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Evaluation of “X2” delineation well drilling project block on oil service company

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Abstract. Project is an activity or business that is temporary and has a certain period of time, unique and produces a product, service or both. Achieving project activity right on the schedule was an important thing for project owners or contractors. However, the schedule of the "X2" Well Drilling Project has delayed from the original plan due to several inhibiting factors. Therefore, the cost's project increased during project implementation. The factor analysis method is used to reduce the number of independent variables until new variables are found which are then examined for their relationship and a mathematical model is built using the regression analysis method. The location of this research was one company with 100 valid respondents. The results of this study indicate that there are 3 (three) new factors that have a positive effect and 1 (one) new factors that have a negative effect on the condition of the differences that occur. If a project can be completed before the work period ends, at other times if the owner wants to build a construction project again, there is no doubt that the owner will re-choose Oil Service Company to work on another Drilling Project.

1. Introduction

PT TEP is one of the oil companies in Indonesia. Beginning in December 2004, PT TEP, located in Petunang Village, Tuahnegeri District, South Sumatra Province, obtained power from the government to manage the Pandan Block. In 2009, PT TEP developed a delineation drilling project at well "X2". The purpose of this drilling is to describe the gas contained in the Talang Akar formation sandstone reservoir which was discovered by the "X1" well. In addition, the "X2" well was drilled to prove the existence of an oil rim under the gas cap which is most likely in the "X2" well structure based on the results of the discovery well at the "X1" well. The prospect of well "X2" is determined by the old seismic line that was reprocessed and also by the new 2D seismic line of PT TEP in 2005-2006 (05TE) and 2008 (08TE). This condition



made PT. TEP choose COSL Indo as a contractor, provider of tools, services and human resources for this drilling project. All oil and gas companies generally carry out various activities in order to increase oil or gas production. PT. TEP is one of the oil and gas companies that conducts Drilling Projects in the "X2" Well, Pandan Block, Musi Rawas Regency, South Sumatra. The purpose of this drilling is to describe the gas contained in the Talang Akar Formation sandstone reservoir which was discovered by the "X2" well. In addition, the "X2" well was drilled to prove the existence of an oil rim under the gas cap which is most likely in the "X2" well structure based on the results of the discovery well at the "X1" well. This makes PT. TEP chose COSL Indo as a provider of tools, services and human resources for drilling this project. The project plan sequence starts from the mud program, the bit and casing program, and the wireline logging program [1]. The project is a temporary effort carried out to produce a unique service or product. Whereas Project Management is the application of skills, knowledge, techniques and tools for project activities in meeting project demand through appropriate applications and pooling of management processes [2].

Project Initiation. Stakeholders of the organization provide policies on the initiation of a project within the corporate environment, operationally following up on responses to factors that occur in their organization. There are 4 (four) basic categories of problems that deserve to be used as a reference for the feasibility of a project to be carried out, namely Figure 1.:

1. Meet regulatory, legal, or social requirements.
2. Satisfy stakeholders requests or Needs.
3. Implement or change business or technological strategies.
4. Create, improve or fix products, processes, or services.

These factors affect the organization's ongoing operations and business strategy. Stakeholders concentrate on these factors so that the organization's business continuity can run well and sustainably. Projects provide various means of communication for organizations to be successful in making the changes needed to deal with the formation of existing factors [3]. These new factors must ultimately be related to the strategic objectives of the organization and the business value of each project and can be simulated for future strategy makers.

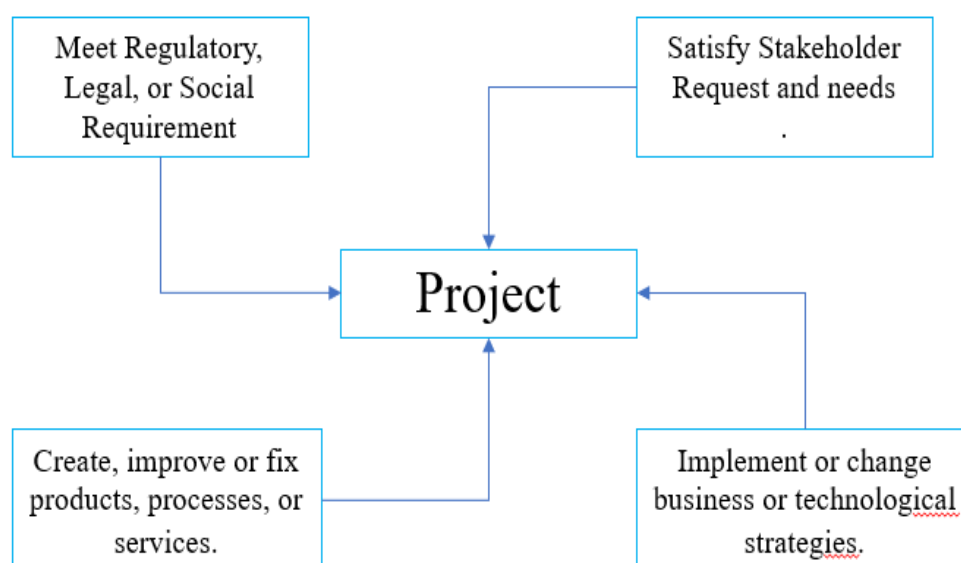


Figure 1. Project initiation context.

2. Literature Review

2.1. Project Management

The project is a temporary effort carried out to produce a unique service or product [4]. Whereas Project Management is the application of skills, knowledge, techniques and tools to project activities in meeting project requests through appropriate applications and the integration of management processes [5].

2.2. Project Management on Drilling

The processes for the drilling project are:

1. Initiation Process: Obtain approval to start work and start drilling development projects [6].
2. Planning Process: Improve objectives, determine the direction of action needed, and set the scope of the project, and to achieve goals. Some activities include reviewing exploration well data, feasibility studies, drilling plans and budgets, procurement strategies, selection of drilling service providers [7].
3. Execution Process: To fulfill project specifications, this process performs and completes activities defined in project management provisions [8].
4. Process of Monitoring and Control: control improvement and performance such as knowing the fields that require changes to the plan, then initiating the appropriate changes [9].
5. Closing Process: Finalize all activities with closing reports such as budget, learning, and all project drilling management data, and submit their management to formally close the project [10].

2.3. Project Integration Management

According to PMBOK, Project Integration Management consists of processes and activities which aim to establish, unite, identify, combine, and coordinate all project management processes and activities in the Project Management Process Group. Project management in its context contains that integration consists of characteristics of unity, interconnection, and consolidation. According to [11] the purpose of integration interdependent elements of the oil and gas project have a good correlation. This is done through good planning and operational plans for oil and gas projects, which are interdependencies between team members. At the same time, it will find ways to control project performance.

The Project Integration Management Process is:

1. *Develop a Charter Program*

Project Charter explains what the project is about and how it approaches the project. Project Charter also contains the names of all shareholders. Project Charter is an important part of the initial project management and project planning phase. In addition, the company can refer to the Project Charter for the entire lifetime of the project. This process is in the initiation phase. The documents are needed that formally certify an oil and gas project and include references. This document is usually produced by senior project managers because it will be the most involved in the project and will fully understand the targets and objectives for senior managers. So it must be simple, precise, and accurate [12].

2. *Develop a Project Management Plan*

According to PMBOK (2017), the Project Management Plan is a document prepared before project commencement and continuously updated to document what has been done on the project. This process is in the planning phase. This process shows the main activities of the project manager and his team, namely all project management activities [13]. This document can contain general information about the project which consists of:

- a. The project name
 - b. Project objectives
 - c. Business needs for the project
 - d. Rough time schedule as determined by the project time period
 - e. Project Budget
 - f. The advantage of the project is using the payment method
 - g. Project manager in any situation
3. *Manage Project Work*

In leading and smoothing out predetermined work, directing and managing project activities including processes on project management concepts and agreed changes must be applied in achieving project objectives. This process is in the implementation phase [14].
 4. *Manage Project Knowledge*

Managing knowledge is an effort to improve performance by utilizing and maintaining the value of current and future knowledge assets to achieve project goals and contribute to organizational learning. This process is in the implementation phase.

Knowledge of oil and gas project requirements can affect the quality of project implementation and return because when designing a pile on the basis that the pile is close to community housing and work on the pile can exceed the permissible noise limit. Therefore, it requires changes in design, such as the use of piles of discharge [15].
 5. *Monitor and Control Project Work*

This process is carried out throughout the project and is in the review and control phase [16]. Every manager in the oil and gas project organization is responsible for planning and monitoring the plan and ensuring that the work is carried out according to plan. To achieve that, it is required to coordinate with other managers and provide reports to the project manager [17].
 6. *Integrated of Change Control*

Carrying out integrated change control is the process of reviewing all change requests, in other words agreeing to changes and managing changes to results, project documents, organizational process assets and project management plans. This process is in the review and control phase. The oil and gas project control includes several steps that will lead if there are changes so that the project objectives are achieved [18].
 7. *Closing the Project*

The closing stage is the final stage of a project where, a final report is prepared, the budget is closed and all project activities are suspended. This process is in the closing phase [19]. The closure report will be at the final stage of each oil and gas project and, therefore, the report will be prepared internally by the project team and must also be carried out by contractors and engineering companies [20]. This report is very important for future projects and is a major part of the continuous improvement cycle. In most oil companies, after commissioning and starting the project, there will be a meeting for all team members who present the advantages and disadvantages for each part of the project such as construction, engineering, procurement, HSE, contracts, planning, and other key activities. After this meeting, all data are collected in the final report, which is the closing report.

3. Methodology

3.1. Research Design

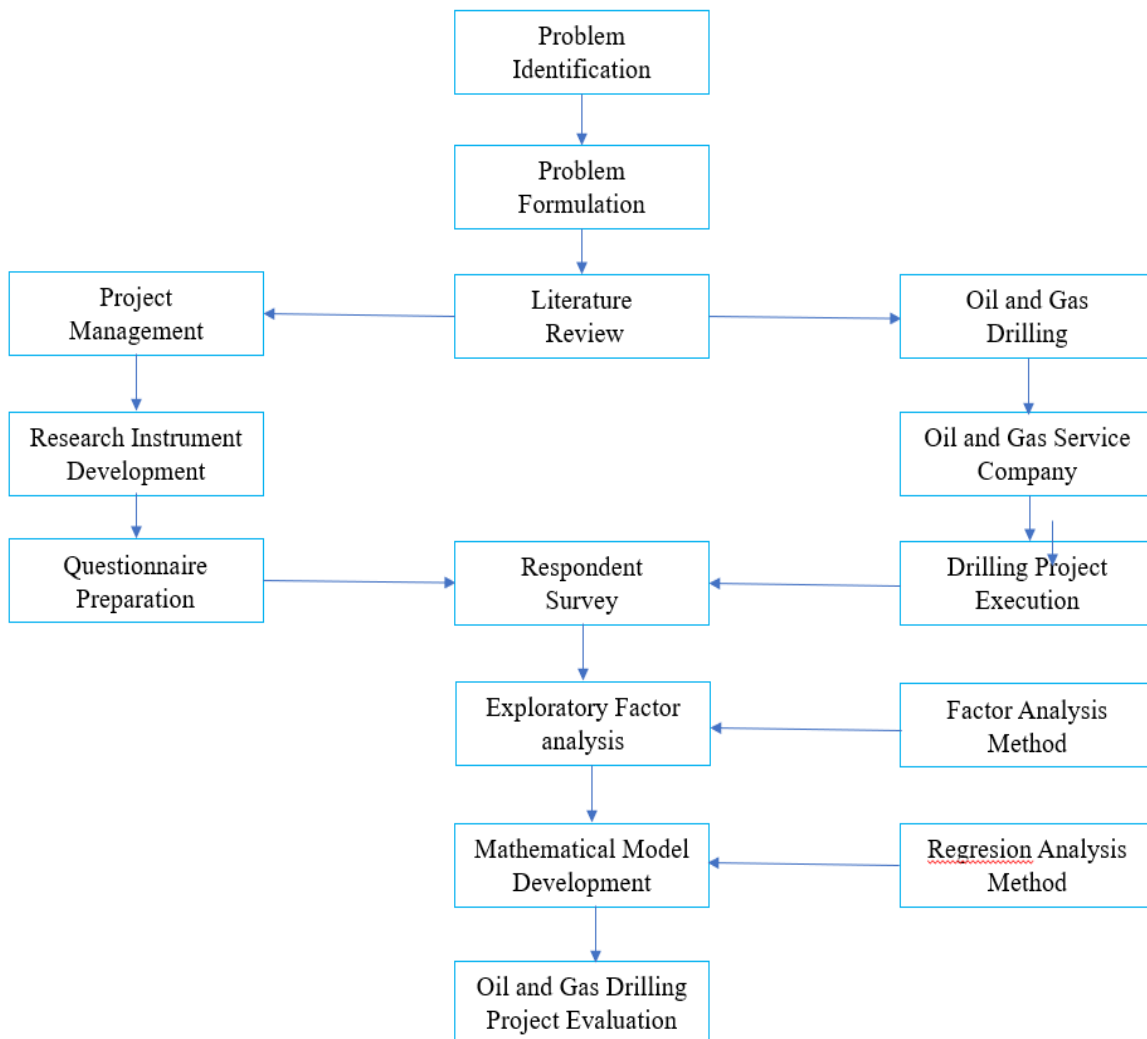


Figure 2. Research design

3.2. Data Collection Technique

1. Literature Study
2. Observation
3. Questionnaire

3.2. Data Analysis Method

1. Process of Reliability Test
2. Process of Validity Test
3. Process of Anti-Image Matrices Test
4. Factor Extraction
 - a) R Square Determination Coefficient
 - b) F Test
 - c) t Test

Based on research instruments that have been built, then used the questionnaire method is one of the data collection instruments applied to this research. The measurement scale used on the questionnaire is an ordinal scale that meets the statement of the Likert scale type. Respondents only put a checklist on the answers chosen according to the statement in answering this questionnaire. Then after the respondent completes the questionnaire, then a score analysis is performed [21].

4. Results and Discussion

4.1. Respondent Demographics

In this study, filling out the questionnaire was done through direct writing and *google form*. Questionnaires were given to all workers involved in drilling projects in their daily work with a total of 100 respondents. It was known that the respondents came from the Administration & HR Department as many as four respondents, as many as five Marketing Department respondents, Operations (QHSE, Equipment & Purchasing) as many as 16 respondents, eight Planning respondents & Finance Department, 12 Production Optimization (PO), 10 respondents Stimulation & Warehouse, 22 respondents from Oilfield Chemical (OCD), 10 respondents from WellTech, and 13 respondents from Drilling. Table 1.

Table 1. Respondents by Department

Department	Number of Employee	Percentage
Adminstration & HR Department	4	4%
Marketing Department	5	5%
Operations (QHSE, Equipment & Purchasing)	16	16%
Planning & Finance Department	8	8%
Production Optimization (PO)	12	12%
Stimulation & Warehouse	10	10%
Oilfield Chemical (OCD)	22	22%
WellTech	10	10%
Drilling	13	13%
TOTAL	100	100%

In percentage form, it is known that the respondents came from the Administration & HR Department department by 4%, Marketing Department by 5%, Operations (QHSE, Equipment & Purchasing) by 16%, Planning & Finance Department by eight respondents, Production Optimization (PO) as many as 12%, Stimulation & Warehouse as many as 10%, Oilfield Chemical (OCD) as many as 22%, WellTech as many as 10%, and Drilling as many as 13%. It can be seen that all company departments have contributed to the implementation of oil and gas drilling projects to run effectively and efficiently. Figure 3.

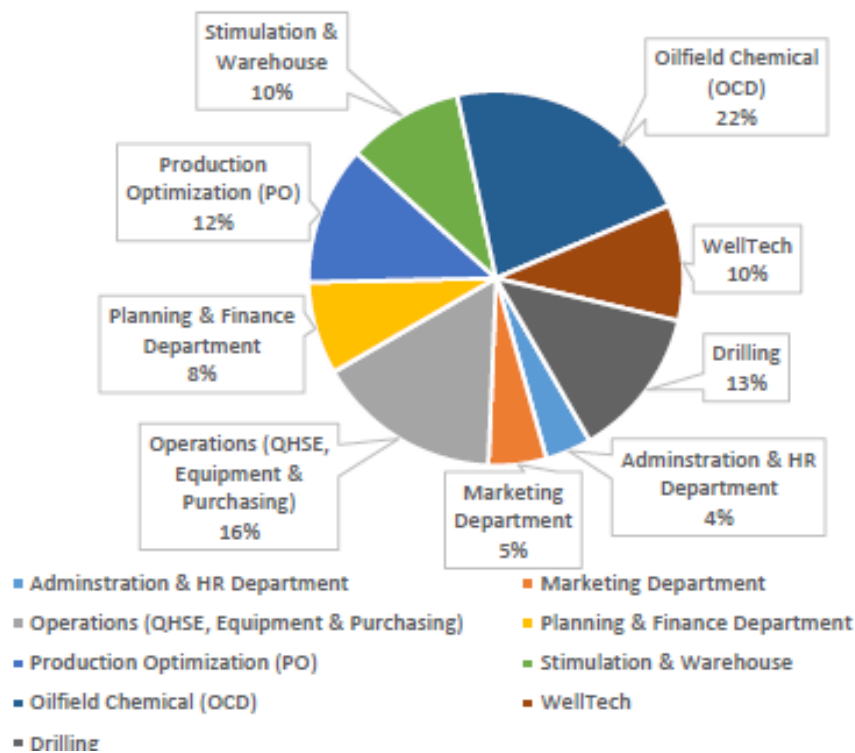


Figure 3. Respondents.

4.2. Reliability Test

The results of the reliability test resulting in the value of *croanbach's alpha* obtained is 0.928 out of a total of 26 variables. If the value of *Cronbach's alpha* > 0.7 then the measuring instrument has been declared reliable [22].

4.3. Validity Test

The KMO number is generated at 0.851. The KMO value needed is equal to ≥ 0.5 . The results of the analysis also state that all indicators consist of values > 0.50. If the value of MSA is ≥ 0.50 then all the requirements of the indicators tested have met and can carry out further analysis [23].

4.4. Factor Analysis

The project are the preparation of all components of the drilling project, neglect of each project activity, integration between processes in the drilling project, and the accuracy of cost planning [24].

4.5. Evaluation Model Condition of the Current Well Drilling Project at COSL Indo Companies

$$Y = 6.570 + 0.179 X_1 - 0.223 X_2 + 0.422 X_3 + 0.479 X_4$$

Where :

Y = Understanding the drilling project

X₁ = Preparation of all components of the drilling project

X₂ = Ignore each project activity

X₃ = Integration between processes in a drilling project

X₄ = Accuracy of cost planning

So that it can be concluded that,

1. Preparation factors for all components of the drilling project are positive with a coefficient of 0.179 which is in line with the needs where the preparation of all components of the drilling project increases, so the level of understanding will increase understanding of all components of the drilling project. the user is 0.179 assuming other factors are constant. This factor has no significant effect because the significance value of this factor is $0.422 > 0.050$.
2. The neglect factor of each project activity is negative with a coefficient of -0.223 which is in line with the need if the reduction in neglect of each project activity will increase the level of understanding where every one point decrease towards the neglect of each project activity will increase user understanding by 0.223 assuming a factor others are constant. This factor has no significant effect because the significance value of this factor is $0.317 > 0.050$.
3. The preparation factor for all components of the drilling project is positive with a coefficient of 0.422 which is in line with the needs where the integration between processes in the drilling project increases, the level of understanding will increase where each one point increase in the integration factor between the processes in the drilling project will increase understanding the user is 0.422 assuming other factors are constant. This factor has no significant effect because the significance value of this factor is $0.060 > 0.050$.
4. The factor of cost planning accuracy is positive with a coefficient of 0.479 which is in line with the need where the accuracy of cost planning increases, the level of understanding will increase where each one point increase in the accuracy of cost planning will increase user understanding by 0.479 assuming other factors are constant. This factor has a significant effect because the significance value of this factor is $0.033 < 0.050$.

4.6. The Strategy for oil Oil service Company in the Future

Table 2. Simulation Model of Delineation Well Drilling Project

Codition	Cons	X₁	X₂	X₃	X₄	Y
Normal	6.570	0	0	0	0	6.570
Expected	6.570	1.787	-2.520	1.639	1.962	9.084
Unexpected	6.570	-2.150	1.784	-3.219	-2.824	3.076

Based on Table 2. the simulation model calculation above, it was found that prior to this study it was known that the value of understanding of drilling project workers reached 6.570. The company is expected to be able to carry out a strategy to increase these factors so that the expected value can be obtained at 9.084.

5. Conclusion

5.1. Preparation of All Drilling Project Components

Through the results of the implementation model that has been obtained, the preparation factor for all components of the drilling project is positive with a coefficient of 0.179 which is in line with the needs where the preparation of all components of the drilling project increases, the level of understanding will increase. Companies need to increase this factor as much as possible until they reach 1.787 but on the contrary if the company ignores this factor, the understanding of project workers can decrease to -2.150. The strategy for this factor is to open up open contributions to project planning and implementation by everyone so that the functions and

roles of the workers are not only technically, but also demanded to have community management and social skills.

5.2. Neglect of any Project Activities

In the implementation model, it is known that the neglect factor of each project activity is negative with a coefficient of -0.223 which is in line with the need if the reduction in neglect of each project activity will increase the level of understanding. This is due to the lack of monitoring and controlling in each project activity. Strategies that can be done to reduce neglect in each project activity are to increase the schedule for review and control at all times and areas of activities that take place. Management must always monitor the course of the project to ensure the project runs smoothly and can face the challenges faced. Management must also analyze the influence of a change in the project. Reviewing and controlling each project activity is important for preventing risk and regulating if there are changes.

5.3. Inter-Process Integration Factors in Drilling Projects

Factors of integration between processes in a drilling project are positive with a coefficient of 0.422 which is in line with the need for increasing integration between processes in a drilling project, the level of understanding will increase. Companies need to increase this factor as much as possible until it reaches 1.639 but on the contrary if the company ignores this factor, the understanding of project workers can decrease to -3.219. The strategy that can be done by the company is by using automatic tools.

5.4. Accuracy of Cost Planning

The factor of cost planning accuracy is positive with a coefficient of 0.479 which is in line with the need where the accuracy of cost planning increases, the level of understanding will increase. Companies need to increase this factor as much as possible until it reaches 1.962, but on the contrary if the company ignores this factor, the understanding of project workers can decrease to -2.824. So the strategy that can be done is to formulate costs by reviewing the historical data of other project financial statements in the past few years. Then the next strategy is to determine how project costs are controlled, estimated, monitored, managed and budgeted for. This strategy is expected to be able to convey direction and guidance on the steps the project costs will be managed.

Based on simulation simulations of user understanding, it was found that before this study the value of the understanding of drilling project workers reached 6.570. The company is expected to be able to carry out a strategy to increase these factors so that the optimal value can be obtained at 9.084.

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