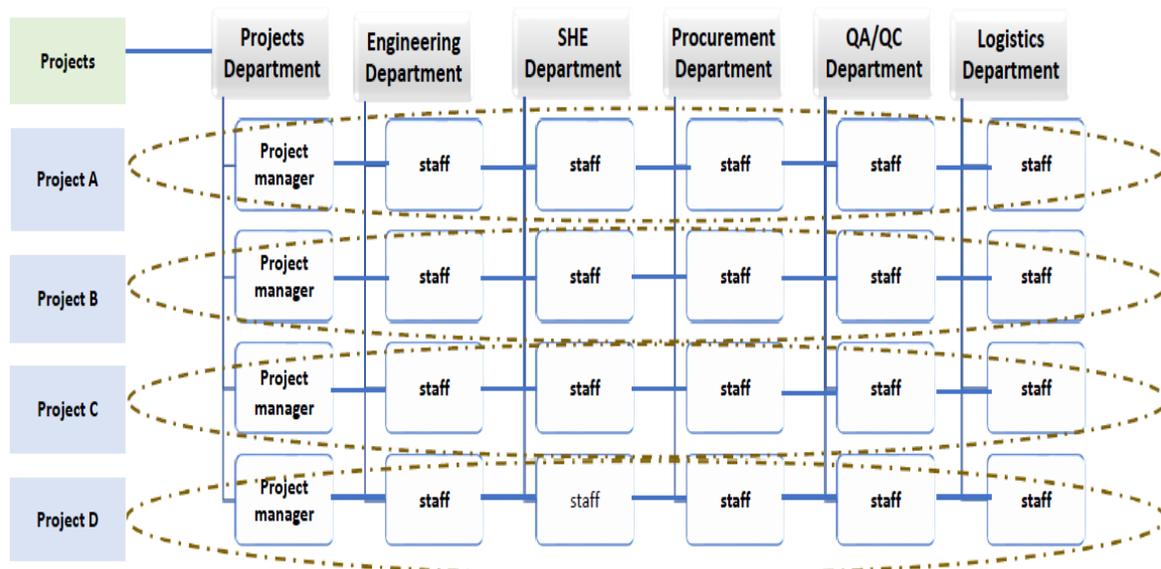


Figure 17 - Current project organizational structure

In formal/bureaucratic organizations, a leader's motivation becomes a complex phenomenon that encompasses individual leader differences, organizational characteristics, and the interaction of both factors (Spangler et al., 2014, P. 1092).

Matrix organizational structures require an increase in interaction among the project team; this could lead to additional sources for organizational conflicts, leading to organizational dysfunction, poor project performance, generates tension, stress, and reduced employee productivity when mismanaged (De Souza and Da Rocha, 2017). This was evident in theme 1.1; there were mixed views on the suitability of the current project organization with the execution of projects. Most participants do not see how the organization is structured, helping the project team make quick and efficient decisions, and providing productive work settings. The structure created a mix of organizational loyalty since members come from different departments/functions; they have multiple reporting lines, their department, and the project manager during the project life span. It was stated by a project manager from major projects that; *"you have so many other departments than projects to be involved in any decision you try to make."* A simple example of this is when you want to make any change to your daily work schedule. You must inform and get the approval of; security, logistics, procurement, SHE, the testing and inspection team, construction, the contractor, your manager, and all your peers and subordinates, *"a long list of the recipient on an email note."* This is just a simple example; on other issues, you must fill in lots of paperwork and seek approval from several individuals and departments. This is the difference between the system's aim and application, especially in an environment with a high uncertainty level like southern Iraq. This setting can suit an environment where conditions are ripe for such mechanization, and uncertainty is low. Lack of decision ownership and lack of real leadership impacted by the organizational structure were evident as main areas of concern and improvement. The SGPMS, according to Walkup and Ligon (2006, p.3), had its downside even in other industries for the same reasons. Project management is not only tools and techniques; a leadership role is vital in human resources management, motivation, problem-solving, and decision making. The project's organizational context, such as how the organization is structured, the work culture, diversity, and the will and desire of upper management, significantly impact the project manager's decision and outcome (Farazmand, 2010). Although every team member must practice their part of the leadership, lack of decision ownership hinders such practice since

leadership requires the individual to be a change agent and motivator (Barber and Warn, 2005; Podgorska and Pichlak, 2019).

– ***Different Size and Complexity Projects***

Due to the difference in size, nature, complexity, cost, and duration of projects participants worked on; there were different views among participants on the SGPMs regarding its suitability for a quick and accurate decision during construction. Findings suggest that the gated project management system is a well-designed system for large-sized and complex projects that greatly help plan complex projects, but it adds complexity, especially to small and simple projects. In other words, it is not suited to fit all types of projects. From theme 1.2, there was evidence of generic application of the SGPMs on any project regardless of size and complexity. The IOC classifies projects into two departments, major and minor, as explained in chapter 3, but the same project management methodology is applied to both. High complexity and more than \$20 Million in cost are classified as major projects, while minor projects were any project with less than \$20 Million in value and low complexity. According to (Sabri et al. 2017, p. 1829), systemic project management such as the SGPMs should have the flexibility that varies according to project size and complexity. It should avoid inconsistencies and reduce re-work due to changes and errors; it typically aims to plan and control the project execution to ensure it can be done on time and cost-effective.

Contrary to that, IOC using the same procedures and processes for every project regardless of the difference among projects; it is one size fits all. A project engineer from minor projects stated that *“for a small project, all these gated planning and reviews are a waste of time to go through, very lengthy routine stages where the project could be planned for and executed in a simple process”*. For simple projects, the gated cycles, most of the time, takes more time than what’s needed for the project execution duration. On the other side, large-sized projects in the O&G industry are branded with a technical scope, and a wide range of procedures, a vital component of these projects is compliance with rules and standards (Thamhain, 2004; Weijermars, 2009). Large-scale O&G projects are also well-known for the high probability of delay and cost over-run during their execution (Salazar-Aramayo et al., 2013; Sung-Hwan et al., 2018), which is no different than the problem stated in this research. The quality of planning and estimates regarding necessary resources, milestones, activities, and deadlines are also important (Weijermars, 2009). However,

the lengthy planning due to time lapse could cause the forecast's expiration and all the performed estimates. If not complete within an adequate time, several revisions are needed, another cycle of the project time, and resource-consuming by recycling efforts.

From discussing the project management system and its attributes according to findings in theme one and themes 1.1 and 1.2 from chapter 4, there seems to be no difference in the application of the gated project management system in terms of decision speed. It is an apparent difference between the system's aim and implementation; it is not geographically tailored to fit a high risk and high uncertainty environment like southern Iraq. There was added complexity due to the high number of stakeholders induced by the SGPMS requirements and the organizational structures. There was a lack of strong leadership where project managers are left to be executors of pre-made plans. Thus, and in answering the first research question, it is safe to say that the gated project management system is useful for project planning, exceptionally for large and complicated projects, although lengthy in the process. It does not help in speedy execution phase decisions regardless of the project's size and complexity and concurrence with participants' views that there "*no size fits all*" in this regard.

Consequences of A Rigid Bureaucratical Decision-Making Process?

Project execution and project management require control and governance to execute the planned work according to the plan and the time sequence. Project governance consists of a set of management systems, rules, procedures, relations, and structures that provide the framework for decision making for project planning and execution to attain the intended business or strategic targets (Salazar-Aramayo et al., 2013). Although there is no standard model that could fit every project, project governance must take the formal shape to achieve optimal performance (Bekker and Steyn, 2008). The IOC is a well-known sizeable bureaucratic organization that develops a web of multi-levels control and utilizes project managers as a key agent in enforcing much-formalized rules and procedures and SOPs, limiting information flow only through hierarchical boundaries. From theme two and theme 2.1, it was clear that the IOC emphases were more on control and compliance, which were only superseded by safety and security. All projects need plans and controls, without which they would be challenging to execute and assess. Project management theory suggests that reliable planning and efficient control are decisive factors in project management success (Kerzner, 2010). From main theme 1, the SGPMS shines at defining the

project's scope in the initial stages through gated process review groups, which are a critical aspect in project management. Is it possible to achieve the traditional cost, quality, and schedule measures to attain project management success? Within this context, the researcher thinks it would not be easy to achieve the triple constraints if the project manager cannot make quick decisions, especially during execution. From field notes, within one year, 27 out of 36 projects experienced cost and schedule overrun. They were mostly in the minor projects section.

In contrast, major projects reported schedule overrun, missing deadlines, delays to some project's targeted milestones, although cost overrun was less than minor projects as a percentage. With systemic project management, there needs to be flexibility (Sabri et al., 2017) that is fit for purpose according to project size and complexity. Many professionals and practitioners involved in conventional project management have come to recognize that project success is not only meeting time, cost, and quality (Ika, 2009). On any project, the traditional measures of cost, quality, and schedule are supreme, but they cannot always be achieved without the freedom to balance an optimal trade-off among the three. Project execution success could be attributed to three main reasons: field engineers and project managers' ability to come up with a creative solution and quick decisions to any field problem, real teamwork spirit among the project delivery team, and quick decision. Project managers must have all the requirements for successful, speedy, and quality decisions under time pressure (Fischer and Adam, 2012).

From theme 2, it is evident that the IOC has a very high level of formality in setting a legal framework for roles and responsibilities where individual responsibility is covered through fulfilling their part of the decisions making process. Participants echoed their main concerns with excessive formality in phrases and statements that were part of most of the transcripts of their interviews and were also part of the researcher's observation during project meetings and discussions. Words like; *"delegation of authority (DOG level), getting approval, I can recommend and wait for upper management, it must be approved by management, SOP, within the organizational norms"* were part of almost all interview transcripts. SOPs are over-utilized in the O&G industry (Salazar-Aramayo et al., 2013, p.591); therefore, having procedural knowledge and experience with these procedures and how to satisfy the system requirement could be either a hinder or an aid to the project manager. Simultaneously, skills and experience are the keys to capturing opportunities for timely delivery and providing creative solutions to instantaneous

problems during construction (Fischer and Adam, 2012). During the pre-decision stage, participants' predicament was mostly a mix of anxiety on how others will react to what they suggest. It also includes how other functions receive their suggestions and how to use the system to convince upper management to sell what they desire as they see it right. They also expressed their search for shortcuts to how they want the decision to go, thinking of the high number of stakeholders, and how to stay within organizational norms. These were very reflective of the project team's human factor, which relates to emotion and sociological factors and some rational making and making pre-decision plans. It requires knowledge of not only how to convince people but mostly on how to find breaches, loops, and possible exemptions within the procedures if they want a decision to go the way they desire; they call this "*procedural knowledge*" (Courtney, 2001). This implication affirms Hallgren and Maaninen-Olsson (2005), cited in Serrador and Pinto (2015, p.1041), argument that the solution to execution phase decisions is not through sophisticated planning and procedure but through methodologies that enable actions and prompt decisions to resolve these deviations. This point stresses the need for flexibility to allow the project manager and his/her team to be iterative in re-planning and adjust the project while executing. The rigid system will waste the project manager's energy on managerial and procedural issues instead of focusing on project execution.

When observing responses to emails that required the recipient to decide, on several occasions, an individual would take as much time as was given to decide that if there were one week, then the full week would be used. Another interesting tactic was saving time by limiting the alternatives proposed to upper management to only a couple of choices to expedite the decision approval and avoid further deliberation. When questioned more in-depth as to what these alternatives were, one option was to do nothing, i.e., to remain at the status quo, and the other option is the way desired. Decisionmakers tend to show a strong bias toward alternatives that perpetuate the status-quo (Hammond, Keeny and Raiffa, 1998; Geng, 2016). The status-quo option was only adopted as a time saver. This concept of using a status-quo choice to enhance the speed of decision-making approval broadens the idea of administrative man "*satisfices,*" looking for courses of action that are satisfactory or decision avoidance (Dean, 2008 cited in Geng, 2016). It indicates that procedural adherence does not promote enthusiasm for out-of-the-box thinking and time and cost savings. This is consistent with Spangler et al.'s (2014) argument on rigid systems implication on leaders; in this case, it deprives project managers of being real leaders and

does not encourage creativity, enthusiasm, and out-of-the-box thinking. It worth noting that a rigid decision-making model makes the project engineer and project manager more of an administrative man who reports a problem and suggests solutions and less as an initiative maker and intuitive thinker. Not necessarily a decision-maker in a real sense, which implies a lack of decision ownership, which leads to lost resource, time, and money resulting from extended project duration. All interviewees have had no formal decision-making training or formal courses; there were still high emphasized the training on control and enforcing procedures as directed by the IOC home office. These elements, precisely, the procedural one, were part of the corporate programming. This “programming” can lead to a baseline of knowledge-driven from the corporation and from which managers can adopt and then adapt to their specific decision-type, locked within the corporate rules and procedures (Bolfikova et al., 2010). Most participants desired to have freedom in applying their tacit knowledge and professional standards during the execution phase, where they can manage bringing the project to speedy, safe, and successful delivery. Another view of this is that having freedom in a large corporation can result in a loss of discipline in the execution process, negatively impacting the project’s safety and quality.

The IOC is very deliberate and tries to build consensus when making significant decisions due to the fear of lousy problem formulation. The consequences are grave in the case of mistakes (Priemus et al., 2008). It was stated by a project engineer from minor projects that: *“Due to blame avoidance, fear, and risk of making mistakes. Group decision-making (meetings style) is heavily applied in our organization, which involves more people than needed in decision-making.”* It mostly results in less than the desired outcome and time-consuming decisions because the voices of the people who will do the actual work are not heard. Another project engineer from major projects cited an incident where a decision about change to a bridge project that connects the oilfield to the main highway during the execution phase took more than four months, even with the limited traffic and load capacity. The reason was to abide by the procedure and to avoid any liability. At the same time, field engineers and project engineers identified the needed action from day one. Still, upper management reverted to committees, consultants, and regulatory bodies to avoid any liability despite countless lost opportunities for four months of delay. A slow decision-making process or too much back and forth consultation with various stakeholders results in, most of the time, a mix, confusion, status-quo, or no-decision. When faced with dynamic situations and uncertainty, humans try to make challenges easier using heuristics, the rule of thumb, rely on

experience, intuition, and gut feelings (Tversky and Kahneman, 1974 cited in Eriksson and Kadefors, 2017, p.493). For decision-makers to make meanings of quick situations with some risk, experiential simplification of the expected risk occurs first where information quality and relevance, information availability, and experience, especially for similar cases, are vital.

The main focus of execution phase decisions is on problem-solving, project control, and monitoring the project plan. It ensures what's executed in meeting deadlines, cost, and ensuring that all technical requirements and planned milestones established in the project plan are met and optimize resources management and efficiency (Pinto, Patanakul and Pinto, 2016). During project execution, any change to the planned sequence of tasks or technically related change requires new decisions. Several tools and techniques are used in this phase to help the project managers decide on controlling and monitoring project performances. Decision aid techniques for cost, schedule, and resource utilization effectiveness could range from S-curves, Earned Value Analysis (EVA), milestone analysis, Gantt charts, resource loading, and resource leveling, depending on the project manager's preferences, familiarity, and project complexity. Participants have different views regarding reacting to change, but there was the constant mention of utilizing the management of change (MOC) and procedural means in addressing project variations. At the same time, they state that they must fill a long list of standardized paperwork where some parts may not be relevant to the change, but only a matter of checking the box and covering yourself. This process is lengthy, but it documents the change and protects the project manager or engineer from being the only responsible party for the change decision and the expected consequences. Also, MOC is an excellent tool for documenting changes in chronologies and making a depository of lessons learned for each project.

The MOC is a misunderstood term and practice in the oil and gas industry. MOC is related to processing change and changing the human factors in it (Serrador and Pinto, 2015), not meant to be a project variation order or change order management. It is essential to state that project change management is different from traditional MOC. Conventional change management is concerned with a process change. According to Creasey (2007), management of change is the process, tools, and techniques to manage the people-side of change. Change management incorporates the organizational tools utilized to help individuals make successful transitions resulting in the adoption and realization of change. Change management is a structured process

that rallies support for change at all levels of the organization while building the knowledge, skills, and incentives to sustain it. However, a project manager from minor projects stated an exceptional understanding of this issue, saying that "*MOC should not be used for changes within a project unless the change impacts the process and final product (operability). For project variations, project change/variation management must be applied, not the MOC.*" It is indicative of the misapplication of a system that deals with an operation in a non-operation activity. In construction change management, the change is associated mostly with managing the project's immediate re-planning to accommodate the difference within a limited timeframe; otherwise, consequences may lead to further change and further consequences.

In summary, the answer to research question 2 is that bureaucratic practices provide a high level of control and compliance, but result in time-consuming cost factors due to time wasted, moral issues, and the lengthy process of resolving an issue. It limits the project manager's leadership role, creates a lack of decision ownership, and adds more administrative burden on the project team. Although it is an excellent tool for control, compliance, and accountability, procedural experience may lead individuals to search for loopholes in the system to save time and keep satisfactory status-quo situations. The implications are several, but the one with high impact is the non-essential practices and time spent across every project regardless of size and complexity. These implications do have a direct and indirect influence on professional, ethical standards, morale, and the lack of tacit knowledge utilization. Experts and professionals need to have freedom and discretion in their decision-making since it is their field of expertise and responsibility. Knowledge, experience, and technical knowledge are essential to successful project decisions and successful project management (Pinto, Patanakul and Pinto, 2016). Excessive and coercive procedures and formalization, and artificial modes could be very costly in creating a lack of motivation among employees (Spangler et al., 2014, P. 1088).

What is the Best Way to Formulate a Procedure?

From theme two and theme 2.1, it is evident that SOPs are overly used in the IOC, which is typical for an O&G company (Salazar-Aramayo et al., 2013). As a large corporation, the IOC tries to standardize the decision process not necessarily for documentation purposes but also for control and compliance. In general, procedures and SOPs are meant for an optimal approval-based decision, communication, and documentation of any project-related planning, change, or activity

performed. It is the standardization of sequences of work tasks through standard operations instruction and authority level with specific tasks governed by rules and regulations (Robbins and Decenzo, 2001). This could also be related to the overall organizational structure (Mintzberg, 1983, cited in Martínez-León, 2011, p 545), where roles and responsibilities are organized through coordination and formal work allocation levels of authority to control and coordinate work activities. Data suggest that individuals with a length of service, especially senior project managers, were feeling more comfortable with procedures; this could result from procedural knowledge and being used to the system throughout their years of service. While the younger professionals, project engineers, have less desire for following bureaucratic procedures and want to see some change to this routine and want a case-driven with discretion decision authority. They believe that the current use of procedures in making decisions is a waste of time and resources for simple matters and stated that in some situations, *“many times the case is simple, the procedures were not needed, but it must be followed.”* Eight out of eleven participants stated knowing the decision outcome prior to following the procedural process in simple project-related issues. Thus, following the procedure, to them, is no more than additional administrative work and a waste of time. In other words, you are not making the decision; you are following the paperwork, filling in a standardized format, and making some suggestions and alternatives for upper management to endorse and authorize or reject your proposal or to choose from your provided options. Surprisingly, there was agreement among all participants that bureaucratic decision-making procedures offer liability protection, which could be due to blame pointing practices at the organization when something goes wrong. There is a threshold level for formalization; if bypassed, it will have consequences contrary to its aim (Kock and Aubry, 2019). Applying procedures excessively and across the board without exception could lead individuals to bypass or consolidate some procedural sections to simplify the process but with risk. This was noticed from participants indicating the use of different procedural knowledge tactics. Some participants apply time delay as they take all the time allotted to them to minimize back and forth deliberation on their recommendations, and through limiting options, they provide two choices. They leave a status quo option with another option they desire to see as a base of the decision outcome.

Every project has procedures to have consistent engineering design and documents to produce it in a standard way efficiently. From preparing a schedule using interactive planning sessions to

designing to archiving documents, all these activities have procedures; these procedures should be written by experienced people who have worked on projects before. However, the challenge arises when procedures are not comprehensive or have too much or irrelevant detail that makes it difficult to follow. Besides, a significant question arises whether the procedures are well communicated, and personnel inducted and trained on using them. This is vital for this workplace problem; project teams in this oilfield are diverse; they come from different backgrounds and speak different languages. Therefore, they may have different understandings and interpretations of the procedures. Written procedures can sometimes be overwhelming to understand and apply, and not having modified and geographically specific procedures only add to this challenge. Significant time spent on documentation and procedures that are most of the time with pre-known results in a project execution phase, where time is best allocated for monitoring project activities with flexibility and freedom of decision making. During the execution phase, project management professionals desire to exercise their professional expertise with responsible freedom to manage, bringing the project to speedy, safe, and successful delivery. However, this could result in a loss of control in the execution process, which can negatively impact the quality. Some participants blame procedures for delays, but they believe these procedures are intended for a right and optimal decision. This point implies that participants in need of modified means and procedures that can be mid-way. Something satisfying compliance with organizational norms but faster and more straightforward than the current process, and that is why they see the key is enhancing communication to get the same process but in a quicker way. Whitley (2006) suggests that procedures and rules should be less formal and more project-specific to achieve this coordination and react to change since the project organization is built based on the specifics of particular project scope and requirements. Tailored and project-specific procedures are needed, but this will create many procedures to be followed.

The solution to execution phase decisions is not only through sophisticated procedures; it could come from methodologies that enable actions and prompt decisions to resolve quick execution action and deviations (Hallgren and Maaninen-Olsson, 2005, cited in Serrador and Pinto, 2015, p. 1041). Procedure writers typically breakdown any task or operation into its smallest possible subtask. They determine its optimal work method, but sometimes procedures and processes are written by managers who never experienced the real site conditions where procedures to be applied. The enabling way is to let the actual people who perform the job develop it and let

management review and enhance to get their share in the way they see fit and ensuring compliance. Informal networks, teamwork, and harmony among the project team are critical success factors in boundary-spanning than a rigid formality (Kock and Aubry, 2019). This way, you can have a procedure that could respond to the deviation and change's actual contingencies. Also, the needed skill set and clarifying the rationale behind the set of rules to see where each employee's parts fit among the team and make sense of it. The argument here is about participative decision-making and its role in improving employee morale and performances through procedures.

Authority given by the procedure should not be based on rank; instead should be based on function (Adler and Borys, 1996). Methods should also be flexible enough to allow some room for adjustment to uncertain conditions, and there should also be flexible procedural change when required. Procedures and rules should be less formal, and project-specific since project organization is built based on the specifics of specified project scope and requirements to achieve coordination and react to changes (Whitley, 2006). Adler and Borys (1996) not only support the notion of decentralizing power, knowledge, skills, and rewards in an organization and go beyond saying that this approach could not even fit bureaucratic and routine task organizations. This process affirms that the solution to execution phase decisions is best to be addressed through means and procedures that enable actions and prompt decisions to resolve execution phase dynamics. There is also a need to distinguish between routine tasks and non-routine jobs where SOP focus and application should be left to the project manager to address. To satisfy organizational structures and level of authority, consider what routine task performer/positions, and what non-routine jobs are needed. In this case, an organizational design dilemma appears since the same employee cannot perform the task's routine parts as a non-routine task. It makes procedures more of cover yourself (get my signature to sign on top of it), from an initiator and endorser sides irrespective of the possibility of doing it otherwise. Unnecessary procedures, formalization, and artificial modes could be very costly in creating a sense among employees to "check out their brains at the door." The driving forces could be that management has the authority to delegate as much responsibility for a negative outcome to subordinate as they want. In contrast, subordinates do not have an easy way of claiming credit for extraordinary efforts (Karreman and Alvesson, 2002).

– ***Communication and Information Flow***

Communication is at the heart of effective project management; that is why it must be timely, complete, accurate, and simplified (Bubshait, Siddiqui and Al-Buali, 2014). With effective communication, team members will have the same view of the work to be done and the deliverables produced, knowing who will perform what part of the project. When proper communication is followed, any change to the project documents, scope, and other requirements could be re-communicated to all the respective parties involved in a much more natural way. Missed communication and confusion caused by improper communication could result in information recycling, causing delays to the decision-making process and, ultimately, missing the project delivery timeline. Efficient speedy communication and coordination among the stakeholders is an effective strategy to mitigate potential project decision delays (Meng, 2012). As procedures intend to communicate and document events and activities to reach an optimal outcome, their main efficiency driver is communication efficiency (Robbins and Decenzo, 2001). From a project perspective, this is crucial because it is the primary vehicle that helps the project's team members understand what needs to be done, how it will be done, who will do it, and the timeframe in which it needs to be completed. It is a process through which the project team assigns and transmits meaning from one source to another to create and share understanding. It could be achieved by imparting or exchanging thoughts, opinions, or information by speech, writing, drawings, or other means. It is a two-way process in which there are an exchange and progression of thoughts, feelings, or ideas towards a mutually accepted goal or direction (Simon 2007, cited in Bubshait, Siddiqui and Al-Buali, 2014, p.1). From observation, this process is mostly concentrated between and within engineering, procurement, construction teams, operations, inspection, and quality control, vendors and contractors, SHE, and with and within the project's stakeholders. It mostly covers issues such as scope changes, design changes, any change due to the unknowns, technical decisions that all require an interface, and interface management among all involved parties.

From theme 2.1, the form and means of communication used in the IOC are several; written and formal, verbal, visual formal in the form of drawings, schedules, reports, charts, and others. Tools, such as charts, schedules, org structures, and matrices identifying stakeholders' roles and responsibilities, are used as a common ground language in almost every project. An overwhelming number of participants stated using a formal written type of communication with their superiors

to document any issue they raise to their managers and provide protection and evidence that they have raised such concerns. From observation, even an internal interface agreement (intra organizational agreement) is placed in a written procedural format, although the interface comes as a result of a meeting discussion. The meeting minutes could serve as the documentation tool, but the interface agreement is part of the generically applied procedure and must be followed. The majority of participants prefer face-to-face communication seeing it as the most efficient communication method for project execution. They also recognize that discussion during meetings provides an excellent platform for deciding. However, it takes a longer time and sometimes requires further explanation to individuals not updated on the subject they discuss during the meeting due to a rotational work schedule (6 weeks in and two weeks out). The main challenge to participants regarding communication is the formal type and the high number of people involved. Also, written communication about some issues is dependent on the recipient's interpretation. In a multi-national, multi-cultural team, written communication creates difficulty as language skills are essential for proper communication. The data attest to this as it shows all local national prefer the use of face-to-face communication means.

Communication is generally a misjudged word, particularly in large corporations, similar to the statement, *"The greatest problem with communication is the illusion that it has been accomplished"* (Quote from George Bernard Shaw). Dropping an email to someone without achieving the email's aim or filling a list of paperwork just to keep it in the project record does not serve the project more than covering the initiator from any potential liability. This illusion of doing my part is happening in the IOC with projects, assuming the other person received and understood what's communicated. Participants highlighted this problem and that difficulty in communication comes from; stakeholder alignment, attention, urgency, experience, the system, procedural knowledge, etc. These factors mostly result from an organizational setup and influence as could be the cause of slow and inefficient communication and significant project changes (Bryde, 2008). The core issue is related to the high number of stakeholders and how they communicate and collaborate, as participants called it *"a long list of the recipient on an email note"*. This problem does not only come from the procedure; there are other sources, the human element, the delivery system, and organizational factors. It is more related to the number of engaged people as the SGPMS, and the size of the IOC requires a high number of stakeholders to participate in the project planning and design to go through several concurrent reviews. It was observed that meetings and

PowerPoint presentations were overly used in briefing management and other functions before making decisions. The preparation of these presentations is time-consuming, where days are spent on development and reviewing PowerPoint slides. Participants were sarcastic about the time they spent preparing PowerPoint slides; they call it "*death by PowerPoint.*" Even when they are in the heart of construction execution, they do that for reporting project progress, meeting, project MOCs, and even for sharing information with other functions. This process could be reduced if all parties sit at one table and have a straight back and forth discussion, or the number of stakeholders lowered to a necessary level. Time could be well invested in focusing on construction activities instead of administrative work. Simplifying this practice into a more casual and candid conversation, even with visual aid on a board or handouts in a meeting, could save a great deal of time and effort. The documentation part could come after reaching an outcome from such a simplified process to assure accountability and control.

On how to improve the decision-making process, input from participants, whether explicit or implied, was focused on three main items; improving communication, simplicity, and reducing the number of stakeholders. Interface between the design team and project management team, among all stakeholders during the early stages of the project and not exaggerating planning. Instead, this suggested simplification could have the team focused instead of being distracted by administrative work. The collective agreement among participants is simplicity; even with forms and procedures, they need to be simplified. Communication enhancement requires having an efficient organizational structure since information sharing, instruction, and information disseminated according to the organizational structure with different levels of access as each position has its information domain (Lam and Lundvall, 2008). Processing and sharing knowledge are organizational and corporate culture factors, where both are vital for the decision-making process.

Procedures are vital for project quality documents and activities; documentation is equally important to keep all project records and draw lessons. However, procedures that are lengthy with a high number of stakeholders are sometimes complicated. The main issues with procedures are the excessive level of formality and the high number of engaged individuals in processing a form or a procedure and their generic application to all types and sizes of projects. From findings, field notes, and observation, it was noticed that overutilization of procedures is

counterproductive with timely decision making. Some methods are not enabling; instead, they hinder rapid decision-making designed by a group of individuals who have never seen the site where the project has taken place. Most of these procedures come as global practices for corporate headquarter without geographical tailoring. Procedure best be developed by individuals with first-hand field experience and knowledge, and it must be relevant and straightforward with the least possible number of stakeholders to be effective. Internal procedures should be designed and applied differently from procedures that are used with contractors and external stakeholders. Simplicity and project specifics are vital to having an effective procedure. The procedure should also be limited to routine tasks, not extended to all project activities where some do not fit any standardized procedures. They should be enabling, task-specific, with freedom for amending as the project manager see fit and enough authority to expert onsite to decide their application and relevance. Process evaluation and, ultimately, process improvement are essential to identify areas for tailoring and alterations regarding currently applied procedures. This could lead to identifying procedural bottlenecks, problem areas and highlighting stakeholders' concerns to reduce delay, improve the interface, and enhance workflow.

The Role of a Well Trusted and Technically Competent Individual in Filling the Control and Complexity Gap in Terms of Decision-Making.

Making the right and most timely decision is considered a primary key to the project manager's competence. Understanding the technical and practical aspects of the project's problem coupled with teamwork can be the best approach to field decision-making in reacting to changes, implying that decision-makers and their team must be technically and practically competent to assume such a role. Despite their difference in size and nature, construction projects in the O&G industry are the collective effort of multidisciplinary teams (Close, 2006), while gaps that could be a source of deficiency could come from the following factors:

- Functional staff members do not understand how their role impacts other steps in a more extensive process.
- Multitasking a team member, not always knowing that an unfinished task is delaying the overall process.

- Lack of mutual communication among team members about role dependency and the project's big picture.
- And others, depending on the type of the project organization

Experience plays a significant role in team building and team harmony. The relationship between the project team and project management success is empirically proven (Dinsmore and Cabanis-Brewin, 2014, P.179) since it's the core for managing the essential element in the process, which is the human resources. Each team member is a crucial player in project success. Having knowledgeable project staff members dispatched to the field to provide all needed coordination and supervision during execution is one of project management's main principles (Rolstadas et al., 2015). Experienced team members could also provide technical and project management support and feedback to the project's engineering office. Besides, a professional person having a good knowledge and understanding of the organization, including the corporate office's practice, standards, and procedures, could enforce control measures and provide insight into the execution process. According to participants, managing various projects for individuals in a key position was critical to decision accuracy and speed. Participants suggested that knowledge/experience of project management and engineering process of middle and upper management in executing projects is essential and has a significant impact on project execution.

– ***Capacity, Competence, Experience, and Decision-Making***

The IOC practices managerial cross-training through shuffling managers from one department to another. This practice is intended for leadership development, where future senior managers should know the role of different organizational functions. In many cases, people who get the job are not from the same function without the technical and needed detailed construction project management knowledge. They have managerial skills; they know how to manage people, are assigned to be decision-makers, but don't know what their people are doing and what they are supposed to do. One example explained a participant was a simple case;

“during the civil work for crude tanks, the contractor was compacting soil according to the project specification in layers where each layer was supposed to be 20 cm in thickness. When the contractor finished the first layer, it was 23 cm in thickness, which is not an issue in civil engineering as long as the compaction test comes back with the specified density. The field engineer reported this to document the case and requested approval from the department manager. The department manager requested a MOC and

referred this case to engineering. Engineering was a subcontractor providing engineering work and charge their expenses according to time spent; engineering requested another test. The lab is another call-off subcontractor whose work is based on request. The test came back again within the specified density, engineering then recommended approving of this layer and proceeding on the second layer but recommended to keep the last layer 3 cm less, so the final elevation will be as specified”.

From the start of this case to the time decision was made, it took six working days to communicate, test, and retest. In contrast, the entire situation could have been closed momentarily if the decision was left to the site engineer who knows the answer from the start or if the department manager has some construction and engineering knowledge.

Understanding the technical and practical aspects of the project’s problem, coupled with teamwork, can be the best approach to field decision-making (Burnes and Cooke, 2013). It helps control the project and react to changes that require decision-makers and their team to be technically and practically competent to assume such a role. The literature on organizational behavior concludes that experience is an essential factor in making a decision and positively correlated to a decision outcome (Dane, 2008). This is a personal context that could impact the result and effectiveness of the project’s execution decision and the project’s future. Integrating design and construction expertise are critical success factors; design engineers without construction and field knowledge will not have the ability to recognize the need for developing solutions for construction changes that are technically related. The same thing applies to field engineers without design knowledge. There is no solo gain with modern construction; team-oriented with broadly experienced project managers are essential for a project’s success. They interact through their full range of technical experience with designers and craftsmen. They best be industry experienced with broad exposure; they manage the project’s team, which requires them to have leadership skills and charisma (Fischer and Adam, 2012). By its nature, the construction industry is a knowledge-intensive and experience-based industry (Yang et al., 2014). The dominant type of knowledge in the execution phase is in the form of tacit knowledge (Nepal and Staub-French, 2016, cited in Mejlander-Larsen, 2017, p.650). Accumulated knowledge from the past performance is often not retained and used on future projects since it is individual and team-based, related to their retention. In order to integrate tacit knowledge into explicit organizational knowledge, high emphases need to be placed on knowledge management and the

retention of experienced individuals, in addition to a constant allowance for the application and development of tacit knowledge. There need to be identification, optimization, and active management of knowledgeable assets to create value and increase productivity and creativity (Carrillo and Chinowsky, 2006 cited in Mejlander-Larsen, 2017, p.650) for continuous improvement.

The primary type of knowledge management used by the IOC is the lesson learned from project history. While there is a practice to document and compile a repository system based on facilitating the sharing of history, it is not enough to capture individual knowledge unless allowed to be practiced and developed. The repository must contain useful experience for employees looking for answers and solutions in the execution of projects. The pool must not only contain useful knowledge, but the knowledge must be intuitive and easy to find. What differentiates the lesson learned depository system in the gated models is the execution phase. The execution phase needs a description of all work processes and activities to manage and execute each discipline. The extent of use will depend on the type, size, and complexity of the project (Kvaerner, 2012 cited in Mejlander-Larsen, 2017, p.652).

As most of the decisions during the project execution phase are problem-solving, they are different from the non-problem-solving decision-making process (Bolfikova et al., 2010). The IOC is a large organization and tends to be more formal, where rules and procedures employ behavioral models that make members adhere to follow a set of structured steps in making their decisions. Every participant has a different view and response regarding solving execution problems and reacting to change, MOC, and other formal procedures that were most utilized. They do have the ideas and answers according to their experience and technical knowledge.

“There is knowledge, there is experience, and there is a desire to apply personal expertise. If the system allows, there is even a desire to use others' expertise if the system permits” – three participants echoed this statement.

Any out-of-the-box problem requires out-of-the-box thinking, which could not always be covered in the set of rules and procedures to be followed in making decisions. There is something called system thinking which is preventing the view of perceiving the larger picture or integral parts of the reality in which these parts exist, like reacting to something without knowing the connecting dots with other parts of the existing fact (Senge, 1990 cited in Bolfikova et al., 2010, p.139).

Another way is personal mastery, which is creatively approaching things without being reactive to events through non-stop learning to perceive reality more clearly. All participants expressed the importance of experience. It is of great importance not only in deciding or in knowing what the outcome and the expectation, and the consequences of the decision are. It does help even within a bureaucratic system through procedural knowledge. Some participants also stated that knowing people's social habits could help select the proper way of approaching them and sell the ideas of the decision they want them to adopt or persuade them to specific options. Some stated that experience is indispensable when it comes to making difficult and complicated decisions. It was noticed that when project managers analyze events that lead to a certain problem, they develop what's called cause dynamic skills, which enable them to predict and warn of the possibility of future issues not necessarily like what they have analyzed. Also, one would think that the interviewees that had such ability and desire want a case-driven with discretion decision authority.

Interviewees with long tenure expressed characteristic behavior of "Guardian culture", which demonstrated the belief that there must be schedules, regulations, and standard operating procedures (Keirse, 1998). This type of culture, coupled with a matrix-type organizational structure, was evident in the interviewee's decision-making style. Data suggest that younger professionals have less desire to follow the bureaucratic procedures and want a case-driven decision method with some change to the routine. Surprisingly, there was agreement among all participants that bureaucratic decision-making procedures provide liability protection, which could be due to blame pointing practices at the organization when something goes wrong. There was a shared sense among research participants that mechanizing/standardizing work and having a specialized workforce hinders the presence of an expert and the creation of knowledge, while standardization and formalization through standard operating procedures reduce creativeness and the production of new skills. The data suggest that most participants felt that their previous project experience was beneficial in providing a framework for decision-making. Interviewees resorted to their experience with similar situations most of the time and drew comparisons to provide the basis for their decision-making steps. In a bureaucratic and procedural workplace, experience does not modify the procedure. Still, it helps the individual model what they propose to upper management before seeking their endorsement. Looking at the results on "procedural know-how," some interviewees felt "very comfortable" with the current procedure as they are

used to it and familiar with it, especially older individuals with longer tenure as indicated earlier. This feeling of comfort assisted them in decision-making by giving them the confidence to use something that has already been tested and trusted by upper management. There are common enforcement and adherence to rules and procedures and no incentive for out-of-the-box decision thinking or creativity in decision-making. Due to the nature of the O&G industry, it is high risk avert and practices procedural protection because of the costly consequences of any potential harm to the environment, individuals, or assets. Safety and environmental concerns are the highest priority to upper management and almost every project delivery team member in any decision to be made.

– ***Application of Expert/Naturalistic Decision Making (NDM)***

Construction execution decision making is not a routine or mechanical process; it is a cognitive process that requires quick thinking, creativity, problem-solving, and reflection; it is not merely following rules and procedures and bureaucratic practice (Frick, 2011). Experts work on exploring and developing alternatives as a quick and essential step in the decision-making process, developing multiple alternatives simultaneously and analyzing them quickly using ready comparative and ranking before selecting among them (Eisenhardt, 1989). It does not work with a paperwork trail required by a large corporation with rigid procedural requirements. When relying on intuition, you know without been conscious or knowing without knowing the real reason and why. Intuition leads to integrating information in a fast way of automatic information processing. For experienced people or experts to utilize their long-acquired knowledge, there is a need for trust, freedom of thoughts, authority, and discretion in making decisions. The case of an expert or naturalistic decision-making could also apply to teams the same as it used on the individual level with some pros and cons. Teams composed of an expert can even learn to be more effective when developing joint metacognition, knowing their roles, conversational in nature, and having effective leadership (Salas, Rosen and Granados, 2009). Three main things make an expert team more successful; stronger team leadership, a strong sense of team spirit and environment, and effective coordination and cooperation. Data suggests that expertise and intuition are utilized here, although on a limited scale due to the rigid system. Participants applied their procedural knowledge in selecting the right path to go with different decisions and in different ways to approach their superiors and limit alternatives to what they see fit for upper management to

choose from quickly. The utilization here is within the system and not for out-of-the-box thinking and not for creativity objective.

From the findings, senior project engineers and project engineers who compose more than half of the interviews stated knowing the answer to most execution decisions before following the decision chain procedure according to organizational requirements. Sr. project manager and project managers concurred with that but expressed frustration that implies that regardless of knowing the answer, the systems must be followed even if you know what to do, so there is no need to waste time energy. They almost agree that in large corporations such as the subject of this research, control is the most crucial element to leadership, and that is why emphases are high on compliance rather than on creativity and intuition. Decision-making during project executions is a multidimensional problem-dependent on several variables; individual mind-set or the view lenses through which the problem is viewed, approach, schools of thought, risk focus, and the process/system of making a decision (Rolstadas et al., 2015). Project execution success is related to three main reasons: field engineers and project managers' ability to come up with a creative solution and quick decisions to any field problem, real teamwork spirit among the project delivery team, and quick decision. Project managers must have all the requirements for successful, speedy, and quality decisions under time pressure (Fischer and Adam, 2012). It is dependent on the right decision during all phases of the project, but the most important and difficult ones are the decisions made during the heart of the execution battle.

In answering the third research question, SME's experience and expertise are vital in all cases and under any circumstances. Still, experience without enough empowerment cannot substitute for the control mechanism, and the full utilization of subject matter experts hindered by bureaucratic practice. Under this system and organizational setting, expert presence adds limited significance to the decision process with a limited role. A review process for some control measures is required to identify essential elements from non-essential, a control process gap analysis. If granted more authority and discretion, experienced and vested personnel could fill some of the non-essential parts to narrow gaps and save time and resources.

Chapter Summary

In this chapter, findings are discussed, and an attempt to finding answers to research questions is made. The discussion identified several potential areas for change and improvement. Observing and analyzing the IOC formal decision-making model through utilizing systemic and structured decision-making, it was found to be following the normative approaches (Mackie et al., 2007; Newman, Begg and Welsh, 2018), which limits the project's team ability in dealing with changes and uncertainty. This type of structured decision-making is more suited for operational needs and not for projects due to the difference in nature and dynamics of project execution (Martinsuo and Lehtonen, 2007). Such a decision-making approach's significant impact is in limiting project managers from practicing effective leadership and decision ownership. Knowing that required an action to rectify this process to have an enhanced decision-making process. Practical knowledge emerged from the discussion of findings of the impact of the SGPMS, bureaucratic practices, procedures, and the role of experience. In the next chapter, a reflection on this process and the development of an action plan is presented.

Chapter – 6, The Scholar-Practitioner

Introduction

The overall DBA program experience was instructive, positively impacting the researcher's personal and professional life in approaching problems and difficulties through a change in own thinking, viewing, sensing, reflecting, and acting. Daily work challenges and difficulties became managerial opportunities as they processed through problematizing, inquiry, and solution-seeking. Learning from conducting research was an emotional and intellectual pursuit in the DBA journey. Going through cycles of optimism and pessimism, information anxiety, discovering not knowing, facing obstacles and overcoming them through patience, further research for information, perseverance, and more were part of the learning experience. Cognitive development was significant and enlightening in changing the approach to life where holistically thinking became a common daily practice. The development process took several years, a transformational process that was cyclical, iterative, and a rolling wave-like process. It positively impacted thinking and personal growth through the linkage between theory and practice, scholar-practitioner thinking, reflective practice, sensing, and acting to address everyday life situations.

The research thesis part was a robust process that resulted in a deep learning experience with influence and impact on the researcher's future practice and character (Hall and Burns, 2009). It changed the approach to events presenting a new variety of perspectives that enlighten, redefine, and forge new paths and directions for knowledge production and retention. Becoming a better listener than ever allows for the emergence of information from others and learning to reflect in action to generate questions to extract further information from conversations and reflection on action to develop broader understanding before taking further action. Understanding a scholarly and theoretical process has helped frame inquiry, insights, and analytical probing into daily work, life events, and activities. It is a re-education process to affirm that there are many ways and forms of knowledge to be created and information to be sought, whether in familiar or rare situations. Before this experience, it was typical for the researcher to view issues with a certain depth, but not with rich picture detail. This research undertaking has led to know that even if you establish a rich picture, there are always richer pictures. There are also different angles to view the perceived picture and learning to evaluate things from different lenses through which you see a different picture. This chapter is devoted to reflecting on the learning process and the researcher's progressive personal development into a scholar-practitioner. It is structured in three sections; introduction, reflection on inquiring practice and the researcher's development to a

scholar-practitioner, and reflection on the development of practical knowledge through which an action plan developed.

Reflecting on Inquiring Practice – the Development of the Scholar-Practitioner

In addition to the DBA program learning modules, this thesis, by itself, opened the searcher's mind to the effectiveness of action research and what it could accomplish for developing understanding, making action plans, and finding solutions to workplace problems. Action research, by its participatory and cyclical nature, goes through iterations in each of the research steps, from concept to developing evidence-based knowledge in the quest for change to a given issue through refining and fine-tuning possible links and investigating leads (Mertler, 2009). Living through the research experience, playing back the chronology of events. Exposure to a significant amount of literature and learning about own learning and discovering not knowing and recognizing what need to be understood. Engaged relationally in creating the conditions that make the social world through interactions with the social environment. Not limited to own thoughts and assumptions (Johannisson, 2011). And learning how to acquire knowledge through collaboration with others through action and interaction. Acknowledging that becoming a researcher does not come from isolation, it is through interaction with others and the nature of those interactions, which influence practice and learning (Hopwood, 2010). Also acknowledged that for knowledge creation, individualism does not exist without collectivism as they are always related to each other, "I" does not exist without "you" or "us" (Sambrook and Stewart, 2008). Thus, it was essential to recognize the development of a new conceptualization of "self" (Hall and Burns, 2009) in being a native researcher researching its organization and knowing through others.

The original conceptualization came from being part of an overall organization and its social structure, self-reflexivity, reflecting on practice, and looking back at experiences. It is an intellectual activity within one's context to reveal oneself to oneself (Cunliffe and Karunanayake, 2013). As such, it is critically crucial that scholars and practitioners in the field of project management address issues such as how to learn research skills and how to learn about the learning environment in which such skillsets are developed. This learning needs to embrace a more reflexive approach to practice. Researchers need to appreciate and understand the nature

of how practitioners come to learn by critiquing their skills, knowledge, and learning context, which supports the development of scholar-practitioner.

Learning the different means of learning and knowing, such as reason, which comes through formal education, training, and judgment. General knowledge which comes from various forms such as text, words, and visual. Empiricism in which learning comes from sense-based data could be induction through observation, the discovery of themes, and patterns in empirical data or testing theories and hypotheses. In this research, empiricism was a great source of learning through an induction process where themes and patterns helped identify links and leads to the impact of several factors on the decision-making process. Still, the most advantageous way of knowing was through self-examination, which comes from an inner source. It is an introspection associated with insight, inspiration, instinct, creativity, and the like (Bourner and Simpson, 2005). It mostly resulted from being aware of the emergent nature of the dialogue/exchange with colleagues in the IOC participating in this research employed in making sense of collective experiences (Fletcher and Watson, 2007). This kind of exchange created arresting moments and creative learning through experiencing, recalling, telling, and re-telling of collective experiences in the dialogue. It was sharing meanings with others through creating the essential space for discussion in conducting research. This space would not be possible without creating the research plan for research, what to research, and how to research. A great deal of learning in this research endeavor came from this sphere, which is more connected to inner source and creativity in learning about the development of own learning. Self-examination helped understand the researcher's way of rationality, reflecting on practice, the research process, challenging own assumptions, and thinking about own thinking (Antonacopoulou, 2009).

From the concept of reflection of Raelin (2011), and Cunliffe (2004) reflective practice and the reflexivity of Weick (2006), from the DAB program and this research, questions and inquiries are more critical in reflection than forming answers or searching for answers. Reflection instances are mostly triggered by critical events and information related to the workplace problem and led to moving beyond tacit judgments, knowledge structures, and skills (Argyris and Schon, 1974; Gherardi 2006). Reflection required the researcher to combine professional experience and new insight (Pittaway and Thorpe, 2012). For example, reading 200 pages (including supporting documents) of quality check report for a simple project triggered reflection in this research

process due to its abnormality. Another example; participants asserting claims contrary to the researcher's own expectation and opinions, triggered reflection as to why and lead to challenging own assumptions in an attempt to know the difference and the why of that difference—knowing that questions require practical wisdom in researching the cause and reasons as they initiate a thinking process (Lindh and Thorgren, 2015) and raising more questions and inquiries about own thinking allowed to move from surface thinking to deeper level thinking. To cite an example of this process, during the data collection and analysis stages of this thesis, a project manager from major projects expressed his comfort using procedures while complaining about the delay at the same time. This contradiction was puzzling at the beginning, but two other participants restated the same thing. Why would those participants state something that appears to be contradictory? That was the first question raised; another question; is there any misunderstanding from their side on the discussed subject and the question? Several other questions about this issue were raised for thinking over many days. The initial question about procedures was asked again through a slightly different form to the same participants in a follow-up note; the answers were similar to the initial ones. Reflecting on the issue and searching for why this difference led to looking at their biodata, which was part of the voluntary information, it was found that they were at the upper bracket of years of service, which resulted in raising another question. Why would an expert person with a length of service feel more comfortable with procedures at the same time complain from the time it takes to come up with a decision? Critically reflecting on the issue in adding a broader organizational context to it, several other questions and cross-checks with other participants' input with different biographical details were raised. This process led to learning more and more until the conclusion drawn that the three participants repeatedly used these procedures to the comfort level and developed extensive procedural knowledge. They are not willing to try something to them is not tested. Acknowledging the lengthy-time was a fact of their assessment, but they desired to keep the comfort level as their procedural knowledge is an advantage. This process of reflection and questioning helped the researcher to interpret, transform, store, and use information (Neisser, 2014, P.126). It was a key component for cognitive development in increasing the ability to use and combine knowledge and experiences to guide the next steps (Lindh and Thorgren, 2015). This metacognition was associated with new insights and knowledge, improved information processing, conceptual arrangements, and frames of the situation (Gordon et al., 2012 cited in Lindh and Thorgren, 2015, p.525).

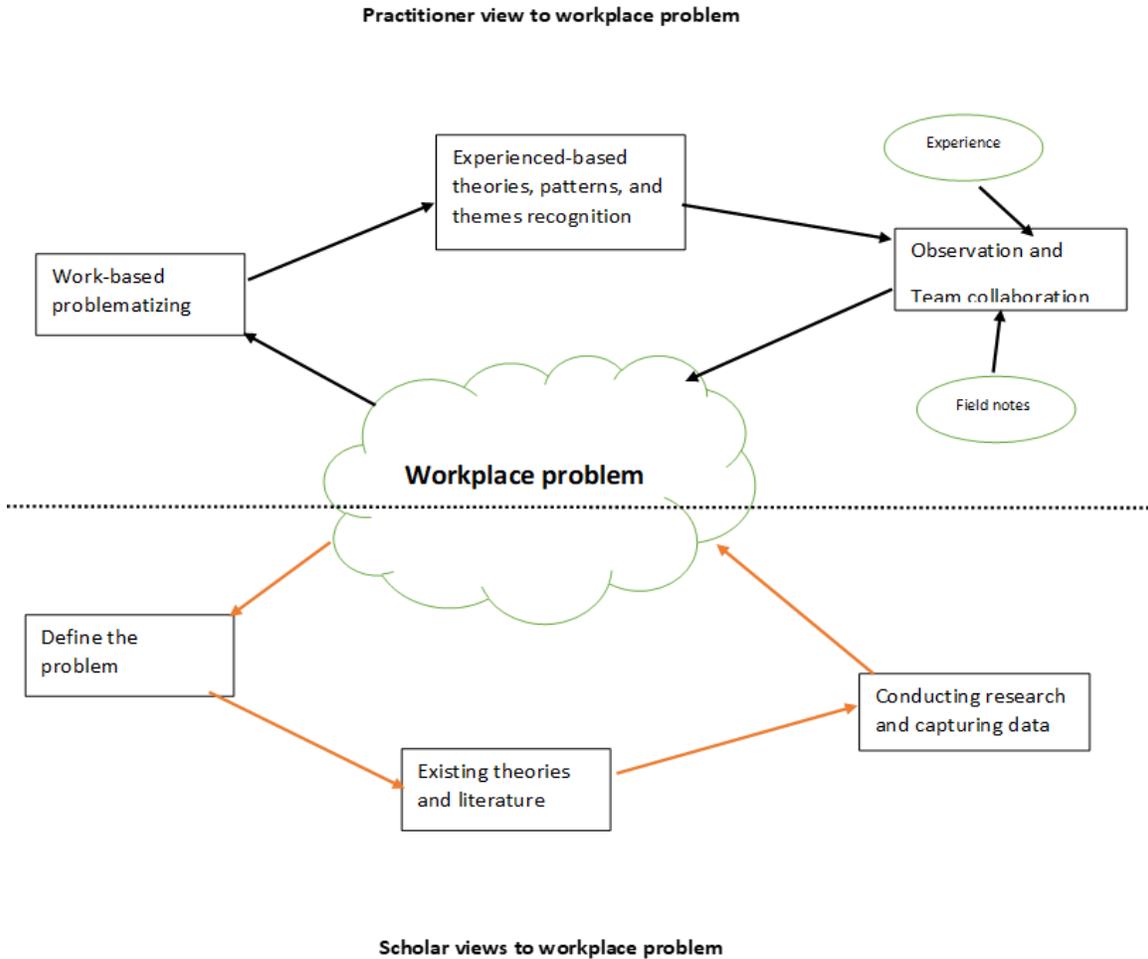


Figure 18 - The Scholar-Practitioner Approach

Handling work-related problems became different; single views were no longer considered reliable. Instead, workplace problems are currently handled through combining two perspectives, practitioner perspective, and scholarly perspective, as shown in figure 18. The process consists of developing a basic framework, outlining the case and defining the elements, building a plan for inquiry, and gathering evidence-based knowledge in a quest for understating prior to making an action plan for a solution for the problem. From a practitioner's perspective, the researcher learned how to identify and problematize through establishing a concept. Sorting through the various elements of the decision-making process and utilizing experience in recognizing themes

and patterns, observe, reflect, and take note and build localized theories. Theories about action built on organizational knowledge explaining why, how, and when of a given situation explain why such action took place and when it should take place, and what has expected if it takes place under different settings. It is a set of norms, strategies, and assumptions meant to make meanings of human conduct with theories about the work environment and the world in which it exists to relate linkages among situation, intention, and behavioral outcome (Patriotta, 2003). These theories come from acquired practical wisdom and experience that pertains to typical ordinary organizational activities the researcher has lived through. When encountering an out of the usual or rare situation that requires an explanation, such theories would not be enough since there is no existing knowledge for a theory base. Hence, building a new theory based on a hybrid approach is required. The hybrid approach utilizes existing theories, whether social or behavioral, tailoring them to fit the given organizational situation to have an acceptable explanation. It is new learning through the linkage of arguments and practice, similar to scientific knowledge creation when experiencing new natural phenomena. An example of that is the project manager's reaction to unexpected complex dynamics of construction project changes, the thinking process, while the situation is unexperienced before. The local theory attests to the need for success and achievement in solving project problems while maintaining organizational norms, but this is not sufficient for an unknown situation. Searching for an approximate theory, such as the field theory of Kurt Lewin on heuristics and human reaction to complex, unexpected events (Burnes Cooke, 2013), could explain how project managers react to dynamics situations. It comes from utilizing theory as a vehicle in solving the problem, from theoretical scaffolding in a cyclical way where knowledge is produced, and action based on the created knowledge. It was like zooming in and zooming out on the subject to see the fine details and see the same topic within a broader context. This process helped in revealing minute and significant differences. These attempts were productive in discovering not knowing, meaning that your research is still subject to further study and additional discoveries.

From a scholarly perspective, the researcher learned how to define the problem, benefit from literature, build theories based on existing theories, and conduct research and collect data in an iterative actionable way—applying empiricism and self-examination in seeking evidence-based knowledge. This approach to scholarship allowed for utilizing theory as an explanation in developing proper practices or, following Weick (1995), using theory as a process of sense-making

in reflection-on-action. Learning to initiate, iterate, build on what others have concluded with questions and critique their views and personal views and perspectives. Learning about the impact of the researched problem on participants, deciding to undertake a research process, and shifting to a facilitator's role in extracting information from participants. As a native researcher assuming double roles, there was a collision between past and present personal situations that induced deep reflection and learning. Raising questions according to the researcher's positionality as a project manager and raising questions that do and do not relate to the broader contexts of past, present, and future selves. Throughout this experience, there was a cyclical dynamic between reflexivity and action in understanding the researcher's role as a project manager within the project team in a natural social construct. It is practicing your profession grounded in theory, inquiry-minded by personal and professional values, and ethical conduct (McClintock, 2004, p.393). In this sense, the research process and DBA program, in general, has a far-reaching impact on personal life and how life is perceived. It indoctrinated the researcher on how to solve a workplace problem through research and construct evidence-based approaches for consideration. This effect has been through both the DBA program's academic journey and researching the area of professional interests, especially in project management. It is much of recognizing the differences between theory and practice and how to employ linking both in a scholar-practitioner complementary approach where practice employs several managerial attributes such as; experience, character, personal psychology, social skills, and other factors. On the other side, academia requires you to theorize, produce knowledge, and collect reliable data to address an issue. These data could be tested with practical wisdom and merged with a professional evaluation to fit with or be out of consideration. The hybrid outcome could complement developing a broader understanding, which could be the basis for better means and methods producing actionable knowledge. Applying this approach from two directions and reversing it helped identify why we know that we did not know. It led to the discovery of parishes that needed to be known in order to know. This thesis study topic and the research findings have led to a further unexpected understanding of a much broader set of perspectives about project decision making and the impact of several factors on the human element in construction project management. For example, before conducting this research, understanding the effect and relationship between organizational structure type and decision speed was there but not fully understood. In this research, it became much clearer that organizational structure has a significant impact on decision-making speed and accuracy in multiple ways, as was illustrated in

the discussion chapter. Here the researchers started to know that he did not know or did not know enough. In short, the practice of inquiry has had a significant impact on the researcher's personal and professional life. This research resulted in developing a new understanding of several factors affecting the construction project decision-making during the execution phase. The following sections will illustrate the researcher's reflection on the development of actionable knowledge and the action plan presented for the IOC management for consideration with an aim at making a change to the decision-making process to enhance decision speed and reduce project delays.

Reflecting on The Development of Actionable Framework

The process of developing an action plan aimed at making changes through action research for enhancing the decision-making speed was a great learning experience. Following action research principles and processes in identifying and limiting the researched problem/topic, gathering information, reviewing relevant/related literature, developing a research plan, conducting research according to the research plan and collecting data, analyzing the data, developing an action plan for the intended change, and reflecting on the process (Mertler, 2009). The workplace problem identified as project delays due to delay in the decision-making process, especially in the execution phase, during the dynamics of an essential part of the construction project. The first question was how to improve the decision-making process, which means what to study about this problem? The factors impacting decision-making were so many, and thoroughly investigating all these factors is not practical. Identifying an area for investigation was a challenging task at the start. Narrowing the focus of the topic to elements with the most impact and much doable research required gathering and filtering more information through establishing a rich picture of the problem. Filed notes from the researcher's diary and available project records were used as a point of reference to certain events and triggers for reflections. Reflection resulted in raising questions with refinement and additional questions on initial assumptions and own thinking. These questions were more than why; they extended to cover how, when, who, where, what, and more of what-if. These questions shared with colleagues affected by the problem, and several other questions and linkages to the problem started to emerge. Following the second step of AR, the literature on project management and decision-making illuminated several aspects and ties among project management, human factors, decision-making theories, and construction project nature and contexts. The literature also suggested a linkage between project management

methodology and organizational structure through the project delivery method and project delivery team, another linkage between organizational structure and communication speed and efficiency. Decision-making literature inferred on the cognitive process, the influencing factors, and the relationship between types and nature of decisions where the framing effect results from situations and individual backgrounds in terms of experience and competence, and practical wisdom capacity.

In contrast, organization literature illuminated several factors related to bureaucracy, controls, procedures, and more. The process was evolving, ideas started to emerge, and a learning process about the subject problem and how to research it was initiated. The problem was recognized, conceptualized, and potential factors identified. Thus, an investigation/inquiry process to the role of five elements on decision making was determined; these were; project management methodology, organizational context, project contexts, formalization/bureaucracies in current decision-making practices, and experience and competence of project management professionals. A research plan was drafted with input from three colleagues in the organization who volunteered to be a supporting group for this research. The three individuals are currently holding a department manager position who, at one time, served as project department heads, the sub-organization where the workplace problem under research. Considering the advantages and challenges of native researcher duality and positionality, working as a project manager, living inside the organization, being part of the problem and affected by it, interacting with colleagues, taking a reflexive approach to inquiry, and reflecting on own practice and experience. The research plan considered positionality, philosophical assumption, rigor, relevance, and practicality. A qualitative methodology chosen to carry out this research, which was very productive in the generation of rich and bulky data as the process of questioning, would illustrate ways unlearning reframes the problem into engaging challenges to be tracked collaboratively. Being an organizational member reflexively positioned within the problem environment in its natural setting and collaborating with colleagues affected by the problem, the researcher started to realize self-awareness and self-discovery. Observing and analyzing the IOC formal decision-making model utilizing systemic and structured decision-making was a normative approach (Mackie et al., 2007; Newman, Begg and Welsh, 2018) limits the project's team ability in dealing with changes and uncertainty. The significant impact of such a decision-making approach is limiting project managers from practicing effective leadership.

Knowledge from theory and action inside the work environment can shape how a task is performed, experience informs action, and help build and develop practical wisdom (phronesis), which is applied as a basis for action (Antonacopoulou, 2009). Empiricism and the induction process allowed the emergence of themes, especially about the SGPMS. There was an apparent contradiction between the system's aim as designed and its application and impact on the decision-making process. Also, in its generic application to all types and sizes of projects, is counterproductive and does not help with small and low complexity projects. SGPMS is associated with the creation of a high number of stakeholders. At the same time, personal experience and theory suggest that the high number of stakeholders adds complexity to the project since it requires additional resources to cater to and manage their expectations (Kermanshachi and Safapour, 2018). Findings and observation indicated the matrix type of project organizational structure in the IOC.

In contrast, the literature indicates that the structure sets the information flow, communication channels, positions, relationships, level of authority, and other means through which decisions are made (Ilin et al., 2016). This type of structure, according to San Cristobal, Fernandez and Diaz. (2018. P795), requires a high level of communication and interaction between department managers and project managers. There are some issues with structure efficiency in communication, level of authority, departmental loyalty, and leadership practice. Without adequate leadership leads to a weak organization (Gray and Larson, 2008). In a trust-based culture, a dedicated project team org structure is needed since projects and their management requires team building, social interaction, and decision making (Kock and Aubry, 2019). This structure will help deal with the dynamic nature of projects and enable the project team to be more creative in finding solutions to execution phase problems.

There was evidence that participants worked on finding loops, holes, and means to bypass the excessive formal and bureaucratic practices from within the system from findings. It indicates exceeding the workable threshold, and there must be a reasonable level for procedures and formalities to be productive without consequences (Kock and Aubry, 2019). There is a need to modify or redesign procedures and think about the best way to formulate them without jeopardizing the control part. Procedures are tied to the organization in general and its own culture and are related to the project organization itself (Mintzberg, 1983 cited in Martínez-

Leo'n, 2011, p.549). According to procedural work, roles and responsibilities are organized through coordination and formal work allocation with levels of authority to control and coordinate work activities to make an integral work from collective tasks. In comparison, the solution to execution phase decisions should come through methodologies that enable actions and prompt decisions to resolve execution quick action and deviations.

The process of identifying themes and patterns went further in analyzing data. It led to finding a theme related to experience application and utilization in a bureaucratic organization. Personal views on experience were that experience is vital in all aspects of project management. It is crucial in team building and team harmony as the relationship between the project team and project management success and decision-making ownership, speed, and efficiency (Dane, 2008; Dinsmore and Cabanis-Brewin, 2014, P.179). It was challenged with organizational practice in relying on structured means of project execution, limiting the utilization of tacit knowledge, which is the core for managing human resources. This piece of knowledge led to the need for further identification, optimization, and active management of knowledgeable assets to create value and increase productivity and creativity (Carrillo and Chinowsky, 2006 cited in Mejlander-Larsen, 2017, p.650) for continuous improvement. There was also evidence of "*Guardian culture*" demonstrated in the belief that there must be schedules, regulations, and standard operating procedures (Keirse, 1998). This type of culture, coupled with a matrix-type organizational structure, was evident in the interviewee's decision-making style. Construction execution decision making is not a routine or mechanical process; it is a cognitive process that requires quick thinking, creativity, problem-solving, and reflection; it is not merely following rules and procedures and bureaucratic practice (Frick, 2011). The experience and expertise of SMEs are vital in all cases and under any circumstances. Still, experience without enough empowerment cannot substitute for the control mechanism, and the full utilization of subject matter experts hindered by bureaucratic practice. Under this system and organizational setting, expert presence adds limited significance to the decision process with a limited role. A review process for some control measures is required to identify essential elements from non-essential, a control process gap analysis. If granted more authority and discretion, experienced and vested personnel could fill some of the non-essential parts to narrow gaps and save time.

Chapter summary

Critically reflecting on the scholar-practitioner development journey and its impact was enabling in the understanding that there is no single stakeholder view to addressing a problem and researching it. The thesis topic and the research undertaken have had a personal influence on professional life. This effect has been the scholarly journey through the program and research thesis in an area of occupational interests that set the stage for continued lifelong learning and development pursuits. In summary, the significant advantage of this experience is not only learning about the research problem; it was considerable learning about personal attributes, habits, practices, values, beliefs, and skills. There were three areas of knowledge discovered; what we know we know, what we know we don't know, and what we don't know we don't know. The change opportunity was found mostly in what we don't know we don't know. The above information supported by evidence is a prerequisite for changes, whether minor or significant, to the way projects are currently managed through the existing methodology, which means a need for tailoring or modification. Based on this research's actionable knowledge, a plan of action was presented to the IOC management for implementation as they see fit for time and geographical location, which to be decided and carried out. The plan, along with the thesis conclusion, is presented in the next chapter.

**Chapter-7, Conclusions, and Implications for Professional
Practice**

Introduction

From action research principles, the goal of any action research is to improve specific practice, correct things related to a problem, or make a change (Johnson, 2008; Mertler, 2009), for this research to be of benefits in linking theory and practice considering the outcome and potential implications. Attention and desire from several parties are required; the Iraqi national oil company since it is the oilfield owner, the IOC upper management since it is the oilfield operator, and Iraq's government since it has the power on all contractual related matters. There should be cooperation to solve this problem where the benefit could be for all involved parties in terms of the speedy decision, which leads to faster and successful projects that could be translated into tangible monetary value. Without a quick and accurate decision, time-lapse could lead to project delays and cost overruns. A framework based on this thesis's empirical research with practical implications could create change in how the IOC currently executes projects, presented in this chapter as an action plan for consideration. Two elements of this action plan were seriously considered by the IOC management and in the process of getting the headquarters' approval for implementation. These two elements were related to combining gate1, 2, and 3 in one stage gate for simple low cost and complexity projects. The second was in applying project change management instead of the current generically used MOC. A summary of a comprehensive action plan was presented, once approved, a detailed plan with action and evaluation measures to be developed for upper management to approve. There needs to be project-specific and fit-for-purpose project management methodology and project organization structure, drafting more efficient and enabling decision-making procedures, and utilizing a trusted expert in filling the control and complexity gap. This chapter is structured in three sections; an introduction, practical implication and action plan, and a conclusion.

Action Framework Work for Enhancing the Decision-Making Process

In this section, a summary of an actionable framework as an action plan presented for the IOC for implementation with proposed means for monitoring and valuation of the proposed action aims to improve decision-making speed and ultimately avoid project delays. It is imperative to recognize that project execution decision-making is not a routine or mechanical process. It is a cognitive process that requires quick thinking, creativity, problem-solving, and reflection; it is not merely following rules and procedures and bureaucratic practice (Frick, 2011). Therefore, the

execution phase decision-making process is complex as it involves many factors and is constrained by time and other constraints. As shown in figure 19, the actionable framework covers three main areas left to the IOC upper management to decide where and when to start. These areas are; project management methodology and project organization, procedures and formalities, and expertise and knowledge management. Each of these elements has an overlap in multiple ways as any enhancement made could have a positive impact on the other.

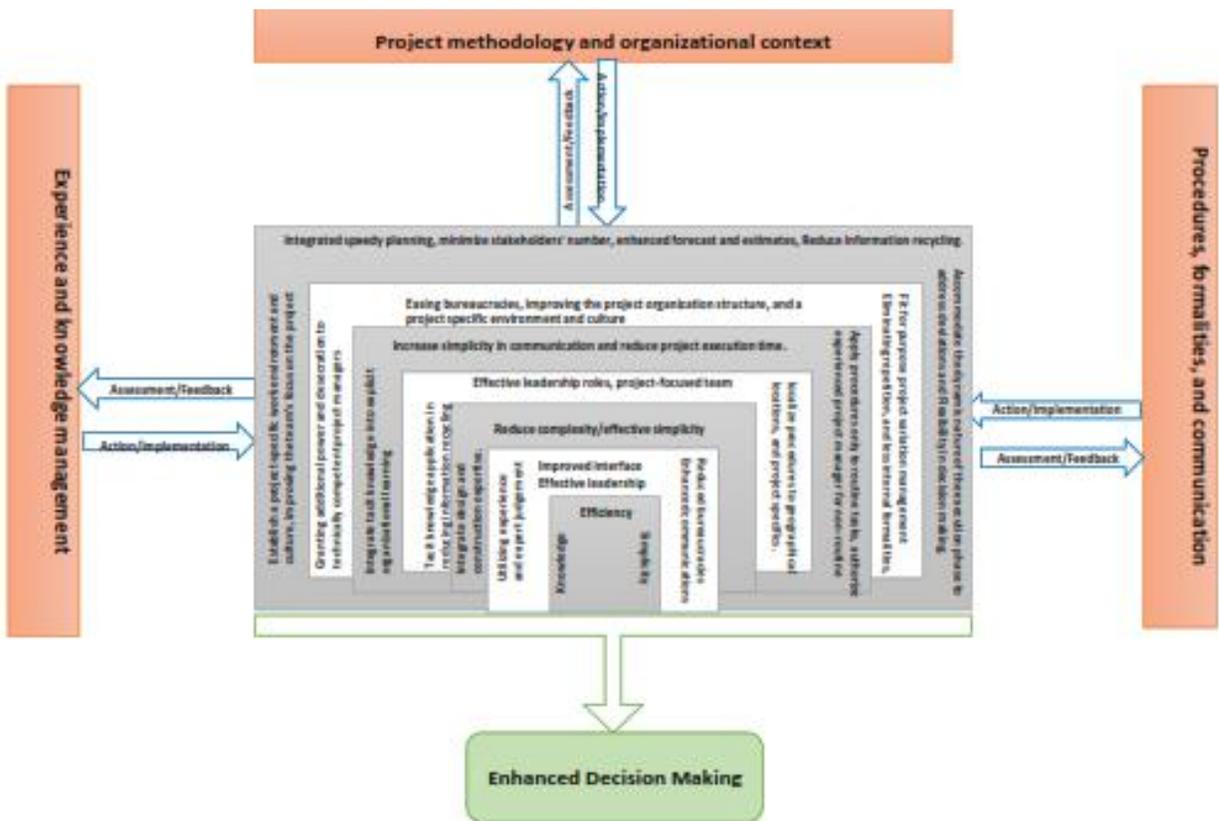


Figure 19 - Actionable framework diagram

For example, changes in the project organizational setting could have an impact on communication enhancement at the same time enhancing communication could provide the needed success factors for several organizational contexts. The same applies to applying experience, when project managers are empowered to make decisions, they will utilize their

experience and contribute to organizational knowledge. The actionable steps explained individually for each of the three areas:

Project methodology and organizational context:

- For small and low complexity projects, combine gates 1, 2, and 3 in one gate approval to integrate and speed up the planning part and minimize stakeholders' number. This action will lead to a much simpler process in shortening planning time and the validity of forecast and estimates and reduce information recycling.
- Small and low complexity projects are many and short in duration, utilize strong matrix type organization, and empower project managers in selecting their project team. Thus, easing bureaucracies, improving the project organization structure, and empowering project managers are pre-requests for better utilization of experienced personnel.
- Execute small and straightforward projects in one work pack; despite the longer design time it may take, it will significantly increase simplicity in communication and reduce project execution time.
- For large and complex projects, utilize a dedicated team organizational structure, as shown in figure 19, since these projects are long-term duration with enough development work to justify a dedicated team for such projects. Empower project managers in selecting their project team. By changing the org structure, having the team closer together, authorizing project managers with more control on their team, and having a team-focused project, the project manager will have more leadership roles than the perceived executor role.
- For the non-EPC project, the IOC team members need to be gathered in one location or proximity to the field, and communication simplified and enhanced. It could ease formalities and the lengthy communication where, in many cases, team member collaborates throughout the project life cycle without meeting each other face-to-face. This action will lead to better integration of the project plan and provides a more natural and efficient interface. It is one of the main principles of project management in having a capable project team with accountable leadership (Kerzner, 2010).

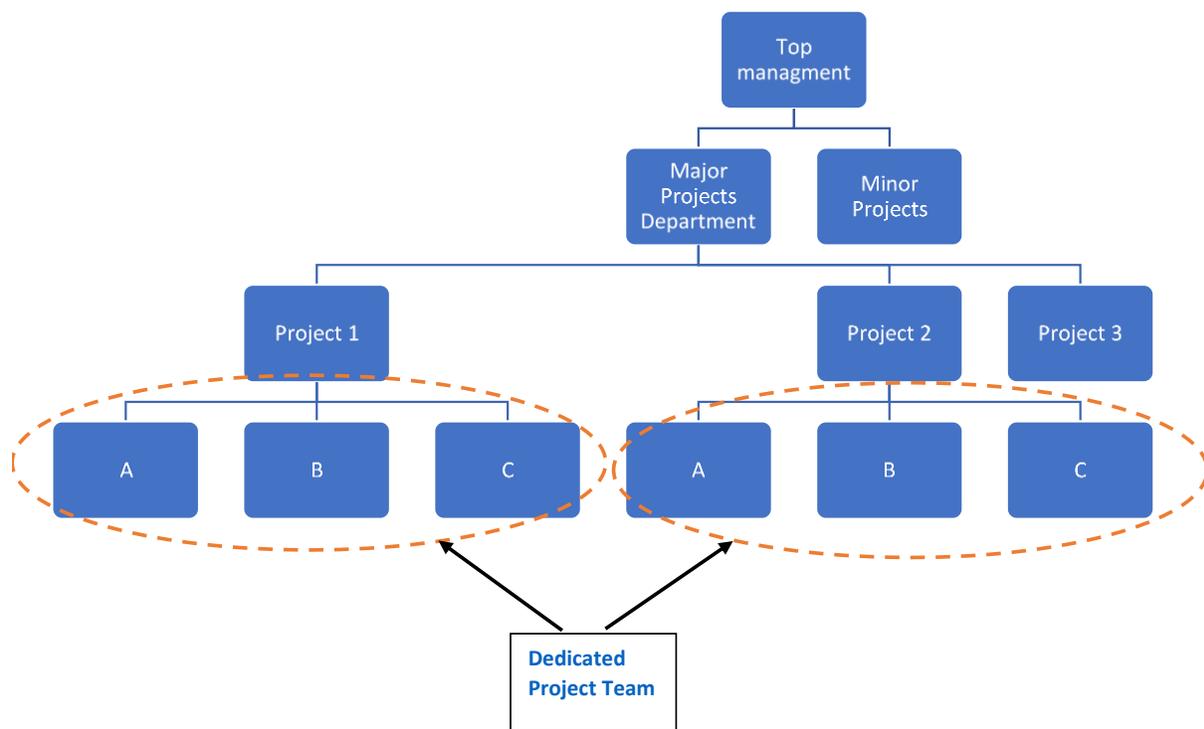


Figure 20 - Suggested, dedicated project team organizational suture

To evaluate the effectiveness and impact of these points and to measure areas of further improvement. There must be an evaluation and benchmarking means and methods, which could be accomplished through selecting a pilot project to implement some or all of these steps and assess the change impact compared with previous practice on another similar in nature project. It could be achieved through feedback from the project team, man-hour count, and the project's performance indices.

Procedures, formalities, and communication

- Adopt methodologies that enable actions and prompt choices to accommodate the dynamic nature of the execution phase and to resolve deviations whenever they take place. Encourage problem-solving, project control, and monitoring the plan as executed to meet deadlines, cost, and other deliverables. Flexibility and freedom of decision-making are needed. A significant amount of time is spent on documentation and procedures that are, most of the time, with pre-known results.

- Use of the MOC procedure in addressing construction project changes only when the change has some operational impact. In construction change management, the change is associated mostly with managing the project's immediate re-planning to accommodate deviation within a limited timeframe (Creasey, 2007). For project variations, project change/variation management must be applied, not the MOC. A modified procedure of an offshoot of current MOC could be used with project-specific and fit for purpose.
- Limit the use of formal IA procedures to interface with external stakeholders and utilize meeting minutes for internal interface agreements.
- Conduct process improvement to current procedures, identify procedures that are not enabling, localize procedures to geographical locations, and project specifics.
- Identify routine tasks, and any that does not fit routine criteria is considered a non-routine task. Apply procedures only to routine tasks while non-routine tasks should be authorized by an experienced project manager with freedom for amending as the project manager see fit and enough authority to expert onsite to decide their application and relevance.
- Modifying current procedures towards an enabling type of system to be more enabling, task-specific, and modified by experience individuals from first-hand field experience with field knowledge must be relevant and straightforward with the least possible number of stakeholders.
- Encourage informal communication in the deliberation process while agreements and decisions must be documented after the deliberation process. Limit formal meetings only to urgent matters and utilize meeting minutes for interface agreements instead of procedural forms of interface agreement.
- Include flow charts and visual communications such as drawings, figures, diagrams, tables, etc., to overcome language and cultural differences in procedures.
- Grant authority of applying or waving procedures to project manager since no procedure could cover all scenarios. Any unanticipated problem requires out of the box creativity, which not always included in the methods for making decisions

Evaluating changes to procedures is a lengthy process that must take a gradual and continuous improvement approach. This comes from time measures and ease of use and effectiveness, measured from project team feedback for a continuing process. It will be a long-term, gradual continuing improvement process.

Experience and knowledge management:

- Integrate design and construction expertise. Design engineer without construction and field knowledge will not have the ability to recognize the need for developing solutions for construction changes that is technically related. The same thing applies to field engineers without design knowledge.
- Reduce the appointment of department managers on cross-training without full knowledge of their departmental technical functions. It could be accomplished through shadow training by placing the trainee within the organization following the position holder until developing adequate knowledge before their full assumption of the position.
- Granting additional power and desecration to technically competent project managers with a length of service and loyalty to the organization as an expert in their field is key to quick decisions. Also, waiving some of the guardian culture requirements could help establish a project-specific work environment and culture, significantly improving the team's focus on the project and speeding up the decision-making process.
- Integrate tacit knowledge into explicit organizational learning; high emphases need to be placed on knowledge management and on the retention of experienced individuals in addition to the constant allowance for the application and development of tacit knowledge. Since the construction project is a knowledge-intensive and experience-based activity (Yang et al., 2013) and tacit knowledge is the dominant needed type in the execution phase (Nepal and Staub-French, 2016, cited in Mejlander-Larsen, 2017, p.650).

Conclusion

Decision-making speed and accuracy greatly influence project delivery's success and, ultimately, the project's strategic value. During construction, the decision-making process takes place during the most active part of the project and is influenced by several factors. Five areas were investigated in this research through a diagnosis of the problem and identifying key factors impacting the decision process, which, if addressed, could help in having an efficient and better decision with less delay and less bureaucracies. The study addressed and examined project management methodology/System, organizational context, bureaucratic/procedural practices, project context, and the role of experience and competence. This study uncovered how decisions impacted as project management professionals behave, react, and affect the stated factors. The

examination of these areas helped develop a further understanding of the causes, impact, and the needed action for timely and accurate decisions.

The oil industry in southern Iraq is suffering from significant and unreasonable delays in project execution. The project's planning part goes to its final stages, which include funding, strategic planning, and detailed design. Still, the implementation phase gets stalled due mostly to delay in decision making. This research was undertaken in a real workplace environment with its natural settings; there was a reasonable view of what's happening in the studied subject, including beliefs, interpretation, assumption, and theory; and the researcher's role was to extract conclusions from it (Miles, Huberman and Saldana, 2014). The research investigated decision-making on the specifics of the construction project management execution in the oil and gas industry and suggest practical implications and further improvement areas to enhance the body of practical knowledge on decision-making. Yet, this research shows that decision analysis elements are more than just a process or written procedure and that the time span for decision making is decisive for project completion and success. These elements are inherent in the individual, the corporate culture, and the adopted project management methodology under which decision-makers are making execution project decisions. They were evident with the individual background/experience, the industry, and the organizational culture. It safe to conclude from this research that the addressed factors are interrelated and not just isolated to one type of project. Inherent in the slow-paced environment of the O&G industry, the excessive use of formal procedures. It is important to note that the decision procedure is a tool for processing information to its conclusion to come up with an outcome to solve a problem or capture an opportunity. These tools must be offered to the practitioner to learn how to adapt such tools for different situations and at different times, including the project execution phase and the associated changes. In short, there is no one size fits all to the right project execution decision-making rules and procedure that meets all needs always.

Throughout the research process, there were matters of great importance to the researcher, most importantly, value, rigor, honesty, ethics, and responsibility on every statement, conclusion, interpretation of findings, and whatever related to this research outcome. The literature review focused on the specifics and relevance of; project management, construction projects execution, formalities, experience, and decision making. The research plan, philosophical assumption, and

the details of the research method are clearly explained and stated in chapter 3. As a native researcher embedded in the workplace, the researcher's role is clearly described, data produced through semi-structured interviews, workplace observation, field notes, and previous project records. The researcher tried to link this research conclusion with the presented data to prove the objectivity and confirmability of this research and was explicit and self-aware about personal assumptions, values, biases, and emotions and how they influence the research process.

These data were summarized, validated, and analyzed thoroughly through five steps and used for analysis, as described in the analysis section in chapter 4. The analysis resulted in three main themes and three subthemes: project management methodology, the project organizational structure that was a byproduct of the adopted method, and project context. Others were related to bureaucratic practices in the decision-making process, communication means and procedures, and the utilization of experience in a procedural and bureaucratic environment. The analysis results were discussed and used in finding answers to research questions established in chapter 1 of this thesis—the conclusions considered to be accurate when presented to; SMEs, colleagues, and participants. The findings are mostly consistent with, linked to, and conform to prior decision-making theories. The results were indicative of a direct and indirect relationship between project management methodology and decision-making speed; there was also a definite impact on the project organizational structure and the induced culture. Bureaucratical practices and excessive formalities and rules and procedures have a significant impact where procedures were not enabling and more mandatory additional requirements even if decision results are pre-known. The finding attests to the importance of experience and SME's presence within a bureaucratic organization, although limited to procedural knowledge, if allowed, it would enhance the control–discretion optimization. This research led to further understanding of several factors affecting the construction project decision-making during the execution phase and raising more questions about the impact of critical elements on the speed and accuracy of execution phase decisions. Some of the practical implications have been seriously considered by upper management on modifying the gated approach's application to smaller and low complexity projects and on the use of MOC. The findings of this research provided an action plan that could change the currently practiced decision-making process, which came as a result of active and transformative participation of those affected by the problem (Crawford, 1995, cited in Sexton Lu, 2009, p686). The goal here was to find means for improving execution phase decision-making

speed through research employing the developed wisdom from practice in a scholar-practitioner approach.

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Appendices:

Appendix A. Participants' Demographics

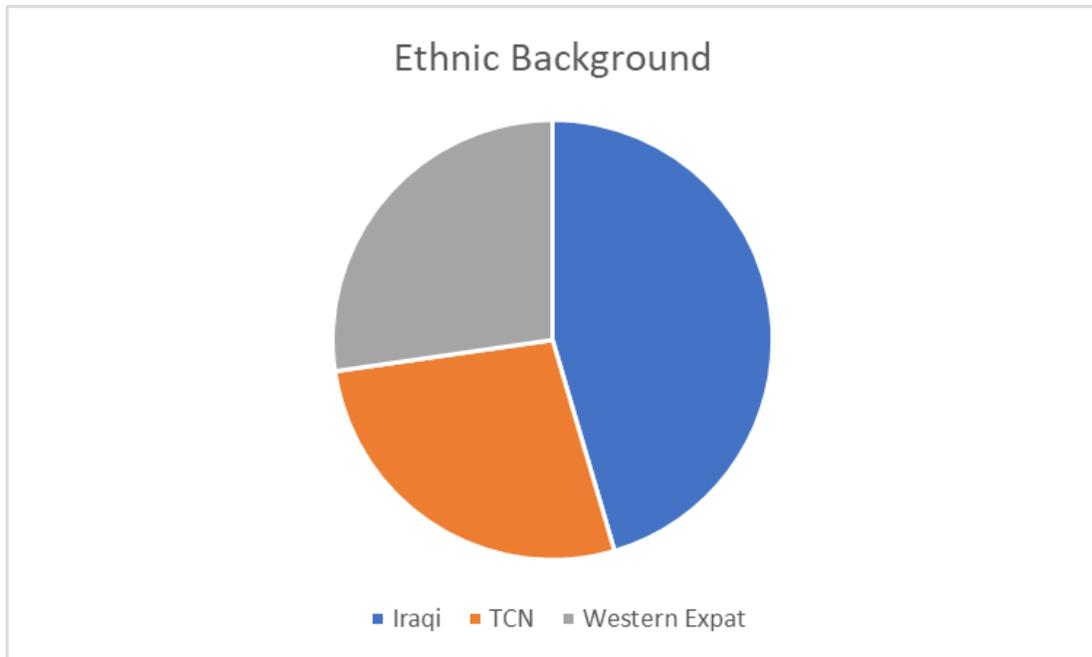


Figure 4.1 – Participants' ethnic background

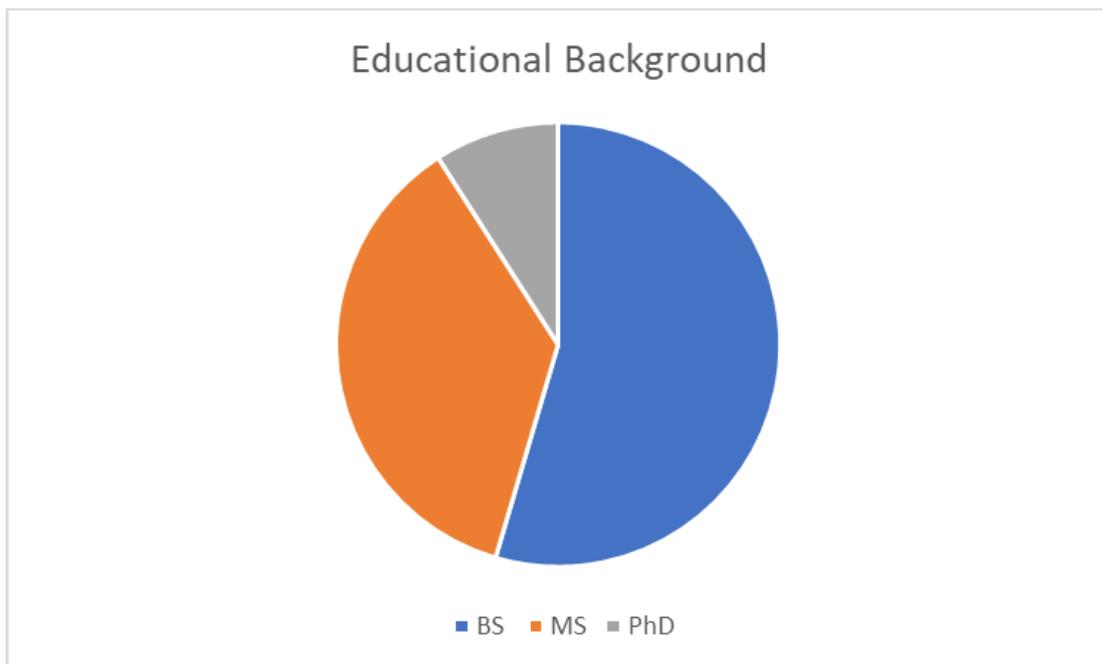


Figure 4.2: participants' Educational background



Figure 4.3: Participants' positions in the organization



Figure 4.4: Participants' experience

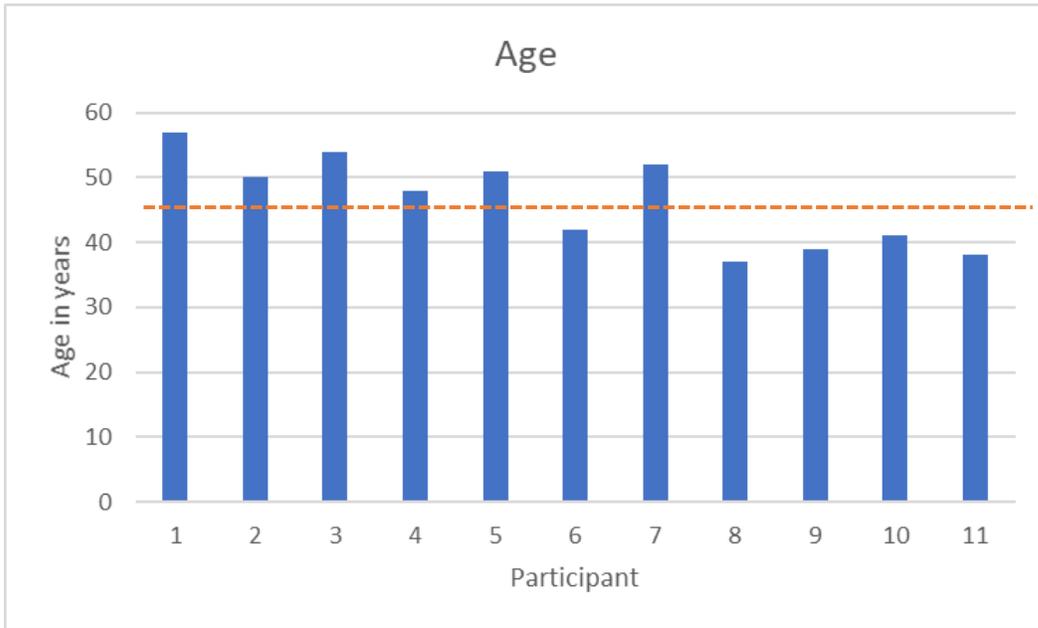


Figure 4.5: Participants' Age

Appendix B, Informed Consent, Recruitment



Committee on Research Ethics

PARTICIPANT CONSENT FORM

Title of Research Project: Construction Project Management In The Oil Industry: Bureaucratic (SOP) Based Decision VS Discretionary SME/Professional Based Decision

Researcher(s): Zeiad Alhachami

**Please
initial box**

I confirm that I have read and have understood the information sheet dated
for the above study. I have had the opportunity to consider the information, ask
questions and have had these answered satisfactorily.

I understand that my participation is voluntary and that I am free to withdraw at any
time without giving any reason, without my rights being affected. In addition,
should I not wish to answer any particular question or questions, I am free to
decline.

I understand that, under the Data Protection Act, I can at any time ask for access to
the information I provide and I can also request the destruction of that information
if I wish.

I agree to take part in the above study.

_____	_____	_____
Participant Name	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature
_____	_____	_____
Zeiad Al-hachami		
_____	_____	_____
Researcher	Date	Signature

Principal Investigator:
Name
Work Address
Work Telephone
Work Email

Student Researcher:
Name: Zeiad Al-hachami
Work Address: Burjesia, Basra, Iraq
Work Telephone: +971559520050
Work Email: Zeiad.al-hachami@woodgroup.com



Committee on Research Ethics
Participant Information Sheet Guidelines

Date:

Dear Sir/Ma'am

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to ask us if you would like more information or if there is anything that you do not understand. Please also feel free to discuss this with your friends, relatives and GP if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to. However, you have four weeks from the day you received this invitation to decide and sign the attached consent form, If we do not hear from you in four weeks we shall assume that you are not interested in taking part of this study.

Research title: Construction project management in the oil and gas industry: Bureaucratic (SOP) based decision vs discretionary SME/professional based decision.

Research aim:

The aim of my proposed research is to explore and study project management professionals' opinions in the oil and gas industry in Southern Iraq regarding their perception of making decisions during the execution phase of projects. It shall cover the basic elements of decision making principles and the potential conflict between the desire of making decision based on experience in the field as subject matter experts (SME) vs making decisions in compliance with organizational norms and requirements based on Standard Operating Procedure (SOP). Project managers utilize their technical expertise to make quick decision in navigating projects during the execution phase while SOPs are rigid and mostly managerial routine driven by control. It will also draw lesson learnt from past project performances and how decision made a difference in project success or failure. My research aim is to explore the difference between technical/functional based decisions and managerial/structural based decisions during the execution phase of construction projects in the oil and gas industry.

Prior to deciding, I would like to answer the following question that may you wish to ask and ready to answer any additional question you may have as well:

1. Why have I been chosen to take part?

You have been chosen for your extensive background in as project management professional due to your experience in construction in the oil

and gas industry and your broad knowledge and length of experience. I have also invited several of your colleagues in different places in the same industry and geographical location. However, answering the following question with YES will explain the criteria on which you have been chosen

1. Project manager or project engineer with more than 15 years of experience
2. Managing construction in the oil and gas industry
3. Managing the execution phase of construction projects
4. Not part of the design phase management

1. Do I have to take part?

Your participation is fully voluntary and free to withdraw at any time you wish to do so.

2. What will happen if I take part?

This research is part of the requirement of a doctorate program with the University of Liverpool Management School. The research method follows a narrative approach which is semi-structured interviews in a story telling style regarding decision you have made and how decision are made during the execution phase of construction project in the oil and gas industry.

Research participant role shall be, voluntarily answering to the best of your knowledge to the extent possible you believe and feel from practical experience any question raised by the researcher during an interview regarding the research subject and what pertain the research area.

The plan is to have these interviews fit your schedule and to carry them on two hour session at place of your convenience in the camp (coffee shop or resident) for three days. However, there may be need to ask some questions later on which we may have to schedule a follow up discussion when possible and when required. Whatever suites your privacy whether time or location could be accommodated and arranged for and agreed upon with you prior to any interview session to take place.

If you feel that you are participating in this research, answering question, or concurring with views only to fulfill a collegial obligation toward me, you can without any reservation withdraw from this research at any time without offending me or affecting our relationship.

3. Expenses and / or payments

There shall be no expenses on your part whatsoever, I shall be visiting your desired place of choice to discuss and ask questions. Any refreshment or phone calls shall be paid and initiated by me.

1. Are there any risks in taking part?

I don't foresee any risk involved in this research; I don't see any disadvantages since the aim is producing new knowledge that could benefit future project managers and the industry in general. If you feel at any moment that there is potential risk of any type or if you feel uncomfortable at any time – please feel free to let me know

2. Are there any benefits in taking part?

I can summarise the benefit in the common good for our profession and our industry. Producing new knowledge and transferring this knowledge to other potential project managers could be of benefit to current practitioner and future project managers. We shall also benefit from the information exchange which is expected to take place during the course of this research

3. What if I am unhappy or if there is a problem?

If you feel unhappy or you have some concerns at any time during the course of this research, you can contact me directly at Zeiad.al-hachami@online.liverpool.ac.uk, or +971559520050. You can also directly contact university of Liverpool at **ethics@liv.ac.uk**. The university of Liverpool has asked to pass the below message to participants of this research.

The University of Liverpool have a research governance officer than you can direct any complaint to at any time. All complaints shall be handled through the Committee on Research Ethics complaints procedure. The University of Liverpool stress passing on this message:

“If you are unhappy, or if there is a problem, please feel free to let us know by contacting [Principal Investigator name and number] and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the Research Governance Officer at ethics@liv.ac.uk. When contacting the Research Governance Officer, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.”

4. Will my participation be kept confidential?

All of the produced data, information, conversations, and opinions shall be kept confidential. I shall keep all of the research record at my position, and I shall not place any names except (reference codes) on any note, paper, or soft copy of any type.

5. What will happen to the results of the study?

I shall use this research to fulfil the requirements of Doctoral degree program which might be published by the university, used in university seminars, and could also be shared and published through professional societies. However, if publication comes through suggestion from my advisor I assure you that there shall be no names, and all confidentiality measures shall be kept as explained above.

1. What will happen if I want to stop taking part?

If you decide to stop taking part in this research at any time you have the right to do so at any time. However, information that is produced from start to the time you opt to stop shall not be used without your approval.

2. Who can I contact if I have further questions?

Zeiad Al-hachami
Zeiad.al-hachami@online.liverpool.ac.uk
Zalhachami1@aol.com
+971559520050

Researcher statement:

This consent form attests that the researcher shall maintain confidential all participants' personal information including identity, opinions, and conversation record unless the participant is willing to be known. Also the form attests that the participant taken part in this research voluntarily with full option to continue or withdraw from the research at any time and to answer or decline any question. Participant may retain copy of this form for personal record.

The researches hereby signing below to uphold the above agreement

Researcher

Zeiad Al-hachami

Participant (Optional)

Appendix C. Interview Guide

Interview Guide – Research Questionnaire

SECTION I – BIOGRAPHICAL INFORMATION

You are free to share this part of the information; it is fully voluntary.

- Age, total years of professional experience, and total years of oil and gas experience?
- Educational and ethnic background?
- Type, sizes, and cost of projects you worked on?
- Past decision-making experience and capacity?

SECTION II - GATED PROJECT MANAGEMENT

- How do you view the gated project management system and its contribution to the execution phase?
- In your own opinion, do you see enough attention given to the execution phase in the gated project management system?
- How does the gated project management system address changed during the execution phase? Does it help in reacting to change during execution?

SECTION III - ORGANIZATIONAL RELATED QUESTIONS

- Hat do you think your current project organization is well suited for execution of your project? What do you think of the overall organizational structure and efficiency required for your projects?
- Do you think the organizational structure causes you some kind of ease or frustration with decision making?
- What do you think the difference in work habits and cultures between Iraq and where you were working has any issue with the way doing business in southern Iraq?
- How do you see any impact of cultural differences among your project team in regard to communicating decisions? Prior to decision making and after decision was made?
- How do you normally communicate with superiors prior to making a decision?
- Do you find communication speedy and efficient? What factors may you think of?
- Does the current project organizational structure suit quick decision making?
- What are the organizational difficulties you see in making decision making, so time-consuming?

SECTION IV - PROJECT RELATED QUESTIONNAIRES

- From your experience, what are the major sources for changes during project execution?
- From your experience, what is the best way to reduce or eliminate the project's changes?

- How do you normally react to any change during project execution in a formal way?
- How do you prefer to react from an expert in the field perspective?
- How do you define a successful project? What does the word success mean to you?
- Do cost and schedule are the main success indices in your view?
- Do you think you have enough involvement in the design input? If not? Why?
- Do you believe as PM or PE that been involved in the design does help you during the execution phase in making decisions? Why?
- Do you think the currently adopted MOC is adequate for addressing execution phase changes in a timely manner?

SECTION V- DECISION MAKING QUESTIONNAIRES

- What does a successful decision mean to you? How do you define "successful decision"?
- What kind of thinking process do you undergo when making a routine decision?
- What kind of thinking process do you undergo when making an important decision?
- Can you describe your natural feeling prior to making a decision?
- Have you felt knowing the answer to a given problem before following the procedure and felt that the procedure is a waste of time?
- Do you think having meetings are good for making decisions to accommodate project changes?
- Do you find it easy to call for timely meetings?
- Do you see that it is good in all cases?
- What kind of communication do you prefer? Face to face or
- Do you have any role in setting the contractor's selection criteria?
- What do you think of a relationship with the contractor and its impact on the ease or difficulty of making a decision during execution?
- What do you think of the relationship with the local community and its impact on decision making during execution?
- Do you rely on your past experience or on following procedure in solving problems during the project execution phase? To what extent do you utilize your past experience when it comes to simple issues and complicated issues? Why?
- Do you think you have enough authority to react to project changes, especially during execution in the time frame you see if professionally, right?

SECTION IIV - GENERAL OPEN DISCUSSION

You can share any topic, any story, and any subject you may wish to talk about. Anything that could come to mind.

Appendix D. Sample Interview Transcript and field notes

Transcript of Research Interviews (ROW DATA)

Date: 11/12/2017

Participant 1

Conducted with [REDACTED]

P: for participant

ZA: for Zeiad Alhachami

Start of Interview

ZA: Thanks for accepting my request for this interview as you know I am doing this research in a DBA program with the university of Liverpool as we have discussed it with you.

P: I'd be more than happy to discuss any topic you may bring to discussion to the best of my knowledge and to the extent possible.

SECTION I – BIOGRAPHICAL INFORMATION

You are free to share this part of the information; it is fully voluntary.

- Age? total years of professional experience? and total years of oil and gas experience?
- Educational and ethnic background?
- Type, sizes, and cost of projects you worked on?
- Past decision-making experience and capacity?

P- [REDACTED] years old, 24 years of work as a civil engineer in oil and gas industry, ten years of working as [REDACTED] and manager, BSC in civil engineering

ZA: Have you had any formal decision-making training?

P: NO, no formal training.

ZA: How did you learn the decision-making process

P: Learned how to make a decision through practice, 16 years in total as a [REDACTED] and [REDACTED] manager which allows me to lead others and make decisions, by experience as I moved up the rank

SECTION II - GATED PROJECT MANAGEMENT

ZA: How do you view the gated project management system and its contribution to the execution phase?

P: It is the most efficient way to control the projects from the start point and to avoid any conflicts and misunderstandings which may occur during the construction phase and make the right preparations to execute any required changes

ZA: In your own opinion, do you see enough attention given to the execution phase in the gated project management system?

P: To some degree, through extensive planning prior to start the executions (gate three) and the check points to make a cold eye reviews but the execution is left to the role of the project manager regardless of the system. The system is great planning system, while execution is putting in place, there is difference here and the role of the project manager in executing planned work is the key.

ZA: do you mean there is not enough attention in the system during the execution phase?

P: there is enough planning for the execution phase but Not much during the execution, as you have to rely on yourself as project manager. We need to not exaggerate the planning time, we need to reduce the number of irrelevant checks and balances, we need to focus on only main stakeholders

ZA: How does the gated project management system address changes during the execution phase? Does it help in reacting to change during execution?

P: The good plans is a key factor to address all anticipated changes may needed, also, In each stage of the project cycle time there is a check point to review the previous progress and plan for the up-coming activities , so , the answer is yes if the planning time is short and no if the planning time is long.

ZA: why?

P: after you plan your work you can put in place as planned if there are no changes, but if this process take long time things will change and you have to change you plans. We have had this happened in several projects

SECTION III - ORGANIZATIONAL RELATED QUESTIONS

ZA: Do you think your current project organization is well suited for execution of your project? What do you think of the overall organizational structure and efficiency required for your projects?

P: It is hard to say that the current projects organization is well suited as it is a combination of two different companies with two different regulations which cause many obstacles need to be solved day by day. We have an excellent professionals with great respect but there is significant routine and bureaucracies that we need to get rid of

ZA: Do you think the organizational structure causes you some kind of ease or frustration with decision making?

P: sometimes it is not easy to deal with the current organization as the roles and responsibilities of each party is not well defined. my own team in my department we are getting well together here, but for the overall organization, I see other departments trying to force their way in project business while we are supposed to be the ones leading the project delivery.

ZA: What do you think the difference in work habits and cultures between Iraq and where you were working has any issue with the way doing business in southern Iraq?

P: Yes

ZA: in what sense?

P: in lack of understanding of the Iraq public bureaucracy and cultural issue especially when it is related to dealing with local communities

ZA: How do you see any impact of cultural differences among your project team in regard to communicating decisions? Prior to decision making and after decision was made?

There were language and cultural barriers among local and international staff but over time these things was dealt with, it took them a while. The change in company leadership cost us time when they replace some executives almost every two years. These guys come from the USA or the UK and it takes them a while under they understand and adjust themselves to the Iraqi culture

ZA: How do you normally communicate with superiors prior to making a decision?

P: Formal through emails and memos, I have to back up anything in writing. Even if there was a telephone conversation that relate to anything of matter, I must follow up with an email to that person to document what was discussed

ZA: why?

P: it is for my own protection

ZA: so, what's the benefit of the phone call?

P: it does expedite the discussion, it resolves some issue, but it has to be followed in something written.

ZA: Do you find communication speedy and efficient? What factors may you think of?

P: sometimes, but not to what I wish for. Bureaucracy, routine stuff, many people involved, and many meetings and discussions make it lengthy

ZA: Does the current project organizational structure suit quick decision making?

P: I see this as one of our main problems, we are mixed or hybrid organization, everything comes from upper management, all approvals has to come from the top. As my lower tier employees, I do not have much of an issue with my own department. However, I don't control everyone on the project, some people come from different departments. I can only recommend or complain to their department heads if I have any problem with them.

ZA: What are the organizational difficulties you see in making decision making, so time-consuming?

P: The main difficulty is to get all stockholders aligned and agreed on the decision, they are so many, and everyone want to have their say. Frankly some people do not even know the project details, but they want to be part of the project to justify their present (but don't say this!)

ZA: does that mean the more stakeholders; the more difficult decision is?

P: indeed, the high number is the main problem, otherwise it could be simpler to manager if the number was lower.

SECTION IV - PROJECT RELATED QUESTIONNAIRES

ZA: From your experience, what are the major sources for changes during project execution?

P: lack of information, skills shortage, bad planning, poor design. Sometimes the end user comes in at the last minutes with changes after everything is complete and as we are building stuff.

ZA: From your experience, what is the best way to reduce or eliminate the project's changes?

P: don't get me wrong on this! reduce the number of people involved in the project execution.

We can do our job without interference much easier. There are of course other means but the most I see is the high number of people engaged. Get me a good team and leave me in the field, I will get it done on time, but when you have almost everyone on the project it becomes hard to control.

ZA: How do you normally react to any change during project execution in a formal way?

P: evaluate the request to see if it is reasonable from technical, economical and contractual stand points then take the decision

ZA: How do you prefer to react from an expert in the field perspective?

P: I rather have authority to use my experience, but I have to follow the procedures

ZA: What procedure do you use?

P: the standard procedure that we have is the MOC

ZA: Do you think the currently adopted MOC is adequate for addressing execution phase changes in a timely manner?

P: yes, but lengthy although it is very good for documentation

ZA: How do you define a successful project? What does the word success mean to you?

P: the successful project is the project which can be completed within the planned budget and period with minimum changes and achieve the purpose it was built for

ZA: does the purpose or aim is more important than cost?

P: Yes, if there is not too much cost overrun

ZA: Do cost and schedule are the main success indices in your view?

P: yes, and the good operation after completion as well

ZA: Do you think you have enough involvement in the design input? If not? Why?

P: not 100% but we got the chance to give the input depending on our knowledge and experience

ZA: Do you believe as PM or PE that been involved in the design does help you during the execution phase in making decisions? Why?

P: yes of course as I will be aware of the reasons why we did that design

ZA: what phase you prefer to be involved in?

P: at least at the feed process

ZA: what about detailed design and tendering?

P: I would love to, but I am focused at execution

ZA: do you select contractors for your projects

P: through the policies and procedures, procurement department get that done for us

SECTION V- DECISION MAKING QUESTIONNAIRES

ZA: What does a successful decision mean to you? How do you define "successful decision"?

ZA: What kind of thinking process do you undergo when making a routine decision?

P: sometimes not much just follow the procedure, I have to think of my superiors and other stakeholders and how to get their buy-in to what I would like to decide

ZA: What if the decision is an important decision?

P: i have to think of how to protect myself, through documenting everything related to that decision. Also, I have to consult with everyone involved in the decision. It may get to feel some anxiety, upper management reaction, and what thinking of the consequences that could come. In most of the time, I call for a meeting

ZA: Have you felt knowing the answer to a given problem before following the procedure and felt that the procedure is a waste of time?

P: most of the times

ZA: in this case, do you think following the procedure is beneficiary

P: off course not but I have to follow it as required by the system

ZA: Do you think having meetings are good for making decisions to accommodate project changes?

P: Yes

ZA: why?

P: to get everyone informed and no one can tell you later you did not tell me. Second, you can get input form all parties involved so no one can blame you later. And third, sometimes you get ideas from others you never thought of, you can get solutions from others

ZA: Do you find it easy to call for timely meetings?

P: sometimes but in most of the cases it is hard to get a meeting quickly, everyone has their own busy schedule. If someone cannot attend, then you have to brief them and this makes you recycle informant of telling the story over and over!

ZA: Do you see that it is good in all cases?

P: have meeting is not an easy thing, you disturb your schedule when you have an ongoing project, I see it good for important issues. Unfortunately, [REDACTED] by nature of it is part of

company culture, having meeting and meeting and meetings for the simplest thing. Not only that – man they kill you with PowerPoint slides and presentations!

ZA: What kind of communication do you prefer?

F: Face to face or, but documenting things is important. Face-to-face very quick, you can get things done in fraction of the time it takes if you follow the email trail.

ZA: Do you have any role in setting the contractor's selection criteria?

F: you asked this question, but we have a procurement department, that is responsible for the tendering and award process. We as project managers sometimes set the required qualification of the contractor but do not go into contractor selection. That is left to procurement to do. They do have a process of technical qualification for selecting contractors, but it is only through paper which is not always reflective of the truth. We have suffered from poor performance when it came to bad contractors,

ZA: What do you think of a relationship with the contractor and its impact on the ease or difficulty of making a decision during execution?

F: Let me put it this way: it is the machine that makes the things for you. Just like the car that take you from home to work. If you have a good relationship with your contractor your life is easy, otherwise, your life will be full of problems!

ZA: What do you think of the relationship with the local community and its impact on decision making during execution?

F: in our case, especially in Iraq this is part of the political process to make people feel they have stake in what's going on in their own areas

ZA: Do you rely on your past experience or on following procedure in solving problems during the project execution phase? To what extent do you utilize your past experience when it comes to simple issues and complicated issues? Why?

F: Yes, whenever allowed but still have to follow the procedures which I see sometimes waste of time to me but it is organizational requirement

ZA: Do you think you have enough authority to react to project changes, especially during execution in the time frame you see if professionally, right?

F: not all the times

SECTION IIV - GENERAL OPEN DISCUSSION

You can share any topic, any story, and any subject you may wish to talk about. Anything that could come to mind.

P: There are many things that could be done to improve project execution but the problem here are many.

ZA: tell me

P: I do not have full control on the overall project team, I can select from my department. Other functions such as SHE, QA/QC and others, they appoint their own, so I end up with people I did not select and sometimes imposed on me.

ZA: how can you create harmony among the team

P: this is the point; it is not your own control since you can't select but it is your responsibility to manage. since our discussion about decision making, I see an important factor that has an impact on the decision and on being responsible. I see the difference in compensation between Western Expat, TCN and local national as a very important factor. For one thing, how can you take responsibility for the something from the same position with less or more compensation. the difference is not reasonable when it exceeds ten times for the same position although there may be difference in the place of gained experience and education, but the level is the same.

ZA: there is difference in experience and exposure

P: agree, but not to that big difference and not for the same position, and for the same responsibility. I believe compensation and responsibility go along

ZA: Mr. [REDACTED] many thanks for your time, it was very interesting conversation. I may need you help with few follow up questions or some clarifications later. I will may have to call you or send you an email if you don't mind

P: it was a pleasure, call me at any time.

Weekly Meeting 127

- * - Discussion on Base line versus re-base line of the schedule
- * - [redacted] to work the train the trainer session on April 4, [redacted]
- * - Taha to send the list of proposed candidates
- * - Delay for the roof structure versus the plan (Brian vs transmittal dates)
A [redacted] + EB
- * - Get update from [redacted] about the pipe
① DISG exploration by Engineering Effort, CPECC and CH [redacted] LL used the charts provided by Nomie to see if we have the correct manpower.
- Long time from C [redacted] to upgrade from code B to rev O. This is delaying the issuance of the PO.
- C [redacted] LL should be doing the TBE on a rev O only.
- * - En [redacted] on panels delivery is now July 21 [redacted]