An Investigation into the Project Scope of Work Role and Characteristics, and its development Process Enablers and Barriers in the Oil and Gas Sector: a comparative case study, Saudi Arabia

'A thesis submitted to the University of Manchester for the degree of Doctor of Business Administration (DBA) in the Faculty of Humanities'

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ABSTRACT

A critical issue that faces the Saudi Arabia Oil and Gas Sector (OGS)'s projects is the high level of uncertainty in the successful delivery of those projects. That high level of uncertainty makes it vital to monitor and control project performance for limiting financial losses, avoiding cost overruns, and improving predictability. One of the fundamental tools that sets the framework for project performance is the project Scope of Work (SOW). Having an effective project SOW at the front end the project is challenging for project practitioners and is an issue that needs to be addressed; as its development process and output can significantly affect the later stages of the project life cycle. The aim of this study was to develop a clearer understanding of the project SOW role in a project development and to make practical recommendations for its improvement by investigating project team members' perceptions of the SOW development process in two Saudi Arabian Oil and Gas companies. This research adopts a qualitative approach, a case study strategy and focus group discussions to collect primary data. The results suggested that the project SOW development process is the foundation for another twelve key project management processes that need to be considered in order to successfully complete a project On Scope, On Time, On Cost and On Strategy. To be considered effective, the project SOW should have the following four characteristics of: formality, usefulness, effective content elements and effective language quality. In addition, the project SOW should support effective decision making, risk management, project planning and project monitoring and control. The results show that the project SOW in Saudi Arabia OGS is developed in several phases as part of Front-End Loading (FEL) development and final project SOW is developed and approved at the end of the 2nd phase of FEL (FEL-2). It was found that there are eleven key enablers, such as clear vision, targets, and objectives; effective stakeholders' engagement; and effective assurance review process, for producing an effective project SOW. While eleven key barriers for producing an effective SOW were identified such as: absence of reward system; insufficient training programs; and insufficient budget. Therefore, enhancing the key enablers and overcoming the barriers may facilitated improvements in the project SOW development process. This study recommends that companies need to pay closer attention to the design of the temporary organisation and accordingly set their strategy, structure, process, rewards and people. The researcher details some implications, acknowledges some limitations and provides recommendations for future research in this area.

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DECLARATION

I declare that this study and all related research results and dissertation chapters are my own work. It is submitted as an important part to achieve fulfillment of the requirements of the degree of Doctor of Business Administration (DBA) for the ***University of Manchester***. This piece of work has not handed before for any degree or examination in any other university.

Ali M. Al-Saffar   Date: 30 September 2017

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ABBREVIATIONS AND ACRONYMS

AS	Alternative Selection
ASG	Alternative Selection Gate
BO	Business Opportunity (check Point)
BOD	Basis of Design
CCA	Conventional Content Analysis
DBA	Doctor of Business Administration
DM	Decision Maker
FAR	The Federal Acquisition Regulation
FED	Front-End Development
FEED	Front End Engineering Design
FEL	Front End Loading
FEL-1	The First Phase of Front End Loading
FEL-2	The Second Phase of Front End Loading
FEL-3	The Third Phase of Front End Loading
FEP	Front End Planning
FID	Final Investment Decision
FO/FD	Functional Organizations/Departments
GDP	Gross Domestic Product
GK	Gatekeeper
IPT	Integrated Project Team including Project Leader, Project Management Team members and Project Manager
IRR	Internal Rate of Return
KSA	Kingdom of Saudi Arabia
OGS	Oil and Gas Sector
P&IDs	Piping and Instrumentation Diagrams
PDRI	Project Development Rating Index
PL	Project Leader
PM	Project Manager
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMP	Project Management Professional
PMT	Project Management Team

ABBREVIATIONS AND ACRONYMS

PPP	Pre-Project Planning
PPR	Project Proponent Representative
PS	Project Sponsor
QAR	Quality Assurance Review
QART	Quality or Value Assurance Review Team
SG	Selection Gate
SOW	Scope of Work
SPM	Strategic Project Management
TSD	Technical Support Department
TSW	Target Setting Workshop
VAR	Value Assurance Review
VART	Value Assurance Review Team
WBS	Work Breakdown Structure

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CHAPTER 1

INTRODUCTION

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1 INTRODUCTION

1.1 BACKGROUND TO THE RESEARCH

Currently the trend for large companies is to outsource activities using projects to enable them to concentrate on their core businesses (Davies and Hobday, 2005). Also, they use projects to find solutions for complex problems (Davis, 2011), in order to accomplish organisational change (Yasin et al., 2009; Partington, 1996), to investigate for new opportunities (Srivannaboon, 2006) and to develop or create totally new product categories (Davies and Hobday, 2005). Davies and Hobday (2005) stated that: "When deployed effectively, projects provide a flexible, efficient and dynamic way of organising a firm's internal resources and capabilities around the needs and priorities of individual customers" (p. 3). Merrow (2011) and Cleland (1998) believed that projects help firms to survive and grow in a highly competitive business environment.

Patanakul et al. (2010) argued that project management was used for decades as a management practice to achieve the organisations objectives and its reputation has grown over recent years. Accordingly, a significant majority of organisations are using the approach of project management to bring significant changes in their approaches to business to meet the aims and objectives of the organisation (Miles and Snow, 1978). Realising the significance of projects for organisations, it is important to understand what is required to ensure effective management of the project in order to guarantee accomplishing their strategic objectives (Maylor, 2001). However, to achieve a project's strategic objectives, all phases and processes of the project life cycle should be managed effectively (Kenny, 2006). Melton, Iles-Smith, and Yates (2008) are of the opinion that the project manager should keep on releasing more funding for the idea development stage till it is ready to be executed instead of rushing toward the delivery of the project and using all resources for it. The resources spent at this early stage, in their opinion, can help greatly in selection of the "right" project and in making that "right" project a success story. By "right" project they mean the project that can "maximize the delivery of benefits to the organization" (Melton *et al*. 2008, p. 14). The purpose is to provide as clear and complete picture of the project as possible so that they can decide whether this project is worth investing in or not. The National Research Council (2001, p. 22) stated that "a project will not be better than its front-end planning process." The importance of Front End Loading (FEL) goes beyond selecting the "right" project to "doing the project right" (Williams and Samset, 2010). One of the important FEL outcomes is a define project Scope. Defining and writing the project

Scope of Work (SOW) is one of the most important processes since "it provides the project team with a clear vision of the scope and objectives of what they are to achieve." (Martin, 2010, p. 1). This process is so important for different project stakeholders in different phases of the project life cycle. For examples, it is important for the project management team including the project manager during the planning, execution and closing phases.

Practically, each organisation starts their project with the intention to succeed. Understanding the factors that have direct or indirect impact on the project final outcomes is significant to undertake the necessary actions for enhancing the chance of ending the project successfully. One of the most common causes of project failure is a poorly defined project scope (Symonds et al., 2011; Zwikael and Globerson, 2004; Thomas et al., 2008; Cho and Gibson, 2001; Dumont et al., 1997; Khang and Moe, 2008; Clark, 1989). Conversely, a well-defined project scope that contained and captured the client requirements is one of the critical common success factors for projects (Yu et al., 2006; Eldin and Mayfield, 2005; Pinto and Prescott, 1988; Belassi and Tukel, 1996). Therefore, to start with, it is essential to identify a clear project vision and clear and specific project scope that helps the project team to set understandable, specific, clear and achievable goals (Atkinson, 1999). Taking this into consideration, it will be important to understand the role of the project SOW to project performance during the project lifecycle, the characteristics that make the project SOW effective, the practical development process for an effective SOW and the enablers and barriers for SOW development process. The lack in previous studies of addressing those issues has motivated the researcher to create this study for his DBA Thesis. This research was undertaken in KSA, OGS as one of the largest industries where organisations are using projects extensively to achieve their objectives.

As it was mandatory for completing the DBA program, a pilot project was carried out by the researcher to verify the importance of the project SOW for the project success and to justify moving forward with this research. The aim was to conduct a study that investigated the relationship between the strategic project SOW and the project success. The findings demonstrated that there was a significant relationship between the project completed on time and project success, $r = .839$, $p < .001$. Likewise, the project success was significantly correlated to the completion of the project within its allocated budget, $r = .883$, $p < .001$. In addition, the project success was significantly related to the completion of the project as per its scope, $r = .950$, $p < .001$. Also, there was a significant relationship between the achievement of the project's strategic objectives and the project success, $r = .982$, $p < .001$.

The findings validate the relationship between the project success and the effectiveness of its SOW and demonstrate that there is a linear relationship between them. [1]

The term "Project SOW", which is the subject of this study, is referred to the written document that describes the firm requirements, which is desired to be a detailed description of a specified work, tasks, services and/or equipment that are needed for project execution. In KSA OGS, SOW is used as document that have all required information that make organisation's confident for executing the project and enabling the executers understanding the organisation requirements. Hence, SOW is a formal document that identifies, defines and describes what desires to be done by executing the project. Usually, it is written in a definitive and precise language that is appropriate to the field of business in order to prevent any misunderstandings of requirements and the used terms and conditions. The Project SOW should address the design and performance requirements, as well as the material and work requirements for the project. It can be used as a working agreement between two parties, normally between a client and a contractor which make it an important legal document. Also, it defines the responsibilities and liabilities, for the agreed scope between the clients and contractor. SOW development process as an important process will be the subject of this research.

1.2   RATIONALE OF THE RESEARCH

Considering the importance of projects for organisations in achieving their vision, it is rational to see different types of researches about project strategies, project performance and project management aspects and tools. Like all sectors and industries, organisations in the OGS are using projects to achieve their strategic objectives. Because of its challenging and highly complex technical nature, the budgets for accomplishing projects in this sector is relatively high but the returns on the economy is also high if they achieved their objectives (Badiru & Osisanya, 2016). The projects in the OGS usually involve more than one organisation such as a company, contractor and government. Such projects are highly sensitive, and more attention needs to be takin in order to assure high performance that provides the desired results. Sensitivity and importance of projects in the OGS motivated researchers to create different researches to understand the challenges that face projects and the related processes in this challenging sector.

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[1] See Annex I for complete Pilot Project Report

Certainly, there is rising need for organisations including those operating in the OGS to reduce the level of uncertainty in their project by eliminating unrealistic expectations and clearly identifying their objectives, targets, requirements and outcomes. To do so, organisations should ensure that the team and manager of projects have the exact amount of certainty that is needed instead of having biased and high expectations from projects (Rajablu, Marthandan & Yusoff, 2015). One of the imperative fundamental tools that sets the framework for project execution and it is useful for different project stakeholders throughout the project lifecycle is the project SOW. The project SOW has an important role that impacts the project performance and having an effective project SOW is a challenging issue that needs to be addressed as an important process that affects the project life cycle processes. Although there are a significant number of authors who discuss the importance of the project SOW, there is no significant comprehensive research that has been carried out on the project SOW development process in the OGS and the practical enablers and barriers that impact upon obtaining an effective project SOW.

The rationale for the problem being addressed in the KSA and OGS context is the existence of a large number of projects with huge financial arrangements that face the challenge of failure. Where Saudi Arabia is considered one of the largest oil exporters and its OGS is one of the largest sectors that spends huge money in the form of projects that serve the development of the Oil and Gas industry and country strategic projects, therefore, there is a logical basis for the researcher to consider this context as case study for his DBA research. Project failures in this sector has a direct impact on the country economy where significant resources can be lost by losing the right direction for project success. Practical experience for the researcher supported by the output of the pilot project conducted as part of his DBA program, confirm that having an effective project SOW can enhance the chance for having a project be completed successfully. On the other side, inefficient project SOW will enhance the risk of project failure.

The rationale of this study is dealing with the project SOW as an important process that organisations in the OGS are spending all kinds of efforts and resources to support this process. The main subject for this study is to investigate in-depth the project SOW development process, the practical enablers and barriers and the required improvements. The outcomes of this study may help organisations in the OGS to improve the SOW development process in order to improve the project performance. For OGS projects, having an effective project SOW is critical and this research will help in identifying enablers and barriers that contribute towards improving the SOW development process in OGS. This

research is conducted to successfully help companies within OGS to improve the output of the project SOW development process by producing an effective project SOW which leads to improving organisational performance.

1.3   PROBLEM STATEMENT AND STUDY MOTIVATOR

Companies in the Oil and Gas Sector (OGS) are making financial arrangements of hundreds of millions as investment in order to finance their strategic projects. But, "Data from more than 300 global megaprojects shows that 65 percent of industrial projects with budgets larger than $ 1 billion in 2010 U.S. dollars failed to meet business objectives" (Merrow, 2011, p. vii). Furthermore, a study conducted in the last decade shows that 78 percent of upstream oil and gas industry failed to meet the objectives of the project (Balibalos, 2013). Merrow's (2011) study shows that the quality of Front-End Loading (FEL) increases the likelihood of the project success. Figure 1.1 below shows that the chance for megaproject[2] success directly impacts with the quality of the project FEL. More than 60% is the percentage of successful megaprojects for the best FEL index while it is decreasing to around 10% for the poor index.

P > |z| < .001
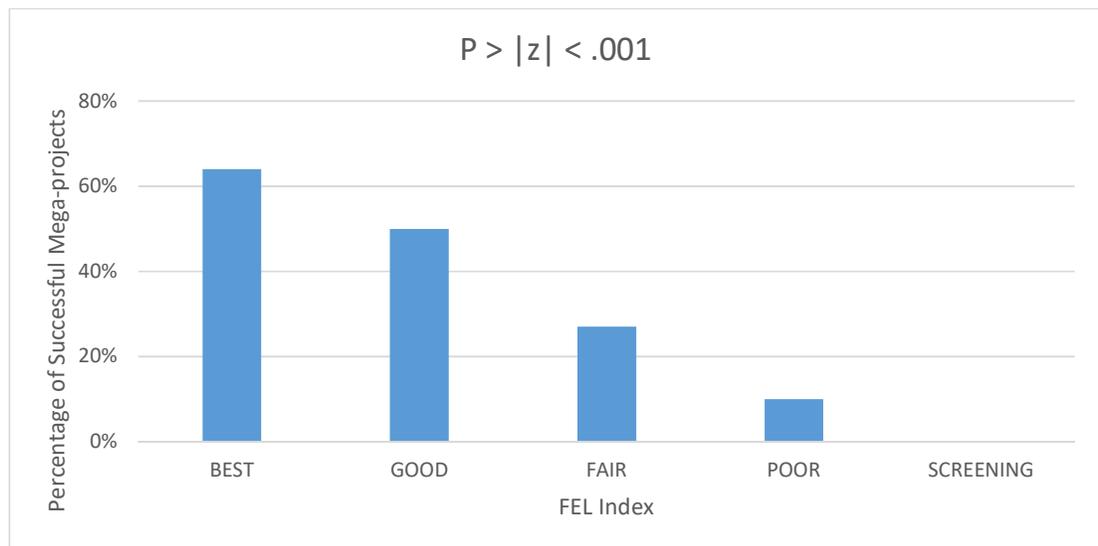
Figure 1.1 : FEL Increases Likelihood of Success (Merrow, 2011, p. 221)

The development of Saudi Arabia's economy is mainly driven by its Oil and Gas Industry. As reported by the annual report of the Saudi Arabian Business Council, Saudi Arabia is the

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[2] Whenever the term Mega-Project is used within this Theses, it refers to what was defined by Merrow (2001, p.15) where he defined "a megaproject as any project with a total capital cost of more than $ 1 billion as measured in January 1, 2003".

second prime oil producer with nine enormous oil refineries, producing almost 13 % of the world's oil. Yousef et al. (2013) also, reported that Saudi Arabia is considered the largest Oil exporter in the world. This motivates its economy to be constantly on growth. The Gross Domestic Product (GDP) stretched out 4.70 % in the 4th quarter of 2013. The average GDP growth from 1969 to 2013 was 5.27 % (Trading Economics, 2013). As a result, significant increases in construction and industrial activities are seen across the years (Husein, 2013). In sequence, a large number of projects are underway in the industrial sector. Also, to increase its production capacity, Saudi Arabia have been investing billions of dollars by developing numerous mega projects in OGS. Accordingly, there is a need to enhance the chance of completing those projects successfully. But researches such as those conducted by Assaf, Hassanain and Al-Zahrani (2015) and Jannadi (1997) indicate that there are significant number of failed projects in Saudi Arabia. A critical issue that face the Saudi Arabia OGS's projects is the successful delivery of those projects in terms of both time and cost (Independent Statistics and Analysis, 2017; OPEC, 2015; Gulf Business, 2015). In practice, "Oil and gas projects contain high level of uncertainty and risk due to their large scope of work, long project duration, technological complexity and multiple geographical sites" (Jawad, Ledwith and Panahifar, 2018). Miller and Lessard add that complication of engineering and design, risks associated with resources, and difficulties of construction are other contributors to uncertainty in such projects. The involvement of a relatively large number of stakeholders and organisations in OGS projects can be a potential source of uncertainty. That high level of uncertainty makes it vital to monitor and control project performance for limiting financial losses, avoiding cost overruns, and improving predictability.

So, as it is all around the world, in Saudi Arabia there is a need to enhance the chance of completing those projects successfully. The real starting point for any project is to start documenting its scope. This start point is so important to be given more attention in order to enhance the chances for achieving the project strategic objectives. The existing literature indicates that it is important to have an effective SOW for enhancing the chances of having the right desired outcomes and enhance the chances of having a completed successful project. However, there is limited research on the project SOW development process and the key enablers and barriers for this important process. Such researches were not conducted in relation to Saudi Arabia.

In addition, the project SOW is an important document that is used by all project stakeholders throughout all phases of the project management life cycle (Cole and Martin,

2012). In general, there is less attention given by organisations to the project initiation phase (Pinto and Prescott, 1988) where project SOW is supposed to be created as a foundation to manage the remaining processes of the initiation phase and the remaining phases of the project management life cycle (planning phase, execution phase, monitoring and controlling phase and closure phase) (PMI, 2009). The pilot project created by the researcher provide evidence that the project SOW is an important document for completing a project successfully. It is important to have an effective SOW for enhancing the chances of having the right desired outcomes and enhancing the chances of having a completed successful project.

However, the focus of OGS organisations tend to be put on the execution phase of the project and therefore they are paying less attention to the initiation phase of projects, particularly aspects related to the project SOW development process are being neglected. This is a core activity of what is known in OGS as Front-End Loading (FEL), Front-End Engineering (FEE), Front-End Design (FED) or Front-End Engineering and Design (FEED), which help in every phase of the project management lifecycle, even though the project scope of work is one of the key factors that shape the result of the project implementation (Martin, 2010). There is ineffective project SOW which results in negative effects on the project completion time, budget, quality and/or meeting its strategic objectives. But what are the qualities of an effective SOW? And what is the "best" effective process to develop such SOW? The literature review conducted identified that there is a gap in previous researches which needs to be addressed by a comprehensive study that focuses on the project SOW development as a factor that has a direct relationship to the project outcome of each phase of the project life cycle. Also, there is very little study on understanding what are the barriers and enablers for developing an effective SOW. This study aims to contribute to filling that gap by creating a research in OGS of Saudi Arabia.

1.4   RESEARCH AIM, OBJECTIVES, AND QUESTIONS

The aim of this research is:

To develop a clearer understanding of the project Scope of Work role in a project development and to make practical recommendations for its improvement by investigating project team members' perceptions of the Scope of Work development process in two Saudi Arabian Oil and Gas companies.

Accordingly, the study has the following objectives:

1) To identify the role the project SOW plays during the project lifecycle.

2) To identify the characteristics of an effective project SOW and the functions it supports.

3) To identify the SOW development process in two Saudi Arabian Oil and Gas companies and the barriers and enablers to its effective development.

4) To make recommendations for improvements in the SOW development process.

Based on the research aim and objectives, this research strives to find answers to the following questions:

RQ1- What is the role of the project SOW in project performance?

RQ2- What are the characteristics of an effective project SOW and what functions does it support?

RQ3: How are project SOWs developed in the Saudi Arabian OGS and what are the practical enablers and barriers for its development?

RQ4: What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

To answer these research questions, a comparative case study was conducted at two organisations operating in the Saudi Arabian Oil and Gas Sector (OGS) using focus groups to collect primary data.

1.5   THESIS STRUCTURE

This thesis is divided into eight chapters. After this introduction Chapter, Chapter 2 has the aim of presenting previous literatures that are relevant to the research topic in order to evaluate previous research and to identify the gaps in the knowledge that this research is attempting to fill. Next, Chapter 3 will outline and explain the research method and design that was used to carry out this research. Also, it includes data collection and data analysis techniques and discussion about the reliability, validity and ethical standards of this research. In Chapter 4 -7, the findings in relation to the research questions will be presented and discussed. Those chapters will provide comments on the findings, explanation of what the findings mean and relate the main results to previous researches. Also, those four chapters will address the contribution of this study to the knowledge. Chapter 4 will present

and discuss the finding for the first research question which aims to understand the role of the project SOW in the project performance. Next, the findings and discussion regarding the characteristics of effective project SOW and the functions it supports will be presented in Chapter 5. After that, Chapter 6 will handle the findings for practical implementation for the project SOW development process and the practical enablers and barriers for this important process. Following this, Chapter 7 is aiming to make recommendations for improvements in the project SOW development process. The final Chapter is the conclusion for this thesis which provides a summary of the study results, recommendations, implications and suggestions for further research.

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CHAPTER 2

LITERATURE REVIEW

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2   LITERATURE REVIEW

2.1   CHAPTER INTRODUCTION

In a highly competitive, risky and uncertain, rapidly changing, and global environment in which a business has to grow or survive, projects are becoming the main key enablers for firms to achieve their necessary profitability targets which allow their plans for growth to become more realistic and support the survival of those firms in such environment (Merrow, 2011; Davies and Hobday, 2005; Patanakul et al, 2010; Cleland, 1998). Firms have realised that projects can be used extensively to face and get rid of problems such as those related to customer satisfaction and product quality, and to deal with opportunities such as entering new markets or producing new products (Srivannaboon, 2006; Davis, 2011). Firms use projects to find solutions to complex problems (Davis, 2011), to accomplish organisational change (Yasin et al., 2009; Partington, 1996), to investigate new opportunities (Srivannaboon, 2006) and to develop or create totally new product categories (Davies and Hobday, 2005). Davies and Hobday (2005) stated that: "When deployed effectively, projects provide a flexible, efficient and dynamic way of organizing a firm's internal resources and capabilities around the needs and priorities of individual customers" (p. 3).

It is clear that whatever the organisation line of business, projects are used extensively to implement an organisation's strategies and to achieve their strategic objectives (Artto et al., 2007). "Projects are fundamentally about states of mind; it is only once they are completed that they become stats of nature" (Winch and Maytorena, 2012, p. 360). The link between business strategy and project management, motivate the necessity of aligning project management with business strategy (Srivannaboon, 2006). Strategic Project Management (SPM) as defined by Heerkens (2007) is "a series of practices, procedures, processes, tools, and behaviours which, when considered collectively, characterized the extent to which an organization creates effective linkages between excellent project management practices and excellent business practices" that enable the organisation advancing its strategic targets and goals (p. 213). According to Wessels (2007), the adoption of the SPM is referred to selection, supporting and managing multiple projects that provide the chance to the companies for moving ahead by earning maximum value and keeping the organisation vibrant in the present market for the purpose of shareholders. Stanleigh (2006) believes that implementation of SPM grants organisations the required business intelligence that enable them to identify at a very early stage projects that are in line with their business strategy and

to terminate projects that have low priorities or that are misaligned with their strategic objectives in order to conserve their resources.

Parsons (2006) believes that when evaluating project success or factors for project success, less intention is given to project early stages or "formulation phase" (p. 12). In this phase there are several processes, tasks and objectives that need to be achieved in order to enhance the chance for a successful completion of a strategic project. One of these important processes is defining and documenting the scope of the strategic project. Project Scope of Work (SOW) is important for better management of the strategic project during its life cycle (Martin, 2010; Nielson, 2009). This make it important to understand the role of the project SOW in the project performance and what characteristics make it effective toward desired performance. In addition, we need to investigate the project SOW development process and the practical enablers and barriers for producing an effective project SOW. The gaps in the current literature will be addressed by this research.

The aim of this chapter is to search and evaluate the available literature in my research topic and related subjects. It documents the state of the art with respect to the research topic to achieve four main objectives: (1) to survey the literature in the relevant area of the study, (2) to synthesise the obtained material from that literature into a summary, (3) to critically analyse the gathered information by identifying gaps in current knowledge; showing various points of view, reviewing areas of agreement and controversy and showing limitations; and by formulating areas for further research and to justify this research and its research questions, and (4) to present the literature in an organised way that helps in understanding the subject. The researcher identified the useful and related literature for this research through a full text search for the research keywords such as "Scope of Work", "Project Management", "Strategic Project Management", "Front End Loading", "Successful Projects", "Failed projects", etc.; and carefully inspecting each result returned by the research engine. The literature that found irrelevant to this particular research were eliminated and only those which were found useful for serving the aim of this research were cited.

This literature review chapter will start with defining the SPM and its importance for organisations as important introduction to the current study. Then, a discussion will be performed to understand the project performance criteria and the role of the project SOW. After that, it will be necessary to recognise and understand what an effective project SOW

is and its characteristics. Finally, the project SOW development process will be discussed. While discussing those subjects, gaps in the previous literatures which motivate the author to carry out this study will be identified and highlighted.

2.2 STRATEGIC PROJECT MANAGEMENT

2.2.1 What is a Strategic Project Management?

According to White and Patton (2001): strategy is an inclusive set of activities, practices and actions that channel or direct the effective usage of an organisation's resources to achieving its vision and objectives and to facilitate sustainable competitive advantage (White and Patton, 2001). Van Der Merwe (2002) identified strategic management as a cluster of decisions that enhance the long-term organisation's performance. This includes the formulation, implementation, evaluation and control of a strategy. There are three key elements that drive "strategic management" which are: "understanding the strategic position of an organization, strategic choices for the future and turning strategy into action" (Johnson et al, 2005, p. 12).

Hence, it can be safely said that a strategic project can be defined as a project which is important and critical to maintain and open future business opportunities for a company. Strategic projects are aimed at providing organisational success where these projects are long term projects and can influence the main business functions of the company (Van Der Merwe, 2002). Maylor, 2001 argues that organisations that choose to manage projects strategically will have good competitive advantages since this will improve the effective usage of their resources, their market sustainability and profitability (Maylor, 2001). Where the project is a part of a wider business sense, it should be evaluated as an essential part of the strategic program (Kaplan and Norton, 1992). A strategic project is focused on organisation's overall directions and gaining competitive advantage over competitors (Crawford et al, 2006). These types of projects emerged from SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis. With the help of such analysis, an organisation "determines where it is currently standing in comparison to where it thinks it wants to be" (Faulkner and Campbell, 2003, p.112). Actually, strategic projects should be a combination of tactical plans in addition to broadness and depth to bring a big change in the business (Miller and Lessard, 2000). Using the SWOT analysis technique for project evaluation allows an organisation to effectively evaluate key strengths and weaknesses which help in identifying the current organisational position and also allows the company

to explore future business opportunities. It also helps in successful evaluation of key business threats that can have an impact over a company's overall performance in the future.

A strategic project cannot be successful if it does not have the support of the executive management team and board members. These members not only extend support but also communicate the vision to the work force involved in the project which creates encouragement and excitement in the employees and works as a counter measure to those who are not in support of a project or a change in the company (Flyvbjerg et al., 2003). A number of tactical goals co-exist within the strategic project that are required to be completed and should be completed on time and within budget to achieve the overall target (Miller and Lessard, 2000). Such tactical goals are established when the group determines different ways to accomplish the strategic goal (Colebrook, 2001).

Strategic Project Management (SPM) as defined by Heerkens (2007) is "a series of practices, procedures, processes, tools, and behaviours which, when considered collectively, characterise the extent to which an organisation creates effective linkages between excellent project management practices and excellent business practices" which enable an organisation to advance its strategic targets and goals (p. 213). SPM is an approach for managing projects in order to create capabilities and competencies that are needed and contribute to having sustainable competitive advantage for the organisation (Prahalad and Hamel, 1990; Stalk et al., 1992; Porter, 1987). Wessels (2007) suggests that organisations can convert their strategic business objectives into actual values by putting a strategic initiative program with support of projects. According to him, the adoption of SPM is referred to selection, supporting and managing multiple projects that provide the chance to the companies for moving ahead by earning maximum value and keeping the organisation vibrant in the present market for the purpose of shareholders. Stanleigh (2006) believes that the implementation of SPM grants organisations the required business intelligence that enables them to identify at a very early stage projects that are in line with their business strategy and to terminate projects that have low priorities or that are misaligned with their strategic objectives enabling resource conservation.

SPM practices cover strategic alignment of projects, Project Portfolio Management, Program Management, and the business results of implementing a project. Sanchez and Robert (2010) argued that Project Portfolio Management is a key driver that guides to align projects to organisation's goals. Naughton (2006) defines SPM as practices to manage those

projects which are key for an organisation to be able to be in an excellent competitive advantage position. This competitive advantage which can be obtained by the effective execution of projects should start by managing the selection of projects and prioritisation of them. Naughton believes that SPM helps an organisation in successfully achieving its objectives and also allows the company to gain competitive advantage by selecting projects which are highly relevant and profitable.

2.2.2 The Importance of SPM for Organisations

For many business leaders and owners, setting a clear vision, company values, ethics, code of conduct and a definite strategic plan can be a frightening task for different reasons such as lack of time, commitment, energy and lack of expertise and qualified workforce (Adner and Levinthal, 2004; Englund and Graham, 1999). So, why do companies follow the difficult path of hard work, establishing values, creating a vision and originating a strategy? The answer is quite simple: converting a good strategic plan into an active strategic project and combining it with timely decisions that are focused on accountability generate activities that are not only completed on time but also increase the productivity of the company (Ash and Burn, 2003). Business leaders should understand that today's success will not surely continue tomorrow, and they will have to constantly evolve and adapt to the changes in order to move and grow. They have to constantly look ahead, anticipate and forecast the changes and develop strategies to take proactive actions so that the business can effectively navigate through the global marketplace (Love et al., 2002). Without strategic planning and development of a strategic project the businesses will simply drift and will be left to deal with the daily affairs of the day (Lefley, 2004; Davies and Hobday, 2005; Johnson, 1997).

Selecting the right project is a process that aligns project initiatives with business and strategic goals, guides allocation of capital and human resources for highest business result impact (Lyneis et al, 2001; MacIntyre, 2006; Thompson et. al., 1998). Lampel (2001) claimed that the project selection can significantly improve the organisation's ability to execute its strategy and enhance its results. The project selection process closely relates to key organisational systems such as strategic planning, process management and leadership. A clear definition and understanding of the problem statement and business requirements plus the breakthrough in finding potential solutions often overpowers the business manager that is in search of an improvement or new solution (Kloppenborg and Opfet, 2002). Inconsistencies in project information, lack of information combined with a lack of objective decision-making makes it impossible to prioritise projects, resulting in large

unresolved project portfolios (Grundy, 2000). Sometimes political conflicts or power structures within the organisation make the project selection difficult and complicated (Lanka and Martin, 2007).

Project selection process is important to be official and integrated with the strategic planning system to ensure that the project board or executive management team is keenly involved with the Project. Projects should be selected by evaluating its proposal for implementation against objective business criteria aligned with the strategic goals (Ilies et al., 2010). When comprehensive project selection process is practiced and sufficient resources are assigned for the project definition, then the final project decision step becomes comparatively easy since the project is not simply evaluated on personal judgments but it is ranked after comparing it with other projects and weighted against the set objectives of business selection criteria. To give the decision maker the ability to select and prioritise a project, project scope should be defined well.

SPM is an action plan of the strategic planning process focusing on the broader areas yet considering the smaller details, ensuring that the business grows and meets its targets in the long term (Srivannaboon, 2006). Lyneis et al. (2001) believe that the importance of a strategic project is in all the parts of the organisation starting from the company's mission to achieving goals and evaluating them. A strategic project is important to an organisation because it gives a sense of direction and clearly sketches out the measurable goals (Norrie and Walker, 2004). Shenhar (2004) argued that by having a strategic project leadership, an organisation will be able to have a definite and clear project management approach which is useful for taking day-to-day judgments and also for measuring the progress and taking necessary actions to correct the errors and mistakes, while moving toward achieving its strategic objectives. In order to achieve the strategic project, the important things that should be most discussed and thought about are: strategic objectives, goals and realistic, quantifiable and thoroughly researched benchmarks for evaluating results (Morris et al., 2012).

Strategic planning defines the company's mission, the mission of the company links the main idea of the company with practical and realistic strategies, that enables the employees and management to set their actions and goals in the direction of the company's mission, while the strategic project helps the company to move on its mission and start achieving the goals to get closer to the main elements of the company's objectives (Lee et al., 2006). To

plan a strategic project it is necessary that the company holds a strong mission. A strong mission statement should be broad enough to explain the overall purpose of the organisation and narrow enough to outline the main prominent duties (Lyneis et al., 2001). This strong mission will give guidance for performing better planning process.

Every planning process has a stage that evaluates the performance of the ongoing process and the targets achieved (Bryson, 2011). The evaluation process helps the company to keep the project in the right direction, a timely detection of an error; mistake or miscalculation which can save the workforce and the company from unnecessary hard work and cost (Lee et al., 2006). Obviously, a strategic project cannot be carried out without a solid plan behind it (Bryson, 2011). Strategic planning is a very important and valuable process that can enhance the chance for achieving a successful strategic project (Thomas et al., 2008). A properly organised strategic planning process helps the business to identify various future scenarios and assists the management to devise strategies that can address the "demands of the changing times" (Thirty, 2008).

A strategic project includes measurable goals which are specific, definite objectives that can be expressed in times line and quantities, so a strategic project serves as a complete package, that enables the managers to achieve their targets, evaluate the progress and make changes accordingly (Merrow, 2011). Developing a strategic project reveals that the company has not only set some goals, but it also has a plan to accomplish those goals. A planned strategic project also helps the company to remain on the right track (Jarzabkowski and Balogun, 2009). Lyneis et al. (2001) believe that strategies, by their inherent nature, are always long-term than tactics. Therefore, setting a clear strategy helps the organisation to direct its resources on top priority goals, instead of being spent on short-term tactics resulting in temporary gains. Without proper strategic alignment, short term goals will use the expensive resources out of the fraction of what they contribute in achieving the overall organisation's goals (Thiry and Deguire, 2007).

A Strategic project is based on the company's perspective of what should be done and what is best for the organisation. The management prioritises different activities and tasks in the order of their relevance to the situation and the extent of their effect on the performance and profitability of the company (Cooper, 2006a). When the project is initiated, mangers keep track of the progress of the project and monitor the situation to make sure that the project is being conducted according to the plan, because of continuous evaluation of measurable

goals corrective actions are taken immediately in case an unexpected problem arises (Verma, 2007; Ajamian and Koen, 2004). A strategic project draws its importance from the fact that such a project is made after comprehensive planning and brainstorming, a strategic project is for the whole of the corporation and not just for limited segments (Miller and Lessard, 2000). Cooper et al. (2005) argue that a strategic project can only be achieved by accomplishing the tactical goals and a multi-action plan that focuses on multiple objectives or set of goals. Achieving each set takes the workforce one step closer to the overall set objective. An effective and efficient Strategic project improves the operating efficiencies of an organisation, which includes operations from receiving supplies to delivering the finished products (Miller and Lessard, 2000).

Thus, SPM paves a way for an organisation to set up a project that distinguishes itself apart from its competition. This distinguished process is sometimes labelled as positioning, gaining competitive advantage or core competence, this planning outlines the ways in which the company or the product can excel, make its mark and gain a unique value in the marketplace (Lyneis et al., 2001). Once the differentiation is established, specific strategies can be developed which are then put into action with the help of a SPM (Asrilhant et al., 2006; Dietrich and Lehtonen, 2005; Brown, 1999).

Understanding the importance of strategic projects for organisations, it is important to ensure that projects are performing as required. The next section will discuss the project lifecycle, project performance criteria and the role of the project SOW in the project performance.

2.3   THE ROLE OF THE PROJECT SOW IN THE PROJECT PERFORMANCE

2.3.1   Project Management Life Cycle

"The project life cycle provides a useful framework for the project manager to (a) identify critical issues and problems sources of major conflict and (b) prioritize them over the process of the project implementation" (Jiang and Heiser, 2004, p. 10). Picariello and McDonough (2011) stated that "understanding the project management life cycle is invaluable for successfully guiding" the "project from its initial stages to completion" (p.1). For small to large projects, experienced project managers use common project management guidance for project management (Miller and Lessard, 2000). These are published and tested systems such as PRINCE2 or PMBOK (Project Management Body of Knowledge). Apart from these methodologies the managers can use in-house methodologies that are

organisation specified and tailored to meet the needs of the organisation (Brown et al., 2006).

Different approaches to project managements carry some differences and they use different terminologies in the project life cycles, but they normally share two key features and are common in almost all the methodologies, which are: projects are initiated and completed in phases and some common project management processes are carried out across these phases (Wessels, 2007; Gray and Larson, 2008; Slevin and Pinto, 1986). Whitley (2006) affirmed that the phases of a project are of prime importance for project managers. He argued that by thinking in terms of stages, the manager can make sure that the results and deliverables created at the conclusion of every phase meet their desired results and purpose, and that project team members are properly informed, prepared and instructed for the next phase. Practically, a project shall be directed and controlled from its start point to the end period using established well known processes (Jiang and Heiser, 2004; Khang and Moe, 2008; Pinto and Prescott, 1988; Patanakul et al., 2010; Tuman (1983).

Project management processes may be grouped into five basic phases (see Figure 2.1): Project conception and initiation phase, project definition and planning phase, project execution phase, project control and performance phase and project closure phase (Picariello and McDonough, 2011). Those are in line with PMI (2013) five project management process groups: Initiating Process Group, Planning Process Group, Executing Process Group, Monitoring and Controlling Process Group, and Closing Process Group. Some researchers such as Khang and Moe (2008); Pinto and Prescott (1988); Jiang and Heiser (2004); and Patanakul et al. (2010), consider that project lifecycle has only four phases: conceptual phase, planning phase, execution phase and termination phase. This is understandable by considering the project monitor and control as a process required but not as an independent phase. In general there are only three phases which are always certain to be performed and include conceptualisation or initiation, intermediate phase(s) or management, and closure phase (Mayer and Spieckemann, 2010). The initiating, implementing and closing stages have critical decision points where the project may be proceeded with, changed or closed down (Jaafari, 2004).

***Figure 2.1: The five Steps in the Project Management Life Cycle; (Picarello and
McDonogh, 2011, p.1)***

It is required to clearly identify the project management phases and those phases should be followed for all projects irrelevant of the project size (Bonnal et al., 2002). It is not feasible to commence a project without breaking down its management into different phases (Belanger, 1997). Gray and Larson (2008) argued that without having a standard project management approach, a project is expected to end up with unsystematic behaviour by means of many uncertain aspects. Therefore, without proper identification of project management phases, the overall project management standard will be affected by unsystematic behaviours. It is therefore crucial to define the project management phases for successful management of the project (Pinto and Prescott, 2008). Also, defining those phases is the key to assign the correct project stakeholders (Picariello and McDonough, 2011).

Hence, regardless of the project complexity, all projects are managed in phases. Belanger (1997) argued that certain phases can be skipped as per the project magnitude and suitable project life cycle can be selected by project owner. On the other hand, Adams and Caldentey (1997) recommended that an organisation should pursue all the common project management phases without skipping any phase to avoid problems during documenting of the project progress. It is obvious that by clearly defining the phases of project management, it will be easier to understand and manage the lifecycle of the project. It is also obvious that

each project has its own set of risks and each phase has its own risk elements. Defining the project management phases will make it more likely possible to identify related risk factors and place alternative methods to face those risks throughout the project lifecycle (Andersen and Jessen, 2000; Ward and Chapman, 2003). Therefore, without having a clearly defined project lifecycle, it is not possible to have the ability for the clear identification of the relevant risk factors (PMI, 2009).

To reduce the project complexity, each phase of project management is further divided into a number of elements or processes (PMI, 2009). For example, defining project scope process, project selection process, allocating the project budget process, bidding process, and contracting process all belong to the initiation phase of the project management life cycle. It is also so important to clearly define the elements of each phase in order to have smooth project management from the beginning to the end without any malfunction (Liu and Walker, 1998). At this stage, it can be concluded that before starting a project, it is important to place the project management methodology; and to identify and define the relevant project management phases. By doing so, high control over the entire project can be gained (Adams and Barndt, 1983; Baccarini, 1999; Patanakul et al., 2010).

2.3.2 Strategic Project Performance Criteria

If you ask a project manager "what is a successful strategic project?" the expected answer is that: the successful project is the project that is completed on time within the budget and as per the project scope. Time, cost and scope are the three criteria that project managers are concerned about and this is what they call the "triple constraints" (Liu and Walker, 1998). Therefore, if a project meets all three, it is a successful project. Although in practice, if a project meets two of those three, it can be considered as a successful project in many cases but it should meet its overall objectives (Cooke-Davie, 2004). In real life, this answer has some concerns that make it unrealistic when we are talking about the real business strategies. Then, what is a successful strategic project? And what is a failed strategic project? It is important to realise the answer for these questions in order to recognise the requirements for achieving a successful strategic project.

In practice there are many projects that are completed late and/or over budget but those are still successful from a strategic perspective as they deliver significant value to the organisation. On the other hand, some projects that are completed as per the schedule within the budget and as per the project scope have added no real value to the organisation after

implementation and do not meet the expected objectives of them. In this case the project from a strategic point view is considered as a failed project. Organisations initiate and execute projects to gain benefits such as reducing the product cost, increase the productivity and increasing organisation sales (Srivannaboon and Milosevic, 2006). If the project is executed perfectly as per its scope within the scheduled time and according to the allocated budget but without obtaining the organisation objective, then it is a waste of resources and it cannot be considered as a successful project (Pinto and Slevin, 1987). The idea here is not to ignore the triple constraints but to take care about additional constraints related to business requirements and strategies. Shenhar (2004) and Shenhar (2001) argued that taking care of all phases including the operation phase of the project can give comprehensive image for the project performance.

To enhance the probability of success, a project should start with a successful initiation and planning (Sears et al., 2010; Milosevic and Srivannaboon, 2006). In addition to that and in order to deliver a successful project, all team members should be informed about their clear roles and responsibilities so that they can have a clear and definite understanding of their duties in the project (Rosenau and Githens, 2011; Olesen and Myers, 1999). They must realise the importance and how expectations versus achievements will be considered, measured and graded (Munns and Bjeirmi, 1996). It is on the shoulders of the project manager to effectively implement and communicate these responsibilities, provide and obtain feedback, and to ensure that everyone understands that they will be held accountable for their respective roles and tasks (Hussey, 1999; Baiden and Price, 2011). This process requires the continuous inspection and measurement of time, costs, milestones, people, and the task schedules. Properly handled and effective schedule control will also provide the first indication as to whether the initial planning is not going according to schedule. If the project manager picks these indications, he obtain an opportunity to further improve the project and enforce a backup plan or re-plan to get back on track (Ibbs and Kwak, 2000; Skulmoski and Hartman, 2010).

There is no perfect list or method to transform a raw project into a complete and successful project and this should be realised by every member of the project team, executive/project board and the stakeholders (Gido and Clements, 2012). A successful project is the result of a hard and dedicated teamwork that sorts and clears out the problem areas in advance (Rosenau and Githens, 2011). The most important and difficult thing to do may be prioritising the essential factors such as "What should be done initially?" "What is more

significant?" etc. The decision reached should be based on the circumstances unique to the project in question (Low Sui and Chuvessiriporn, 1997).

A good and successful strategic project is a mixture of right initiation, right planning, right execution and a careful review of the project after its implementation. In other words, it is successful management of the project management life cycle. To give the project a high probability for success, the project should be initiated correctly to have the right outcomes. Strategies designed and plans made will not work unless and until the leaders and the executive team speak and express what they want to say during defining of the project scope. It is always necessary that all the participants speak honestly, express their ideas and everything they are carrying in their minds. Obtaining twisted views and incomplete information will result in a strategy which is not transparent and unclear (Gido and Clements, 2012). Also, to get everyone on-board on the same vision of success will require clear and specific project scope and objectives that help the project team to set understandable, specific, clear and achievable goals (Atkinson, 1999).
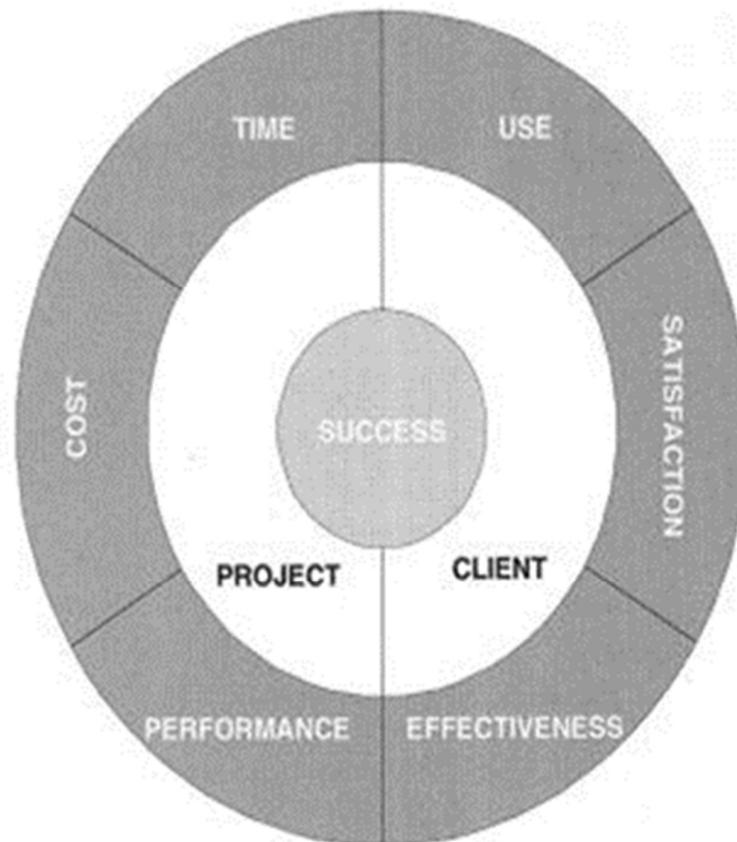
Figure 2.2: Model of Success Criteria; (Pinto and Slevin, 1988, p. 69)

Figure 2.3: A Quad Constrained Project Management Model; (Norrie and Walker, 2004, p. 48)

Cooke-Davies (2002) suggested that a successful project should meet overall objectives of the business in addition to the traditional performance measures: on time, on budget and on scope. Jugdev and Muller (2005) defined the successful project as the project that expands the focus of the traditional definition of completing the project on time within the budget as per the specified scope to include the stakeholder requirements. Pinto and Slevin (1988) suggested the model of success criteria for a project as shown in Figure 2.2. They divided the success criteria into two: "Project" criteria which include time, cost and performance; and "Client" criteria which measure the use, satisfaction and effectiveness. Norrie and Walker (2004) presented the model shown in Figure 2.3. They argued that the traditional triple constraints are not enough to define the successful project. Instead, they include strategy as another important constraint for project management.

Successful strategic projects then are those projects that 1) meet business requirements and deliver the expected value to the organisation, 2) maintained and delivered as per the schedule, 3) maintained and delivered within the allocated budget, 4) maintained and delivered as per its scope. Therefore, successful strategic projects are those completed on: **strategy, scope**, **budget**, and **time**. The first item is the most important quality of a successful strategic project. It is important to achieve the other three constraints but without meeting the business requirements and delivering the expected value to the organisation,

this project is just a waste of resources. On the other hand if the first constraint is achieved, the project might be considered as a successful project even if it misses one or more of the other constraints. By having a specific, clear and achievable scope of work that reflects the business requirements and organisation strategic objectives, project stakeholders will have the tools for achieving the project's objectives and targets at different stages and at the end for obtaining a successful project.

A project can become unsuccessful either because of one major reason or due to a collection of very small and continuous events and mistakes that lead to its failure (Olesen and Myers, 1999). There are many issues and challenges that may occur during the project management life cycle that may result in delays, errors, revisions, late submission and sometimes non-compliance to budget and policies. If a project fails, it shows the negative impact on the delivery of projects as well as schedule or budget. These issues are the indication that there is a set of problems and identifying the major reasons and causes for the failure of project management is essential. When a project fails the questions asked is how, when and why the project failed and fell short of meeting its objectives. In most of the cases the reason for failure is obvious and identified after careful examination, while in others the case may be complicated. Olesen and Myers (1999) claimed that the main reason for failure is not always clear and to identify the main reason, it is necessary to put effort into analysing the root cause.

A project is labelled as a failed project when it is not able to deliver what was required and what was expected from it. Whittaker (1999) identified the failed project as the project that does not deliver the expected results, incurs extra and unnecessary costs, produces poor quality and misses the deadlines. Therefore, it fails to provide the essential and main benefits that were associated with the project.

As mentioned earlier, delivering the scope by managing the time and cost is not enough to have a strategic successful project. For example, a delay in one project might lead to failure, while a similar delay might bring success and betterment to the project. Also, sometimes decisions can be taken to cancel the project but a cancelled project cannot be automatically labelled as a failed project because of the various reasons that can lead to the cancellation of the project including the involvement of key stakeholders and the decision making processes carried out (Maylor, 2001). If the requirements of the project are set on the "wrong basis," it may result in a failure even if everything is delivered on time, within the available

funds, and to the desired quality (Frame, 2002). This situation may seem rough but it is true. Similarly if the project is unable to deliver what the company actually requires, this will unavoidably and negatively affect how it is perceived. To cater and escape from this problem it is important to conduct business requirements analysis and to have clear documented scope of work that meet business and strategy requirements (Whittaker, 1999).

If the business case was unable to be delivered, then the task of a successful project becomes impossible to achieve (McDermott and O'Connor, 2002). A worst case scenario develops when the case gets approved but the actual project develops problems and fails to deliver effectively, which makes it more difficult to change the project's budget and deadlines (Kerzner, 2001). When writing the business case the project manager or team leader should ensure that he considers the entire project requirements in detail and lays complete emphasis in finding and chalking out the ways that will make it possible to deliver the requirements as expected. Another mistake that leads to problems is the lack of research and not reviewing similar projects which causes the manager to overlook important and major considerations (Kerzner, 2004). To save the project from the failure the team should be ready and make good preparation for difficult conversations with the executive board. The main theme is to be realistic and highlight all the limitations and risks that are involved honestly in the project (McDermott and O'Connor, 2002). This is more important at the early stage while defining and documenting the scope of the project and before implementation.

Implementation is the core phase of the business life cycle. Developing and delivering the project completely does not guarantee its success because delivering and achieving the right result is complex and which cannot be achieved without proper implementation. Projects that are not constantly, vigorously and realistically tracked, monitored, managed and controlled throughout their execution are either killed or changed because recovery steps cannot be taken quickly (Hobday, 2000). The implementation of project plan includes managing risks, scope, issues and communication (kerzner, 2004). If it is evident that the project will not be able to generate the results, then the best thing to do is not to ignore this. The earlier this fact is communicated, and the sooner the decision is made about the project's future, the better it is (Shimizu and Hitt, 2004).

To avoid failure, the project manager should ensure that he identifies the right business requirements, creates a realistic and achievable business case, puts strong project controls into place, organises and manages a superior-quality implementation, streamed around

benefits and monitors the changing business environment. Unsuccessful projects can be a result of lacking support from the executive board and top management which is important through the project life cycle (Shenhar and Dvir, 2007). Shimizu and Hitt (2004) highlighted that it is important to obtain the support of the project board and key stakeholders which saves the project from failure because they are the ones who decide the future of the project.

 The initial phase of the project is the major and most crucial phase in the life cycle of a project in which the project manager defines the business scope and hires the team to continue the project. A project manager can clearly define the scope of business, as well as a suitably skilled team that leads towards the project's success. Ineffective SOW which is important to be defined and documented at the very early stage of the strategic project, most probably will lead to unsuccessful project. Defining the project scope is the starting point in the strategic project management life cycle and the SOW is a useful document at every stage of that cycle. It is evident that SOW is essential in ensuring successful project management.

On the other hand, many researchers, such as Symonds et al. (2011), Zwikael and Globerson (2004), Thomas et al. (2008), Cho and Gibson (2001), Dumont et al. (1997), Khang and Moe (2008), and Clark (1989) assumed that poorly defined project SOW is one of the most common causes for project failure. Failure to produce effective SOW will only result in unsuccessful projects. They claimed that project failure is heavily dependent upon the presence or absence of SOW. Researchers have also successfully explored the impact and importance of SOW for successful project management and its resultant impact on project performance. It can be identified that poor SOW can lead to project failure and even project termination in later stages which means, organisations can face huge losses financially as well as with regards to its reputation. If SOW is not properly documented or formulated, it can result in several uncontrollable changes to the project and it can result in impacting the project negatively; ultimately resulting in project failures.

2.3.3 Importance of the Project SOW for Project Performance

Developing an effective SOW is one of the critical tasks that needs to be achieved at a very early stage of the strategic project management life cycle (Stallsworth and McDonough, 2013). This SOW will be the base for project selection process, budgeting process, bidding process and contracting process (Hart, 2012). Drafting a good SOW will make it easier to pass those processes with great successful decisions. Kloppenborg et al. (2009) argued that

decisions taken at this stage will form the foundation for the project life cycle and will draw the map for reaching the final stage of the project.

Project **initiation** phase sets the expressions of orientation that form the execution phase of the project (Pinto and Prescott, 1988). The initiation phase is where the business case is stated, project scope is defined, and expectations of stakeholders are set (Adams and Barndt, 1983; King and Cleland, 1983). Failure of doing things right in this phase means a high likelihood of failure of the project (Patanakul et al., 2010; Pinto and Prescott, 1988). Consequently, there is no harm of spending more time -as required- on this phase of activities since it helps raise the success likelihood of the project in the following phases (Archibald, 1987). It is true that it is attractive to start the project implementation quickly, however a poor initiation normally moves the project to troubles, crises and even failure (Khang and Moe, 2008). If this stage is not executed properly the whole project may go down (Shimizu and Hitt, 2004). The initial stage of the project is important because this stage evaluates and outlines the scope of the project. The scope of the project assists the project manager to define the realistic goals that can be achieved to make the project a success (Pinto and Slevin, 1987).

This opening stage initiates the process of maintaining and documenting information about the project in an organised manner which helps the future team members to obtain valuable information from it (Adner and Levinthal, 2004). This stage defines the approaches that will be used to manage the project. It is necessary that these approaches are properly documented in the Project Initiation Plan (Pinto and Slevin, 1987). It is the initial stage that plants the seeds of change; by including a description of how scope will be handled and how changes to the scope will be dealt with (Scarbrough et al., 2004).

In this stage, a risk plan is developed and included in the project scope by identifying broad risk areas. This helps and provides valuable information to the executive sponsor, project director and other funding sources to clearly understand what the possible risks are and what can go wrong so that they can ascertain if they need to prepare a contingency strategy and extra funds for contingency (Scarbrough et al., 2004). Calculating the risks well ahead puts the project and the team in a good position to troubleshoot any issues that could arise during other stages of the project (Chapman and Ward, 2003). Also allowing the team to specify the team members who will be responsible for addressing actions, timings and the expected results will be generated (Ward and Chapman, 1995).

SOW can help the decision maker to compare and prioritise between several strategic projects to select the most important and that which can provide the most benefits to the organisation (Verzuh, 2012). Good and clear SOW that describes the proposed project will make the evaluation of the proposal easier and will provide a clear and strong justification for the selected project (Sousa, 2009b; Edward, 2010). Also, specific, comprehensive, clear and understandable SOW is important to the budgeting team to be able to have detailed breakdown of services and tasks required. This will help in estimating the required budget (Sousa, 2009a). Evaluating the right budget will increase the possibility of completing the project as per its plan. Nielson (2009) claims that poor SOW will make it difficult to estimate the right budget that is needed for project implementation. Over budget means waste of resources by reserving more than required. On the other hand, under budget means high risk of having an uncompleted project or delayed project which is a costly issue (Abdul-Rahman, Takim and Min, 2009). As it was discussed earlier in this chapter, cost is one of the "triple constraints" that is necessary for judging the success of the project. Also, it is one of the "quad constraints" presented by Norrie and Walker (2004). If the budget for implementing the strategic project was estimated wrong, the project most probably will face problems that produce unsuccessful project. Hence, it is important for the project to have a budget that is, practical, realistic and broadly covers all of the major areas of costs and expenditure (Chapman and Ward, 2003). Putting this altogether for a small project is not a complex process, but large projects can include long and complex calculations (Jiang and Kleim, 1997). The project should be evaluated, and the requirements should be assessed by creating an itemised list of everything that will be required during the project from inception to the closing out stage (Jugdev, 2006). The budgeting process of a project can be evaluated in a step by step approach which helps the manager to determine the budgets and costs that will be associated with different phases and can compare the same with other projects in the project portfolio (Kwak and Ibbs, 2002; Hoegl et al., 2003; Love et al., 2002).

Clear and understandable SOW is a must for effective bidding and contracting processes (Hart, 2012). This is important for both the organisation that initiates and owns the project and the service provider (or contractor) that selected to bid for project execution (Cole and Martin, 2012). Having good SOW will help the potential contractor in understanding the client expectations and requirements from implementing the project. This will enable the bidder to provide responsive high-quality technical and commercial proposals that meet the client needs since they will have the ability to understand precisely the project SOW (Martin, 2010). High-quality proposals will make it easier to evaluate those proposals and compare

them with the issued SOW (Reiling, 2008). Good proposals can give a good indication that increases the likelihood of getting what is expected from the project by awarding the contract to that bidder (Phillips, 2008). Unclear and vague SOW in this process can lead to higher costs if the bidders received a hard to understand, with unclear specifications SOW (Edward, 2010; Verzuh, 2012; Lock, 2013).

The main purpose of the management of bidding process is to determine and choose a suitable partner of delivery for any project or activity. Usually, a contractor is selected based on best value determined and the lowest cost proposal (Cleland, 1999). A delivery partner can be identified at the initial phase or any stage of the project due to rapidly increasing complexities of the project (Beard et al., 2001). Effective bid project management emphasises on certain important factors including bid process planning, task scheduling, and coordinating the exchange of information and documentation in order to ensure that all submission preparation is completed efficiently on time (Crawford, 2006). The first step of the bidding process deals with the specifications for the job and the project SOW. When the details of the project have been developed and designed, the bid opportunity may be open to anyone who is qualified to bid on it (Tiong and Alum, 1997). The span of time that it takes to review the bids could vary as it depends on the number of bids received (Andersen and Jessen, 2007). Success and failure of some projects rely heavily on the task performed by the contractor. So it is important that when the manager makes the selection he should ask as many questions as is required to ensure that the best contractor is selected (Aubrey et al., 2007) and that the contractor's bid is meeting the project requirements as stated in the project SOW (Anderson and Merna, 2005).

During initiation of the project, the contract between the project owner and the execution contractor/s, SOW is representing a considerable part of it (Cole and Martin, 2012; Nielson, 2009). This part is the core and is the purpose of having a contract between parties. If the SOW is so clear and covers all requirements for constructing a strategic project, it will be a legal document that manages the risk for all parties (Reiling, 2008). This document can be used to understand the rights and obligations for all parties that sign the contract. Also, it will be the general guidance for implementing and managing the project in the next phases of the project management life cycle. The effectiveness of this guidance is depending mainly on the SOW that is usually attached to the contract (Phillips, 2008; Hart, 2012). Good and effective SOW will produce most probably a good and effective contract that helps in

managing the risk associated to the project (Reiling, 2008). SOW is the core of the initiation process and is involved in each activity of this phase of activities.

Improving the area regarding the controls of contracts should be a main focus for most firms and organisations. Lowe (2004) stated that "the contract agreement itemizes the documents comprising the contract. It includes the identities of the parties and defines the scope of work, the contract price, and the schedule for its execution" (p. 680). He claim that "general specification and scope of work" is a considerable part of a project's contract where the project SOW is described, technical specifications and standards are identified, and project implementation management and control procedures are mentioned. Managing risk is the fundamental part of the contract and it is essential to understand the contract in-depth (Baccarini and Archer, 2001). The framework and its focus should be related to activities and they should be undertaken during the contract's operational phase (Sousa, 2009b). Thus, the framework is considered as good practices for the purpose of managing a wide range of contracts. The main purpose of making a contract is to prevent any disputes that can arise between the parties and to clearly spell out the duties and actions of each party (Atkinson et al., 2006). A valid and binding contract can be made verbally, but the safest thing to do is to get the terms in writing (Schwalbe, 2012). It is necessary for both the parties to clearly understand and then sign the contract (Aubrey and Hobbs, 2007).

After project Initiation, **Planning** is the key for having a successful project (Longman and Mullins, 2004) and creation of a project plan is the first task for any project after project selection (Khang and Moe, 2008). Project planning should not be ignored since it is an important process that saves time and resources and it is a useful key for preventing or detecting problems that may occur during project execution (Kerzner, 2013; Zwikael and Globerson, 2004). This step of project management life cycle should contain a comprehensive breakdown and duty of every task of the project from starting to closure (Picariello and McDonough, 2011). The criteria desired for the successful achievement of each task should be defined in this phase. Writing the project scope, outlining the tasks to be done, identifying project plan are important for the planning phase to be sure that the initiated project will achieve its goals within the available resources, at the required time and quality (Patanakul et al., 2010).

Jiang and Heiser (2004) proposed that project teams should expend the needed time planning a project before moving on to the next phase. "Faulty planning will result in failure,

whereas high-quality project planning increases the project's chances of success" (Zwikael and Globerson, 2004, p. 1545). Zwikael and Globerson (2004) suggested that the knowledge area of scope should product "scope planning" and "scope definition". They argued that Work Breakdown Structure (WBS) is the major important output of scope definition process. Having a well-defined and clear SOW will help in generating effective WBS that helps in establishing a high quality plan (Edward, 2010). Gibson and Hamilton (1994) see that success of performing the planning tasks that produce a high-quality plan is highly reliant on the level of exertion spent to define and write the project SOW. Also, Cho and Gibson Jr. (2001) suggested that detailed and clear SOW is the key for successful planning which is a vital step towards the overall success of the project.

During the **Execution** phase, a detailed design of each objective and deliverable is shaped (Morris and Jamieson, 2005) and the required results or products are physically constructed, scrutinised and evaluated to determine whether they meet the criteria of quality and acceptance as specified in the project SOW and design (Mullaly, 2006). With each deliverable being constructed, a collection of management processes is carried out to observe and control the activities. During the execution phase the physical visible deliverables are obtained which are presented to the customers for their acceptance (Morris and Jamieson, 2004). If the customer gives a negative or does not accept the deliverables it is a clear indication that the deliverable does not meet their requirements due to which the success of the project will be compromised (Jaafari, 2004). SOW is the main player for managing this phase. Having a comprehensive understandable SOW will assist the project manager to identify exactly the project scope, requirements and expected results from the project (Nielson, 2009; Martin, 2010). This will enhance the chances of delivering all project deliverables as per the quality specified in the project SOW, on the specified schedule and within the budgeted cost (Sousa, 2009a).

"Monitoring and control" is a vital process for the strategic project management to ensure that it is running as planned (Kenny, 2006). This process is mainly considered as a part of project execution phase (Patanakul et al., 2010, Khang and Moe, 2008; Jiang and Heiser, 2004). During this phase, project plan, project timeline and project team member performance are monitored and controlled to deduct any non-conformity and take the necessary corrective action (Kloppenborg and Petrick, 1999). Lefley (2004) highlighted that it is necessary to compare the actual project progress and current status with the placed plan and SOW requirements and to monitor the performance of the resources for the scheduled

work. By this way, the necessary reaction can be taken and any adjustment can be done to maintain the project on track (Verma, 2007). Actually, it is important over the project period to keep control and monitor the project progress and the achieved deliverables (Steyn, 2002; Picariello and McDonough, 2011). This can be accomplished through regular reporting of project progress, risks, and issues that face the project and checking the actual status and then comparing it with the plan which was developed according to the project scope to ensure that the benefits expected from this project are still valid and will be delivered as planned (Shenhar and Dvir, 2007). Monitoring and control is an important process in order to maintain track of the project (Khang and Moe, 2008; Adams and Barndt, 1983). Cole and Martin (2012) suggest that one of the tools that gives the project manger the talent for doing so, is the project statement of work. Understanding the SOW and monitoring and controlling the implementation of its requirements is the key for moving the project successfully to its closure phase (Amanwani, 2009; Benjamin, 2007; Cleland, 1999).

Practically, when all the project deliverables have been achieved as per SOW requirements and the same communicated to the stakeholders, customers and the management, the project becomes all set for **closure** (Jaafari, 2004; Archibald, 1976; Kerzner, 2013). In the closure phase, the project is completed as per the project scope and approval of project's client should be obtained to certify the satisfaction of the delivered performance and project outcomes (Jaafari, 2004; Picariello and McDonough, 2011). During this phase, the review of the project should be carried out, the performance during the project should be evaluated and the good quality and bad practices are recorded as lessons to learn (Khang and Moe, 2008; Patanakul et al., 2010). This can help in repeating the successes and avoiding failures (Patanakul et al., 2010). Closing the project according to the project SOW closing conditions, will smooth the progress of the closure process (Martin, 2010).

Un-closed project will continue consuming resources (Yeo and Tiong, 2000). That is why, closing a project should not be considered as a fairly routine and easy to do process (Hobday, 2000). According to Benjamin (2007), the most important closing document in this phase is the sign-off. If the physical signatures are not placed on the document that implies that the project has been completed, the stakeholders can continue to force some changes and enhancements in the project (Hobday, 2000). So, it is always better to obtain the sign off and to put the project to completion however, any subsequent changes and enhancements forced can also be put in action but then they will amount to being changes out of the original scope of the project (Benjamin, 2007). Written SOW issued in the early stage is important

in this phase to identify terms and conditions for closure phase and to compare what was implemented during the execution phase with the project requirements stated in the SOW statement (Cole and Martin, 2012; Sousa, 2009b). Effective SOW will assist the project manager to arrive and pass this phase successfully (Nielson, 2009; Martin, 2010; Nutt, 2007).

It is so clear that it is important to have a project SOW in order to serve both the operation and strategic side of the project performance. Operationally, it is important to have the project SOW available in order to have the desired performance of the project and to pass all phases successfully. As it was discussed in this chapter, different stakeholders use the project SOW at different stages of the project lifecycle in order to manage the operation of the project and maintain the best results. It is considered that SOW is a critical document for the management of a project (Martin, 2010; Cole and Martin, 2012). Thus, it is necessary that all project stakeholders should have a clear understanding regarding the projects SOW and stick to it (Kloppenborg et al., 2009). Proper and effective scope management is significant in the success of any project, particularly in terms of time and money (Dumont et al., 1997). SOW can be used as a rule book for the entire project team, key stakeholders, the project sponsor and the project manager, and steers the processes and deliverables of the project. Cho and Gibson Jr. (2001) stated that: "Poor scope definition is recognized by industry practitioners as one of the leading causes of project failure, adversely affecting projects in the areas of cost, schedule and operational characteristics" (p. 115). Therefore, scope definition has a direct impact on project operation and the overall success of the project (Dumont et al., 1997; Clark, 1989). From a strategic point view, having effective project SOW as a base for any project will help in achieving the long-term objectives of the project. The scope of project identifies the problem and describes it, as an opportunity that can be exploited, or a benefit that can be obtained or a solution to a problem (Garfein, 2007). The justification for the project is always derived keeping in view the strategic objectives of the company. The project justification should be clear, specific and precise, and it should cover both qualitative and quantitative actions and procedures (Englund and Graham, 1999). The objectives in the statement constantly indicate the reason "Why" the project is initiated. There is always and for obvious reasons a motive behind the investment of funds and time invested by the sponsor to start a project. The objectives answer the "WHY" part of the project undertaken (Highsmith, 2009). Selection of the right project, taking the right diction and satisfying the long-term objectives are just examples for the expected role that the project SOW should play in serving the strategic side of the project.

The literature highlights that SOW is important for the project performance but its role in the project performance needs to be addressed clearly by identifying how the project SOW development process impacts the project performance criteria and its importance to the project key processes. One of the objectives of this study is to identify the role the project SOW plays during the project lifecycle, through a literature review, which is done within this chapter, and then through an empirical study which will be addressed by answering the first research question (RQ1): -

RQ1- What is the role of the project SOW in project performance?

2.4 EFFECTIVE PROJECT SOW

2.4.1 What is SOW?

Nordmeyer (2015) stated that business proposal is a document which highlights financial or operational purpose of construction. The summary of this proposal is called; Scope of Work (SOW), which briefly explains the purpose of a project and the intended results from it after execution (Crawford, 2006). Similarly, National Archives and Records Administration (2003) and Hinkelman (2008) defined it in the context of the construction industry that it is a written statement of project requirements, which helps the contractor to fulfill the desires of customers. It can also be called as clients' requirements. In this way, SOW and statement of need seemed to be very similar documents, only with some minor differences to each other. However, generally they both address the same areas either in construction or in any other business. In a similar manner, the relationship between clients' requirements and SOW can be understood in the way that SOW is simply a summary of a project proposal, which entails customer requirements towards the project.

Marchewka (2014) and Kloppenborg (2012) gave a general definition of SOW other than construction that it is a written description of any business system, product, or service. It is usually written to bring the business realities in compliance with the requirements of the customers. It is important to notify that SOW is normally written on those projects, in which multiple stakeholders are involved. Wright (n.d.) asserted that the term of SOW is typically used in government construction contracts. It enlists requirements of clients, brief explanation of project, timetable, quality criteria, and travel expenses, location of site and labour skills, which are required to build that project. It helps the construction firm to approximate the cost and scope of the project before starting tangible construction. Therefore, each project does not start out of the thin air, rather it requires extensive human-

to-human discussion, drawing of multiple drafts, and debate on them. In this way, the approval of each partner is also needed to be acquired before project construction. Fox and Waldt (2007) in a brief manner, stated that SOW takes the official status of a project after its approval and approval can only come when it deeply reveals the major reason or purpose behind the project for which it is required to be constructed.

Although the term Scope of Work (SOW) is commonly used in different industries in Saudi Arabia, there is no agreed definition for SOW as a term. The Project SOW is referred to the written document that describes the firm requirements, which should contain a clear description of the work required to be performed, location, execution period, relevant applicable standards, deliverable schedule and any other specific requirements. SOW is a detailed description of a specified work, tasks, services and/or equipment that are needed for project execution. SOW is usually integrated, directly as an attachment or indirectly by referring to, in a contract. Similarly, in OGS, SOW is used as a document that has all the required information that makes the organisation confident for executing the project and enabling the executers understanding of the organisation requirements. Hence, SOW is a formal document that identifies, defines and describes what is necessary to be done by executing the project. Usually, it is written in a definitive and precise language that is appropriate to the field of business in order to prevent any misunderstandings of requirements and used terms and conditions. The Project SOW should address the design and performance requirements, as well as the material and work requirements for the project. It can be used as a working agreement between two parties, normally between a client and a contractor which makes it an important legal document. It defines the responsibilities and liabilities, for the agreed scope between clients and contractor.

Cole and Martin (2012) uses the term "Statement of Work" "to refer to the document that completely describes the contractual work requirement" (p. 1). The Federal Acquisition Regulation (FAR) states that "Statement of Work" has to include "the work to be performed; location of work; period of performance; deliverable schedule; applicable performance standards; and any other special requirements". PMI defines "Statement of Work" as "a narrative description of products or services to be delivered by the project". Martin (2010) proposed to expand the PMI definition to be; "A narrative description of the products and services to be supplied to the client and the needs and requirements of the contractors to deliver such products and services under the contract" (p. 14). "Statement of Work" function as defined above is so close to the project SOW which is considered as a document that formally captures and describes the deliverables work and performance activities, and

timeline a contractor must implement in performance of identified work for a client. Usually it takes account of detailed requirements and standard controlling and authority terms and conditions. SOW forms a major part of any project contract and actually it is often legally equivalent to the project contract. The difference between the project SOW which is the subject for this research and the "Statement of Work" is that the project SOW is considered a complete document that describes the whole project while the "Statement of Work" can describe part/s of the whole project. So, the project SOW can be divided into several "Statement of Work" for bidding purposes.

Merrow (2011) claims that the development of the project scope is the most essential phase for any project development. He claims that after completing the first phase (FEL-1) of Front End Loading (FEL), FEL-2 should "develops and articulates the scope of a project to a point where we can be confident that all elements of scope are accounted for" (P. 206). The developed scope in this phase should be comprehensive to the extent that it enables the investor and executer to develop trustworthy capital cost estimation. It should include each and every piece of scope that is required for achieving the project's strategic objectives and according to that scope and output of this phase, the decision maker can take at the end of FEL-2 the go/no go decision for the project. The current research will address the project scope of work as defined above and its development process as the second phase of FEL phases (FEL-2).

A SOW serves as an official document through which a project is carried out. Without the SOW, the project cannot have any direction and therefore no existence. Every business that commences a project and wants to execute the project successfully must create a SOW in order to outline various needs, demands and conditions (Kerzner, 2013). It builds the foundation for agreement between customer and supplier and at the same will becomes the root source which will be considered and read for all project related decisions. This document will be exercised to decide whether the project has been completed or is still left to be completed at the closure phase (Green, 2005).

Using the SOW, the major task can be broken down into subtasks that are do-able tasks and are called work packages. These work packages have specified outlines and are to be completed in a short duration of time. Many work packages constitute the work of a stage or even of the project as a whole. The outcomes achieved from these work packages are officially called the deliverables. In any given phase the deliverables that are specified

decide the way the work packages have to be carried out to complete the work of that phase and achieve the required deliverable (Adams and Barndt, 1983).

The SOW clearly lists and mentions the work that is to be done for the project and this process that has to be followed for each phase of the lifecycle (Dvir and Shenhar, 2007). The Work Breakdown Structure which is an extended arm of the SOW provides a detailed sketch of the work and work packages to be carried out. The scope reveals the environment for the work that is to be performed by explicitly mentioning definite points known as inclusions and exclusions (Dietrich and Lehtonen, 2005). Everything that is covered in the SOW is part and parcel of the project and if something is not mentioned in the SOW then it is beyond the scope of the project. The Scope of the project does not outline the lengthy details of each and every work package but there are some specific conditions that may be obligatory and have to be adhered to irrespective of the point of views of the members (Thiry and Deguire, 2007).

Exclusions in the scope of the project mentions those particular conditions and standards that are though stated in the SOW but are not required to be adhered to or to pursue no matter what the circumstances are (Clark, 1989). Change control processes provide an explanation of how the project scope will be handled and how agreed changes will be integrated with the project deliverables. Usually a separate document is prepared that describes the change control processes but a cross reference to that document should be included in the SOW (Dumont et al., 1997).

Numerous participants involved in the project need to understand the SOW. In order to provide easy understanding, the SOW should have the strength in describing the project's scope and its requirements (Clark, 2007). The language used in the scope of work statement should be simple so that the document clearly reveals the important points and those points could be understood by all the members' easily. In case of technical projects involving the use of technical terms, the SOW should be prepared in easy to read and easy to understand language (Cicmil and Hodgson, 2006).

SOW, as mentioned in several statements in this chapter, is an important document for managing a strategic project and to enhance the chance of success. Project SOW is the core of this research and actually there is a gap in the literatures discussions about this important document for project management life cycle and its relation to project success.

2.4.2 SOW and Client Requirements

In any field, clients are the most important element of business around which all of the operations, processes and transactions revolve. Similarly, in the oil and gas industry clients are also a central element of any project. Client's satisfaction is an indicator that is very often used to measure the project success (Lee and Egbu, 2005). Takim and Akintoye (2002) strongly asserted that the satisfaction of clients is directly proportional to its success. Munns and Bjeirmi (1996) generally stated that the success of any project widely depends on clients' satisfaction towards products. They considered this factor as one of the vital stakeholders of the project, which gives tremendous input in the long term success. However, there are numerous dimensions of this satisfaction which collectively ensure a projects success, for example stakeholders' role during the construction process, perfect analysis of their performance, and fulfillment of clients or users' expectations. In the oil and gas industry, clients not only initiate the projects but also finance it. Therefore, their satisfaction in the final product is a central focus for the industry and it can only be achieved through fulfillment of all their requirements. This is the reason Kamara, Anumba, and Evbuomwan (2002) along with Nicol and Pilling (2000) termed clients' satisfaction as "driving force", and stated that it can be identified through various means from which 'statement of need' is one of them.

It is most likely that clients are gratified when their perceptions about the contractor performance and provided services are matching or exceeding their expectations (Ahmed and Kangari, 1995). Assessment of client's needs is the starting point for achieving their satisfaction (Kotler, 1997) and fulfilling their needs is the key for obtaining their satisfaction (Mbachu, 2003). Emery (2004) classified Client's requirements into their needs and wants. "Needs" is representing the necessities and they are considered as a special wants that is necessary to achieve the objective of the project, while "wants" representing the client's wishes and desires.

Kamara, Anumba, and Evbuomwan (2002) differentiated the number of clients in industry that they can either be an individual or an organisation, which pay for the design and construction of building, bridge, plant or road. The clients may not be the very user of that particular facility which needs to be constructed (Salisbury, 1990). This means that sometimes the owner of the project is totally separate from the grass-root users, which alternates their status from user to proprietor of development scheme. In this way, it adds numerous stakeholders with them, such as local councils, environmental groups, pressure groups, lobbies, and users. Thus, it can be evaluated that if clients are full-fledged working

organisations then they work in collaboration with several parties at once and their collective interest dominates the project (Naoum and Mustapha, 1994). In this domain, clients can be categorised in four major types: investors, private sector, public sector, and real estate firms (Ofori, 1990).

The Chartered Institute of Building (2010) asserted that before the beginning of a project, any sane client prefers to make a detailed report or case, in which financial evaluation of project is conducted along with identification of involved risks in it and examination of its future need. It is usually called "statement of needs", on which basis the objectives and targets of projects are identified. It is not necessary all needs are practically addressed in the final project; more or less it helps in identification of real needs of the project with the scope of future alterations and changes (Designing Building Wiki, 2015; ECI, 1996; Stephenson, 1996; Smith, 2000). It reveals that statement of need targets the customers' hidden desires and imaginations towards project. This is the reason that before any project construction, several meetings are conducted between constructors and customers to discuss multiple aspects. These meetings help to fulfill maximum desires within limited budget, in fact they sort to maximize the existing resource (Weaver, 1993). It is just like the internal operation of the business sector, in which firms aspire to yield huge output from tiny inputs.

Thus, the premise has been settled that the statement of need usually plays an important role in the long run, to establish client's satisfaction after completing the project (Ahmed and Kangari, 1995). It can be viewed from the perspective that this statement is a root foundation of any project, in which constructors and clients collectively discuss its desired outcomes and the ground realities such as, plant construction, local environment, political environment, expected cost, existing budget, future prospects for further expansion and integration. Hence, clients' requirements documentation represents the foundation and the cornerstone for attaining their satisfaction (Carroll et al., 1997). To improve the project scope development process, it is important to carefully take care of client's requirements capturing process in order to produce a document that represents the client needs and expectations (Macfarlane and Reilly, 1995). Laufer et al. (1993) argued that client needs and their expectation is the information primary source for any project and missing or inadequate information can end with a project that does not meet its main objectives. Similarly, O'Reilly (1973) stated that for a successful project planning and execution, it is vital to have a documented clear scope that contains the client requirements and expectations.

Capturing the client's main requirements starts at an early stage during project briefing process but it does not stop at that stage and should be continued throughout the project planning and implementation. "The briefing process has for some time been recognized as important area in which the construction process can be improved" (Lee and Egbu, 2005, p.865). This process aimed to translate the client's desire into a clear documented project scope of work (Winch et al., 1998). To develop the process of project scope briefing, it is crucial to take into consideration the process of capturing of clients' requirements in order to end with a project scope of work that fully fulfills their needs and expectations (Lee and Egbu, 2005). Due to the detailed paper work of project execution business, it has been found that corporate clients usually possess an entire team with them, who initiate and run the project (Wysocki, 2004). First, it involves the decision maker of the investment, who keeps checks and balance on the whole process of project execution. Second, there is a sponsor or financer of the project, who has the responsibility to run the business for client/s and handle daily operations of project. Finally, the advisor who is responsible for giving professional assistance and help to the buyer regarding construction and its multiple aspects (The Chartered Institute of Building, 2010). It is an obvious fact that mega projects in oil and gas industries require good teamwork and labour on its back. The Chartered Institute of Building only mentioned very basic officials, which are an essential part of any project. Nonetheless, the number and skills of the rest of the team can be varied according to nature and scope of projects. The relationship between this workforce and client's satisfaction can be evaluated in the manner that the workforce actually draft the paperwork and formally brings client's desires into reality (Young and Egbu, 1992). In this regard, both parties are required to have constant and dynamic relationship throughout the execution procedure of the project. Similarly, their healthy and intense relationship can become a big guarantee for project's success and customers' satisfaction.

In the contrary, Lee and Egbu (2008) revealed that mostly in the construction industry clients remain unsatisfied. They further asserted that there is a lack of research and assessment on clientele needs and demands. In most cases, the expectations of customers are higher than the realities, which cause deep dissatisfaction in them at the end of the project. The authors had themselves answered the question as to why there is lack of satisfaction among clients. Research and development emphasises the hidden aspects of construction and other significant areas, which cannot be seen through the naked eye. The desires of clients have not been evaluated empirically, so significant research has been conducted on the particular reasons behind clientele desires and means to achieve them. It is an obvious fact that all

desires of clients cannot be satisfied equally in single timeframe, because some of them could be challenged by on the ground realities. Nevertheless, the research and development can make the ground to yield new possibilities and opportunities. Similarly, the arrival of new technology and construction skills can address some requirements at the very early level, if executed intelligently. In this framework, Lee and Egbu (2008) both opined that customers' long term satisfaction can only be achieved by cooperative and efficient functioning of project team and its management with the client team to understand and meet their expectations.

Martin (2010) gave a detailed account of the client's importance in the designing of SOW. He stated that usually customers tend to ignore to be part of SOW due to lack of their knowledge and skills on the concerned project area. Similarly, the lack of experience and resources also makes them restrain their participation (Griffin and Hauser, 1991). Nonetheless, without their assistance, a true SOW cannot be framed, because SOW's purpose is to reveal the in-depth desires of clientele out of that project (Martin, 2008). In addition, SOW drawn by service or construction firm has also a huge capacity to be misinterpreted and altered repeatedly. In this regard, a service firm should ensure that the client would understand that both of them are willing to avoid any type of future dispute between each other and they must have understanding about the quality and services, which clients expect and the firm may provide them (Cole and Martin, 2012). In the long term, it helps in budget management of project by service firms and acts as a scale to measure performance of latter in the favour of clients. It should be noted that SOW always comes from the client (Yashiro, 1999). In this regard, if clients are not experienced and skilled then they should take private consultancy or involve third party in project initial negotiations and discussions (Hansen and Zenobia, 2011).

Van Horn, Schwarzkopf and Price (2006) asserted that the development in research and technology is a constant factor. It widely influenced cost, success, innovation and benefits of any project. They stated that clients are basic source in technological and physical development of any business area. Their desires and needs play an important role to bring out new aspects and modification in existing resources. In a similar line of action, Whelton, Pennanen, and Ballard (2005) quoted the model given by Kamara, Anumba, and Evbuomwan (2002), which revealed the procedure to acquire client's requirements and it is based on three major stages. First, requirements are necessary to be defined clearly, second, they are analysed and evaluated in a strict manner, and finally, the stage of their translation or implementation occurs. Ofori (1990) asserted that the stage of implementation formally

starts the mainstream construction process of a project. Nevertheless, the Construction Industry Board (1997) presented more detailed procedure, which starts with identification of customer's needs and requirements, followed by formation of team, then designing of construction project, beginning of mainstream construction, and post-construction evaluation of infrastructure. Normally all these steps are needed to fulfill the requirements of clients and ensure their satisfaction in the project.

Failures of project scope management is caused by the ineffectiveness practice of scope of work development and the current practice of capturing client requirements. Practically, poor project scope decreases the confidence and the ability to deliver on time and within the project budget and accordingly it decreases the investing attractiveness (Salisbury, 1990). Carrick (2004) claimed that Scope "Creep" that causes progressive evolution of the project quality and quantum, is considered a major source for cost overruns and client dissatisfaction. Common concerns related to scope creep start with poor project scope definition that does not represent the client requirements or that which is not articulating and not specifying those requirements clearly. Variations to the project function, quality requirements and quantum over that described in the project scope will impact directly the project cost and it will run out of its planned budget (Barrett and Stanley, 1999). That explains the importance of having clearly defined scope at the start and managed during the course of design and implementation stages in order to have effective control for its budget.

In most cases, because of undetailed, undefined and/or unspecified scope, wider interpretation for both client and contractor usually open (Salisbury, 1990). Limited project scope information can cause uncertainty and accordingly the client budgeting a higher budget to mitigate the risk that will be transferred to the contractor. But with this less defined scope, conflicts in quality, quantum and even cost will be created for both parties. According to Masterman and Gameson (1994), the client usually chooses to transfer cost risk to the contractor at the early phase while defining the project scope. Using traditional contract structure, the cost risk is shifted to the contractor through bidding process. They state that the bidding Process is used to define the project scope to contractors using price-able format. Contractors are accepting the risk transfer from the client throughout the project contract. However, this usually makes it subject to different interpretations between both parties during implementation phase which may have significant increase in the project volume and accordingly its cost. So, it is important to have advance documentation that can describe the client requirements in terms of bill of quantities and specifications supported by design drawings. This type of documentation allows bidders to produce a commercial statement

that meets the project requirements (Martin, 2008). But the Contractor has the responsibility in the bidding process to be sure that the scope is clear and the client requirements were captured correctly. Redefining the project scope in this stage is much cheaper than doing so at any later stage (Nkado and Mbachu, 2001).

It is fundamental for having a successful project to have a well-defined project scope of work that captures and covers all client requirements and expectations. If the client requirements were not understood during scope of work development process, the cost impact of re-designing work and change in the project scope can lead to an unprofitable project. This is considered as wasting of different resources such as that related to redesigning and redoing of completed work and this drags the project completion time and cost. Therefore, scope of work is the cornerstone that can give the client a transparent process that can be used to check the project function, the required quality and quantum that control its cost. A well-defined project scope will represent a fundamental for having secured decisions and functional and cost outcomes.

Usually and due to management and some time the need to commence and start project implementation, less time is given to develop the project scope which resulted in having inadequately defined project SOW that does not represent the client needs and expectations. "Improved transparency between cost and scope will allow contractors and subcontractors to compete on market prices and management/time factors and not a 'guess the scope' basis" (Carrick, 2004, p. 8). To establish a solid foundation for a project, a well-defined standard for the project SOW supported with sufficient informative design is needed.

2.4.3   Characteristics of Project SOW

Industries face significant issues with project scope management and its cost containment. This ends with projects outcomes with lower quality and/or cost over runs that have undesired impact on the project profitability and leads to client dissatisfaction (Carrick, 2004). Unclear project scope makes its returns uncertain which make clients hesitant to invest (Lee and Egbu, 2005).

Pratt (2006) further added that SOW is a keystone of any project, the more exact it is, the more benefits it yields. Ambiguous and vague SOW causes multiple interpretations by different stakeholders, which become cause for quarrel among parties. She gave more extensive and detailed ground of SOW's content that first, it enlists main product of the construction and gave the timetable for its final delivery. Second, it reveals those particular tasks which are needed to be achieved to construct that particular project. In addition, it also

highlights those actors who are responsible to perform necessary preliminary tasks, such as construction firm or customers. Third, it expresses how the project would be governed or managed from the beginning of the paper work and construction to final product of implementing the project scope. Fourth, it pins down the required resources of that project, the benefits it would generate, paraphernalia required to run the project after construction, and testing devices. Finally, it highlights the payment and cost of the whole project, such as who will pay to whom and when. Under the light of this discussion, it can be opined that SOW acts as a brief guideline for the project, from the beginning to end. It somehow draws foundational skeleton of the project and evaluate each dimension.

Kerzner (2013) explained that most of the times SOWs are misunderstood and wrongly interpreted due to its brief language. It includes mixing of different sections such as long term and short term targets, project specification and particular instructions of clients. The vagueness also yielded by the use of general vocabulary, such as: mostly, nearly, approximately, mainly, or almost. Similarly, when there is no specific structure or skeleton given by clients regarding deadlines and resources, the misinterpretation is likely to occur. Lack of homogeneity in all required tasks along with insufficient description of final results is also the cause. Finally, failure in achieving third-party review also generates significant barriers. Kerzner (2013) further evaluated the misconception in SOW with the help of an example. He gave the example of the navy as a client, which mentioned in its SOW that tests on new prototypes should be conducted on water. The construction company tests them in a swimming pool; however, the navy actually meant water of Atlantic Ocean. In this way, huge costs are created by the service-company and initial tests would be considered as total failure. Thus, it can be asserted that the language and content of SOW is a key foundation of any project. This example sufficiently explains the significance of client's requirement in SOW. It shows that there is a huge scope to mislead the SOW and alter the mainstream design of the project. In this regard, the construction clients should make a special effort to design extremely discreet and to the point SOW, with no vague vocabulary so, no huge error would arise.

Before writing the project SOW, the writer/s should have a clear understanding of what are the issue and the purpose of the project as per business requirements and business stakeholders' agreement (Sousa, 2009b; Reiling, 2008). Reiling (2008) argued that the writer for the project SOW should have a wide detailed understanding about the project scope, project materials and services required, general and special terms and conditions for the project execution management and control. Even if this may seem to be simple, it is

essential to spend more time to discuss and think carefully what the organisation wants to do and what are the expected results of this project (Stallsworth and McDonough, 2013). Obviously, it will be very hard or may be impossible to write a clear and effective SOW for a project without understanding the objective of the project, the expected results after implementing the project and the requirements and targets (Reiling, 2008). Sometimes it is required to have the SOW done by a consultant especially for those complicated and highly technical projects (Phillips, 2008).

The project scope statement issued at the end of FEL-2 is a documented description of the project scope in order to ensure that all stakeholders are on the same page. It is part of a broader document called Statements of Work. The Statement of Work is one of the most crucial components of Project Management which details the work to be completed for the successful launch of a project. In its most fundamental comprehension, it is a narrative description of the project purpose which is utilised as feedback and/or input for creating a Project Charter (PMBOK, 2013; PMP Study Guide 2013). The statement of work also serves as a set of instructions and specifies the various tasks that need to be met for fulfillment by the project team in order to meet project objectives.

The main quality of statement of work is that it should clearly describe and define the work activities, deliverables, and timeline of a particular project that the project manager will execute from the initiation and towards the completion of the project at hand (PMBOK, 2013). A right statement of work will include all requirements and pricing for the project at hand very precisely, which will serve the purpose of communicating to the client about the various steps the project will go through towards completion (Nielson, 2009).

The language of the Statement of Work is of critical importance and special attention must be taken in respect to the standard regulatory and governance terms and conditions. Hence, the Statement of Work may at times appear to overlap in purpose with the agreement between project team and client. In fact Statement of Work may serve the purpose of a legal contract as well (PMBOK, 2013).

Different working formats for the Statement of Work exist however, they share the same salient features (Miller, 2007). Specialised software or hardware solutions may be adopted befitting the nature of the project at hand. Customised version of Statement of Work may also be conceived to accommodate projects of high technicalities, although it is a rarity (Miller, 2007).

A good statement of work is the 'blue print' that enables the members of a project team to systematically follow as a basis for completing daily scheduled tasks and taking day-to-day decisions (Neilson, 2009). A key element of a correct statement of work is the project organisation chart. It carries the roles of the various stakeholders, and their references towards their influence towards the project.

The document of the statement of work runs systematically to typically attend to the following demands of the project that are encountered in any project regardless of the industry (Neilsen, 2009; PMBOK, 2013).

1) **Purpose**: This defines the purpose of the project and the need that the project will fulfill. This section typically answers the core questions such as, why the project needs to be undertaken.

2) **Scope of Work**: This is a list of action items described in steps for the successful initiation of the project. It describes the specific tasks to be accomplished in order to meet project completion and specifies the involved hardware and software requirements.

3) **Location of Work:** As the name aptly suggests, this section describes the location where the work will be done. It may also include locations of hardware and software which are integral for the project if it is different from that of the work location.

4) **Period of Performance**: This is a time table for the project and includes such details as the start and finish time, the total billed hours per week/month and other specific details pertaining to schedules.

5) **Deliverables Schedule**: This may be part of the above or may be treated as a disparate section listing deadlines and due dates of various tasks to be completed.

6) **Applicable Standards**: This sections mentions the industry specific or international standards that need to be kept in consideration towards the fulfillment of the Statement of Work. This is an extremely sensitive aspect as deviation from it may even render the project as non-compliable.

7) **Acceptance Criteria**: This sections provides a guideline for acceptability standards. It is a barometer that serves the clients to determine whether or not the product or service delivered is acceptable.

8) **Special Requirements**: Special hardware or software are often required for projects to be completed. These may include certifications from various international bodies, government agencies, or technical experts or professionals and everything else not covered in the Statement of Work.

9) **Type of Contract and Fee Schedule**: If budgets are adequately available to cover the work required, the project is accepted. This is followed by a breakdown of payments which may include mobilisation funds, up-front or phased payment which is usually negotiated prior to the start of the project.

10) **Miscellaneous**: Such items not included as a part of the main negotiations are enumerated under miscellaneous. They are integral to the project, they may be the cause of problems and hurdles if overlooked. While trivial in nature, if avoided it can create glitches slowing the overall pace of the project.

Scope of work is one of the most important elements of Statement of Work and the content and language of the scope of work statement should match well with the Statement of Work. The scope of work often also termed as the 'project scope' is the final element of the Statement of Work. It describes the scope of work entailing the project. This may be service oriented, or in terms of a product, and generally specifies the guidelines and frameworks for acceptance criteria of the project upon finishing point (Dinsmore and Cabanis-Brewin, 2011).

The document of the scope of work includes various other elements including project exclusions, constraints and assumptions. The former deals with particulars which are not to be included in the project deliverable at completion. Items that restrict the work of the project team are listed under project constraints. Sourcing of materials or human asset management personnel also fall under this element. Project assumptions deal with those items that may be achieved or believed to be true pertaining to the project. In PMBOK (2013) the key elements of project scope statement are identified as:

- Project justification – the business need to be attended by the project

- Project product – a summarised description of product (or service) features

- Project deliverables – a catalogue of sub-products to be delivered for successful completion of the projects

- Project objectives – the measurable or scalable standards that a project must meet (PMBOK, 2013)

The language of the scope statement ought not to be very technical. It should be clear and concise so that all stakeholders can understand the scope of the project very well (Dinsmore and Cabanis-Brewin, 2011). All works need to be performed surrounding the design and execution phases should be clearly described (PMBOK, 2013). However, the upper management will not be very interested in the activities but rather in the cost of these activities (Dinsmore and Cabanis-Brewin, 2011). Therefore, the value of the project and the cost of the work needed to be completed should be given clear emphasis in this document. Also, the statement of scope or statement of work should be in line with the requirements of the project client so that the scope can be justified before the client.

The strategic project's SOW is a comprehensive description of what are the objectives and expectations that need to be achieved by execution of the project (Amanwani, 2009). The information and requirements written in the SOW is the foundations for the prospective bidder to understand what is required to enable him to determine the cost. If the expectations of the project are not specified clearly in detail, it will not be possible to have them delivered by implementing the project (Stallsworth and McDonough, 2013). Detailed SOW will help in all phases of the project management life cycle and will give a clearer picture to all of the project's stakeholders (Amanwani, 2009; Reiling, 2008; Sousa, 2009b). Hence good SOW should describe the expectations of the strategic project in detail.

The requirements or expectations should be clearly defined and the focus should be on the performance and final results not on the process or procedures (Phillips, 2008). The SOW focus should be on project performance objectives, project expected outputs, requirements and project milestone which enable the user of the SOW in different stages to verify if the received services meet the expectation of the project (Amanwani, 2009). Effective SOW is written in an outcomes-oriented approach.

Phillips (2008) suggested that performance obligations should be included in the SOW and written in a very clear language which makes it easy to determine them after completion of a certain performance. Obligations and rights are an important part of a project SOW and this part should be precise (Riling, 2008). For example, the payment terms and conditions against the milestones and performance achievements should be stated in a more precise

way that ensures the quality of the performed work or provided service (Sousa, 2009a). Having a precise SOW will make it more effective.

SOW should state the completion period and timelines for accomplishing the project milestones. This will help the planning phase to produce a high-quality plan that contributes to effective performance during the execution phase (Edward, 2010). Also, it will be one of the important controls for the project. Without specifying the expected completion period or due date, the project will lose one of its important controls and it will be up to the executer to judge the completion date (Cho and Gibson Jr., 2001). Effective SOW should not ignore time as a factor for better project management. SOW should state the frequency of the required progress reports and meetings that are required which are a significant part of project monitoring requirements. Thus, effective SOW have to state the due dates and/or periods.

The language used to write the SOW should be clear and easy to understand by different stakeholders (Nutt, 2007). Task oriented statements using active voice is the most appropriate way to state clearly who is responsible for performing certain tasks (Nielson, 2009). Using statements such as "The Company shall provide 'X'" or "The Contractor shall provide 'Y'" will make it clearer and easier to identify the responsibilities. In contrast, using passive voice will make the responsibilities vague (Cole and Martin, 2012). Accordingly, it is not recommended to use statements that obscure the responsibilities such as "'Z' shall be provided".

As much as possible, SOW should keep away from using acronyms and abbreviations. This will prevent or minimise misunderstandings of the SOW statements. When it is necessary to use them, the writer should define them before the first time that he/she uses the acronym or abbreviation (Martin, 2010). Usually, SOW has a separate section for defining terms, abbreviations and acronyms. This will help in removing any confusion and lead to easy and correct interpretation and understanding of the project SOW statements (Cole and Martin, 2012).

For high effectiveness of the project SOW, vague or ambiguous words and statements should be avoided (Martin, 2010; Nielson, 2009; Cho and Gibson Jr., 2001). Statements such as "the Contractor shall excavate as required" or "the Contractor shall modify the existing as necessary" are vague statements that give evidence of less understanding of the project conditions and requirements. Sousa (2009b) claims that many Project Managers have the wrong thinking by assuming that the vaguer the project SOW is the healthier. "But

the problem is that by doing this" they "are simply storing up numerous problems for the future" (Sousa, 2009b, p.1). Vague statements will have the impact on the project in its planning phase, execution phase, monitoring and control phase and even closure phase (Edward, 2010; Reiling, 2008). Instead, the first statement above can be written in a very clear and effective way such as: "the contractor shall excavate a total length of 500 m using the rout specified in the drawing # 'xxx' with 1 m width and 0.6 m depth".

Also, effective SOW should use constant terminology all the way through its text. The same word/term should be used while referring to the same meaning or thing all the way through the project SOW (Martin, 2010; Cole and Martin, 2012). The use of constant terminology is more imperative when referring to technical specifications and requirements (Verzuh, 2012). Constant terminology will make the SOW more effective in delivering the required massages to the user of this important document (Dumont et al, 1997).

Reading about the SOW characteristics, it is necessary to understand what characteristics and what functions it should support in order to be considered effective project SOW. Since there is a gap in the current literature to address this imperative matter, this study has an objective of identifying the characteristics of an effective project SOW and the functions it supports. This will be addressed by finding the answer to the second research question:

RQ2- What are the characteristics of an effective project SOW and what functions does it support?

2.5   SOW DEVELOPMENT PROCESS

2.5.1   Front-End Loading
Turner (2008, p. 14) listed down four phases of a project cycle. These are *proposal and initiation*, *design and appraisal*, *execution and control*, and finally *finalization and close-out*. The idea of front-end loading (FEL) is that the first two phases of *proposal and initiation* and *design and appraisal* are critical for the success of any project. Resources must be utilised in these phases to ensure that the project will be completed with success and will create value for the organisation (Bosch-Rekveldt 2011). Together these preliminary phases are called front-end which are defined by Edkins, Geraldi, Morris and Smith (2012, p. 2-3) to be a preliminary phase of project beginning from the "approval by management – strictly by the sponsor/sponsors management – to authorise expenditure of time, money and effort to commence development of project definition with the exception

that the proposed project would at some point be submitted to the sponsor for sanction approval for full development."

Although no universally accepted definition of FEL is present, most of the definitions refer to the same phenomenon of planning before starting a project. The method of this planning might vary, however. Van Der Weijde (2008) defined it as "significantly investing effort during the phases of a project that leads towards the final investment decision." A very similar definition is by Melton, Illes-Smith and Yates (2008, p. 14) who sees it as "spending appropriate time and resources at an early enough stage in a project." Similarly, Merrow (2011) defined it as "the definition of a project, from the formation of the core team until full-funds authorization is achieved."

Many other terms like Front-End Development (FED), Pre-Project Planning (PPP), Front-End Planning (FEP) and Front-End Engineering Design (FEED) have been used interchangeably to refer to the same idea (Construction Industry Institute, 2012). One definition of FED sees it as a process of gathering strategic information to reduce risks and utilise the resources in the best possible way to make the strategic objectives of the project possible (Gibson, Wang, Cho & Pappas, 2006). According to IPA (2009), FED involves answering all the basic questions about the project in order to have a very clear picture of why, when and how the project will be executed. Priemus et al. (2013) gives out the small difference between FEL and FED as former to be the efforts made for the latter. So FED basically involves all the activities at the earlier phases of the project while FEL are the efforts put for doing these activities. However, in many definitions FEL is referred as a process rather than an effort. Hence, the two terms can be used interchangeably and mean the same. The same is true for other terms. As concluded by Shlopak et al. (2014, p. 209) all these different terms and their definitions are similarly "imply[ing] and emphasize[ing] the extreme importance of a front-end phase of a project" and, therefore, can be and have been used interchangeably.

In addition to the difference to the terminologies, different sources have developed different models for FEL identifying some standard activities to be performed during this front-end phase of the project. According to the Construction Industry Institute (2012, p. 1.01-2), the main activities to be performed during this phase include "optional analysis, scope definition and boundaries, life-cycle cost analysis, site investigation, environmental analysis, process design basis, initial engineering design, space planning, site layout, project execution approach, procurement plan, architectural renderings and appropriation submittal package."

Irrespective of the model one goes with and the activities one chooses according to the needs of the project and organisation, there are a few success factors that need to be ensured. First, FEL activities must be well-defined and ought to be explained to all project participants in order to keep all operations, business activities, and management aligned on one scale (Construction Industry Institute 2012). Second, the project needs to be developed according to the specific project requirements and the sequence and prioritisation of different activities ought not to be copied from other case studies. Specification of the FEL objectives, activities and their sequence is a necessity for success of FEL in producing the desired effect (Nobelius and Trygg, 2002; Payne and Turner, 1999; Muller and Turner, 2003; Bosch-Rekveldt, 2007). Third and last, during FEL a broad and holistic view of the project should be kept in consideration along with focusing on the specifics in order to build a unified plan (Haji-Kazemi, Andersen and Krane, 2013).

Lastly, it is important to keep in mind the cost of the FEL phase including both the monetary cost and the time cost. There are different estimations for the percentage of total cost of project needed to be used in FEL phase. De Groen *et al.* (2003) estimated it to be 1% to 7% of total cost, while the Construction Industry Institute (2012) estimations varies between 2% to 5% depending on the project particulars. Merrow's (2011) assessment of 2.5% to 5.5% are very much close to the estimation of the Construction Industry Institute (2012). In terms of time, the estimations is 20% of the total time of the project (Nobelius and Trygg, 2002). Nevertheless, the time and cost spent on FEL is returned after multiplication as FEL has the potential to reduce cost and increase speed of project execution, as will be discussed in the next section on importance of FEL for a project.

2.5.2   Importance of Front-end Loading for a Project Cycle

"FEL approach increases project definition and lower risk to positively impact total investment costs and return on investment" (Saputelli et al., 2008, p. 1). According to the Independent Project Analysis Group (2002), FEL significantly lowers the overall investment costs, improves the project life time cycle, improves the safety and increases the Internal Rate of Return (IRR). Spending enough time and resources in the front-end of the project cycle has been advocated by many scholars (Artto, Lehtonen, & Saranen, 2001; Flyvbjerg et al., 2003; Morris et al., 2006). The influence curve developed by the construction Industry Institute (see figure 2.4) shows how the influence of the front-end loading on the success rate of the project is higher than efforts at all other phases of projects (Westney Consulting Group, 2008).
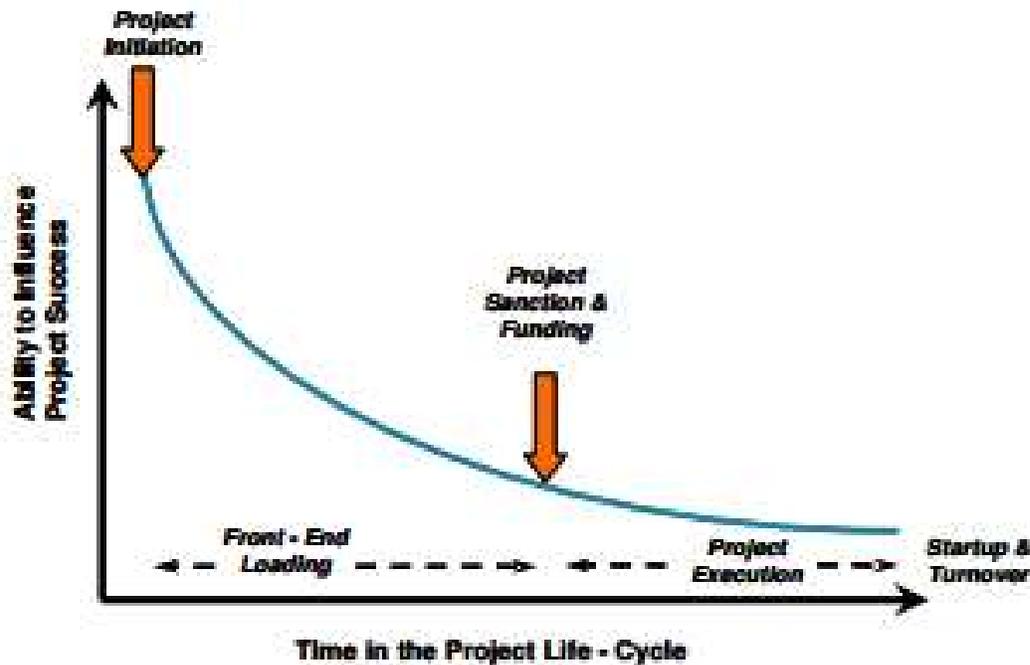
Figure 2.4: Influence Curve (Source: Westney Consulting Group, 2008, p. 3)

Hutchinson and Wabeke (2006) provided that if FEL resulted in execution of high value project, even the poor execution of that high value project would be of better value than the project that has been poorly defined (See figure 2.5). Thus, the planning and defining of the project is far more important than the execution.

Based on this theorised importance of FEL, it was stated in the report by National Research Council (2001, p. 22) that "a project will not be better than its front-end planning process." Melton, Iles-Smith, and Yates (2008) are of the opinion that the project manager should keep on releasing more funding for the idea development stage until it is ready to be executed instead of rushing toward the delivery of the project and using all resources for it. The resources spend at this early stage, in their opinion, can help greatly in selection of the "right" project and in making that "right" project a success story. By "right" project they mean the project that can "maximize the delivery of benefits to the organization" (Melton *et al*. 2008, p. 14). The purpose is to provide as clear and complete picture of the project as possible so that they can decide whether this project is worth investing in or not.
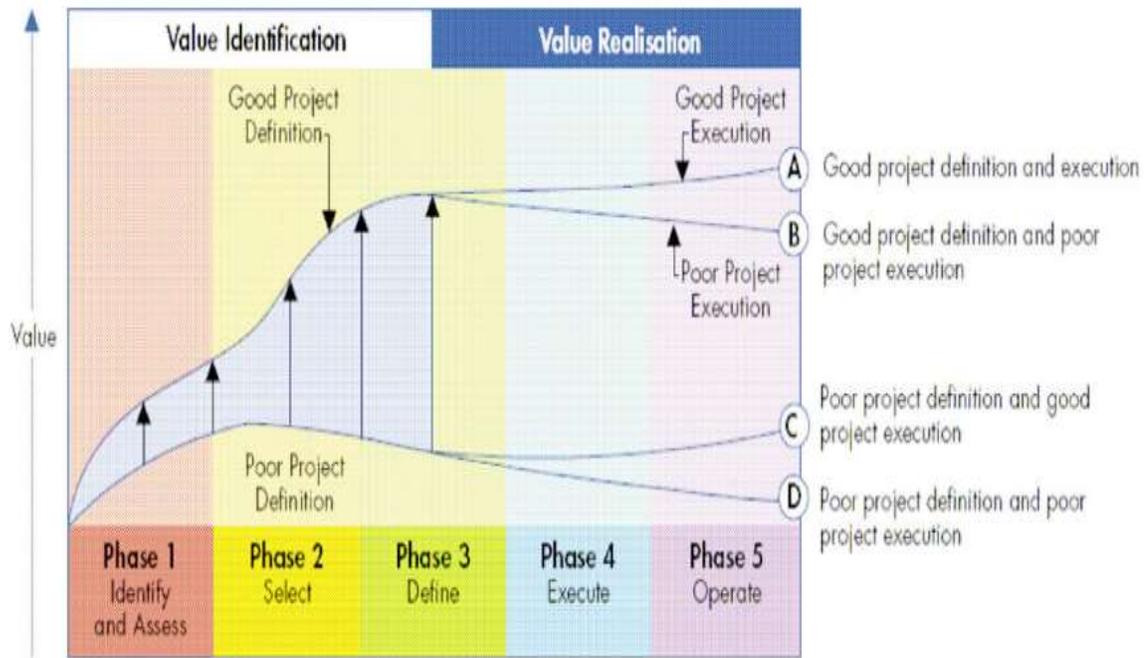
Figure 2.5: The relative importance of project definition and execution in terms of project value (Hutchinson and Wabeke, 2006)

The importance of FEL goes beyond selecting the "right" project as "doing the project right" is also very important (Williams and Samset 2010). Bosch-Rekveldt (2011) and Priemus, *et al.* (2013) have focused on another important benefit of FEL and that is the reduction of the complexities involved in a project. In her thesis, Bosch-Rekveldt (2011) found that project complexity, which significantly influences project performance can increase with the lack of FEL. They also identified several FEL activities that can lessen the effect of project complexity and can improve project performance. Activities that were found to be significantly but negatively related with certain type of project complexity were; active goal monitoring (technical complexity), goal setting and alignment (technical and organizational complexity), timely involvement of parties in the project (technical and organizational complexity), and applying team building (organizational and external complexity) (Bosch-Rekveldt, 2011, p. 222). FEL activities that are found to significantly improve project performance include "goal alignment between business and project team, applying operations implementation planning, applying external benchmarking, and adequate contract type in co-operation with subcontractors" (Bosch-Rekveldt, 2011, p. 223).

Studies have found that one major cause of project failure is poor planning especially the lack of FEL (Emblemsvåg, 2014; Magnussen and Samset, 2005). The cost-overruns which is one major reason for project failure is found to be avoided through cost-estimation during the front-end of the project (Magnussen and Samset, 2005). Additionally, Haji-Kazemi *et al.* (2013) have found that early warning identification during the FEL phase can greatly help in deciding about the feasibility of the project and in accessing the ability of the project to achieve the strategic objectives. Their findings were based on the document analysis and interview of feasibility manager of a railway construction project. However, they also pointed out the limitation of the FEL and have clarified that at this early stage of the project, it is not possible to identify early warning signs of the many risks. Yet seeing the positive outcome of some early warning signs identified during FEL, they strongly supported the importance or FEL and the identification of risks before the execution.

Many studies have also shown a strong relationship between FEL and the success of the project (Bakker, 2008; De Groen *et al.*, 2003; Flyvbjerg *et al.*, 2003; Oosterhuis et al., 2008; Van Der Weijde, 2008). Van Der Weijde (2008) statistically tested the correlation between quality of FEL and different measures of project success. With a large sample of 458 projects from the oil a gas industry they found strong correlation between FEL inputs and at least one measure of project success like cost predictability, cost effectiveness, schedule predictability and schedule effectiveness (Van Der Weijde, 2008). FEL has been shown to improve not only the cost of a project but also its speed of delivery (Oosterhuis *et al.*, 2008; Wang and Gibson Jr, 2010). As per the survey data of around 600 projects conducted in 2009, it was reported that projects with high FEL quality have lower costs, faster delivery, and fewer changes during execution (Oosterhuis *et al.,* 2008). The data shared by the Construction Industry Institute (2012) shows the same as projects with FEL were found to have 10% lower cost, 7% quicker delivery, and 5% fewer changes.

Some studies have nevertheless rejected this view and have raised questions over the relationship between FEL and project success. They suggest that the importance given by the project managers on FEL is over-rated and in reality FEL has not been able to deliver as much as was expected. Westney Consulting Group (2008) reported that FEL works only for conventional projects and for unconventional projects it has not been successful enough. For instance, mega-projects are hard to be planned before execution and the predictability of these projects is so low that FEL cannot translate into project success (Westney Consulting Group, 2008).

This critique is, however, not supported through research (Menches and Hanna, 2006; Menches et al., 2008; Merrow, 2011). A recently conducted survey of executives managing mega projects in the chemical industry showed that improving FEL in their projects is the second most important priority of these executives in the next three years of study. The respondents of this survey further explained that the inadequate information at the planning and design phase causes project rescheduling, budget overruns, and similar other problems (Webster and Bjacek, 2013). Based on the findings derived from this survey it was stated that FEL for mega-projects requires a tool for validation of FEL activities, a more comprehensive view of risk and its proactive management, capturing of information at the very start by deciding the leaders of operations (Webster and Bjacek, 2013). Merrow (2011) has also given evidence to support the way FEL can help in succeeding the mega projects.

Another critique on FEL was that small independent owners are fast-paced and use unconventional means to plan the project. For them, "stage-gate" processes are slow-paced and they need some other approach that can both provide predictability, as well as speed of planning (Westney Consulting Group, 2008). Again, it has been proved through research that the time consumed during FEL is far less than the time saved due to the pre-planning of the project (Nobelius and Trygg, 2002). As said by Cooper (2006b, p. 20), "a good dose of the right up-front homework pays for itself tenfold, saving time and producing higher success rates." Also stage-gate process is not the only method of implementing FEL as will be discussed later.

Lastly, Westney Consulting Group (2008) pointed out the difference in the risk profile of new investors who rely more on the project finance and equity for the funding of projects. FEL must therefore include understanding of this new profile of risk to work in project initiated by such investors and owners. The main problem with this critique is its lack of understanding of FEL. It is true that FEL is comprised of some standard procedures and activities but there are many other activities called value added principles that can assist in improving the positive influence of FEL.

Actually the main challenge before a project manager is to create a balance between FEL and the other phases of the project cycle (Bosch-Rekveldt, 2011). Over-reliance on FEL can cause over-confidence and failure in dealing with the complexities at the execution stage (Westney Consulting Group, 2008). However, if such balance is maintained, the execution would be free from ambiguities but not entirely free from complexities and risks as FEL can reduce but not completely end these risks (Priemus et al., 2013). Also there are multiple

models for FEL and the project manager should choose the model based on the specific needs of the project.

Also, FEL is not a rigid phenomenon. The basic idea of giving enough time and resources to planning is what it emphasises but not giving a strictly-defined plan for designing of the project. It accepts the differences in the context of the project and allows modification likewise (Shlopak, Emblemsvåg & Oterhals, 2014). As put by the Construction Industry Institute (2012), it is a complex process that ought to be personalised according to the specific needs of the business firm and requirements of that particular project. Similarly, Nobelius and Trygg (2002) held that "the Front End activities need to be sequenced, prioritized and properly staffed depending on the specific context." This contextualization and specification of FEL can enable it to address the need of including more risks and speeding the process of FEL in accordance with the needs of projects.

This problem in the understanding of flexibility of FEL is caused due to the lack of literature on the influence of FEL on different industries. The literature has relied heavily on construction projects and new product development projects (Shlopak, Emblemsvåg & Oterhals, 2014). Projects from the gas and oil sector have received certain attention as well. However, there are many other industries where FEL is important and future researchers interested in FEL should address these neglected industries too.

2.5.3   Phases and Gates of FEL

FEL is divided into three phases in order to make the project definition and design process more focused and precise. This division of FEL into phases is based on the recommended stage-gate process (McGee, DeFoe, Robertson, & McConnell, 1999). The purpose is to generate all the information required for the project selection and execution in a systematic and step-by-step process so that no important information gets missed. The sequence of these phases are based on the logical arrangement of activities needed to be conducted for effective FEL. As explained by Bosch-Rekveldt (2011, p. 25), the purpose of stage-gate process is to ensure that "steps in the process of generating the information that is required at the Final Investment Decision (FID) are taken in the right order. If some aspects are not well developed, this issue can be resolved before expenses have been made in areas that build upon this aspect."

In these phases of FEL, a well-defined scope of the project matching with the strategic objectives needs to be developed. Love et al. (2002) recommended to keep this scope

unaltered in the early stage of the process as much as possible. However, while taking FID, inputs ought to be taken from the business perspectives. Patty and Denton (2010) has referred to these three phases as appraise, select and define respectively, in accordance with the activities to be performed in each phase.

This division of FEL into three phases is based on the model developed by IPA which has been found to be the most useful in projects with different contexts (Shlopak, *et al*. 2014). However, many other models of FEL have also been developed with each having its own name of the phases in which FEL is divided.

The model developed by Construction Industry Institute (2012) divide the first part of FEL (it named it as Front End Planning (FEP)) into three phases namely, feasibility, concept and detailed scope, as shown in figure 2.6. As can be seen the activities to be performed in each cycle are very much similar to what has been defined for FEL 1, 2 and 3 in IPA model. One exception is the use of Project Development Rating Index (PDRI) as a tool to assess the activities of front end development after each phase in order to guide the project manager on whether to proceed to the next phases of the project cycle or to spend more time over the planning phase. PDRI is actually a tool developed by the Construction Industry Institute to measure the quality of front-end activities in terms of front-end scope definition level.
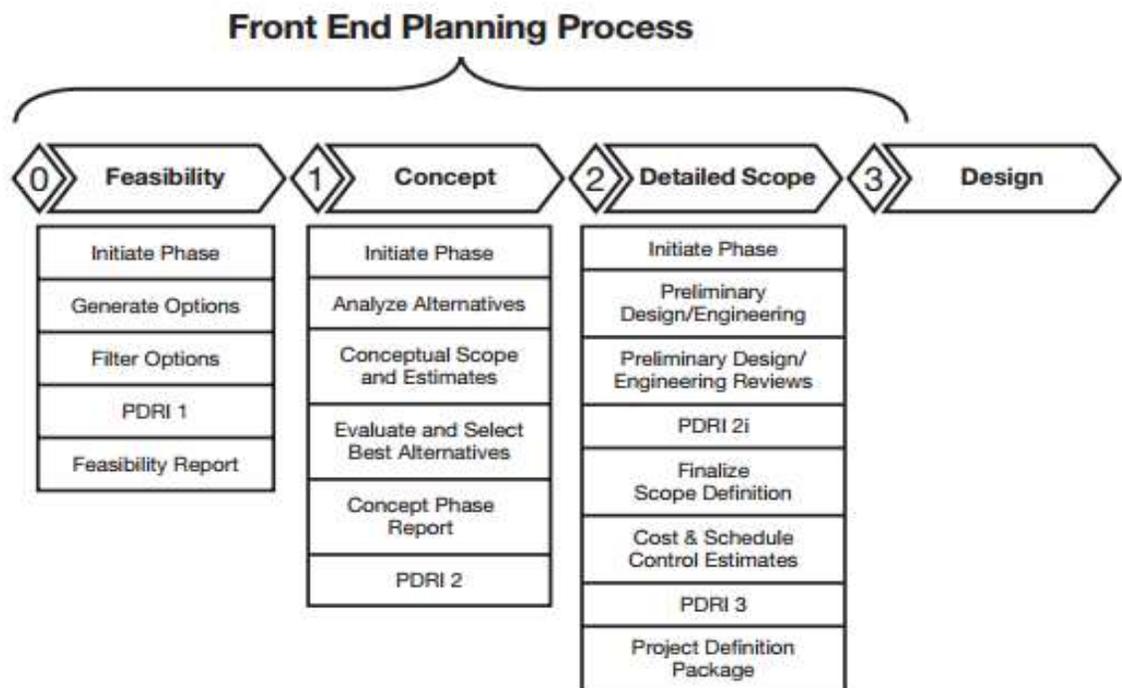
Figure 2.6: FEL/FEP model developed by Construction Industry Institute (2012)

The first phase of FEL *i.e.* FEL-1 is mainly concerned with understanding the needs and requirements of a project as well as resources available to fulfil those needs (Patty and Denton, 2010). Dinsmore and Rocha (2012) have called this phase to be a kick-off phase. In this phase the project manager pays attention to the client's demand, evaluates the technological option available to meet the project requirements, and develops the business case (Patty and Denton, 2010). The feedback is taken from all stakeholders to develop a more unified plan (Smith, 2000). The project criteria is also developed at this stage in accordance with the technological and business requirements of the project.

The activities to be conducted in FEL-1 are specified by Bosch-Rekveldt (2011)

- Defining the project objectives

- Deciding the project needs along with detailed description of constraints (budget, time, quality) and asset (input, throughput, output)

- Assessment of risks in the project

- Exploration of the required available technologies

- Planning the next two phases of FEL

Since it is a very preliminary phase of the project, the accuracy level of estimation at FEL is +/- 40 (Oosterhuis *et al.*, 2008). The key deliverables of this phase according to Oosterhuis *et al.* (2008) are "business goals, project objectives, requirements on project premises, preliminary cost and revenue assessment, market strategies, contracting strategy, technology review, risk assessment, project execution plan, FEL strategy."

FEL-2 phase or select phase of IPA (2009) is a complex phase and there is difference in the deliverables of this stage in accordance with the needs of the project. However, Oosterhuis *et al.* (2008) have specified a list of deliverables for this phase namely, "basis of design (BOD), process design basis, risk assessment, evaluation report, cost estimation, and project execution plan." BOD is a written plan that includes details of what the project designer will develop in order to fulfill the requirements of the owner (Stum, 2006). It includes both the information regarding technology and instruments used to answer the owner's requirements but also the design parameters of the project that will enable the right use of technology and instruments (Stum, 2006). Process design basis is another document that provides a summary of the overall process engineering. This document is for project engineering team

to guide them the process they need to execute. To provide the aforementioned deliverables the activities identified need to be usually part of this phase including heat and material balances, diagramming the process-flow charts and concluding the primary systems for the project execution (Patty and Denton, 2010).

It is the scope developing phase and is very important phase for it is considered important to define the project criteria at this level (Patty and Denton, 2010; Smith, 2000). With more clarification of the plan, the predictability level of estimation at FEL-2 is +/- 20 (Oosterhuis *et al.*, 2008). The engagement of senior management is also very important to confirm the scope developed at this stage (Smith, 2000).

The list of activities to be performed at this phase, according to Bosch-Rekveldt (2011) are:

- Deciding the best method to achieve project objectives defined in FEL-1

- Identification of technological, process-related and marketing substitutes

- Development of scope and execution plan for each alternative

- Assessment of project value for each alternative

- Planning for execution of FEL-3

The third and final phase of FEL is referred by Patty and Denton (2010) as "define" stage based on how it is termed by IPA (2009). This stage is more informed and the decision making is therefore with a higher level of predictability (Dinsmore and Rocha, 2012). Oosterhuis *et al.* (2008) have mentioned the accuracy of prediction at this level to be +/-10. During this phase, the process flow charts developed at the FEL-2 stage are further developed to reach at various Piping and Instrumentation Diagrams (P&IDs) (Patty and Denton, 2010). P&IDs include all basic engineering information regarding instrumentation (meter, gauges, switches etc.), piping (the size and type of pipework, high pressure and low pressure piping etc.) and process equipment (compressors, pumps, burners etc.). The flow charts also provide this information with some basic details but P&IDs also specify the location of each element with respect to the entire project design (Nardone, 2009).

The scope of the project that was started to be developed at the prior phase needs to be completely defined by this phase so that the design and assembly follows the construction strategy. The target cost and schedule is again revised at this phase in accordance with a

more informed view of the project and the execution programs for construct and design are presented before the client for final approval (Patty and Denton, 2010). According to Smith (2000) this phase should also include team building activity.

The activities specified by the Bosch-Rekveldt (2011) for this FEL-3 phase include:

- o Further defining the chosen alternatives to assist in FID

- o Freezing the scope

- o Preparing the final estimates

- o Development of final execution and implementation plans

- o Detailed designing of the project is left to be taken at the execution phase

The deliverables of this phase include "basic design engineering package, cost estimation, risk assessments, project implementation plan, project execution plan, change management process, and execution schedule" (Oosterhuis *et al.* 2008).

In the IPA model, the purpose of assessment is fulfilled through the concept of 'gates' present in between each project phases. These gates represent a pause in project progress for assessment of prior phases in order to identify whether to proceed further or not. Merrow (2011) suggested that this assessment at the projects gates should include not only the economic aspects but also technical ones to ensure that the project will not face any major problems in the coming phases of design and execution. This division of FEL into phases and gates is developed figuratively by Merrow (2011) and is provided in the figure 2.7.
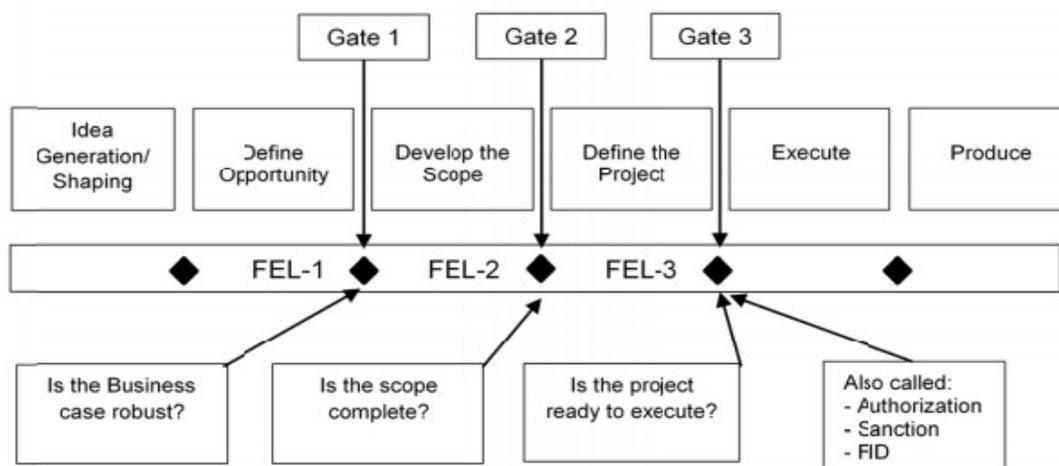
Figure 2.7: Phases and Gates of FEL (Merrow, 2011)

Gates are the points where team leaders meet with the members of the team to make important decisions including the most important one of whether to go further or not. There is a pre-planned list of deliverables for each gate and prioritization criteria is set to use the deliverable for decision making. Gates are also the point where requirements for the next phase are presented before the senior management to get it moving forward (Cooper, 2006a).

The stage-gate process for front-end development is quite popular among most of the industries. In new product development projects, the majority of industries are found to follow some forms of stage-gate process, having more sophisticated models than one shown in figure 2.7 (Cooper, 1994). In these more sophisticated models, there can be more than one gates for assessment of project progress. The number of gates to be included in FEL can be decided with respect to three factors:

- The stability of the selected business as specified by the level of variability in the strategic environment

- The power needed to be awarded to the project manager for making decisions in accordance with the defied strategy

- The specifics of the project in particular the degree of appropriation of periodic third-party review

- The effectiveness of matrices accessible to both project team and the client (Dinsmore and Rocha, 2012, p. 99).

2.5.4   Project Scope Development in FEL-2 Phase

As provided above the second phase of FEL is for development of project scope. A detailed overview of what a project scope is and why it is so important is needed to explain the link between FEL and project success. "Scope" of a project is basically composed of two components: the product or service scope and the project scope (PMI Standard Committee and Duncan, 1996). The product or service scope refers to the details of the features of product or service to be provided after the completion of the project. The project scope is defined by Harrington and McNellis (2006, p. 46) as "all works necessary to design, build, deliver, and test a new process, enhancement, or new function as defined in the project's scope and task details section of the work break down structure." This work breakdown

structure is a set of project elements that combines together to define the total project scope (Harrington & McNellis, 2006).

Cho and Gibson Jr. (2001) view project scope definition or development as a process for defining the project by analysing the risks associated with the project and determining a specific project execution approach. Their understanding, however, seems very general and the definition by PMI Standard Committee and Duncan (1996) and Harrington and McNellis (2006) is more clear and practical. In this section, the importance of project scope and its planning and definition, the processes for development of the right scope and the quality of the right statement of scope or work is provided in relation to the second phase of FEL.

Management of project scope is an essential element of project management (PMBOK, 2013, PMP Study Guide, 2013). Project scope management is defined in PMBOK (2013, p. 67) as "processes required to ensure that the project include all the work required, and only the work required, to complete the project successfully" (PMI Standard Committee and Duncan, 1996). Two of these processes, namely project planning and definition, are part of pre-project planning or FEL. During FEL-2 a project scope statement is usually prepared in order to define the boundaries of the project. Later on during project definition, the main deliverables of a project are divided into smaller sub-elements to make the project easy to manage (PMI Standard Committee and Duncan, 1996).

Project scope statement prepared during FEL-2 is a very important document as it serves as the foundation for the agreement between the owner and the project team by clarifying what the project includes and what not and what the objectives of the project are and what will be delivered as the outcome of the project. Projects having poor scope definition have been found to suffer from cost and schedule overruns (Cho, 2000; Cho *et al.* 1999; Maylor, 2005; Pinto, 2004).

Pertaining to the high importance of the project scope, it is important to pre-define the project scope at the planning phase of the project. Also, it is important to keep the project scope as unchanged as possible and for these alternatives to be analysed. However, some changes are unavoidable but these changes in the project scope definition should be documented, reviewed and evaluated by all stakeholders. Harrington and McNellis (2006) asserted that the project manager is mainly responsible for defining the project scope, yet he/she must interface with other stakeholders for requirement specification for project scope definition. The purpose is to define a project scope that does not suffer from serious changes during the project execution phase.

It has been observed that some project teams skip one or two key processes of scope development which results in poor scope definition and later causes problems during the execution phase (Cho & Gibson Jr., 2001). It is, therefore, important to know all important processes and activities that can be used for the development of an effective project scope.

Different models provide different views of project scope definition and therefore differ in terms of the processes and tools for the development of the right scope. In the PMBOK, the project development process in the planning phase has been divided into project scope planning and project scope definition (PMI Standard Committee and Duncan, 1996). During scope planning the scope statement is prepared and during project scope definition this statement is used to create sub-divisions among the deliverables of the project. However, for Cho and Gibson Jr (2001) project scope definition is a broader term and they include the preparation of project scope statement to be part of the project scope definition. In their understanding project planning and project definition are a combined process. Bosch-Rekveldt (2011) shares the same view as that of Cho and Gibson Jr (2001) by keeping project scope development with respect to each alternative to be part of FEL-2 with no distinction between planning and definition.

According to PMI Standard Committee and Duncan (1996) the processes and techniques required for the development of effective project scope statement include the product analysis, benefit/cost analysis, alternative identification and expert judgment. Product or service analysis involves detailed examination of the features of product or service to be delivered at the end of the project. The main input used for this analysis is the product description completed in the first phase of FEL (Bosch-Rekveldt, 2011).

Benefit/cost analysis involves examining the different technical and functional alternatives and to examine their benefits as well as costs. This assessment of alternatives or options has to be completed by the FEL-2. However, Patty and Denton (2010) found that sometimes project teams spend excessive time on benefit/cost analysis by exploring more than necessary options and spending too much time on this exploration that there is not much time left for other important activities to be finished by this phase. Sometimes these teams even fail to finish the optionality process in FEL-2 and continue it to the third phase of FEL, which they identify as uneconomical. On the other hand, if some teams are ready to proceed to FEL-3 while some are busy working on exploration of different options and scope definition for each option is like "holding back the horses." This dilemma situation is often faced by many traditional project teams in all industries (Patty and Denton, 2010). In

addition to all, benefit/cost analysis is an important process for the development of project scope and, therefore, delay in this would cause delay in the project scope development. Without a defined project scope, it is not feasible to move forward to the next phases of project cycle (Harrington & McNellis, 2006).

The identification of alternative is another important process for the development of scope (PMI Standard Committee and Duncan, 2006; Smith, 2000; Bosch-Rekveldt 2011). Not considering the alternatives can result in limiting the knowledge before the stakeholders in making future decisions. It stops the project manager, team or other stakeholders from "falling in love with a solution too quickly" and enables them to view the diversity of solution available for solving a specific problem (PMP Study Guide, 2013).

Expert judgment involves presenting the inputs of the project phase before experts to get their opinion before working on them. The inputs for the project planning include product descriptions, strategic plan, project selection criteria and historical information (PMI Standard Committee and Duncan, 1996). In the stage-gate model, these inputs are developed in FEL-1 and the process of expert judgment is covered at the gate 1 before proceeding to FEL-2. The authorities of that particular input from the entire organisation, as well as consultants and professionals from outside the organisation can be consulted by the project manager to have them review the input documents and to decide whether they are sufficiently good to be used in the processes for project scope planning and definition.

In addition to the scope statement, the FEL-2 phase should also provide supportive documents explaining the assumptions and constraints of a project (PMP Study Guide, 2013). Also, a scope management plan should be developed for the rightful implementation of project scope so that in case of any change in the project scope, the manager is prepared in advance to control the change and to integrate the necessary change into the project without causing cost and schedule overruns (PMI Standard Committee and Duncan, 1996).

The Construction Industry Institute have also developed a tool called PDRI for examining the quality of project scope definition (Gibson, Jr. and Gebken, 2003; Gibson Jr. 2004). PDRI include 70 elements for assessment of project scope developed by a team and the lower score on these elements shows that the project scopes have been well-defined (Gibson Jr., 2004). Cho and Gibson Jr (2001) analysed these 70 elements of PDRI specific to the project scope definition and found encouraging results. They found that the project scoring lower than 200 in the PDRI project scope definition elements have 19% lower cost, 13% reduced schedule, fewer changes and increased predictability. The tool was found to assist

in the completion of all major elements of project scope management identified by PMI Standard Committee and Duncan (1996). In case of project planning, PDRI was found to help in identifying the key elements of project scope statement, in providing data for the work breakdown structure, in developing milestones and standard nomenclature and in interacting with the project teams (Cho and Gibson Jr. 2001).

However, PDRI tool can only be used in industrial projects and non-industrial projects cannot use this tool for assessing the project scope definition. Recently, however, the tool has been modified to cover the construction projects with success (Dumont, Gibson Jr., & Fish, 1997; Cho & Gibson Jr., 2001). However, other projects like shipping and new product development need to use this tool with caution unless some research proves its validity.

As was discussed above, PDRI is an important tool to evaluate FEP process as the process used for developing sufficient strategic information with which project owners can identify and address risk and take the right decision for committing resources to maximise the chance for project success. This tool is important to establish if the developed project scope, which is delivered at the end of FEL-2, is effective enough to move to the next phase. But this tool is not designed to investigate the reasons behind having good FEP or having an effective project SOW. This gap will be addressed by this study where it is designed to identify the key enablers and barriers for developing an effective project SOW. Identifying those will help in understanding the required improvements in this process which will contribute to having better PDRI for projects in Saudi Arabia OGS.

The literature review shows that there are a wide range of researches addressing different issues of different project management processes, but only a few have addressed the issue of identifying enablers and barriers for the project SOW development process. Jawad, Ledwith and Panahifar (2018) claimed that top management involvement is one of the important enablers for project control system which helps processes within that system to deliver the desired outcomes. In this regard top management should recognise that project control system is a management requirement that needs to have high level of coordination between different processes and other related control systems with clear identification of the development procedures (Li and Carter, 2002; Kraus, 2007; Mehta, 2008). To deliver the desired output of the project management processes, it is required to assign skilled and experienced development team (Jawad, Ledwith and Panahifar, 2018; Mehta, 2008; Muller and Turner, 2007) with clearly defined roles and responsibilities (Jawad, Ledwith and Panahifar, 2018; Muller and Turner, 2007). But, "one of the most important, and sometimes

most difficult, steps in developing an SOW is identifying and acquiring the appropriate resources to be part of the development team" (Martin, 2010, p. 50). One important enabler for development process, as highlighted by several writers such as Shu-Shun and Shih (2009) and Jackson (2010), is having and using of information technologies for sharing accurate and timely project data. Miller and Lessard (2001) argued that as it is important to have technologies to support different project management processes, it is so important to have well training and development programs for the human resources participating in different processes of the project development. Nasseri and Aulin (2016) argued that effective managerial support for training and motivation programs is an important factor that helps in achieving the required objectives and targets.

On the other side, unclear project vision, and objectives will prevent the project team from understanding the required outcomes of each phase of the project development process and that barrier may lead to considerable waste of resources (Olawale and Sun, 2012; Moselhi, Li, and Alkass, 2004; Rozenes, Vitner and Spraggett, 2004; Jawad, Ledwith and Panahifar, 2018). Researchers like Jiang, Klein and Chen (2001) and Jawad, Ledwith and Panahifar (2018) assumed that lack of experience or assigning unqualified project development team is a considerable barrier for success. In addition, they claim that lack of clear roles and responsibilities for team members is also presenting a barrier towards achieving the desired outcomes of the project processes. Also, dislike or distrust of the development procedures in addition to the disinterest of the team members in participating in the development process is one of the important barriers as highlighted by authors like Mehta (2008) and Jawad, Ledwith and Panahifar (2018). A study done by Al Nasseri and Aulin (2016) concludes that insufficient support from the project stakeholders, poor decision-making regarding the process activities and criticality, absence of technology, lack of effective leadership and lack of education and training programs are barriers that prevent getting the desired outcome from the project management process.

Hence, the literature review conducted by the researcher shows that there is a gap in previous researches which needs to be addressed by a comprehensive study that focuses on the project SOW development process as a factor that has a direct relationship to the project outcome of each phase of the project life cycle. Also, there is limited research on understanding what are the barriers and enablers for developing an effective SOW. One of this study objectives is to contribute to filling that gap by undertaking a research on the OGS of Saudi Arabia. This will be addressed by finding the answer to the third research question (RQ3):

RQ3: How are project SOWs developed in the Saudi Arabian OGS? Plus, what are the practical enablers and barriers for its development?

2.6   BUSINESS PROCESS IMPROVEMENT

To gain and maintain competitive advantages, Organisations should define, improve, deploy and maintain robust and purposeful business processes (Ould, 1995). Having robust business processes in an organisation can help in engaging its personnel effectively and allocating accountability and responsibility to the work (Cheung and Bal, 1998). Also, it helps in accessing employees' experience and knowledge by encouraging them to define the associated problems, to identify the possible solutions, and to participate in solving them by implementing their solutions (Roberson and Roberson, 2013). Organisations used their assets, including facilities, equipment, tools, systems, technologies, people, and intellectual property, to enhance their business processes efficiency to produce the desired outcomes that help them in achieving their objectives. It is necessary for any process to understand to what extent the assigned assets serve the intended purpose. The productivity of an organisation's assets for a process is derived through the ratio of the process's outputs relative to the utilised resources to produce those outputs (Blias, 2012). Process efficiency describes the level to which a process achieves compared to its full potential. Blias (2012) argued that better process efficiency originates delivering better outputs taking into consideration the assets utilised for that purpose. On the other hand, less efficient process may cause higher costs, slower response times and less reliable and dependable outcomes.

Cheung and Bal (1998) described improvements in a business process as a proactive action to identify the process issues, analyse the required actions for improvement and apply the identified required improvements upon current processes within an organisation for optimisation and for establishing better performance or standards of quality. They argued that the ultimate goal of improvement can be achieved by modifying the process, complementing with sub-processes or even by eliminating or adding some steps or functions to the process. Darwish (2011) believe that improvements in the business processes is an ongoing practice that companies need to deal with which makes it necessary for them to understand their business processes and always analyse for tangible areas of improvement. Successful implementation of process improvement can enhance the quality of the process outcomes, efficiency, and enhance the process's beneficiary/customer satisfaction (Swanson, 2012). Also, it may help in increasing the productivity, developing the skills of employees which increase their productivity, loyalty and performance efficiency (Hass,

2008). Darwish (2011) stated that Organisations use process mapping for their improvement approach to drive sustainable advantage with very powerful improvement strategies. He trusts that process mapping helps in providing the basis for how work gets accomplished and clear understandings of what is required to improve it.

Some business processes, such as the project SOW development Process, requires forming of temporary organisation for better efficiency. Kates and Galbraith (2007) believed that the organisation can refer to a whole firm or to just a part of it and it can be formed of thousands of people or only a few numbers. They claim that organisation's need to be designed carefully in order to ensure the capability of achieving its strategy by forming structures, processes, rewards, and people performs. They believe that a "strategy implies a set of capabilities at which an organization must excel in order to achieve the strategic goals. The leader has the responsibility to design and influence the structure, processes, rewards, and people practices of the organization in order to build these needed capabilities." (Kates and Galbraith, 2007, p. 3)
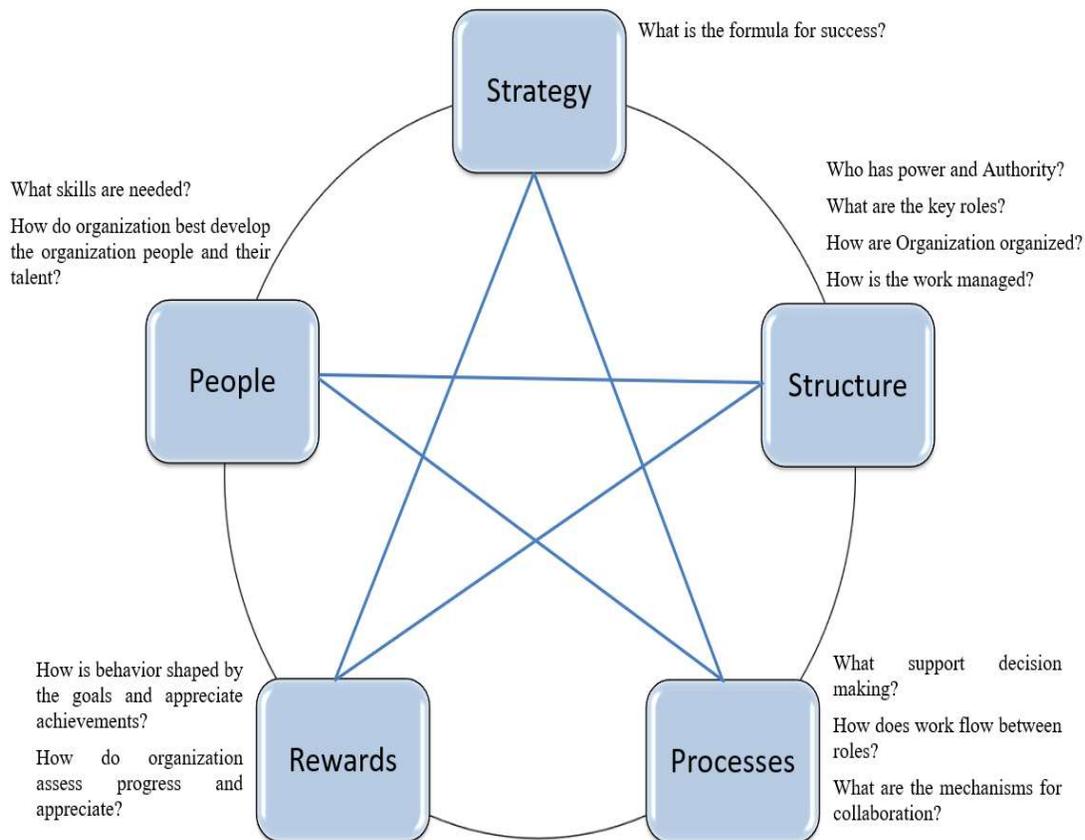
Figure 2.8: The Star Model adopted by: (Kates and Galbraith, 2007, p. 3)

Galbraith (nd) and Kates and Galbraith (2007) believe that the Star Model shown in Figure 2.8 is a powerful framework that provides the bases for company organisation design choices. It involves a series of controllable design policies that influence employee performance and shapes effectively the organisation's decisions. He stated that the design guidelines for the Star Model fall into five areas: (1) Strategy as determinant of direction, (2) Structure as determinant decision-making power, (3) Processes as determinant of information flow, (4) Rewards as determinant of people motivation to influence them to perform and address organizational objectives, and (5) People as determinant of policies relating to human resource and their qualifications and skills.

One implication of the star model is to have a complete picture about the organisation taking into consideration all of the related aspects instead of focusing on the organisation structure while current business environment with fast change show that "processes, rewards, and people are becoming more important" (Galbraith, nd, p. 4). Another implication is the alignment and interaction between all polices in order to have an effective organisation which allows delivering clear and consistent vision to employees. The Star model can be used as a powerful framework to overcome and counter the negatives while achieving the positives (Galbraith, nd).

Up to the knowledge of the researcher, there is no previous study addressing the improvements for the project SOW development process. As it is mentioned in the previous section, there is need to understand what are the barriers and enablers for developing an effective project SOW. Identifying those can help in achieving the last objective for this study of making recommendations for improvements in SOW development process. This will be satisfied by answering the following research question:

RQ4: What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

2.7 CHAPTER OVERVIEW

Strategic Project Management (SPM) is a chain of practices, instruments, procedures and performances that generates successful associations among brilliant business practices and brilliant project management practices (Heerkens, 2007). The link between business strategy and project strategy, motivates the need for aligning project management with business strategy (Srivannaboon, 2006; Artto et al., 2007) and to enhance the probability of success, a project should start with a successful initiation and planning processes (Sears et al., 2010;

Milosevic and Srivannaboon, 2006). A good and successful strategic project is a mixture of the correct initiation, right planning, right execution and a careful review of the project after its implementation (Rosenau and Githens, 2011; Olesen and Myers, 1999). In other words, it is the successful management of the Project Management Life Cycle (PMLC). To give the project a high probability for success, the project should be initiated correctly to have the right outcomes (Munns and Bjeirmi, 1996). To start with, it is essential to identify a clear project vision and clear and specific project scope that helps the project team to set understandable, specific, clear and achievable goals (Atkinson, 1999). The SOW is important for better management of the strategic project during its life cycle (Martin, 2010; Nielson, 2009) as it provides information about what work needs to be completed, breakdown of the work that needs to be done and provides the foundations for developing the project budget and schedule.

During the **project SOW development,** the strategy that will be used to achieve the desired objectives and results or outcomes that the project will deliver after the implementation phase is established. This is the first step but it will draw the line to the end results that can be obtained from the project (Picariello and McDonough, 2011). A solid initiation of a project can place the project on the track for success and lay the groundwork for the following phases of the project lifecycle. Projects that lack a clear scope will have a very limited chance of achieving their goals on time (Somers and Nelson, 2004). In contrast, the chances of a successful completion of a project increase if the project is developed well at its early stage when the project scope should be identified and all the requirements have to be specified (Letavec, 2007).

In the oil and gas sector (OGS), the initiation development of a project is normally performed through Front End Loading (FEL) process (Spangler, 2005). This process includes all activities for project development from conceptualisation up to project authorisation and funding. Jones (2004) claimed that FEL is a process that takes a thoughtful approach for planning a capital project. Merrow (2011) suggested a three phase FEL model. FEL-1 is dedicated for business case development and study capital investment feasibility. Project scope development and selection is the function of FEL-2. The last phase of FEL process is FEL-3 where the project is defined, and advance engineering is carried out. Merrow also suggested that there should be three gates as decision points in FEL development process. Those gates are after the completion of each phase and prior to the next phase.

To understand the current state of knowledge, the researcher searched a significant number of articles, books and previous research studies published in the field of his study. The researcher contends that some other literature may also publish related research, yet he argues that his gathered information from the obtained sample provides a useful snapshot of research that has been published in the area lately. Literatures indicate that it is important to have an effective SOW for enhancing the chances of having the right desired outcomes and enhance the chances of having a completed successful project. However, more studies are required to understand the project SOW development process, its role in the project performance, the characteristics of an effective project SOW and functions it supports, the enablers and barriers for developing an effective project SOW and the required improvements to enhance achieving the desired outcomes of this important process. As mentioned in this chapter, the conducted literature review indicates that there is a gap in previous researches which needs to be addressed by a comprehensive study that focuses on the project SOW development process. Since it is an important factor that has a direct relationship to the project outcome of each phase of the project life cycle. This study therefore aims to contribute in filling that gap.

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CHAPTER 3

RESEARCH METHODOLOGY

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3 RESEARCH METHODOLOGY

3.1 CHAPTER INTRODUCTION

Research is a process that uses a systematic method to explore realities for validating, evidencing or even for disproving themes, concepts or phenomenon (Cryer, 2000). Jankowicz (1995) argued that for studying certain themes, research is considered an essential means using systematic analysis to discover problems, construct models, and highlight and recommend the right and actual implementation associated with those themes. Carrying out a research by collecting proper data and doing proper data analysis shall increase the aptitude for decision-making and provide the researcher the capability to recommend since it enhances his/her knowledge on the subject of the research (Kotler, 1995).

The target for this chapter is to review and critique theoretical research methodologies that are used for the current study; and to discuss approaches used to conduct this research. Accordingly, this chapter will start discussing the research methodology and the case study as a strategy to accomplish the purpose of the study. Then the method for data collection and approach for data analysis will be discussed. This chapter shall conclude with discussion of the research quality, validity and reliability.

3.2 RESEARCH METHODOLOGY

There are several aspects leading to the research variety (Sarantakos, 2005). These aspects include research driver, research focus and research methodology and method. According to Collis and Hussey (2003), researches are categorised according to their purpose, used process, their logic and their outcome. By taking the research purpose into consideration, they categorised researches to be descriptive, productive, explanatory, or analytical. From process perspective, researches can be divided into primary and secondary research. Then, by looking to the logic of the research, it is either deductive or inductive research. Lastly, they classified research into quantitative or qualitative from the outcome perspective. Sarantakos (2005) argued that there are only two types of research that all other classifications must fall within them: positivism (quantitative) or non-positivism (qualitative). This view is agreed by a number of authors such as Silverman (1993), Gill and Johnson (2010), Walker (1985), Bryman (1988), Atkinson (1999) and Kotler (1995). Identifying and choosing the most appropriate methodology is very important taking into

consideration the research's nature and ease of access to data (Naom, 1998; Morris,1994; Morris, 2001).

Quantitative research is the best choice for testing hypotheses that combines a number of variables measured by figures, and those are analysed using arithmetical process (Creswell, 1994; Naom, 1998). Quantitative data is assumed as a solid reliable data as it is more countable, measurable and tangible (Bouma and Arkinson, 1995). Nevertheless, whereas the quantitative research is comparatively robust with high reliability, its relative validity is weak (Walker, 1985). Measurements control might result in undermining of the complex nature associated with certain phenomena, which is the main limitation that quantitative research has (Denscombe, 2003).

Quantitative research is "objective" in nature whereas qualitative research is "subjective" (Casey, 1993). Collis and Hussey (2003) argued that some researchers desire to go with qualitative researches in order to involve themselves in deep exploration of social or human phenomena, which provides deep insight into the research issues. Sarantakos (2005), debated that qualitative research is the right way for building realism by giving the meaning of the events that occurred within human being or social actions. Furthermore, Cohen and Manion (1994) supposed that the effectiveness of quantitative research is less than qualitative research. They claimed that before being able to use quantitative research for testing a theory, it should be developed using a qualitative research. In fact, qualitative research has several qualities that make it preferred by many researchers. As it is subjective, it is subject centered, context sensitive, normative, informative, detailed, holistic, flexible, realistic, reflexive, dynamic, and inductive (Smith, 1992; Crabtree and Miller, 1992). With all those qualities, collecting of qualitative data and then analysing of the collected data are the most considerable challenges for the researcher (Dey, 1993; Yin, 1994; Robson, 2002).

Neumann and Peterson (1997) simply summarise the difference between quantitative data and qualitative data as where quantitative research collects numbers, qualitative research collects words. In view of the qualitative versus quantitative dispute, a mixed methods approach has been suggested to be the research middle ground, whereby many researchers suggest that both the qualitative and the quantitative approaches complement and assist each other rather than being at loggerheads (Bryman, 2004; Creswell, 2003a).

This study has opted for a qualitative over quantitative research because this approach allows for contextual experiences of individuals to be recorded and used for arriving at

context-based generalisations. Qualitative research helps enrichment on the chosen topic by enabling access to and creating an understanding of the human perceptions on that issue, the contradictions that exist as well as individual and personal beliefs, norms, expectations, perceptions and opinions and the role of these factors within the theoretical aspect of the phenomenon being addressed (Cohen, Manion and Morrison, 2007).

3.3   RESEARCH STRATEGY

3.3.1   Various Approaches for Research Strategy

There are many research strategies available for researchers including: experimental and quasi-experimental design, survey research, action research, ethnography and case study method. Each one of these strategies can be used for exploratory, descriptive, or explanatory research (Yin, 2003). Saunders et al. (2007: P.135) argued that "no one research strategy is inherently superior or inferior to any other". These strategies will be discussed briefly for the selection of the most appropriate research strategy for this study, while more discussion will be presented for the selected strategy for this study (case study). In this section, I will discuss four research strategies and why those strategies were excluded from this study while the selected strategy will be discussed in the next section.

Experimental and Quasi-Experimental Research

The experimental design is the most effective strategy available for the researcher to develop the causal relationship between the given factors (Barlow, Andrasik, and Hersen, 2007). It can provide a significant support for the identification of the impact made by the factor towards the change in the results. Clearly it is based on a deductive approach to theory testing. The researcher can gain information regarding the impact of factors in both a controlled and an uncontrolled manner. It is quite a basic and straightforward technique that can be applied in all the disciplines as per its requirement. It provides an authenticity of checking and verifying the received results in an effective manner due to its nature of repetition (Sameroff and Mackenzie, 2003). The experimental design can also be conducted by the researcher in a controlled environment. The researcher can develop laboratory conditions for undertaking this research strategy by controlling the factors of the external environment in an effective manner. There are many variations available in the experimental design and the researcher can take the most appropriate one for ensuring the relevance of the undertaken research (Morse et al., 2002). Despite its advantages, it does come with certain limitations for the researcher including the artificial situations that are not likely to occur in real-time situations due to the controlling of a number of factors that are not controlled or cannot be controlled in the real-time scenario (Kolb, 2012). The controlled

situations may support the researcher in collecting the desired results but the researcher is not able to link it with the real-time situation. The human errors are also present in the research strategy. The research has to comply with all of the ethical standards in order to be valid. The research strategy provides internal validity to the researcher; however, external validity is compromised in the case. It is not possible to conduct the research in a natural environment like in the community or hospitals (McKeown, Beck and Blake, 2009). Most significantly, the research strategy can provide information regarding the causal relationship in between the factors but it cannot provide any information regarding the reasoning of relationships .

Quasi-experimental design is more feasible for the research that is not offering any time or logical constraints. It can modify the environment in favour of the researcher to develop such scenarios that are not possible to develop in real time situations. The reactions achieved from the research tend to be more genuine instead of artificial design (McKeown, Beck and Blake, 2009). The problem of ethical implications and complexity reduces in this strategy. The researcher can make use of certain procedures to develop appropriate control groups. The results provide information in a statistical manner (Sameroff and Mackenzie, 2003). The validity threats are also mitigated in this type of research. Despite the advantages of the method, it offers certain drawbacks and limitations including the lack of random assignments to the group that is under testing. The statistical analysis is not providing the extent of since that required for some researches such as those need to have to answer questions of "what" and "way". Also, it is not possible to include pre-existing factors due to less control over variables (Barlow, Andrasik, and Hersen, 2007). Finally, this type of research strategy can be affected by human error which affects the results of the study.

As mentioned above, that both experimental and quasi -experimental research are clearly based on a deductive approach to theory testing, while this study will have more effective results if it is based on an inductive approach. In order to develop a clearer understanding of the project Scope of Work role in a project development and to make practical recommendations for its improvement by investigating project team members' perceptions of the Scope of Work development process in two Saudi Arabian Oil and Gas companies.

Survey Research

Survey research, which is associated with deductive approaches, is a very popular research design within the business and management field and it offers many benefits to the researcher including the true representativeness of the behaviour of the large population

with the support of small sample size for answering the desired questions. It enables the collection of a large amount of data in a relatively time efficient manner. The cost of conducting survey design is also quite low providing a significant benefit to the economy to the researcher. The researcher is able to collect the data in a much convenient manner (Morse et al., 2002). The researcher can develop effective statistical results providing a precision factor to the research. There is no subjectivity involved in the research. Easterby-Smith et al. (2008) classify types of surveys into: (1) Factual which focuses upon collecting facts such as those to examine the attitudes through opinion polls, (2) Inferential which has the aim of establishing relationships between variables, and (3) Exploratory which has the aim to explore a variety of matters and look for general patterns in the collected data. This type of research strategy can be designed using a cross-sectional approach which involves looking at the same variables but with different sites or different contexts at a given point in time or longitudinal approach which involves the repeat of a survey over a period of time.

The survey research as strategy has certain drawbacks including the limitation of developed proper survey design (Kolb, 2012). The research strategy cannot be used for the controversial issues as there is a limitation of no rational available. Also, it is quite possible that the questions asked by the researcher are not appropriate to the study design. The collected data using survey is unlikely to be as extensive and comprehensive as the other research strategies. It has less flexibility in design where -in most cases- the researcher gets only one opportunity for data collection. Finally, it is important to highlight here that response rates are significant for survey strategy and can be a source of concern.

The researcher used the survey approach in his pilot project (see Annex I) as introduction for this study to identify the relationship between the project SOW and the project success in different phases of the project life cycle. In order to answer the research questions for this study it is required to adopt the inductive approach and this cannot be explored using the survey strategy, this approach was not selected for this research.

Action Research

Action research can be described as the research that initiated to solve an instantaneous problem or that involves a thoughtful process for solving progressive problem directed by individuals working with and as part of community or team/s to improve the way issues addressed and address the required change to solve problems. Action research design offers certain benefits to the researcher including the true reflection of the things that are in practice in the real-time scenario (Barlow, Andrasik, and Hersen, 2007). It provides an effect to the

researcher regarding the development and change. The research keeps the intention and issue of the research at the prime position and shares the best practices with all of the other researchers. This is quite relevant to the business research. It provides an opportunity to the researcher regarding making use of both quantitative and qualitative data and provides in-depth understanding to the researcher (Morse et al., 2002). The main advantages of action research include that it enables researchers to feel that they have contributed, or made a difference, to practice in some context, and enables them to see the practical outcomes of the theories underlying their research. On the other side, it comes with certain drawbacks for the researcher including the problem in the segregation for the action and research in order to gain application of both aspects. It is more like a structured plan where the results focus on the outcomes. Hence, the action used by the researcher can be more seductive than the research itself and the researcher can become immersed in and affected by organisational politics. Change process requires a long time which makes it very time-consuming. Also, it involves much delay in the completion of the research and there is no opportunity available for the research regarding the repetition leading to no ownership of the research results (McKeown, Beck and Blake, 2009). The researcher has a wider range of stakeholder groups to satisfy which may affect the required outcome of the action research.

The current research is seeking to explore the actual practice and recommend the required improvements in the SOW development process. The long time required for using action research and the accessibility for the researcher to be able to contribute in the change while doing the research is preventing the researcher from using the action research as a strategy for this study.

Ethnography Research

Within management and business research, there has been an extensive practice of ethnographic studies that generate rich data about organisational life. Ethnography research design provides significant benefit to the researcher including the provision of support to the individuals and researchers for gaining understanding regarding the culture of the people. Rosen (1991, P.5) suggested that "the ethnographer's method of collecting data is to live among those who are the data". By using action research, the companies are able to understand their target market and their behaviours in a more appropriate manner (McKeown, Beck and Blake, 2009). It provides an easy approach to the researchers for discovering new things. The drawbacks for the same include the difficulty in the selection of appropriate sample for the researcher. It is quite a time-consuming approach and knowing

when to finish is one of its key issues. Van Maanen and Kolb, (1985: p. 11) added that: "gaining access to most organizations is not a matter to be taken lightly but one that involves some combination of strategic planning, hard work and dumb luck". The study design effectiveness depends upon the relationship of the researcher with the subject (Morse et al., 2002). It depends much upon the authenticity of the data provided by the sample group and it can lead to certain biases from the cultural perspective.

This option was also excluded as a strategy for the current study because of its nature where it is not looking for the culture, but it is looking to explore the SOW development process and the requirements for improving this process. Also, the current research has to be completed in defined time and the researcher has less access to the organisations than what is required for undertaking such research using ethnography research as a strategy.

3.3.2 Case Study as Research Strategy

Case study method is another strategy available to the researcher that is quite efficient in the identification of rare issues in the period of exposure and manifestation (Kolb, 2012). They are time and cost effective. They are the best tools available for studying the trend and behaviour of the dynamic population. The disadvantages for the same include the subjection to the biases of selection. If the exposure is done for less time, then they cannot provide effective results. It can lead towards the selection biases if there is inadequate information available regarding the exposure.

A case study is a qualitative research strategy that uses a single or multiple case to discover purpose reality relevant to a widely scattered population (Gerring, 2007). The qualitative case studies rely on inductive logic to arrive at conclusions to real world problems (Simon and Francis, 2001). The focus is more on gaining a comprehensive and in-depth look at a particular phenomenon while using a specific evidence characteristic. Since the case study relies heavily on emotions and opinions, the method followed requires consistent interaction with humans, giving it a 'real-life' context (Denscombe, 2003). The topic matter is concentrated to one single factor and hence the case study research focuses on this factor to draw out naturalistic observations and conclusions. This present study relates to a study of the exact nature of SOW development process, its role in the project performance, the characteristics of an effective project SOW, and to study the barriers and enablers for producing an effective project SOW hence, this brings the case for research methodology to qualitative case study exploration.

Hartley (2004) considers that the case study is increasingly being used as the preferred research strategy. This is also seconded by Stake (2000, p.435) who states that "case studies have become one of the most common ways to do qualitative inquiry". Irrespective of this, Hartley (2004) also states that generalisability as well as rigor (born out of quantitative assessments) is just not possible within the qualitative field of inquiry. Yin (2003, p.1) states that "using case studies for research purposes remains one of the most challenging of all social science endeavours".

Yin (2003) recommends designing a protocol to effectively undertake and manage case studies. This involves, as in other types of research methodologies, firstly identifying the aims and objectives of the research. The researcher is then in a better position to design his case study approach in a practical manner, which involves personal resources that he/ she can deploy as well as access to the case study. The researcher needs to formulate the research questions and design the case study presentation before formally commencing the fieldwork required.

Comparative case studies, such as the current study, have also been recommended by scholars as being important as they help in testing hypotheses and generalizing them. A single case study enables the researcher to test the scope and applicability of a hypothesis, while a comparative case study enables him to compare between two or more cases whether the hypothesis can be generalized and holds true for a range of environments and situations (Yin, 2003).

3.3.3   Justification for Using the Case Study

After completing the critical analysis of all the potential options available regarding the use of research strategies for the execution of this study. Now, it is the time to evaluate the above mentioned research strategies with the credentials of the research i.e. research questions and research gaps. The research is more related with the evaluation of the role of project SOW in the performance of a project. In addition, the research aims to identify the characteristics for ensuring the maximum effectiveness of project SOW and the functionalities to be done by the same (McLafferty, 2004). In order to fulfil the purpose, the research is carried out using any of the research strategies as mentioned above. However, the decision must be based on the inclusion of the remaining part of the research study. After completing the information regarding project SOW in a general manner, the study aims to identify the pattern by which the project SOW's are developed in the OGS industry of Saudi Arabia

along with all of the barriers that create difficulty for the OGS companies and the enablers for developing an effective project SOW to gain overall project success. In addition, the study also aims to suggest some improvements that can be used by the OGS of Saudi Arabia for bringing certain improvements in their project SOW development process. Now, after completing a short analysis of the plan in the study, the selected research strategy must be able to explore the matter with certain details in an investigating manner (Shenton, 2004). The research study must be providing subjective detailed research that can be used to justify the study in an effective manner. The rationale of the research results will be quite necessary for declaring the results. As the study links to one of the biggest sectors in the world; therefore, it is quite necessary to provide required justification for all the statements and results made in the study in order to convince the concerned stakeholders from the OGS industry for using the results for this study for improving their business in an effective manner (McLafferty, 2004). The most significant thing required from the research strategy will be its ability to provide results in a real-time scenario. It means that the researcher must not be enforced by the research strategy to create artificial or laboratory situation for finding answers to the study (Shenton, 2004). The research study is more related with the real-time scenario that is why the research strategy must be able to provide results in real-time situations and the results provided by the research strategy must be able for the implementation in the practical project field. Overall, the selected research philosophy must be providing a clear answer to all the "why" and "how" questions raised in the study. The research strategy needs to be selected based on the criteria defined above .

From the above analysis, the preferred research strategy for this research is case study due to a number of reasons including the intensive study. The case study will provide an effective advantage to the researcher for investigating and exploring the matter of SOW in the OGS industry of Saudi Arabia. The researcher will be able to unlock the detailed aspects involved in the benefits of SOW for the OGS industry in Saudi Arabia. This will provide effective benefits to the OGS companies operating in Saudi Arabia. The case study will be providing an effective benefit to the researcher for the execution of new research with a number of valuable detailed findings that can lead towards proper rationale for the subject matter and execution of advanced research. The case study research strategy will be providing a value to the study for comparing the results of the study with previous literatures (Shenton, 2004). The researcher will be able to carry out a comparison with the previous ideas and results of the study to develop a clear verdict regarding the subject matter. One of the important reasons behind the selection of a case study approach for the given research

is the flexibility being offered by the case study approach. The researcher will be able to collect valuable information from the focus groups that will be providing justification to their response. In this way, the researcher will not be in trouble of declaring the results without proper justification (Shenton, 2004). The researcher will provide rationale to all the response submitted by the sample or focus groups along with the justification provided by them. It will enable the researcher to provide more authentic results for the purpose of the research, when the researcher will be providing justification for the results. The researcher will be able to collect the underlying reality of the matter with this approach. The case study strategy will enable the researcher to view the matter from the real-time situation. The researcher will also be able to relate the results of the real-time matter with the research (McLafferty, 2004). The researcher will not have to create some artificial modifications in the research that are not possible to occur in the real-time scenario. Most significantly, the researcher will be able to provide effective solution to the subject matter. The research will have the benefit of developing appropriate hypothesis that can guide the researcher throughout the research course for achieving appropriate results (Fern and Fern, 2001).

The case study reviewed in the previous section shows that both the design and research objective for this research allow it to be regarded as a case study research. In this study, case study was selected to be as research strategy due to two distinct factors that are unique to the case study. Firstly, the 'how' question that this research poses- How is SOW developed in Oil and Gas (OGS) projects in Saudi Arabia- needs an elaborate answer in order to move ahead and identify barriers and enablers in the Saudi Oil and Gas sector, further to which recommendations can be formulated. The case study strategy is preferred for studies that require answering the 'how' or 'why' questions (Denscombe, 2003). Secondly, owing to the expansive and varied nature of the OGS industry in Saudi Arabia, access to multiple data sources could potentially be obtained, in order to fulfill the important merits of the case study design.

An important aspect of this study is its exploratory nature- it is the study objective to explore the nature of SOW development in the Saudi OGS industry. Only then can clarity be achieved as to the exact nature of barriers and enablers to SOW formulation within the Saudi OGS sector. This knowledge is important since it will likely direct my inquiry towards a solution for how best these barriers can be minimised or overcome altogether. It will also help the researcher in identifying whether the enablers within the OGS in Saudi Arabia can be strengthened for better quality SOW development.

3.3.4   Selection of case study sample

The selection of the number of cases is a pivotal factor within the case study approach that has the potential to substantially affect the outcome of the research. The researcher knows that the principal advantage of the case study approach is a small sample size, ranging from a single case study to multiple case studies. Yin (2003) recommends the study of multiple cases within the case study research approach. He specifically negates the choice of a single case study selection for a doctoral dissertation. The choice of a single case has a greater potential and risk to be labeled 'non-scientific', since qualitative research is based on subjectivity and does not meet well with dissertation evaluators who are more inclined towards a quantitative analysis.

Consequently, it has been assessed that the best possible course of action for this study would be the selection of a multiple case study design. This brings the researcher to an important and extremely relevant question- how should the case study size be evaluated. A review of case study research literature does not specifically give explicit guidance on sample size for case selection. Patton (2015, pgs.244-245) states that, "sample size depends on what you want to know, the purpose of the inquiry, what will be useful, what will have credibility, and what can be done with available time and resources", also emphasising that "the validity, meaningfulness and insights generated from qualitative inquiry have more to do with the information richness of the cases selected and the observation/ analytical capabilities of the researcher than with sample size".

Lincoln and Guba (1985) suggest that the case number selection should be based on 'point of redundancy', which they explain to be a point that is achieved when addition of new case material is unlikely to marginally impact new information obtained. This is somewhat akin to the economics theory of diminishing marginal returns when adding just one more unit is unlikely to affect the overall scenario. Many researchers argue that assessment of the 'redundancy point' is still a matter of subjective discretion. Perry (1998) states that "the widest accepted range seems to fall between 2 to 4 cases as the minimum and 10, 12 or 15 as the maximum".

Hence, this research adopts a qualitative approach and a case study strategy for addressing the research questions. Two case study organisations working in the OGS in Saudi Arabia were identified and selected for the research. The first organisation (Organisation A) is considered the main driver for Saudi Arabia economics, it has more than 50,000 employees

and its subsidiaries have offices throughout the Kingdom. It is spending hundreds of millions U$ to invest in various mega, medium and small size projects all over the kingdom and around the world. The other organisation (Organisation B) is a relatively medium size organisation and it operates only from one office with around 1,000 employees. This organisation also uses projects to achieve its operation and strategic objectives but those projects are in medium and small size projects.

3.4   DATA COLLECTION

3.4.1   Data Collection Procedures for Case Study Strategy

The case study strategy typically makes use of three important data collection procedures. Yin (2003) recommends using multiple data sources while also triangulating them so as to achieve 'converging lines of inquiry' (p.98). What this essentially means is that triangulation of the data sources will enable the researcher to identify like information as well as dissimilarities, giving a consensus towards arriving at a conclusion. The second principle that Yin (2003) suggests is the creation of a case study database- a place where relevant material related to the case study is collected and can be accessed by anyone and everyone at any time. What this means for the research is that it enables the reliability and credibility of the case study to be cross-referenced and made use of, so that the case study is made more reliable. The third principle that Yin (2003) deems to be an important one for case study data collection is designing a transparent research structure and presenting it in a straightforward and transparent manner so that anyone else, a part of the researcher can reconstruct the steps taken with logic and without ambiguity. Again, this serves to establish credibility and reliability since a chain of evidence, so to speak, is created whereby no process is left to the imagination and logical reasoning is available for every step taken to arrive at a meaningful conclusion regarding the study.

Data collection is a very rigorous and precise function within the research design methodology. Data was collected for this research study using the case study approach. For this reason, two organisations were selected based on their position in the OGS sector in Saudi Arabia. Primary data was collected in two phases as explained in section 3.4.4 below. Two focus group interviews for the first phase were conducted at each organisation. Further, each focus group consisted of eight members for this phase. For the second phase; one focus group discussion was conducted for each organisation with 10 participants from Organisation "A" and 11 from Organisation "B". This allowed the study to have a wide

scope in contextual parameters for understanding the methodology followed for development of SOW in the Saudi OGS sector, while identifying the barriers and enablers for the process at the industrial level. For comprehensiveness and better methodological research design, the group discussions were recorded while transcripts were also recorded manually to enable later cross-correspondence and reference with each member of the focus group. Hence, the primary data sources used for this study include the audio recordings of focus group interviews as well as the responses to interview questions.

The researcher has relied on Yin (2003) to strive to collect material data through objectivity and conscientiousness. The three principles of data collection put forth by Yin (2003) have guided the data collection for this research study. The researcher had access to 32 respondents for the first phase and 21 for the second phase, who represented an individual unit of analysis in addition to interacting as a focus group. Hence, the study consisted of two large units of analysis (the two organisations for my case study), four sub-units for the first phase and two for the second phase being the focus groups that were interviewed. Within these sub-units, the lowest unit of analysis was the individual respondent, enabling the study to gain an insight through multiple levels of analysis. The positive aspect or strong advantage of this step was that it allowed for triangulation of the data sources- the first data collection principle recommended by Yin (2003). The advantage of this triangulation is that it has enabled the researcher to achieve construct validity- a method that is recommended by some researchers like Yin (2003) and Healy and Perry (2000) while it is criticised by others like Mason (2002). The second principle recommended by Yin (2003) to ensure a transparent and fair data collection procedure is creation and maintenance of a case study database. This has been taken to account for methodological trustworthiness, which is an important and integral component of any research and specifically, the case study approach. The last principle is the creation of a trail or chain of evidence so that anyone who studies this research can construct the methodology from scratch and in exactly the manner that the researcher has constructed to check for himself if a fair and relevant methodological practice has been followed. The chain of evidence will help reveal similar results were anyone to follow the methodological steps for this study. A trial focus group discussion was done for each phase prior to actual data collection in order to test the proposed procedure, questions and guidelines of the semi-structured focus group discussion and obtain the participant feedback for improvement.

3.4.2 Focus Group Discussion

The use of the focus group was considered an appropriate tool for collecting primary data for this study because the use and related experience to project SOW is constructed individually and collectively. Therefore, a rich data is attained by sharing common experiences and exploring different perspectives which is enhanced and encouraged by the dynamics of group discussions. Therefore, the methodology of the focus group is considered as a well-suited qualitative research tool to explore person's perspectives, experiences, understandings and meanings toward a multifaceted phenomenon (Lunt and Livingstone, 1996). "One of the major strengths of focus groups methodology is its exploratory nature" which make it very worthwhile in delivering "context and depth" (Poels, Kort and Ijsselsteijn, 2007, p. 84).

The focus group interviews followed a semi-structured format based on the interview questionnaires designed earlier. The focus group discussions were more informal, being conducted in a conversational style with prompts given by the researcher. Various respondents were asked their opinions and sometimes, if opinions did not coincide, the respondents spoke up to present their own contribution, either based on factual knowledge or firsthand experience. The conversational style interview was chosen for the focus group discussion because as Patton (2015, p.349) explains that during this type of conversational interview, "questions emerge from the immediate context and are asked in the natural course of things". The main advantage that the researcher saw during this open interview style was that contextual understanding was developed and secondly, and most importantly, much like an informal conversation, professionals coincided to speak on a given professional area from within a pool of expertise that could only have a beneficial effect on the data enrichment for the study.

Patton (2015, p.349) specifies that the strength of this approach is that the "topics and issues to be covered are specified in advance, in outline form". Hence, this form of interviews yielded data based on structure and form and within the context providing a deeper analysis of the phenomena being studied. Question selection was made based on the scope and context of the research questions.

For the purpose of assuring research quality, the research made an effective use of the construct validity during the collection of data from the focus groups. All the data provided by the focus groups was to be analysed based on the characteristics of the data. The research

examined six items for assuring the measurement of construct validity in the test. Those six items are consequential, in this, the researcher analysed the possible risk existing if the information collected from the focus group is interpreted in a wrong manner and the threats being imposed by the same on the future research and project SOW usage in the oil and gas industry. The content of the data was also evaluated by the researcher in order to ensure that the item is related to the interested area of study or not. It was significant to evaluate the relevance of the data with the study to make sure that the data available from the focus group is actually adding some value to the research problem. The next thing verified by the researcher was an evaluation of the theoretical foundation availability for the claim made by the focus group. However, it is significant to note here that the information from focus group was not judged against the theoretical data. It was just to make sure that there was no such information from the focus group in the study that had nothing to do with the project SOW. The next thing done was to identify that there was a correlation between the construct of data and interest and the results obtained from the data. It was also significant for the researcher to estimate that the collected data is displaying any discriminant, predictive, or convergent qualities for assessing the quality of them. Lastly, the generalizability of the collected data with other groups was checked to see that it could be applied for the general purpose of making the study more effective. As the narrow study raises a question regarding the validity of the data.

3.4.3   Participants

The participants in focus groups were drawn from the two organisations and their contractors. It was significant for the first phase of data collection for this research to involve both client and contractor from the project field due to certain reasons in order to collect rich data for evaluating the project SOW role and its characteristics to be effective. The client is normally more involved with the administration work and overall management of the project with less involvement from technical aspect. Where, the contractor team is more linked with the technical aspect of the project. They are most of the time dealing with the resource issues, quality issues, communication issues, management issues, etc. it was significant to involve both stakeholders to enrich the study with the support of a range of experience coming from different dimensions. On the other hand, the second phase of data collection for this study was intended to collect data about the development process in the organisation under study and because of confidentiality consideration, it was necessary to exclude contractors' representatives from this phase of the study. Participants were carefully selected and nominated by the organisations according to the selection criteria specified by

the researcher. As the criteria was already developed by the researcher with the support of appropriate academic literature review; therefore, the researcher does not have to face certain problems during the selection of participants. The researcher already shared the selection criteria with the organisations for their consent. Afterwards, the researcher moved towards the selection of participants based on the selection criteria. All participants are holding high level education certificate (minimum college certificate) with minimum experience of five years at both projects and OGS. This was significant to ensure that the participant is not only able to provide the data in a descriptive form or either he understands the rationale of the activity being carried out by him. Also, for each group, participants representing different teams with different roles and responsibilities at different phases of the project management life cycle. The employee learning tends to stop after spending a certain time on the same position with no change in the job description. Therefore, it was significant that the participant carries a multi-dimensional experience of working at different positions at the organisation. It will enable the participant to understand the context of the role and action in a much significant manner. Organisational decision makers, project SOW initiators/writers, bidding and contracting team members, project manager, project execution team members and project end users are forming the groups from both the organisation (as the client or project owner) and the contractor. As important criteria, participants were willing to discuss the research subject and share their opinions and experiences with others. These criteria designed to afford a "professional" sample and enrich the depth of the collected data. In development of each group, all of the stakeholders were involved in the group for example, there were project end user, client personnel, project SOW initiation, project management and project execution team in both group of each organisation. The assurance of participants coming from different positions in the same group was much significant for the brainstorming of the participants. The information shared by the participants with different expertise could have ignited any information from the participant of other expertise.

A total of 32 participants were selected based on the above criteria with 5-25 years of experience at both project and OGS. Table 3.1 and Table 3.2 show the number of participants for each category by categorising them according to their involvements during the project life cycle processes and their roles as project stakeholders. "Client" refer to the organisation that this research is considering as a case to conduct the study in while

"contractor" is referring to contractors that work for that organisation to execute their projects.[3]

Participant Category	Organization A		Organization B		Total N
	Client	Contractor	Client	Contractor	
Project manager	1	1	1	1	4
Project management and execution team	3	4	1	3	11
Bidding and contracting team	2	1	2	1	6
Project end user (Beneficiary)	1		2		3
Project SOW initiation/writing team	1		3		4
Client's decision maker	2		2		4
Total N	10	6	11	5	32
	16		16		

Table 3-1: Participants for the first phase of the field research

Participant Category	Organization A	Organization B	Total N
	Client	Client	
Project manager	1	1	2
Project management and execution team	3	1	4
Bidding and contracting team	2	2	4
Project end user (Beneficiary)	1	2	3
Project SOW initiation/writing team	1	3	4
Client's decision maker	2	2	4
Total N	10	11	21

Table 3-2: Participants for the second phase of the field research

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[3] See Annex II for demographical information about the participants

3.4.4   Procedures

Before commencement of the field research, the two organisations approvals were obtained after submitting official requests to their public relation department with a description of the research objective and method supported by a letter from the University of Manchester. According to the criteria mentioned above, each organisation selected 16 participants representing its personnel and its contractors' personnel. The 16 participants from each organisation were assigned into two groups each one with 8 participants. All 32 participants were contacted to assure their interest to participate before forming the groups and to negotiate and set an appropriate time for attending the focus group. The venue for each group discussion was set by the organisations and those were very good and appropriate venues for such discussions. The field research was conducted in two phases, first phase had a total of four focus group discussions and the second had a total of two focus group discussions. All 32 participants were participating in the 1st phase of the research (8 participants for each focus group) while only 21 of them were participating in the 2nd phase after excluding contractors' personnel for this phase (Number of participants are 10 forming one focus group discussion for organisation A and 11 for organisation B). The 1st phase, which was conducted during 2nd quarter of 2015, was intended to collect data for answering the first and second research questions which are:

RQ1- What is the role of the project SOW in project performance?

RQ2- What are the characteristics of an effective project SOW and what functions does it support?

For this phase, at the beginning of each focus group discussion, participants were requested to read the research information sheet and sign forms signifying their informed consent. A duration of 90-120 minutes was the length for each focus group and they were structured in the following approach:

Opening Round: At the beginning, the moderator presented himself and gave a brief explanation of the main aims of the focus groups. More concretely, the moderator clarified that the focus group was about the project SOW, its role in the project performance, and its characteristics to be effective and participants are encouraged and could feel free to talk about their perspectives during the discussions.   After that, participants presented

themselves, providing their names, job title, their involvement during project life cycle and their years of experience in projects as well as in the OGS.

Individual Talk: Just as a start for the focus group, each participant was asked to talk for 2-3 minutes about their perspectives of the definition of a successful project? And the importance of the project SOW for the project owner (organisation or client) and for execution contractors. The moderator debated to encourage individual participants to enhance his thinking about the use and importance of SOW during the project formulation phase of the project management life cycle.

Individual Assignment: The moderator requested each participant to give their perspectives of what is the key characteristics of an effective project SOW and what functions it supports in the project management by writing down two different lists. The first list of the project SOW characteristics and second one is for the functions that effective SOW should support. Participants were asked to write each characteristic or function on post-it notes and those were posted in the centre of the round table to assist as starting theme and check the source for the following step, the group discussion.

Group Discussion: This was the most essential part of those focus groups. During this part, participants could feel free to communicate and interact with each other about their perspectives about the key characteristics of an effective project SOW. The discussion was grouped around three basic themes by means of a semi-structured questionnaire. The three main themes were: (1) effective project SOW (2) key characteristics of an effective project SOW (3) key functions that effective project SOW should support. Further, the characteristics reported by participants individually were put forward by the moderator and additional Post-It notes were added when new characteristic or function was mentioned.

Group Assignment: At the close of group discussion, participants were requested to cluster and form unified lists for: (1) the key processes that need to be managed during the project life cycle in order to meet the project performance criteria and (2) the project SOW characteristics and functions using large sheets of paper. The unified lists were presented and discussed within the focus group discussion. As such, sheets from different focus groups

could be compared and helped the researcher in constructing the variety of characteristics mentioned by participants.[4]

The 2nd phase, which was conducted during the 1st quarter of 2016, was intended to collect data for answering the third and fourth research questions which are:

RQ3: How are project SOWs developed in the Saudi Arabian OGS? Plus, what are the practical enablers and barriers for its development?

RQ4: What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

For this phase, again 90-120 minutes was the length of each focus group and they were structured in the following approach:

Opening Round: At the beginning, the moderator reminded the participants with the 1st phase and thanked them for continuing with this phase. He gave a brief explanation of the main aim of this phase of the research. More concretely, the moderator clarified that after understanding the role of project SOW in the project performance and the characteristics and project management functions supported by an effective project SOW, it is required to understand the development process for that SOW, the advantages and disadvantages of the current practice, barriers and enablers for SOW development and to understand what is required to improve current practice. Participants then gave a reminder presentation about themselves.

Individual Talk: At this point, each participant was asked to talk individually about steps (stages) normally used to develop the project SOW, advantages and disadvantages of the current practice from their point view. The moderator debated to encourage individual participants to enhance his thinking about the current practice for SOW formulation.

Individual Assignment: The moderator requested each participant to give their perspectives of what is the key enablers and the key barriers for development of an effective project SOW by writing down two different lists. The first list is for key enablers and the second one is for key barriers. Participants were asked to list at least five items for each list. Each

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[4] See Annex II for key questions and supplementary questions asked during focus group discussion to collect the primary data for this research.

characteristic was written on post-it notes and those were posted in the centre of the round table to assist as a starting theme and check source for the following step, the group discussion.

Group Discussion: During this part, participants could feel free to communicate and interact with each other about their perspectives about the key <u>enablers</u> and the key <u>barriers</u> for the development of an effective project SOW. The discussion was grouped around two basic themes by means of a semi-structured questionnaire. The two main themes were: (1) the key <u>enablers</u> and the required for utilising those for developing an effective project SOW for the current practice (2) the key <u>barriers</u> and the required for overcoming those for developing an effective project SOW for the current practice. Further, the points reported by participants individually were put forward by the moderator and additional Post-It notes were added when new points were raised.

Group Assignment: This was the essential part of those focus groups. Participants were requested to develop and present two different flow charts. The first flow chart was to show the current practice used at the organisation to develop the project SOW. The second one was a modified flow chart showing the required to improve the current development process and to obtain more effective SOW. Participants drew the two flow charts using large sheets of paper and they selected one of them to explain the two charts while discussing each step for project SOW development and why the suggested improvement were required. As such, sheets from different focus groups were collected as important data, which could be compared and helped the researcher in constructing the model for Project SOW development process.[5]

3.5   DATA ANALYSIS

3.5.1   Content Analysis

Data analysis involves a thorough investigation of data generated to allow the researcher to combine fragments and create a comprehensive picture of the phenomenon being studied or addressed (Denscombe, 2003). Content analysis, which is a type of methodology undertaken to analyse text data, allows the researcher a degree of flexibility in interpretation while the remaining contextual and within the framework of the phenomenon being considered (Cavanagh, 1997). Since content analysis is entirely qualitative in nature, it uses personal

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[5] See Annex II for key questions and supplementary questions asked during focus group discussion to collect the primary data for this research.

interpretations of individuals being surveyed to construe or arrive at contextual inferences. Downe-Wamboldt (1992, p.314) clarify that "the goal of content analysis is to provide knowledge and understanding of the phenomenon under study".

Content analysis is also conducted through one of three approaches (Hsieh and Shannon, 2005). In the Conventional Content Analysis (CCA) approach, the text data is divided directly into codes, serving as benchmarks or pointers for correlation to theory and practice in the context of the phenomenon being studied. The Directed Content Analysis (DCA) approach, on the other hand, begins with theoretical background to pinpoint specific codes against which the research findings are directed. Finally, the Summative Content Analysis (SCA) approach involves numerical count of keywords, with compilation of this summation and analysis in order to enable textual interpretation.

3.5.2 Conventional Content Analysis

Conventional Content Analysis (CCA) is commonly used when a research design aims to explore a phenomenon (Hsieh and Shannon, 2005) and it is considered a suitable approach when research literature and existing theory is limited such as in the case of this study. Researchers avoid having preconceived or prejudiced categories; instead, they allow categories to flow smoothly from the collected data (Kondracki and Wellman, 2002; Hsieh and Shannon, 2005). Researchers permit new perceptions to develop by immersing themselves in the collected data (Kondracki and Wellman, 2002), which is labeled as inductive category emergent (Mayring, 2000).

The CCA approach was also considered to be a better analysis approach since the research design itself is quite structured and specific, which is an important pre-requisite for this content analysis approach (Hickey and Kipping, 1996). The CCA approach encourages the use of open-ended questions, which have been used for shaping the instrument used for data collection. These types of questions allow the researcher to delve further into specific areas of research that are contextual in nature and serve as guidelines for respondents to give their opinion and feedback on the phenomena being addressed. The researcher has used his interview questions to specifically probe into the relative exposure and experiences of the respondents regarding their opinion and feedback on SOW development and their understanding of the enablers of SOW, given their own educational background and professional experience within the context.

CCA generally uses data that is collected primarily using open-ended questions. "Probes also tend to be open-ended or specific to the participant's comments rather than to a preexisting theory" (Hsieh and Shannon, 2005, p. 1279). Reading data frequently is the start point for data analysis in order to accomplish immersion and achieve a comprehensive outcome (Tesch, 1990). Then, reading the data word by word is an important step to develop codes (Morse and Field, 1995; Morgan, 1993; Miles and Huberman, 1994) starting with identifying the words that seem to capture key concepts or themes. Afterwards, the text under analysis is approached by noting down the researcher's primary thoughts, impressions, and analysis. As the process carries on, codes emerge which is reflective of several key thoughts that come straight from the text under analysis, which is forming the initial coding scheme. Then, codes are organised and sorted into categories founded by relating and linking different codes. By this way of categorising, codes are actually organised and grouped into meaningful clusters (Patton, 2015; Coffey and Atkinson, 1996).

By identifying the relationships among subcategories, large numbers of emerged subcategories can be combined to form a reduced number of categories. Hierarchical structure for categories using tree diagram can be used to help in shaping this (Morse and Field, 1995). After that, definitions for each category are established. Examples for each category are then identified as preparation for reporting the findings. With a CCA approach, the related theories or other research results are discussed in the discussion chapter. The discussion would take account of how the current study findings add to knowledge in the addressed area and recommendations for improving current practice, and future research.

The advantage of CCA is the acquisition direct data from research participants with no need for setting predetermined categories or theoretical perceptions. Knowledge generated from the current study CCA is grounded on participants' perspectives and the actual primary data collected. This study's sampling method was planned to maximise the diversity of participants' thoughts and opinions; and the analysis approach was designed to recognise that complexity.

The possibility of failing to establish a comprehensive thoughtful understanding of the context is considered one of the challenges that CCA faces because of inability to identify key categories (Hsieh and Shannon, 2005). This may lead to findings that do not truthfully represent the data. Lincoln and Guba (1985) called this challenge as internal validity or credibility within the realistic paradigm of reliability and validity. To establish and maintain

credibility, actions such as triangulation, peer debriefing, participant checks, extended engagement, negative analysis, and referential adequacy could be used (Manning, 1997; Lincoln and Guba, 1985).

Another important challenge of the CCA approach is the easy confusion that may occur with other qualitative approaches such as phenomenology or grounded theory approach. They share with CCA similar primary analytical approach but they go further than content analysis to develop theory or to explain an existed experience while CCA is limited in both, because sample and procedures for analysis make it difficult to build theory from concepts relationships (Hsieh and Shannon, 2005). At best, the outcome of a CCA is model construction or concept development (Lindkvist, 1981).

3.5.3 NVivo Assist Data Analysis

Qualitative methods is considered the best option for research that aim to explore in depth process or experience understanding, where much information is required to control the characteristics or boundaries of the subject under investigation. Such investigations normally require collecting intensive and extensive data. Maintaining and managing qualitative data is one of the challenges that researchers need to deal with. While using computer as assistance for data management, the intention is not displacement of time esteemed ways of learning the collected data, but for increasing the learning efficiency and effectiveness. The efficiencies afforded by software release some of the time used to simply 'manage' data and allow an increased focus on ways of examining the meaning of what is recorded (Bazeley and Jackson, 2013, p. 2). The computer gives the researcher the required insurance of doing the work more logically, more systematically, and more responsively which leads to more rigorous qualitative data analysis. However, computer software, by any mean, cannot turn untidy work into rigorous analyses, nor compensate for inadequate interpretive capability of the researcher (Bazeley and Jackson, 2013).

Hence, good qualitative software is designed to give the researcher the closeness and distance that he needs (Richards, 1998): closeness to be familiar, appreciate and understated differences, but distance to be able to construct and create, while keeping the facility to switch among the two. Improving access to and management of multiple types and sources of data; and quick retrieval of codes and ability to outlook codes' text segments in their original context will assist in obtaining the required closeness to the data. On the other hand, there are other tools designed to offer the required distance, such as modelling ideas tools,

cross-examining and test theory tools, and results summarising tools. "These take the researcher beyond description to more broadly applicable understanding" (Bazeley and Jackson, 2013, p. 8). NVivo provides tools that support the researcher to analyse using multiple strategies simultaneously such as reading, taking memos, annotating, reflecting, linking, discussing, visualising and coding. Those strategies are integrated processes for understanding and learning from the data under study.

NVivo, as qualitative software, is useful during conducting of qualitative data analysis as it helps the researcher in managing the data, managing ideas, querying data, visualising data, and reporting from data (Bazeley and Jackson, 2013). But, NVivo user have to understand that NVivo is just a set of tools that are designed to help the user to undertake analysis of a qualitative data. The recording, linking, matching, and sorting capacity that the computer has can be coupled to assist the researchers in answering their research questions using the research data, while keeping access to the original source data. NVivo tools allow the researchers to manage their data and to do a comparison or isolation of diverse components within the project. It allows them to have everything about a topic under one project and to make instantaneous compressions transversely different types and sources of data, and different cases. Bazeley and Jackson (2013) reported that some researchers argued that sometimes using software opened up for them new ways of sighting the collected data.

As it is more about the ability to reflect on concerned data and make cross connections, analysis is also about the ability to categorise and manipulate data in codes. To work with and build knowledge from data, coding is an essential method in combination with writing memos, annotating, modeling and linking. "Any researcher who wishes to become professional at doing qualitative analysis must learn to code well and easily. The excellence of the research rests in large part on the excellence of coding" (Strauss, 1987, p. 27). Raw data collected from the field and verbatim transcripts for recorded data reflect "the undigested complexity or reality" (Patton, 2015, p. 463), demanding coding that makes sense and organises them in sensible order. Corbin and Strauss (2008) defined a code as a theoretical illustration of a phenomenon or object and Bernard and Ryan (2010) defined coding as a way of recognising and categorising themes in a text. Coding a text can vary from being simply descriptive by labeling themes or topics to further analytical and interpretive concepts (Richards, 2009). Coding is simply a method of tagging or labeling text with codes and listing them with the intention of easy retrieval when it is needed. Corbin and Strauss (2008) argued that labeling topics and concepts in a text helps the researcher to

organise data and hence promote analytic thought. Coding assists the researcher to "re-contextualize" data (Tesch, 1990), and to move from text study to theorising.

A common tactic for coding is to start coding broad categories, and then do this in more detail (Coffey and Atkinson, 1996). Sorting data roughly to identify major categories at the beginning could be a worthwhile way but the researcher will need to proceed with another look. Most of the time, analysts need to work somehow with a mixture of the two tactics and NVivo provides the provision to use either or both. NVivo is storing codes in nodes where each concept or theme should have a unique node. NVivo has the research capacity to trace and retrieve passages coded at their original sources.

For the current study, the researcher used NVivo for storing, managing and organising the collected data. The provided tools were useful to handle coding while reading and learning from the data. The moment an idea that is related to a concept or category is attracting my attention, I do record those views in a memo that is linked with its code. Several times of reading, generate additional ideas, which lead to merge, rename, or revise some themes and codes .

Qualitative data can be connected with demographic scaled or categorical values for the purpose of comparison between subgroups within the study. This connection occurs through cases, the analysis units established for the study, which are created from data sources. Hence, a case refers to a unit of analysis that is definable and bounded such as a person, a department, and a policy instead of a concept. A case is a fundamental structural component in NVivo. "In NVivo, cases are managed by creating case nodes; with each case node acting as the 'container' that holds all data, of all types, for each case, regardless of source" (Bazeley and Jackson, 2013, p. 52). NVivo user can use case nodes that have demographic data, which are called attributes, connected to qualitative data. Actually, the user can take benefit of the case node to hold everything he/she knows for a specific case.

NVivo use term "Cases" as a unit of analysis for a study and number of cases and number of types of cases may vary depending upon the research study itself. Understanding cases is important to facilitate analysis, for comparing subgroups. Also, any particular piece of data has to be coded to a single case node. In addition, researchers have to use a unique classification system for each case type connecting different attributes and values. During gathering this research qualitative data, the attributes were in mind and those were recorded

(e.g., demographic details). By thinking of all the categories of comparison that I want to make, I do record the details required to make those possible. For example, as I need to compare between what different participants said based on their categories within the organisation as well as between the organisation's personnel and contractors' personnel, I collect the related information for each participant in order to use them during the analysis phase. Figure 3.1 shows the attributes and values used for the current study.
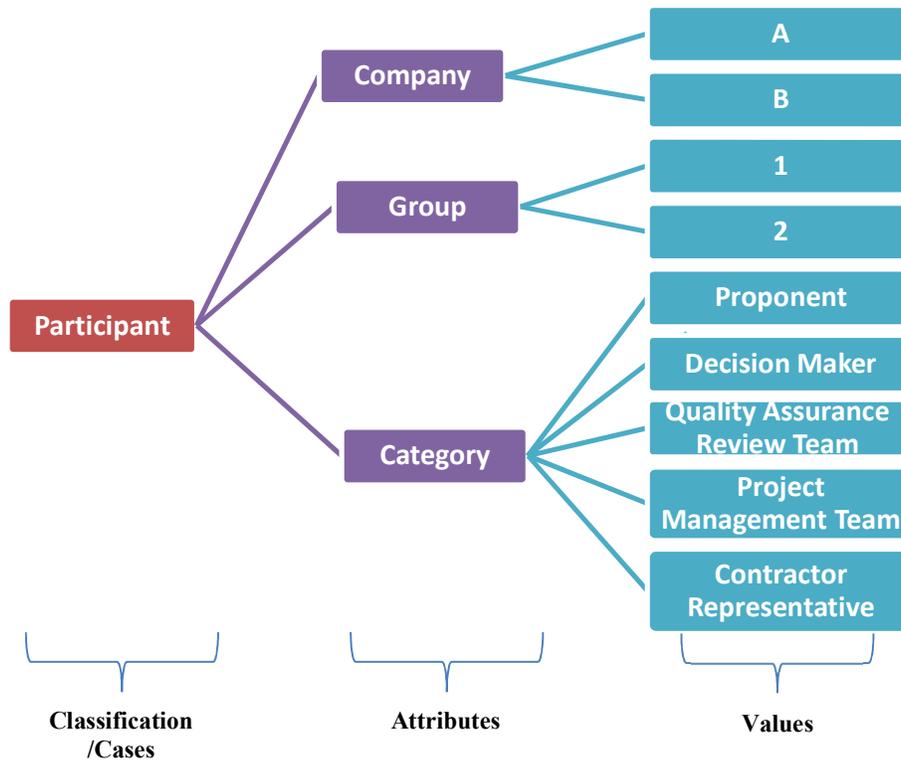
Figure 3.1: Attributes and Values used for the current study

Using cases that are attached with their attributes became useful to me especially as an instrument for filtering data and comparing subgroups. For example, I used it to compare the opinions of participants that represent the organisation (project owner) and the contractor (project executer). Since those kinds of attributes were recorded during data collection and then they were associated with cases, the compression became a direct task using NVivo query or visualisation. Similarly, I used the values of an attribute to filter cases. This allowed me to run a query only on data organisation and then compare the results with similar query, filtered for data contractor.

3.6   RESEARCH QUALITY

For any research to be meaningful, it is important that it be both valid as a body of research and knowledge and that it be reliable. The reader of any scientific work should not only find important findings from that study, he should also be able to understand that the research was as devoid of subjectivity as possible.

3.6.1   Validity

Validity is a measure of the reflection of the true nature of the phenomenon that the researcher is attempting to study. Irrespective of the word 'measure' used to explain validity, qualitative researchers seldom measure any element in the conventional sense of the word. Rather qualitative studies attempt to seek out characteristics that are representative or typical of the phenomena, either reinforcing these characteristics or building further on them (Stenbacka, 2001). Denscombe (2003) explains this in layman terms when he says that the validity of a research is defined through proper use of research methods which can in turn, generate appropriate results. However, it is not to be confused with the generalisations or conclusions arrived at after the research has been analysed.

The validity of a research is explained through its purpose. The main objective in any type of qualitative data is to extract data from findings that corroborate the purpose-specific information for the phenomenon. This means that the respondent should be chosen from within the specific sample or problem area being studied so that he/she is able to inform and enhance the nature of the study. Validity is hence rather dependent on the target population, who inform the research phenomena (Stenbacka, 2001). The respondents used for this qualitative case study have been chosen from within two organisations operating within the OGS sector in Saudi Arabia. They are highly educated and professionally experienced to engage in the interview process.

Three types of validity have been identified by Yin (2003) as being vital in the construction of a quality case study research. These are:

- The Construct validity, or undertaking appropriate procedural measures, so that there is a decreased possibility of subjective opinions developing.

- The Internal Validity, or identification and defining of clear links between the internal stakeholder relationships. These relationships show cause and effect and help to differentiate between inter-related cause and effects and spurious relationships.

- The External Validity, or the identification and defining of external variables that are crucial in establishing relationship domains for the entire phenomena.

However, although Yin (2003) is considered the authority on the case study research, other researchers like Healy and Perry (2000), Klein and Myers (1999) and Walsham (1995) have identified validity as a quality criteria to be strongly dependent on the research paradigm that the researcher subscribes to. Yin (2003) is a positivist; hence his manner of conducting case study research reflects this stance. Healy and Perry (2000, pgs. 120-121) specifically explain this idea when they stated that "the quality of scientific research done within a paradigm has to be judged by its own paradigm's terms". The authors ascribe to the realist paradigm and hence their stance on case study quality criteria reflects this. Healy and Perry's (2000) Realist stance, as opposed to Yin's (2003) Positivist stance, identify six quality criteria for quality case study research. These share some similarities with the Yin (2003) model, while they also exhibit some dissimilarity.

Both Yin (2003) and Healy and Perry (2000) agree on the basic meaning of construct validity under the Positivist and the Realist paradigm to mean the same thing. Healy and Perry (2000, p.124) identify construct validity as "how well the information about the constructs in the theory being built are measured in the research".

What Yin (2003) defines as Internal Validity is referred to by Healy and Perry (2000) as contingent validity, and defined as "validity about generative mechanisms and the contexts that make them contingent" (p.123). This essentially means that answers are sought within contexts which act as research parameters, allowing the researcher to focus on the issue at hand. Elsewhere, this process has also been likened to bringing credibility to the research process, since context-specific answers are sought, a point of concern not addressed through Yin's Positivist approach.

External validity referred to by Yin (2003) measures the external scope of the research- how applicable it is in the context of prevalent theories and the extent of contribution it makes to

these. Alternatively, this same concept is referred to by Healy and Perry (2000) as 'theory building', clearly describing the process inherent therein. The main objective behind ensuring that the case study approach will be able to produce externally valid results is that the material obtained coincides with academic and theoretical assumptions while allowing for further point of reference, or rather building up on prior work. This is a research trait sought after in both the positivist and the realist paradigm and is evidenced through the work of both Yin (2003) and Healy and Perry (2000) among others.

3.6.2 Reliability

Reliability is a measure of the exactness or sameness of the results achieved when repeated similar random tests are performed for the phenomena being studied. It demonstrates that the whole process of the research study, including the data collection procedure, can easily be replicated with the amount of clarity mentioned within the research process. This measure relies on both the respondents and the researcher himself, as well as the soundness of the research design to the extent and degree that respondents are able to inform in a similar manner on research areas, or the ability of the researcher to use similar tools and procedures for consistent results. Reliability is a strong factor in any type of research approach since replication of consistent measures is of paramount importance in establishing the generalizability of the results.

Within the case study approach, reliability is often criticised as a true measure since qualitative studies tend to be more subjective, being subject to personal opinions, however guided (Schneider and Samkin, 2008). Some researchers like Llewellyn and Northcott (2007) among various others, also consider that qualitative studies do not contain scientific objectivity, hence they lack scientific rigor. However, proponents of the qualitative research approach contend that qualitative data can be as scientifically rigorous as quantitative data. This is brought about through a structured content analysis approach. Rigorous content analysis of qualitative data gives it as much validity as quantitative data, in turn also rendering it just as reliable (Schneider and Samkin, 2008). Specifically in the context of generalization and case study research, Yin (2003, p.10) states that "case studies […] are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study […] does not represent a 'sample', and in doing a case study, your goal will be to generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)".

Yin (2003) considers reliability of the case study approach to show beyond doubt that the material can be depended upon in the context of research contributions. Hence, in addition to construct validity, internal validity and external validity, Healy and Perry (2000, p.123) also speak of 'methodological trustworthiness' (akin to Yin's reliability criteria) or "the extent to which the research can be audited by developing a case study database and by the use of quotations in the written report". This statement tells us two different criteria; firstly it refers to the database building and maintenance that Yin (2003) speaks of when addressing the criteria for designing case study protocols and secondly, it tells us that direct quotations from case references are a pre-requisite to establish credibility and trustworthiness within the methodological process followed. Table 3.3, adapted from Yin (2003), shows the points to be borne in mind for establishment of research credibility while undertaking a case study research:

3.6.3   Considerations for Research Quality for This Study

Concerns for construct validity were mitigated through the use of triangulation, which is defined as "a combination of methods used to study the interrelated phenomena from multiple and different angles or perspectives" (Given, 2008, p.892). For this study triangulation was used in terms of data sources, whereby different sources of data are used for the same research questions and data collection methods.

For this study, the researcher, though using only two cases for data collection, has made use of a wide range of respondents within the pre-determined sample characteristics to enable establishment of triangulation of data sources. The logic is to enable the researcher to find two or more responses that are similar, indicating a like process of thought on the phenomenon. Hence, any finding that was corroborated by two or more respondents was considered valid in so far as it could also be backed up with theoretical linkages.

Additionally, the researcher has tried to create and maintain a 'chain of evidence' as advised by Yin (2003). As already explained, a chain of evidence allows the reader to follow the study 'trail' so to speak, much like one would follow footsteps to arrive at the same place as the person before did. This means that the research is a transparent one, precisely documenting each and every step undertaken. An alternate reason for presentation of response documents is that being fully cognizant of the responses and the study research questions allows the reader to formulate an independent opinion, which, may or may not correspond to the researcher's conclusions.

Quality Aspect	Case Study Approach	Time period during which the approach occurs
Construct Validity	Use multiple sources of evidence	Data collection
	Establish chain of evidence	Data collection
	Have key informants review draft case study report	Composition
Internal Validity	Match patterns	Data analysis
	Build explanations	
	Address rival explanations	
	Use logic models	
External Validity	Use theory in single-case studies	Research Design
	Use replication logic in multiple-case studies	
Reliability	Use case study protocol	Data collection
	Develop case study database	

Table 3-3: Case Study Research Credibility, (Yin, 2003, p.36)

Another important methodology followed to strengthen the study's construct validity, the researcher had the respondents participate in the stage making inferences. The management representatives from each of the two companies were also enlisted for reading the findings obtained, while corrections were promptly made if any aspect required this. Fellow colleagues were approached to review dissertation drafts, particularly the proof-reading of the findings and the inferences drawn. The rationale behind this was that the researcher, being completely immersed in his findings may not have been able to take a critical stance or may have missed an important observation. A fresh perspective would add to the work by looking at various viewpoints through an independent outlook. Various researchers encourage such a practice. For instance, Frost and Stablein (1992, p.53) state that "good

researchers require the collaboration of others to make their projects work, to get them to completion".

Concerns for internal validity were mitigated by undertaking the following steps:

1. Pattern-matching approach was followed to match responses with corresponding elements- these elements were based on notes taken during reading organizations' procedures phase since no hypotheses were formulated for this study.

2. The differences and similarities were studied and relevant literatures and procedures were revisited to gain a contextual understanding of various patterns recognised.

3. Factors other than those that were deemed to be directly attributable to SOW formulation were viewed with a critical stance.

4. Tables and charts were constructed to gain a deeper understanding of the barriers and enablers in the SOW process while these were further linked to constituent elements so that a clearer pattern of relationships and inter-relationships could be assessed- much like a map to guide the researcher regarding what has been discovered. Also what was already known and these can be inter-linked to present a more elaborate scheme of events taking simultaneously

Due consideration was also given to preserve the external validity of the study by addressing the relevant sections of the literature and procedures, specifically in how the internal organisational factors coincide with external factors to enhance SOW formulation. Reliability as a factor material for preserving the quality of the dissertation was also borne in mind during the data collection as discussed above.

3.6.4   Quality of Sample

The sample size for any case study research varies with the nature of the qualitative research as well as the technique to be employed. However, the general understanding is that case study samples are small (Creswell, 2003b). The main point is that an appropriate sampling technique needs to be employed. This will help to capture all the elements of the study from within a small sample size- a sample that can truly be considered a representative of the

broader population of which it is a small part, albeit always considering that there may be a possibility for error (the margin of error associated with any type of research) (Iarossi, 2006).

The researcher chose two organisation or cases for his case study design. Sub-units were identified through two focus group interviews for each organisation for each phase of the data collection phases. Each group was to consist of a number of project stakeholders having relatively fair experience and well-educated so as to achieve the objective of the discussion and to obtain relevant data. Hence, in all, four focus group discussions were conducted.

The above methodology will enable the researcher to analyse embedded units of analysis through the two focus group discussions per organisation. Although only two organisations have been included in this study, it has been made up by the fact that the researcher will be studying multiple units of analysis within the individual case studies. The methodology has also attempted to include individuals across experience levels and from multiple educational backgrounds so that the focus spans over a large area of organisational scope rather than limitation to any one level. This has been advocated by Yin (2003) when he encourages case study design to consider the larger unit of analysis as opposed to solely focusing on sub-units.

Although due care has been taken to select a representative sample from the Saudi OGS sector, it may still be possible that a margin of error may exist due to sampling error. This error is defined by researchers as the exact measure of results that the researcher can obtain from a complete sample by using a smaller sample that is considered an approximate representation of the entire sample (Hansen, Hurwitz and Madow, 1953).

The procedure used to select a representative sample reduces sampling error and the methodology followed is called population validity. Normally, researchers follow either of four sampling procedures; these being random, stratified random, systematic and finally, probability proportional-to-size sampling. The larger units of analysis for this study were two organisations (or cases) operating within the Saudi OGS sector. Within these cases, sample respondents were selected on the basis of two important criteria. Firstly, the respondents would be highly educated, typically graduates. Secondly, their experience would exceed five years of working within the industry. Hence, the stratified random sampling procedure was considered the most appropriate sampling procedure that would

also potentially reduce sampling error, allowing the researcher to eliminate those candidates who did not meet the educational and the experience criteria. In a stratified random sampling procedure, the population is divided into distinct strata based on sample criteria or characteristics and samples are collected from pre-determined strata.

The stratified random sampling procedure is again divided into three distinct routes to select samples. Where the sample size (as conceived by the sample criteria characteristics) is equally divided within the sample population, equal allocation is used. Alternatively, where equal proportions of sample size exist in the sample population, proportionate allocation is considered a better option. Finally, where uneven conditions exist and high degree of precision exists for sample choice, optimum allocation is the desired route. This study used the optimum allocation route because the two criteria that were set for the sample selection-graduate and an experience of five years or more in the Saudi OGS sector- were mutually congruent, in that both criteria must exist in order to consider the candidate. Merely being a graduate in the Saudi OGS sector without the pre-defined experience criteria or merely having an experience of five years or more in the Saudi OGS sector without being a graduate disqualified the potential candidate from being considered a respondent for the study. This allocation method enabled the researcher to screen out only the sample size that could provide the maximum assistance within a minimum time frame.

3.7   CHAPTER OVERVIEW

This chapter deliberated the Methodology and strategy used to conduct the current research. An important aspect of this study is its exploratory nature- it is my objective to explore the nature of SOW formulation in the Saudi OGS industry. Therefore, this study has opted for qualitative over quantitative research because this approach allows for contextual experiences of individuals to be recorded and used for arriving at context-based generalizations. Discussing case study as research strategy shows that both the design and research objective for this research allow it to be regarded as a case study research due to the 'how' question that this research poses. Consequently, it has been assessed that the best possible course of action for this study would be the selection of a multiple case study design. Hence, two case study organisations working in the OGS in Saudi Arabia were identified and selected for the research. The focus group was considered an appropriate tool for collecting primary data for this study because of the use and related experience to project SOW is constructed individually and collectively. Therefore, a rich data is attained by sharing common experiences and exploring different perspectives, which is enhanced and

encouraged by the dynamics of group discussions. Conventional Content Analysis is used to explore the research subject as it is considered a suitable approach when research literature and existing theory is limited like the case of this study. In order to have more rigorous analysis, the researcher use NVivo for storing, managing and organising the collected data. The provided tools were useful to handle coding while reading and learning from the data. The results of implementing what is discussed in this chapter will be presented in the next chapters.

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CHAPTER 4

ROLE OF THE PROJECT SOW IN PROJECT PERFORMANCE

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4   ROLE OF THE PROJECT SOW IN PROJECT PERFORMANCE

4.1   CHAPTER INTRODUCTION

One of the study objectives was to identify the role that the project SOW plays during the project lifecycle. This objective was achieved by conducting a comprehensive literature review as discussed in chapter 2 of this thesis and then by conducting an empirical study, to obtain the answer for the first research question:

RQ1- What is the role of the project SOW in the project performance?

To collect data to answer **RQ1**, participants were requested to give their views on two things: First, on their understanding of what constitutes a successful project and second, the role of SOW in contributing towards a successful project. The following supplementary questions were used to assist in collecting the primary data during the focus group discussion: -

- ❖   What is a successful strategic project?

- ❖   What is the performance criteria for a successful project?

- ❖   What is the importance of having a written documented project SOW at the very early stage of the project initiation phase?

- ❖   Explain the use and importance of the project SOW during the project formation phase.

- ❖   Explain the role of the project SOW in the project performance.

- ❖   Why is the Project SOW important for the project owner?

- ❖   Why is the project SOW important for the Contractor?

- ❖   How can the project SOW help in achieving the desired project performance?

By analysing and coding the transcribed group discussion with the aid of NVivo software (as described in section 3.5), it was found that there are four main themes that participants used to define a successful project. Responses from different participants with different roles at both organisations show that there is broad agreement that a successful project is the one that is completed On Scope, On Time, On Cost and On Strategy. Those four main themes represent the key project performance criteria. By analysing, categorising and

tabulating the collected data for each one of the four main themes, a total of thirteen subthemes were identified as key processes to achieve the main themes[6]. The findings and discussion for the four performance criteria and related processes are described in the next sections with more focus on the research subject which is project SOW development process.

4.2   THE ROLE OF THE PROJECT SOW FOR COMPLETING THE PROJECT ON SCOPE

It has been reflected in the data that in order to ensure the success of a project, it is important to achieve the project scope which is a major performance criterion in the successful completion of the project. The project scope determines the different dimensions of a project like the associated costs and required time for the successful completion of the project and these dimensions depend on different factors such as, what are the number of tasks that need to be completed in the project, how much time should be allocated to each task, and how different tasks will interact with each other during the course of the project. If the project scope is defined clearly and comprehensively, it is easy to plan accordingly for different factors. The same has been endorsed by Organisation 'A's contractor as:

"Project scope of work should state the project scope clearly and should help in estimating the required time and required resources. Planning the resources and activities and completing those on time as per its original planned and agreed on scope without additional cost is the greatest success for any project".

By analysing the collected data, subthemes emerged for completing the project "On Scope". Four key processes were highlighted as vital to enhance the chance of completing the project "On scope": (1) Developing the Project SOW, (2) Planning for Scope Implementation, (3) Directing Implementation, and (4) Controlling Project Scope.

It has been found that **Project SOW Development Process** is the foundation for the rest of the processes and it is a common process that needs to be considered for all four performance

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[6]See Annex III for detailed examples of participant's quotes that emerged the four main themes and the related subthemes. Tables are tending to reflect the emerged subthemes for each performance criteria taking into consideration different roles representing different participants in the project such as proponent, decision maker, quality assurance review team, project management team and contractors of the organisations.

criteria highlighted here which give support to justify this study. This process will be discussed in detail in chapter 6 while addressing the third research question.

Planning for Scope Implementation refers to effectively planning to ensure successful implementation of the defined scope of the project. It has been found that each and every participant of the project tends to have a unique and important role in the project in order to ensure the success of the project. It includes a number of roles such as significance effective planning in terms of defining as well as implementing the project scope of work as successful planning entails meeting the objectives defined in the project scope. As well as accomplishing the requirements set with respect to the budget and completion time of the project. In order to effectively complete the project, it is imperative to make realistic planning. Similarly, it has been endorsed by Organisation B's Contractor:

"No doubt, project scope has to be checked carefully during the development process to ensure that it is representing the project objectives. Before starting real implementation, realistic and effective planning to ensure that project requirement are all considered is a must."

Directing Implementation is also vital in ensuring the success of a project. After planning the scope implementation, there is a great need for project managers to direct their subordinates about the scope of the project. This refers to the responsibility to direct the implementation resting with the project manager as he/she is the one leading the project. According to the Decision Maker in organisation A, "It is the project manager's role to direct the right implementation". The participants also emphasised that effective implementation of the project scope is possible only when the scope is clearly defined and all the project requirements are being accomplished in accordance with the defined scope. To implement a project scope successfully, it is necessary that the project scope is defined such that it is understood by all the stakeholders and all of them are on the same page regarding the objectives of the project, its deliverables, available resources, and the time and steps required to achieve the project objectives. The project managers need to provide assistance to their subordinates throughout the project as it has been identified by the contractor of Organisation B:

"Key to success is a well-defined project scope that assists in implementing the required deliverables and obtaining the required outputs."

While these factors are clearly defined at the time of planning the project scope, sometimes circumstances demand a change in the scope like extending the schedule of the project to remain within the estimated cost structure or vice versa etc. These changes usually require an adjustment in the scope, thus leading to another important subtheme, **Controlling Project Scope**. It has been identified that there was no consensus in the responses of participants from different organisations, as well as participants bearing different roles in the same organisation. The participants provided mixed views about the controlling process of the scope, however, the decision makers of both of the organisation's agreed an additional cost may occur when the project scope is changed in the implementation phase.

Additionally, they stated that a change in the project scope during the implementation stage will lead to additional costs, extension in completion time, or both, and can lead to incomplete achievement of the strategic objectives of the project or complete project failure. On the other hand, the proponent and the project management team in both the organisations were of the view that having some variations does not critically affect the achievement of project objectives if the project manager properly monitors the implementation and integrates the required changes in the scope effectively. The views of the quality assurance review team in organisation A were against the controlling required for changes in the scope as they believed that "a successful project is one that is completed as per its signed contract" while the same team in organisation B supported the change in the following words:

"Change doesn't mean always increasing the scope, raising the budget, or postponing the deadline. Sometimes it is the opposite".

Analysis of the literature and findings reflected project scope as one of the most significant factors, contributing to effective performance of the project. In this context, Williams and Samset (2010) identify project scope as a major performance criterion, which directly impacts the successfulness and effectiveness for project completion. This on-scope project performance is also supported by the respondents who also emphasised how project scope supports project planning, executing and monitoring and controlling. This is supported by the analysis of studies given by Adner and Levinthal (2004), and Baiden and Price (2011) argue that project scope supports the performance through outlining the tasks to be carried out. As well as identifying important planning, which is required to achieve the project goals and objectives. In the literature, Mayer and Spieckermann (2010) also relate the role of

project on-scope in sustaining the satisfaction of the client with the delivery of the expected performance and project outcomes.

Hence, to complete a project "On Scope", it is important to have a clear project scope that is developed during "developing project SOW" process at the project initiating phase. Effective project SOW will be the main enabler for achieving the required outputs of "Planning for Scope Implementation" process at Planning Phase, "Directing Implementation" process at Executing Phase and "Controlling Scope" process at Monitoring and Controlling Phase. This study provides logic and practical sequence that needs to be followed in order to accomplish a project that is completed on scope by identifying the four key processes mentioned within this section.

4.3   THE ROLE OF THE PROJECT SOW FOR COMPLETING THE PROJECT ON TIME

The next performance criterion highlighted by the participants was the completion of project "On Time". Time was considered one of the most important success factors and having a comprehensive project SOW is a great enabler to achieve this target as stated by one of the Organisation "A" project management team:

"Completing the project per its schedule is important success factor. Having detailed scope of work helps in more accurate durations"

In consistent with the idea, Organisation B project proponent stated that:

"Completing the project on time within its budget" are important factors for measuring the success. To be able to reach that objective, the contractor should identify that activities, plan the resources, schedule the implementation and meet the schedule deadlines."

By analysing the collected data, subthemes emerged for completing the project "On Time". Four key processes were highlighted as vital to enhancing the chance of completing the project "On Time": (1) Developing the Project SOW, (2) Scheduling Project Activities, (3) Directing Schedule Implementation, and (4) Controlling Project Schedule. As is mentioned in section 4.2, the "Developing project SOW" process will be discussed in more detail in chapter 6, while it is important to highlight here that the Project SOW is a key enabler for the remaining three processes mentioned in this paragraph.

If the project SOW is comprehensive, clear and effective, then planning and scheduling activities is the first and foremost step in completing the project on time. It involves certain conditions, for example; defining the relationship between the activities, estimating the resources which will be required to perform the activities and estimating the duration of the activities. A detailed scope of work was also deemed helpful in estimating more accurate time allocation to the project, as well as to the individual tasks. It is an important tool for lead time estimation. Since the project SOW clearly states and defines the project scope, it helps the project manager for accurately estimating the required time and the required resources for successful completion of the project. According to the Quality Assurance Review Team of Organisation A:

"Project can be completed successfully on desired time and at desired cost which makes it strategically feasible if it has the effective scope of work and that scope of work implemented effectively."

Scheduling Project Activities process refers to the effective planning and scheduling of a detailed plan about the activities to ensure effective time management. This refers to planning for the available resources and according to the availability of these resources allocating time to each activity in the project so that the resources are utilised optimally within the planed schedule. To effectively complete a project on time, it is important to plan the requirements for human resources, financial resources, and equipment as the efficient use of these resources leads to effective implementation and therefore to a successful project. A good and properly developed scope of work provides guidance to all the parties involved in the project to plan properly to accomplish the objectives of the project as well as the long-term objectives of the organisation at the right, desired and realistic time.

Additionally, the proper planning for scheduling activities, effective implementation is also as important for successful completion of the project, which leads to another important subtheme/process, **"Directing Schedule Implementation"**. This refers to practical implementation of the planned schedule by ensuring that all required resources are available and applying effective project time management. The importance of effective execution is evident from participant's comments such as DM in organisation B who stated that:

"It is not enough to have a perfect schedule. To be considered as a successful project, it should meet certain deadlines and pass all phases on the agreed and planned schedule".

Hence, to direct the schedule execution, each activity in the project must have a definite start and end date. Project execution schedule should be monitored, and any variation should be identified and highlighted as soon as it appears. This refer to the fourth subtheme/process identified here, **Controlling Project Schedule**. This indicates the views of the participants regarding the changes that are sometimes required to be made in the project scope, resources, or allocated time. Unlike the responses to the Control Scope, the responses from the participants of the focus group were more centered towards the same view that some variations in the schedule are normal in a project and sometimes it is necessary. Accordingly, if the change in schedule is necessary it should be accepted. All the participants from both the organisations believed that the efforts should be made to complete the project on time, however, if there is a necessity for a change in the schedule, it should be communicated to all parties in the project and necessary approval should be obtained before making any variations in the schedule.

Hence, to complete a project "On Time", it is also important to have an effective project SOW which is desired to be the output of "developing project SOW" process at project initiating phase. Effective project SOW will be the main enabler for achieving the required outputs of "Scheduling Project Activities" process at Planning Phase, "Directing schedule Implementation" process at Executing Phase and "Controlling Project Schedule" process at Monitoring and Controlling Phase. Consistently, responses and Patanakul et al. (2010) identified on-time project as a key criterion for managing the effective performance and successfulness of the project. In support to Scarbrough et al., (2004), the responses highlighted that whenever businesses strive to obtain high-quality and effective performance, it increases the importance of understanding the time allocation given on project resources as well as completion of different activities.

4.4 THE ROLE OF THE PROJECT SOW FOR COMPLETING THE PROJECT ON COST

The completion of the project within the costs associated with a project allocated budget is also an important determinant of the project performance. The budgeting for the project allows the allocation of different types of resources, financial, equipment, human resources to the project and provides an estimate of the costs that will be incurred in completing each task in the project, as well as in completing the whole project. If the resources are allocated

properly and effectively, this helps in completion of the project within or as per the defined budget. It has been stated by the proponent of Organisation A that:

"The project manager needs to make a good plan that includes all deliverables and acquire the needed human, equipment, and financial resources and then monitor the effective implementation of the plan to enhance the chance for success."

Also, four key processes were found that were highlighted as vital to enhance the chance of completing the project "On Cost": (1) Developing the Project SOW, (2) Allocating Resources, (3) Directing Resources, and (4) Controlling Project Cost.

The Project SOW Development was a major tool, according to the participants of the focus group, to ensure effective allocation of resources in the project and successful completion within the budget. The significance of the project SOW development to effectively complete the project on cost is captured in many quotes such as the following quote made by the project management team in organisation A:

"The project scope of work is so important as an official document that includes in detail the project requirements and execution methods. This will help in identifying the required resources and allocate appropriate budget".

According to the comments of the participants, completing the project on cost will help in having a completed project that is strategically feasible. Accordingly, it is necessary to have a scope of work that is defined effectively in order to use it for effective planning, execution and controlling. Proper planning for the required resources, that is done based on the scope of work, will enhance the performance and help in achieving a successful project within the allocated resources. Effective planning at the initial phase helps the project in avoiding any unnecessary changes in the cost structure at later stages of the project. As highlighted by the contractor at organisation B,

"Project management plan is the base for planning the success. It includes schedule, resources, and execution management plans".

Effective "**Allocating resources**" process is based on two things: accurate identification of the available resources, and appropriate allocation of those resources. If all the available resources are not identified at the initial stage, it is not possible to achieve the optimal level

of resource allocation for the project. While the importance of effective planning for resource allocation has been established, it is also important to understand the significance of effectively using the resources allocated for each task, as well as for the whole project.

Even if the planning for the resources has been done efficiently and the resources have been allocated appropriately, the non-utilisation of the resources in the most effective manner will not lead to good project performance and successful completion within the specified time and budget. This indicates the importance of the "**Directing Resources**" process. Participants agreed that the availability of the resources is not enough to ensure the success of the project. At each stage of the project, the allocated resources need to be utilised optimally to serve a two-fold purpose, the project is completed successfully within the budget and none of the available resources are gone to waste because of inefficient utilisation as this wastage of resources can lead to increase in project costs indirectly.

If the resources are utilised effectively in the project, it also helps in controlling the costs from escalating, thereby leading to the important subtheme/process, **Controlling Project Cost**, identified in this performance criterion. While the participants acknowledged that some variations in the cost structure are normal and should be adopted if really necessary, they also believe that a change in the project cost, unlike the change in project scope or time, always leads to an increase in the original cost of the project. As highlighted by the comments of the project management team in organisation A: -

"Completing the project beyond its allocated budget means an increase in its initial cost raise in its depreciation and the production cost."

Therefore, the need for controlling the cost is more emphasised by the participants as compared to the need for controlling the scope or schedule of the project. Avoiding cost overrun and working according to the allocated budget is essential for project success.

Hence, to complete a project "On Cost", an effective project SOW needs to be available as enabler to do so. It will enhance the chance of effective "allocating resources" process at Planning Phase, "Directing resources" process at Executing Phase and "Controlling Project Cost" process at Monitoring and Controlling Phase. Responses and Edkins et al., (2012) investigated on-cost project as significant determinant, which influences the performance, effectiveness, and success of the project. Both literature and responses greatly supported the role of associated cost and budget for sustaining the constant standards of project

performance. Respectively, the responses showed consistent findings with Gido and Clements (2012), revealing that On-Time projects help the companies to understand the significance of budgeting and allocation of the proper cost in such an effective way, which enhance the profitability and project's return on investment (ROI). Likewise, respondents also agreed with the study of Jugdev and Müller (2005) demonstrating that successful project are enabled through reducing the incurred cost that must increase the project return as well as productivity. Similarly, findings and Kendra and Taplin (2004) define that projects executed without the proper budgeting cannot be considered as successful projects. On a similar note, the study of Kerzner (2013) also analyses the reasons behind failure of projects, and miscalculation or inadequate approach of budgeting is highlighted as the major driver that keeps hindering the good performance of the projects.

Other than the theoretical review, the findings of respondents highlighted the associated cost as imperative dimension which is included and explicitly defined within the project SOW to develop better understanding about adequate budgeting and other financial assistance. Use of an effective project SOW will support businesses to plan their deliverables, human, equipment, and financial resources accordingly toward a successful achievement of the project performance. In addition, direct implementation and executional process helps the project in avoiding unnecessary changes of initial cost structure, as well as later stages of the projects. In addition to this, the outcomes interpreted this implementation and execution as key approach that ensures the availability or accessibility of adequate budget to transform the resources into successful final project. The finding also identifies that control process support the businesses to bring some variations in the cost structure, depending on the necessities and project requirements that might lead the projects towards the successful and effective performance. Likewise, the analysis of the respondents has also highlighted the significance of controlling certain budget for each activity or project deliverables.

4.5 THE ROLE OF THE PROJECT SOW FOR COMPLETING THE PROJECT ON STRATEGY

The final project performance criterion highlighted by participants was the completion of the project "on strategy". A project strategy involves defining and agreeing on the project goals at the organisation level and for providing guidance to the parties in the project about how to undertake the different activities in the project in order to ensure that the objectives and mission of the project are met in accordance with the organisation's business context.

A project is considered successful if it adds value to the organisation and enables the company to achieve its long-term objectives. The creation of a strategy ensures that the project objectives are aligned with the objectives of the organisation and that the completion of the project will add significant value to the organisation. According to the collected data, to complete the project "on strategy", the following four identified processes need to be taken into consideration: (1) Developing the Project SOW, (2) Verifying Project Objectives and Expectations (3) Controlling Project Performance, and (4) Managing Operation Performance.

The project SOW development plays a critical role in achieving the successful completion of the project in terms of strategy. It is important to include the strategic objectives of the project in the project SOW because that will enable the organisation to achieve the project purpose and enhance the performance of the project. As the organisation B's contractor noted that:

"If project scope includes the organization vision and strategic objectives, then execution of the project scope of work is a means for meeting project strategic goals and achieving targeted success".

When the SOW for a project is vague in terms of ambiguity in the strategic goals, it is not possible to achieve successful project completion.

After having an effective project SOW which includes the project stakeholder expectations and serves toward achieving the organisation's long term objectives, it is important to verify and include expectations and objectives to project plans during planning phase which is highlighted here as **"Verifying Project Objectives and Expectations"** process. This constitutes an important component of the project performance with respect to project completion on strategy. The inclusion of expectations and objectives into project plans will give confidence that the project will bring significant positive differences in the existing business operations. As highlighted by the project management team at organisation B that:

"Any project will be considered successful only if it adds significant value to the company or if it serves in achieving company's long-term objectives. Taking this into consideration during the planning and execution will contribute in reaching there".

Likewise, the project management team of Organisation A highlighted that:

"Successful strategic project means it achieved its strategic goal or goals but this will not happen without careful planning and close monitoring."

In order to be able to convert the expectations and long-term objectives of the company into deliverables, it is important to first understand those objectives and expectations and then incorporate them into the planning for project activities. Following that the equally critical process of **Controlling Project Performance** constitutes the next subtheme for this study. After effective planning, the project manager needs to ensure that the work on the project is being done according to the specified plan by continuously monitoring the performance of the project and of individual tasks against the standards set in the planning phase according to the strategic objectives of the organisation. Furthermore, the monitoring of allocated resources and time is also essential to ensure that each activity or task is completed according to the resources and schedule to serve the strategic objective of the project which is usually to benefit the organisation through the introduction of new products or through increasing production capacity, or through the reduction in the cost of existing production.

The final subtheme highlighted here is **Managing Operation Performance which** refers to the achievement of long-term benefits after the completion of the project or the value that the business has gained with successful project completion. The true success of the project can only be measured when the benefits from the project after its completion can be evaluated. Participants were generally agreed that real success of the project is when it is able to meet the long-term objectives of the organisation and provides strategic value to the business after the startup. Even if the project meets all the other performance criteria i.e. it is completed on time within the allocated budget and the specified scope, if it fails to add value to the business, it is not considered as a successful project. This is endorsed by the comments from proponent in organisation B as:

"Some projects are completed on time, completed on the specified scope, and completed within its budget but after successful startup, it fails to add value to the organization and in some cases, it adds losses to the organization. Such projects are failed strategically".

Therefore, to complete a project "On Strategy", long term objective and stakeholder expectations should be included and clearly stated in the project SOW. Those need to be verified and incorporated in the project plan during the planning phase and the project performance has to be monitored throughout its lifecycle to ensure the desired performance.

Finally, closing of the project activity is not the end of the project performance measurement and in order to be sure that the project is achieving its strategic objectives, the long term performance after closing the project should be managed correctly.

In this context, Scarbrough et al., (2004) and respondent identifies on-strategy as a meaningful attribute which defines and involves the project agreeableness towards the strategic goals and objectives at the organisational level, ensuring the achievement in accordance with the long-term success and sustainability. Meanwhile, Shenhar and Dvir (2007) imply the positive impact of setting the clear set of strategies, which assists the organisations to direct top priority goals rather than consuming the time on short-term tactics resulting in temporary business benefits. The findings of this study support the outcomes of Skulmoski and Hartman (2010) which conclude that project without on-strategy criterion consumes more expensive resources out of the fraction and contributes comparatively less likely towards the accomplishment of organisational objectives. Moreover, it supports Williams and Samset (2010) who declare how businesses and organisations prioritise their different tasks and activities through on-strategy projects in order of their relevance to the project circumstances and situations required for extending their positive impact on the profitability and performance. The uniformity of the primary responses analysed the influential role of-strategy in project SOW development, which lead the businesses towards successful completion of the project in terms of high-quality, effectiveness, and successfulness.

This study argues that ending the project at the closing phase is not enough to establish whether it is achieving its strategic objectives. In this context, the last fourth key process suggested by this study is to manage the project outcomes by managing the long term performance after completing the project. Completing a project on strategy supports the businesses to develop most useful actions, approaches, and strategic techniques according to the objectives and expectations of effective project performance. The process provides the improved consideration on identifying the relationship between strategy development and strategy implementation, as well as measure the impact on the overall project performance. On a consistent note, the findings have proposed the significant role in supporting the management to stop further pursuing the actions that are no longer delivering the superior value. Therefore, such scenario exposes more prosper entries to experience transformed strategies. The respondents also investigated direct implementation and

execution as the process that brings positive difference, as well as assures the transformation in the existing business operations through new effective strategic approaches.

4.6   PROJECT PERFORMANCE FRAMEWORK

The results of this study strongly support the existing literatures by identifying five major project phases: (1) initiating, (2) planning, (3) executing, (4) monitoring and controlling, and (5) closing. The respondents responses show that they are in line with the five process groups identified by PMI (2013) and the five different phases recognised by many authors such as Kerzner (2013) and Picariello and McDonough (2011) as significant aspects of successful project performance. Furthermore, Khang and Moe (2008) and respondents govern the role of project life cycle as vitalising framework to identify critical problems and issues as well as prioritise them over the complete process of the successful project execution. Meanwhile, the interview responses also support the fact that project managers use guidance from project lifecycle to tailor the project needs and transforming the high-quality performance. In addition to this, Mayer and Spieckermann (2010) and findings also investigated how the different phases of project lifecycle enable the businesses to follow guidelines and instructions, based upon the relevancy and size of the project. However, the findings of this study add one important dimension to the five well established project phases by highlighting the importance of operation phase. By definition, project is temporary where it should have a defined start and end and accordingly defined scope and resources. Because of that, the operation phase is not part of the project since it has an undefined end. While the operation phase is not part of the project lifecycle phase, it is an important phase for measuring the project performance. They argue that three of the key project performance criteria (on scope, on time, and on cost) can be gaged by reaching to the closing phase of the project, but the fourth key criteria (on strategy) can be gauged only at operation phase. This study supports the Shenhar (2004) argument by stating that taking care of all phases including the operation phase of the project can give comprehensive image for the project performance.

This study supports that the successful project is the project that is completed (1) on scope, (2) on time, (3) on cost and (4) on strategy. This finding is consistent with Narrie and Walker (2004) who argue that successful project should expand the focus of the three traditional performance criteria: on scope, on time and on budget, supported by studies such as Cooke-Davies (2002) to consider on strategy as a vital fourth performance criteria. Those four

performance criteria need to be taken into consideration throughout the project life cycle until it passes its operation phase. While Narrie and Walker (2004) mentioned "On Budget" as a performance criterion, this study uses "On Cost" instead. On cost refers to the appropriate cost that makes the project strategically successful regardless of its allocated budget. But at the same time, it is necessary to have as accurate budget as close to the appropriate cost in order to avoid project failure. While discussing the role of the project SOW in the project performance, this study brings to attention that the project SOW development process is the foundation for another twelve key project management processes   that need to be considered in order to achieve the desired project performance.

By exploring the project performance criteria, it was clear that the project SOW has a major role in determining the project performance. Respondents believe that an effective project SOW is the key enabler for achieving a project that is completed on scope, on time, on cost and on strategy. Both, literature review and responses from the participants have shown positive reflection on the imperative role of the project SOW towards the project performance. In accordance with the findings, Cole and Martin (2012) emphasise how more and more companies are adopting ways to use project SOW to maintain project performance with the compliance of contractual boundaries or union guidelines. Also, Baiden and Price (2011) conclude the fundamental contribution of SOW towards the completion of projects with high-quality performance and effectiveness. Additionally, the respondent's answers also supported the findings of Kendra and Taplin (2004) who continuously relate the role of SOW with the lifecycle of project management. The literature and analysis of the responses showed consistent outcomes that businesses usually face complications during the initial stages and project SOW helps the managers to deal with all the vital densities and riskiness, which are observed during the early stages of the project. The respondent's findings and the study of Gido and Clements (2012) explain the role of SOW in investigating the new opportunities and creating unique solutions for the complexities, faced with the globally competitive environment. Furthermore, the findings support Jugdev and Müller (2005) who asserted the imperative application of SOW in deploying effective techniques and resources to attain flexible, dynamic, and efficient outcomes; and Jugdev and Thomas (2002) who suggest the progressive role of SOW in identifying and using the resources to attain better project performance in the businesses. In line with the findings, the study of Merrow (2011) signifies the complexities and difficulties that businesses face in breaking down the project management to obtain a systematic approach for revitalising the project performance. Under this consideration, another study conducted by Patanakul et al. (2010) also indicates the

negative impact on the behaviour of project performance, in cases of businesses ignoring and overlooking the proper identification of project management phases within standard project SOW approach. In comparison to the findings, Skulmoski and Hartman (2010) suggestively recognise SOW as a strong foundation for businesses to improve the direction and existence of their entire project. Adjacent to this, Srivannaboon and Milosevic, (2006) also associate the concept of SOW with different partners where companies form strong, long-term relationships in order to sustain the high standards of their business performance.

As it has been mentioned in previous sections of this chapter, that Organisation A and Organisation B perceive success based on the four key project performance criteria which are scope, time, cost and strategy. This criterion is established by considering the thirteen key processes that need to be undertaken throughout the project lifecycle and these are shown in Figure 4.1. It has been highlighted in the study that both of the organisations generally agreed on the importance of project SOW for the performance of the project and they have consider it as an enabler for different project performance criteria and for successfully completing a project. The main contribution of this study is the framework that show the linkage between the project SOW and different project performance criteria and role of the project SOW in developing different processes through the project life cycle. This study identifies new and unique findings obtained through responses, which kept missing in the literature review by understanding the role of the project SOW in achieving each of key performance criteria and the associated processes to complete the project successfully.

The results indicated that the project SOW development which includes the project strategy and clearly defined objectives is essential for successfully undertaking the project and completing it within the acceptable cost and on schedule. The suggested frame of work shown in Figure 4.1 indicates that planning for the project scope, project schedule, and project resource allocation are the major activities after accomplishing an effective project SOW. Additionally, these activities allow a better understanding of the various aspects of the project like the mission and objectives of the project, the available resources, etc. In addition to that, the importance of project execution phase is also highlighted since it plays a significant role in the project performance. It should be ensured by the project manager that execution should be made according to the project scope.
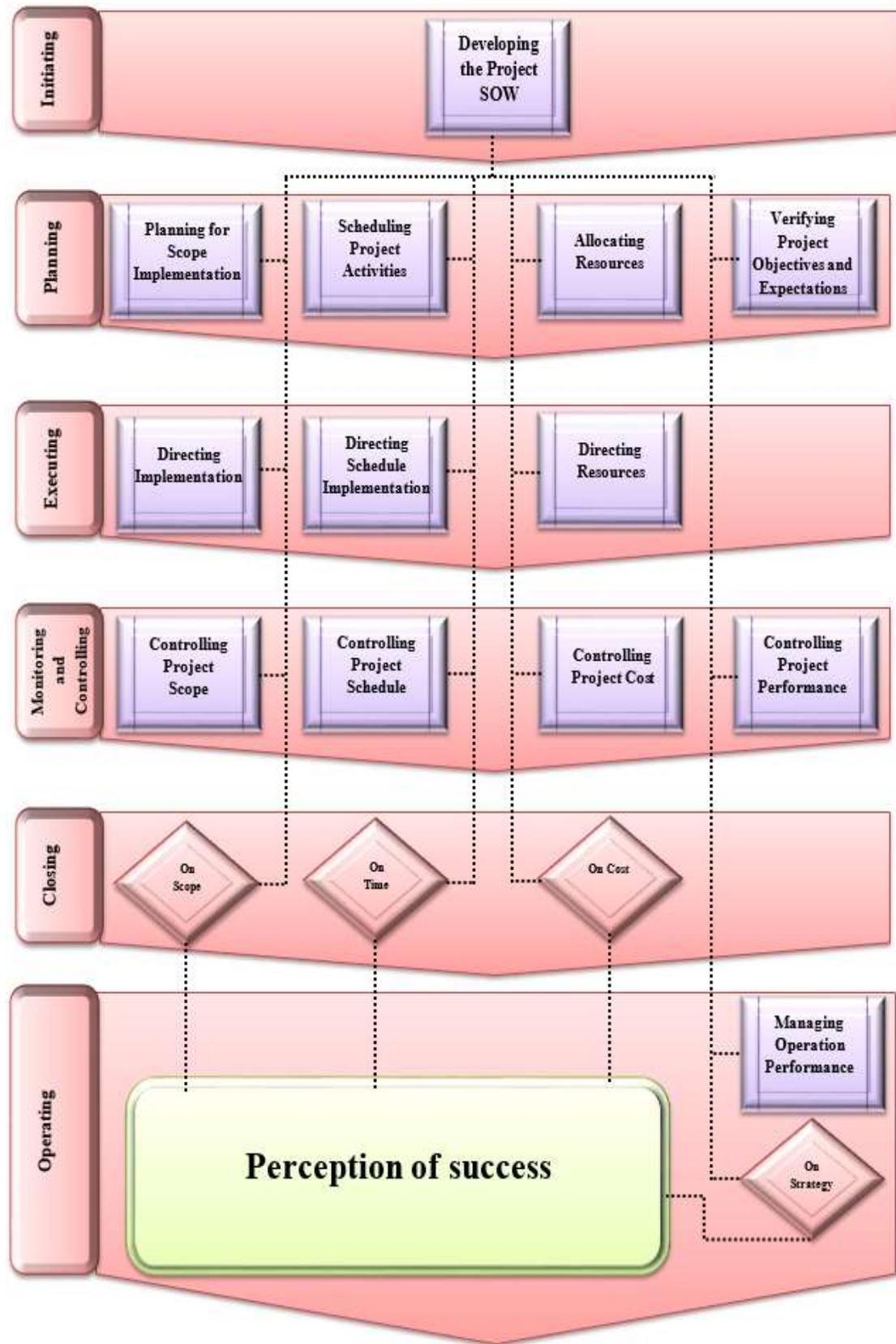
Figure 4.1: Key Project Processes for Perception of success

In terms of the controlling for changes in project scope, schedule, or costs at a later stage in the project, the participants provided mixed responses. Some believed that these changes should be controlled especially in the case of project scope and schedule as accepting these changes can lead to increase in completion time and may not lead to successful completion of the project within desired parameters while others believed that such changes in the project are normal and accepting that the manager should monitor the project for any possibility of such variations in the project scope, schedule, or costs and if deemed really necessary these changes should be accepted and adopted to ensure that the project is completed successfully. In terms of the role of project completion on strategy in project performance, the study suggested the need to manage operation performance in addition to the successful integration of project objectives with the organisation objectives and monitoring and controlling the project work performance. It is important that the project meets the long-term objectives of the organisation and provides strategic value to the business after the startup.

4.7   CHAPTER CONCLUSION

This study shows that an effective project SOW plays a key role in influencing the project performance. It concludes that an effective project SOW is the key enabler for achieving a project that is completed on scope, on time, on cost and on strategy. Briefly, there are thirteen key processes given to establish the criteria that must be undertaken throughout the project lifecycle to sustain the project performance where there are four processes underpinning each performance criteria in order to obtain the expected outcomes and results. As a vital process, SOW development process is the foundation and common practice to regulate the four performance criteria's processes as shown in Figure 4.1. It is necessary for the companies to consider the relationship between the project SOW, project performance criteria, and the role of project SOW in developing different processes throughout the complete project lifecycle and its operation phase.

This study gives additional support that project SOW is an important tool that enables different project stakeholders in understanding and managing different perspectives of the project. Having an effective project SOW is the key for successfully completing different processes through different phases of the project lifecycle and its operation phase which enhance the chance for having a project that achieves the desired performance criteria. The outcome of the study gives a comprehensive view of the project SOW that helps

understanding the theoretical framework for its role in the project performance and the related key processes that need to be considered in order to accomplish a successful project. This theoretical framework has practical implementation that help business to achieve their projects goals. The outcomes guide companies as to how the proper project SOW supports them to manage the project performance in terms of introducing more authentic ways to initiate, plan, execute, monitor and control, close and operate project processes. The findings also help businesses to incorporate project management lifecycle as common practice, which businesses require to learn new techniques and approaches for dealing with the business projects as well as their successful achievements.

The theoretical framework shown in Figure 4.1 shows the linkage between the project SOW development process and the project performance by the four identified key performance criteria: on scope, on time, on cost and on strategy by considering another twelve processes in different phases of the project that notably bridge the gap between ineffective project performance and effective outcomes from project completion. This framework which is developed as an important outcome of this study, is a step in filling the gap in the existing related literatures and may open the door for interested researchers to verify and critique the findings using different types of research strategies, methods, techniques and tools.

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CHAPTER 5

EFFECTIVE PROJECT SOW

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5   EFFECTIVE PROJECT SOW

5.1   CHAPTER INTRODUCTION

It was identified in the last chapter that project SOW is a key enabler of the success of the project no matter which stage the project is at and which performance criteria is considered. The data obtained highlights the importance of having an effective SOW as it is important for managing different processes at different phases of the project life cycle. After understanding the important role of the project SOW for better project performance, it was necessary to satisfy the second objective for this research by identifying the characteristics of an effective project SOW and the functions it supports. The definition of an effective SOW was the subject for the 2nd research questions of this study:

RQ2: What are the characteristics of an effective project SOW and what functions does it support?

The results show that participants define an effective project SOW from two perspectives: first in terms of its characteristics and second in terms of its supporting function. At the first perspective, participant's highlighted four subthemes: (1) SOW Formality, (2) SOW Usefulness, (3) SOW Content Elements and (4) and SOW Language Qualities. On the other side, by taking the project SOW supporting function in consideration, participants defend the effective SOW as the one that supports (1) Effective Decision Making; (2) Effective Risk Management; (3) Effective Planning; and (4) Effective Monitoring and Controlling. The findings and discussion for the four chainsticks for an effective project SOW and four functions it supports are described in the following sections of this chapter.

5.2   CHARACTERISTICS OF AN EFFECTIVE PROJECT SOW

The characteristics of the project SOW are said to be the main factors making it an effective element in the success of a project. Participants highlighted that an effective project SOW is the one that is formally developed to have effective content and uses effective language that makes it useful for all parties at all times. This definition from this perspective contains four themes which will be elaborated upon more below: Formality, Usefulness, Content, and Language.[7]

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[7] See Tables Annex IV- 1 and Annex III-2 in Annex IV for detailed examples of participants quotes that emerged from the four main themes.

5.2.1   SOW Characteristics: Formality

Since it is considered to be a written document that captures clearly and specifically the required work, it should be signed-off and approved by the concerned authorities such as project sponsor. Therefore, the formality of project SOW is identified to be the first characteristic that makes it effective. Participants at both Organisations point out that all parties should depend on only a written SOW and that should be formally approved and signed in order to be used as a document during different project phases. For example, DM from Organisation "A" define the effective SOW as "clear, specific and detailed written formal document….". In the same way, contractors' representatives define the effective SOW by stating that "effective scope of work is the written document that presenting all project requirements ...". Likewise, Organisation "A" Proponent, PMT and QART and organisation "B" DM, Project Proponent, PMT, QART and Contractors are all agreed that the primary requirement for any project scope to be effective is having it as a formal written document. Contractors' participants at both organisations agreed that they should deal with only a written approved document. Otherwise, there will be no way to resolve any dispute that may accrue during execution. Participants insist that there is no way to have it effective if it is not developed using formal procedures and accordingly written and approved formally. Having that formal written document will protect all parties and will facilitate execution and monitoring.

Formality as a characteristic gives indication that the project development process should follow a formal path where the project SOW development should start by a decision from the organisation decision maker like the project Sponsor or Organisation Executive Management and the produced project SOW needs to be approved by the decision maker. Formality explores the need for a qualified team leader/s and team members to accomplish this important document. Having a formal project SOW will give it the value that makes it effective. Formality in designing the project SOW can be reflected as a positive impact that assists the respective companies to fulfil the tasks, as well as obtain the objectives effectively. Compared to the findings, Hinkelman (2008), Marchewka (2014) and Kloppenborg (2012) are all describing the project SOW as a formal written document which makes it important for all concerned parties. In line with that, Fox and Waldt (2007) argued that project SOW takes official status only after approval and that makes it an important document that governs the operational and financial purposes of construction.

5.2.2 SOW Characteristics: Usefulness

As it is important to have a formal document that helps in initiating the project, participants highlighted the second characteristic which is its **Usefulness**. The SOW document should be good enough to support all potential users which include both participants of the supply side and participants from the demand side at all phases of the project lifecycle. The Project SOW should be **available and accessible** to all the concerned people of the project. Organisation "B" project Proponent add that having a written project SOW will make it available for all users at any phase of the project lifecycle. This will assist them to do their tasks correctly and quickly on the right time and this is what is called "effectiveness". Proponent of Organisation B states that:

"If it is good scope of work, it guides all concerns to accomplish the project objectives and the organization long term objectives as well as the completing project on agreed time and within its budget. "

One of organisation "A" contractors elaborate more while discussing this view by stating that:

"scope of work should have characteristics that make it easy to read and easy to interoperate by all parties and contains all rights and liabilities for all parties".

It has been analysed that easy to interpret and easily readable is one of the most important characteristics as it will ensure that all of the concerned parties of the project will know their rights and liabilities and as a result, they will successfully complete their specific job roles associated with the project. It was highlighted by the contractors and quality assurance review team of Organisation B that the project SOW needs to be useful for all parties at a different phase of the project lifecycle by assigning clear responsibilities.

Usefulness is considered as a fundamental attribute that helps the businesses to transform the effectiveness of their project practices, approaches, and techniques to obtain organisational success. On this related note, the respondents also confirmed how usefulness in project SOW has eliminated the meaningless and ambiguous functionality from the project's operations. This requires comprehensive and deep understanding of the project requirements and different project stakeholder expectations. Consistent with the findings, Amanwani (2009) argued that project SOW should help the project manager in managing the project at different phases of the project lifecycle. Similarly, Nielson (2009), Martin (2010) and Nutt (2007) agreed with this study that effective project SOW is the one that

assists the project manager to pass different phases of the project successfully. This study argued that the project manager is one of the key users of the project SOW during the project lifecycle but he/she is not the only one. There are several stakeholders such as the project proponent, project contract demonstrators that project SOW is important for them and it is necessary to take that into consideration during the SOW development process.

5.2.3   SOW Characteristics: Content Elements

The third characteristic highlighted was the Project SOW **content** which was considered an essential characteristic for describing an effective project SOW. As part of the focus group discussion, participants were requested to write down the main content characteristics of an effective project SOW. Collected SOW content characteristics were clustered into five key characteristics which are (1) Project Requirement, (2) Deliverables, (3) Owner Expectations, (4) Other Necessary Information and (5) Liabilities.   The clustered characteristics were emailed to the participants to confirm their perspectives. Figure 5.1 shows the different perspectives for different Organisation "A" and Organisation "B" project stakeholders.

Project requirements are settings or tasks that need to be accomplished for the success of the project. With those requirements, a clear picture for the work that needs to be done is provided. They should be intentionally meant to line up the project's resources with the organisation's objectives. It has been highlighted that effective SOW should include project requirements that are mentioned clearly and those should be comprehensive and specific at the same time. Comprehensive requirements mean to ensure that all project requirements are included with the appropriate level of detail, while it should include only "what is required and necessary for the project using the clear description of required specifications, required quantity, and so on". Site requirements, procurement requirements, the scope of supply, construction requirements, commissioning and startup requirement are examples for Project Requirements that are mentioned by participants. In the same way, most of the Organisation "A" contractors' representatives agreed that all project requirements should be clearly mentioned in the project SOW and those should be mentioned in detail. On the other hand, Figure 5.1 shows that there is no common agreement of having project requirements as a key content characteristic of an effective SOW.
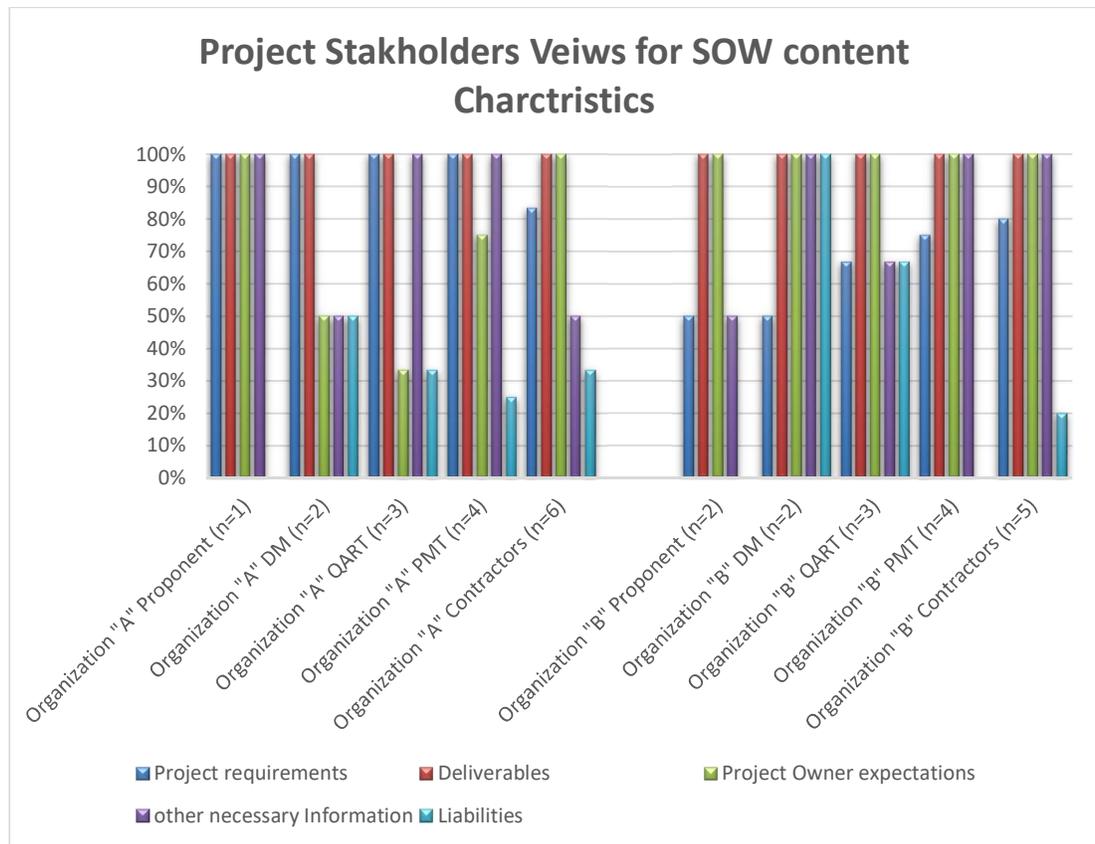
Figure 5.1: Project Stakeholders Views for SOW Content Elements[8]

The argument that project requirements is still included as deliverables and having project SOW that includes all desired tasks as deliverables means that it is including all project requirements. But some of them insist that project requirements may include some things that cannot be represented as deliverables and those are important to be included in the project SOW. Taking care of quality assurance procedure, security and work permit procedures are examples of project requirements but they are unconvertable into deliverables. On the contrary, others debate everything can be presented as a deliverable. For example, having a SOW that mentions clearly that the contractor should perform with zero accident, zero nonconformity and so on convert those requirements into deliverables. As a result, the project requirements are considered as one of the key content characteristics and it should be considered as one of the project SOW content elements.

Deliverables are products or services that are achieved and delivered to the project owner. Deliverable should be specific, tangible and measurable with due dates. All participants

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[8] See Table Annex IV-3 in Annex IV to see the Table that this Figure is developed based on.

from both organisations have a common agreement that effective SOW should have clear and specific deliverables. Specifying the desired and expected results and including them in the project SOW as deliverables that can be easily identified is important to enable all parties to plan, execute and monitor the execution and close out phases. To be effective, project SOW "should include all required and expected outputs and formed and presented in the project SOW as specific deliverables" and that is what is enabling the company and the contractor to achieve the purpose of the project execution. A detailed list for all deliverables including measurable required outcomes is necessary and considered the key content characteristics that good SOW should include.

Some of the participants argued that the purpose of having a project SOW is to identify the deliverables and if those are not stated clearly, then it is a useless SOW. Organisation "B" DM argued that:

"effective scope of work should contain precise measurable expected results and those should be introduced as deliverables that have a due date and is tangible, measurable, and specific".

Dividing the project into deliverable pieces will make implementation more workable. Organisation "B" PMT argued that it is their roles and responsibility of the project scope of work development process to "convert the project goals and desired outcomes into specific and clear deliverable". At the same time, those deliverables should reflect the expected performance and criteria.

The third element of the Project SOW content is the Client expectation. **Client expectations** refers to the perceived values or benefits that the client seeks as outputs of the project. While all Organisation "B" participants agreed that effective SOW should include all client expectations, it was found that some of DM, QART and PMT respondents from Organisation "A" are not considering that as one of the key content characteristics. All Organization "B" participants agreed that effective SOW should include a description of acceptable criteria, acceptable performance and performance measures. They also agreed that effective scope of work content should include: specific and measurable required outcomes, describe the expectations of the project and project requirements in detail; include a specific desired execution completion time table for each deliverable and milestones and overall completion schedule for the project. Project Proponent argued that at least "minimum operation and performance measurable criteria should be included" in the project

SOW. Having the organisation expectations in the project SOW is "must or otherwise, a lot of dispute that has bad impact of the project will happen during execution time".

"Specifying the acceptable performance criteria that meet the expectation" is considered an important deliverable that PMT should take care of during the project development process. Contractors' respondents assumed that any project SOW should have the project expectations were having clear "description of accepted performance and criteria is very helpful" for the contractor to do the required to achieve high client satisfaction. Contractors work for Organisation "A" projects debated that project SOW that has unspecified owner expectations, insufficient content describes acceptable criteria and/or undefined expected and acceptable completion time for each deliverable and milestone is ineffective project SOW. Project proponent and most of the PMT agreed with the contractor view in this concern.

Organisation "A" Proponent, PMT members and QART members and Organisation "B" DM and PMT and Contractors were showing insist of having a project scope of work that contains all of the **other necessary information** that may affect the project delivery method and cost. Organisation "B" highlights that "information that may impact the project delivery time and cost"; "organisation's procedures and policies"; "all technical data and specifications for required services and materials"; "accepted standards and execution methodological information" in addition to "inclusions or out of scope items" are all necessary to be included in the project SOW. Similarly, Organisation "A" argued that information such as quality assurance and quality control requirements and procedures; Safety, Health and Environment requirements, Security requirements are all necessary to be included in the project SOW.

Out of the 32 participants for the study, only ten (five for Organisation A and five for organization B) stated that effective SOW should describe all parties' **liabilities** and roles of responsibilities. Organisation "A" assumed that:

"Specifying liabilities and responsibilities of the contractor that assigned to execute the project and liabilities and responsibilities of the company that owns the project will help in reducing the dispute between all parties and will make the SOW more legal document".

On the other side, others debate that identifying liabilities is an important part but it is not necessary to be part of the project SOW. However, it should be included in the later stage while writing the project contract where more legal terms should be formed and included.

According to them, this will make the project SOW "more focus and give more attention to the project deliverables and requirements which are the core of any project SOW". Some of Organisation "B" QART respondents agreed that project SOW should give a clear description of liabilities and responsibilities in order to have a useful scope that helps all of the involved parties to understand their roles and act accordingly. One of the contractors' respondents supports that view considering the "clarity of responsibilities will lead to a clear plan and successful implementation". Even though this characteristic was considered the least important content characteristic, but it is still important to be taken into consideration especially that it is highlighted by the DM.

Content Characteristics	Description
Project requirements	✓ Clear, specific, comprehensive and detailed requirements ✓ Clear and specific performance criteria
Deliverables	✓ Clear and specific deliverables ✓ Specific millstones
Owner expectations	✓ Clear expectations ✓ Specific desired output ✓ Specific Desire execution time table for each deliverable and milestones
Others necessary information	✓ Clear Project Objectives ✓ Specific number and type of needed staff. ✓ Include technical information and required specifications and related standards ✓ Include related policies and procedures. ✓ Include quality assurance/Quality control requirements, safety, and health, environment and security requirements ✓ Include any other information that may affect the project delivery method or cost
Liabilities	✓ Clear description of all parties' liabilities, roles and responsibilities ✓ Clear inclusions and exclusions

Table 5-1: Content Elements for an effective project SOW

In general, participants agreed that the SOW content is a major part that has direct influence on the overall effectiveness of project SOW and in sequence the project success. As a result, an effective project SOW should contain five key elements: Project requirements, deliverable, Owner expectations, Other necessary information, and Liabilities. Those are listed and described briefly in Table 5.1.

The project SOW content should be comprehensive and include all the necessary details and include only that relevant to the project performance. Accordingly, content is acknowledged as imperative characteristic, which configure the precise and correct details of the project. Having those elements included in the project SOW can make it effective for many processes in different phases of the project lifecycle. There is a wide discussion regarding the project SOW content in the existing literature which are consistent with the findings of this study. For example, Dvir and Shenhar (2007), Dietrich and Lehtonen (2005), Clark (2007) and Martin (2010) pointed to project requirements as the major part of the project SOW and including them can facilitate the implementation. Others such as Adams and Barndt (1983) and Pratt (2006) argued that all project outcomes and millstones should be included and presented in the project SOW as deliverables items. In line with this study, Emery (2004), Naoum and Mustapha (1994), Macfarlane and Reilly (1995), Winch et al. (1998), Lee and Egbu (2005) and Reiling (2008) all assume that capturing the client requirements and their expectations and including them in the project SOW can help the project in achieving its target. In addition, the findings and Clark (1989) support the view that any relevant information that may affect the project performance, such as relevant standards, company relevant procedures and polices need to be included. Finally, study findings support Thiry and Deguire (2007) and Domont et al. (1997) who claim that parties' responsibilities and obligations need to be stated clearly in order to avoid confusion during project execution.

5.2.4   SOW Characteristics: Language Qualities

As it is important to highlight the key elements of the project SOW content, it is important to know the key SOW **language qualities**. Figure 5.2 shows those key language characteristics highlighted by different project stakeholders at both Organisations. After clustering different highlighted themes, those language qualities are summarised in five key qualities: (1) using understandable language, (2) avoiding ambiguity, (3) using correct language structure, (4) using proper presentation, and (5) using legal language. The first three qualities were found to be common between the two Organisations. On the other hand,

while "using proper presentation" is considered the fourth language quality for an effective project SOW at Organisation "A", it is not considered or highlighted by Organisation "B" and instead "using legal language" is highlighted as the fourth key quality.

A common quality that all respondents, from the both organisations, support is that the used language in writing the project SOW should be understandable to all potential users. **Using simple and easy to understand language** will make it a useful document and make it easy to interpret by all parties. Organisation "A" PMT members argued that having a SOW that understandable for all potential users is the most important language quality that project SOW should have. Project Manager agrees with that by stating that:

"I think that all of us should agree that the used language should be readable, understandable and easy to be realized by any reader and this is in fact so important characteristic for any project scope of work".

Likewise, QART members agreed that project SOW should be written in easy understandable words and statements. According to Organisation "B" DM, using "explicable language that makes it useable and useful for all users is a must" and the project SOW developers have to ensure that there is no difficulty to understand the used language. Also, Project Proponent agreed that useful project SOW means it is understandable for all possible users taking into consideration that it should remain understandable for all project phases. PMT members claim that use of complex language will make it difficult to implement the project SOW contents correctly. Hence:

"unnecessary complex way of writing its texts should be avoided and instead, it should use easy common language"

Also, Contractors argued that using common and understandable language will facilitate all later processes where project scope is the core for proceeding and this makes it important to have project SOW development team that practice using common language that makes it useable and understandable for targeted concerned readers or users.

Another quality that all participants agreed on is that SOW should **avoid using ambiguous language**. Project proponents claim that using ambiguous language can cause "project delay, amendment, cost overruns, and delivering less than desired outcomes". That make it necessary to avoid contradictory terms or statements that may lead to confusion of what is the real project requirements. Also, to avoid ambiguity, phrases or words that have multiple meanings should be avoided. Organisation "A" DM added that project SOW has to be free

of contradiction articles and statements in order to enhance the chance for achieving the project targets. To do so, used statements should be carefully checked and it should identify specific task/s with a specific responsibility.

"tasks should be clearly assigned by using a statement such as 'contractor shall do X task" to have clear instruction and avoid vagueness".

That is why using the correct voice to assign the tasks is important to specify the action taker for each task. Using the right voice to assign tasks will eliminate confusion and dispute between different parties and make it easy to complete the project successfully. In this regard, most of the participants at both organisations argued that passive voice has to be avoided and only present active voice should be used. Also, the right verb in the right tense should be used to ensure clear instruction for project requirements. To avoid ambiguity, used terminologies, abbreviations, acronyms, terms need to be defined in advance and when it is used several times, it should refer to the same meaning.
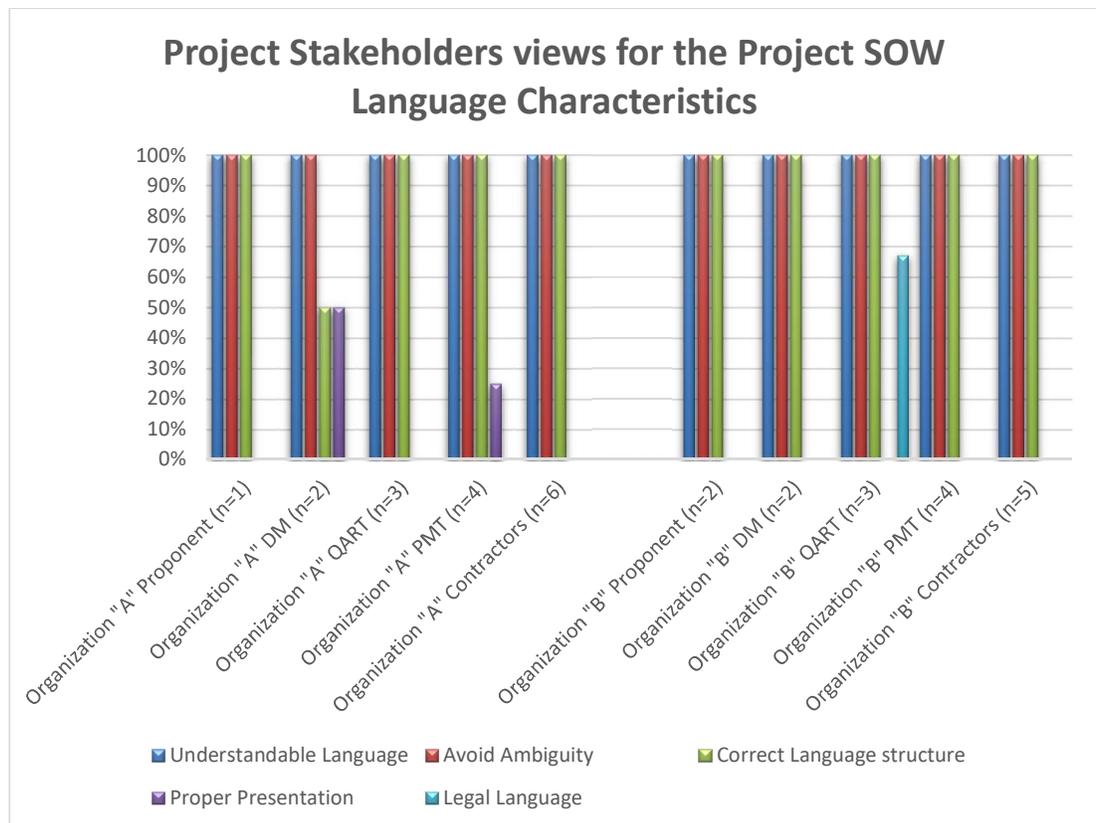
Figure 5.2: Project Stakeholders Views for SOW Language Qualities[9]

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[9] See Table Annex IV- 4 in Annex IV to see the Table that this Figure is developed based on.

Language Characteristic	Description
Understandable Language	✓ Use easy understandable language ✓ Use common terms and terminologies ✓ Avoid use of strange terminologies or terms/ and unusual use of words
Avoid Ambiguity	✓ Use present active voice ✓ Use clear instructions ✓ Use constant terminology to refer to the same meaning ✓ Avoid duplication, overlap and contradiction terms or statements ✓ Avoid acronyms and when it is necessary to use spell out acronyms and provide definition for technical, unique and abbreviation terms
Correct Language Structure	✓ Use correct and most appropriate simple language grammar ✓ Use correct and standard spilling format ✓ Use correct words and verbs to construct a clear statements and paragraphs
Proper Presentation	✓ Use proper presentation and writing structure ✓ Use for sections and subsections with appropriate numbering ✓ Use table of contents and appendices as needed
Legal Language	✓ Use legal terms as needed

Table 5-2: Language Qualities for an effective project SOW

One of the important language qualities that is highlighted by most of the Organisation "A" and all of the Organisation "B" participants, is **using correct language roles and structure**. Participants agreed that SOW should be free of language mistakes including both spelling and grammar mistakes. They argued that using the right language roles will help all parties in understanding their responsibilities. The argument that having a project SOW as a written communication makes it indirect communication, which reduces the possibility for the project SOW user as a receiver to the written massage to demand verification. So, the effectiveness of the project SOW as a written communication means it depends on the

correct use of vocabulary, spelling and grammar and this will make the project SOW comprehensible to the user, eliminating meaningless or ambiguous massages.

Language vocabulary, spelling, grammar, and even pronunciation, are the communication codes, and to maintain effective communication, writers should use standard codes that are understandable by the readers in order to ensure effective communication. PMT members debate that using correct standard spelling format and correct and appropriate language rules will help in producing more understandable and useful project SOW. Therefore, respecting and using the essential rules of grammar for developing the project SOW is vital and this makes it necessary for SOW developers to develop their technical writing skill that respects the correct language structure and rules. Otherwise, the usefulness of the project SOW will be missed:

"If I am driving with the wrong car or on a road that has no signs, I will miss my targeted place. Similarly using incorrect vocabulary, or wrong spilling is as I am selecting the wrong car and improper using of grammar is similar to drive on a road that has no markings and in both cases, you will miss your target"

Using **Proper Presentation** as one of the language qualities was highlighted only by two of Organisation "A" respondents and no one from Organisation "B". One of Organisation "A" PMT claim that having good presentation, guideline and table of content is important for the SOW user in order to facilitate reaching to the required information whenever it is needed. By the same token, one of Organisation "A" DM stated that the OSW "structure and presentation is important for easy deducting the required section and information whenever it is required".

On the other hand, the last quality characteristic that is highlighted by only two QART respondents from Organisation "B" is **using of legal language** while writing the project SOW statements and paragraphs. They argued that SOW needs to be "written in a way that legally protects all parties". They argued that SOW after awarding the contract is considered a legal document and it is necessary to use some legal terms as necessary to make it more lawful and powerful document.

Hence to be effective, the used language for the SOW should have qualities of: Understandable language, Avoid ambiguity, Correct language structure, Proper presentation, Legal language. Those are listed and described briefly in Table 5.2. Using the correct and appropriate language qualities will enhance the effectiveness of the SOW

content while it will be useless to have perfect content with poor presentation using poor language. The findings positively supported the role of language in developing an effective SOW because clear statement of project reduces the possibilities of delays, misconception and delusions.

This study assumed that using of understandable language that avoid ambiguity and use correct language structure and proper presentation and, if required, using legal language are the key language qualities that help in enhancing the project SOW effectiveness. The Findings portrayed the consistent understanding with many researchers such as Kerzner (2013), Phillips (2008), Dinsmore and Cabanis-Brewin (2011) and Cicmil and Hodgson (2006), who insist that the language used in the project SOW should be simple and appropriate that make it effective and useful. In addition, they agreed that the ambiguous and vague statements and words have to be taking in consideration to avoid contradictory interpretations by different parties or users. Also, the findings and Merrow (2011) signified that project SOW must respect the rules and guidelines using correct language structure respecting the language grammar and spilling, so it could make highly understandable and interpretable about the important sections of the information. Significantly, the findings signify the role of language as successful characteristic, which incorporate the explanations of short term as well long-term targets, particular instructions of clients, and project specification in most appropriate and understandable way. The study assumed that language pursues an imperative role in eliminating the amendments, cost overruns, and producing the outcomes less than the desired expectations. The results also noted that clear communication is an effective skill, which project SOW developers can enhance through using the appropriate verbs, necessary grammar, and clear statement or paragraphs.

5.3   SOW SUPPORTING FUNCTIONS

Taking into account the project SOW supporting function, participants argued that the SOW of the effective project is the one that provides the necessary support to the stakeholders of the project in question for effective decision making, risk management, planning and monitoring and controlling of the project.[10] The topics for this definition is described below.

5.3.1   SOW Supporting Functions: Effective Decision Making

Taking into account the first issue, **effective decision making** in both organisations, "A" and "B", all participants believe that the SOW project is a useful document for decision-

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[10] See Tables Annex IV-5 and Annex IV-6 in Annex IV for detailed examples of participant's quotes that emerged from the four main themes.

makers to make the right and effective decisions. Decision makers argued that they need to read the SOW project carefully before making the decision to approve or reject a project. Both organisations agree with the fact that the SOW project helps select a project from a variety of different projects. In addition, they agree with the part that, the more clearly, comprehensively and close to the reality of the SOW project, the better it is to prepare the budgets and the feasibility of the projects. Different participants agreed that the SOW project will provide a clear vision of the project and help all stakeholders to understand the feasibility of the project. For example, the project proponent states that:

"having a broad scope of work that actually meets real needs will help the decision maker to make the right decision based on the correct estimate and to act on the feasibility study".

In addition, the SOW project will help the organisation to approve the correct budget based on the exact scope of the project and the selection of the appropriate contractor for the execution of the project. In fact, it is a very useful tool to make the necessary decision in different processes in the formulation phase of the project. In addition, for a contractor to decide to participate in the bidding process or accept a contract for project implementation, it is important to understand the scope of the project to ensure the availability of the necessary resources. Therefore, the different level of decision-makers in the different roles of both parties, an organization that owns the project and the contractor, need to understand the project by reading their SOW in order to make the right and effective decision. The perception of both organisations reflects how the SOW project is a multi-way street among all stakeholders. In other words, all parties must be on board.

Taking this function into consideration, project SOW should include all necessary information that helps different decision makers. In line with the findings, writers such as Adams and Barndt (1993), Englund and Graham (1999) and Cleland (1999) are arguing that project SOW have to be comprehensive and clear enough to be an effective tool in hand of the decision maker for taking right decisions as imperative part of effective project management. They argued that having an effective Project SOW can help businesses meeting the need, demands, and requirements of the project completion. The SOW development process hence plays an integral role in deciding the action, approaches, and techniques for the formulation and integration of the effective project SOW.

5.3.2   SOW Supporting Functions: Effective Risk Management

Moving towards the second theme, **Effective Risk Management**, in both organisations, "A" and "B", it is seen that mostly both organisations treat project SOW as a means of not just understanding the risk associated with a project but also the cost that is attached to it.

"It will help the company to reduce the cost by reducing the risk cost that usually contractors add due to unclear scope"

The perception of organisation A reflects that SOW helps make sure that all uncertainties and risks associated with the project are communicated to the contractors before the bidding process is initiated. Similarly, the perception of organisation B is that conflicts are avoided and disagreements are avoided by a clear SOW. Furthermore, wrong implementation is avoided by carefully reading and understanding the project SOW – which must be clear and certain for communicating the implementation of the project. Finally, the perception of organisation A reveals that a well-defined SOW will safeguard both the client and the contractors – the clients by effectively communicating everything that is required and the contractors by limiting the requirements in writing – ones that cannot be changed by the client in due time.

Similarly, the perception of organisations B reflects how the SOW project is a protection for both the company and the contractor; something that can be used to hold each other accountable for actions. To conclude the effective risk management issue of the SOW project, both organisations have similar perceptions and the differences are non-existent in the current findings.

This study suggests that the effective project SOW helps the businesses to examine the uncertainties and conflicts, thus hindering the project performance. Accuracy and comprehensiveness of the project SOW help who concern to understand the possible associated risk and put the appropriate plan. In addition, having an effective project SOW will reduce the probability of conflicts between different project stakeholders and that reduce the risk associated with major change during project implementation. Taking into consideration that the project SOW will be an important part of any contract between the project contractor and the project owner, it should be effective enough to support the contract administration. In this regard, the findings and Lowe (2004) argue that the project SOW is a considerable part of the project contract. In line with this study, Martin (2010), Salisbury (1990) and Nkado and Mbachu (2001) assumed that limited project scope

information can cause uncertainty, and which make it costly and difficult to manage the associated risks.

5.3.3 SOW Supporting Functions: Effective Planning

Moving to the third supporting function that effective project SOW supports, **Effective Planning**, it was shown that both organisations give much credit to the SOW project for allowing effective planning of the global project including resources - financial and non-financial. The findings show that the perception of organisation A on this issue is like an equation in which a clear and well-written SOW would be equivalent to effective planning that would amount to successful implementation and project completion. Similarly, the perception equation of organisation B concludes that:

"good SOW can translate into a good execution plan; using SOW for planning would improve project completion successfully."

It was also seen, in the perception of Organisation A, that good SOW would allow effective planning of contractor activities through the definition of time and resources for each activity in an effective and realistic manner. In general, both organisations have attached much importance to SOW regarding effective planning, however, organisation B has a more "process-oriented" approach where SOW is used in each task and "throughout the project execution cycle". While developing a project SOW, the necessary information that is required for effective planning for the required resources, execution method and execution time needs to be included and presented clearly. Highlighting this function in defining the project SOW effectiveness provides additional evidence regarding its importance and its role in the project performance. The findings and Edward (2010), Cho and Gibson Jr. (2001) and Gibson and Hamilton (1994) suggest that detailed and clear project SOW is the key for successful planning which is a vital step toward an overall success of any project.

5.3.4 SOW Supporting Functions: Effective Performance Monitoring and Controlling

Finally, the fourth theme highlighted as supporting function that project SOW should have to be effective: **Effective Monitoring of Performance**. It was found that SOW is considered the guide to monitoring the different processes by different stakeholders.

"It is for the organization the guide to verify the performance during the project execution and the exit of the project during the project closing and operation stage"

The proponents argued that it is such a useful tool that was used up to the last moment of the project by all parties and it is so important to spend more time during the development process of the SOW project taking into account "the operation and maintenance inputs and the requirements in order to have an effective document " this helps the organisation achieve its objectives through project implementation.

While for the organisation "A" participant role QART, this theme means comparing the actuals with the required, for organisation "B" it means accounting for the not just the progress of performance but also the performance of the 'executers'. Moving forward, effective performance monitoring, on the basis of SOW, is helpful for all the involved parties from both the client and the contractors. This is done effectively where each task, throughout the lifecycle, is checked for its implementation relevance on the basis of defined guidelines in the SOW; this helps to protect the project from resources in the form of time or cost that can be incurred if in case the implementation has deviated from the requirements.

Project SOW that helps in keeping the right track of the project needs to have the right and precise specifications for the project requirements and desired outputs. It is necessary to have tools that enable the project management team to monitor the resources utilisation, compare the actual project status with the current status and to ensure that the delivered work is serving the project vision and its strategic objectives. The findings of this study and Cole and Martin (2012), Amanwani (2009), Benjamin (2007) and Cleland (1999) suggested that the project SOW is one of the important tools that gives the project manager the talent for effective monitoring and controlling throughout the project life cycle.

5.4 FRAME FOR EFFECTIVE PROJECT SOW

This study provides comprehensive definition for an effective project SOW. Interestingly this definition is providing significant guidelines for the project SOW development team to produce a SOW that helps the project to achieve its objectives. The findings and study of Gido and Clements (2012) undertake that good characteristics of project SOW reduces the vagueness in businesses and delivers high quality functionality of project processes, ultimately impacting the project performance and success. Also, in line with Williams and Samset (2010), the findings indicate that proper identification of the characteristics in project SOW helps the companies to reach the expected outcomes of the project with compliance of all the requirements of legal parties. As well as explains the clarity of responsibilities, which lead them towards successful execution of the complete project.
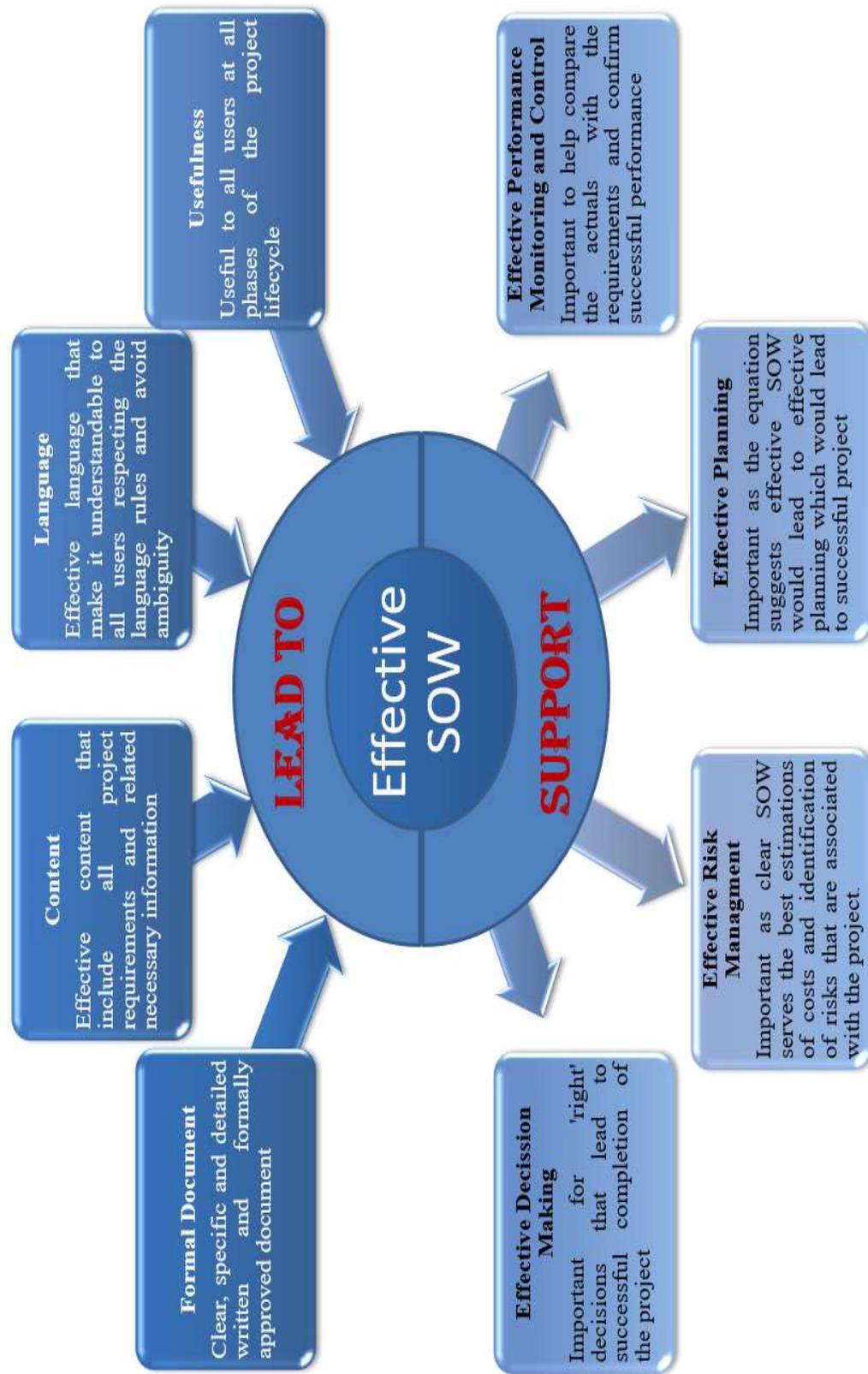
Figure 5.3: Characteristics of an effective project SOW and functions it supports

In addition, effective project SOW was interestingly defined from another perspective by considering its contribution to supporting important functions. Effective decision making, effective risk management, effective planning and effective performance monitoring and controlling were identified as the four key functions that effective project SOW is supporting. Even though this perspective is considering the hypothetical outcome of using an effective project SOW, it gives guidelines for the project SOW developer to consider those functions during the development process. These findings keep supporting the role of project SOW for effective project management by considering that it acts as a keystone for businesses, the more well-defined and exact it is, the more benefits it will yield. This perspective defines how effective project SOW contributes to project performance, leading the organisations to reduce the level of risk associated with the projects and turning the projects into ultimate success.

The results conclude that the starting point of having an effective project SOW is its formality which makes it an official document. This document needs to be useful and useable by different parties at different phases of the project lifecycle. In order to have it so, careful attention should be given to its contents and used language. Such effective SOW will have a positive influence on the project processes. To be considered effective it should support effective decision making, effective risk management, effective planning and effective performance monitoring and controling. Figure 5.3 summarises the findings presented in this chapter for defining an effective project SOW.

Hence, an effective project SOW can be defined as the one that is formally developed to have effective content and uses effective language that makes it useful for all parties at all times. To be effective, it should support effective decision making, effective risk management, effective planning and effective performance monitoring and control. This definition gives new logical sequence for the eight attributes highlighted by this study and prioritised them accordingly. The definition given by this study provides considerable guideline for the SOW development team in producing an effective tool for better project performance. It provides significant understanding of the SOW characteristics and the functions it is supporting. This can form a practical framework for checking and examining the produced project SOW to ensure that it will serve the purpose of the project. This framework helps the project manager, decision maker and concerned project stakeholder to distinguish between an effective and ineffective project SOW to ensure not to start the project without having a good project SOW as an effective tool helping in accomplishing different project phases objectives and project overall success.

5.5   CHAPTER CONCLUSION

The results of this study show that effective project SOW is defined from two perspectives: its characteristics and its support functions. Accordingly, an effective project SOW has four key characteristics: **formality** where it should be developed in a formal context and remain as a formal document through the project lifecycle; **usefulness** which makes it useful for any potential user at any phase of the project lifecycle; **content** elements which include project requirements, deliverables, owner expectations, necessary information and liabilities; and **language** qualities which include using understandable language, avoiding ambiguity, using correct language structure, using proper presentation and using legal language. On the other hand, effective SOW has four key support functions: **effective decision making**, **effective risk management**, **effective planning** and **effective performance monitoring and control**. Taking into consideration those eight significant attributes while developing the project SOW will enhance the effectiveness of the SOW toward better project management and performance.

The study results deliver comprehensive understanding for defining an effective project SOW which is adding a new perspective to the existing literatures. This is a significant contribution and can help interested academics, as well as professionals in considering those results while discussing and practicing project management. This study is not just providing a definition for the effective project SOW, but it offers theoretical assumption that there is linkage between these attributes and the SOW effect and impact on the project performance. These assumptions may encourage for other researches to verify and critique this assumption for some or all eight attributes, and items associated with them such as element characterising effective content and qualities characterising effective language, using different types of research strategies, methods, techniques and tools.

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CHAPTER 6

PROJECT SOW DEVELOPMENT PROCESS, KEY ENABLERS AND BARRIERS

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6 PROJECT SOW DEVELOPMENT PROCESS, KEY ENABLERS AND BARRIERS

6.1 CHAPTER INTRODUCTION

The answers for the first research question indicate the importance of the project SOW development process as a foundation for the sequence of processes that enhance the chance of completing the project successfully. Another essential objective for this study is to identify the SOW development process in two Saudi Arabian Oil and Gas companies and the enablers and barriers to its effective development. To satisfy this objective, primary data was collected during the second phase of this research in order to answer the third research question (RQ3):

RQ3: How are project SOWs developed in the Saudi Arabian OGS? Plus, what are the practical enablers and barriers for its development?

The findings show that the project SOW development process is considered an essential process as both organisations in this study are taking special arrangements to support development process in order to ensure that the desired outputs are met by the end of the process. The investigation indicates that the project SOW is developed in phases as part of Front End Loading (FEL) development where Organisations are taking special arrangements, allocating resources and assigned sufficient team leaders and members (with different roles) to do this process effectively. Before moving from one phase to the next phase, there is a gate or check point to check and assure that the deliverables from the phase are met and it is ready to proceed to the next phase. The findings show that the number and title of phases is differing from one organisation to another but the process are much similar. Commonly, the project SOW development process starts at FEL-0 and goes through FEL-1 and final frozen Project SOW is developed and approved at the end of FEL-2. Based upon the responses, three key enables were highlighted as the most important common enablers for developing an effective project SOW: (1) clear vision, targets, and objectives, (2) stakeholders' engagement, and (3) assurance review process. While, enablers are important for organisations, the absence of one of them (or more) can turn them into major barriers. On the other hand, the findings highlighted three key barriers as the most common barriers: (1) Absent of motivation system, (2) insufficient training program and (3) insufficient budget. The findings and discussion for the project SOW development process and its enablers and barriers will be the subject of this chapter.

6.2   PROJECT SOW DEVELOPMENT PROCESS

The data was collected from participants through individual talk about steps, procedures and phases   normally used to develop the project SOW. There were advantages and disadvantages of the current practice in addition to the group assignment during the focus group discussion where participants were requested to work as a group to develop and then present flow charts that showed the current practice used at the organisation to develop the project SOW (see section 3.3.5). Sheets from different focus groups in addition to the focus group discussion transcription and the notes taken during the discussion provided the researcher with important data, for comparing the data and this helped the researcher in constructing the model for project SOW development process. All figures used in this chapter and the related Annex were developed based on the analysis of the collected data as indicated within this paragraph.

FEL has been identified by Organisation A as a process which splits and organises the project lifecycles into different phases. Each of these phases tends to be organised in terms of defined objectives, deliverables, and activities. It has been identified that at each phase, achievement of the objectives is checked at the Gate or Checkpoint in a documented and systemised way. The project moves from one phase to its next phase only if the objectives of the Phase are accomplished. At each Gate or Checkpoint, the project's Business Case is defined and formulated, the associated risks are identified and mitigated, project execution plan strategies are evaluated, and management authorisations and guidelines are obtained. Before the Gate; "independent Value Assurance Review" is conducted to obtain additional assurance that the objectives of the phase are met and the project is ready to move to the following Phase. Participants agreed that FEL delivers a well-organised structured and controlled process that supports the overall control on project progress and decreasing project progress risk.

It has been identified that different FEL process is used by both of the organisations. In each organisation, there are different actors who play different roles in the organisation. The participants of FEL in Organisation "A" are Project Sponsor (PS), Integrated Project Team including Project Leader (Project Management Team (PMT) and Project Manager (PM) is used here to unify the roles names for the two organisations), Quality or Value Assurance Review Team (QART), Gatekeeper (GK), Decision Maker (DM), and Functional

Organisations/Departments (FO/FD).[11] These roles as shown in Process flow charts (See Figures 6.1 and 6.2) are the main driver for SOW development process.

The official process of FEL starts with the phase of Business Case[12]. At this phase, the activities are focused on the development of the business case by developing and evaluating economic, commercial and technical aspects of the project which are based on the "opportunity statement" which was issued during the process of FEL 0. The lessons learned and which are applicable to the project are identified by the PMT at the beginning phase in order to implement them. When these deliverables are completed then PS involves QART for the Assurance Review. The lessons which are learned during the phase are then formalised and they are placed at the lessons learned system of the organisation so that they can be used when they are needed in other projects.

On the other hand, the technological and economic perspective is also highlighted in the FEL study[13]. In the FEL 2 Study Phase, the activities are focused on the identification and analysis of the project alternatives by a technological and economic perspective. The FEL 2 starts with a meeting, where the PS and PM recap the key objective of the Phase to all the PMT members, and the outcome of the Gate, including management directions for the project.

At the beginning of the Phase, the PMT updates the Lessons Learned applicable to the project and implements them and updates the Project Charter. The core deliverable of the FEL 2 Study Phase is the Business Case that, focuses on the project's evaluation of alternatives. This shall include a description of the "project's alternatives with related scope". Technology alternatives, facilities related to the alternatives, civil works, and communications are examples of this important deliverable that found the base for the project scope of work. After completing all of the deliverables, PS involves QART for the Assurance Review. This phase does not require gate access but still, there is a check point called "Alternative Selection" (AS) which require the approval of "Capital Program Efficiency" and "Value Assurance" Department before proceeding to the next Phase. In the FEL 2- Design Basis Scoping Paper (DBSP)[14], the activities are focused on the selected alternative to forming project definition that has a final project scope. This phase has a long

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[11] Detailed description of these critical roles for Organisation A can be found in Annex V, Table Annex V-1.
[12] See Annex V, Figure Annex V-1 for list of deliverables of the FEL1-Business Case Phase
[13] See Annex V, Figure Annex V-2 for list of deliverables of the FEL2-Study Phase
[14] See Annex V, Figure Annex V-3 for list of deliverables of the FEL2-DBSP Phase

list of required deliverables which require more effort and time to accomplish them right. It has been identified that the core deliverable of this Phase is the DBSP that includes a frozen project scope of work.

The DBSP provides an overview of the physical location of the proposed facilities and the related interfaces; description of requirements for the constructability and logistics and expected issues such as accessibility to the project site and access roads and bridges load restrictions, identification and explanation of the extent to which existing drawings must be updated to reflect as-built facilities, the extent to which existing drawings are available in an appropriate format and the time required to modify existing drawings; physical design objectives or functions of each major project scope element; description of the general design bases; description of proposed facilities including the type of facility to be provided, and the related technical design basis, (e.g., the obligatory capabilities, capacities, etc.); and information on technology suppliers and licensors. At the end of the Phase, PS involves QART for the Assurance Review and the GK to schedule the Gate meeting. Also, as it is at each phase, the captured Lessons Learned from this Phase are recorded and included in the VIP – DBSP Lessons Learned Report and made available to other projects.

Organisation "B" also follows a similar process to produce the project SOW at the end of gate 2 of FEL. The FEL process "comprises several Phases separated by Gates". "Each Phase is characterized by a set of deliverables that need to be developed to support decisions at the following Gate". The Gate that is placed at the end of the Phase is a decision point where the Decision Maker decides the project's position and accordingly gives the decision to move on, recycle or cancel.

The flow chart for the development process of project SOW has been highlighted in Figure 6.4 and 6.5. FEL in Organisation B involves the following crucial roles: Project Proponent Representative (Project Sponsor (PS) is used here to unify the names of roles for the two organizations), Project Management Team (PMT) including project Manager (PM), Technical Support Department (Quality Assurance Review Team (QART) is used here to unify the names of roles for the two organisations), Decision Maker (DM), and Functional Departments (FD).[15]

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[15] Detailed description of these critical roles for Organization B can be found in Annex V, Table Annex V-2.

While analysing the SOW development process of organisation B, it has been identified that the process starts at the early stage (see Figure 6.6) when the organisation is seeking to invest in the potential opportunities which can be termed as profitable for the businesses. At this stage, the activities are focused to determine benefits which the business can achieve by acquiring these potential opportunities, potential risks which are associated with the particular opportunity and the importance of implementation of those projects. The vision and strategic objective of the organisation is aligned with the objectives of the project in "Opportunity for Investment" as it can provide clear justification for the selection of a particular project.

The "Opportunity for Investment" is found to be the most important part to ensure that vision and strategic objectives of the organisation are aligned with the projects which have been selected by the organisation. In addition, the "Opportunity for Investment" includes the organisation's investment strategies and plan and what of those can be met by investing in the proposed project. Another important content of "Opportunity for Investment" is the project scope as guidelines and objectives. The "Opportunity for Investment" is developed by the PMT with request and input from the Proponent. To pass this phase it should be approved by the DM at the end of FEL 0 at the initial gate called G0. If it is approved, then the project FEL process officially starts by moving to FEL 1.

FEL 1 activities are focused on the Business Case[16] development by developing and evaluating technical, commercial and economic sides of the project based on the "opportunity for Investment" that approved at G0. At the beginning of the Phase, the PMT prepare the project charter including project scope, project objectives, and project boundaries. Also, basic data requirements with the identification of the key needed information are prepared as an initial deliverable that helps in delivering the phase expected outputs. After completing all deliverables, PS involves QART for the quality Assurance Review. After the gate process is started by requesting QART to check the readiness to access the gate until it is approved by DM.

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[16] See Annex V, Figure Annex V-4 for list of deliverables of the FEL1-Business Case Phase
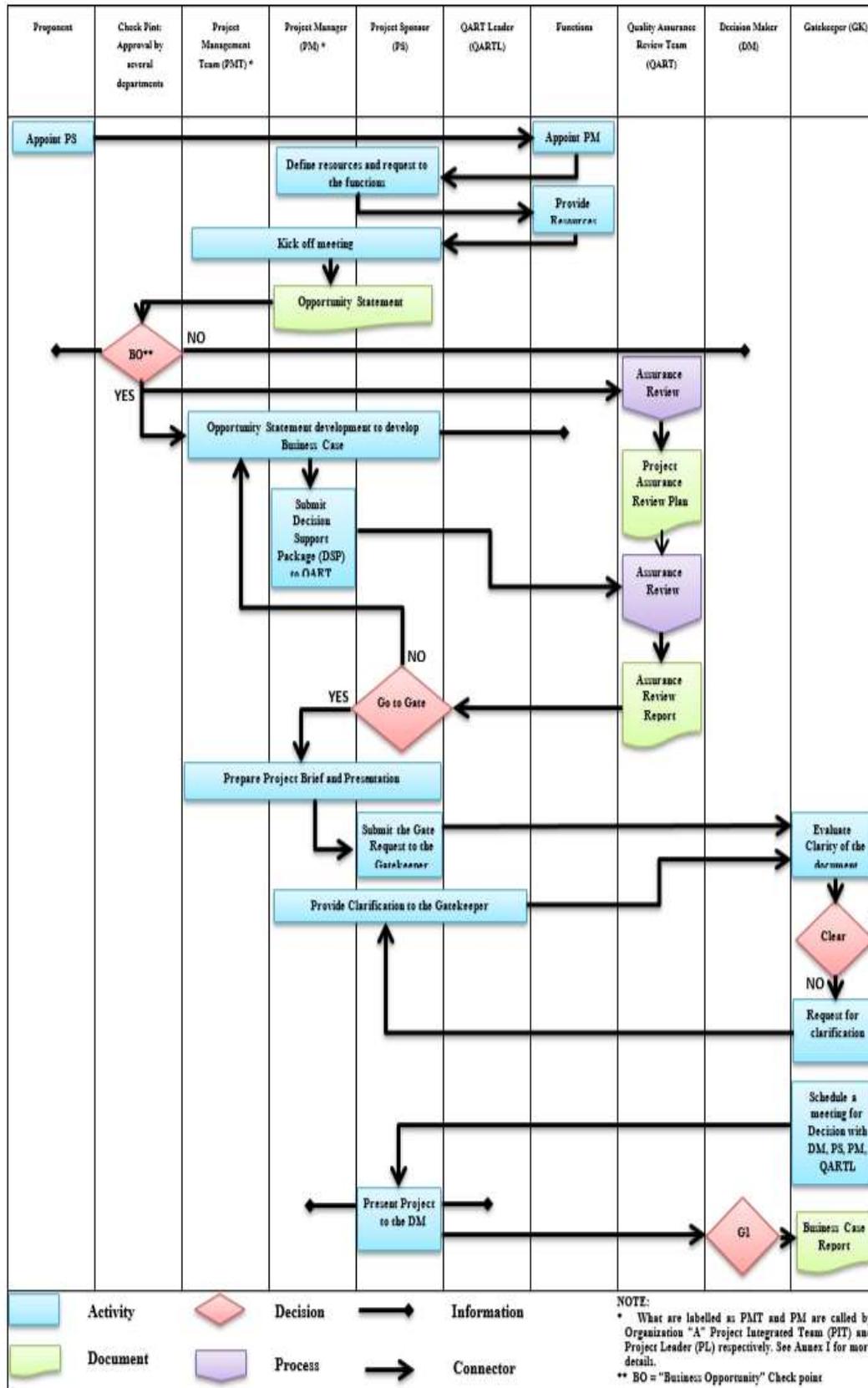
Figure 6.1: SOW Development Process @ Organisation "A" (Continued in Figure 6.2)
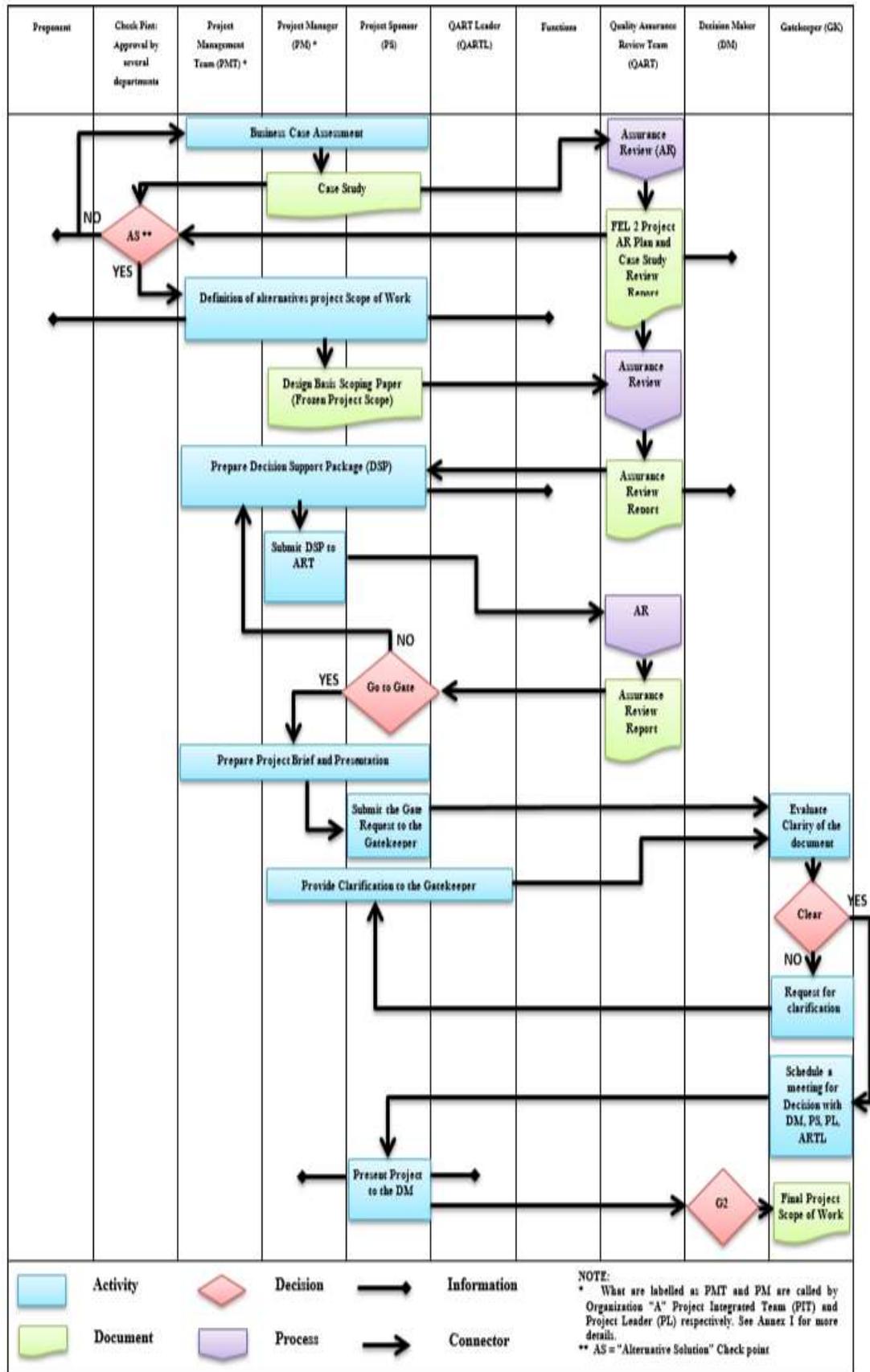
Figure 6.2: SOW Development Process @ Organisation "A" (Continued from Figure 6.1)
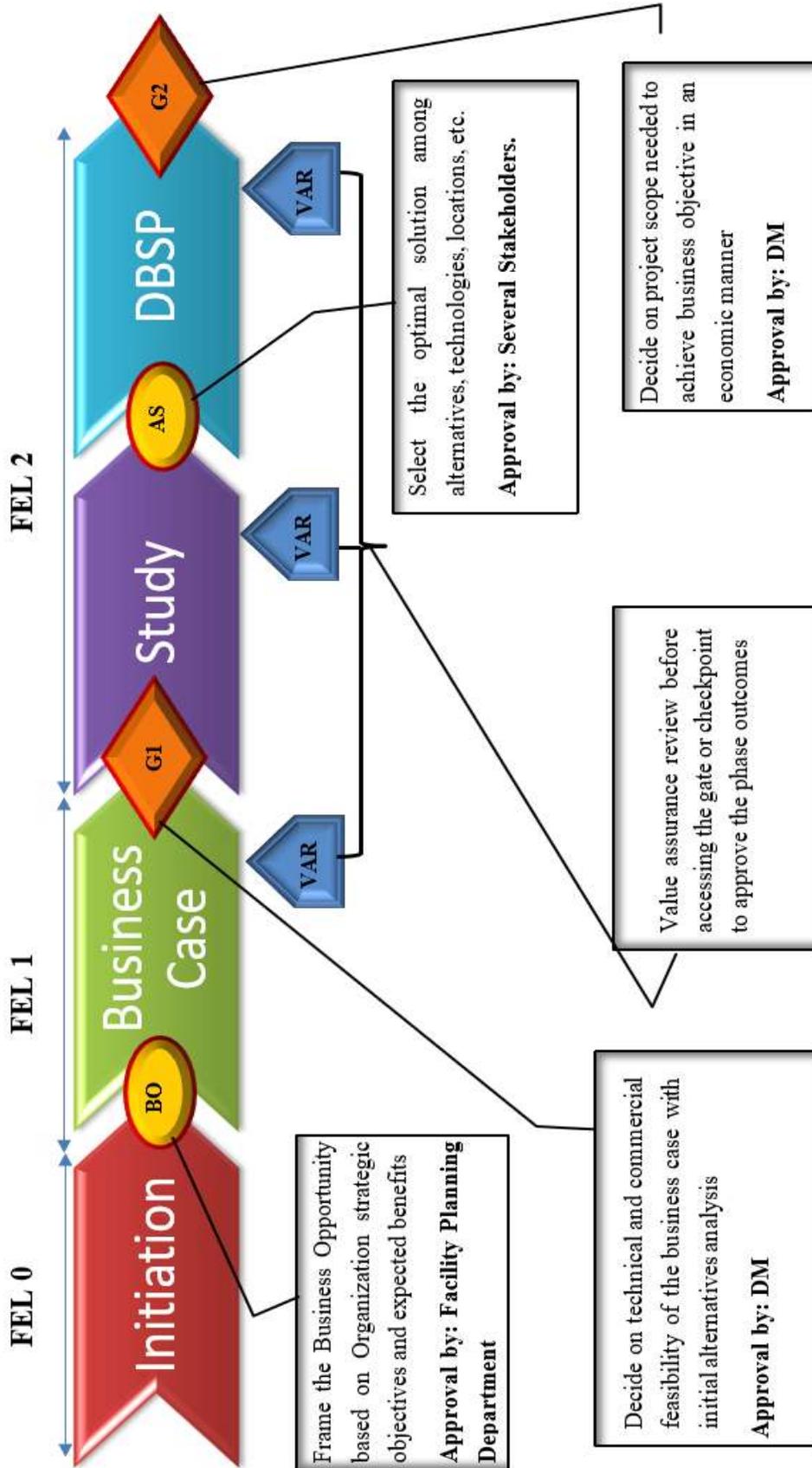
Figure 6.3: Phases for Project SOW development Process (Organization A)

In the FEL 2 Project Scope Phase[17], the focus is to identify the project alternatives by analysing available technologies and economic options and then to form a project definition based on the selected alternative to produce a final frozen project SOW. This phase is considering the core for FEL process and it includes many deliverables that PMT has to work hard to prepare them. The core deliverable of this Phase is a frozen project scope of work. At the end of the Phase, PS involves QART for the Quality Assurance Review and if all are ready to access the gate, QART coordinates the gate meeting schedule. The Project Scope is frozen if it is approved by DM at gate meeting G2.

Apart from highlighting the importance of Front End Loading, both organisations have also highlighted the importance of the initiation phase before starting the Front End Loading (FEL) process. This phase is aimed to see the available opportunities and accordingly select the project that helps in achieving one or more of the organisation objectives and then take the required approval prior to starting the official FEL process. While organisation "A" considers that there is no need to have Gate for Decision Maker (DM) and only a check point at the end of this phase is needed to be passed, Organisation "B" considers this phase as important as others and it is needed to be approved by the DM at G0 in order to proceed to the next phase.

In both Organisations, FEL 1 is consist of one phase where Business Case is developed. Also, in both organisation's, the final frozen project SOW is delivered at gate 2 (G2) at the end of FEL2 and accordingly the DM is taking the decision to proceed, cancel, hold or to recycle. While FEL 2 is only one phase for Organisation "B", it is two phases for Organisation "A". Identifying and analysing the project alternatives is considered to be done in a separate phase at Organisation "A" which is called "FEL 2 - Study" Phase. Then the final frozen project scope is delivered at "FEL 2 - Design Basis Scoping Paper" (DBSP) Phase. Similar activities are performed at Organisation "B" but by merging the two phases in only one phase. Figure 6.3 and 6.6 are showing the phases of project SOW development process for Organisation "A" and Organisation "B" respectively.

[17] See Annex V, Figure Annex V-5 for list of deliverables of the FEL2-Project Scope Phase
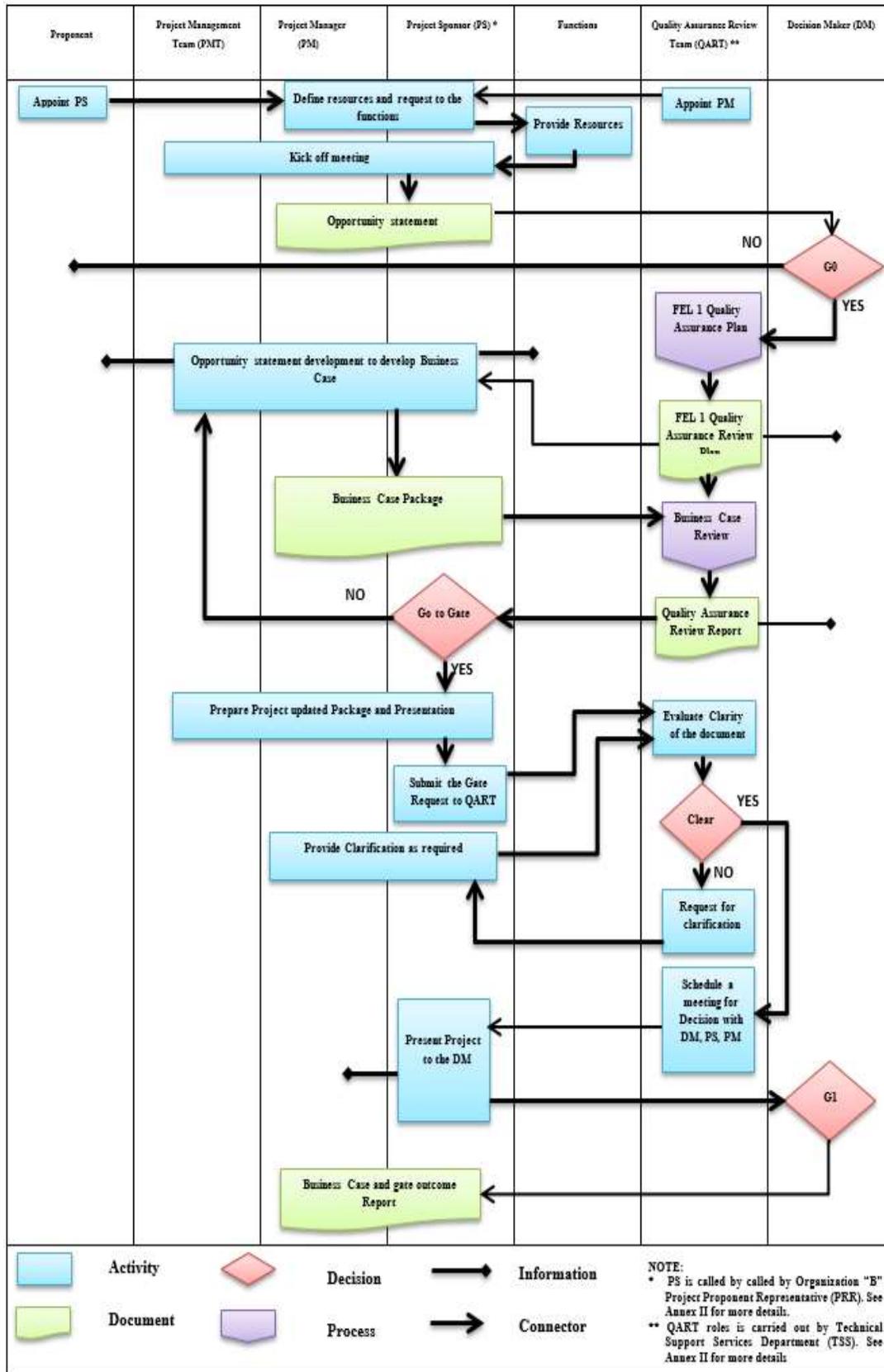
Figure 6.4: SOW Development Process at Organisation "B" (Continued in Figure 6.5)
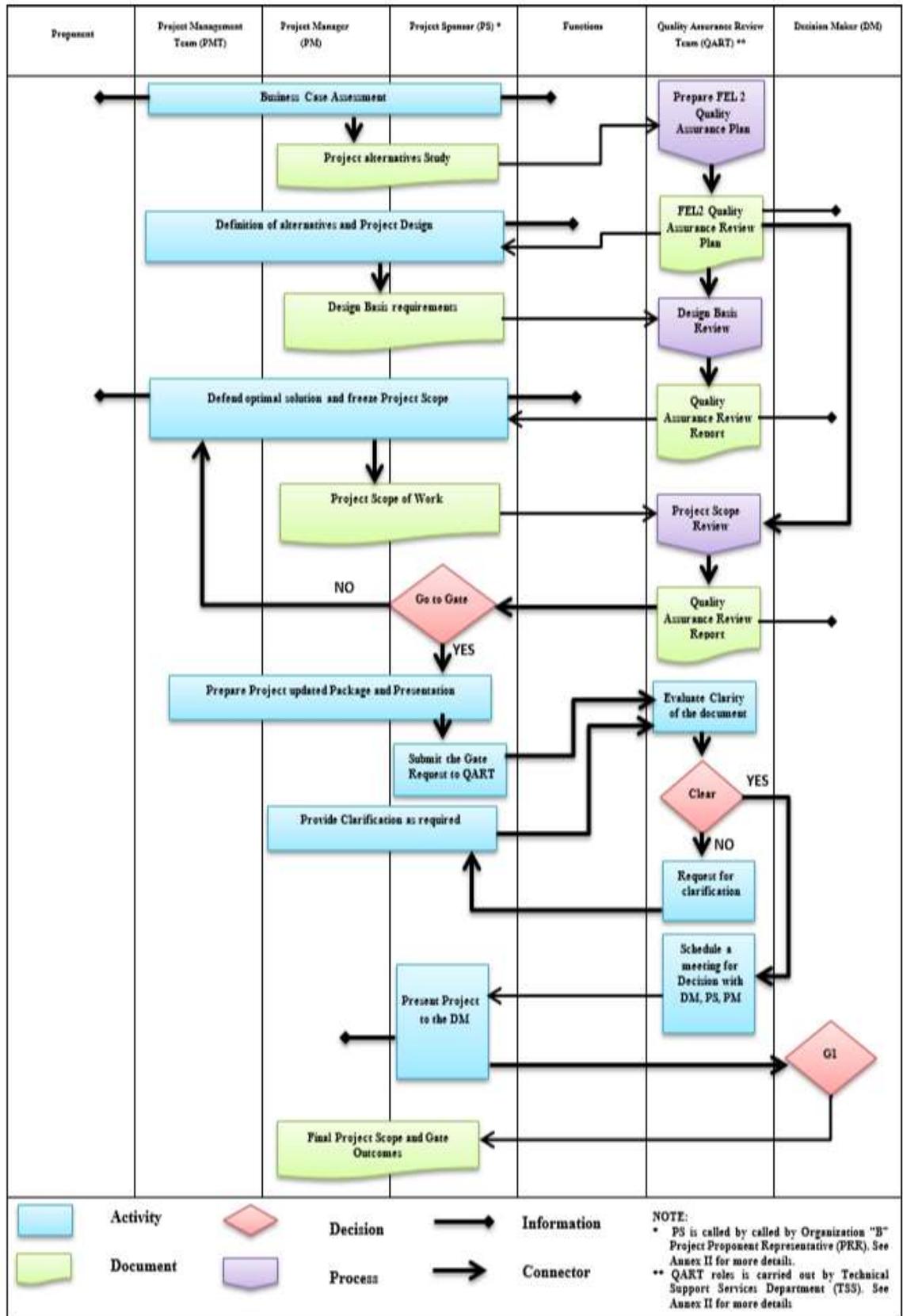
Figure 6.5: SOW Development Process @ Organisation "B" (Continued from Figure 6.4)
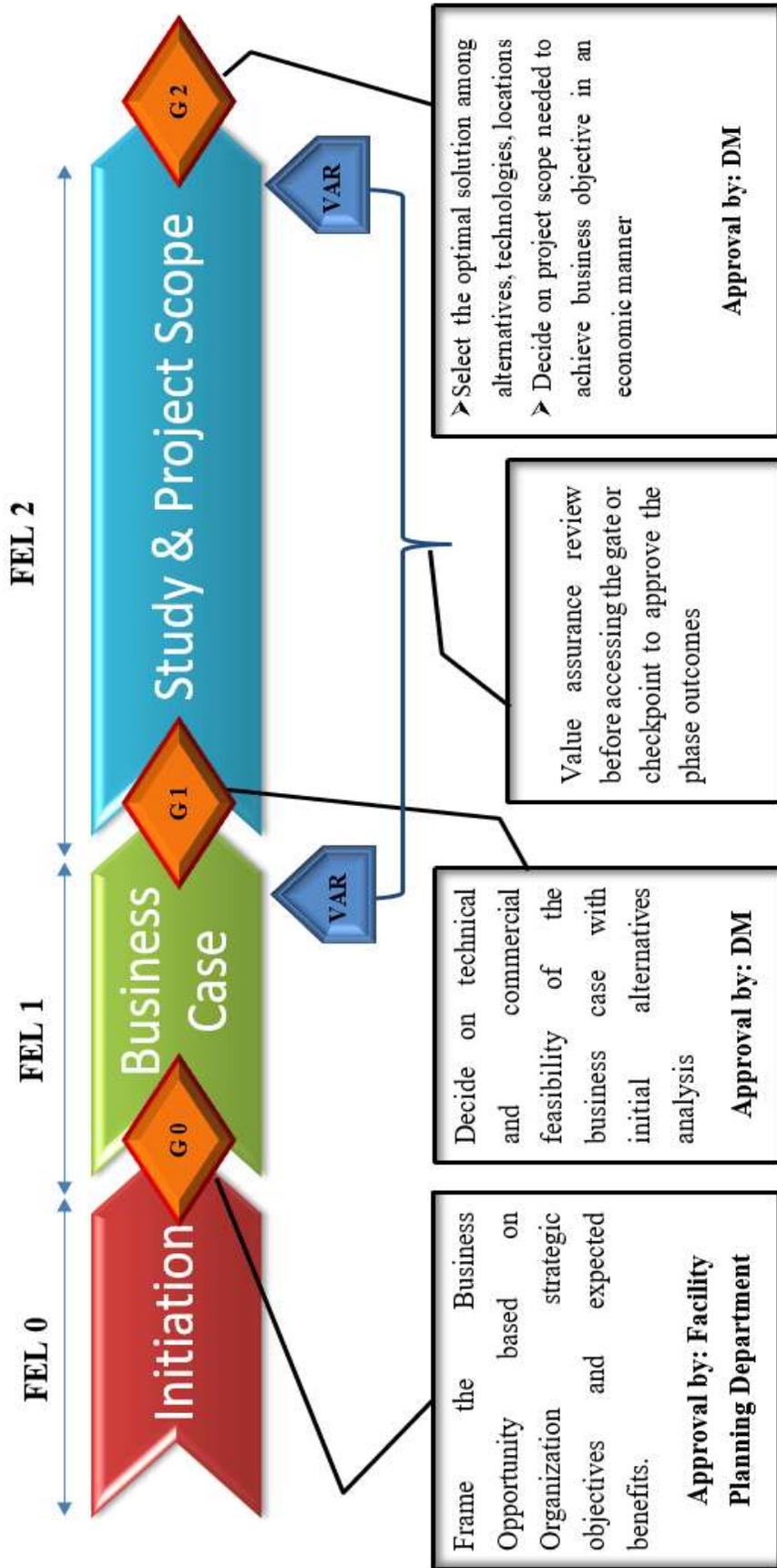
Figure 6.6: Phases for Project SOW development Process (Organization B)

This study indicates that organisations operating in the OGS in Saudi Arabia are considering the importance of the projects and the FEL development process and that encouraged them to spend effort, time and money to develop an effective process that guarantees the desired results. They do the necessary for having a documented and efficient procedures and instruction manuals for the project SOW development process and therefore provided all what is required to assure a proper implementation for these procedures. Both the findings and the study of Skulmoski and Hartman (2010) explained how organisations of the oil and gas industry not only finance the project planning and execution but also place strong financial investments for developing the project SOW. Regardless of total number of phases required to reach to an effective project SOW, each phase has its importance and it is necessary for each phase to have its purpose and deliverables. Merrow (2011) claimed that the three-phase FEL arrangement (FEL 1, FEL 2 and FEL3) shown in Figure 2.4 (see section 2.5) is the typical arrangement of such work process.

The results of this study support Merrow (2011) in that the project scope is defined and delivered at the end of FEL2. Also, the two organisations used for this study are using the Three-Phases FEL supported by Merrow (2011) for developing their projects FEL. But both Organisations which were subject to this study are adding an earlier Phase which is called "Initiation Phase" or "FEL 0" and this phase to be completed, passed and approved before the official start of FEL Phases. Organisations in the OGS use the "Initiation Phase" for formulating the vision and goals for the selected project and that should be aligned with the strategic vision of the company. This Phase, which is not considered one of the official FEL Phases but practically of great importance as its results will be the core for the later phases. Project Scope development process is passing several phases until reaching to a frozen project SOW. The number of Phases within a single FEL Phase vary from company to company and this can be justified in view of the size of projects. Merrow (2011) argued that there should be a gate at the end of each phase where DM should take the right decision according to the phase outcomes. This is completely supported by this study in addition to some checkpoints where DM approval is not required but still there should be special approvals from concerned departments. This study suggests that it is important before entering the gate to have an effective quality review and evaluation in order to facilitate the gate process and the required decision. The role of independent Value Assurance Process is to obtain additional insurance to meet the project's objectives through controlled and structured processes.

However, the literature lacks in investigating and determining the details provided by this study for the project SOW development process, this study provides the investigative and exploratory framework for answering the 3rd research question. This study assumed that FEL is a tool that delivers a well-organised structured and controlled process that helps the organisation in producing an effective project SOW. It is an imperative process that systematises into different phases in terms of activities, deliverables, and objectives. Meanwhile, the respondents also determined the major parties including project sponsor (PS), project manager (PM), project leader (PL), value or quality assurance review team (QART), decision maker (DM), gatekeeper (GK), and functional organisations/departments that play different roles and responsibilities for the development of an effective project SOW. In addition to this, the analysis of responses also identified how different parties are involved in the development of each phase to formulate and accomplish the desired outcomes. For example, at the gate of each phase, PS involves QART for the Assurance Review and the GK to schedule the Gate meeting. The findings also reflected how different checkpoints or Gates must be implemented in the SOW development process flow chart in order to achieve the project objectives in a systematised and documented way.

In-depth theoretical and investigative perspectives help the businesses to understand how organisations in OGS use FEL as a means to produce an effective project SOW. The findings provide the strengthening knowledge to the existing research that vitalises the companies to closely monitor the level of engagement and cooperation between different project stakeholders and the development team to create an effective SOW that fulfils their demands and business requirements. Notably, the literature along with the findings of the respondents supports the study arguing that the SOW development process is a driving force for project sustainability and success. Exploring the insight attributes, objectives, deliverables and the role of the involved teams, teams' leaders and other stakeholders for the SOW development process and its phases will assist the organisations in OGS in building effective system that helps in producing the desired outcomes of each phase in the project SOW development process. Remarkably, this study provides detailed flow charts for the project SOW development process with in depth explanation of its procedures and expected deliverables and objectives.

The practical model provided by this study for the project SOW development process affords organisations in the OGS with significant guidelines for implementation. The created model and related flowcharts and phase details can be used as significant materials

for couching involved and interested professionals. This enhances the knowledge about the subject. Even though, the study practical model for the project SOW development process was developed based on the research carried out in the OGS in Saudi Arabia, this model can be examined in different industries and different countries. The researcher assumes that the results of this study can be subjected to further research with different circumstances, industries and geographical locations.

6.3 KEY ENABLERS FOR PRODUCING AN EFFECTIVE SOW

While discussing the key enablers for producing an effective SOW, the participants from both of the organisations have listed certain key enablers. During the focus group discussions, participant's present and discussed the final agreed list of enablers. The final list was typed after the focus group discussion and sent to all participants by email to ensure that it was reflecting their opinions. According to the respondents' discussions, there are a total of nine key enablers in Organisation A and only five for organisation B. These key enablers are listed and prioritised, based on the responses, in Table 6-1 and the main participants' perspectives will be highlighted below.

Comparing the two organisations, there are three common key enablers which were agreed as important facilitators for the development process and those were ranked among the top key enablers. These include clear Project's vision, objectives and targets; stakeholder's engagement; and   assurance review process.

Key Enablers

Common for both organizations A & B	Organization A only	Organization B only
Clear Vision, Objectives and Targets	Clear documented and systematic procedures	Team work environment **
Stakeholders Engagement	Updated project lesson learning	Experience of assigned team
Assurance review process	Strong authority control	
	Clear roles and responsibilities *1	
	Sufficient human resources *2	
	Support technologies *3	
	* Missing of those enablers are considered Barriers for Organization B as shown in the below key Barriers table	** Missing of those enablers are considered Barriers for Organization A as shown in the below key Barriers table

Table 6-1: Key Enablers for SOW development

Well-defined vision, objectives, and targets were ranked at both Organisation's as the most important key enabler for project SOW development process due to its importance and its effectiveness on the overall outcome of the project. Organisation "A" suggests that:

"clear goal is the key to justifying the decision of starting the project formulation and that goal will be reflected from the beginning in the 'Opportunity Statement' where significant and key guidelines of project scope are identified"

Having clear vision from the beginning will help in identifying the project requirements that guarantee to obtain the desired outputs from the project and those outputs should be aligned to the goal of the project. FEL process is aimed to translate the project vision and goals into deliverables and this is exactly what is done during developing the project SOW. For example, if the company has the vision to be the leader in the oil and gas industry in the region it operates in, the selected project should have a vision that helps in achieving that vision and that vision should be clear and articulated to the SOW development team and accordingly the objectives and targets of the project should be highlighted to enable the involved teams to develop an effective project SOW.

Participants strongly agreed that having clear goals will help all involved stakeholders to ensure production of a SOW that contributes and guarantees to achieving those goals. In line with that, Organisation "B" agreed that well-defined vision, objectives, and targets will deliver a clear and mutual understanding of the proposed project and keep all involved persons and project Scope of Work development members focused on what is ultimately desired to achieve. On the other hand, by having unclear or undefined project's vision, objectives and targets, project stakeholders will be confused about the purpose of the project. Organisation B stated that:

"It will be too easy for the involved members to get side-tracked by proposing a scope that does not contribute to what proposed project was designed to accomplish".

Both Organisations agreed that the Management in any organisation should insist on having clear project vision, objectives and targets before starting the project scope of work development process and this will work as a great enabler to achieve the goals of the process. Hence, one of the most important enablers contributing to the project SOW development process is having a clear vision and clear objectives and this is what justifies the existence of the initiation phase prior to the official start of the FEL process. The findings reflect that

there are positive and progressive outcomes of involving the management in understanding and articulating the project visions and objectives since it is forming the process strategy for producing an effective project SOW.

Project stakeholders' engagement was found to be another common key enabler for developing effective project SOW because of the fact that stakeholders "have their stakes in the project's outcome". Both Organisation's agreed that there are different project stakeholders who are involved in this process and their involvement is important when they interact positively to contribute in producing an effective project SOW. Organisation "A' argued that project stakeholders have a lot of say before the project and even after the project so it is necessary to include them throughout the project; definitely in the most integral part of the project which is: development of an effective project SOW. They agree that engagement of the decision maker in this important process is giving support to enhance the effort for issuing an effective SOW.

Organisation "B" debate that:

"Decision Makers and key stakeholders engagement is one of the top drivers for project success and it is so important to have them involved in project scope development process"

They argued that it is important to have management that builds a culture that helps the project scope development by creating effective leadership, communication and development plans. Leading and monitoring the process to ensure that it is moving in the right way and achieving the targeted goals is an important enabler for the project SOW development process and that enabler will be more effective by engaging the organisation's top management in the process. Engagement of the Management Committee members and different project stakeholders will empower the involved staff in the development process to enhance their effort toward better productivity and higher quality.

Hence, the involvement of a strong team environment is the fundamental enabler for producing an effective project SOW. According to Schwalbe (2012), a strong team environment impacts the positive synergies of performing duties and responsibilities as well as creating firm engagement between employees, who collaborate to execute work within effective teams. The findings reflected ignore the support of management, however, increasing their involvement is the most challenging task but businesses need to deal with the challenge in the right approach for securing the effectiveness. In addition, the study also

scrutinises the positive impact of proper stakeholder engagement, which puts effective impact on the quality and value of the development of project SOW because core objectives properly to all the associated stakeholders of the project. In consistency with this study, Jawad, Ledwith and Panahifar (2018) claimed that top management involvement is one of the important enablers that helps development processes to deliver the desired outcomes. In contrast, a study done by Al Nasseri and Aulin (2016) concludes that insufficient support from the project stakeholders, poor decision-making regarding the process activities and criticality, and lack of effective leadership are barriers that impact the anticipated success.

Assurance review for each phase of the development process has been found as the third common enabler. Organisation "A"'s Assurance review team members argued that this is the most important key enabler for producing an effective project SOW. They claim that:

"without assurance review no assurance that the phase outcomes are meeting the project objectives and no assurance that the produced project scope of work is effective"

Others from Organisation "A" agreed that it is important to have assurance review for each phase until having a frozen project SOW, but this cannot be done without having clear project vision and goals and this cannot be done if it is not part of the procedure. Similarly, others argued that lessons from previous projects and stakeholder involvement are important factors for even value assurance team to ensure effective review for the active project.

Organisation "B"'s participants consider this the least key enabler but they argued that:

"the role of preparing the quality assurance criteria and then evaluate each phase to ensure that there is no deviation or nonconformity according to the quality assurance plan is so important enabler for the process"

So, having a department to give the required technical support needed and to monitor the outputs quality at each phase before moving to the gate process is helping both the team members who are involved in the development process and the Decision Maker to monitor and evaluate the process outcomes.

The findings for this study revealed the importance and significance of assurance review process contributing towards the successful completion of the project and effectiveness of the performance. The proper assurance review process assists the business in investigating all of the stages and processes of the project in terms of meeting the excellence criteria.

The availability of clear and documented systematic procedures has been considered by Organisation A as one of the key enablers for developing effective project SOW because of the fact that:

"systematic procedure covers the entire development process from Business Planning through Project Definition, Project Scope Development, Issuing Project Proposal and Execution to Operation".

Participants claim that those Procedures are a means to understand the process and to transfer knowledge among employees. Also, having documented procedure can be used to monitor the process and to ensure that nothing is missed during implementation. Project Scope of work development process is included as a documented procedure in "Front End Loading Manual" and those procedures are clear and comprehensive which make it a useful document that helps the involved persons understand their roles and responsibility and the required deliverables for each phase. In this regard top the management should recognise that the project development process needs to have high level of coordination between different processes and other related systems and procedures. Hence, it is required clear identification of the development procedures (Li and Carter, 2002; Kraus, 2007; Mehta, 2008).

After the availability of clear documented systematic procedures appears in the picture during the discussion of Organisation "A", the availability of the updated lesson learned from previous projects and recording the new lesson for future projects. This is part of the "Value Improving Practices" system and is important during the different phases of the project, including the phases in which SOW is developed. This helps maximise the value of the project by:

"aligning project objectives with business needs and systematically analyzing and adapting project scope, design and execution to minimize the life cycle and cost required to meet project objectives".

The availability of that updated learning lesson from the previous project and the recording of the new lesson for the active project are an important alignment of objectives and an effective tool for team building as it requires broad participation and interaction on the part of many Members of the project team. Participants claim that by looking at past projects and understanding the lessons learned from them, project team members will take that

advantage to apply the positive experience and avoid the negative experience for the active project. Similarly, the procedure requires recording the lesson learned for each phase and updating the system accordingly. This is considered a great facilitator to produce the final SOW that meets the expectation and includes everything that is required to ensure a successful project.

Organisation "A" respondents highlighted that the high control that the process has at different phases with different levels of authorities is positively contributed in producing an effective project SOW. According to the procedure and by using the system:

"activities are recorded and documented and before proceeding, required approval is obtained which build a very effective control system that assists in achieving the required outputs at each phase"

PS, PM, VART Leader, DM and some others are involved in controlling this process and they are actually taking the responsibility of assuring that each phase deliverables are met before authorising moving to the next phase and this enables ending with an effective project SOW.

Another key enabler highlighted by Organisation "A" is having roles and responsibilities for assigned participants in the SOW development process. Participants argued that for the teams to be productive it is imperative to take any necessary measures so that the timelines are met and deliverables are delivered. This can be done by assigning clear responsibilities for individuals and groups working to produce the desired output. Respondents argued that knowing the duty and who is in charge will make it more systematic and will help in achieving "the target much faster and much better". This finding is supported by the findings of Jawad, Ledwith and Panahifar (2018), and Muller and Turner (2007) arguing that assigning skilled and experienced team member should be associated with clearly defined roles and responsibilities.

Moving forward, Organisation A highlighted that to develop a project SOW, several phases should be successfully accomplished and to achieve so, a lot of human resources are involved. Organisation "A" argued that because of the availability of sufficient and qualified human resources within the organisation, and the ability to outsource on temporary base for those who needed whenever needed, this make the development process more effective and the productivity as required. One of the FO/FD responsibilities is to manage the resources

in the professional families. This involves providing the skilled and knowledgeable resources, in order to form the PMT in line with the PS and PM requirements. PMT is then taking the lead to produce the deliverables for each phase and finally delivering the project SOW is their responsibility. On the other side, PMT delivered work is evaluated by QAR Team and this team is another important human resource which is required to be able to develop an effective project SOW. Organisation A stated that:

"Having sufficient human resources will ensure smooth development process without affecting other business operation".

Having sufficient human resource is so important in order to deal and handle management activities and that enabler directly impacting the speed, accuracy, and accomplishment of the project SOW. The existence of the supporting departments within the Organisation to support the development of the project SOW is very essential and significantly helps in achieving the best results. OGS's Companies need to create an organisational structure that takes into account the provision of the necessary support for this process by having specialised departments and qualified personnel. This study and Jawad, Ledwith and Panahifar, (2018), Mehta (2008), and Muller and Turner (2007) agreed that to deliver the desired output of the project management processes, it is required to assign skilled and experienced development team. However, "one of the most important, and sometimes most difficult, steps in developing an SOW is identifying and acquiring the appropriate resources to be part of the development team" (Martin, 2010, p. 50).

The availability of information and communication technologies is another key enabler that helps Organisation A for developing an effective project SOW. Most of the participants agreed that the existence of communication and information systems has clear impact on the systemisation of the activities, keeping records, acquiring information, facilitate communication and systemising approvals. They argued that:

"Company is spending a lot to keep communication and information systems updated using up to date technologies. This facilitates the communication and feedback between different project members and stakeholders during project SOW development process as it is necessary to stay on the track"

Some argued that communication and feedback still can be done effectively without using advanced technologies by stating that:

"All archiving and recording activities can be done effectively using manual archiving as it was used to be in the past"

On the other hand, others debate that the technology has become a must and in order to achieve the target in better and faster way, those must be available and used. Organisations need to provide and use modern technologies and systems with advanced methods and techniques as a means to support the project development process. Accordingly, the involved people have to be trained on the optimal use of these means. The existence of such means with special software dedicated to this process will be important enabler for the development process and will help in obtaining the desired outcomes. On the other hand, the absence of such means or lack of optimal use of them would be a barrier hindering the development process. Such means are playing an important role in making effective communication between the people involved in the SOW development process and helping in the conservation and management of information and facilitating the search process. Such means can add another advantage by helping in the smooth transfer of knowledge and keeping the record for learning lessons for best utilisation in later projects. Having and appropriately using technologies for sharing accurate and timely project data was highlighted also as an important enabler by some researchers such as Shu-Shun and Shih (2009) and Jackson (2010).

On the other hand, Organisation B highlighted two additional different key enablers. First that organisation "B" offers and that help in developing an effective SOW is the team work environment that organization create and encourage at the work places. Participants argued that one of the key benefits of having a teamwork environment is the ability to share information and exchange ideas among the team members. Sometimes, several potential approaches are available to achieve the project objectives and to select the most appropriate approach it is required to exchange and discuss them with others in a very healthy team work environment. As a team, each member can contribute by constructional critique for approaches to accomplish targeted objectives. This kind of collaboration both helps the project SOW development and gives involved project stakeholders and team members a passage to understand different ideas. Another key benefit of "teamwork environment" is that working as a team will help different team members to utilise their strengths and at the same time will help them to distribute the workload during the project SOW development process. This collaboration can help also in:

"creating a stronger and more skilled workforce where each member can tackle areas of weakness that he has and improve them by getting experience gained from others worked in the team".

Another key enabler for developing an effective project SOW that organisation B claims is the experience of team leaders and team members involved in the process. Respondents argued that because of the careful selection of PS, PM and PMT members, the process moves in a very smooth manner and the results are very effective. According to Organisation B:

"The selection criteria are important in order to be sure that the leaders and selected members are qualified and have the minimum experience required that makes the process of developing the Work Scope project more likely to achieve its objective"

The argument is that achieving the objective of the process depends primarily on the members who have the responsibility to do so. Their experience, knowledge and qualification are tools that they use during the development process to achieve the objective and establish the required results of each individual phase and global process. Respondents agreed that their organisation has the required highly experienced professionals who support the development process when needed. However, they claim that the number of existing staff is not enough to support several projects at the same time and this is considered as a barrier as will be highlighted in 6.4 below.

The highlighted enablers by the participants are not the only possible enablers that need to be considered by Organisations in order to obtain the best outcomes of the project SOW development process. The researcher assumed that success of this process depends mainly on the human resources participating in the SOW development. So, it is an important enabler to assign for this process people who are interested in addition to their qualifications and skills required for that developing an effective project SOW. The assigned people should have appropriate training programs that enable them to trust the related procedures and make them confident that they can add value by participating in SOW development process. Dislike or distrust of the development procedures in addition to the disinterest of the team members in participating in the development process is one of the important barriers as highlighted by authors like Mehta (2008) and Jawad, Ledwith and Panahifar (2018). Enablers such as effective leadership style used to lead the process activities can make the difference in the results obtained. Team leaders assigned to supervised the SOW process

activities have to lead their members toward focusing on a holistic approach rather than on the completion of individual activities. Building development team that works for the benefit of the team and for the objectives agreed on between the leader and team members is an important enabler for success. Also, it is important to enhance the proficiency of the team in managing scheduled activities and corrective actions required during the process to ensure effective management for the resource and time utilisation. Another important enabler that needs to be highlighted is the need for creating appropriate understanding of the interrelationship between different activities within the SOW development process and between the SOW development process and other processes in order to take them into consideration while developing the project SOW and making sure that SOW is able to help in facilitating those processes.

The results of this study provide a list of key enablers that support organisations in the OGS for accomplishing an effective project SOW. Meanwhile, the findings also strongly recommended how the enablers of effective project performance can turn into devastating challenges, which lead the projects to ultimate failure. Exploring this significant list after knowing the importance of having effective project SOW, will encourage companies in the OGS to ensure that such enablers are present in their organisations and do the necessary actions to have them available while developing the project SOW. The information about the key enablers support the study to investigate the core reasons that transform the effectiveness of the project SOW. In the context of the research, the clarity within the project's vision, objectives, and targets support the businesses to improve the understanding of employees with respect to their achievements and project's accomplishments. Furthermore, this clarity within the objectives and targets also guides the businesses to improve their decision-making in terms of effective project performance. In addition to this, the findings also assist the research to increase the understanding regarding the strong involvement and engagement of the stakeholders. The outcomes interpret the positive consequences of associating the stakeholders with the project performance and provide continuous guidance to the managers in ensuring the achievements of mutual goals. Meanwhile the constant reviewing and assistance of the development phases as well as performance will also support the delivery of the required outcomes.

In order to increase the knowledge, the research bridges the gap to acknowledge the significance of proper management, communication, and leadership that reduces the possibilities to raise the challenging problem in this significant process. In the context of the

research objective of effective project performance, the findings have assisted the study to deliver the significance of availability of sufficient and qualified human resources, collaborated with the project objectives. In addition to this, the findings also assist the study to investigate and transfer the understanding about the team environment that will establish the wide platform to the individuals for generating the unique ideas to make the project SOW highly effective. Further, the information also develops a supporting framework that assists the managers to adopt and support the innovative technologies and infrastructure, thus eliminating the development process' barriers.

6.4   KEY BARRIERS FOR PRODUCING AN EFFECTIVE SOW

As part of the focus group plan, discussion was conducted to identify the barriers for developing an effective project SOW. Table 4.16 shows the barriers listed, agreed upon by the respondents and prioritised, based upon the responses, with some words adjustments. The list was written after the focus group discussion and was sent to all participants by email to make sure it was reflecting their opinions.

The major key barriers identified by both organisation's include absence of motivation system, insufficient training programs, and insufficient allocated budget. While "Improper selection of leaders and team members" is considered the greatest barrier to developing an effective project SOW at Organisation "A", "lack of using common language" between people involved in the development process is considered the most important barrier at Organisation "B". Table 4.4 shows that both organisations considered the availability of seven barriers and they are common in three of them. Looking carefully at Table 4.3 and Table 4.4, there are three key enablers at organisation "A" that are absent at Organisation "B" and because of that, they are considered as key barriers for project SOW development process at organisation "B".

Those are: "Lack of sufficient human resources", "Lack of clear responsibilities" and "Absence of support software and systems". On the other hand, the teamwork environment is highlighted as an enabler for project SOW development at Organisation "B" while the absence of this enabler at Organisation "A" was highlighted as one of the key barriers as shown in Table 6-2.

One of the key barriers for developing an effective SOW, and concerned about the participants of the two Organisations as a common barrier, is the absence of a motivation system. It is argued that the availability of incentives can help increase the performance of

the members involved and raise the quality. In addition, this motivation system can help create a spirit of loyalty to the teams and to everyone involved in the development process. One of the participants in Organisation "B" stated that:

"participation in the development process will add additional work load to the participant without expectation of receiving any incentives as appreciation, make it unwanted assignment"

One of the "A" participants states that:

"giving the team members special appraisals, incentives, promotions and so…, using the motivational tools, things can turn around in favor of the project and the development process will be more effective and will produce effective results"

The motivational program for special incentives for those who have chosen to participate in the development process of the SOW project will be the motivation for achievement and creativity. Participants agreed that incentives could be in the form of valuable gifts, participation certificates, financial rewards, promotions or salary increases. To address this barrier, participants argued that organisations must develop a special motivation system that will help develop an effective SOW project. Nasseri and Aulin (2016) support this study by assuming that effective support for motivation programs is an important factor that helps in achieving the required objectives and targets. Additionally, they argued any motivation system has to be supported by well-designed training programs.

Key Barriers

Common for both organizations A & B	Organization A only	Organization B only
Absent of Motivation System	Improper selection of assigned team	Lack of common Language
Insufficient training program	Unarticulated project Vision	Lack of clear responsibilities for evaluation process *1
Insufficient budget	Absent of proper team work environment **	Insufficient human resources *2
	Limited time	Absent of support technologies *3
	** Missing enabler that Organization B has is found to form a brier for Organization A	* Missing enabler that Organization A has is found to form a brier for Organization B

Table 6-2: Key Barriers SOW development

The lack of training programs for the teams involved is another important common barrier. According to respondents, training is very important in this process and the presence of people who have received prior training on the steps and procedures to follow in the development process helps to increase the efficiency of the assigned members and increases their productivity and quality of work. However, some participants see this as a barrier related to motivation. For example, one of the "A" Organisation participants stated that:

"If employees assigned to take the required training programs, they will be more motivated to apply their knowledge during the project Scope of Work development process"

Participants claim that in many cases, employees consider the training as an appreciation of their performance and they show their happiness when they are selected for a training program. On the other hand, an employee who feels that there is no development plan or training programs for him, will be disappointed and demotivated to perform well. But aside from the motivation, training is important to increase the project team members' capabilities and enhance their necessary knowledge regarding the project life cycle, project management and project scope of work development process. Insufficient training programs, work as clear barrier to deliver the desired results in many cases. Organisation "B"'s respondents claim that their organisation:

"is falling short on the subject of training in general and thus also do not care about the issue of staff training in special programs for the FEL or project SOW development process and all topics related"

They debate that conducting training workshops on the steps and procedures for the project SOW development process is so essential for the participants before involving them in the real process. This will allow them to participate in the development process in a very effective way that helps in achieving the objectives of the process. Similarly, the results of Al Nasseri and Aulin (2016) study suggested that lack of education and training programs is a barrier that prevents the development of team members from obtaining the desired process's outcomes.

Lack of adequate budget to finance the project SOW development process is the third common key barrier that both Organisation's consider due to its effect on the required quality of the process outcomes. Participants complained that allocating limited budget for this process can lead to a negative impact on the process and its results. There are several

tasks that need financial support and those are essential tasks for the development process. It was agreed that organisation's should allocate enough budget for the development process in order to enable the assigned team to deliver high-quality product. Organisation B stated that:

"company must understand the importance of this process and accordingly should understand that placing of an adequate budget for this process will help in producing an effective project Scope of Work which will save a lot during project implementation".

Likewise, Organisation A stated that: *"If the allocated budget is limited, then it will be difficult to spend as required for organizing related meetings, workshops, traveling, consultation requirements and for teams' member's overtime to complete it on the required time"*

Respondents debated that limited budget can force the productivity of a team as well as project efficiency to decline drastically. Therefore, funding should be given proper attention to overcome such barriers.

Improper selection of leaders and team members was considered the most important barrier for producing an effective project SOW for Organisation "A". Organisation "A" participants highlighted that selection process should be based on clear criteria that takes into consideration the required skills, knowledge and experience that each member should have. Participants agreed that the development of the project SOW depends upon the assigned human resources who are carrying out activities and taking the responsibilities to produce a high-quality product of that process (e.g project SOW). Participants argued that improper selection of leaders such as PS, PM and QART Leader will lead to the improper selection of team members since they are not qualified to set the process requirements and the selection criteria for their teams. Participants claim that sometimes selection of those leaders are not taking into consideration the project needs and instead the selection is based on the relationships between those and the one who has the selection authority. Such a case makes the development process struggle with the lack of required qualifications and experience. In line with this, researchers like Jiang, Klein and Chen (2001) and Jawad, Ledwith and Panahifar (2018) assumed that lack of experience or assigning unqualified project development team is a considerable barrier for success.

Having clear vision and objectives was considered as the most important enabler for developing an effective SOW by participants representing both Organisation "A" and Organisation "B". But, Organisation "A"'s participants argued that it is not sufficient to have that clear vision and objectives only on paper or known only to the top management or project leaders. The argument is that project vision and objectives have to be articulated to all involved persons and concerned departments. Otherwise, it will be one of the barriers that affects the project SOW development process. They debate that it is the leaders' role to articulate clearly the project vision and objectives to their team members and to any necessary involved person in order to enhance their role of the project requirements during the development process. Absence of that will affect negatively the quality of the produced SOW.

"If goals are not articulated to team members, it will be equal to existence of unclear and ambiguity goals, which make it one of the biggest and highest ranked barrier for the development of an effective SOW"

This means that unclear project vision, and objectives will prevent the project team from understanding the required outcomes of each phase of the project SOW development process and that barrier was highlighted by several studies such as: Olawale and Sun (2012), Moselhi, Li, and Alkass (2004), Rozenes, Vitner and Spraggett (2004) and Jawad, Ledwith and Panahifar (2018).

Also, one of the very important barriers that makes it difficult to develop the desired project SOW, is the absence of strong relationship between the team members themselves and the team members and their leader. This barrier is highlighted by Organisation "A" while Organisation "B" highlights that the opposite is one of its key enablers. Organisation "A" argued that strong relationships and trust are critical elements in team productivity. Without them, "it is doubtful to obtain anything meaningful done by the team". But by maintaining good relationships, teams can undertake and accomplish all what they set out to do and even more. Building those relationships should start from the leader toward his team and it is essential to lead by example by showing team members how important is building the relationship between each other "by demonstrating his care and trust in them". The leader then needs to make an effort to assist and support everyone to build that relationships and trust by knowing each other on a personal level. But on the other hand, cliques have to be avoided and discouraged "especially if cliques are damaging the team's relationships, trust

and morale". Gathering team members from different functions and departments, will require effort and time to build a real team that believes in teamwork. In some cases, the weak relationships and weak trust between the gathered team members will work as a significant barrier from developing an effective project SOW. Therefore, it is necessary to overcome such barriers by creating and maintaining effective relationships that help in developing a good project SOW.

Organisation "A"'s respondents consider that project SOW development process is essential for the next phases of the project SOW and having an effective project SOW will enhance the chance of ending with a successful project. This essentially makes it necessary to spend all the required time, effort and resources in order to deliver the desired output. But it is claimed that:

"in many cases, management force to complete the development process in short time which is not sufficient to cover all process requirements with the required level of quality"

So, limited given time for completing the project SOW development process is another important barrier that in many cases top management is the cause of its existence. Each phase of the project development process until ending with a frozen project SOW should take its required time to ensure that its outputs are meeting the phase objectives and delivering all the expected deliverables to the required quality. Pushing to reduce the required time is counterproductive and works in the opposite direction of the favour of the project. Leaders and different management levels who are involved in that important process have to understand and work to overcome this barrier.

For Organisation "B", the first and the most important key barrier as per respondents' opinion is lack of using common language. The existence of a common language for team members and all others involved in the development process is necessary for developing effective communication between project team members themselves and between them and others who are involved during the development process. All of them agreed that the existence of a common language is necessary for developing an effective project SOW. In contrast:

"the absence of a common language is a barrier for doing the job at required effectiveness and speed".

Participants claim that the presence of experts from several countries is important for the company, but it represents a barrier in many cases due to the absence of a common language. The company adopts English as a common language for its internal communication, but "there are plenty of experienced employees, who are needed to be involved during the project SOW development process, are struggling with using English". Participants argued that some of them are unable to read or write in English and cannot even talk and exchange ideas or views with others which constitutes a significant barrier to do what is required during the project SOW development process. Participants suggested that it is necessary for the company to be aware of this barrier and to carry out an appropriate substitution so that all project stakeholders involved in the project SOW development process are fluent in English as the common language. Since English is adopted by the company as the official internal language that is used in its communications and documents.

Although assurance review for each phase of the project SOW development process was considered one of the key enablers for carrying out the process of project SOW development for the two Organisations, but the lack of clarity in defining the commander of the evaluation activities is considered one of the key barriers for Organisation "B". According to Organisation "B" respondents, it will be more efficient to assign a team leader and team members to do quality assurance review and evaluation tasks throughout the project life cycle, and this will be helpful for having clear vision throughout the project SOW development process. They claimed that:

"Existence of permanent members during the development process will help in better understanding of the project, careful attention to the quality of performed work, better productivity and faster accomplishment".

Conversely, assigning the quality review tasks to different people each time will give unclear responsibility, and longer time is required to complete the task. Participants agreed that this barrier can be overcome by selecting and assigning a team leader, as well as team members to carry out the assessment for each individual project. In this regard, Jiang, Klein and Chen (2001) and Jawad, Ledwith and Panahifar (2018) claimed that the lack of clear roles and responsibilities for team members can present a major barrier that reduces the chance of achieving the desired outcomes of the project processes.

Also, for Organisation "B", the lack of a sufficient number of human resources to handle and cover management of several projects at one time is highlighted as another key barrier

that has a direct impact on the accomplishment speed during the project SOW development process. Organisation "A" overcame this barrier and reached a position of having sufficient human resources which is considered as one of its key enablers. Organisation "B" argued that:

"organization projects considered medium-sized projects, but because of their number, it is necessary to have sufficient number of personnel to carry out the job as quickly as required and without overload that may lead to a lack of productivity, or may affect the quality of the desired results".

It was argued that the project SOW development process needs time and effort and that assigned people should spend and to do that efficiently which require a free mind and relaxed work environment. Because of lack of sufficient staff, employees assigned to carry out the project scope development tasks and activities are assuming that this is a secondary assignment and they have their focus on what they consider as original work responsibilities. Respondents assumed that this represents a real barrier which needs to be overcome by increasing the number of staff to avoid overload on staff, while carrying out the project SOW development process.

Absent of supporting systems and software were the last barriers listed by the Organisation "B"'s participants. The lack of providing system for recording, documenting, and archiving the development process results and related actions make it:

"difficult for involved or concerned stockholder to follow-up the progress in the development process and to know the status, only manual communication need to be followed which is not possible at all times"

Also, participants highlighted that the support system can help in obtaining very efficient approval system that allows to add comments and give documented feedback which helps all of the involved parties in executing their tasks more efficiently. In addition, the existence of efficient supporting software and system can help in saving learning lessons of each phase of the project SOW development process, and thus can be used in subsequent projects to enhance the capability of participants by learning from the previous projects. Al Nasseri and Aulin (2016) study and this study assumed that that absence of technologies is an important barrier that may prevent the development of team members from obtaining the desired process's outcomes. This study added that, the absence of such a system is a barrier for

smooth knowledge transfer and in sequence, a barrier for producing an effective project SOW as stated:

"The absence of a special system of projects and lessons learned from them makes the difficult process of knowledge transfer process and reduce the opportunities to learn from previous projects. The fact that the process of taking approvals and comments carried by hand makes a slow process accomplish tasks."

Human resources is considered the main driver for the project SOW development process and without the availability of sufficient qualified and skilled staff, the development process will not produce what is the expected as outputs of it. At the very basic foundation, it is important to have sufficiently qualified skilled staff within the organisation and then it is important to have and follow suitable criteria to select and assign from them to a certain project to participate in the project SOW development. While having sufficient number of qualified staff is considered an important enabler for producing an effective SOW, the lack of a sufficient number of staff can represent an obstacle that prevents in achieving the required outputs and that needs to be overcome if the organisation wants to succeed in the process of development of the project SOW. As the development process is mainly subject to the human resources factor, the management of this process is a process that requires expertise in human resource management. So, it is important to have qualified leaders within the organisation in order to select the most appropriate leaders for each specific project.

Careful and appropriate selection of team leaders and team members for handling the activities during the development process, in addition to the selection of the Management Committee members for directing the process and taking the decisions will help in reaching the correct results. On the contrary, having improper team leaders and team members, who are not selected based on professional criteria will be a barrier for producing the desired results of the process. Prior to the selection process for assigning team in the project SOW development process, there is an important process that organisations should take care of all the time. This is the recruitment process where selection of qualified persons is important during the hiring process. Also, it is essential to provide the appropriate training programs before assigning them to the development process and that training should be effective to qualify and enhance their skills in order to enable them to participate actively during the development process. The team leaders and DM have special importance in the development process where they lead to create a homogeneous team and can stimulate the participants

for hard work. The cooperation between the members and creating a healthy work environment can only be achieved by having a clear vision and a unified goal that all involved persons working together to achieve. It is necessary to generate a feeling among all concerned that the success of the process is a success for everyone who participates, while not reaching the required results is the failure of all. Since the process is done through the formation of various working groups working together to achieve the objective of the process, such arrangement is similar to small organisation that is working on a temporary basis, and assigned people in such arrangement need to be treated well. The presence of incentives and motivation system is important and will help in motivating the staff for more productivity, high performance and high quality.

Correspondingly, the findings have assisted the researcher to explore the challenging attributes of insufficient training programs, absence of motivation system, and insufficient budgeting. Since, the literature lacks in providing the in-depth information about how they are influencing the effectiveness of project SOW. Therefore, the findings assist the study to explore the techniques and approaches that support the motivation level of employees to fulfil their responsibilities with full potential. Also, the findings have provided the practical evidence from the organisations about the importance of identifying and implementing the effective project training sessions. Additionally, the study provides better understanding on how the better competence, skills, and intellectual capabilities support the employees and managers to meet the requirements of the effective project completion.

6.5   CHAPTER CONCLUSION

In the Saudi Arabia OGS, the project SOW is developed in phases as part of FEL development where organisations are taking special arrangements, allocate resources and assign sufficient team leaders and members with different roles to perform this process effectively. Before moving from one phase to the next phase, there is a gate or check point to check and assure that the deliverables from the phase are met and it is ready to proceed to the next phase. The findings show that the number and title of phases is differing from one organisation to another but the processes are much similar. Commonly, the project SOW development process starts at FEL-0 and goes through to FEL-1 and final frozen Project SOW is developed and approved at the end of FEL-2. The study develops examples for the process models shown in Figures 6.3 and 6.6 and the related flowcharts used to develop the project SOW in the two organisation's under the study and identify the roles for different project stakeholders and development team in the process. A comprehensive SOW, which

makes concerned project and business stakeholder's confident that all fundamentals of the project scope are accounted for, should be developed in FEL2 and approved at its gate, which makes FEL2 the most important part of FEL.

To produce an effective project SOW, companies need to assure availability of process enablers and the absence of possible barriers. Based upon the responses, three key enables were highlighted as the most important common enablers for developing an effective project SOW: (1) clear vision, targets, and objectives, (2) stakeholders' engagement, and (3) assurance review process. In addition, clear documented and systematic procedures, updated project lesson learning, strong authority control, clear roles and responsibilities, sufficient human resources, support technologies, team work environment, and experience of assigned team are considered enablers that help the organisation to develop an effective project SOW. While, those enablers are important for organisations, the absence of one of them (or more) can turn them into major barriers. On the other hand, the findings highlighted three key barriers as the most common barriers: (1) absence of motivation system, (2) insufficient training program and (3) insufficient budget. In addition, improper selection of assigned team, unarticulated project vision, absence of proper team work environment, limited time, lack of common language, lack of clear responsibilities for evaluation process, insufficient human resources, and absence of support technologies are other barriers that companies need to overcome for better SOW development process outcomes. By categorising the study findings for identifying the key enablers and barriers, it can be found that the project SOW development process can face challenges that normal organisations may face. Understanding key enablers and barriers for the project SOW development will help organisations to tackle the challenging environment and obtain the potential of successfulness by taking the necessary and required actions for improving the organisation performance. Understanding those challenges helps in putting the appropriate strategy using proper structure, selecting the right people, applying appropriate processes and applying a suitable rewarding system.

This study succeeds in achieving one of its objectives by contributing to filling the gap to which less attention is given in the previous literatures regarding the practical challenges that companies face for producing an effective project SOW. Interested professionals can take advantage of the study results to understand the practical challenges that organisations need to take into consideration in order to enhance the chance of having the desired outcomes of the project SOW development process. Also, this significant contribution to

the knowledge will support and motivate interested researchers for more or different investigations in the same or different industries.

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CHAPTER 7

RECOMMENDATION FOR IMPROVEMENTS

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7 RECOMMENDATION FOR IMPROVEMENTS

7.1 CHAPTER INTRODUCTION

In chapter 6, the project SOW development process phases and activities were identified, and key enablers and barriers were highlighted and discussed. The aim of this chapter is to satisfy the last objective for this study by making recommendations for improvements in SOW development process to make it more effective. Hence, this chapter is addressing the last research question (RQ4):

RQ4: What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

Understanding the project SOW development process and its key enablers and barriers helps in answering this research question by analysing the required improvements. Within the process context, the project SOW development processes can be improved through revising some phases' deliverables, as well as adding some more effective activities, tasks, gates and/or phases. Within the organisation context, taking benefit of key enablers and overcoming the barriers is an important key for improvement. In this regard, improvement can be implemented in terms of the strategy, structure, process, rewards and people used as organisation's assets used to produce the desired outcomes. The recommended improvements as the subject of this chapter and will be discussed in the following sections.

7.2 IMPROVEMENTS FOR THE PROJECT SOW DEVELOPMENT PROCESS PHASES AND ACTIVITIES

The required improvements in the project SOW development process were discussed during the focus group discussions to obtain the participants opinions. By analysing the collected data and taking into consideration participants inputs, while discussing the SOW development process flow charts, the suggested modification for both organisations is presented in Figures 7-1 and 7-2 below. For Organisation "A", the participants suggested conducting a "Target Setting Workshop" at the beginning of each phase to make sure that all requirements of the phase are identified and known to the involved persons and departments at an early stage of the phase. According to one of the Organisation A participants, the aim is to define:

"measures that focus on maximizing value and driving investment objectives toward excellence in a way that improves historical performance and is equivalent to or better than industry benchmarks".
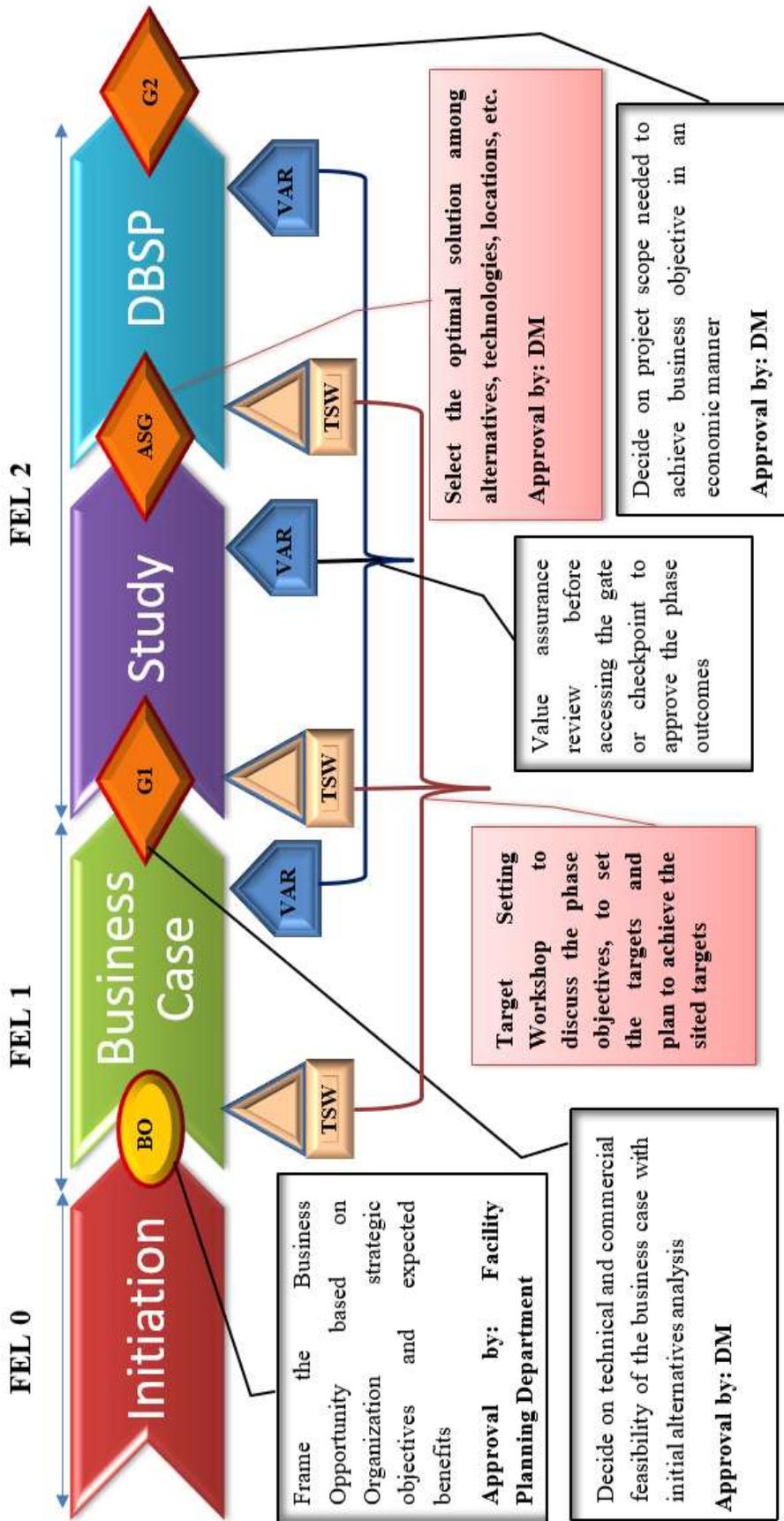
Figure 7-1: Required Improvement for project SOW development process (Organization A)
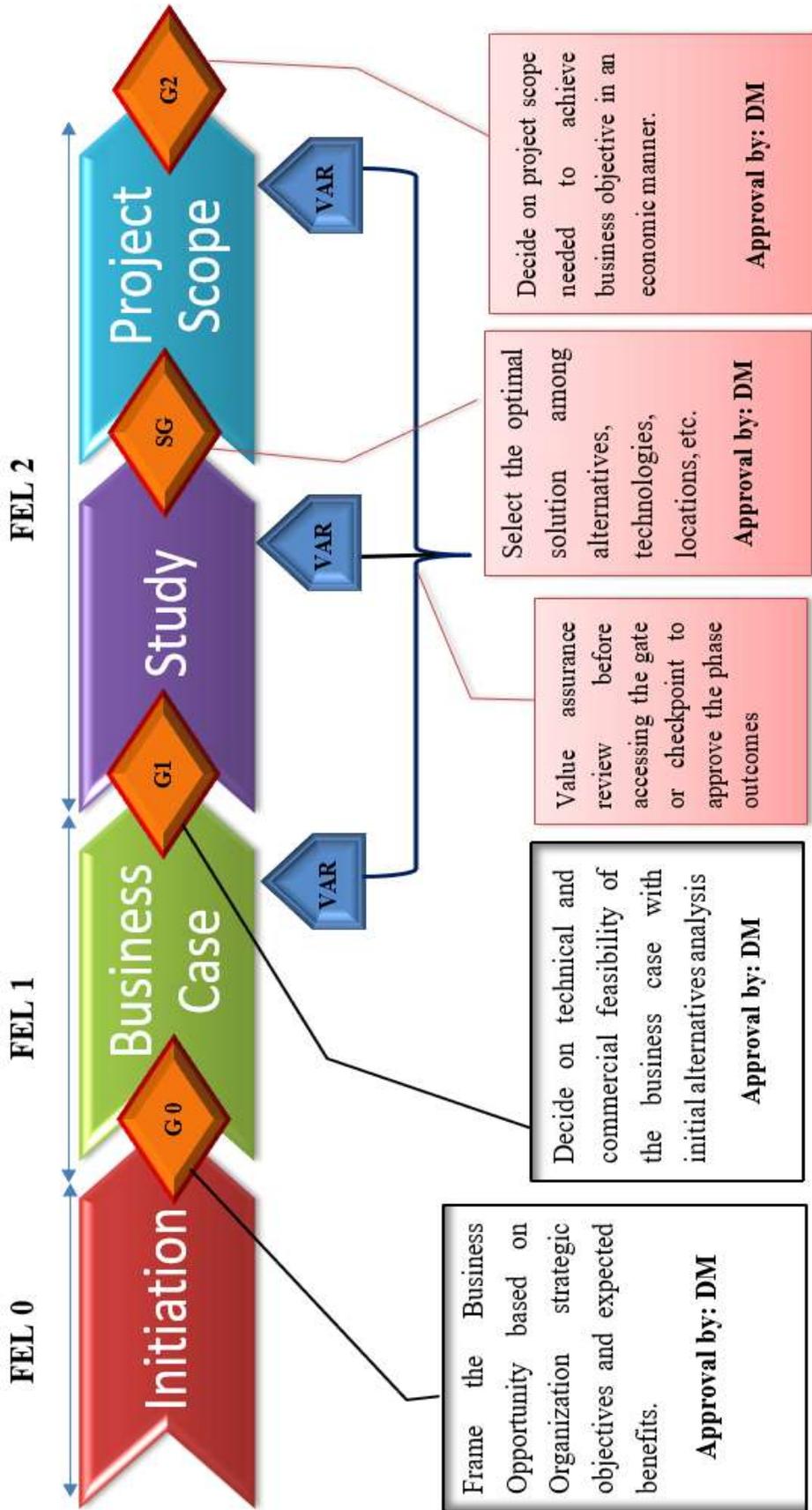
*Figure 7-2: Required Improvement for project SOW development process (**Organization B**)*

The idea for having "Target Setting Workshops" with a clear process that involves the PMT, representatives from different stakeholders and led by the PS is to set targets for the project, drive commitment and challenge the creativity of the FO/D to achieve the targets. Those workshop output, then need to be approved by PS, PM, and QVART and concurred by Facility Planning Department and Project Management Office Department with notifying the DM. Those targets then need to be monitored during the phase process and any variances should be reported and when it is required it should be approved with the appropriate level of escalation. Participants think that this will make the plan for passing the phase gate clear to everybody involved and will improve the productivity, as well as the quality of the gate outcomes.

Another suggestion for improvement as shown in Figure 7-1 is to add a new gate that is agreed to be called Alternative Selection Gate (ASG) to replace the Alternative Selection (AS) check point after FEL 2 – study phase. Participants argued that selecting the optimal solution among different alternatives, technologies, and locations is an important process and the output of this phase will shape the output of the next phase. This makes it important to involve the Decision Maker to approve the output of this phase. This will keep top management involved all the way throughout the project SOW development phases and will reduce the time required to obtain approvals from several stakeholders from different departments. According to them, the output of FEL 2- Study phase will impact positively or negatively the project scope which is developed in the following phase. Ensuring that the required results are achieved as per the project objectives at each phase is necessary and the "involvement of the Decision Maker will support that objective".

For Organisation "B", participants suggested splitting the FEL 2 activities into two phases where a separated phase to be dedicated to studying and identifying the available technological and economic options for project execution by selecting the optimal solution among alternatives, technologies, locations … etc, while the other phase would only be focused on the most suitable and optimal option for delivering the final project SOW. Based on that suggestion, quality assurance process for the new suggested phase needs to be added and a new gate (SG) to be considered for separating the two phases (See Figure 7.2). According to one of the respondents:

"Having a separate phase for selecting the optimal solution will help in carful selections between available alternatives and will give the team the required time for this activity".

Respondents claim that the existing practice, procedure and processes are acceptable for most of the projects that the company is executing since they are relatively considered small or medium size projects. However, in the case of having complex or mega projects, the current practice will not end with an effective project Scope of Work.

Hence, the first perspective for improvement for this study is in the process activities and phases. Understanding the process facilitates identifying the area for improvements (Darwish, 2011). The researcher agreed with Swanson (2012) who suggested that successful implementation of process improvement can enhance the quality of the process outcomes, efficiency, and enhance the process's beneficiary/customer satisfaction and with Hass (2008) who argued that process improvement may help in increasing the productivity, developing the skills of employees which increases their productivity, loyalty and performance efficiency. The SOW development process model shown in Figure 7-1 after adding the recommended improvements is representing a typical practical model that can be used for developing an effective project SOW. This model is more appropriate for mega or complex projects as important projects. "They are important to the societies in which they are being done; they are important to the health of the global economy; they are important to the sponsors and others putting up huge amount of money" (Merrow, 2011, p. 15). Merrow (2011) claimed that megaprojects are very problematic and the use of FEL is important to overcome implementation difficulties. That is why the model suggested by this study (Figure 7-2) is more helpful for such projects. This model can still be used for small and medium size projects but merging of some phases can make the process faster.

Related to the process, conducting a "Target Setting Workshop", to make sure that all requirements of the phase are identified and known to the involved people and departments at an early stage of each phase, this will make the plan for passing the phase gate clear to everybody involved and will improve the productivity, as well as the quality of the gate outcomes. Those targets to be monitored during the phase process and any variances should be reported and when it is required it should be approved with the appropriate level of escalation. This improvement will enhance the effectiveness of the decision taken within the development phases and the overall process. This study suggested to revise the process phases and the decision flow by adding and revising some gates and phases. Those can be taken into consideration and it can be different based on the organisation needs. In general, it will be more effective to have clear phases and specific achievable objectives for each phase and to have gates that control the decision made at the gate of each phase. It is

important to highlight the fact that, improvement is a continuous process and companies need to study the project SOW development process regularly in order to investigate the possible areas for improvements and apply them for better efficiency.

7.3 PROVISIONS FOR PROCESS PERFORMANCE IMPROVEMENT

Some of the recommended improvements were highlighted in chapter 6 (see sections 6.3 and 6.4) while discussing key enablers and key barriers for the project scope of work development process. Taking advantage of the existing enablers during the project SOW development process will help in improving the process. Also, understanding the current barriers and working to eliminate or overcome those will again help in improving the development process. Taking the founded project SOW development enablers and barriers into consideration, the researcher suggested using the star model to present improvements in the SOW development process by improving the organisation as presented in Figure 7-3. The founded enablers and barriers were categorised by the researcher in terms of Strategy, Structure, Process, Rewards and People in order to highlight the provisions for improvements.

The first step for developing an effective project SOW is to make a strategy for the development process which will determine the direction for the process. The organisation needs to make a strategy which will focus on maintaining the clear vision, objectives and targets for the project that is aligned with the organisation's vision and missions in order to produce the final product of the project SOW development process, which should be an effective project SOW. Having vision, objectives and targets needs to be supported by key stakeholders and articulated to all of the involved stakeholders.

Strategy supports the businesses to reduce the vagueness and ambiguity regarding the unarticulated vision, objectives, and targets of the project and its SOW development process. According to the outcomes, it is being analysed that the project needs proper formulation of project's vision, goals, and objectives that also improve the understanding of what is required to be achieved by writing the project SOW. It is obvious that the project SOW should help in achieving the project objectives and without having those objectives clearly stated as part of the strategy, it is not expected to be incorporated in the SOW. Taking this into consideration, the strategy process helps the businesses to develop the opportunity statement consisting of all the important guidelines and instructions about the project's core vision and their targets that support the management in identifying the project requirements

that guarantee to obtain the desired outputs from the SOW development process and those outputs should be aligned to the goal of the project.

The next step to have a powerful project SOW Development Process is the structure which determines the location and enablers of decision making power. The SOW development process is manly depending on the right decision taking by the decision makers throughout the process life cycle and the leadership style that top management and involved team leaders use to drive the process. The positive involvement of top management and team leaders is considered as an important factor and because of that, organisation's should make strong management and select qualified team leaders for the development process. Engagement of the Management Committee members and different project team leaders will empower the involved staff in the development process to enhance their effort toward better productivity and higher quality. To enhance the efficiency of the decision-making power, clear roles and responsibilities for all of those who are involved in the development process should be in place at the right time and articulated to all concerned people. The organisation structure for the company, as well as that formed temporary for the development process needs to be in a form that encourages a teamwork environment in order to enhance the productivity and quality of the involved people in the project SOW development process and accordingly builds the environment for taking the correct decisions. Also, having strong Authority control at different levels will ensure that the deliverables are met at each phase and ensure that the final project SOW is meeting the required level of effectiveness. To have the power to do so, sufficient human resources should be allocated. Assigning sufficient and proper specialties will contribute to producing an effective project SOW. Those who are involved in taking the decisions at any stage belong to the structure human resources and those are depending on the inputs that are obtained by the human resources assigned to develop the project SOW.

To implement the strategy, the structure should be able to deal with the issues and problems occurring in the top management and team leaders' engagement, roles and responsibilities, teamwork environment, authority control and insufficient human resource. Study outcomes assumed that proper structure executed in the project's processes and techniques support the businesses to make more valuable and effective decision making. Moreover, adequate and systematic structure increases the positive level of top management and team leders' engagement and commitment towards the project throughout from developing stages to the final execution stages. In addition, the structure process also supports the business to ensure

the excellence in the productivity and quality of the project's deliverables. Besides this, the structure process also recommends the businesses to develop strong association, commitment, and relationships to their potential stakeholders through communicating all the projects detailing at different developmental stages. Furthermore, the structure needs to support the businesses to ensure effective teamwork environment that helps the businesses to accomplish their expected outcomes according to the project requirements. Structure builds a culture that encourages a teamwork environment in order to enhance the productivity and quality of the involved people in the project SOW development process. Additionally, improving the structure helps the businesses to bring improvement in insufficient human resource. Under this consideration, the analysis of responses recommends that the businesses seek some effective engagement approach that will empower the involved staff during the SOW developmental phase, ultimately enhancing their efforts towards exceptional quality and better productivity.

One important dimension for improvement is to identify the process which includes the flow of the information and decision-making process. It is vital for the organisation to make an effective official communication portal where all the project participants can communicate with each other in terms of sharing important project information. It is so important to have a lessen learning system and keep it updated all the time for process improvement purposes. This will help the organization formed for project SOW development process to keep high level of performance and take benefit of lessen recorded from previous projects to improve the process performance. Also, it is vital to have documented and systematic procedures which will make it easy for those who are involved in the SOW development to understand their roles and the steps to achieve the required deliverables. By using the latest technology, an organisation can collect and record the information from all participants which facilitates taking the right decision and transferring knowledge. In addition, having a quality assurance review is considered one of the most important factors in taking the right decision towards an effective project SOW. Careful selection of the team members, and giving them the required support and time to do a careful review will enhance the quality of phases results. Also, having adequate time for the project SOW development process will help in taking the carful decisions and producing an effective SOW.

STRATEGY

What is the formula for success?

STRUCTURE

Who has power and Authority?

What are the key roles?

How are Organization organized?

How is the work managed?

PROCESSES

What support decision making?

How does work flow between roles?

What are the mechanisms for

PEOPLE

What skills are needed?

How do organization best develop the organization people and their talent?

REWARDS

How is behavior shaped by the goals and appreciate achievements?

How do organization assess progress and appreciate?

* Effective project SOW with clear Vision, Objectives and Targets

* Top Managment and team leaders
* Clear roles and responsibilities
* Team work environment
* Strong authority control
* Sufficient human resources

* Updated project lesson learning for process improvment.
* Clear documented and systematic procedures
* Support technologies
* Assurance Review Process
* Suffciant time

* Assigned team experience and competence
* Stakeholders engagements
* Use of poject lesson learning for training and development.
* Sufficient training program
* Common Language to ease understanding and knoledge transfer.

* Motivation System
* Sufficient budget

Figure 7-3: Provisions for process performance improvement

So, improvements in the process is very essential. The process factor brings improvement in the business performance through rectifying the flow of project information across different parties to support successful decision-making process. Studying the process and doing the necessary improvements can support the businesses in dealing with the challenges such as lack of identification of client's requirements and demands, inadequate availability of framework for project's practices, poor communication between the parties, inadequate involvement of relevant parties of the project, and insufficient allocation of time and budget. Meanwhile, the process also improves the positive impact of innovation on successfulness of project SOW through creating optimal solutions to technological issues. In addition, the processes also support the businesses to improve their assurance review process, using a strict system of monitoring and controlling of the project's functions. Understanding the process can support the development process of understanding the critical issues of the insufficient financial resources. Besides this, the understanding of the process also helps the business to plan a timely formation of all the activities for the project SOW development process and approaches that must be executed as per the requirements of effective project performance.

Another dimension for improvement is encouraging founding and implementation of reward and reward systems which influence and motivate the assigned members in the project SOW development process in achieving the goals of the organisation. Establishing a reward system for the SOW development process will not only satisfy the employees but it will also make them feel motivated in the work and that will be reflected on the process products. Availability of rewards system can enhance the improvements in employees' engagement and satisfaction in terms of intrinsic or extrinsic motivation system. Having appraisal and motivation system for those who participate in the development process will encourage them to enhance their capabilities, performance and the quality of their outcomes. On the other hand, ignoring rewards can create demotivated people and in sequence undesired outcomes. But for having an effective reward system and to support the process, an effective process needs adequate financial resources. Allocating the right budget that take in consederation the required rewards, will make it possible to take the most appropriate decisions during the project SOW development process. On the other hand, a limited budget will limit the options and it may force the decision makers to accept achievements with less quality. Businesses need to allocate a sufficient budget for the project SOW development process to increase the capability of taking the right decision without constraints. In such a scenario, process

demonstrates how businesses accomplish strategic objectives effectively through proper budgeting that elevate the new standards of project oversight, visibility, and accountability.

The last area of improvement is related to the polices for selecting, training and developing skills of the participants in the project SOW development process. Organisation's have to put clear, fair and effective criteria for selecting the team leaders, team members who assigned in the project SOW development process. Those criteria should include the required experience and the work roles responsibilities during the development process. Also, it is vital to identify the project stakeholders and their level of engagements for this process. In addition, organisation's should create development and training programs before and during the project SOW development process in order to enhance its employees' capabilities. Also, having updated project lessons learning will help in developing the participants' knowledge and experience. This area for improvements is suggested by this study which regulates the people determinant reflecting how it assists the companies to understand the impact of proper selection of individuals to the responsibilities of the project completion. However, the process also advises the businesses to acquire better understanding about the experience and competencies of the assigned teams. In addition to this, investigating the people's needs improves the businesses through developing clearer pattern of roles and responsibilities. It helps the businesses to emphasise on initiating more exposure to the FEL training programs and sessions to increase the understanding, skills, and knowledge of the individuals to deal with the business complexities of the project scope of work. Also, it is important that project stakeholders should have same bases and use common language. The existence of a common language for team members and all others involved in the development process is necessary for developing effective communication between project team members themselves and between them and others who are involved during the development process. In the meantime, outcomes also indicated how successful businesses translate all of the relevant documents into the primary language, which parties such as employees, contractors, stakeholders, and others easily interpret and understand the transcribed information. Correspondingly, this study also discussed how processes improve businesses through using simple, clear and concise language for reducing the communication gap between different parties associated with project development and execution.

This study and Blias (2012) assumed that better process efficiency originates delivering better outputs taking into consideration the assets utilised for that purpose. On the other

hand, less efficient process may cause higher costs, slower response times and less reliable and dependable outcomes. Careful investigation into the key enablers and barriers and by understanding the challenges that project SOW development process has, it is clear those are related to the assets and resources that company as organisation and the process as temporary organisation is using to archive significant objectives. Kates and Galbraith (2007) believed that the organisation can refer to a whole firm or to just a part of it and it can be formed of thousands of people or only a few people. They claim that organisation's need to be designed carefully in order to ensure the capability of achieving its strategy by forming structures, processes, rewards, and people performance. The new outcomes of this study showed the significance of developing and implementing the star model to improve the performance in dealing with the critical challenges and barriers discussed in this study.

In context of this research objective, the five determinants discussed above and shown in figure 7-3 support the businesses and managements to increase the knowledge and understanding regarding the approaches to tackle the challenging situations. The insight information presented within the model helps the businesses to get the benefit of enablers, eliminate the barriers as well as overcome the challenges that occur in project SOW development process taking into consideration the right strategies, effective structure, appropriate processes, helpful rewarding system, and careful selection of human resources. Using the star model as framework for presenting the improvements is very helpful practice that provides the type of general recommendations for the project SOW development process in any organisation that uses FEL as a means to generate an effective project SOW. This study suggests constructing of systematically clear and vibrant framework for continuous improvements in dealing with the issues that face the project SOW development process. This is a practical implementable model that helps companies to enhance their knowledge about the required organisation design and work to have it implemented in order to improve the SOW development performance.

This study provides a new approach for dealing with process improvements by considering the organisation design that impacts the SOW development process. It adds to the existing literatures different tactic of using the star model. To the knowledge of the researcher, this is the first study that deals with the improvements in project SOW development process in OGS which makes a significant contribution in the project management field. But, the provided findings are just elementary and entrance hypotheses for further studies.

7.4   CHAPTER CONCLUSION

Understanding the project SOW development process and its key enablers and barriers help in identifying the required improvements. Figure 7.1 can be considered an appropriate practical model for the project SOW development process after incorporating the suggested improvements in the process phases, gates and activities. In addition, this study provides a new approach for dealing with process improvements by considering the organisation design that impacts the SOW development process. It adds to the existing literatures different tactic of using the star model as presented in Figure 7.3. Within the organisation context, taking benefit of key enablers and overcoming the barriers is an important key for improvement. To improve the process effectiveness, companies need to maintain a development team in the organisation that builds the strategy on clear and articulated vision, objectives and targets. The structure should include sufficient human resources with sufficient allocated time and should encourage a teamwork environment, positive top management and team leaders' engagement and strong and appropriate control authority. To improve the process, it should have clear documented, updated and systematic procedures supported with technologies. Having assurance review for each phase of the project SOW development process is one of the very important items for improvement. In addition to this, the project processes can be improved through revising some phases' deliverables, as well as adding some more effective activities, tasks, gates and/or phases. People assigned for the development process need to be selected carefully taking into consideration the required experience with clear roles and responsibilities. Also, it is necessary to develop and provide sufficient training programmes for the assigned team. In addition, having updated project lesson learning will help in developing the team working for the project SOW development. Finally, it is recommended to have a reward system that motivates the required high performance for the team assigned in the project SOW development process.

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CHAPTER 8

CONCLUSION

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8   CONCLUSION

8.1   CHAPTER INTRODUCTION

To summarise, the aims of this study were to investigate project team members' perceptions of the SOW development process in two Saudi Arabian Oil and Gas companies, to develop a clearer understanding of its role in project development and to make practical recommendations for its improvement. To achieve the study aim, the research was designed in order to address and answer the following questions:

RQ1- What is the role of the project SOW in project performance?

RQ2- What are the characteristics of an effective project SOW and what functions does it support?

RQ3: How are project SOWs developed in the Saudi Arabian OGS and what are the practical enablers and barriers for its development?

RQ4: What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

This chapter aims to report on the study conclusions. It begins with a summary of the research (section 8.2). This is followed by a presentation of the conclusions (section 8.3). Then, the study implication (section 4.4), the study limitations and recommendations for future research will then be discussed (section 8.5).

8.2   THE STUDY SUMMARY

This research subject is concerned with the project SOW development process where project SOW is an important document that is used by all project stakeholders throughout all phases of the project management life cycle. By conducting a wide range of literature review (see chapter 2), the state of current practice was established and the gap was identified. In general, there is less attention given to the project SOW development process even though there is wide agreement that it is the foundation to manage different phases of the project management life cycle and it is important to have an effective project SOW for enhancing the chances of having the right desired outcomes and enhancing the chances of having a completed successful project. The literature review conducted identified that there is a gap in previous research which needed to be addressed by a comprehensive study that focused

on the project SOW development as a factor that has a direct relationship to the project outcome of each phase of the project life cycle. Also, there is very little study on understanding the barriers and enablers for developing an effective SOW. This study succeeds in contributing in filling that gap by creating a research in OGS of Saudi Arabia.

As discussed in chapter 3, this research adopts a qualitative approach and a case study strategy for addressing the research questions. Two case study organisations working in the OGS in Saudi Arabia were identified and selected for the research. Focus group was considered an appropriate tool for collecting primary data for this study because the use and related experience to project SOW is constructed individually and collectively. Therefore, a rich data is attained by sharing common experiences and exploring different perspectives, which is enhanced and encouraged by the dynamics of group discussions. A total of six focus group discussions were conducted for the two phases of the field research. Total of four focus group discussions with a total of 32 participants were conducted for the first phase and primary data for answering the first and second research questions (**RQ1** and **RQ2**) was collected. For the second phase, a total of two focus group discussions with total of 21 participants were conducted and primary data for answering the third and fourth research questions (**RQ3** and **RQ4**) was collected. Conventional Content Analysis was used to explore the research subject. In order to have more rigorous analysis, the researcher used NVivo for storing, managing and organising the collected data. The provided tools were useful in handling the coding while reading and learning from the data.

The major findings as discussed in chapters 4, 5, 6 and 7 can be summarised as follows:

❖ The Project SOW development process is the foundation for other twelve key project management processes that need to be considered for successfully completing a project On Scope, On Time, On Cost and On Strategy.

❖ To be effective, the project SOW should have the characteristics of formality, usefulness, effective content elements and effective language quality. In addition, to be considered effective the project SOW should support effective decision making, risk management, Project planning and project monitoring and control.

❖ The project SOW in Saudi Arabia OGS is developed in several phases as part of Front End Loading (FEL) development and final frozen Project SOW is developed and approved at the end of FEL-2.

❖ There are enablers, such as clear vision, targets, and objectives; effective stakeholders' engagement; and effective assurance review process, for producing an effective project SOW. On the other side, the absence of motivation system; insufficient training programs; and insufficient budget are examples of barriers for producing an effective project SOW.

❖ Taking benefit of key enablers and overcoming the barriers is important key for improvement in the project SOW development process. Companies need to look to the process development team as temporary organisation and accordingly set its strategy, structure, process, rewards and people.

8.3   THE STUDY CONCLUSION

This study has succeeded in achieving the following research objectives:

1) To identify the role the project SOW plays during the project lifecycle.

2) To identify the characteristics of an effective project SOW and the functions it supports.

3) To identify the SOW development process in two Saudi Arabian Oil and Gas companies and the barriers and enablers to its effective development.

4) To make recommendations for improvements in the SOW development process.

Research Objective 1

This objective was satisfied through a literature review (see chapter 2) and then through an empirical study. The empirical study achieves this objective by identifying the linkage between the project SOW development process and other key project management processes and how this relationship is impacting the project performance criteria. The findings show that the project SOW is perceived to have a major role that impacts the project performance within the project lifecycle and its operation performance. The study concludes that there are thirteen (13) key project management processes that need to be managed well in order to accomplish the key four project performance criteria: (1) On Scope, (2) On Time, (3) On Cost, and (4) On Strategy. The thirteen key processes given to establish the criteria must be undertaken throughout the project lifecycle to sustain the project performance where there are four processes underpinning each performance criteria in order to complete

the project within the desired performance. As a vital process, SOW development process is the foundation and common practice to regulate the four performance criteria's processes (see Figure 4.1). The results shown in Figure 4.1 represent a practical framework for tracking the key processes that impact the project performance. The researcher is of the view that it is necessary for the companies to consider the relationship between the project SOW, project performance criteria, and the role that project SOW plays in developing different processes throughout the complete project lifecycle and its operation phase for good management of the project and good project performance.

Research Objective 2

This objective was satisfied by obtaining the participants opinions about an effective project SOW. Findings show that effective project SOW is defined from two perspectives: its characteristics and its support functions. According to the findings, effective SOW has four key characteristics: **formality** where it should be developed in formal context and remain as a formal document through the project lifecycle; **usefulness** which make it useful for any potential user at any phase of the project lifecycle; **content** elements which include project requirements, deliverables, owner expectations, necessary information and liabilities; and **language** qualities which include using understandable language, avoiding ambiguity, using correct language structure, using proper presentation and using legal language. On the other hand, effective SOW has four key support functions: **effective decision making**, **effective risk management**, **effective planning** and **effective performance monitoring and control**. The author trusted that achieving this research objective provides a comprehensive definition for an effective project SOW. Taking into consideration of those eight significant attributes discussed in chapter 5 and summarised in Figure 5.3 while developing the project SOW will enhance the effectiveness of the SOW toward better project management and performance.

Research Objective 3

This objective was satisfied by investigating first the actual practices, procedures and policies that organisations in Saudi Arabia OGS are using to develop the project SOW and second the practical enablers and barriers that project SOW development process face in Saudi Arabia OGS. The findings indicate that the project SOW is developed in several phases as part of Front End Loading (FEL) development where organisations are taking special arrangements, allocating resources and assigning sufficient team leaders and

members (with different roles) to do this process effectively. Before moving from one phase to the next phase, there is a gate or check point to check and assure that the deliverables from the phase are met and it is ready to proceed to the next phase. While the number and title of phases is differing from one organisation to another, the process are much similar. Commonly, the project SOW development process starts at FEL-0 and goes through FEL-1 and final frozen Project SOW is developed and approved at the end of FEL-2. The study develops the process model and flowcharts (see chapter 6 and Figures 6.1 to 6.6 for more details) used to develop the project SOW in the two organisation's under the study and identifies the roles for different project stakeholders and development team in the process. I believe that the models and flowcharts developed in chapter 6 based on the two organisations practice indicates the importance of FEL in developing an effective project SOW. The project SOW development process model and related flowchart can be used to ensure that process phases deliverables are met before moving to the implementation phase. Based upon the responses, three key enables were highlighted as the most important common enablers for developing an effective project SOW: (1) clear vision, targets, and objectives, (2) stakeholders' engagement, and (3) assurance review process. While, those enablers and others mentioned in Table 6.1 are important for organisations, the absence of one of them (or more) can turn them into major barriers. On the other hand, findings highlighted three key barriers as the most common barriers: (1) Absence of motivation system, (2) insufficient training program and (3) insufficient budget. The findings include other barriers as shown in Table 6.2. The researcher believes that understanding the phases, activities, enablers and barriers for the SOW development process is the key for improvements which is important for any business process for better quality efficiency. While the findings are more specific for the two organisations under the study, but it can be used to develop general improvements that can be applied to projects that FEL is used to develop the project SOW. Achieving the third objective for this research helps in satisfying the next objective.

Research Objective 4

The last objective for this study was to make recommendations for improvements in the SOW development process. Understanding the project SOW development process and its key enablers and barriers helps in satisfying this objective. Within the organisation context, taking benefit of key enablers and overcoming the barriers is an important key for improvement. To improve the process effectiveness, companies need to maintain a

development team in the organisation that builds the strategy on clear and articulated vision, objectives and targets. The structure should include sufficient human resources with clear roles and responsibilities that encourage team work environment, positive management and leadership engagement and strong and appropriate control authority. To improve the process, it should have clear documented, updated and systematic procedures and supported with technologies. Having assurance review for each phase of the project SOW development process is one of the very important items for improvement. In addition to this, the project processes can be improved through revising some phases' deliverables as well as adding some more effective activities, tasks, gates and/or phases. All those important items for process need to be supported with sufficient allocated budget and time. People assigned for the development process need to be selected carefully taking into consideration the required experience. Also, it is necessary to develop and provide sufficient training programmes for the assigned team. In addition, having updated project lesson learning and using common language will help in developing the team working for the project SOW development and ease knowledge transfer. Finally, it is recommended to have a reward system that motivates the required high performance for the team assigned in the project SOW development process. The author suggested that Figure 7.1 can be considered an appropriate practical model for the project SOW development process after incorporating the suggested improvements in the process phases, gates and activities. To be effective, the project SOW should be developed within an organisation that tackles the challenges discussed above.

To conclude, this study provided a clearer understanding of the project SOW role in project performance, it highlighted the attributes that make it effective, it investigated the project SOW development process and the related practical enablers and barriers, and made practical recommendations for its improvement. Hence, by satisfying the four research objectives, the aim of this study was achieved. According to the researcher, this study has important implications for practitioners as mentioned during discussions in the previous four chapters and summarised in the next section (section 8.4). At the same time, this study is considered a primary step that opens the door for further research. On the other hand, the researcher acknowledges that there is some limitations for this study as highlighted in the last section of this theses (section 8.5).

8.4 STUDY IMPLICATION AND RECOMMENDATIONS FOR PRACTITIONERS

The outcome of the study gives a comprehensive view of the project SOW that helps understanding the theoretical frame (see Figure 4.1) for its role in the project performance and the related key processes that need to be considered in order to accomplish a successful project. This theoretical framework has practical implications that help business to achieve their projects goals. The theoretical framework shown in Figure 4.1 suggests the relationship between the project SOW development process and the project performance by the four identified key performance criteria: On Scope, On Time, On Cost and On Strategy by considering another twelve processes in different phases of the project that notably bridge the gap between ineffective project performance and effective outcomes from project completion. The outcomes guide companies as to how the proper project SOW supports them to manage the project performance in terms of introducing more authentic ways to initiate, plan, execute, monitor and control, close and operate project processes. The findings also help businesses to incorporate project management lifecycle as common practice, which businesses require to learn new techniques and approaches for dealing with the business projects, as well as their successful achievements. Therefore, it is recommended for organisations to understand the role of the project SOW in the project performance by understanding its importance and impact to different project processes. More focus on the project SOW development process and the other twelve processes shown in Figure 4.1 may help organisation's in completing the project to the desired performance.

To achieve the desired project performance mentioned above, it is necessary to have an effective project SOW. The study results deliver a clearer understanding for defining an effective project SOW which can help interested professionals in considering those results while discussing and practicing project management. Figure 5.3 shows that the effective SOW project has eight significant attributes. These attributes are separated in terms of two fundamental perspectives; characteristics and functions, contributing towards the effectiveness of the project SOW. The definition given by this study for the effective project SOW provides considerable guideline for the SOW development team in producing an effective tool for better project performance. It provides significant understanding of the SOW characteristics and the functions it is supporting. This can form a practical framework for checking and examining the produced project SOW to ensure that it will serve the purpose of the project. This framework helps the project manager, decision maker and concerned project stakeholder to distinguish between an effective and ineffective project

SOW. Thus, making sure not to start the project without having a good project SOW as an effective tool helping in accomplishing different project phases objectives and project overall success.

After understanding the role of the project SOW in the project performance and the importance of the project SOW development process as foundation to do so, and after defining the effective project SOW, it is important for organisations to understand the practical procedures for project SOW development process. This study findings help the businesses to understand how organisations in the OGS use FEL as a means to produce an effective project SOW. The practical model provided by this study for the project SOW development process affords organisations in the OGS with significant guidelines for implementation. The created model after the recommended improvements shown in chapter 7 (Figure 7.1) and related flowcharts and phases details (see chapter 6) can be used as significant materials for teaching the involved and interested professionals. This enhances the knowledge about the subject. The findings provide the insight and greater knowledge to the existing research that vitalises the companies to closely monitor the level of engagement and cooperation between different project stakeholders and the development team to create an effective SOW that fulfils their demands and business requirements. Exploring the insight attributes, objectives, deliverables and the role of the involved teams, teams' leaders and other stakeholders for the SOW development process and its phases will assist the organisations in the OGS in building effective systems that help in producing the desired outcomes for each phase of the project SOW development process. Remarkably, this study provides detailed flow charts for the project SOW development process with in depth explanation of its procedures and expected deliverables and objectives.

The study provides lists of key enablers and key barriers for developing an effective project SOW. Exploring this significant list of key enablers after knowing the importance of having effective project SOW, will encourage companies in the OGS to ensure that such enablers are present in their organisations and do the necessary to have them available while developing the project SOW. On the other hand, knowing possible barriers can help the organisation to avoid the existence of such barriers and do the necessary to overcome their impacts. It is recommended for any organisation to investigate and understand its own enablers and barriers for the project SOW development process in order to be able to do the necessary improvements for better process outcomes. Listing the key enablers and key barriers develops a supporting framework that assists in adopting the assigned resources and

supporting systems to eliminate the project SOW development barriers and take advantage of the existing barriers for producing an effective project SOW. Interested professionals can take benefit of the study results to understand the practical challenges that organisations need to take into consideration in order to enhance the chance of having the desired outcomes of the project SOW development process.

The recommended improvements support the businesses and managements to increase the knowledge and understanding regarding the approaches to tackle the challenging situations. The insight information presented helps the businesses to obtain the benefit of enablers, eliminate the barriers as well as to overcome the challenges that occur in project SOW development process taking into consideration the right strategies, effective structure, appropriate processes, helpful rewarding system, and careful selection of human resources. The study recommends the star model as framework for presenting the improvements which is very helpful practice that provides the type of general recommendations for the project SOW development process in any organisation that uses FEL as a means to generate an effective project SOW. This study suggests constructing of systematically clear and vibrant framework for continuous improvements in dealing with the issues that face the project SOW development process. This is a practical implementable framework that helps companies to enhance their knowledge about the required organisation design and work to have it implemented in order to improve the SOW development performance.

8.5   STUDY LIMITATION AND RECOMMENDATIONS FOR FUTURE RESEARCH

One of this research's limitations is related to the validation of its results. Collected data was checked several times and compared with the notes taken during the focus group discussion to ensure its credibility. Also, the findings and developed frameworks and modules were checked with the participants to: validate the results obtained, ensure the reliability of the collected data and evaluate the integrity of the research results. This allows evaluation of the extent to which an interpretation is validated by truthfully representing participants' subjective views. However, the results of this study were not validated in practice as it was beyond the scope of this study due to the limited available time to complete this research. Extended practical validation of the results and developed frameworks and models in an actual implementation process would be a significant addition to understanding.

Another validity limitation for this study is related to its transferability and the extent to which findings can be generalised. This study was conducted in two Saudi organisations operating in the Oil and Gas Sector (OGS). Accordingly, the primary data collected for this research was limited to a single country and a single industry. Although there were participants with different experiences in addition to OGS and different nationalities including Saudi and no-Saudi expertise, but the findings still cannot be generalised taking into consideration the context the research was conducted in. But, this study can be viewed as a primary step for more research in the future using wider range of organisations, wider geographical area and different sectors. However, depending on only two case study organisations operating in one sector and in the same country, helps this study to reduce possible noise which may occur as a result of comparing a wide range of multiple organisations in different sectors from different countries. Hence, this primary step is an important logical step.

Even though, the study suggested frameworks and practical models for the project SOW development process which was developed as a base on the research carried out in the OGS in Saudi Arabia, the implication of this study may be extended to all organisations which use FEL as a means to develop the project SOW and to the projects that need FEL to establish them. Sectors such as chemical and petrochemical industries are examples of industries that use FEL to develop the SOW of their mega projects. To enhance the knowledge about the subject, the results of this study can be examined in different industries and different countries. The researcher assumes that the results of this study can be subjected to further research with different circumstances, industries and geographical locations. But, the researcher acknowledges that for some projects, such as services projects, renovation projects, some of programming and information technology projects, FEL is not one of their Lifecycle processes, but the project SOW is still issued using different practices. The results of this study may open the door to the researchers to investigate the project SOW development process for those type of projects/organisations/sectors to complete the overall picture of the project SOW development process.

Finally, undertaking this study may open many avenues for further research initiatives as presented in previous chapters while discussing the research findings. Using case study as strategy and focus group discussion as tools to collect the data provided a very rich qualitative data that helped in answering the research questions and achieving its objectives.

Even though, this study achieves its aim, quantitative study is recommended in the future to complete this logical step and fill this gap.

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ANNEXES

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ANNEX I: PILOT PROJECT REPORT

PILOT PROJECT AIM AND OBJECTIVES

The aim of this pilot project is to conduct a study that investigates the relationship between the strategic project SOW and the project success. Because the project life cycle is consisting of process and phase, it is important to identify the relationship between the project SOW and those phases. Accordingly, the proposed study has the following objectives:

RO1: To understand the relationship between the project SOW and initiation phase processes.

RO2: To understand the relationship between the project SOW and the phases of the project life cycle.

RO3: To understand the relationship between the project phases and a project overall success.

RO4: To understand the relationship between a successful project and its SOW.

RO5: To understand the relationship between the project successes and project's success controls.

RO6: To build a conceptual model that describes the relationship between the effective project SOW and the project success in its different phases of the project management life cycle and overall project success.

THEORETICAL MODEL AND HYPOTHESIS

By conducting a comprehensive literature review, research conceptual model was formed as shown in Figure PP-1. This model assumes that there is relationship between the successful strategic project and its SOW. In order to understand this relationship; it is required to understand different relationships throughout the project life cycle which include the relationship between the SOW and (1) its content and language, (2) different processes in initiation phases and (3) each phase of the project lifecycle. This model is also assumed that there are relationships between each phase of the project lifecycle and overall success of the project.
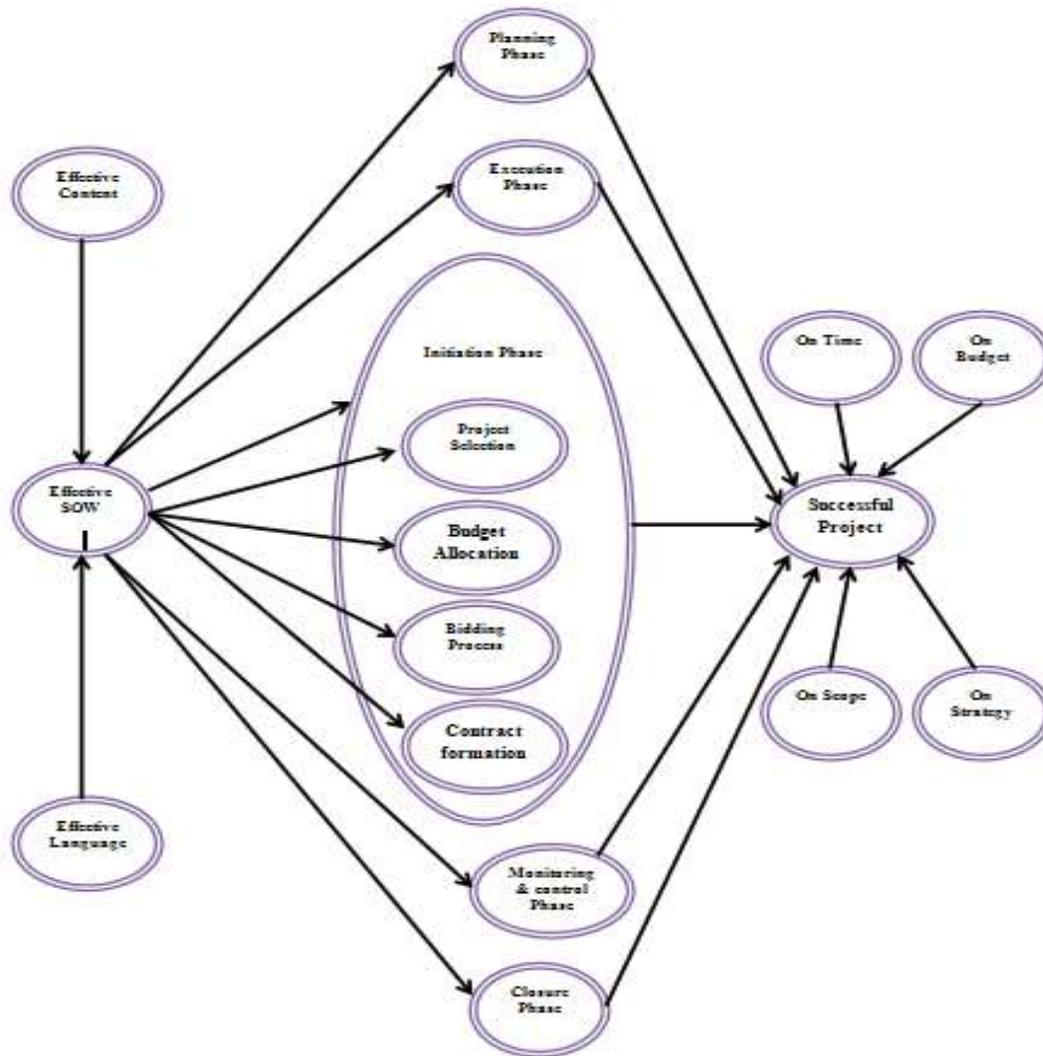
Figure PP-1: Research Conceptual Model

Also, the following hypotheses were formed:

H1: The higher the effectiveness of the project SOW content and language, the higher the effectiveness of the project SOW.

   H1.1: The higher the effectiveness of the project SOW content, the higher the effectiveness of the project SOW.

   H1.2: The higher the effectiveness of the project SOW language, the higher the effectiveness of the project SOW.

H2: The higher the effectiveness of the project SOW, the higher the chance of having a successful initiation phase.

H2.1: *The higher the effectiveness of the project SOW, the higher the chance for having successful project selection process.*

H2.2: *The higher the effectiveness of the project SOW, the higher the accuracy of having the right budget for that project.*

H2.3: *The higher the effectiveness of the project SOW, the higher the chance for having successful bidding process.*

H2.4: *The higher the effectiveness of the project SOW, the higher the effectiveness of the contract between the strategic project owner and the execution contractor.*

H3: *The higher the effectiveness of the project SOW, the higher the chance of having successful phases of the project life cycle.*

H3.1: *The higher the effectiveness of the project SOW, the higher the chance of having a successful initiation phase.*

H3.2: *The higher the effectiveness of the project SOW, the higher the chance of having a successful planning phase.*

H3.3: *The higher the effectiveness of the project SOW, the higher the chance of having a successful execution phase.*

H3.4: *The higher the effectiveness of the project SOW, the higher the chance of having a successful monitoring and control phase.*

H3.5: *The higher the effectiveness of the project SOW, the higher the chance of having a successful closure phase.*

H4: *The higher the chance of having successful project phases the higher the chance, of having successful project.*

H4.1 *The higher the chance of having successful project initiation phase the higher the chance of having successful project.*

H4.2 *The higher the chance of having successful project planning phase the higher the chance of having successful project.*

H4.3 *The higher the chance of having successful project execution phase the higher the chance of having successful project.*

H4.4 *The higher the chance* of having successful project monitoring and control phase *the higher the chance* of having successful project.

H4.5 *The higher the chance* of having successful project closure phase *the higher the chance* of having successful project.

H5: *The higher the chance the project completed on time, on budget, on scope, on strategy , the higher the chance* of having successful project.

H5.1: *The higher the chance* the project completed on time, *the higher the chance* of having successful project.

H5.2: *The higher the chance* the project completed on budget, *the higher the chance* of having successful project.

H5.3: *The higher the chance* the project completed on scope, *the higher the chance* of having successful project.

H5.4: *The higher the chance* the project completed on strategy, *the higher the chance* of having successful project.

H6: *The higher the effectiveness* of the project SOW, *the higher the chance* of having successful project.

Thus, the current pilot project has aims of identifying the relationship between the project success and its SOW. In order to achieve the aforementioned research objectives, there is a need to adopt a comprehensive research methodology whether a study relies on either or both primary (firsthand knowledge) and secondary (already published material) research. Research model and hypotheses was formed base on the literatures while testing those will be done by conducting a survey to collect primary data.

METHODOLOGY

Whenever a research on any subject is intended, the most important part of the research is how to conduct it. It is a systematic and structured procedure which is applied to carry out a research in proper manner. According to Saunders et al. (2009), it can consist of four chronological steps: identifying a research philosophy, selection of research approach, choosing of a suitable research technique, and adopting of a good research strategy. The assumption of each element is implemented in accordance with the subject and nature of the study. The selection of a research method is made to determine a research direction which is further streamlined while selecting the respective research approach, technique and strategy. Research onion by Sanders (2009) (see Figure PP-2) provides a good guidance for

the researcher to adopt the research methodology. The process of the current study is captured according to that "research process onion".
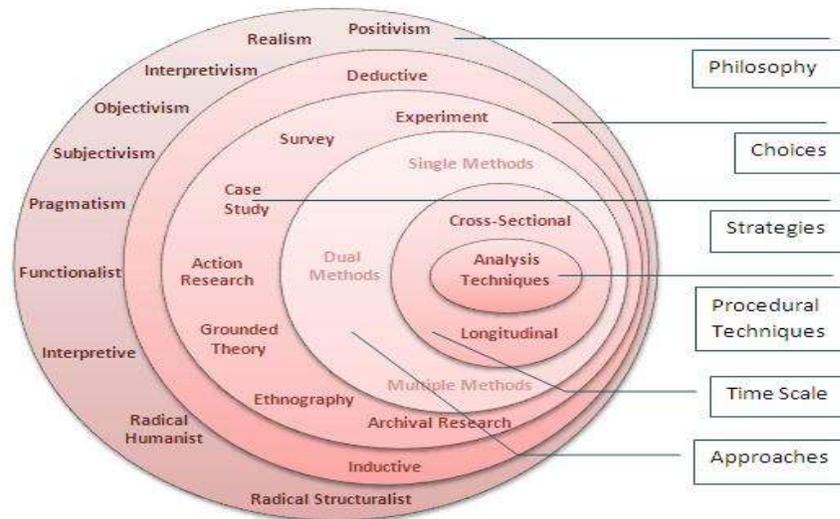
Figure PP-2: The research Process, Source: Saunders et al., (2009: p. 38)

Research Philosophy

The adoption of a research philosophy is made to indicate the perception of the researcher to the real world (Saunders et al., 2009). In this regard, from the existing theories include realism, positivism, interpretivism, functionalism, pragmatism, objectivism, subjectivism, radical structuralist and radical humanist (Amaratunga et al., 2002) either is picked. In this way, the intended course a research is backed by a philosophical support.

However, there are a large number of philosophical bases, but two of them; Positivism and Interpretivism are widely used. The former philosophical base deals with facts whereas latter philosophical dimension talks about meanings. It is all about objectivity and subjectivity. Though, the selection of Interpretivism allows the researcher to conduct in-depth investigation, there is always a room of subjectivity that can lead to biased and partial findings (Malhotra and Bricks, 2003). For this reason, in order to maintain the objectivity most often Positivism is preferred over Interpretivism (Shiu et al., 2009) as practiced in the current research study to serve the same purpose.

Research Choices

In the next stage, after the selection of a philosophical paradigm, the implementation of a research approach is brought under consideration. With respect to the two philosophical dimensions, the two research choices are in existence including deductive and inductive

approach. Hussey and Hussey (1977) clarifies that "a study in which a conceptual and theoretical structure is developed which is then tested by empirical observation; thus particular instances are deducted from general observation." (P. 13). Conversely, in case of picking an inductive approach a theory is "developed from the observation of empirical reality; thus general interferences are induced from particular instances, which is the reverse of the deductive methods since it involves moving from individual observation to statements of general patterns or laws" (Hussey and Hussey, 1997, p. 14). For the current research study, there are some hypothetical assumptions need to be tested in order to achieve the objectives of this research. Those assumptions are based on literatures and it is aimed to test those assumptions to understand the relationship between project success and its SOW. Accordingly, deductive approach is more suitable to the nature of the current research study.

Research strategy

Research strategy defines the course of research through which required information is collected. In context of collection of data, there are two options are always available; primary and secondary research method. The former method of data collection seeks the production of first-hand knowledge while employing different tactics in which survey, observation, interviews, experiment, focus group, and field notes are included (Craig and Douglas, 2000). In contrast, the latter method is completely depended on acquiring of already published material using the sources like books, journals, research papers, newspapers, magazines and websites (Craig and Douglas, 2000). In context of structured and well-prepared researches, the importance of secondary research cannot be overlooked. Actually, no research can be practically imagined devoid of extant review of previous published literature. In this way, studies are purely or partially designed on secondary research. If a study is based on primary research, the inclusion of secondary research is made to provide its supportive role for backing the operations of primary research from the extant literature. With regard to current research study, it uses both the methods; primary method as main and secondary method as supportive element. Literatures will be used as secondary to build the theoretical research model.

Collection of required data in social and management sciences researches using surveys method deemed as one of the most frequently used method (Sarantakos, 2005). It is so helpful to use questionnaire to collect comparable information (Gill and Johnson, 2010).

Kervin (1999) argued that questionnaire as technique is very helpful in researches. In this pilot project research, a survey questionnaire will be conducted using 300 questionnaires. The collected data will be a good base to test related hypothesis and find quantitative results that make the research more objective and reliable. By collecting this quantitative date, reliable data that has features such as accountability, tangibility, measurability and sensitivity (Bouma and Arkinson, 1995) will be used. Walker (1995) disputed that concurrently the quantitative study is strong with high reliability; it is weak from validity point view. It is not giving the depth that may needed in some researches.

Research Approaches

The turn of deciding a research technique comes at the third stage. Again, there are two different kinds of techniques in which quantitative and qualitative techniques are included. The purpose of selecting a research technique is to predict the pattern of analysis aimed at applying in a study. As similar to deductive and inductive approaches, these two approaches are also quite different in nature. They can be easily distinguished as "quantitative research methods were originally developed in the natural sciences to study natural phenomena. Examples of quantitative methods now well accepted in the social sciences include survey methods, laboratory experiments, formal methods (e.g. econometrics) and numerical methods such as mathematical modelling" (Myers, 1997: p. 14). In contrast, "qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. Examples of qualitative methods are action research, case study research and ethnography. In fact, "qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions" (Myers, 1997: p. 15). As per the current research study, it not only involves the quantitative, but also makes the use of qualitative data. For this reason, it aims to apply two different survey questionnaires to collect the required data. In general, however, one of the techniques is used, but in some cases amalgamation of both the techniques can also be applied under the concept of mixed methodology (Cavaye, 1996; Leedy, 2001; Miles, 1994) or triangulation of both the techniques (Amaratunga et al., 2002). The main reason to pick only a single technique is to avoid the complexity of mixed methodology in case if a researcher is not adept in the use of the combined technique. The decision to pick either or both techniques is taken in accordance with the requirement of a study. Thus, in order to deal with the nature of data under the study, the quantitative techniques is used. In this regard, the data cultivated through the survey questionnaire will be analyzed statistically.

According to Moustakas (1994), "the challenge facing the human science researcher is to describe things in themselves, to permit what is before one to enter consciousness and be understood in its meanings and essences in the light of intuition and self-reflection" (p. 27). A thorough study of methodologies is required to design and conduct good research (Hasselbring and Giesecke, 2006). Accordingly, the researcher needs a thorough understanding of a vast range of research methodologies in order to select the most appropriate design for a particular study (Creswell, 1997). In addition to selecting an appropriate research approach, the research instrument must also be selected wisely. In this section of this paper, the selected methods for collecting and carry out the study will discussed along with the suitable instruments the assist in achieving the goal of this study.

Qualitative Method

In order to define the base for this research which gives it a higher value, it is important to define: (1) what an effective SOW is, and (2) what a successful project is. Project stakeholders such as the project SOW initiator, the organization's decision makers, budgeting team, bidding and contracting process team, project manager, project team/s in different phases of the project management life cycle, the contractor and project end user may have different opinions in defining the effective project SOW and the qualities a project SOW should have to be effective. Also, different stakeholders have different definition for a successful project and different opinions regarding what measurements can be used to measure to what extent a completed project was successful. Those two questions will be answered using qualitative methods as suitable methods to collect rich data obtained from different opinions (Gill and Johnson, 2010). Qualitative methods has been used extensively by researchers to study different management fields including "soft" areas such as those related to leadership and organizational analysis (Symon and Cassell, 2012; Cassell and Symon, 2004) and those areas which considered as quantitative fields such as accounting and finance (Humphrey and Lee, 2004). Cassell and Symon (2004) claimed that qualitative researchers are interested in generating rich data that give more focus on interpretations and meanings that person or groups attribute to the concept under study.

Quantitative Methods

Quantitative research technique is a method in which statistics or numbers are involved and the observation are evaluated on the basis of number of respondents (Creswell, 2003b). After founding the base for this research by defining the effective project SOW and the successful project, it will be suitable to use quantitative methods to test the research hypotheses. Qualitative methods have a tendency to convoy a positivist model viewpoint.

The concern here is related to testing of hypotheses and measuring the relationships between variables using statistics. Hence, the main objective of quantitative methods is conducting replicable objective researches. Bryman and Bell (2007) suggested that after development of research hypotheses, researcher should choose the measures that can be used for measuring the variables. In the research under discussion here, survey questionnaire will be used as a tool to collect the required data to investigate the relationship between the project success and its SOW. Statements describe and identify different aspects in different phases of the project management life cycle, and the relationship between achieving the expectation and the SOW will be used to measure the level of agreement to those statements from different perspectives of different project stakeholders. 5-point and 11-point Likert scales will be used as measures.

The core of the current study is to understand and identify the relationship between the SOW and the project success. Statistics analysis and tests such as correlation, Multi Liner Regression (MLR) and descriptive analysis can be used to investigate the relation between variables. This required collecting of quantitative data using quantitative methods approach. The quantitative data will be collected using a questionnaire. Logic being that the questionnaire will prove efficacious and effective in obtaining primary information from various respondents.

Research Time Scale

Cooper & Schindler (2006: p. 138) labels a research design as "the blue print for the collection, measurement, and analysis of data." However, there are a large number of research designs, but the selection is made in accordance with study's purpose. It is first of all taken into account that whether a research study is descriptive, exploratory or casual/experimental.

While taking the characteristics and implications into account, it is decided to pick descriptive pattern of research in order to fulfill the required criteria of projected research study. However, descriptive form of research can also be of two types; cross sectional and longitudinal. The cross sectional research is undertaken for the factors such as shorter period of time, single measurement, easier and computability with all descriptive studies that are not about a process (Bagozzi, 1994). In contrast, the longitudinal research is exercised if a study looks for longer period of time and aims for multiple measurement (McDaniel and Gates, 1996). For this reason, most often a longitudinal research becomes difficult and expensive because it seeks to view change over period of time which cost excessive time and money, too (Churchill and Iacobucci, 2004). In context of the current research study,

cross sectional pattern of research is more suitable to the aims and objectives as well as nature of the study than longitudinal technique. Thus, cross sectional is preferred and chosen.

Research Techniques

Population

"Unfortunately, the actual population (called the target population) to which a researcher would really like to generalize is rarely available. The population to which a researcher is able to generalize, therefore, is the accessible population" (Fraenkel and Wallen, 2006, p. 93). For the current research, the accessible population would be the privet industrial business sector located at Eastern Region of Saudi Arabia. This sector is quite wide sector and quantifying the exact population is difficult. Project is extensively used to achieve different organizations' objectives and accordingly number of project stakeholders is defiantly high and it is growing day by day.
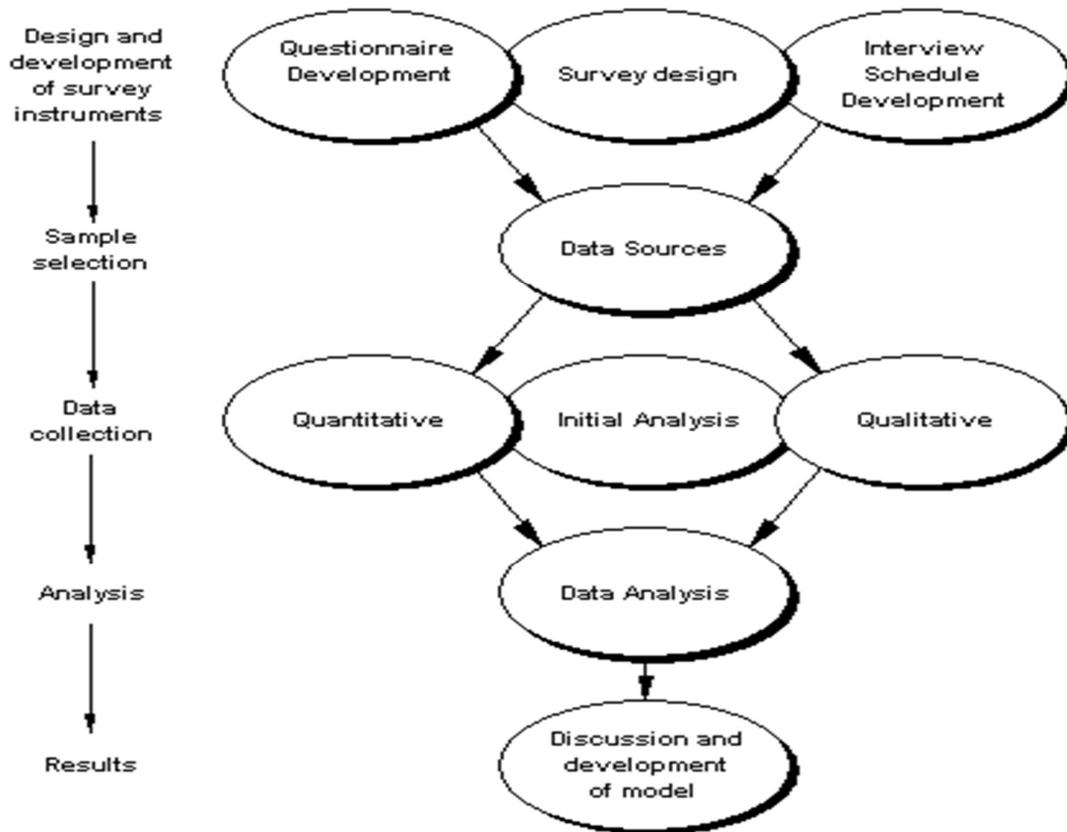
Figure PP-3: An example of research design (Siragusa, 2002: p. 13).

Sample Design

The process that considers taking sufficient number that represent the total population is what we call sampling (Sakaran, 2003). Same is to be exercised in context of this study. To identify the relationships using regression and/or correlation, 50 is the minimum sample size as general rule of thumb and number increasing as the number of independent variables increased (Van Voorhis and Morgon, 2007). Green (1991) suggested that for testing multiple correlations assuming medium sized relationship, the sample size should not be less than "50" plus eight times the "number of independent variables". He also suggested that to test individual predictors, the sample size should be greater than "104" plus "number of independent variables". Regressions that use more than five predictors, at least 10 respondents should be obtained for each predictor variables (Harris, 1985). For the current study, considering maximum of 17 independent variables, 200 sample size is exceeding the minimum size required.

The study is based on KSA privet industry sector; therefore, respondents will be selected from the business companies operating in KSA. In this regard, 300 questionnaires will be distributed for expected participants form the organizations working in KSA. All the participants will be project stakeholders like project managers, and project coordinators. In this way, different project stakeholders will participate under the concept of stratified sampling. It is pertinent to mention here that the study involves two techniques of data collection, therefore, from the same population data will be clinched with the use of both techniques. In order to deal with this issue, both survey questionnaires will be sent to all in two separate emails. Among 300 participants, it is expected to have 200 participants for the quantitative questionnaire and 20 for qualitative questionnaire.   The researcher has an easy access to the companies in Eastern Region of Saudi Arabia, therefore, these companies would be preferred, however, efforts would be made to collect information from other organizations, too, but time and access can be the constraints for the researcher.

Data Collection Procedure

The researcher would use all available options that can ease his work. In this regard, the researcher can collect the information on phone or through email from the respondents after taking the convenience of the respondents into account. To maintain the ethics of research, every participant will be ensured of complete confidentiality and anonymity of their personal identification.

PILOT PROJECT

The pilot project study conducted in private industrial sector at Eastern Province of KSA. Industrial sector as a typical example that has many of executed projects which motivate the researcher to conduct this research in. Data collected from different project stakeholders and in different business fields with different levels of experience. For the purpose of this project, around half of the selected participants were selected to be representative of the project owner and the rest were selected to be representative the project execution contractor. As it was planned, one third of the final actual research proposed participants to be invited to participate for this pilot project research. Accordingly, it was expected to have around 30% as response rate for the research questionnaire. This low expectation because of the limited time required to complete this pilot project.

A questionnaire is designed to collect a quantitative data that enable the researcher to find the relationship between the project success and the project SOW. Different project stakeholders with different years of experience and different organization business field were invited to be the participants. In order to have high validity and reliability for the collected data and the farther analysis, it is required to relatively higher response rate than that required for the first questionnaire. Field (2009) claimed that "the bigger the sample, the more likely it is reflect the whole population" (p. 35). The questionnaire requires about 30 minutes and it is quite easy to fill. Hence, it is expected to have good response rate.

Survey Questionnaires Respondents Profile

Different project management stakeholders such as organization decision makers; project scope of work writers, project bidding and contracting team members, project managers and project management professionals were contacted and invited to participate in this pilot project research survey using email and telephone over a period of 5 weeks. Based on researcher easy access, a total of 104 project stakeholders were contacted and separate invitations for each survey questionnaire were emailed to them. Total of 51 completed surveys were returned and taken forward for analysis. This represents a response rate of about 49% which is quite good response rate when it is compared with similar surveys that usually achieve response rate between 15-20% (Wu et al. 2006; Jugdev et al., 2007). Figure PP-4 shows the respondent profile for this part of survey. 25% respondents were project managers; and 27% were project management and execution team members as shown in

Figure PP-4-A. Project SOW initiators/writers (11.7%), project bidding and contracting team members (9.8 %), organization decision maker (9.8 %) and project end user (15.7 %) represent the remaining. Figure PP-4-B shows that more than 50 % of the participants have experience between 10 to 20 years while around 25 % for those who have less than 10 years' experience and less than 25 % for those who have more than 20 years' experience. By looking to the organization field, 19.6 % of the respondents are working for manufacturing organizations, 23.5 % for chemical/petrochemical organizations, 15.7 % for Oil & Gas organizations, and 27.4 % for construction /contracting organizations, 3.9 % for engineering services and 9.8 % for utilities organizations (see Figure PP-4-C). About 70 % of the respondents are working for organizations who won the projects and they represent the projects owner while the remaining 30 % of the respondents are representing the projects execution contractor as it is indicated in Figure PP-4-D. Finally, around 78 % of the respondents were appraising what they considered as completed successful projects while the remaining participants ($\approx$ 22 %) were appraising failed projects.

FINDINGS

The collected data was entered into SPSS; some graphics and analysis techniques were used to represent the findings. Mainly, clustered bar and correlation analysis is used in this report to test if the selected methods can help achieving the current research objectives, answering research questions and testing the research hypotheses. In this section, the data analyses results are represented and the structure (the below sub-headings) is design to follow the sequence of research objectives, questions and hypothesis mentioned earlier in this report.

Successful Project

By comparing successful projects with failed ones, it is easy to recognize that successful projects have higher level of agreements against the project completion on time, within the allocated budget, according to its scope and achieving its strategic objectives. Oppositely, participants see that failed projects were failed to: achieve their strategic objectives, complete according to the schedule, not to exceed their allocated budget and/or match their original scope. Figure pp-5 shows that it is more important for the successful project to achieve its long term goals that contribute in the organization business developments. Project completion according to its initial scope is coming in the second rank of importance for having a successful project. Even though it is important to have project completed on time, this factor is the least important factor -for the respondents- between the four project success measures; on time, on budget, on scope, on strategy.
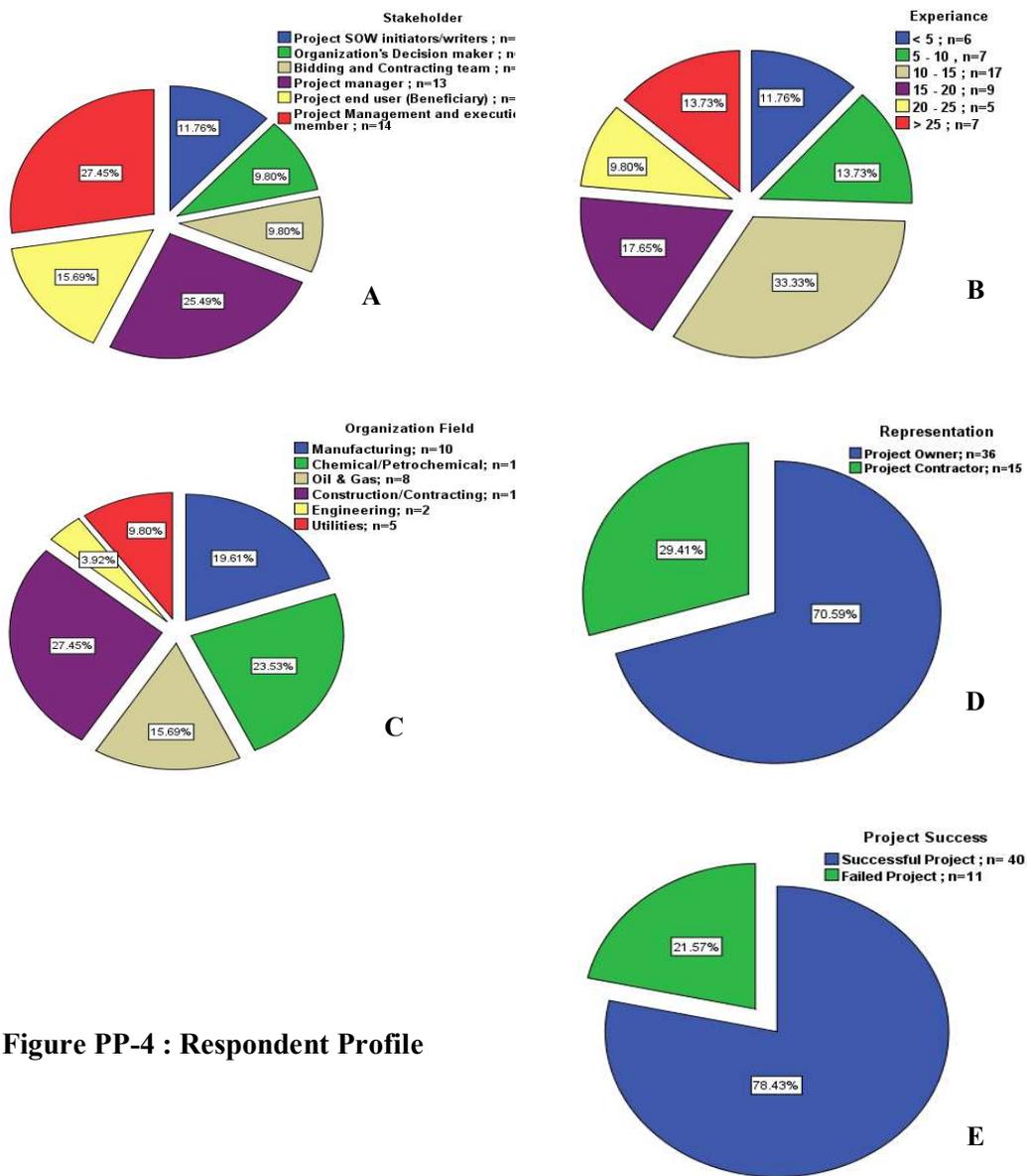
Figure PP-4 : Respondent Profile

Based on the above, successful project can be define as the project that meets its overall strategic objectives that add value to the organization's business. Such project should be completed on time, on budget, on quality and on strategy (Norrie and Walker, 2004). This finding is agreed with Jugdev and Muller (2005) when they defined the successful project as the project that expands the focus of traditional definition of completing the project on time, within the budget and as per the specified scope to include the stakeholder requirements. What is found here can be supported by conducting interview with different project stakeholders in order to have more reliable and valid answer to the first research

question (RQ1). This can be done in the next stage of this research to replace the survey questionnaire I proposed for this pilot project.
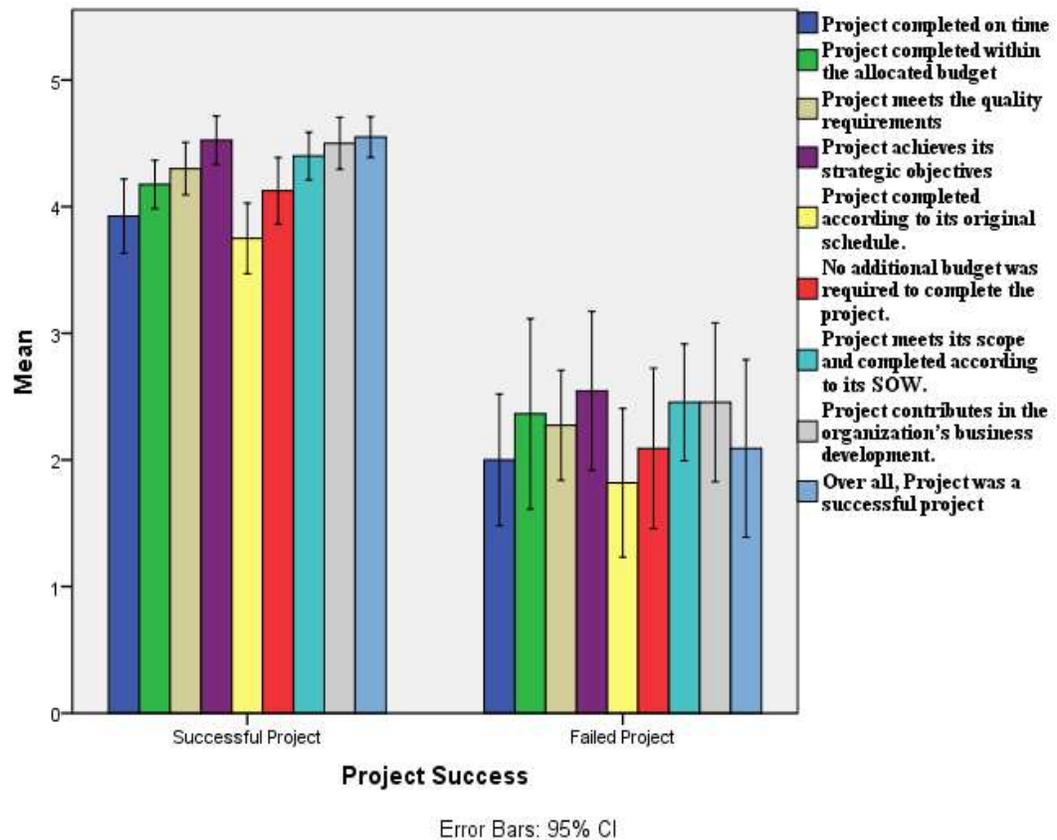
Figure PP-5: Project success

Effective SOW

Figure PP-6 shows the mean level of agreement for the respondents against the qualities of SOW contents. They agreed that effective scope of work content should: describe the expectations of the project in detail; specify the deliverables; specify inclusions and executions; state the completion date or period; precise in specifying performance obligations; and give full technical information and specifications. SOW that miscues the focus on project performance objectives, project expected outputs, requirements and project millstones is considered as an ineffective SOW and that seems to be one of factors that causes a failure of the project. It is agreed that the SOW content is a major part that have direct influence of the overall effectiveness of project SOW and in sequence the project success.
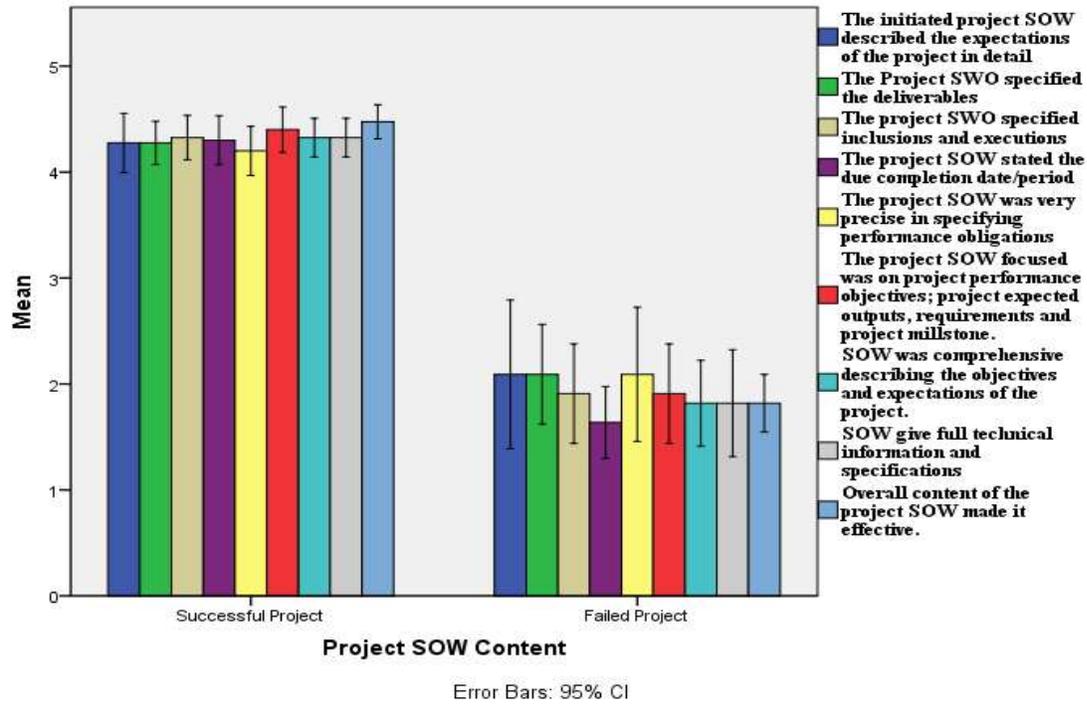
Figure PP-6: SOW Content
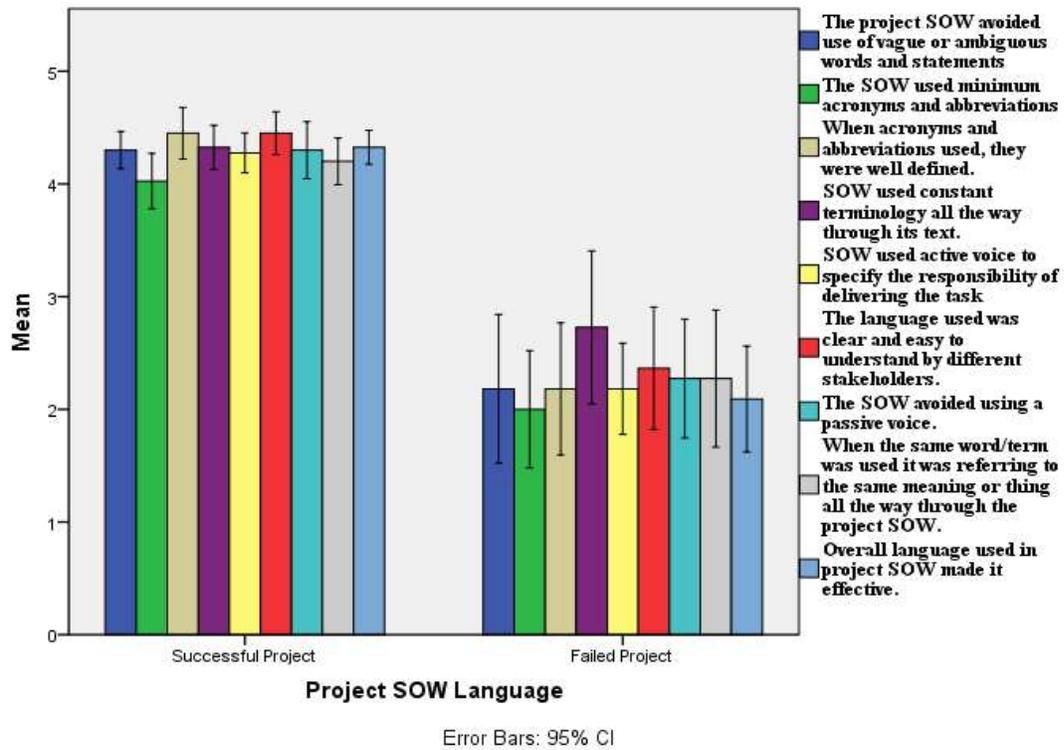
Figure PP-7: SOW Language

As it is important to measure the essentialness of the project SOW content, it is important to measure that importance for SOW language. Figure PP-8 shows the mean level of agreement for the respondents against the qualities of SOW language. They agreed that successful project is that have effective scope of work language. SOW should: avoid using of vague or ambiguous words or statements; use minimum acronyms and abbreviations and defined them well when they used; use constant terminology all the way through its text, use active voice to specify the responsibilities; and use clear and easy to understand terms. SOW that: use unclear and un-understandable language; use passive voice which confuse the responsibility of delivering the project tasks; and use vague terms is considered as an ineffective SOW and that seems to be one of factors that causes a failure of the project. It is also agreed that the SOW language is another major part that have direct influence of the overall effectiveness of project SOW and in sequence the project success.

This part of findings can assist in answering the second research question (RQ2). The objective here is to understand what an effective SOW is. In fact this part gives idea about the qualities of an effective SOW and the answer RQ2 required more investigation which was planned to be obtained by survey questioner I (see Appendix I). But because zero response rate, this will be considered in the next stage by conducting interviews instead. The above findings ensure the needs of having a project SOW that have good content using good language in order to enhance the chance of completing the project successfully. As it is found here, the project SOW should describe in detail the expectations (Reiling, 2008), should be written in outcomes oriented approach (Amanwani, 2009), should contain the performance obligations (Phillips, 2008) and should include millstones and due dates (Cho and Gibson Jr., 2001). Also, Project SOW should use active voice (Nielson, 2009), keep away of using vague words or statements (Martin, 2010; Nielson, 2009; Cho and Gibson Jr., 2001) and use constant terminology (Dumont et al., 1997).

SOW and Initiation Phase Processes

Project stakeholders agreed that without effective SOW, it was difficult to select the right project for execution. They agreed that effective SOW helped decision makers to select and prioritize the right project because of its clarity; and its contribution of describing the business requirements, the problem statement and associated risk. On the other hand, ineffective SOW is helpless for the decision makers and it has no significant assistance for taking the right decision and this may end in wrong investment that affect the achievement of the key objectives that organization aim to accomplish by implementing the project. If SOW failed to give the organization top management a

clear identification for the strategic benefit of the project, the project SOW is considered as ineffective SOW. Figure PP-8 show that a well-defined effective SOW normally helps the decision makers to justify their decision of selecting the project while it is difficult to justify a project that has ineffective SOW.
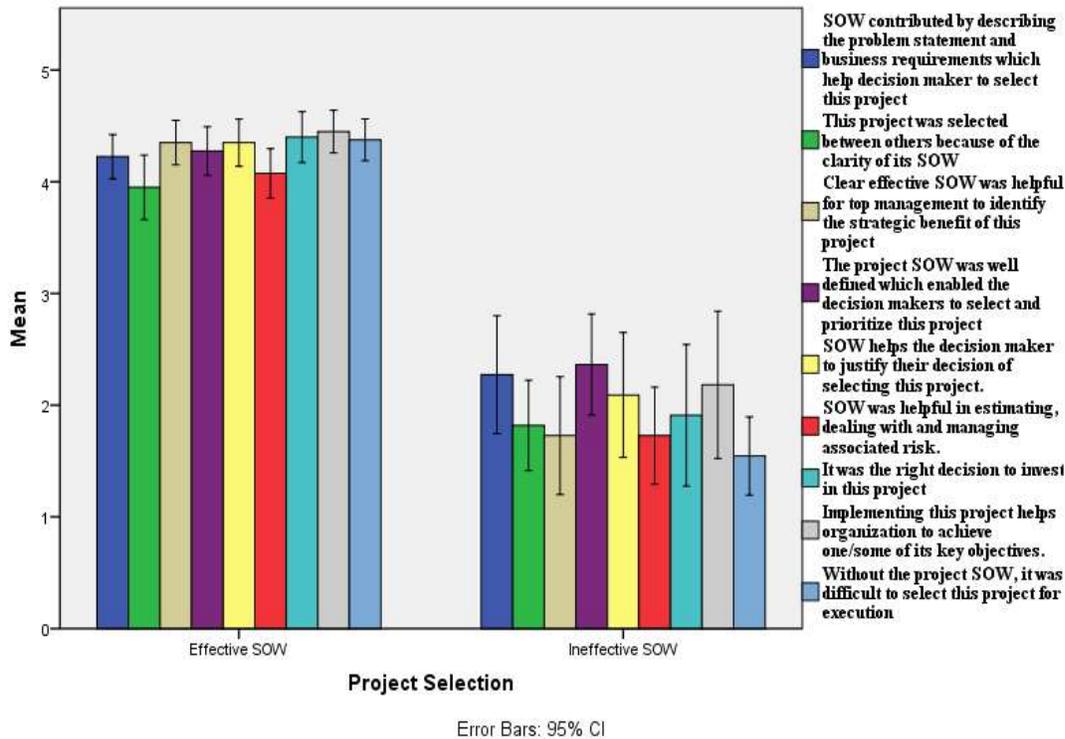
Figure PP-8 : SOW and Project Selection Process

Having of specific, comprehensive, clear and understandable SOW that has detailed breakdown of the project's required services and tasks is important for allocation the right budget for the project. This because that effective SOW is a helpful document to estimate the right budget and evaluate the required resources. Figure PP-9 shows that effective SOW lead to have a project that completed within the budget and/or without the need for significant additional budget beyond that allocated. On the contrary, respondents see that the project SOW is considered ineffective if major change in the project scope during the project execution phase was happened which required significant additional investment beyond the allocated budget.
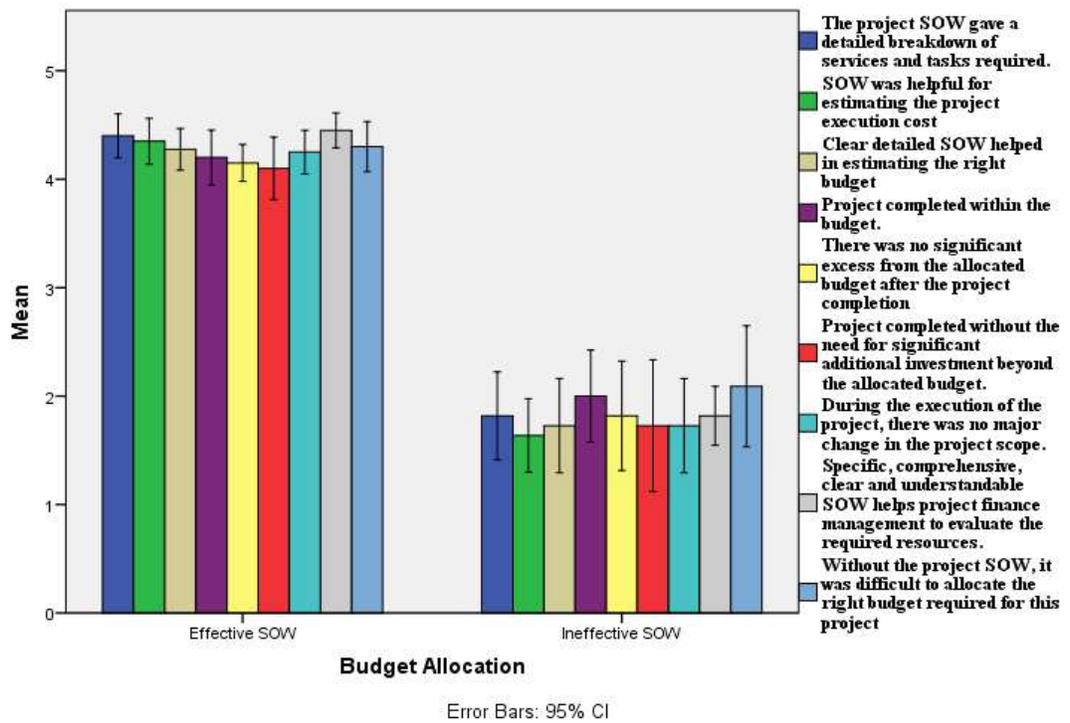
Figure PP-9: SOW and Budget Allocation Process
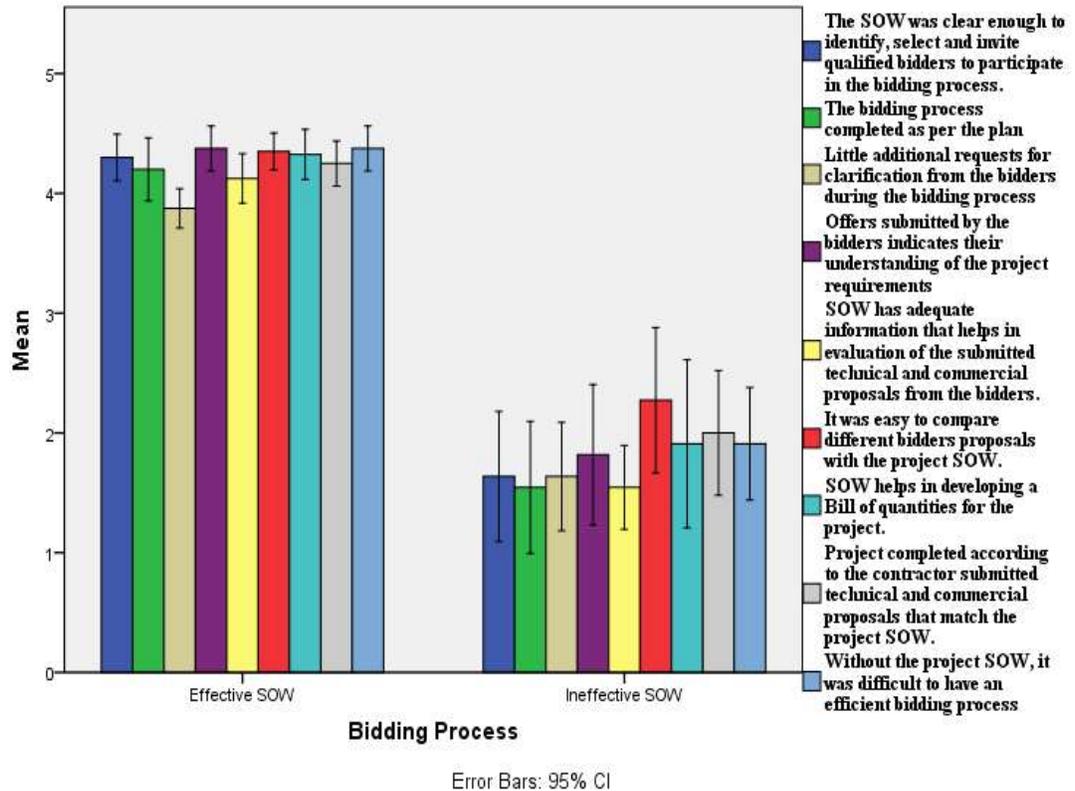
Figure PP-10: SOW and Bidding Process

The project SOW formed a main part of the project contract

The project contract contains a clear scope and clear terms and conditions.

The project was completed without any amendment to the initial contract.

Project completed according to the contract terms and conditions and as per the project SOW.

SOW helps in identifying the risk and manage it by forming an efficient contract.

Specific SOW and clear bill of quantities contribute in developing –within the contract- clear millstones and accordingly clear payment terms.

Contract contains clear deliverables that match the project SOW

The project completed without disputes between the contractor (the project executer) and the organization (the project owner)

Without the project SOW, it was difficult to have an efficient project contract

Error Bars: 95% CI

Figure PP-11: SOW and Contract Formation

After writing the project SOW, selecting the project for implementation and allocating the budget, it is a time to start first step for implementation processes which is "bidding process". In Figure 10, respondents discriminate between the effects of what they considered as effective SOW and ineffective SOW on bidding process. While effective SOW is helpful in identifying, selecting and inviting the qualified bidders, ineffective SOW is not. Effective SOW helps bidders to understand the project requirements which minimize their additional clarifications, assist them to develop accurate bill of quantities and submit clear technical and commercial proposals that match the project SOW. Also, this effective SOW helps biddings evaluation team for easy compare between different bidders proposals and compare those with the project SOW. In contrast, inefficient SOW give inadequate information which make it hard to evaluate the bidders' submitted technical and commercial proposals. This may cause requests for more clarification from both parties and in sequence more time.

By end of the bidding process, project normally awarded to contractor/s and it is also normally to have a written contract between project owner and other parties. Participants in this survey strongly agreed that effective SOW is the main part of project contract and without that SOW; it was tough to have an effective project contract. The clear contract which has clear SOW assisted in completing the projects without major amendment and without disputes between the contract's parties. This was a result of having project contract that have clear scope and clear terms and conditions which contributed in developing clear millstones and accordingly clear payment terms.

The results indicate that developing an effective SOW is a critical task that needs to be achieved at a very early stage of the strategic project management life cycle (Stallsworth and McDonough, 2013). The SOW is the foundation for project selection process, budgeting process, bidding process and contract formation process (Hart, 2012). The results give clear indication that there is relationship between the written SOW and these processes of the initiation phase. Drafting an excellent SOW will facilitate the success of these processes.
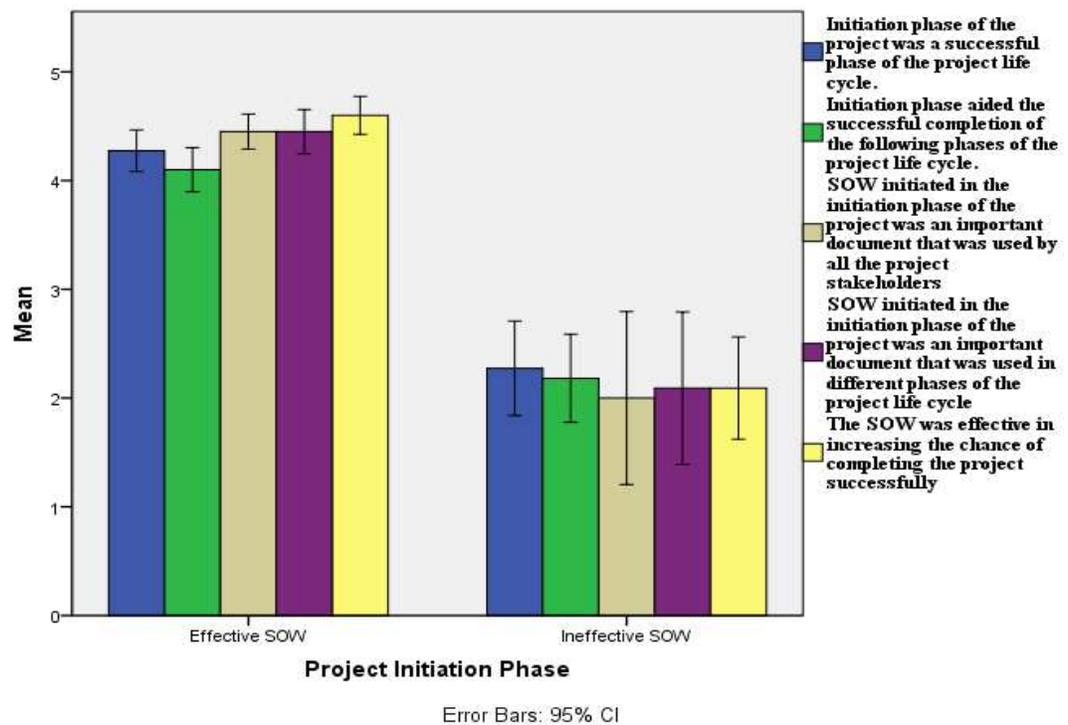
Figure PP-12: SOW and Project Initiation Phase
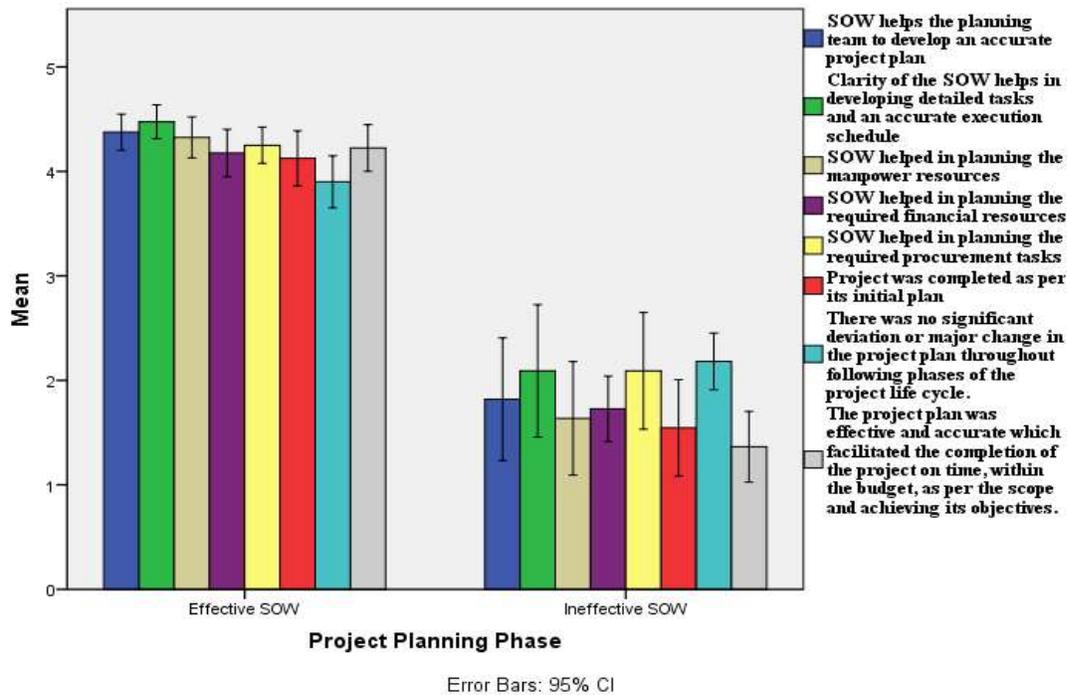
Figure PP-13: SOW and Planning Phase

SOW and Project Lifecycle Phases

Survey's participants identified that successful initiation phase is connected with effectiveness of the project SOW and it is usually used by different project stakeholder at the project initiation phase as well as for following phases of the project life cycle. Figure PP-12 shows that the more the project effectiveness the more the chance for having a completed successful project. It is similar to the previous results; the level of agreements for the statements related to the initiation phase is high for effective SOW and is low for ineffective one.

Similar to initiation phase, planning phase is important phase for preparing for the project to pass its next phases. Participants agreed that effective SOW helps the planning team to develop accurate plans that have detailed tasks and accurate execution schedule. Different resources requirements for project can be planned well if the project has an effective SOW. Projects which have ineffective SOW cannot have accurate schedule and deviation from and changes in their initial plans is expected. Ineffective SOW have low chance to have a successful project that completed on time, within the budget, as per the scope and that achieved its objectives. More detailed can be seen in figure 14 above.

In the execution phase, project SOW is used as reference for the project manager, project management team from both parties; project owner and contractor. Project stakeholders agreed with the previous statement if the project SOW was an effective one and they this agreed if it is not. It is difficult with ineffective SOW to identify the project requirements and this may cause a major change in the project scope during execution phase. Stakeholders agreed that project that have effective SOW can end with a successful execution phase that aids the project to pass its closure phase easily and in conclusion a successful completed project.
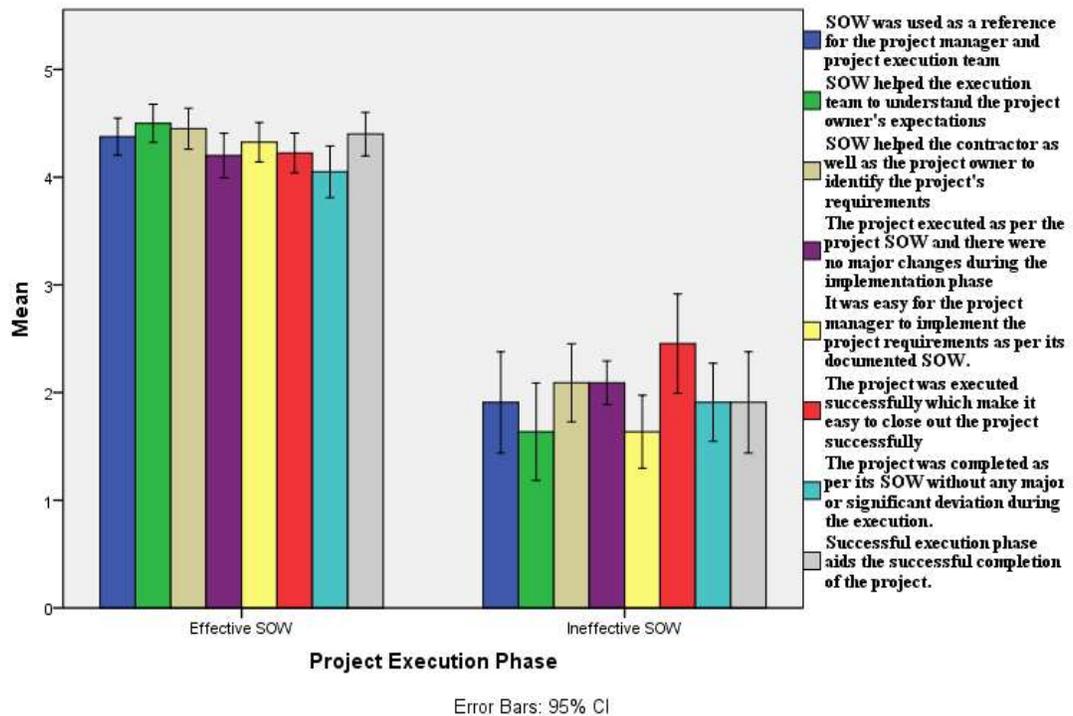
Figure PP-14: SOW and Project Execution Phase

In Figure PP-15, project stakeholders agreed that effective SOW specify the project requirements and provide detailed specification that helped identifying the project requirements. Because of that it was used by quality control/quality assurance team to ensure that the executed project's tasks are meeting the project quality requirements and to give early alert to highlight any deviations from the project scope. In opposition, project stakeholders are unhappy about ineffective SOW and its role in the monitoring and control phase of the project life cycle which lead to unsuccessful monitoring and control phase and after that unsuccessful overall project.
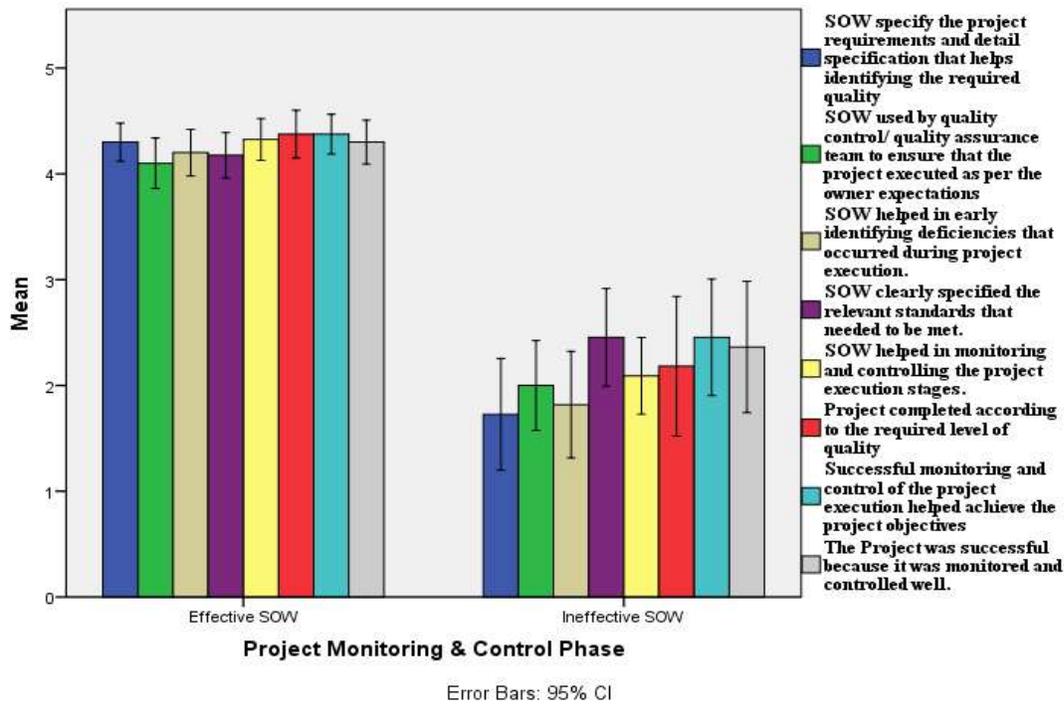
Figure PP-15: SOW and Project Monitoring and Control Phase
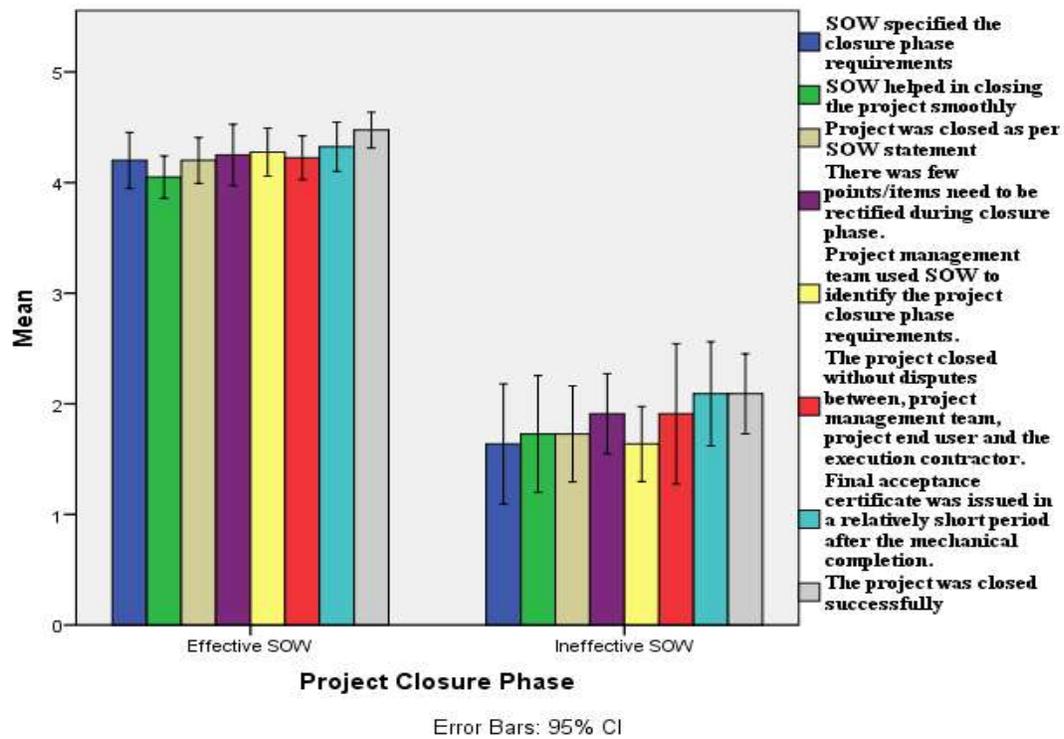
Figure PP-16: SOW and Project Closure Phase

Last stage of the project is the closure phase. Figure PP-16 shows the level of agreement of different project stakeholders against some feature of this phase. It shows that ineffective SOW is failed to specify the closure phase requirements and this prevent the project stakeholders' aim of having a smooth close out phase. Ineffective SOW may cause of having long list of items that need to be rectified during this phase of the project. Project management team is welling to use effective project SOW to identify the project closure requirements while they are not willing to do so with an ineffective SOW. Effective SOW helps in closing the project without disputes between different project stakeholders and this aids in issuing the final acceptance certificate and close the project successfully.

As it was expected, the effective project SOW is important for each phase of the project management lifecycle. It is used for different phases and without SOW, it will be difficult to pass those phases successfully and accordingly it well be more difficult to have a completed successful project. The results here give an idea how it will be the relationships between an SOW effectiveness and success of each phase of the project life cycle and the relationships between that success and the project overall success.

Relationship between SOW Effectiveness and its Content and Language
There was a significant relationship between the SOW content and SOW effectiveness, r= .96, p < .001. Also, the relationship is significant between the SOW language and SOW effectiveness, r= .946, p< .001. SOW content was significantly correlated with SOW effectiveness for both successful and failed project. On the other hand, while SOW language was significantly related to SOW effectiveness for successful projects, this relationship is small and insignificant for failed projects, r= .034, p> .05 as shown in table 1.1 in Appendix III. Table 1.2 shows that both project owner and project contractor assumed high significant relationship between project SOW content and SOW effectiveness as well as the project SOW language and SOW effectiveness. Same is applied by looking at different categories of project stake holders with little difference in the level of significant (see table 1.3).

Different project stakeholders with different years of experience is participating in evaluating this relationship and the results shows that those who have less experience (< 5 years) and those who have long experience (>25 years) assumed less relationship between the project SOW content and language and SOW effectiveness but those relationships are still significant as indicated in Table 1.4 of Appendix III. Finally by

splitting the participants according to their organization field, it is recognized that there was a significant relationship between the project SOW content and SOW effectiveness regardless what type of business was project executed in (p<001). This is also applicable for the relationship between the SOW language and SOW effectiveness.

The results described above give an overall support to Hypothesis H1 and its sub hypotheses (H1.1 and H1.2). The effectiveness of the project SOW content and Language have a significant impact on its overall effectiveness. This was supported by different project stakeholders with various years of experience and working for different fields. The only finding that different than what was expected is that H1.2 is2 not supported when the selected project is failed one. This motivate the researcher to have more investigation in the next stage of this research.

Relationship between SOW Effectiveness and Initiation Phase Processes

There was a significant relationship between SOW effectiveness and the success of the project selection process, $r= .943$, $p < .001$. Also SOW effectiveness was significantly correlated with the accuracy of the allocated budget, $r= .896$; success of bidding process, $r= .888$; and the effectiveness of the project contract, $r= .930$(all ps $< .001$). Splitting the data by the project success, it was fond that the relationship between SOW effectiveness and both the success of the project selection process and the accuracy of allocated budget are insignificant ($p > .05$) and it is less significant for the relationship between SOW effectiveness and both success of bidding process and effectiveness of the project contract. On the other hand those relationships are significant for successful projects as you can see in table 2.1 of Appendix III. Table 2.2 shows that the relationship was find to be significant ($p < .001$) between SOW effectiveness and (1) success of the project selection process, (2) accuracy of allocated budget, (3) success of bidding process, and (4) effectiveness of the project contract. This significance is involved for both project owner and project contractor.

Table 2.3 shows the correlation between SOW effectiveness and above mentioned four variables after splitting the collected data according to project stakeholder category. The relationship is still significant for all but it is less significant for SOW initiator, decision maker, and bidding and contracting team. By categorized the

participants according their years of experience, table 2.4 identified that there were significant relationships between the SOW effectiveness and four variables for all gropes of experiences except those who have less experience (< five years) and who have long year of experience (> 25 years). Finally, categorizing the data according to the company business field indicates the relationships are significant regardless the type of business field respondent work for.

Hypothesis H2 and its sub-hypotheses (H2.1, H2.2, H2.3 and H2.4) are supported. In general, SOW effectiveness has significant impact on project selection process, budget allocation process, bidding process and contract formation process. But some of those sub-hypotheses are not supported by project stakeholders who have relatively short years of experience and those who have long years of experience. Also, some of them were not supported when the project was a failed one. Again, researcher needs to have more investigation for those cases in empirical research to understand the reason behind such results.

Relationship between SOW Effectiveness and Phases of the Project Lifecycle

The SOW effectiveness was significantly related to: initiation phase success $r = .944$; planning phase success $r = .900$; execution phase success $r = .935$; monitoring and control phase, $r = .941$; and closure phase success, $r = .930$ (all $ps < .001$). The relationships between the SOW effectiveness and the success of the five phases were significant for successful projects. Also, for failed projects the SOW effectiveness was significantly correlated to all five phase of the project life cycle except that with planning phase ($p > .05$, see Table 2.1 at Appendix III) . The results shown in table 2.2 give evidence that project owners as well as the project contractor are identifying the significant relationship between the success of each phase of the project life cycle and the SOW effectiveness. Also, that relationship was significant for all types of business category (see Table 2.5).

Categorizing the collected data based on the project stakeholders, results shows that there was relationship between the effectiveness of the project SOW and the five phases of the project life cycle except for SOW initiator where results show no significant relationship between SOW effectiveness and the success of planning and execution phases ($p > .05$ as shown in Table 2.3). Also, SOW effectiveness was not

significantly related to the success of initiation, planning and closure phases (p > .05) for those whose have experience less than five years or those whose have more than 25 years (see Table 2.4). Others groups of experience are satisfying the relationships between the five phase and the project SOW effectiveness.

The result indicates that the effectiveness of the project SOW has impact on the success of project intuition phase, planning phase, execution phase, monitoring and control phase, and closure phase of the project lifecycle. Thus, H3.1, H3.2, H3.3, H3.4, and H3.5 are supported. But H3.2 and H3.3 are not supported by SOW writers/initiators. Also, H3.1, H3.2, and H3.5 are not supported by those who have less than 5 years of experience and those who have more than 25 years of experience. Again those cases need to be highlighted for more investigation when conducting the next survey for current research.

Relationship between Phases of the Project Lifecycle and the Overall Project Success
Investigating the relationship between the success of each phase of the project SOW and overall success of the project indicate that overall project success was significantly correlated with success of initiation phase, $r = .926$; success of planning phase, $r = .888$; success of execution phase, $r = .933$; success of monitoring and control phase, $r = .940$; and success of closure phase, $r = .935$ (all $ps < .001$). Those relationships were found to be significant for both successful project and failed project. Likewise, those relationships were found to be significant for: owner and contractor, all project stakeholders, and all types of business field that organizations are belong to. Also those relationships were found to be significant for project stakeholders who have more than five years and less than 25 years of experience (see Table 3.4).

In total, the higher the chance for successful project initiation, planning, execution, monitoring and control, and closure phases, the higher the chance for an overall successful project. The correlation results support H4.1, H4.2, H4.3, H4.4, and H4.5. But again, by having deep investigation, it was found that the H4 and its sub-hypothesis are not supported by project stakeholders whose have years of experience less than 5 years or more than 25 years. Also, one more surprise result is H4.2 was not supported when the project evaluated by respondents was a successful project.

This result is not in line with the assumption that good planning is the key factor for project success (Asrilhant et al., 2006; Hobbs et al., 2006; Zwikael and Globerson, 2004).

Relationship Between successful project and project success controllers

There was a significant relationship between the project completed on time and project success, $r = .839$, $p < .001$. This relationship was significant for successful project but it is not for failed project as it shown in table 4.1. This relationship was significant for SOW initiator, decision maker, bidding and contracting team, project manager, project end user and Project Management Team (PMT) members whatever their company field is and regardless if they represent the project owner or the project contractor. This relation is insignificant for those who have less than five years of experience and those who have more than 25 years of experience.

Likewise, the project success was significantly correlated to the completion of the project within its allocated budget, $r = .883$, $p < .001$. This relationship was significant for successful projects but it is not for failed projects. This relationship was significant for all project stakeholders whatever their company field is and regardless if they represent the project owner or the project contractor. Again, this relation is insignificant for those who have less than five years of experience and those who have more than 25 years of experience.

In addition, the project success was significantly related to the completion of the project as per its scope, $r = .950$, $p < .001$. This relationship is significant for successful projects as well as for failed projects, for project owner as well as for project contractor, and for all business fields. This relation is also significant for all project stakeholders except for SOW initiator ($p > .05$). Also, this relationship is insignificant for those who have less than five years of experience and those who have more than 25 years of experience.

Finally there was a significant relationship between the achievement of the project's strategic objectives and the project success, $r = .982$, $p < .001$. That relationship was significant for all project stakeholders and regardless of their years of experience and their organization field. Also that relationship was found to be significant for successful and failed projects, and it was significant for project owner and contractor.

The outcomes point out that the higher the chance the project completed on time, on budget, on scope, on strategy, the higher the chance of having a successful project. So, H5.1, H5.2, H5.3, and H5.4 are supported. It seems that project stakeholders are not considering the significant of completing the project on time or within the budget for failed projects. Also, H5.1, H5.2 and H5.3 are not supported by those who have less than 5 years or more than 25 years of experience. It is interesting here that H5.4 is supported by all types of categories used to compare the results in this study. Overall finding is consistency with Norrie and Walker (2004) model. Having a project that achieved its strategic goals is the most significant and without achieving that, it is not possible to consider that project is a successful project. On the other hand, there is a chance for the project to be a successful project even if it is completed beyond its time, budget and scope.
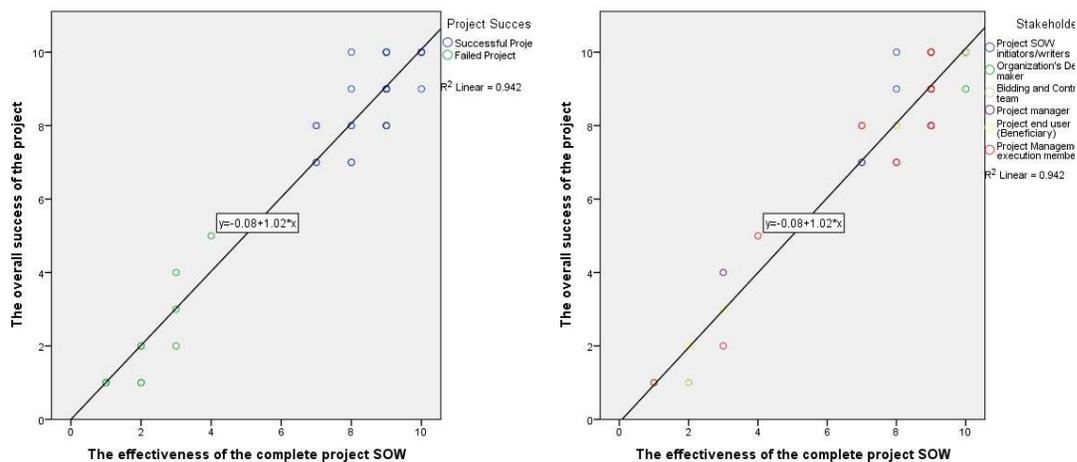
Grouping variable: Project success   Grouping variable: Project stakeholders

Figure PP-17 : Relationship between SOW effectiveness and project success

Relationship between Project Success and project SOW

The above findings prove the relationship between the project success and the effectiveness of its SOW. Figure PP-17; shows the linear relationship between the project SOW effectiveness and the project success. Successful projects intersection points are clustered at high SOW effectiveness and high project success. Oppositely, failed projects intersection points are clustered at low SOW effectiveness and low project success. The fit line shows that there is a positive relationship between the project SOW effectiveness and the project

success. Thus, as the SOW effectiveness increases the chance of having a successful project is increased. H6 is supported here and the relationship between the project SOW effectiveness and the project success can be written as follow:

PS=0.08 + 1.02 SWE   where:

PS = Project success

SWE= project SOW effectiveness

CONCLUSION AND RECOMMENDATIONS FOR NEXT STEP

It was useful practice to conduct this pilot project as an investigation tool to test the research proposed methodology, research approach, suitability of the selected instrument to collect the primary data and to test the proposed analysis techniques. Due to time constrain, it was not possible to test more possible instruments for data collection such as single face to face interview or focus group interview to collect more qualitative data. The survey was conducted successfully and it gives good response rate. The questionnaire was designed well to cover achieving research objectives and testing research hypotheses. The results obtained from the collected data through this questionnaire give indication that it is a suitable instrument for the purpose of this pilot project. Some more statistics tests such those to test the reliability and validity of the collected data, checking assumptions for the collected data and additional analysis to find model values for the relationships such as multi linear regression (MLR) analysis are required to validate the results. The results show the importance of the Project SOW and this justify my DBA research subject. To obtain rich in depth data, a qualitative data need to be collected to understand the role of the project SOW in the project performance, the characteristics of an effective project SOW, its development process and practical enablers and barriers to make recommendation for improvements.

Attachments to Annex I

A) <u>Research Survey</u>

Please recall one completed project that you know very well and complete the following questionnaire accordingly:

I)   Demographic Information

Company	………………………………..……………………………………
Position	……………………………………………………………………
Years of experience	○ 5 - 10 ○ 15 - 20 ○ 20 - 25 ○ > 25
State which category of Organization you are working for?	○ Manufacturing ○ Chemical/Petrochemical ○ Oil & Gas ◉ Construction/Contracting ○ Engineering ○ Utilities
Your involvement was as representative for Project ……….……	○ Owner ○ Contractor
State which category of project stakeholders you fall into?	☐ Project SOW initiators/writers ☐ Organization's decision makers ☐ Bidding and Contracting team ☐ Project manager ☐ Project end user (Beneficiary) ☐ Project Management and execution member

II) **Project success and its Scope of Work (SOW)**

Please rate each of the following statements as per rating scale:
- **1= strongly disagree**
- **2= disagree**
- **3= neither disagree or agree**
- **4= agree**
- **5= strongly agree**

A) Project Success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	Project completed on time.	○	○	○	○	○
2	Project completed within the allocated budget.	○	○	○	○	○
3	Project meets the quality requirements.	○	○	○	○	○
4	Project achieves its strategic objectives.	○	○	○	○	○
5	Project completed according to its original schedule.	○	○	○	○	○
6	No additional budget was required to complete the project.	○		○	○	○
7	Project meets its scope and completed according to its SOW.	○	○	○	○	○
8	Project contributes in the organization's business development.	○	○	○	○	○
9	Over all, Project was a successful project	○	○	○	○	○

B) Project Scope of Work (SOW) Content

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	The initiated project SOW described the expectations of the project in detail	○	○	○	○	○
2	The Project SWO specified the deliverables	○	○	○	○	○
3	The project SWO specified inclusions and executions	○	○	○	○	○
4	The project SOW stated the due completion date/period	○	○	○	○	○
5	The project SOW was very precise in specifying performance obligations	○	○	○	○	○
6	The project SOW focused was on project performance objectives; project expected outputs, requirements and project millstone.	○	○	○	○	○
7	SOW was comprehensive describing the objectives and expectations of the project.	○	○	○	○	○
8	SOW give full technical information and specifications	○	○	○	○	○
9	Overall content of the project SOW made it effective.	○	○	○	○	○

C) Project Scope of Work (SOW) Language

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	The project SOW avoided use of vague or ambiguous words and statements	○	○	○	○	○
2	The SOW used minimum acronyms and abbreviations	○	○	○	○	○
3	When acronyms and abbreviations used, they were well defined.	○	○	○	○	○
4	SOW used constant terminology all the way through its text.	○	○	○	○	○
5	SOW used active voice to specify the responsibility of delivering the task	○	○	○	○	○
6	The language used was clear and easy to understand by different stakeholders.	○	○	○	○	○
7	The SOW avoided using a passive voice.	○	○	○	○	○
8	When the same word/term was used it was referring to the same meaning or thing all the way through the project SOW.	○	○	○	○	○
9	Overall language used in project SOW made it effective.	○	○	○	○	○

D) Project SOW and Project Selection Process

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	SOW contributed by describing the problem statement and business requirements which help decision maker to select this project	○	○	○	○	○
2	This project was selected between others because of the clarity of its SOW	○	○	○	○	○
3	Clear effective SOW was helpful for top management to identify the strategic benefit of this project	○	○	○	○	○
4	The project SOW was well defined which enabled the decision makers to select and prioritize this project	○	○	○	○	○
5	SOW helps the decision maker to justify their decision of selecting this project.	○	○	○	○	○
6	SOW was helpful in estimating, dealing with and managing associated risk.	○	○	○	○	○
7	It was the right decision to invest in this project	○	○	○	○	○
8	Implementing this project helps organization to achieve one/some of its key objectives.	○	○	○	○	○
9	Without the project SOW, it was difficult to select this project for execution	○	○	○	○	○

E) Project SOW and Budget allocation

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	The project SOW gave a detailed breakdown of services and tasks required.	○	○	○	○	○
2	SOW was helpful for estimating the project execution cost	○	○	○	○	○
3	Clear detailed SOW helped in estimating the right budget	○	○	○	○	○
4	Project completed within the budget.	○	○	○	○	○
5	There was no significant excess from the allocated budget after the project completion	○	○	○	○	○
6	Project completed without the need for significant additional investment beyond the allocated budget.	○	○	○	○	○
7	During the execution of the project, there was no major change in the project scope.	○	○	○	○	○
8	Specific, comprehensive, clear and understandable SOW helps project finance management to evaluate the required resources.	○	○	○	○	○
9	Without the project SOW, it was difficult to allocate the right budget required for this project	○	○	○	○	○

F) Project SOW and Bidding Process

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	The SOW was clear enough to identify, select and invite qualified bidders to participate in the bidding process.	○	○	○	○	○
2	The bidding process completed as per the plan	○	○	○	○	○
3	Little additional requests for clarification from the bidders during the bidding process	○	○	○	○	○
4	Offers submitted by the bidders indicates their understanding of the project requirements	○	○	○	○	○
5	SOW has adequate information that helps in evaluation of the submitted technical and commercial proposals from the bidders.	○	○	○	○	○
6	It was easy to compare different bidders proposals with the project SOW.	○	○	○	○	○
7	SOW helps in developing a Bill of quantities for the project.	○	○	○	○	○
8	Project completed according to the contractor submitted technical and commercial proposals that match the project SOW.	○	○	○	○	○
9	Without the project SOW, it was difficult to have an efficient bidding process	○	○	○	○	○

G) Project SOW and Contract Formation

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	The project SOW formed a main part of the project contract	○	○	○	○	○
2	The project contract contains a clear scope and clear terms and conditions.	○	○	○	○	○
3	The project was completed without any amendment to the initial contract.	○	○	○	○	○
4	Project completed according to the contract terms and conditions and as per the project SOW.	○	○	○	○	○
5	SOW helps in identifying the risk and manage it by forming an efficient contract.	○	○	○	○	○
6	Specific SOW and clear bill of quantities contribute in developing –within the contract- clear millstones and accordingly clear payment terms.	○	○	○	○	○
7	Contract contains clear deliverables that match the project SOW	○	○	○	○	○
8	The project completed without disputes between the contractor (the project executer) and the organization (the project owner)	○	○	○	○	○
9	Without the project SOW, it was difficult to have an efficient project contract	○	○	○	○	○

H) Project SOW, Initiation Phases and project success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	Initiation phase of the project was a successful phase of the project life cycle.	○	○	○	○	○
2	Initiation phase aided the successful completion of the following phases of the project life cycle.	○	○	○	○	○
3	SOW initiated in the initiation phase of the project was an important document that was used by all the project stakeholders	○	○	○	○	○
4	SOW initiated in the initiation phase of the project was an important document that was used in different phases of the project life cycle	○	○	○	○	○
5	The SOW was effective in increasing the chance of completing the project successfully	○	○	○	○	○

I) Project SOW, Planning Phase and project success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	SOW helps the planning team to develop an accurate project plan	○	○	○	○	○
2	Clarity of the SOW helps in developing detailed tasks and an accurate execution schedule	○	○	○	○	○
3	SOW helped in planning the manpower resources	○	○	○	○	○
4	SOW helped in planning the required financial resources	○	○	○	○	○
5	SOW helped in planning the required procurement tasks	○	○	○	○	○
6	Project was completed as per its initial plan	○	○	○	○	○
7	There was no significant deviation or major change in the project plan throughout following phases of the project life cycle.	○	○	○	○	○
8	The project plan was effective and accurate which facilitated the completion of the project on time, within the budget, as per the scope and achieving its objectives.	○	○	○	○	○

J) Project SOW, Execution Phase and project success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	SOW was used as a reference for the project manager and project execution team	○	○	○	○	○
2	SOW helped the execution team to understand the project owner's expectations	○	○	○	○	○
3	SOW helped the contractor as well as the project owner to identify the project's requirements	○	○	○	○	○
4	The project executed as per the project SOW and there were no major changes during the implementation phase	○	○	○	○	○
5	It was easy for the project manager to implement the project requirements as per its documented SOW.	○	○	○	○	○
6	The project was executed successfully which make it easy to close out the project successfully	○	○	○	○	○
7	The project was completed as per its SOW without and major or significant deviation during the execution.	○	○	○	○	○
8	Successful execution phase aids the successful completion of the project.	○	○	○	○	○

K) Project SOW, Monitoring & Control Phase and project success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	SOW specify the project requirements and detail specification that helps identifying the required quality	○	○	○	○	○
2	SOW used by quality control/ quality assurance team to ensure that the project executed as per the owner expectations	○	○	○	○	○
3	SOW helped in early identifying deficiencies that occurred during project execution.	○	○	○	○	○
4	SOW clearly specified the relevant standards that needed to be met.	○	○	○	○	○
5	SOW helped in monitoring and controlling the project execution stages.	○	○	○	○	○
6	Project completed according to the required level of quality	○	○	○	○	○
7	Successful monitoring and control of the project execution helped achieve the project objectives	○	○	○	○	○
8	The Project was successful because it was monitored and controlled well.	○	○	○	○	○

L) Project SOW, Closure phase and project success

S/N	Statement	Degree of Agreement				
		1	2	3	4	5
1	SOW specified the closure phase requirements	○	○	○	○	○
2	SOW helped in closing the project smoothly	○	○	○	○	○
3	Project was closed as per SOW statement	○	○	○	○	○
4	There was few points/items need to be rectified during closure phase.	○	○	○	○	○
5	Project management team used SOW to identify the project closure phase requirements.	○	○	○	○	○
6	The project closed without disputes between, project management team, project end user and the execution contractor.	○	○	○	○	○
7	Final acceptance certificate was issued in a relatively short period after the mechanical completion.	○	○	○	○	○
8	The project was closed successfully	○	○	○	○	○

III) Effectiveness and Successfulness

Please appraise the following:

		Low				Medium				High		
		0	1	2	3	4	5	6	7	8	9	10
1	The effectiveness of the project SOW content	○	○	○	○	○	○	○	○	○	○	○
2	The effectiveness of the project SOW language	○	○	○	○	○	○	○	○	○	○	○
3	The effectiveness of the complete project SOW	○	○	○	○	○	○	○	○	○	○	○
4	The success of the project selection process	○	○	○	○	○	○	○	○	○	○	○
5	The accuracy of the allocated budget	○	○	○	○	○	○	○	○	○	○	○
6	The success of bidding process	○	○	○	○	○	○	○	○	○	○	○
7	The effectiveness of the project contract	○	○	○	○	○	○	○	○	○	○	○
8	The success of the project initiation phase	○	○	○	○	○	○	○	○	○	○	○
9	The success of the project planning phase	○	○	○	○	○	○	○	○	○	○	○
10	The success of the project execution phase	○	○	○	○	○	○	○	○	○	○	○
11	The success of the project monitoring and control phase	○	○	○	○	○	○	○	○	○	○	○
12	The Success of the project closure phase	○	○	○	○	○	○	○	○	○	○	○
13	The overall success of the project	○	○	○	○	○	○	○	○	○	○	○
14	Project completed on time	○	○	○	○	○	○	○	○	○	○	○
15	Project completed within the budget	○	○	○	○	○	○	○	○	○	○	○
16	Project completed as per its scope	○	○	○	○	○	○	○	○	○	○	○
17	Project achieve its strategic objectives	○	○	○	○	○	○	○	○	○	○	○
18	The project was	○ OptionButton6					○ Successful Project					
19	The project SOW was	○ Effective SOW					○ Ineffective SOW					

B) Correlation Tables

Correlation		SOW Effectivness		
Project Success		**Successful Project** n=40	**Failed Project** n=11	**All** n=51
Pearson Correlation	SOW Content	.700	.863	.960
	SOW Language	.755	.034	.946
Sig. (1-tailed)	SOW Content	.000	.000	.000
	SOW Language	.000	.460	.000

Correlation		SOW Effectivness		
Representation		**Project Owner** n=36	**Project Contractor** n=15	**All** n=51
Pearson Correlation	SOW Content	.962	.960	.960
	SOW Language	.943	.957	.946
Sig. (1-tailed)	SOW Content	.000	.000	.000
	SOW Language	.000	.000	.000

Correlation		SOW Effectivness						
Project Stakeholder		**SOW Initiator** n=6	**Decision Maker** n=5	**Bidding and Contracting** n=5	**Project Manager** n=13	**Beneficiary** n=8	**PMT member** n=14	**All** n=51
Pearson Correlation	SOW Content	.897	.990	.959	.898	.993	.984	.960
	SOW Language	.921	.990	.949	.926	.983	.928	.946
Sig. (1-tailed)	SOW Content	.008	.001	.005	.000	.000	.000	.000
	SOW Language	.005	.001	.007	.000	.000	.000	.000

Correlation		SOW Effectivness						
Experience		**< 5** n=6	**5 - 10** n=7	**10 - 15** n=17	**15 - 20** n=9	**20 - 25** n=5	**> 25** n=7	**All** n=51
Pearson Correlation	SOW Content	.856	.987	.922	.994	.976	.750	.960
	SOW Language	.899	.914	.974	.956	.938	.801	.946
Sig. (1-tailed)	SOW Content	.015	.000	.000	.000	.002	.026	.000
	SOW Language	.007	.002	.000	.000	.009	.015	.000

Correlation		SOW Effectivness						
Company Business		Manufacturing	Chemical/ Petrochemical	Oil & Gas	Construction/ Contracting	Engineering	Utilities	All
		n=10	n=12	n=8	n=14	n=2	n=5	n=51
Pearson Correlation	SOW Content	.975	.986	.923	.958	1.000	1.000	.960
	SOW Language	.947	.942	.942	.956	1.000	.999	.946
Sig. (1-tailed)	SOW Content	.000	.000	.001	.000	.000	.000	.000
	SOW Language	.000	.000	.000	.000	.000	.000	.000

Correlation		Effective SOW		
Project Success		Successful Project n=40	Failed Project n=11	All n=51
Pearson Correlation	Project selection process Success	.590	.377	.943
	The accuracy of allocated budget	.393	.036	.896
	The success of bidding process	.537	.532	.888
	The effectiveness of the project contract	.546	.625	.930
	The success of initiation phase	.521	.758	.944
	The success of planning phase	.306	.446	.900
	The success of execution phase	.402	.850	.935
	The success of monitoring and control phase	.685	.724	.941
	The Success of closure phase	.438	.580	.930
Sig. (1-tailed)	Project selection process Success	.000	.126	.000
	The accuracy of allocated budget	.006	.458	.000
	The success of bidding process	.000	.046	.000
	The effectiveness of the project contract	.000	.020	.000
	The success of initiation phase	.000	.003	.000
	The success of planning phase	.027	.085	.000
	The success of execution phase	.005	.000	.000
	The success of monitoring and control phase	.000	.006	.000
	The Success of closure phase	.002	.031	.000

Correlation		Effective SOW		
Representation		**Project Owner** **n=36**	**Project Contractor** **n=15**	**All** **n=51**
Pearson Correlation	Project selection process Success	.954	.931	.943
	The accuracy of allocated budget	.919	.854	.896
	The success of bidding process	.900	.862	.888
	The effectiveness of the project contract	.945	.892	.930
	The success of initiation phase	.934	.970	.944
	The success of planning phase	.913	.885	.900
	The success of execution phase	.925	.972	.935
	The success of monitoring and control phase	.933	.964	.941
	The Success of closure phase	.951	.885	.930
Sig. (1-tailed)	Project selection process Success	.000	.000	.000
	The accuracy of allocated budget	.000	.000	.000
	The success of bidding process	.000	.000	.000
	The effectiveness of the project contract	.000	.000	.000
	The success of initiation phase	.000	.000	.000
	The success of planning phase	.000	.000	.000
	The success of execution phase	.000	.000	.000
	The success of monitoring and control phase	.000	.000	.000
	The Success of closure phase	.000	.000	.000

Correlation		Effective SOW						
Project Stakeholder		**SOW Initiator**	**Decision Maker**	**Bidding and Contracting**	**Project Manager**	**Beneficiary**	**PMT member**	**All**
		n=6	**n=5**	**n=5**	**n=13**	**n=8**	**n=14**	**n=51**
Pearson Correlation	Project selection process Success	.739	.868	.995	.930	.989	.931	.943
	The accuracy of allocated budget	.762	.941	.908	.881	.981	.859	.896
	The success of bidding process	.905	.921	.945	.901	.953	.731	.888
	The effectiveness of the project contract	.739	.990	.980	.895	.954	.881	.930
	The success of initiation phase	.933	.984	.984	.882	.979	.933	.944
	The success of planning phase	.609	.958	.953	.831	.949	.900	.900
	The success of execution phase	.545	.990	.978	.880	.972	.921	.935
	The success of monitoring and control phase	.754	.973	.997	.933	.984	.910	.941
	The Success of closure phase	.798	.877	.967	.927	.963	.966	.930
Sig. (1-tailed)	Project selection process Success	.047	.028	.000	.000	.000	.000	.000
	The accuracy of allocated budget	.039	.009	.017	.000	.000	.000	.000
	The success of bidding process	.007	.013	.008	.000	.000	.002	.000
	The effectiveness of the project contract	.047	.001	.002	.000	.000	.000	.000
	The success of initiation phase	.003	.001	.001	.000	.000	.000	.000
	The success of planning phase	.100	.005	.006	.000	.000	.000	.000
	The success of execution phase	.132	.001	.002	.000	.000	.000	.000
	The success of monitoring and control phase	.042	.003	.000	.000	.000	.000	.000
	The Success of closure phase	.029	.025	.004	.000	.000	.000	.000

Correlation		Effective SOW						
	Experience	< 5 n=6	5 - 10 n=7	10 - 15 n=17	15 - 20 n=9	20 - 25 n=5	> 25 n=7	All n=51
Pearson Correlation	Project selection process Success	.725	.984	.960	.957	.976	.540	.943
	The accuracy of allocated budget	.186	.965	.878	.868	.960	.711	.896
	The success of bidding process	.684	.926	.851	.904	.986	.609	.888
	The effectiveness of the project contract	.679	.927	.920	.929	.974	.411	.930
	The success of initiation phase	.455	.989	.946	.978	.856	.452	.944
	The success of planning phase	-.322	.989	.868	.868	.937	.559	.900
	The success of execution phase	.914	.979	.858	.921	.990	.710	.935
	The success of monitoring and control phase	.851	.943	.939	.934	.986	.801	.941
	The Success of closure phase	.227	.986	.939	.854	.977	.420	.930
Sig. (1-tailed)	Project selection process Success	.052	.000	.000	.000	.002	.105	.000
	The accuracy of allocated budget	.362	.000	.000	.001	.005	.037	.000
	The success of bidding process	.067	.001	.000	.000	.001	.073	.000
	The effectiveness of the project contract	.069	.001	.000	.000	.002	.180	.000
	The success of initiation phase	.182	.000	.000	.000	.032	.154	.000
	The success of planning phase	.267	.000	.000	.001	.009	.096	.000
	The success of execution phase	.005	.000	.000	.000	.001	.037	.000
	The success of monitoring and control phase	.016	.001	.000	.000	.001	.015	.000
	The Success of closure phase	.332	.000	.000	.002	.002	.174	.000

Correlation		Effective SOW						
Company Business		Manufacturing	Chemical/ Petrochemical	Oil & Gas	Construction/ Contracting	Engineering	Utilities	All
		n=10	n=12	n=8	n=14	n=2	n=5	n=51
Pearson Correlation	Project selection process Success	.962	.978	.974	.933	1.000	.953	.943
	The accuracy of allocated budget	.925	.898	.984	.844	1.000	.992	.896
	The success of bidding process	.924	.900	.937	.854	1.000	.859	.888
	The effectiveness of the project contract	.893	.978	.983	.888	1.000	.951	.930
	The success of initiation phase	.835	.984	.979	.968	1.000	.910	.944
	The success of planning phase	.899	.893	.979	.877	1.000	.961	.900
	The success of execution phase	.844	.966	.952	.971	1.000	.992	.935
	The success of monitoring and control phase	.822	.989	.976	.965	1.000	.985	.941
	The Success of closure phase	.942	.944	.980	.953	-1.000	.999	.930
Sig. (1-tailed)	Project selection process Success	.000	.000	.000	.000	.000	.006	.000
	The accuracy of allocated budget	.000	.000	.000	.000	.000	.000	.000
	The success of bidding process	.000	.000	.000	.000	.000	.031	.000
	The effectiveness of the project contract	.000	.000	.000	.000	.000	.006	.000
	The success of initiation phase	.001	.000	.000	.000	.000	.016	.000
	The success of planning phase	.000	.000	.000	.000	.000	.005	.000
	The success of execution phase	.001	.000	.000	.000	.000	.000	.000
	The success of monitoring and control phase	.002	.000	.000	.000	.000	.001	.000
	The Success of closure phase	.000	.000	.000	.000	.000	.000	.000

Correlation		The overall project success		
Project Success		**Successful Project** n=40	**Failed Project** n=11	**All** n=51
Pearson Correlation	The success of the project initiation phase	.408	.795	.926
	The success of the project planning phase	.218	.590	.888
	The success of the project execution phase	.406	.869	.933
	The success of the project monitoring and control phase	.605	.810	.940
	The Success of the project closure phase	.531	.626	.935
Sig. (1-tailed)	The success of the project initiation phase	.005	.002	.000
	The success of the project planning phase	.089	.028	.000
	The success of the project execution phase	.005	.000	.000
	The success of the project monitoring and control phase	.000	.001	.000
	The Success of the project closure phase	.000	.020	.000

Correlation		The overall project success		
Representation		**Project Owner** n=36	**Project Contractor** n=15	**All** n=51
Pearson Correlation	The success of the project initiation phase	.924	.940	.926
	The success of the project planning phase	.911	.873	.888
	The success of the project execution phase	.945	.948	.933
	The success of the project monitoring and control phase	.939	.945	.940
	The Success of the project closure phase	.954	.876	.935
Sig. (1-tailed)	The success of the project initiation phase	.000	.000	.000
	The success of the project planning phase	.000	.000	.000
	The success of the project execution phase	.000	.000	.000
	The success of the project monitoring and control phase	.000	.000	.000
	The Success of the project closure phase	.000	.000	.000

Correlation		The overall project success						
Project Stakeholder		**SOW Initiator**	**Decision Maker**	**Bidding and Contracting**	**Project Manager**	**Beneficiary**	**PMT member**	**All**
		n=6	n=5	n=5	n=13	n=8	n=14	n=51
Pearson Correlation	The success of the project initiation phase	.794	.937	.993	.859	.977	.920	.926
	The success of the project planning phase	.778	.881	.963	.841	.960	.869	.888
	The success of the project execution phase	.768	.949	.984	.867	.979	.919	.933
	The success of the project monitoring and control phase	.885	.948	.992	.935	.980	.915	.940
	The Success of the project closure phase	.920	.921	.982	.940	.950	.957	.935
Sig. (1-tailed)	The success of the project initiation phase	.030	.010	.000	.000	.000	.000	.000
	The success of the project planning phase	.034	.024	.004	.000	.000	.000	.000
	The success of the project execution phase	.037	.007	.001	.000	.000	.000	.000
	The success of the project monitoring and control phase	.010	.007	.000	.000	.000	.000	.000
	The Success of the project closure phase	.005	.013	.002	.000	.000	.000	.000

Correlation		The overall project success						
Experience		**< 5**	**5 - 10**	**10 - 15**	**15 - 20**	**20 - 25**	**> 25**	**All**
		n=6	n=7	n=17	n=9	n=5	n=7	n=51
Pearson Correlation	The success of the project initiation phase	.640	.967	.922	.975	.824	.362	.926
	The success of the project planning phase	-.302	.987	.907	.843	.931	.207	.888
	The success of the project execution phase	.701	.991	.912	.881	.978	.279	.933
	The success of the project monitoring and control phase	.798	.963	.958	.934	.967	.462	.940
	The Success of the project closure phase	.426	.977	.978	.873	.991	.101	.935
Sig. (1-tailed)	The success of the project initiation phase	.086	.000	.000	.000	.043	.212	.000
	The success of the project planning phase	.281	.000	.000	.002	.011	.328	.000
	The success of the project execution phase	.061	.000	.000	.001	.002	.272	.000
	The success of the project monitoring and control phase	.029	.000	.000	.000	.004	.149	.000
	The Success of the project closure phase	.200	.000	.000	.001	.000	.415	.000

Correlation		The overall project success						
	Company Business	Manufacturing	Chemical/ Petrochemical	Oil & Gas	Construction/ Contracting	Engineering	Utilities	All
		n=10	n=12	n=8	n=14	n=2	n=5	n=51
Pearson Correlation	The success of the project initiation phase	.854	.972	.958	.938		.915	.926
	The success of the project planning phase	.952	.904	.957	.870		.936	.888
	The success of the project execution phase	.927	.974	.964	.947		.980	.933
	The success of the project monitoring and control phase	.877	.979	.977	.943		.993	.940
	The Success of the project closure phase	.975	.926	.969	.922		.982	.935
Sig. (1-tailed)	The success of the project initiation phase	.001	.000	.000	.000	.000	.015	.000
	The success of the project planning phase	.000	.000	.000	.000	.000	.010	.000
	The success of the project execution phase	.000	.000	.000	.000	.000	.002	.000
	The success of the project monitoring and control phase	.000	.000	.000	.000	.000	.000	.000
	The Success of the project closure phase	.000	.000	.000	.000	.000	.001	.000

Correlation		The overall project success		
	Project Success	Successful Project n=40	Failed Project n=11	All n=51
Pearson Correlation	Project completed on time	.331	.365	.839
	Project completed within the budget	.454	.135	.883
	Project completed as per its scope	.525	.813	.950
	Project achieve its strategic objectives	.892	.923	.982
Sig. (1-tailed)	Project completed on time	.018	.135	.000
	Project completed within the budget	.002	.346	.000
	Project completed as per its scope	.000	.001	.000
	Project achieve its strategic objectives	.000	.000	.000

Representation		Project Owner n=36	Project Contractor n=15	All n=51
Pearson Correlation	Project completed on time	.834	.901	.839
	Project completed within the budget	.902	.873	.883
	Project completed as per its scope	.966	.948	.950
	Project achieve its strategic objectives	.983	.978	.982
Sig. (1-tailed)	Project completed on time	.000	.000	.000
	Project completed within the budget	.000	.000	.000
	Project completed as per its scope	.000	.000	.000
	Project achieve its strategic objectives	.000	.000	.000

Correlation		The overall project success						
Project Stakeholder		SOW Initiator n=6	Decision Maker n=5	Bidding and Contracting n=5	Project Manager n=13	Beneficiary n=8	PMT member n=14	All n=51
Pearson Correlation	Project completed on time	.897	.852	.947	.645	.942	.851	.839
	Project completed within the budget	.832	.907	.918	.908	.958	.796	.883
	Project completed as per its scope	.668	.957	.993	.902	.979	.950	.950
	Project achieve its strategic objectives	1.000	.994	.970	.974	.993	.984	.982
Sig. (1-tailed)	Project completed on time	.008	.033	.007	.009	.000	.000	.000
	Project completed within the budget	.020	.017	.014	.000	.000	.000	.000
	Project completed as per its scope	.074	.005	.000	.000	.000	.000	.000
	Project achieve its strategic objectives	.000	.000	.003	.000	.000	.000	.000

Correlation		The overall project success						
Experience		< 5 n=6	5 - 10 n=7	10 - 15 n=17	15 - 20 n=9	20 - 25 n=5	> 25 n=7	All n=51
Pearson Correlation	Project completed on time	.114	.926	.870	.784	.805	.230	.839
	Project completed within the budget	.234	.944	.828	.769	.994	.423	.883
	Project completed as per its scope	.234	.990	.953	.936	.993	.367	.950
	Project achieve its strategic objectives	.923	.990	.975	.984	.994	.906	.982
Sig. (1-tailed)	Project completed on time	.415	.001	.000	.006	.050	.310	.000
	Project completed within the budget	.328	.001	.000	.008	.000	.172	.000
	Project completed as per its scope	.328	.000	.000	.000	.000	.209	.000
	Project achieve its strategic objectives	.004	.000	.000	.000	.000	.002	.000

Correlation		The overall project success						
Company Business		Manufacturing	Chemical/ Petrochemical	Oil & Gas	Construction/ Contracting	Engineering	Utilities	All
		n=10	n=12	n=8	n=14	n=2	n=5	n=51
Pearson Correlation	Project completed on time	.840	.851	.858	.900		.967	.839
	Project completed within the budget	.904	.884	.927	.871		.973	.883
	Project completed as per its scope	.985	.972	.988	.948		.960	.950
	Project achieve its strategic objectives	.983	.996	.970	.979		.993	.982
Sig. (1-tailed)	Project completed on time	.001	.000	.003	.000	.000	.004	.000
	Project completed within the budget	.000	.000	.000	.000	.000	.003	.000
	Project completed as per its scope	.000	.000	.000	.000	.000	.005	.000
	Project achieve its strategic objectives	.000	.000	.000	.000	.000	.000	.000

ANNEX-II: PARTICIPANTS AND KEY QUESTIONS FOR DATA COLLECTION.

What in this Annex:

A) *Participants Demographic Information*

Participants were asked to fill the questionnaire for their Demographic Information and summarized in the following tables:

Table	Description	Reference for Section
Annex II-1	*1st Phase, Case A, Group 1, Participants demographic Information*	3.4.4
Annex II-2	*1st Phase, Case A, Group 2, Participants demographic Information*	3.4.4
Annex II-3	*1st Phase, Case B, Group 1, Participants demographic Information*	3.4.4
Annex II-4	*1st Phase, Case B, Group 2, Participants demographic Information*	3.4.4
Annex II-5	*2nd Phase, Case A, Participants demographic Information*	3.4.4
Annex II-6	*2nd Phase, Case B, Participants demographic Information*	3.4.4

B) *Key Questions and Supplementary Questions Asked for Data Collection*

The key questions and main supplementary questions asked in focus group discussion to collect the data that answer the research questions are listed.

A) *Participants Demographic Information*

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Representation of:	Category of the project Stakeholders
CA-G1-P1	Site Project Manager	10-15	5-10	Project Execution	Contractor	Project Manager
CA-G1-P2	Operation Manager	15-20	15-20	Project Close out and operation	Company - Owner	Project End User (Beneficiary)
CA-G1-P3	Project Engineer	5-10	< 5	Project Execution	Contractor	Project Management and execution team
CA-G1-P4	Business Development Engineer	5-10	5-10	Project Scope Development	Company - Owner	Project SOW initiation/writing team
CA-G1-P5	Project Management execution Manager	10-15	10-15	Project Execution	Company - Owner	Project Manager
CA-G1-P6	VP Business Development	20-25	20-25	Project Feasibility	Company - Owner	Organization's Decision Maker
CA-G1-P7	Contract Administrator	5-10	5-10	Project Execution	Company - Owner	Bidding and Contracting Team
CA-G1-P8	Bidding Engineer	5-10	10-15	Project Feasibility	Contractor	Bidding and Contracting Team

Table Annex II-1: 1st Phase, Case A, Group 1, Participants demographic Information

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Representation of:	Category of the project Stakeholders
CA-G2-P1	Commissioning Manager	10-15	10-15	Project Execution	Contractor	Project Management Team
CA-G2-P2	Project Engineer	5-10	5-10	Project Execution	Company - Owner	Project Management and execution team
CA-G2-P3	Business Development Manager	10-15	10-15	Project Feasibility and project Scope development	Company - Owner	Organization Decision Makers
CA-G2-P4	Planner	< 5	< 5	Project Execution	Contractor	Project Management and execution team
CA-G2-P5	Deputy Project Manager	15-20	< 5	Project Execution	Company - Owner	Project Management and execution team
CA-G2-P6	Mechanical Construction Engineer	5-10	5-10	Project Execution	Contractor	Project Management and execution team
CA-G2-P7	Bidding and proposals Manager	5-10	5-10	Project Execution	Company - Owner	Bidding and Contracting Team
CA-G2-P8	Inspector	< 5	< 5	Project Execution	Company - Owner	Project Management and execution team

Table Annex II-2: 1st Phase, Case A, Group 2, Participants demographic Information

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Representation of:	Category of the project Stakeholders
CB-G1-P1	Technical Support Services Manager	10-15	5-10	Project Scope Development	Company - Owner	Organization's Decision Maker
CB-G1-P2	Project Coordinator	< 5	< 5	Project Scope Development & Project Design & Project Execution	Company - Owner	Project SOW initiation/writing team & Project Management and Execution team
CB-G1-P3	Contract Manager	5-10	< 5	Project Execution	Company - Owner	Bidding and Contracting Team
CB-G1-P4	Chief Operation Officer	20-25	5-10	Project Feasibility	Company - Owner	Organization's Decision Maker
CB-G1-P5	Project Operation Manager	10-15	< 5	Project Execution	Contractor	Project Manager
CB-G1-P6	Project Planner	20-25	20-25	Project Execution	Contractor	Project Management and Execution Team
CB-G1-P7	Plant Manager	20-25	5-10	Project Operation	Company - Owner	Project End User (Beneficiary)
CB-G1-P8	Proposal Manager	10-15	10-15	Project Feasibility	Contractor	Bidding and Contracting Team

Table Annex II-3: 1st Phase, Case B, Group 1, Participants demographic Information

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Representation of:	Category of the project Stakeholders
CB-G2-P1	Project Document Controller	10-15	5-10	All Phases	Company - Owner	Project Management and execution Team
CB-G2-P2	Project Quality Assurance Manager	15-20	5-10	Project Execution	Contractor	Project Management and execution Team
CB-G2-P3	Contracts Administrator	15-20	< 5	Project Execution	Company - Owner	Bidding and Contracting Team
CB-G2-P4	Project Coordinator	5-10	< 5	Project Scope Development & Project Execution	Company - Owner	Project SOW initiation/writing team Project Management team
CB-G2-P5	Utility Manager	15-20	5-10	Project Operation	Company - Owner	Project End User (Beneficiary)
CB-G2-P6	Project Engineer	5-10	< 5	Project Execution	Contractor	Project Management and execution Team
CB-G2-P7	Cost Estimation Specialist	10-15	< 5	Project Feasibility	Company - Owner	Project SOW initiation/writing team
CB-G2-P8	Projects Section Head	10-20	5-10	Project Feasibility, Scope Development and Execution	Company - Owner	Project Manager

Table Annex II-4: 1st Phase, Case B, Group 2, Participants demographic Information

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Category of the project Stakeholders
CA-G1-P2	Operation Manager	15-20	15-20	Project Close out and operation	Project End User (Beneficiary)
CA-G1-P4	Business Development Engineer	5-10	5-10	Project Scope Development	Project SOW initiation/writing team
CA-G1-P5	Project Management execution Manager	10-15	10-15	Project Execution	Project Manager
CA-G1-P6	VP Business Development	20-25	20-25	Project Feasibility	Organization's Decision Maker
CA-G1-P7	Contract Administrator	5-10	5-10	Project Execution	Bidding and Contracting Team
CA-G2-P2	Project Engineer	5-10	5-10	Project Execution	Project Management and execution team
CA-G2-P3	Business Development Manager	10-15	10-15	Project Feasibility and project Scope development	Organization Decision Makers
CA-G2-P5	Deputy Project Manager	15-20	< 5	Project Execution	Project Management and execution team
CA-G2-P7	Bidding and proposals Manager	5-10	5-10	Project Execution	Bidding and Contracting Team
CA-G2-P8	Inspector	< 5	< 5	Project Execution	Project Management and execution team

Table Annex II-5: 2nd Phase, Case A, Participants demographic Information

Participant Code	Position	Years of experience in O&G	Years of Experience in the current company	Involvement @ which phase of Project life cycle	Category of the project Stakeholders
CB-G1-P1	Technical Support Services Manager	10-15	5-10	Project Scope Development	Organization's Decision Maker
CB-G1-P2	Project Coordinator	< 5	< 5	Project Scope Development & Project Design & Project Execution	Project SOW initiation/writing team & Project Management and Execution team
CB-G1-P3	Contract Manager	5-10	< 5	Project Execution	Bidding and Contracting Team
CB-G1-P4	Chief Operation Officer	20-25	5-10	Project Feasibility	Organization's Decision Maker
CB-G1-P7	Plant Manager	20-25	5-10	Project Operation	Project End User (Beneficiary)
CB-G2-P1	Project Document Controller	10-15	5-10	All Phases	Project Management and execution Team
CB-G2-P3	Contracts Administrator	15-20	< 5	Project Execution	Bidding and Contracting Team
CB-G2-P4	Project Coordinator	5-10	< 5	Project Scope Development & Project Execution	Project SOW initiation/writing team Project Management team
CB-G2-P5	Utility Manager	15-20	5-10	Project Operation	Project End User (Beneficiary)
CB-G2-P7	Cost Estimation Specialist	10-15	< 5	Project Feasibility	Project SOW initiation/writing team
CB-G2-P8	Projects Section Head	10-20	5-10	Project Feasibility, Scope Development and Execution	Project Manager

Table Annex II-6: 2nd Phase, Case B, Participants demographic Information

B) *Key Questions and Supplementary Questions Asked for Data Collection*

- **What is the role of the project SOW in project performance?**
  - ❖ What is a successful strategic project?
  - ❖ What is the performance criteria for a successful project?
  - ❖ What is the importance of having a written documented project SOW at very early stage of the project initiation phase?
  - ❖ Explain the use and importance of the project SOW during project formation phase.
  - ❖ Explain the role of the project SOW in the project performance.
  - ❖ Why the Project SOW is important for the project owner?
  - ❖ Why the project SOW is important for the Contractor?
  - ❖ How project SOW help in achieving desired project performance?

- **What are the characteristics of an effective project SOW and what functions does it support?**
  - ❖ What is an effective Project SOW?
  - ❖ List the most important key content characteristics of an effective project SOW.
  - ❖ List the most important key language characteristics of an effective project SOW.
  - ❖ Discuss the listed characteristics and cluster them into groups.
  - ❖ What characteristics need to be considered while writing the project SOW.
  - ❖ What are the outputs characteristics that SOW have to have in order to be considered effective?

- **How are project SOWs developed in the Saudi Arabian OGS and what are the practical enablers and barriers for its development?**
  - ❖ Are there written procedures for project SOW development process?
  - ❖ What are the practical procedures for project development process at the organization?
  - ❖ Who are involved in the project SOW development process? What are their roles?
  - ❖ What are the main deliverables of the project SOW development process phases?
  - ❖ I group, develop a flow chart that represent the project SOW development process.
  - ❖ Is the currant practice effective for developing an effective project SOW?
  - ❖ What are the current enablers for developing an effective project SOW?
  - ❖ What are the current barriers for developing an effective project SOW?
  - ❖ In groups discuss the enablers and barriers and what is required to improve the current practice.

What improvements are needed to improve project SOW development in the Saudi Arabian OGS?

- ❖ Is the current project SOW development process effective to develop an effective SOW? Explain why?
- ❖ Which tasks or activities need to be improved in order to have more effective project SOW development process? How? Why? What is the expected impact?
- ❖ In which way we can utilize the existing enablers to improve the project SOW development process?
- ❖ In which way we can overcome the existing barriers to improve the project SOW development process?
- ❖ Is it required to improve the organization for the project development process or for the company in order to obtain better outputs of the project SOW development process? How? Why?

ANNEXIII: EXAMPLES OF PRIMARY DATA COLLECTED FOR ANSWERING FIRST RESEARCH QUESTION (RQ1)

What in this Annex:

➢ **Detailed examples of participants quotes that emerged the four main themes and the related subthemes. Tables are tending to reflect the emerged subthemes for each performance criteria taking in consideration different roles representing different participants in the project such as proponent, decision maker, quality assurance review team, project management team and contractors of the organizations.**

➢ **The first row of each table is the heading of the table which is representing one of the four main themes which are the key performance criteria: On Scope, On Time, On Cost, and On Strategy.**

➢ **The Second row of each table is presenting the subthemes which are the key processes for achieving the required performance criteria highlighted in the first row.**

Table	Description	Reference for Section
Annex III-1	*Examples of participants' quotes for emerged subthemes for completing the project on Scope (Organization A)*	**4.2**
Annex III-2	*Examples of participants' quotes for emerged subthemes for completing the project on Scope (Organization B)*	**4.2**
Annex III-3	*Examples of participants' quotes for emerged subthemes for completing the project on Time (Organization A)*	**4.3**
Annex III-4	*Examples of participants' quotes for emerged subthemes for completing the project on Time (Organization B)*	**4.3**
Annex III-5	*Examples of participants' quotes for emerged subthemes for completing the project on Cost (Organization A)*	**4.4**
Annex III-6	*Examples of participants' quotes for emerged subthemes for completing the project on Cost (Organization B)*	**4.4**
Annex III-7	*Examples of participants' quotes for emerged subthemes for completing the project on Strategy (Organization A)*	**4.5**
Annex III-8	*Examples of participants' quotes for emerged subthemes for completing the project on Strategy (Organization B)*	**4.5**

Organization	Participant Role	"On Scope"			
		Developing the Project SOW	Planning for Scope Implementation	Directing Implementation	Controlling Project Scope
A	Proponent	"Understanding and right implementation of the agreed scope of work is the only way to ensure delivering the desired project results" (CA-G1-P2)	"planning is important step to achieve the project scope. If you plan it right, you will succeed" (CA-G1-P2)	"Also, all project requirements have to be accomplished in consistent with its scope. Then we can say that it is meeting its scope and it's a successful one" (CA-G1-P2)	"Success is to meet the scope and control any variation that my required during project execution. Updating the scope baseline is a continues process throughout the project lifecycle" (CA-G1-P2)
	Decision Maker (DM)	"Project scope of work has to translate the project scope and its objectives into measurable deliverables to evaluate the success of the project."(CA-G1-P6)	"Each project should have some sort of mission stated in the project scope. Completing the project by meeting its scope is the success that ensure its objective are accomplished but planning is the key for reaching there" (CA-G1-P6)	"Elaborating project scope will define all requirements and the right implementation of those is the success. It is the project manager role to direct the right implementation" (CA-G2-P3)	"implementation according the approved scope baseline is the great success. Change in the scope will impact the project cost and schedule and in some cases this will lead to a clear failure" (CA-G2-P3)
	Quality Assurance Review Team (QART)	"Project scope should be clearly stated in the project scope of work. Scope of Work should take care to give all expected from the project and contractor should execute accordingly" (CA-G1-P4)	"Project should meet its objectives in which we can say that it is get ahead to meet its scope. Project team need to plan implementation process to be able to complete a project that it meets its scope" (CA-G2-P7)	"Managing the execution phase is also important. Project requirements should be accomplished to meet the project scope. Those requirements should be accomplished as it is no less no more" (CA-G1-P4)	"Project should meet its scope. Successful project is the project that completed as per its signed contract with no dispute between the contractor as project executer and the owner as the project user." (CA-G1-P7)
	Project Management Team (PMT)	"our role during the execution is to monitor the progress and ensure that the project is done per its agreed scope and signed contract that include the project scope of work" (CA-G1-P5).	"Effective planning can lead to finishing the project as per project scope which have meaning that it meets its objectives and executed at the right time using right resources within the required quality and budget that make it visible after completion" (CA-G2-P5).	"..... contractor should manage to do as per the project scope to meet project requirements and meeting the expectations of the client and this means that client is satisfied about the contractor performance and project outputs." (CA-G2-P2)	"It is important for project manager to monitor the execution and implement integrated change control to avoid scope creep. By doing so, project can end successfully" (CA-G2-P8)
	Organization A's Contractors	"project scope of work should state the project scope clearly and should help in estimating the required time and required resources. [...] planning the resources and activities and completing those on time as per its original planned and agreed scope without additional cost is the great success for any project" (CA-G2-P4)	"Contractor role is achieving the project scope by understanding its objectives and all requirements, plan the implementation and execution methods. At the end, contractor need to be sure that objectives are successfully accomplished" (CA-G1-P8)	"Success is completing the project as per its scope taking in consideration that its scope is reflecting the project objectives and the real business needs. This need strong project manager who can direct and lead the implementation phase" (CA-G2-P1).	"Procedures and tools that help in detecting the impact of any change or deviation from the scope, schedule or cost baselines on the project objectives should help in controlling any change and enhance the chance for success" (CA-G1-P3)

Table Annex III-1: Examples of participants' quotes for emerged subthemes for completing the project on Scope (Organization A)

Organization	Participants Role	"On Scope"			
		Developing the Project SOW	Planning for Scope Implementation	Directing Implementation	Controlling Project Scope
B	Proponent	"If it is good scope of work, it guides all concerns to accomplish the project objectives and the organization long term objectives as well as completing the project on the agreed time and within its budget (CB-G2-P5)	"success can be achieved only if the project planned and executed per its scope which give insurance that the original objectives for the project are achieved" (CB-G1-P7).	"… it is so essential to complete the project at its designed and agreed required level of quality, performance and capacity …. success can be achieved only if the project achieved its scope and this need good project management" (CB-G1-P7).	"In some cases it is necessary to do some changes for the project scope, schedule or budget within the project lifecycle to ensure delivering the desired products, services or results. It is not a problem if changes truly needed" (CB-G2-P5)
	Decision Maker (DM)	"… the teams and assigned persons who work during the project scope of work development process are qualified and have enough experience to end with complete and perfect project scope of work that clearly define the project scope." (CB-G1-P4).	"After having clear scope, it is necessary to have clear plan how this scope will be met. Successful project is the one that completed after meeting its scope" (CB-G1-P1).	"project that complete all planned activities and give designed or expected results is the success project that meet its scope and satisfy its objectives" (CB-G1-P1)	"Project Scope should be clear enough to control any further change. Change in the project scope during execution mean additional cost and delay the completion time and in some cases this may have bad impact on achieving the project strategic objectives" (CB-G1-P4).
	Quality Assurance Review Team (QART)	"The project scope of work is the key for completing the project successfully. It helps in achieving the project scope at the required quality, time and cost" (CB-G1-P3)	"No doubt, project scope has to be checked carefully during the development process to ensure that it is representing the project objectives. Before staring real implementation, realistic and effective planning to ensure that project requirements are all considered is must" (CB-G2-P7).	"completed as per its scope at most available level of quality that satisfy the project requirements is the most successful project. This need effective planning and high level of leadership for execution" (CB-G2-P3).	"It is normal practice having some variation. Change doesn't mean always increasing the scope, raising the budget or postponing the deadline. Sometimes it is the opposite and managing the required is required for success" (CB-G1-P3)
	Project Management Team (PMT)	"The most important tool that help everyone involved in completing their tasks successfully is the project scope of work. Using this tool effectively will help achieving the project scope and do that as per the schedule and within the approved budget" (CB-G2-P8)	"No success without meeting the project scope. No way to meet the project scope without correct plan. Also, we can't say it is successful project while it is not meeting its objectives or not accomplishing its requirements. Directing implementation in effective way is necessary" (CB-G1-P2)	"No success without meeting the project scope. No way to meet the project scope without correct plan. Also, we can't say it is successful project while it is not meeting its objectives or not accomplishing its requirements. Directing implementation in effective way is necessary" (CB-G1-P2)	"having some variations of the original scope is not a barrier for achieving the target" (CB-G2-P4).
	Organization B's Contractors	"Having well defined agreed Scope of Work will make completing the project as per its scope is a real success and it is the most important target" (CB-G1-P5)	"It is sure that closing the project without accomplishing its scope is like wasting the money. Planning the implementations process can help in avoiding that" (CB-G2-P6)	"key for success is a well defend project scope that assists in implementing the required deliverables and obtaining the required outputs" (CB-G2-P2)	"Ending with a completed project with no variation from its original scope is a great success that any contractor should work hard to achieve" (CB-G1-P8).

Table Annex III-2: Examples of participants' quotes for emerged subthemes for completing the project on Scope (Organization B)

Organization	Participants Role	"On Time"			
		Developing the Project SOW	Scheduling Project Activates	Directing Schedule Implementation	Controlling Project Schedule
A	Proponent	"It is useful to use the project scope of work to allocate the right budget and estimate the required time for completing the project" (CA-G1-P2)	"Plan is the way to success. Project manager need to make good plan that include all deliverables and acquire the needed human, equipment and financial resources and then monitor the effective implementation of the plan to enhance the chance for success" (CA-G1-P2)	"To say that it is successful project, it should be completed as per its scope with no additional cost and within or before its agreed deadline" (CA-G1-P2)	"Similarly, updating the schedule and cost baselines are continues processes throughout the project lifecycle. Managing those required changes is necessary for success" (CA-G1-P2)
	Decision Maker (DM)	"By capturing the strategic objectives and clearly including them in the project scope of work, the project can be completed successfully on the right time and right cost by planning the required resources and scheduling the implementation tasks" (CA-G1-P6)	"By capturing the strategic objectives and clearly including them in the project scope of work, the project can be completed successfully on the right time and right cost by planning the required resources and scheduling the implementation tasks" (CA-G1-P6)	"Each activity has to have agreed start and end dates. Progressing as per the schedule and reaching the milestones on time will end with a successful project" (CA-G2-P3)	"implementation according the approved scope baseline is the great success. Change in the scope will impact the project cost and schedule and in some cases this will lead to a clear failure" (CA-G2-P3)
	Quality Assurance Review Team (QART)	"Project can be completed successfully on desired time and at desired cost which make it strategically feasible if it has effective scope of work and that scope of work implemented effectively" (CA-G2-P7)	"project sponsor and project manager share the responsibility for success. All resources need to be planed and per them all activities should be scheduled. Right planning and right execution will end with a success" (CA-G1-P7)	"project sponsor and project manager share the responsibility for success. All resources need to be planed and according to them all activities should be scheduled. Right planning and right execution will end with a success" (CA-G1-P7)	"Agreed completion time and budget should be respected and only necessary and approved change should be accepted to complete the project successfully" (CA-G1-P4)
	Project Management Team (PMT)	"Completing the project per its schedule is important success factor. Having detailed scope of work helps in more accurate durations" (CA-G1-P5)	"Completing the project per its schedule is important success factor. Having detailed scope of work helps in more accurate durations" (CA-G1-P5)	"to complete the project on time is important and in some time missing the target date may make completing the project is useless which means it is not a successful project" (CA-G2-P2)	"My role to control the execution time and assure that work tasks done according to the project approved schedule to complete the project on time" (CA-G2-P5)
	Organization A's Contractors	"project scope of work should state the project scope clearly and should help in estimating the required time and required resources. […] planning the resources and activities and completing those on time as per its original planned and agreed scope of work without additional cost is the great success for any project" (CA-G2-P4)	"completing the project as per its plan is the success that contractor normally looking for, but planning the resources and activities and completing those on time as per its original planned and agreed scope of work without additional cost is the great success for any project" (CA-G2-P4)	"To satisfy my client I need to follow the agreed schedule and achieve the agreed important milestone on or before the agreed date" (CA-G1-P1)	"Procedures and tools that help in detecting the impact of any change or deviation from the scope, schedule or cost baselines on the project objectives should help in controlling any change and enhance the chance for success" (CA-G1-P3)

Table Annex III-3: Examples of participants' quotes for emerged subthemes for completing the project on Time (Organization A)

Organization	Participants Role	"On Time"			
		Developing the Project SOW	Scheduling Project Activates	Directing Schedule Implementation	Controlling Project Schedule
B	Proponent	"If it is good scope of work, it guides all concerns to accomplish the project objectives and the organization long term objectives as well as completing the project on the agreed time and within its budget (CB-G2-P5)	"completing the project on time within its budget is important factor for measuring the success. To be able to reach to that objective, the contractor should identify activities, plan the resources, schedule the implementation and meet the schedule deadlines" (CB-G1-P7)	"completing the project on time is important factor for measuring the success. To be able to reach to that objective, the contractor should identify activities, plan the resources, schedule the implementation and meet the schedule deadlines" (CB-G1-P7)	"In some cases it is necessary to do some changes for the project scope, schedule or budget within the project lifecycle to ensure delivering the desired products, services or results. It is not a problem if changes truly needed" (CB-G2-P5)
	Decision Maker (DM)	"To be able to complete the project on time, within the budget and achieve the project scope and organization vision, project scope of work should be developed right and utilized right" (CB-G1-P1)	"role of Plan-Do-Check-Act is important for success. To complete on time and within the budget, planning and managing resources and activities is necessary for achieving the targets" (CB-G1-P4)	"It is not enough to have perfect schedule. To be considered as successful project, it should meet certain deadlines and pass all phases on the agreed and planned schedule" (CB-G1-P1)	"role of Plan-Do-Check-Act is important for success. To complete on time and within the budget, planning and managing resources and activities is necessary for achieving the targets" (CB-G1-P4)
	Quality Assurance Review Team (QART)	"The project scope of work is the key for completing the project successfully. It helps in achieving the project scope at the required quality, time and cost" (CB-G1-P3)	"We work with the contractor to put a plan the required activities and put realistic schedule. Execution per approved schedule will satisfy us and accomplish the targets" (CB-G2-P7)	"Project milestones are considered as important events to understand the project status. it is important for successful project to meet its schedule as well as not exceed its budget" (CB-G2-P3)	"It is normal practice having some variation. Change doesn't mean always increasing the scope, raising the budget or postponing the deadline. Sometimes it is the opposite and managing the required is required for success" (CB-G1-P3)
	Project Management Team (PMT)	"The most important tool that help everyone involved in completing their tasks successfully is the project scope of work. Using this tool effectively will help achieving the project scope and do that as per the schedule and within the approved budget" (CB-G2-P8)	"having the right execution plan and schedule, defiantly will enhance the chance for success" (CB-G2-P1)	"It is necessary to define milestones and when need to be achieved. Then, it is necessary for any project to be completed on schedule" (CB-G2-P4)	"Any negative or positive change in the project need to be addressed to the project sponsor and obtain the required approval. Impact on the project cost or schedule should be addressed and approved" (CB-G1-P2)
	Organization B's Contractors	"having useful project impossible without having an integrated project scope of work that enable the contractor to plan the required activities and resources" (CB-G2-P2).	"Project management plan is the base for planning the success. It includes schedule, resources and execution management plans. Implementing as per the plan if it is realistic and effective plan will help in completing the project successfully on time and on budget" (CB-G1-P8)	"The project that completed as per agreed schedule with a good profit margin and with high client satisfaction is the successful project" (CB-G2-P6)	"necessary change in the schedule or any additional work that impact the project cost and deadline should be agreed by all parties and officially approved by the client to avoid unnecessary arguments that may affect the long relationships for the future projects" (CB-G1-P5)

Table Annex III-4: Examples of participants' quotes for emerged subthemes for completing the project on Time (Organization B)

Organization	Participants Role	"On Cost"			
		Developing the Project SOW	Allocating Resources	Directing Resources	Controlling Project Cost
A	Proponent	"It is useful to use the project scope of work to allocate the right budget and estimate the required time for completing the project" (CA-G1-P2)	"Plan is the way to success. Project manager need to make good plan that include all deliverables and acquire the needed human, equipment and financial resources and then monitor the effective implementation of the plan to enhance the chance for success" (CA-G1-P2)	"Any project has to be completed as profitable project. This is done if it is completed as per planed budget and this what we can consider as effective performance. Project manager need to utilize all resources in very effective way" (CA-G1-P2)	"Similarly, updating the schedule and cost baselines are continues processes throughout the project lifecycle. Managing those required changes is necessary for success" (CA-G1-P2)
	Decision Maker (DM)	"By capturing the strategic objectives and clearly including them in the project scope of work, the project can be completed successfully on the right time and right cost by planning the required resources and scheduling the implementation tasks" (CA-G1-P6)	"By capturing the strategic objectives and clearly including them in the project scope of work, the project can be completed successfully on the right time and right cost by planning the required resources and scheduling the implementation tasks" (CA-G1-P6)	"Cost effectiveness is necessary for the project. High cost will impact the net profit and in some cases, completed projects became source for lose. Managing the project resources is important during the execution to avoid over run cost" (CA-G2-P3)	"implementation according the approved scope baseline is the great success. Change in the scope will impact the project cost and schedule and in some cases this will lead to a clear failure" (CA-G2-P3)
	Quality Assurance Review Team (QART)	"Project can be completed successfully on desired time and at desired cost which make it strategically feasible if it has effective scope of work and that scope of work implemented effectively" (CA-G2-P7)	"project sponsor and project manager share the responsibility for success. All resources need to be planed and according to them all activities should be scheduled. Right planning and right execution will end with a success" (CA-G1-P7)	"Each project has limited resources and managing those resources is the way for success" (CA-G1-P4)	"Agreed completion time and budget should be respected and only necessary and approved change should be accepted to complete the project successfully" (CA-G1-P4)
	Project Management Team (PMT)	"The project scope of work is so important as official document that include in details the project requirements and execution methods. This will help in identifying the required resources and allocate appropriate budget" (CA-G2-P2)	"Effective utilization for the human resources and financial resources and any other resources will help in completing the project on the planned desired cost which ensure good margin of profit after completing the project successfully" (CA-G1-P5)	"Effective utilization for the human resources and financial resources and any other resources will help in completing the project on the planned desired cost which ensure good margin of profit after completing the project successfully" (CA-G1-P5)	"Completing the project beyond its allocated budget means increase in its initial cost and raise in its depreciation and defiantly this will affect the production cost. It is important to control the cost and to be sure that only the needed additional cost is approved" (CA-G2-P5)
	Organization A's Contractors	"project scope of work should state the project scope clearly and should help in estimating the required time and required resources" (CA-G2-P4)	"To meet the success, contractor and the project owner should plan for the required resources and then manage those resources during execution to ensure effective cost" (CA-G2-P1)	"We need a reasonable margin of profit that enable us to survive and develop our business. Projects that end with a cost more than the contract value is disaster for the contractor. So, contractor need to have strong project manager that can manage those resources during implementation" (CA-G1-P8)	"Procedures and tools that help in detecting the impact of any change or deviation from the scope, schedule or cost baselines on the project objectives should help in controlling any change and enhance the chance for success" (CA-G1-P3)

Table Annex III-5: Examples of participants' quotes for emerged subthemes for completing the project on Cost (Organization A)

Organization	Participants Role	"On Cost"			
		Developing the Project SOW	Allocating Resources	Directing Resources	Controlling Project Cost
B	Proponent	"If it is good scope of work, it guides all concerns to accomplish the project objectives and the organization long term objectives as well as completing the project on the agreed time and within its budget (CB-G2-P5)	"completing the project on time within its budget is important factor for measuring the success. To be able to reach to that objective, the contractor should identify activities, plan the resources, schedule the implementation and meet the schedule deadlines" (CB-G1-P7)	"Correct utilization for the assigned resources for project execution will help in completing the project successfully as per its baseline cost" (CB-G1-P7)	"In some cases it is necessary to do some changes for the project scope, schedule or budget within the project lifecycle in order to ensure delivering the desired products, services or results. It is not a problem if changes truly needed" (CB-G2-P5)
	Decision Maker (DM)	"To be able to complete the project on time, within the budget and achieve the project scope and organization vision, project scope of work should be developed right and utilized right" (CB-G1-P1)	"role of Plan-Do-Check-Act is important for success. To complete on time and within the budget, planning and managing resources and activities is necessary for achieving the targets" (CB-G1-P4)	"project that lose the correct management for its resources will run more likely over cost which is failure. I mean here all type of resources including human and financial resources" (CB-G1-P1)	"role of Plan-Do-Check-Act is important for success. To complete on time and within the budget, planning and managing resources and activities is necessary for achieving the targets" (CB-G1-P4)
	Quality Assurance Review Team (QART)	"The project scope of work is the key for completing the project successfully. It helps in achieving the project scope at the required quality, time and cost" (CB-G1-P3)	"Cost of the project can tell us if it is successful project or not. If it is completed as per planed and allocated budget, this mean there was good management for the resources and positive cost-effectiveness utilization which represent excellent achievement" (CB-G2-P7)	"Cost of the project can tell us if it is successful project or not. If it is completed as per planed and allocated budget, this mean there was good management for the resources and positive cost-effectiveness utilization which represent excellent achievement" (CB-G2-P7)	"It is normal practice having some variation. Change doesn't mean always increasing the scope, raising the budget or postponing the deadline. Sometimes it is the opposite and managing the required is required for success" (CB-G1-P3)
	Project Management Team (PMT)	"The most important tool that help everyone involved in completing their tasks successfully is the project scope of work. Using this tool effectively will help achieving the project scope and do that as per the schedule and within the approved budget" (CB-G2-P8)	"Identifying and then Planning for the required resources should help in completing the project successfully without additional cost" (CB-G1-P2)	"One of the most important roles for the project manager is the effective use of the assigned resources and allocated budget to end with a project that successful in reaching its objectives without overrun cost" (CB-G1-P2)	"it should be selected and executed at the right time, within the right execution plan and schedule without variations that seriously impact the allocated budget and its initial cost" (CB-G2-P1)
	Organization B's Contractors	"having useful project impossible without having an integrated project scope of work that enable the contractor to plan the required activities and resources" (CB-G2-P2).	"Project management plan is the base for planning the success. It includes schedule, resources and execution management plans. Implementing as per the plan if it is realistic and effective plan will help in completing the project successfully on time and on budget" (CB-G1-P8)	"The most important for contractor is completing the project on time as per its scope without overrun cost. This will guarantee a reasonable profit margin" (CB-G1-P5)	"right budget is necessary and it is more essential success factor for all parties to work according to the allocated budget and to avoid cost overrun (CB-G2-P6)

Table Annex III-6: Examples of participants' quotes for emerged subthemes for completing the project on Cost (Organization B)

Organization	Participants Role	"On Strategy"			
		Developing the Project SOW	Verifying Project Objectives and Expectations	Controlling Project Performance	Managing Operation Performance
A	Proponent	"The project long term objectives, the expected and desired outputs and criteria that satisfy us need to be mentioned in very clear statements in the project scope of work" (CA-G1-P2)	"At the beginning and during planning phase, project proponent's expectations and project objectives need to be identified and considered in the implementation plans" (CA-G1-P2)	"monitoring and controlling the implementation is necessary to ensure that each completed activity will help the project to achieve its strategic objectives after completion" (CA-G1-P2)	"What is gained or added to the organization after completing and operating the project? This question will answer if it is successful project or not" (CA-G1-P2)
	Decision Maker (DM)	"By capturing the strategic objectives and clearly including them in the project scope of work, the project can be completed successfully on the right time and right cost by planning the required resources and scheduling the implementation tasks" (CA-G1-P6)	"In my opinion, any project has to be connected to the organization vision and success happened only when the project help in achieving that vision. The way to reach those should be considered while planning for project" (CA-G1-P6)	"Projects are used to add new product, increase productivity, or to reduce the cost. So, it should add value to the existing business. This only happen if every step is checked to ensure that it help in achieving the project goals" CA-G2-P3)	"The success should be measured long time after completion. If project different stakeholders are satisfied about its operation, then it is excellent results" (CA-G2-P3)
	Quality Assurance Review Team (QART)	"Project can be completed successfully on desired time and at desired cost which make it strategically feasible if it has effective scope of work and that scope of work implemented effectively" (CA-G2-P7)	"to deliver and end with a project that satisfy the company objectives, it is required to have clear road map for achieving them successfully. Taking those objectives in consideration while planning is the right way to achieve them" (CA-G1-P4)	"Evaluating the completed tasks and ensuring that it is done as required and be sure that it is supporting ending with a project that meet the company strategic objectives will lead to success" (CA-G1-P4)	"Achieving the long-term objectives is mandatory for getting the targeted satisfaction. As high as the project proponent is satisfy as high as the success is assumed. This satisfaction should be measured during project operation phase" (CA-G1-P4)
	Project Management Team (PMT)	"scope of work that include the strategic purposes will help in achieving the project purpose and will help in doing as required" (CA-G2-P8)	"Successful strategic project means it achieved its strategic goal or goals but this will not be happened without careful planning and close monitoring " (CA-G2-P2)	"Successful strategic project means it achieved its strategic goal or goals but this will not be happened without careful planning and close monitoring " (CA-G2-P2)	"Project which is fail to add any improvement to the organization, then it is just waste of effort and resources. Real success should be measured after some time of its operation" (CA-G1-P5)
	Organization A's Contractors	"Success is completing the project as per its Scope of work taking in consideration that it is reflecting the real business needs" (CA-G2-P1).	"For both, there should be strategic goals need to be achieved by completing a project. For the contractor, it is necessary to plan and ten monitor implementations to use the project to build strong team and gain experience and reputation that help in the long term" (CA-G2-P4)	"For both, there should be strategic goals need to be achieved by completing a project. For the contractor, it is necessary to plan and then monitor implementations to use the project to build strong team and gain experience and reputation that help in the long term" (CA-G2-P4)	"The contractor is doing all necessary to satisfy the client but it should not impact the value that he should gain from the project. Real success is the will performance with high client satisfaction during and after the project phases" (CA-G1-P3)

Table Annex III-7: Examples of participants' quotes for emerged subthemes for completing the project on Strategy (Organization A)

Organization	Participants Role	"On Strategy"			
		Developing the Project SOW	Verifying Project Objectives and Expectations	Controlling Project Performance	Managing Operation Performance
B	Proponent	"If it is good scope of work, it guides all concerns to accomplish the project objectives and the organization long term objectives as well as completing the project on the agreed time and within its budget (CB-G2-P5)	"If it doesn't make significant difference in the existing business operation, it is not meeting its strategic objective and hence it is not a successful project. Good plan is the key for achieving all objectives" (CB-G1-P7).	"As project sponsor, proponent and end user, I have to be satisfied by achieving the desired results and accomplishing the long-term objectives that project originally initiated and approved to achieve. One role during execution is to monitor and control the right execution" (CB-G2-P5).	"Some projects are completed on time, completed on the specified scope, and completed within its budget but after successful startup, it fails to add value to the organization and in some cases, it adds loses to the organization. Such projects are failed strategically" (CB-G1-P7)
	Decision Maker (DM)	"To be able to complete the project on time, within the budget and achieve the project scope and organization vision, project scope of work should be developed right and utilized right" (CB-G1-P1)	"Considering the Organization vision during the planning phase and monitoring project life cycle will give results that satisfy the management who approved the project and only then we can talk about the success that everyone involved should contribute to make it" (CB-G1-P4).	"Considering the Organization vision during the planning phase and monitoring project life cycle will give results that satisfy the management who approved the project and only then we can talk about the success that everyone involved should contribute to make it" (CB-G1-P4).	"No one will be satisfied if the completed project fails in its operation mode to give the strategic results. So managing the operation phase is required to end with a successful project" (CB-G1-P4)
	Quality Assurance Review Team (QART)	"for some projects, their scope of work has vague vision, objectives and requirements and such scope of work is will not be helpful for completing the project successfully" (CB-G1-P3)	"Company's vision and mission can be achieved by effective planning and effective monitoring and controlling for project execution. Each project assists the organization in the direction of its vision is a typically a fruitful project" (CB-G2-P7)	"It will not be successful if it is not adding value to the organization. project team need to observe and correct any deviation from the project strategic objectives" (CB-G2-P3).	"To measure the success you can measure different parties' performance and satisfaction. Project performance after startup is important to be managed to ensure achieving its long-term goals" (CB-G2-P3)
	Project Management Team (PMT)	"perfect implementation of good project scope of work that include the strategic objectives, at agreed period and agreed cost is the success. This is by default satisfying the strategic objective of the project" (CB-G2-P8).	"Any project will be considered successful only if it adds significant value to the company or if it is serve in achieving company's long term objectives. Taking this in consideration during the planning and execution will contribute in reaching there" (CB-G2-P1)	"Any project will be considered successful only if it adds significant value to the company or if it is serve in achieving company's long term objectives. Taking this in consideration during the planning and execution will contribute in reaching there" (CB-G2-P1)	"High level of satisfaction is a reflection of success for project execution and meeting of strategic objectives after certain time of operation is the aim. In this regard, project sponsor need to manage the right operation" (CB-G1-P2)
	Organization B's Contractors	"If project scope includes the organization vision and its strategic objectives, then execution of the project scope of work a mean for meeting project strategic goals and this is the targeted success" (CB-G1-P6).	"We need to know our client expectations and their long-term objectives and translate them into deliverables. This help in include those while planning the project activities" (CB-G1-P5)	"each project should add, to the business of the project owner and to the contractor, value that make them grow or improve their business. So, monitoring the execution phase is the right way to ensure accomplishing that strategic value" (CB-G2-P2)	"Observe its results for while after completion. If its strategic points were achieved, then it is completed successfully. Otherwise, it is not" (CB-G1-P5)

Table Annex III-8: Examples of participants' quotes for emerged subthemes for completing the project on Strategy (Organization B)

ANNEX IV: EXAMPLES OF PRIMARY DATA COLLECTED FOR ANSWERING THE SECOND RESEARCH QUESTION (RQ2)

What in this Annex:

Table	Description	Reference for Section
Annex IV-1	Examples of participants' quotes for emerged subthemes for SOW characteristics (Organization A)	**5.2**
Annex IV-2	*Examples of participants' quotes for emerged subthemes for SOW characteristics (Organization B)*	**5.2**
Annex IV-3	*SOW Content Elements*	**5.2.3**
Annex IV-4	*SOW Language qualities*	**5.2.4**
Annex IV-5	*Examples of participants'' quotes for OSW support functions (Organization A)*	**5.3**
Annex IV-6	*Examples of participants'' quotes for OSW support functions (Organization B)*	**5.3**

Organization	Participants Role	Effective Project SOW: SOW Characteristics			
		Formality	Usefulness	Content	Language
A	Proponent	"Effective scope of work is a formally approved one that use appropriate language and contain current, sustainable, clear, accurate, and complete requirements that make it suitable for use at any phase of the project" (CA-G1-P2)	"Effective scope of work is a formally approved one that use appropriate language and contain current, sustainable, clear, accurate, and complete requirements that make it suitable for use at any phase of the project" (CA-G1-P2)	"It should be more focus and give more attention to the project deliverables and requirements which is the core of any project scope of work. It should ensure that all project requirements are included with appropriate level of detail" (CA-G1-P2)	"scope of work that use unclear statements and ambiguous language can lead to project delay, amendment, cost overruns, and delivering less than desired outcomes" (CA-G1-P2)
	Decision Maker (DM)	"It is the clear, specific and detailed formal written document that defines and captures deliverables work requirements, tasks, and timeline for completing the project successfully" (CA-G1-P6)	"The one that useful for all users at all time of the project life is what we can call an effective. tasks should be clearly assigned by using statement such as 'contractor shall do X task' to have clear instruction and avoid vagueness" (CA-G2-P3)	"....is an agreed upon by all parties as a formal and written document that contains project background, deliverables, roles and responsibilities and the implementation schedule and description to complete a specific project" (CA-G2-P3)	"Scope of work should respect language rules and use simple language that make it understandable. Also, structure and presentation is important for easy deducting the required section and information whenever it is required" (CA-G1-P6)
	Quality Assurance Review Team (QART)	"I defend the effective scope of work is the written document that contains all project stakeholders' requirements and state them in a very easy understandable and unconfused way which make it easy to interoperate by all parties" (CA-G1-P4)	"Effective scope is the one remain effective all the way from the first moment until last moment of the project lifecycle as useful document for all parties. In this regard, right voice to assign the tasks is important to specify the action taker for each task" (CA-G2-P7)	"It should include implementation schedule and milestone for each stage and identifying the roles and responsibilities as well as liabilities of all parties. Also, it is so important to have all exclusions clearly declared and what is required and necessary for the project using the clear description of required specifications, required quantity, and so on" (CA-G2-P7)	"effective scope of work need to use effective language that use easy understandable words and statements" (CA-G1-P7)
	Project Management Team (PMT)	"It the written project supporting documentation which must be presented with sufficient narrative so that the project scope, objective, inputs and output can be easily understand, reviewed and critiqued. Relating tasks to identified project objectives that help in understanding the reason behind the selected deliverables" (A-G1-P5)	"Effective SOW is the one suitable and useful to every user at every phase of the project life cycle. It is required clear and comprehensive scope of work [...] this will make the project scope of work comprehensible to the user, eliminating meaningless or ambiguous massages. It should include all related standards that need to be implemented and acceptable specifications" (CA-G2-P8)	"project scope of work is important and it should include all required and expected outputs and formed and presented in the project SOW as specific deliverables" (CA-G2-P5)	"Communicating effectively in writing is essential skills and this required to be enhanced by the scope of work developers. Using clear statements and paragraphs using right words and appropriate verbs with simple appropriate correct grammar is necessary" (CA-G2-P2)
	Organization A's Contractors	"effective scope of work is the written document that presenting all project requirements and specifications which is presented in a neat, easy-to-read format, free of grammatical and clerical mistakes" (CA-G1-P3)	"To be effective, scope of work should have characteristics that make it easy to read and easy to interoperate by all parties and contains all rights and liabilities for all parties. Effective SOW help me reaching and passing commissioning stage easily" (CA-G2-P1)	"Effective SOW is the one that summarizes the project's purpose and describe the desired results. It should include the work to be done, deliverables, the project milestones and the staff qualifications of those responsible for the work" (CA-G1-P8)	"Effective SOW is a comprehensive document that include all project requirements and present them in clear and simple language" (CA-G2-P4)

Table Annex IV-1: Examples of participants' quotes for emerged subthemes for SOW characteristics (Organization A)

Organization	Participants Role	Effective Project SOW: SOW Characteristics			
		Formality	Usefulness	Content	Language
B	Proponent	"Effective scope of work is the one that written to all possible users and formally approved to assist them to do their tasks correctly and quickly on the right time and this what is called effectiveness" (CB-G1-P7)	"project scope of work has to be understandable for all possible users taking in consideration that it should remain understandable for all project phases" (CB-G2-P5)	"Good scope of work should have effective content that clearly identify the project requirements, minimum operation and performance measurable criteria should be included. Also good language will eliminate confusion and dispute between different parties and make it easy to complete the project successfully" (CB-G2-P5)	"scope of work that written in good language will be more effective than the one written using very difficult to understand language. Writers should use standard codes that understandable by the readers and use correct language rules" (CB-G1-P7)
	Decision Maker (DM)	"Effective scope of work is a formal document that cover all and the only needed project requirements and that written in a very easy to understand and correct language format. Explicable language that make it useable and useful for all users is a must" (CB-G1-P1)	"If it is useless at any point of time during the project life cycle or if it is not useable by any concern user, then it is not effective" (CB-G1-P1)	"Effective scope of work should contain precise measurable expected results and those should be introduced as deliverables that has a due date and is tangible, measurable, and specific. Taking care of quality assurance procedure, security and work permit procedures and other organization's procedures and polices is necessary" (CB-G1-P4)	"If I am driving with wrong car or on a road that has no signs, I will miss my targeted place. Similarly using incorrect vocabulary, or wrong spilling is as I am selecting wrong car and improper using of grammar is similar to drive on a road that has no markings and in both cases you will miss your target" (CB-G1-P4)
	Quality Assurance Review Team (QART)	"clear, specific and detailed scope of work that agreed and signed to be a formal project document will have its effect on the project progress" (CB-G2-P7)	"Effective SOW should lead to a successful project which mean it is useful to all users at all phases and describe in detail in what manner a successful project can be achieved and written in a way that legally protect all parties. It is necessary to give clear description of liabilities and responsibilities" (CB-G1-P3)	"… It should include all expectations, detailed project accepted operation criteria, and detailed and specific deliverables in order to have an effective scope of work that help monitoring the project execution" (CB-G2-P3)	"No doubt the way of giving instructions and presenting the project requirements is important. Using suitable words and correct sentences structure, and using the right grammar and spilling will give more clear scope of work" (CB-G2-P7)
	Project Management Team (PMT)	"Verbal scope of work is not an effective. It should be documented in written and approved by higher management to be effective" (CB-G1-P2)	"Effective scope of work convert the project goals and desired outcomes into specific and clear deliverable. It need to cover all materials, equipment, tasks, specifications and criteria and it should be clear and specific to give the user at any stage the help he need to do his work. Such scope of work is what we can call an effective SOW" (CB-G2-P8)	"Effective scope of work content is must […] Specifying the acceptable performance criteria that meet the expectation, providing the information that may impact the project delivery time and cost, and clearly stated the accepted standards and execution methodological information" (CB-G2-P4)	"make it easy to read and easy to interoperate by all parties using clear statements and words that make it free of ambiguity. Its text should avoid unnecessary complex statements and common language should be used" (CB-G2-P1)
	Organization B's Contractors	"Written and formal document which is unambiguous, detailed and understandable to every user which will, if used correctly, end with all desired results and outcomes for a successful project. This is what we can call an effective SOW in my opinion" (CB-G1-P8)	"Effective SOW is the one that have clear specifications and criteria of required work which make it very useful to everyone and easy and smooth to pass each phase of the project life cycle successfully. Clarity of responsibilities will lead to a clear plan and successful implementation" (CB-G2-P6)	"comprehensive, detailed, specific, clear and well-structured requirements is the most important quality that make the scope of work effective. It should include sufficient description of accepted performance and criteria is very helpful for doing the required to achieve high client satisfaction" (CB-G2-P2)	"Using of correct, free of vague statements and easy to understand language; in addition to comprehensive, detailed and specific requirements, will make the scope of work effective. Involved persons in developing and writing the project scope should have technical writing skills which include using correct words and correct grammar" (CB-G1-P6)

Table Annex IV-2: Examples of participants' quotes for emerged subthemes for SOW characteristics (Organization B)

Content Characteristics	Description	Organization "A"					Organization "B"				
		PRO N=1	DM N=2	QART N=3	PMT N=4	CON N=6	P N=2	DM N=2	QART N=3	PMT N=4	CON N=5
Project requirements	✓ Clear, specific, comprehensive and detailed requirements ✓ Clear and specific performance criteria	1	2	3	4	5	1	1	2	3	4
Deliverables	✓ Clear and specific deliverables ✓ Specific millstones	1	2	3	4	6	2	2	3	4	5
Owner expectations	✓ Clear expectations ✓ Specific desired output ✓ Specific Desire execution time table for each deliverable and milestones	1	1	1	3	6	2	2	3	4	5
Others necessary information	✓ Clear Project Objectives ✓ Specific number and type of needed staff. ✓ Include technical information and required specifications and related standards ✓ Include related policies and procedures. ✓ Include quality assurance/Quality control requirements, safety, and health, environment and security requirements ✓ Include any other information that may affect the project delivery method or cost	1	1	3	4	3	1	2	2	4	5
Liabilities	✓ Clear description of all parties' liabilities, roles and responsibilities ✓ Clear inclusions and exclusions		1	1	1	2		2	2		1

Note: PRO=Proponent, DM=Decision Maker, QART=Quality Assurance Review Team, PMT= Project Management Team, CON= Contractors Representatives

Table Annex IV-3: SOW Content Elements

Language Characteristic	Description	Organization "A"					Organization "B"				
		PRO N-1	DM N-2	QART N-3	PMT N-4	CON N-6	P N-2	DM N-2	QART N-3	PMT N-4	CON N-5
Understandable Language	✓ Use easy understandable language ✓ Use common terms and terminologies ✓ Avoid use of strange terminologies or terms/ and unusual use of words	1	2	3	4	6	2	2	3	4	5
Avoid Ambiguity	✓ Use present active voice ✓ Use clear instructions ✓ Use constant terminology to refer to the same meaning ✓ Avoid duplication, overlap and contradiction terms or statements ✓ Avoid acronyms and when it is necessary to use spell out acronyms and provide definition for technical, unique and abbreviation terms	1	2	3	4	6	2	2	3	4	5
Correct Language Structure	✓ Use correct and most appropriate simple language grammar ✓ Use correct and standard spilling format ✓ Use correct words and verbs to construct a clear statements and paragraphs	1	1	3	4	6	2	2	3	4	5
Proper Presentation	✓ Use proper presentation and writing structure ✓ Use for sections and subsections with appropriate numbering ✓ Use table of contents and appendices as needed		1		1						
Legal Language	✓ Use legal terms as needed								2		

Note: PRO=Proponent, DM=Decision Maker, QART=Quality Assurance Review Team, PMT= Project Management Team, CON= Contractors Representatives

Table Annex IV-4: SOW Language qualities

Organization	Participants Role	Effective Project SOW: Functions SOW Supports			
		Effective Decision Making	**Effective Risk Management**	**Effective Planning**	**Effective Performance Monitoring and control**
A	Proponent	"If more time is consumed at the stage of writing and developing this important document, it will help the organization to take the right decision" (CA-G1-P2)	"it will help the company to reduce the cost by reducing the risk cost that usually contractor add for uncertainty or unclear scope" (CA-G1-P2)	"organization will be more confident if thy can plan all required resources. planning is the mean for success and good scope of work is the tool for effective planning" (CA-G1-P2)	"It is for the organization the guide for checking the performance during project execution and the output of the project during the project closing and operation stage" (CA-G1-P2)
	Decision Maker (DM)	"For me to approve a project, I should read and understand its scope. projects can be rejected if it seems unfeasible. Some projects rejected because it has unclear or confused scope which make it difficult to take the decision to go toward next process" (CA-G2-P3)	"It is very impotent tool for mitigating, reducing, or managing the associated risk that any project has. It will help in understanding the possible risks and accordingly what is required to effectively manage that risks" (CA-G2-P3)	"I can't imagine planning for a project execution and then implementing this plan without having a project scope of work […] it is used to plan different required resources including required human resources, required tools and equipment for correct and easy execution and to estimate the required execution time for each task. The execution plan should be approved and reviewed and revised when it is needed" (CA-G2-P3)	"This tool can be used and it should be used to monitor the quality and progress of the project and to be sure that all requirements are met" (CA-G1-P6)
	Quality Assurance Review Team (QART)	"It is important to include all project requirements which enable us to take the right decision and the contractor to decide to participate and if so to give the right technical and commercial proposals. Sometimes by looking to the scope we can decide to split it into several portions and each part to have its own bidding process with different categories of contractors" (CA-G2-P7)	"To manage the risk, scope of work is included as main part of the contract to ensure that what contractor quote for is what is documented in the project scope. This will avoid any misunderstanding or disagree between the parties " (CA-G1-P7)	"it has grate help during planning and tasks scheduling. Contractor can assign the required resources and do the right profitable execution" (CA-G1-P4)	"Contractor use the project scope at all phases of the project life and to report the progress and the performance, completed tasks should be monitored and compared against the requirements mentioned in the project scope of work" (CA-G2-P7)
	Project Management Team (PMT)	"Well defined scope of work will help in approving or rejecting the project with clear justification. Without a project scope of work, it will be impossible for estimating team to put right estimation for budget and it will not be possible to the top management to take the right decision" (CA-G2-P2)	"as it is important to the company to be sure that the scope of work is effective to overcome any possible risk, contractor should read it carefully and understand every statement and more than that every word to avoid the risk of giving low bid during bidding and later avoid wrong execution" (CA-G1-P5)	"It is useful for planning the execution phase, commissioning and startup phase and close out phase. planning for the project life cycle phases will help passing them smoothly" (CA-G2-P2)	"It is important document for implementing an effective QC/QA for the project and monitor the performance" (CA-G2-P8)
	Organization A's Contractors	"To approve a project, the picture should be clear to the management. project scope is considered the imaginary picture that management can see the future through it and based on that they can approve or disapprove the recommended project. Clear scope of work equal to high resolution picture which mean easy to decide after all concerns do their responsibilities" (CA-G2-P1)	"Good scope of work will reduce the risk factor that usually contractors add to cover unexpected or unclear items" (CA-G2-P4)	"all parties will be happy by having clear and specific scope of work and it will be opposite if the given scope is not so clear. [......] there will be a lot of arguments between the contractor and client during execution and even before that during the obtaining approvals for the project schedule and planning the required resources for execution. project execution cannot be ignored and should be used at all phases" (CA-G1-P8)	"During the project execution and construction phase, the project owner is checking and observing every single activity and judge if what is done is required or not or if it is meeting the expectations by comparing what is implemented in the site with what is written as agreed project scope of work" (CA-G1-P3)

Table Annex IV-5: Examples of participants'' quotes for OSW support functions (Organization A)

Organization	Participants Role	Effective Project SOW: Functions SOW Supports			
		Effective Decision Making	Effective Risk Management	Effective Planning	Effective Performance Monitoring and control
B	Proponent	"the most important use of the project scope of work during Front End Loading is for checking the project feasibility and accordingly to decide to implement the project, hold the project or discard the idea by canceling the project (CB-G2-P5)	"There is always a risk of completing a project without achieving the real expected value of the project. having a scope of work will help all concerned to measure the risk and do the necessary to manage, control and mitigate that risk" (CB-G2-P5)	"Organization and all concern departments will arrange their financial and human resources according to the project requirements which cannot be understand if there is no project scope of work" (CB-G1-P7)	"It is important to the contractor to implement as per the project scope of work and for the owner to monitor and control the implementation. All tasks should be monitored and compered with the project scope of work even those after project execution and hand over process tell passing the warrantee period" (CB-G1-P7)
	Decision Maker (DM)	"As decision taker, I have to get full idea about the project […] The scope of work helps me in taking the right decisions about the project. scope of work heling the organization to know in advance the benefit that they will gain by investing in a project. also help in allocating the right budget, assigning right project management team and assigning the right contractors for project execution" (CB-G1-P4)	"project scope of work is important for organization to ensure that the project is supporting the organization objectives and to avoid failure or any other risk. In the same way it is important for the contractor. Having unexpected events may lead to unsuccessful project and such events can be reduced by having complete scope of work that explain all needed requirements and all possible risks" (CB-G1-P4)	"good scope of work can be translated into a good execution plan which assist the contractor and the company for smooth implementation" (CB-G1-P1)	"A good scope of work will help organization all the way during project lifecycle to have close monitoring the quality of the delivered materials and services and executed tasks" (CB-G1-P1)
	Quality Assurance Review Team (QART)	"before doing anything toward implementation and in order to convince the top management about the project feasibility, project scope of work is the only comprehensive tool that help in doing so" (CB-G2-P7)	"It is the mechanism to administrate the contract and manage the risk" (CB-G2-P3)	"All parties including contractor use the project scope of work throughout the project execution lifecycle. It is excellent useful tool for good planning and high performance" (CB-G1-P3)	"Organization take benefit of scope of work existence to evaluate the execution progress and performance of the executers" (CB-G1-P3)
	Project Management Team (PMT)	"It is the key for management to compare, evaluate and choose the right, needed and adding value project. It is necessary at the same time for estimation team to estimate the required budget. If it passed to bidding process, it is also necessary to select the right contractors for execution and to do all bidding process stages" (CB-G2-P8)	"scope of work should be clear for smooth interpretation for its words, statements and paragraphs by all parties. This will make it useful during tendering and during implementation to execute the project exactly as it is required to avoid and disagreement between parties regarding the quality of supplied materials and work itself" (CB-G2-P4)	"Contractor use this document for planning their tasks and monitoring their performance and progress. For me I will use it to be sure the availability of all required resources and be sure the implementation method and time" (CB-G1-P2)	"All those who are involved in the project execution and monitoring are relay on the project scope of work to monitor and measure the actual performance and progress. […..] closing the project mean meeting all its objectives and those can be checked only by comparing the accomplishments with the project scope of work" (CB-G1-P2)
	Organization A's Contractors	"For contractor to decide to participate in the bidding process or to accept to have a contract for project execution, it is important to have and understand the project scope to be sure the availability of the required resources" (CB-G1-P8)	"This will avoid any clash during execution and will help both parties to have a right cost for project execution. No over estimation which affect the project return and harm the client, and no underestimation which may harm the contractor" (CB-G1-P5)	"To do a good planning we need to have a good and detailed scope of work. […..] this will make next phases easier since it gives clear vision" (CB-G2-P6)	"as part of QA/QC requirements to be sure that project is executed as per its scope and to control the quality of supplied materials, equipment and quality of the work, project scope is used to check and monitor all activities during execution, commissioning, testing, startup and final acceptance of the project" (CB-G2-P2)

Table Annex IV-6: Examples of participants'' quotes for OSW support functions (Organization B)

ANNEX V: DATA RELATED TO THE PROJECT SOW DEVELOPMENT PROCESS (RQ3)

Note:

The flow charts and Process phases' details were developed based on the sketched flow charts that drafted by participants during focus group discussion and the participants' discussions and inputs which were recorded and transcribed. The final figures shown in this annex were sent to participants to ensure that it is really reflect the process and procedures used at organization to develop the project SOW.

What in this Annex:

Table	Description	Reference for Section
Annex V-1	**Detail description for crucial roles involved in Project SOW development (Organization A)**	**6.2**
Annex V-2	**Detail description for crucial roles involved in Project SOW development (Organization B)**	**6.2**

Figure	Description	Reference for Section
Annex V-1	**Business Case Phase Deliverables (Organization A)**	**6.2**
Annex V-2	**Study Phase Deliverables (Organization A)**	**6.2**
Annex V-3	**Design Basis Scoping Paper Phase Deliverables (Organization A)**	**6.2**
Annex V-4	**Business Case Phase Deliverables (Organization B)**	**6.2**
Annex V-5	**Project Scope Phase Deliverables (Organization B)**	**6.2**

Project Stakeholder	Role description during Project SOW development Process
Project Spenser (PS)	PS is assigned by the proponent to lead the activities of FEL phases. During FEL, the PS is responsible for providing directions to the IPT, with greater involvement in the early Phases where project scope of work is developed. The PS is the in charge to start the gate process, by informing and involving Value Assurance to start the Assurance Review activates, and by notifying the Gatekeeper. During the Gate process, the PS provides in advance the required information related to the project status which include the project brief and presentation to the Gatekeeper and then presents the project to the DM during the Gate Meeting. PS play main role in case of disagreement on deliverables with the Functions where he/she interacts to resolve the disagreement with Function management.
Project Leader (PL)	PL is assigned at the beginning of the FEL process by Functions and then works with the PS to defined the required resources and send those to Function to assign the IPT before starting any of FEL activities.
Integrated Project Team (IPT)	IPT is in charge of developing and emerging the project's deliverables for FEL Phases, provides the required support to the PS in the preparation of the fundamental documents for the Gate.
Value Assurance Review Team (VART)	The VART is headed by a Team Leader (ARTL) assigned by Value Assurance and includes members from various Functions. VART is accountable for reviewing the deliverables at the beginning of the phase, and then evaluate the documents produced at each phase by IPT in regard of deliverables' completeness and degree of quality and accordingly gives recommendations on the project's readiness and robustness. VART summarizes findings in the 'Assurance Review' Report which is an important document that PS use to decide to go to gate or to recycle. VART may discusses results with the IPT to resolve and clear any disagreement. If there are still any unresolved issues, those can be reported to the PS and if not agreed on, those can be escalated to the DM for resolution.
The Gatekeeper (GK)	The GK is the Admin Area Head of Corporate Planning and he takes the role of verifying the level of development of the project's deliverables and their readiness for accessing the Gate. The GK evaluate based on Value Assurance recommendations and submitted Project's Brief and Presentation. The GK provides in advance to the DM timely pre-read documents during the Gate process that include Project Brief and Presentation. At the end of gate process, GK is responsible of issuing Gate Outcome Report which includes the results of the gate meeting and the final decision on the project.
Decision Maker (DM)	The Management Committee is playing the role of the DM at the gate. The DM decides according to pre-set criteria that related to the corporate strategic objectives, business operation objectives in addition to the quality and completeness of the presented documents. The decision related to project's readiness to proceed, established according to the PS's presentation, Value Assurance Report recommendations and discussion at the Gate meeting.
Functions Organization/Department (FO/FD)	The FO/FD have the accountability for managing of project portfolio. While the PS is accountable for individual project successful outcome, FO/FD are accountable for the successful planning and execution of the projects portfolio. Even dough, FO/FD has direct involvement in individual project deliverables and related activities. This includes performing controls-type activities on projects on selected deliverables, and analyzing and discussing with the PS key issues. FO/FD have the responsibility of development and management of guidelines, procedures, standards and know-how. FO/FD may issue a specific procedure for development of each deliverable and this procedure is improved and updated by the Function that owns the procedure. FO/FD have important role of "management of the resources in the professional families. This includes providing the qualified, experienced and knowledgeable resources, in order to form the IPT in line with the PS and PL requirements.

Table Annex V-1: Detail description for crucial roles involved in Project SOW development (Organization A)

Project Stakeholder	Role description during Project SOW development Process
Project Proponent Representative (PPR)	PPR is representing the proponent during FEL process as he already assigned by the proponent to supervise each phase activities to ensure meeting and compliance with proposed objectives of the project. During FEL, the PPR is in charge for managing and give directions to the PMT, as well as he has the full responsibility of starting the gate process, by submitting the gate request to TSD after checking the outcome of Quality Assurance Review activates, and accordingly prepare Project updated Package and Presentation. After Checking the clarity of the submitted information and documents, and during the gate meeting, PPR is responsible for presenting the project status to the DM. At the end of the gate, PPR with support of PM is responsible for issuing the gate outcome report documenting all gate results and recommendations. PPR has important role in case of disagreement on deliverables with the Functions or with the TSS where he works closely with them to resolve the disagreement with their management.
Project Manager (PM)	Project Manager (PM) is assigned at the early stage during FEL process by TSS to lead the project during execution. PRR is the leader for FEL process but after completing FEL, the lead is transferred to the PM. The selected PM has to have experience in project execution with very high engineering and technical background. At early stage of FEL process, he works with the PPR to defined the required resources and notify Function to assign the PMT. PMT is then works under the PM leadership until the end of the project.
Management Team (PMT),	During FEL process, PMT is in charge of developing the project's deliverables for FEL Phases, supports PPR for all activities specially for preparing the required documents that necessary for proceeding with the project, and provides necessary information as and when required.
Technical Support Department (TSD)	The TSD is having the lead for FEL process and most of technical, quality and clarifications related process are handled by it. During FEL process, TSS is mainly taking the responsivity of preparing the Quality Assurance Plan for each phase after receiving the related document from PPR and checking the deliverables at the beginning of the phase, then reviewing and evaluating the documents produced at each phase by PMT and approved by PPR in regard of having comprehensive deliverables compared with the plan and quality level and accordingly gives recommendations on the project's readiness. TSS summarizes results in the "Quality Assurance Report" which is used by PPR decide to start gate process or to recycle. TSS in organization B is taking the role of the gatekeeper where the request for starting the gate process is received by TSS and takes the role of verifying and evaluating the clarity of the submitted package and presentation to decide the readiness of the project for getting into the gate. In case of readiness for accessing the gate, TSS notify the Proponent to schedule the gate meeting with coordination with DM, PPR and PM.
Decision Maker (DM),	DM is not a one person, but it is a grope formed by the top management to take the strategic decisions for the organization which is called Management Committee Teem. DM is deciding the project start at its early stage by evaluating and deciding based on the "Opportunity for Investment". Also, DM decide for the project at each gate of FEL process for moving on, recycling, holding or canceling the project. The DM decides based on the project presentation introduced by the PPR and related discussion during the gate meeting. Project that not meeting the organization long term objectives as well as its short term operation objectives will has no access from the gate. Also, projects that not meet the required level of quality will not pass to the next phase.
Functional Departments (FD	The project successful is mainly depend on the selected PMT and the information and resources provided by FD. FD have to manage their human resources to ensure the availability of important professionals that are qualified, with required level of experience and updated required knowledge. This will help in forming strong PMT for individual project. Also, FD have the responsibility of issuing, maintaining and updating the procedures that include the required deliverables. So, the project deliverables are selected base on the related procedures that owns by the FD and those are shared and discussed with PPR and the Proponent.

Table Annex V-1: Detail description for crucial roles involved in Project SOW development (Organization B)

FEL 1 – Business Case Process detail

Business Case

INITIAL DELIVERABLES
- Project Lessons Learning Report (VIP)
- Project charter
- Basic Data Requirements

CORE DELIVERABLES

Business Case Assessment
- Business Objectives
- Alignment between the project and the organization's investment and master planes
- Potential synergic with other projects
- Main Scope, expected life cycle
- Economic model including net benefits, cash flow lifecycle, costs, NPV
- Identification of alternatives.

SUPPORTING TO CORE DELIVERABLES
- Schedule Level 1
- Business Case Cost Estimation ($\pm 50\%$)
- Target setting
- Environmental Impact Assurance
- Site Selection Assessment
- Project Risk Management (VIP)
- Stakeholder Management Plan

DELIVERABLES UPDATES FOR FOLLOWING PHASE
- Contracting Strategy
- Project execution Plan
- Operational Readiness Plan Strategy
- Preliminary funding request
- Proposed resources staffing for the study.

Figure Annex V-1: Business Case Phase Deliverables (Organization A)

FEL 2 – Study Process detail

Study

INITIAL DELIVERABLES
- Lesson Learned
- Project Charter

CORE DELIVERABLES

Analyzing and assessing Project Alternatives
- Description of Project's alternatives with related scope.
- Economic evaluation
- Description of the main assumptions for the economics
- Sensitivity analysis on economics.

SUPPORTING TO CORE DELIVERABLES
- Updated Schedule Level 1
- Business Case Cost Estimation (± 40%)
- Facility Security Assessment
- Technology Selection Report (VIP)
- Land Use Permit
- Site Selection Assessment
- Project Risk Management (VIP)
- Stakeholder Management Plan

DELIVERABLES UPDATES FOR FOLLOWING PHASE
- Contracting Strategy
- Proposed resources staffing for the Design Basis Scoping Paper (DBSP).

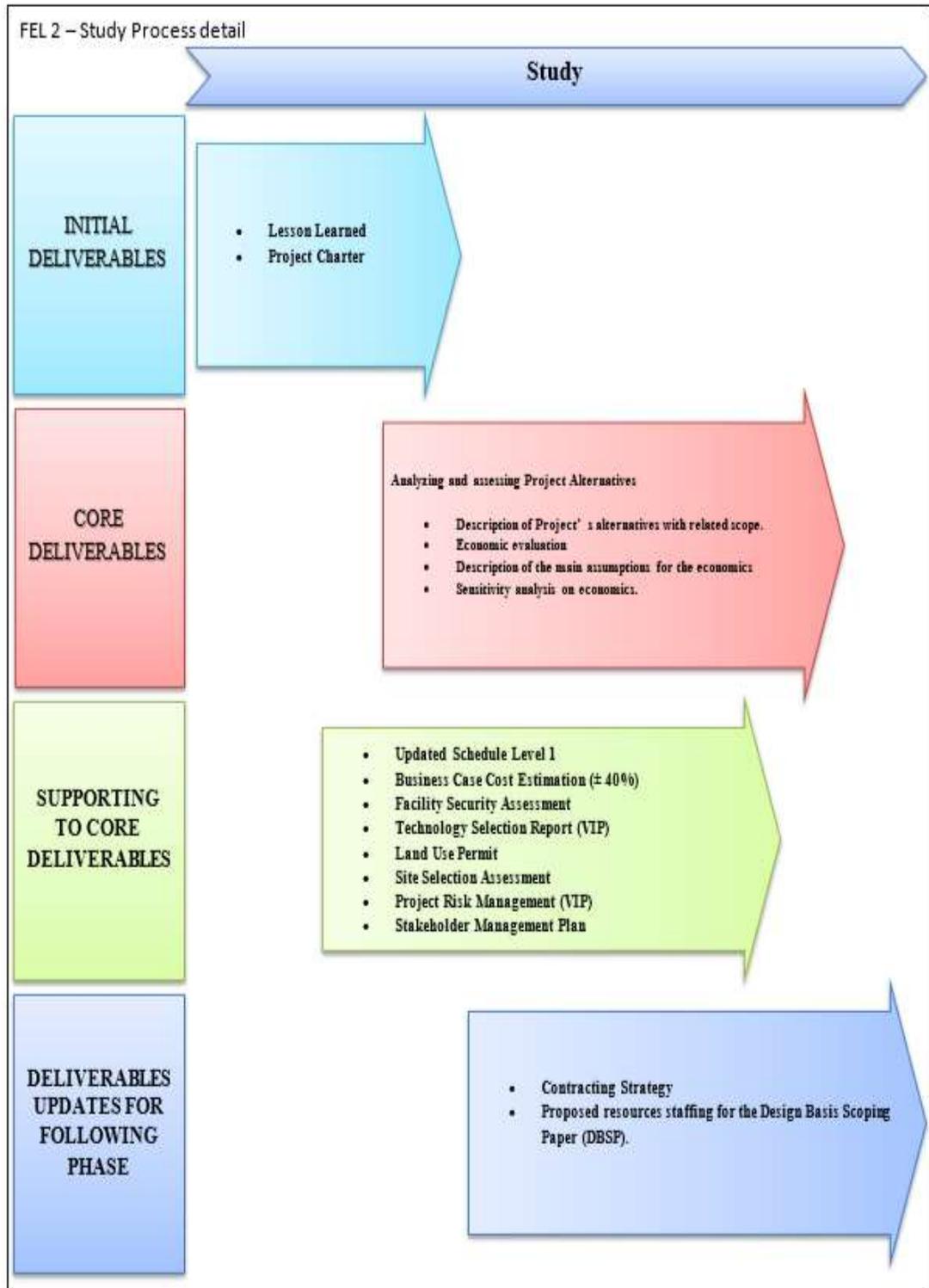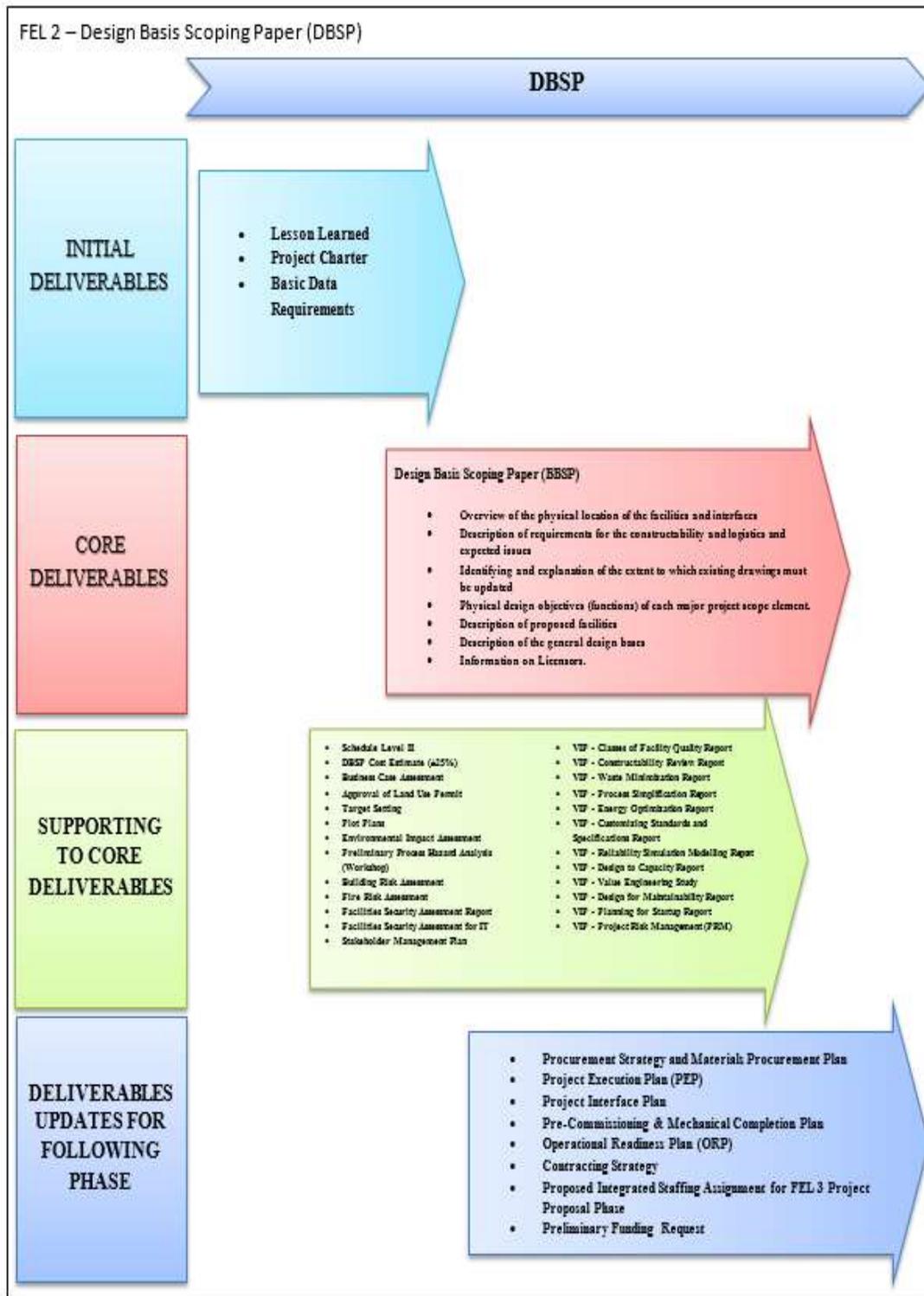*Figure Annex V-2: Study Phase Deliverables (Organization A)*

Figure Annex V-3: Design Basis Scoping Paper Phase Deliverables (Organization A)

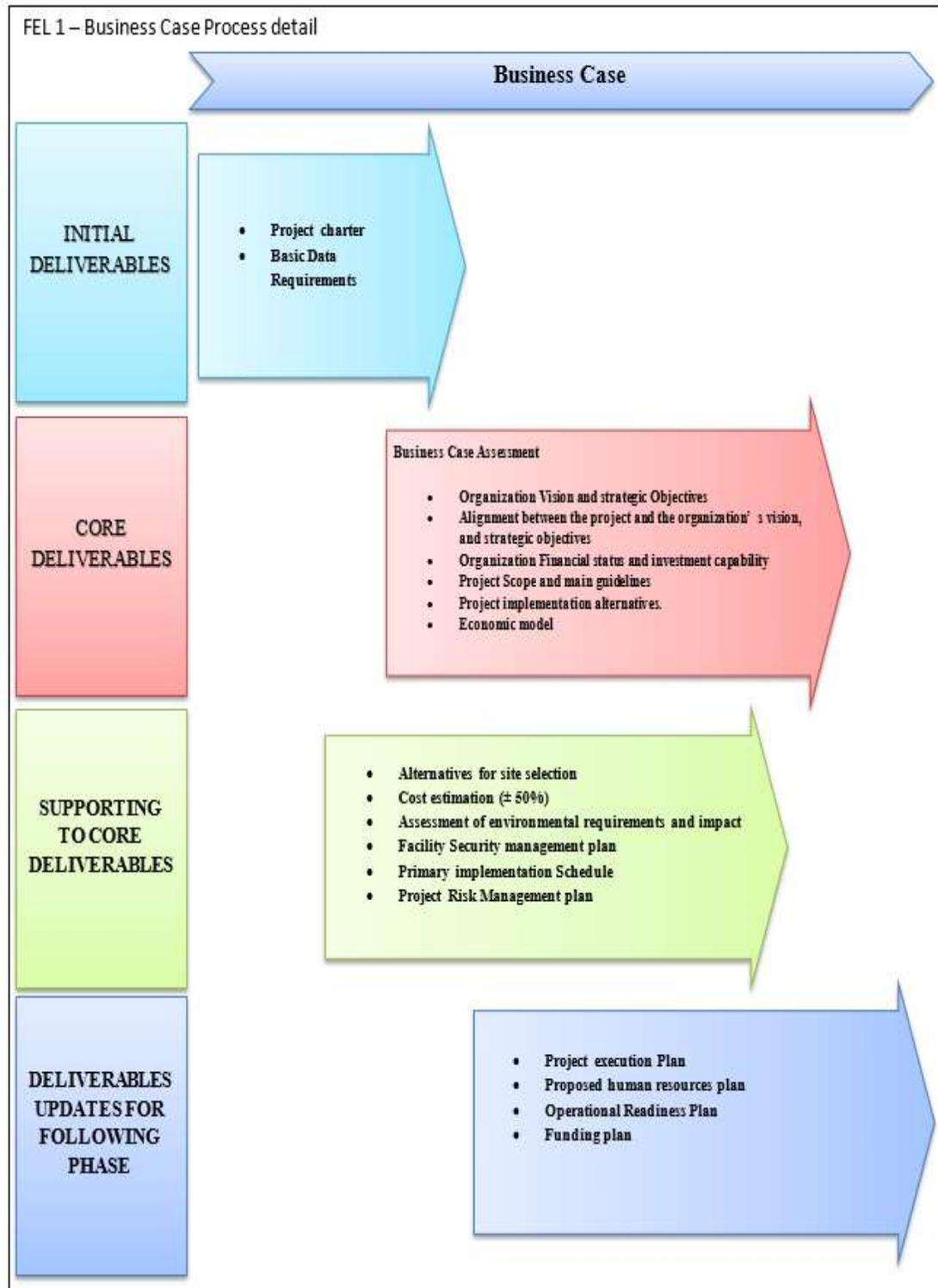*Figure Annex V-4: Business Case Phase Deliverables (Organization B)*

FEL 2 – Project Scope

Project Scope

INITIAL DELIVERABLES

Analyzing and assessing Project Alternatives

- Description of Project's alternatives with related scope.
- Economic evaluation

CORE DELIVERABLES

Frozen Project SOW:

- Description of the physical location of the facilities and interfaces
- Description of logistics requirements
- Description of design requirements
- Description of supply requirements
- Description of construction requirements
- Information on technology suppliers and Licensors.

SUPPORTING TO CORE DELIVERABLES

- More detailed project Schedule Level II
- Project scope cost estimate (±20%)
- Updated Business Case Assessment
- Approval of site location
- Environmental Impact Assessment
- Preliminary Process Hazard Analysis
- Detailed Risk Assessment
- Facilities Security Assessment Report
- Stakeholder Management Plan

DELIVERABLES UPDATES FOR FOLLOWING PHASE

- Procurement and contracting Strategy Plan
- Project execution plan
- Project interface plan
- Mechanical completion plan
- Pre-Commissioning, commissioning and startup plan
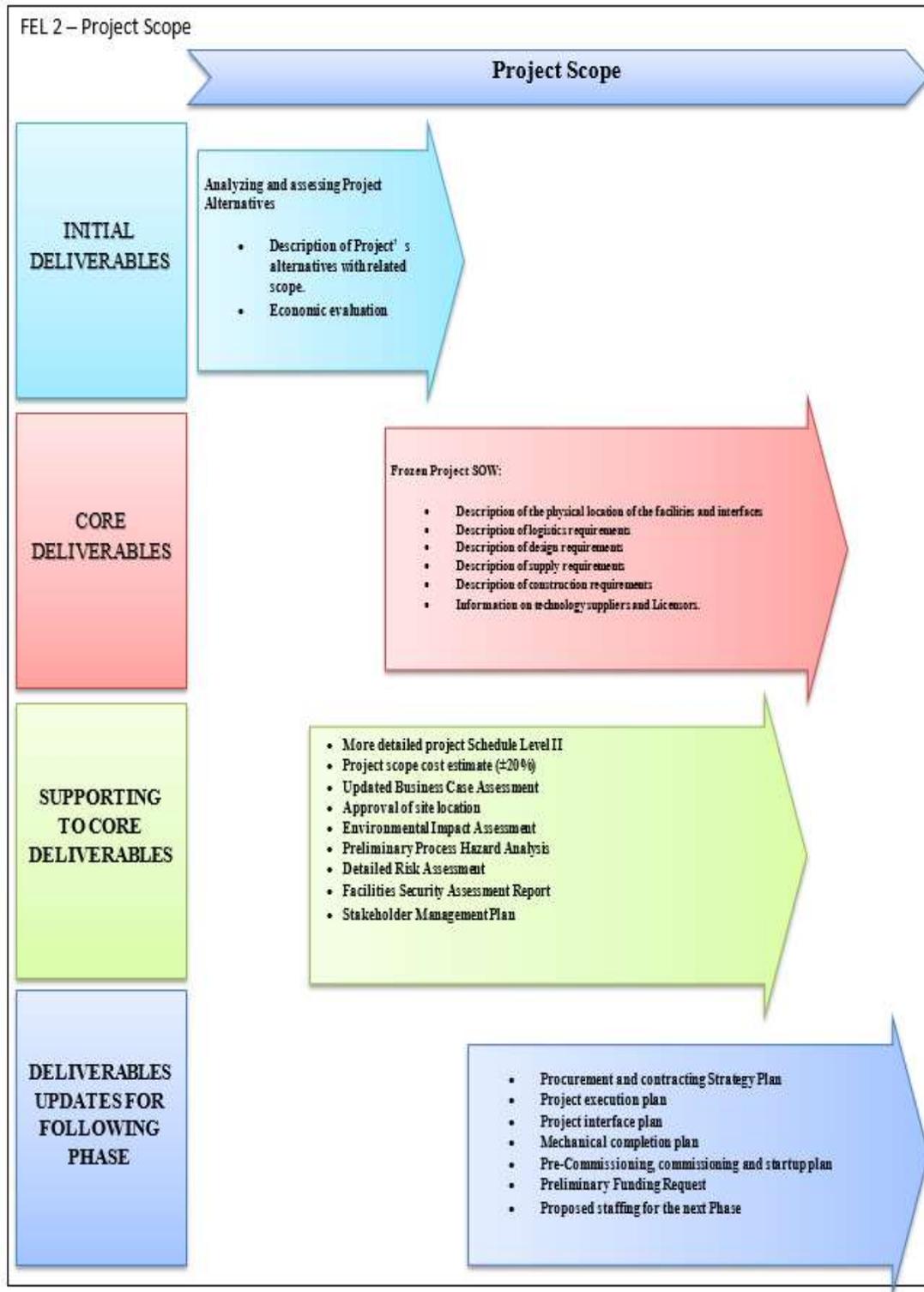- Preliminary Funding Request
- Proposed staffing for the next Phase

Figure Annex V-5: Project Scope Phase Deliverables (Organization B)