

Analysis of Major Challenges to the Implementation of Oil, Gas, and Petrochemical Projects in Iran

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Abstract. In the last century, there have been many challenges in Iranian oil industry such as internal and external issues and their interaction with foreign companies in engineering, contracting, construction and operational aspects.

Identification of these challenges, through expert viewpoints would improve the performance of companies work in the oil, gas, and petrochemical industry. To achieve this goal, a literature review and some interviews with experts were conducted. To recognize these major challenges in the execution of oil industry projects the results were categorized into nine-areas of project management knowledge. A questionnaire survey based on Husky project lifecycle was distributed within the selected case studies to find out relevant root-causes and to validate information gathered from the interviews.

Consequently, a percentage of deficiencies were discovered through analyzing and categorizing the findings in the nine project knowledge areas. These were mapped with five-group project management processes in current Iranian oil, gas, and petrochemical industry lifecycle which three major criteria of “Procurement, Risk, and Documentation Mismanagement” are discovered. Furthermore, some remedial action plans were recommended based on the literature review and the respondents’ solutions classification in this regard.

Keywords: Major Challenges, Oil and Gas, and Petrochemical Industry, Project Lifecycle Procurement Management, Risk Management, Documentation Management

1. Introduction

Necessity of production acceleration, due to being the world second significant oil and gas reservoir¹, causes many challenges in the implementation of Iranian mega oil projects. It has drawn oil experts’ attention to identify and submit solutions to overcome these challenges in different aspects of projects such as engineering, contracting, commercial, and management. Main objectives of this study are to identify major challenges projects implementation in their lifecycle and their level of importance via wide industrial survey in Iranian oil, gas, and petrochemical industry.

2. Literature Review

Project management process varies according to the nature of the industry, projects, and the organization. In a typical project management process forty two processes can be categorized based on the nine project knowledge areas which are good criteria for analysis of the challenges of any projects implementation [1].

Based on previous literature studies, major challenges were categorized in the format of nine project knowledge areas in Figure 1 [2], [3], [4], [5], [6], [7], [8], [9], [10], [11].

This research focuses on finding the major challenges in Iranian oil, gas, and petrochemical projects and also presenting recommendation to improve the projects performance.

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¹ According to the British Petroleum (BP) report in 2004, 11.4% of the world oil reservoirs and 15.2% of the world gas reservoirs belongs to Iran.

For this purpose, a multi-pronged research methodology was developed to address objectives. The preliminary data for this research was collected through a wide literature review and followed by structured interviews of various oil industry mega projects experts and the use of a questionnaire survey of three selected cases in the oil industry to extract rich knowledge bases of major challenges.

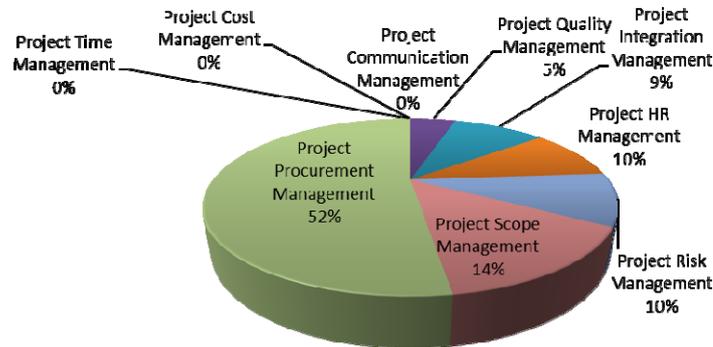


Figure 1: Studied Major Challenges

3. Research Methodology

Research process of this study is depicted in the Figure 2. Face to face interviews with eight project managers, with different scopes and valuable years of experience in oil industry, have been successfully implemented and the external issues including social, cultural, educational, economical, legal, political, and governmental were found. To prepare a questionnaire, the major aspects of questions are divided into five-Phases of “Identification”, “Selection”, “Definition and Plan”, “Execution”, and “Commissioning”. The total numbers of sixty questionnaires are distributed in the three companies in the oil industry and twenty one completed one were returned and analyzed. (Figure 2)

Husky² definition of the project life cycle, PMBOK nine project knowledge areas and five-process groups of project management have been used as criteria for analysis of the identified challenges by questionnaires results.



Figure 2: This Study Process

4. Analysis of Findings

Certain factors of “Weakness of the Project Scope Definitions”, “Cost Estimation”, “Educational System”, and “Lack of Contractual Knowledge” have been established as the causes of the challenges through interviews’ data analysis. The interviews revealed the possible major challenges are through the “Planning Process” of Project Management Process and are related more to “Project Procurement, Cost, Human Resource, Risk, and Scope Management” of project management knowledge areas (Table 1).

Table 1: Major challenges from the point of project management process

Analysis	Project Management Process (Interviews Analysis)				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring & Controlling Process Group	Closing Process Group
Project Integration Management	1 Case	2 Cases	3 Cases	4 Cases	3 Cases
Project Scope Management		8 + 1 Of 4 (Rep.) + 1 Of 2 (Rep.) Cases		4 + 1 Of 2 (Rep.) Cases	
Project Time Management		8 Cases		3 Cases	
Project Cost Management		14 + 3 Of 2 (Rep.) Cases		3 Cases	
Project Quality Management		1 Case	1 Of 2 (Rep.) Case	6 Cases	

² Husky Energy Inc. focusing on petroleum and natural gas exploration, production, refining and retail sales, the company primarily conducts operations in Canada, the United States, China and Indonesia. The Husky lifecycle can be applied to any type of projects and to any size of company in terms of five phases of “Identification”, “Selection”, “Definition”, “Execution”, and “Commissioning”.

Analysis	Project Management Process (Interviews Analysis)			
Project HR Management		8 + 4 Of 2 (Rep.) Cases	7 Cases	
Project Communication Management	0	3 Cases	1 case	1 + 1 Of 2 (Rep.) Cases
Project Risk Management		14		1 Case
Project Procurement Management		17 + 6 Of 2 (Rep.) Cases	2 Cases	7 Cases
				0

Table 2 indicates different challenges in all phases which some of them repeated in all three or two job sites. For instance “Lack of Strategic Risk Assessment” in the phase one and “Documentation” in the phase five are the most considerable issues, reported from all three job sites and “Lack of Risk Evaluation Preliminary Plan for Preferred Alternative” and “Final Project Risk Assessment” are the other common issues from two job sites. All of them could be mentioned as major challenges from the questionnaire point of the research.

Table 2: Major challenges from the point of project lifecycle

Analysis	Project Life Cycle (All Job Sites Analysis)				
Knowledge Areas	Phase1 (Identification)	Phase2 (Selection)	Phase3 (Define)	Phase4 (Execute)	Phase5 (Commissioning)
Project Integration Management			Front-End Engineering Design (NISCO)		Documentation (CNG&NIORDC&NISCO), Finalize Documentation (NIORDC), Commissioning (CNG), Operation (CNG)
Project Scope Management	Generate Alternative And Required Technologies (CNG)	Select Preferred Alternative And Conceptual Design (CNG)		Detail Engineering Plan (NISCO)	
Project Time Management				Final Operation Plan/Implementation & Commissioning (NIORDC)	Commissioning Plan (CNG)
Project Cost Management			Preliminary Cost Plan (NISCO)		
Project Quality Management	Plan For Alternatives Evaluation (CNG)		Value/Quality Assessment (CNG)	Operation Readiness Assessment (NIORDC)	
Project HR Management					
Project Communication Management	Identify Stakeholder (NISCO)			Interaction Between Unit And Operation Processes (CNG)	
Project Risk Management	Strategic Risk Assessment (CNG&NIORDC&NISCO)	Risk Evaluation Preliminary Plan For Preferred Alternative (NIORDC&NISCO)	Final Project Risk Assessment (CNG&NIORDC)		
Project Procurement Management			Long-Lead Equipment Identification (CNG)	Contracting (CNG)	

In general, the following results could be concluded by comparing these two analyses, shown in Table 2 and Table 1.

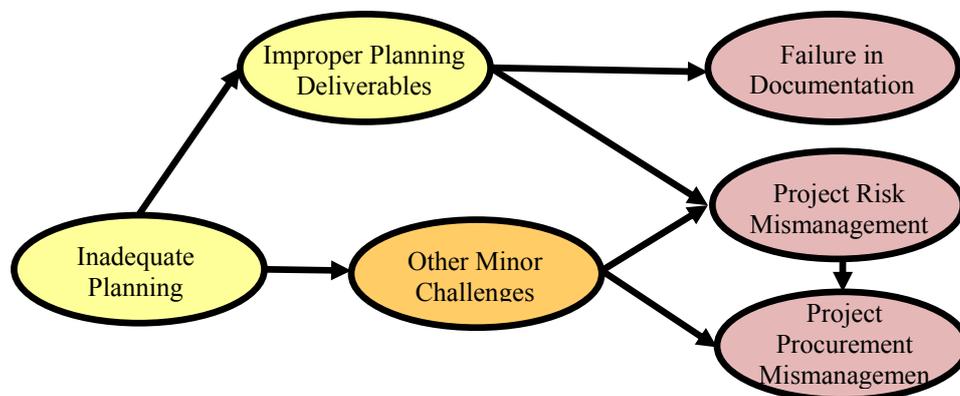


Figure 3: Analysis of Major Challenges to the Implementation of Oil Industry Projects in Iran

- Due to inadequate managements in “Planning Process” analyzed in interview part and consequent improper deliverables of this phase, the considerable challenges of “Strategic Risk Assessment” and “Documentation” are emerged in the first and last phases of the project life cycle.
- Other challenges in the project life cycle address some other mismanagement in “Project HR and Scope Management” in the “Planning Process” too.
- Huge challenges in “Project Procurement Management” of “Planning Process” come out of lack of “Risk Evaluation” and “Strategic and Final Risk Assessment” and consequently other minor mismanagement found in the questionnaire data.

5. Remedial Action Plans

Based on the literature study and the result of the survey, action plans listed as below are recommended to lessen the affect of “Failure in Documentation”, “Risk Mismanagement”, and “Procurement Mismanagement” on Iranian oil industry.

One of the solutions to recover failure in documentation are document management and control consideration and definition from the onset of the project and will be set up through more detailed as further steps. Also, documents validation process such as incoming and outgoing documentation should follow a guiding template format, model, or example beside of adequacy of review, control, quality, and audit the data. At the End of the project stage, all planned deliverables should be completed, finalized, approved and distributed, respectively. Final external deliverable can be flowing out the documents into the future projects which depict a continuous process of permanent documentation management.

Risk mitigation and management solutions are considering risk management as part of every project in any organizations procedure, prioritizing all risks and their impact, determining the budget, schedule and responsible person, and finally categorizing them as well as taking action to reduce the likelihood of risks occurrences and the root causes determination of risks.

And also, project procurement management solutions is creating SMART (Strategically, Managed, Aligned, Regenerative, and Transitional) procurement and supply system and some key guidelines are: increasing managerial efforts and concerns, sanction issues management, increasing local manufacturer capabilities, establishment of a standard reference or organization for oil industry equipment manufacturers, logistics, transportation, and roads improvement, and revising and up-to-dating the legislations, codes, and formalities.

6. Conclusion and Recommendations

Using a multi-pronged research methodology consisting of literature review, structural interview, and conducting the questionnaire survey based on in the Huskey project life cycle and PMBOK definitions structure showed that, "Weakness of the Project Scope Definitions", "Cost Estimation", "Educational System", and "Lack of Contractual Knowledge" are defined as challenge reasons in "Planning Process" of Project Management Process and "Project Procurement, Cost, HR, and Scope Management" of knowledge areas which have been concluded with "Lack of Strategic Risk Assessment", "Documentation", "Lack of Risk Evaluation Preliminary Plan for Preferred Alternative", and "Final Project Risk Assessment" as the most common issues in all job sites. Consequently, “Failure in Documentation”, “Risk Mismanagement”, and “Procurement Mismanagement” have been indicated as three major challenges which Iranian Oil Industry faces during the implementation of projects.

Companies’ capacity, projects delivery methods and project infrastructures are projects success or failure elements. Moreover, highlighting the most significant barriers and providing an integrated structure for better analysis of the project success in the future, are our research deliverables that could be a good reference for further survey.

7. Acknowledgements

The authors want to thank all the managers, engineers, and staff of CNG, NIORDC, and NISCO who participated in the survey. The authors also want to thank Dr. George Jergeas from University of Calgary and

Dr. M. Mehdi Mortaheb from Sharif University of Technology for their guidance, patience and constant support.

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