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Process Mapping Analysis to Improve Scheduling Strategy for Exploration Well Drilling Investment in Proposal Phase

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ABSTRACT: The delay of accomplishing business process milestones in Exploration Function was an impact of organizational transformation that includes re-grouping of working area and manpower of multiple subsidiary entities into one region. Only two wells managed to be drilled out of six targeted wells. The bottleneck issue lies in the proposal phase of the exploration well drilling investment. Report documents, interviews, and focus group discussion are collected as data for this research. The root causes were found in several stages along proposal phase and coming from process, people, and data aspect. The qualitative analysis of this research applied process mapping analysis to understand the dependency of each task, and value-added - non-value-added activity analysis to define the importance of each task. The result is corrective actions proposed to cut time duration through several treatments towards specific processes. Sequentially, the quantitative analysis of this research applied that new process mapping and use the time of events on the following execution phase as the time limit to estimate the new time duration for each task. The managerial implication of this research is the generation of a metric for project scheduling.

KEYWORDS: Business process modeling notation, Dependency analysis, Project, Process mapping, Value-added activity analysis, scheduling.

INTRODUCTION

As a net importing country, Indonesia still needs oil and gas energy in the energy transition era. For this reason, SKK Migas is expecting to achieve the production target of 1 million BOPD and 12 BSCFD by 2030. Depletion of reserve and lack of new reserve discoveries are still the issues in the upstream sector of oil and gas industry in Indonesia.[1] The productivity of oil could not cover the rate of consumption that has been increasing from 1,585 MBOPD in 2020 to 1,585 MBOPD in 2022.[2]

As one of the core functions in an oil and gas company, Exploration Function has a major role in keeping the business alive and being responsible for the discovery and addition of oil and gas resources. To discover oil and gas, Exploration Function activities are generally to obtain subsurface information from Geology and Geophysics (G&G) data acquisitions. G&G data can be acquired from geophysical seismic surveys, geological field surveys and studies, and exploration well drilling. Exploration well drilling could provide subsurface well data that will be very informative after being analyzed in laboratories for various kinds of deeper analysis.

During the transitional phase from work from office to work from home lifestyle in 2021, top management of PT PETA had taken this opportunity to establish re-organization known as the establishment of six sub-holdings. The organizational transformation has created a re-grouping of working area. One region could consist of operating working area and manpower that comes from several different subsidiary entities. The multi-interpretations of how business process should be followed during this transformation transition has impacted in the delay of accomplishing milestones along the business process for Exploration Function. In 2022, the performance of exploration well drilling was only 2 wells out of 6 targeted wells.

This phenomenon might be affected by the performance of processes prior to the exploration well drilling. Well drilling is an activity located in the execution phase of an exploration well drilling investment. Before it reaches the execution phase, an investment must undergo budgeting session, pre-operation session, and the proposal phase. The bottleneck could be from any of those prior phases. The poor performance during the proposal phase is reflected in the Key Performance Indicator (KPI) productivity that happens during that phase. The KPI items applied during the proposal phase are such as New Prospect Generation (NPR) and Technically Approved Prospect (TAP). NPR and TAP are the earliest two KPI items along the business process of Exploration Function. This could affect the later stages from the whole business process. Another stage in the proposal phase is called Final Investment Decision

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(FID) Approval. FID Approval is the last stage of the proposal phase, yet neither target nor KPI had been set by the Exploration Function for this final stage.

Based on those facts, this research will investigate the reasons behind the lack of NPR and TAP KPI items performance compared to plan, the impacts of not having any targets for FID approval towards the timeline of the following phase, the issues and insufficiencies that are faced when finishing tasks from the start until gaining FID approval, how process analysis could assess the relationship between one stage and another within the proposal phase, and how could a new project scheduling strategy be created and if possible, could shorten the length of proposal phase duration.

LITERATURE REVIEW

Internal Business Process

To carry out a consistent process, the company has a guideline book for investment management in accordance with the applicable regulations. Based on the book, investment is the usage of resources to maintain and increase the value of the company. Investment management for Exploration Function is divided into two main phases, namely proposal phase and execution phase. The proposal phase is the delivery and submission of investment proposal until approval of FID is granted. After the proposal phase, a project goes to setting budget allocation meetings called *Rencana Kerja dan Anggaran Perusahaan* (RKAP) and Work Program & Budgeting (WP&B). Then it goes to the execution of the project itself, and up to project closing. Specifically for the proposal phase, the business procedures of exploration well drilling investment proposal consist of several stages.

Table 1. Activity Description for Stages in Proposal Phase for Exploration Function

No.	Stages	Activity Description
1.	Funneling	• An assessment session to discuss the calculation of possibility of success and of resources of the proposed prospect from technical point of view • The assessor is a team of fellow geoscientists from subholding • Approval is given in the form of signed Minutes of Meetings • The output is generation of TAP using MMBOE as quantity unit • TAP and it is one of the KPI items for Exploration Function
2.	TECOP	• Parameters used for evaluation of exploration portfolio. Abbreviation of Technical, Economics, Commerciality, Operations, and Political
3.	Operational Challenge Session	• An assessment session to ensure the quality of a proposed investment from all five TECOP aspects • The asessor is a team of multiple functions from the subholding • Approval is given in the form of signed Minutes of Meeting
4.	FS	• FS is a document that encompasses complete description of investment opportunity from general, technical and operational, law and compliance, human capital, commerciality, health safety security environment (HSSE), financial, and project economics aspects • Submission of FS is sent to subholding or holding company, along with cover letter and form that had been signed by Director Region D • FS submission is one of the KPI item with percentage of progress in writing the FS document and number of document as quantity unit
5	Gate Review	• An assessment session involving multiple functions to ensure the quality of a proposed investment from all aspects within the FS • The assessor is a team from subholding or holding company depending on the threshold of capital expenditure of the project • Approval is given in the form of signed Minutes of Meeting

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6	FID Approval	• FID is a written final agreement from Shareholder Meeting, or highest stakeholder such as Board of Commissioners, or Board of Directors regarding the investment proposal. • The capital expenditure stated in the FID will become a reference for budget allocation in RKAP and WP&B • With an FID approval, proposal phase is completed, and a project can proceed to the execution phase

Problem Analysis

One of the theoretical cause-effect analysis methods was proposed by Kaoru Ishikawa in the 1960s and the application was finalized using the elaboration of a fishbone diagram. Practically, the fishbone diagram is a graphical representation of the connection between a result and the factors able to exert influence on the result.[3]

Project Schedule Management

The PMBOK Guide groups divide processes into ten categories based on knowledge areas, one of them is project schedule management. Project schedule management includes the process required to manage the timely completion of a project.[4] A Gantt chart is a horizontal bar chart that can be used to display the start date and duration of each task that makes up a project. Project scheduling serves several purposes, such as identifying precedence relationships among activities, encouraging the setting of realistic time for each activity, and making better use of resources by identifying critical bottlenecks in the project.[5]

Process Mapping Analysis

Process mapping analysis is to ensure that a specific process is clearly defined. Metric is a tool to define a reliable means of measuring the process that is relative to the project deliverables.[6] There are some cases of having multiple processes within the series of processes or lack of a well-defined process. This phenomenon is often revealed after interviewing users who do the process. In this regard, the outcome of process analysis is closely linked to revealing process baseline.

Business Process Modeling Notation

Business Process Modeling Notation (BPMN) is a graphical notation that describes the logic of the steps in a business process and specifically designed to coordinate the sequence of processes that flow between actors in a related set of activities.

Terms or notations used in BPMN are such as:

1. Participant: In a business process, several actors or roles or participants are involved. To describe different actors, diversifications of lane are used.
2. Event: There are two types of events i.e., Start Event (symbolized with non-bold circle) to mark the start of the business process and End Event (symbolized by bold circle) to mark that the business process flow has stopped or finished.
3. Gateway: The branching in a business process flow that determines which path will be taken and why. There are exclusive gateway, inclusive gateway, and parallel gateway. The diamonds shape symbolized decision task.

Value-Added and Non-Value-Added Activity Analysis

How effective a process is in creating value could show the excellence of the processes. Effectiveness itself is defined as a process that encompasses quality, price, delivery, timeliness, and everything else goes into perceived value. Having a process focus is to classify whether an activity is relating to the creation of the final value.[6] Thus, a process can be either value-added (VA), non-value-added (NVA), or essential-non-value-added (ENVA) if an NVA activity is still needed in order to comply with the necessity.

RESEARCH METHOD

For this research, primary data is taken directly from the users in the company through interviews and focus group discussion, meanwhile secondary data are the data that have been interpreted such as in the form of report documents. The research is consisting of both qualitative and quantitative research with sequential analysis.

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Table 2. Interview Questions Analysis

No.	Questions	Purpose	Relation to research questions
1.	Could you describe how the company organizational transformation has impacted your working activities?	To be a real case example that shows how business process is perceived by users from several different subsidiary entities	Why was the actual performance of NPR and TAP had been lacking compared to the plan?; What are the impacts of not having any targets for FID approval towards the timeline of the following phase?
2.	Could you mention the source and step-by-step of carrying out the proposal phase in your routine work?	To capture the undetected process of how users get data for starting the first step in the series of processes	
3.	What are the issues and insufficiencies that you are still facing throughout proposal phase?	To find the root cause of problems; To seek where improvement or acceleration can take place	What are the issues and insufficiencies that are faced when finishing tasks and completing stages in the proposal phase, from the start until gaining FID approval?
4.	Which step during the proposal phase took the longest to finish and why?	To evaluate which steps are critical path, could be executed in parallel, or could be eliminated	
5.	What improvements could be done to accelerate the processes in proposal phase?	To gather step by step practical alternative solutions; To generate both quantitative and qualitative value creation	How could process mapping analysis assess the relationship between one stage and another within the proposal phase?

Table 3. Focus Group Discussion Topics Analysis

No.	Topics	Purpose	Relation to research questions
1.	How can improvements in cutting time duration for processes in proposal phase help to reach KPI target and make the result of exploration activities even better?	To generate value creation and define the changes expected from the improvements	How to create a project scheduling strategy that is more accurate and if possible, could shorten the length of proposal phase duration?
2.	What are the step-by-step actions plan for the implementation of the new metric scheduling? (For the business solution, and also for the cutting time initiative action plans)	To get support for the implementation of business solutions	
3.	Who is in charge, how much budget, and what resources can be utilized to implement those improvements?		

RESULTS

The qualitative data analysis reveals the actual breakdown list of tasks for each stage including the ones that were not included in the organization business process guideline book. Other stages in proposal stage that were not captured are Data Preparation, Subsurface Evaluation, Pre-Funneling, Technical Discussion Session, and Operation Discussion Session. Within the stages, there are also tasks that were not captured such as meeting arrangement, presentation preparation, follow-up evaluations, and approval routing. The precedence relationships among tasks including dependency are mapped out using a flowchart. Based on the data reported by users, there are some findings on possible root causes of problems that arise during the proposal phase as summarized on the fishbone diagram below.

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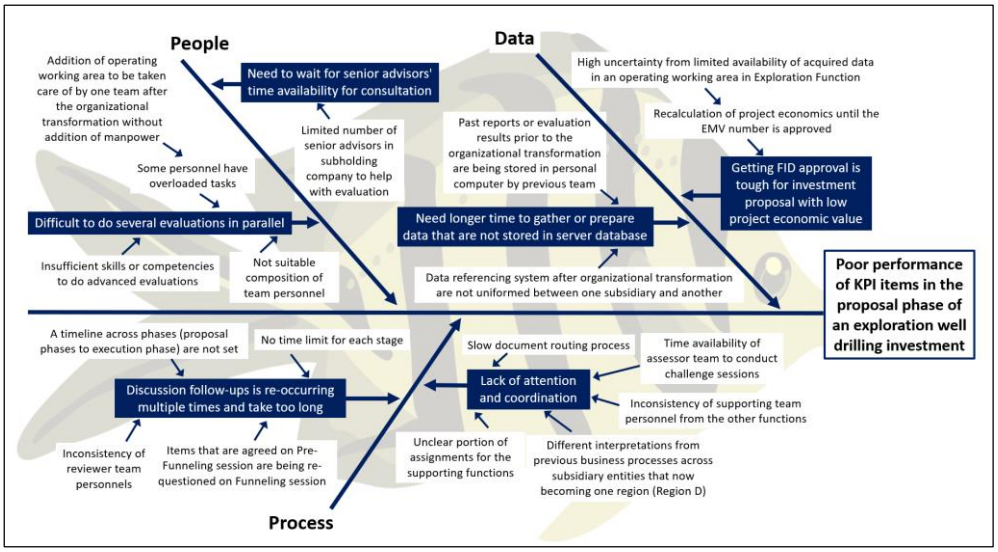

Figure 1. Cause-Effect Analysis

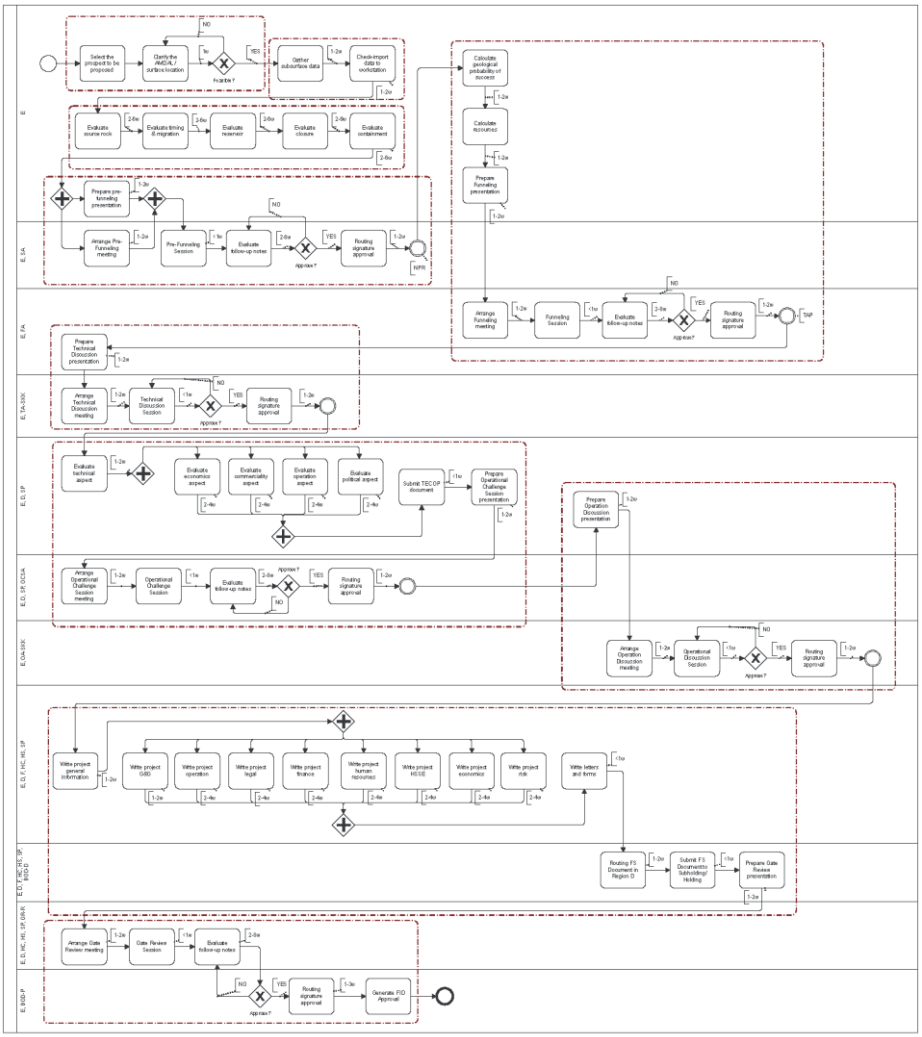

Figure 2. Actual Well Drilling Investment Process Mapping Flowchart in Proposal Phase

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The ideal dependency of each task to its precedent task can be determined by measuring the minimum percentage of progress of each task to proceed to the next task. The value of activity is determined by the verb of activity and output of the activity.

Table 4. Dependency and VA/NVA/ENVA Activity Analysis

Stage	Activity	Duration (weeks)	Dependency (%)	VA/ NVA/ ENVA
Data Preparation	Subsurface Data Gathering	1-2	0	NVA
	Data Check and Import to Workstation	1-2	25	ENVA
Subsurface Evaluation	Petroleum System Element: Source Rock	2-8	100	VA
	Petroleum System Element: Timing & Migration	2-8	0	VA
	Petroleum System Element: Reservoir	2-8	0	VA
	Petroleum System Element: Closure	2-8	0	VA
	Petroleum System Element: Containment	2-8	0	VA
Pre-Funneling	Presentation Preparation	1-2	50	NVA
	Meeting Arrangement	1-2	75	NVA
	Pre-Funneling Session	<1	100	VA
	Follow-Up Evaluation	2-8	100	VA
	Approval Routing	1-2	100	NVA
Funneling	Probability of Success Calculation	1-2	100	VA
	Resource Calculation	1-2	100	VA
	Presentation Preparation	1-2	50	NVA
	Meeting Arrangement	1-2	75	NVA
	Funneling Session	<1	100	VA
	Follow-Up Evaluation	2-8	100	VA
	Approval Routing	1-2	100	NVA
Technical Discussion	Presentation Preparation	1-2	50	NVA
	Meeting Arrangement	1-2	75	NVA
	Technical Discussion Session	<1	100	VA
	Approval Signature Routing	1-2	100	NVA
Operational Challenge Session	TECOP: Technical Evaluation	1-2	100	VA
	TECOP: Economics Evaluation	2-4	100	VA
	TECOP: Commercial Evaluation	2-4	25	VA
	TECOP: Operation Evaluation	2-4	25	VA
	TECOP: Political Evaluation	2-4	0	VA
	TECOP Document Submission	<1	100	NVA
	Operational Challenge Session	<1	100	VA
	Follow-Up Evaluation	1-3	100	VA
	Approval Routing	1-2	100	NVA
Operational Discussion	Presentation Preparation	1-2	50	NVA
	Meeting Arrangement	1-2	75	NVA

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	Operation Discussion Session	<1	100	VA
	Approval Routing	1-2	100	NVA
FS	Writing Project General	<1	100	VA
	Writing Project G&G & Reservoir	1-2	0	VA
	Writing Project Operation	2-4	0	VA
	Writing Project Legal Information	2-4	0	VA
	Writing Project Financial	2-4	0	VA
	Writing Project Human Resources	2-4	0	VA
	Writing Project HSSE Information	2-4	0	VA
	Writing Project Economics	2-4	0	VA
	Writing Project Risk	2-4	0	VA
	Letter and Forms Writing	1-2	75	NVA
	FS Document Routing in Region	1-2	100	NVA
	FS Document Submission to Sub-holding/Holding Company	<1	100	VA
Gate Review	Presentation Preparation	1-2	50	NVA
	Meeting Arrangement	1-2	25	NVA
	Gate Review Session	<1	100	VA
	Follow-Up Evaluation	2-8	100	VA
	Approval Routing	1-3	100	NVA
Decision Gate	FID Approval	1-2	100	VA

The quantitative analysis calculates the length of time for each activity in the current project schedule chart from the average length of time taken according to several exploration projects actualization. The actual total duration of the proposal phase is around 24 months.

Stage	Activity	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6				Month 7			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Data Preparation	Suburface Data Gathering																												
	Data Check and Import to Workstation																												
Subsurface Evaluation	Element: Source Rock																												
	Element: Timing & Migration																												
	Element: Reservoir																												
	Element: Closure																												
	Element: Containment																												
Pre-Funneling	Presentation Material Preparation																												
	Meeting Arrangement																												
	Pre-Funneling Session																												
	Follow-Up Evaluation																												

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Stage	Activity	Month 8				Month 9				Month 10				Month 11				Month 12				Month 13			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Approval Routing																								
Funneling	Probability of Success Calculation																								
	Resource Calculation																								
	Presentation Preparation																								
	Meeting Arrangement																								
	Funneling Session																								
	Follow-Up Evaluation																								
	Approval Routing																								
Technical Discussion Session	Presentation Preparation																								
	Meeting Arrangement																								
	Technical Discussion Session																								
	Approval Routing																								

Stage	Activity	Month 14				Month 15				Month 16				Month 17			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Operational Challenge Session	TECOP Evaluation: Technical																
	TECOP Evaluation: Economic																
	TECOP Eval.: Commerciality																
	TECOP Evaluation: Operation																
	TECOP Evaluation: Political																
	TECOP Doc. Submission																
	Presentation Preparation																
	Meeting Arrangement																
	Operational Challenge Session																
	Follow-Up Evaluation																
	Approval Routing																
Operational Discussion Session	Presentation Preparation																
	Meeting Arrangement																
	Operation Discussion Session																

Stage	Activity	Month 18				Month 19				Month 20			
		1	2	3	4	1	2	3	4	1	2	3	4
	Approval Routing												
Feasibility Study (FS) Document	Project General Information												
	Project G&G and Reservoir												
	Project Operation Information												
	Project Legal Information												
	Project Financial Information												
	Project Human Resources Info												
	Project HSSE Information												
	Project Economics Info												
	Project Risk Information												
	Letter and Forms Writing												
	FS Doc Routing in Region												
	FS Document Submission to Subholding/Holding Company												

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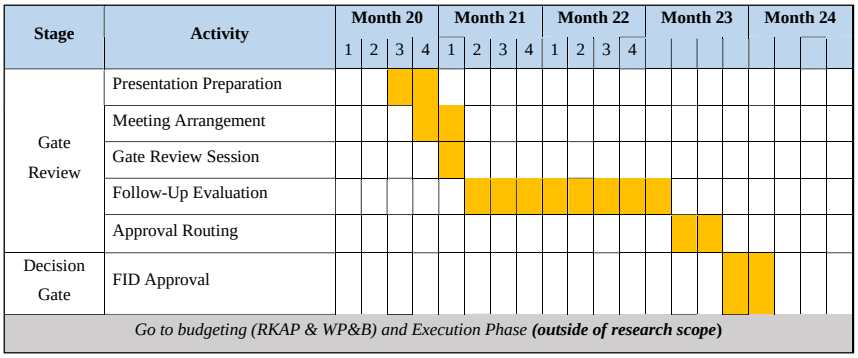

Figure 3. Current Project Schedule Realization

In relation to project scheduling, some tasks with low dependency are to be treated with solutions that enable tasks to run simultaneously, meanwhile tasks with high dependency become the critical path. NVA tasks are to be eliminated or at least reduced in term of time consumption through several cutting time duration initiatives.

Table 5. Potential Tasks that could be Treated with Improvement

Task	Process Category	Process Status	Type of Treatment
Gather data	NVA	Can be eliminated	Change the process mechanism
Check data, import data	ENVA	Cannot be eliminated	Start the process earlier/in parallel
Evaluate subsurface (5 elements)	VA	Cannot be eliminated	Add executor of the process
			Start the process earlier/in parallel
Arrange meeting, prepare for meeting	NVA	Cannot be eliminated	Change the process mechanism
			Start the process earlier/in parallel
Evaluate follow-up questions after challenge sessions	VA	Cannot be eliminated	Standardize scope of the process
			Set time limit for the process
Evaluate TECOP (5 aspects)	VA	Cannot be eliminated	Standardize the executor of process
			Start the process earlier/in parallel
			Set time limit for the process
Write FS document project information (9 chapters)	VA	Cannot be eliminated	Start the process earlier/in parallel
			Set time limit for the process
			Standardize the executor of process
Routing documents approvals	NVA	Cannot be eliminated	Standardize scope of the process
			Change the process mechanism
			Set time limit for the process

The type of treatments above is translated into action plans in accordance with its root cause previously elaborated in the fishbone diagram and the positive impacts that come out of it so it can be implemented for generating the new process mapping.

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Table 6. Proposed Improvements to Cut Time Duration

Task	Root Cause	Treatment	Action Plan for Cutting Time Duration	Positive Outcomes
Gather data	Past reports or evaluation results prior to organizational transformation are being stored in personal computer by the previous team	Change the process mechanism	Standardize and centralize the database through a procedure regarding submission of evaluation results from personal computer to the company's server storage database	• Similar destination of data transfer, ownership of data is the company • No need to gather data because already in the server storage database
	High uncertainty from limited availability of acquired data in an operating working area in the Exploration Function		• Conduct more data acquisitions to fill data gap referring to recommendations from past evaluations • Grant database accessibility for users in the technical departments (cross-function) who work for the same region to maximize data availability	• More accurate evaluation could prevent follow-up questions during Pre-Funneling or Funneling • More data gives lower uncertainty that is preferable to gain approval
Check/ import data	Data referencing system after organizational transformation are not uniformed between one subsidiary and another	Start the process earlier/in parallel	• Standardize data classification for more organized utilization of server storage • Begin this task early without any precedent task	Importing data to workstation can begin right away with complete collection of data that is already compiled and accessible
Evaluate subsurface/ petroleum system (5 elements)	Addition of operating working area to be taken care of by one team without addition of manpower	Add executor of the process	Adjust the number of personnels within a team in proportion with its operating working area targets, workloads, and agenda	Task of one personnel is not overloaded, and team's priorities are well defined
	Limited number of senior advisors from sub-holding company to help with evaluation		Adjust the number of senior advisors in sub-holding company with number of regions, number of petroleum system elements to be	• More flexible time availability of the advisors to be approached by proposers for consultation • Faster duration of evaluation because issues are tackled right away

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			evaluated, and the level of difficulty of the evaluation	• More accurate evaluation could prevent follow-up questions during Pre-Funneling or Funneling
	Insufficient skills and competencies to do advanced evaluations		Conduct training or development program to hone skills, widen and deepen competency of employees for doing subsurface evaluations	More accurate evaluation result could prevent follow-up questions during Pre-Funneling or Funneling
	Not suitable composition of team personnels	Start the process earlier/in parallel	• Sort employees using competency parameter • Arrange each team to consist of personnels that could complement each other with each personnel's specialty • Have five different personnel to conduct evaluations at the same time	Each petroleum system element evaluation is handled by one user so all elements can be evaluated simultaneously
Arrange meeting, prepare for meeting	A timeline across proposal to execution phase are not set	Change the process mechanism	Arrange the schedule and timeline for all challenge sessions before starting the proposal phase	No need to arrange meeting time because every stage already have timeline or deadline
	Time availability of assessor team to conduct challenge sessions	Start the process earlier/in parallel	Start putting evaluation result on a presentation slide for any evaluation that finishes first	No need to wait for all evaluations to be done to start composing presentation material
Evaluate follow-up questions after challenge sessions	Inconsistency of reviewer team personnels	Standardize scope of the process	Assign consistent, suitable, and sufficient reviewer team personnels at the first sitting until a stage is done	No new assessor who asks new questions after the post-Funneling follow-up that could prolong the follow-up duration
	Items that are already agreed on Pre-Funneling session are being re-questioned on Funneling session		• Distinguish scope and portion of review between Pre-Funneling and Funneling session • Clarify the validity of deals that has been agreed in the minutes of meetings	Commitment to only review petroleum system elements during Pre-Funneling session and agree with the Pre-Funneling results in minutes of meeting to avoid prolong follow-up evaluation tasks
	No time limit for each stage	Set time limit for the process	Arrange the schedule and timeline for all challenge sessions before starting the proposal phase	• Time limit duration of maximum four weeks for

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				post Pre-Funneling follow-up evaluation • Time limit duration of maximum of two weeks for post Funneling follow-up evaluation
Evaluate TECOP (5 aspects)	Different interpretations of business processes across subsidiary entities that now became one region	Standardize the executor of the process	Clarify portion of duties for the supporting functions	Written company guideline regarding this matter states the portion for each PIC, so all PIC from supporting function know its portion and prevent dispute or refusal that take up some time
	Inconsistency of supporting team personnels from other functions		Assign dedicated personnel from other functions for a specific project	Every PIC from supporting function is committed to help until the end of proposal phase to prevent extra time to re-explain project if the PIC changes
	Unclear portion of assignments for the supporting functions	Start the process earlier/in parallel	• Clarify portion of duties for the supporting functions • Arrange each team to consist of personnels that could complement each other with each personnel's specialty • Have five different personnel to conduct evaluation of the five aspects of at the same time	• Written guideline states the portion for each PIC, so all PIC from supporting function know its portion and prevent dispute or refusal that take up some time • Each TECOP aspect evaluation is handled by one user so all aspects can be evaluated simultaneously
	No time limit for each stage	Set time limit for the process	Arrange the schedule and timeline for all challenge sessions before starting the proposal phase	Time limit duration of maximum three weeks for post Operational Challenge Session follow-up evaluation
Writing FS document project information (9 chapters)	Different interpretations across subsidiary entities that now became one region	Standardize the executor of the process	Clarify portion of duties for the supporting functions	Written guideline lets PIC from supporting function knows its portion and prevent dispute or refusal that take up some time
	Inconsistency of supporting team		Assign dedicated personnel from other functions that help	Every PIC from supporting function is committed to help until the end of

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	personnels from other functions		contribute in one of the TECOP evaluation for a specific project	proposal phase to prevent extra time to re-explain project if the PIC changes
	Unclear portion of assignments for the supporting functions	Start the process earlier/in parallel	• Clarify portion of duties for the supporting functions • Arrange each team to consist of personnels that could complement each other with each personnel's specialty • Have nine different personnel to write project information of the nine chapters at the same time	• Written guideline states the portion for each PIC, so all PIC from supporting function know its portion and prevent dispute that take up some time • Each FS aspect evaluation is handled by one user so all aspects can be evaluated simultaneously
Routing documents approvals	Slow document routing process	Standardize scope of the process	Lower down FID approval authority level (increase budget threshold approval)	• Shorter chain of management-level to sign documents
		Change the process mechanism	Create a dashboard for monitoring document's routing position	Approvers are reminded of how long the document has been in their table and how much time left for them to review and decide
		Set time limit for the process	Arrange the schedule and timeline for all challenge sessions before starting the proposal phase	• Time limit duration of maximum four weeks for post Gate Review session follow-up evaluation • Time limit duration of maximum one week for all stages document signature routing

The new process mapping metric that was resulted from the qualitative analysis will be drawn into a new flowchart. The expected time duration for each task in the proposal phase after the action plans are then calculated to generate a metric for the improved project scheduling.

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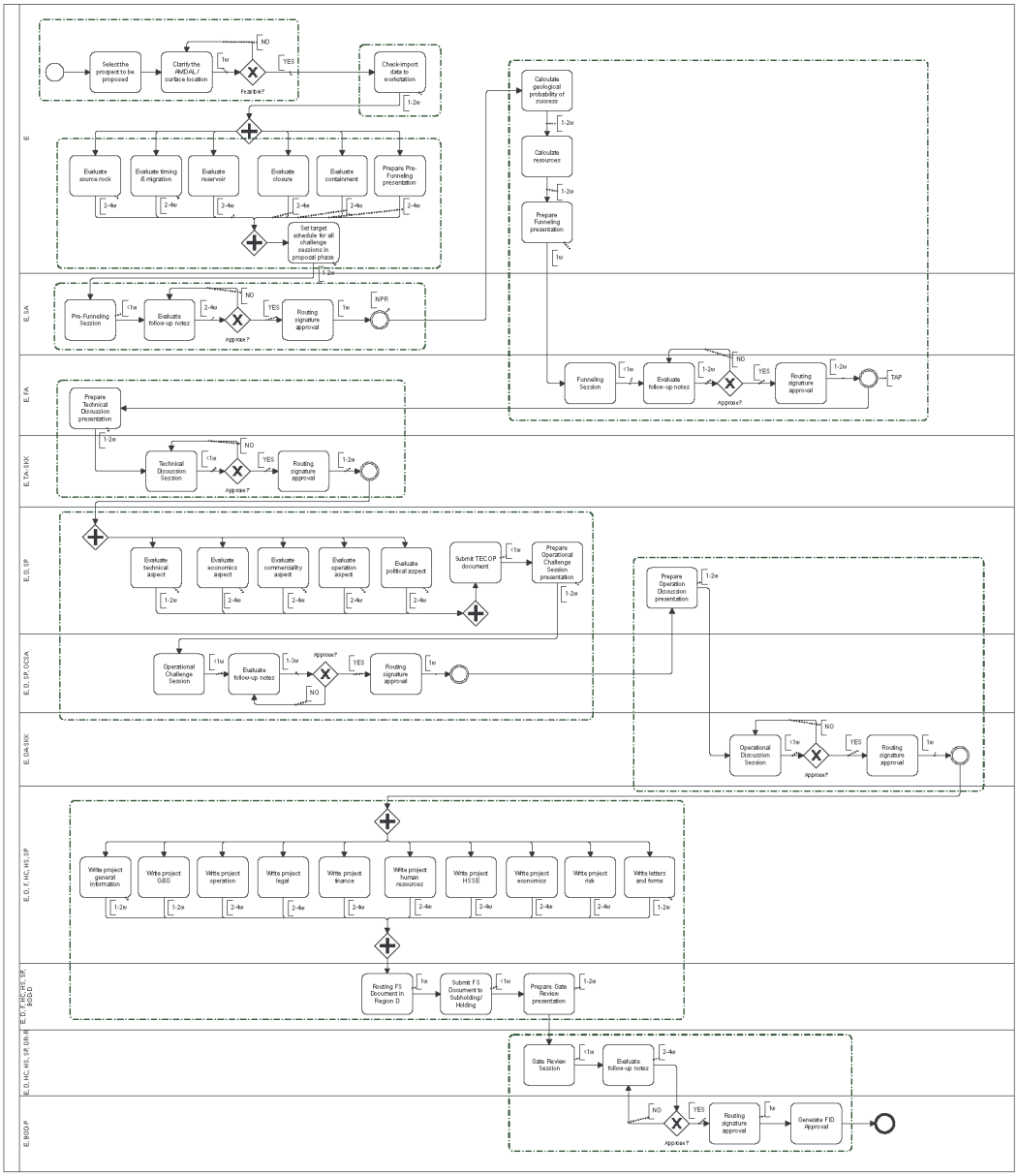

Figure 4. Well Drilling Investment Process Mapping Flowchart in Proposal Phase After Cutting Time Duration Initiatives

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Stage	Activity	Month 1				Month 2				Month 3				Month 4			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Data Preparation	Data Check and Import to Workstation																
Subsurface Evaluation	Element: Source Rock																
	Element: Timing & Migration																
	Element: Reservoir																
	Element: Closure																
	Element: Containment																
Pre-Funneling	Presentation Preparation																
	Pre-Funneling Session																
	Follow-Up Evaluation																
	Approval Routing																
Funneling	Probability of Success Calculation																
	Resuorces Calculation																
	Presentation Preparation																

Stage	Activity	Month 4				Month 5				Month 6				Month 7				Month 8			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Funneling Session																				
	Follow-Up Evaluation																				
	Approval Routing																				
Technical Discussion Session	Presentation Preparation																				
	Technical Discussion Session																				
	Approval Routing																				
Operational Challenge Session	TECOP Technical Aspect																				
	TECOP Economics Aspect																				
	TECOP Commercial Aspect																				
	TECOP Operations Aspect																				
	TECOP Political Aspect																				
	TECOP Doc. Submission																				
	Operational Challenge Session																				
	Follow-Up Evaluation																				
	Approval Routing																				

Stage	Activity	Month 8				Month 9				Month 10			
		1	2	3	4	1	2	3	4	1	2	3	4
Operational Discussion Session	Presentation Preparation												
	Operation Discussion Session												
	Approval Routing												
Feasibility Study (FS) Document	Project General Information												
	Project G&G and Reservoir												
	Project Operation Information												
	Project Legal Information												
	Project Financial Information												
	Project Human Resources Info												
	Project HSSE Information												
	Project Economics Info												
	Project Risk Information												
	Letter and Forms Writing												

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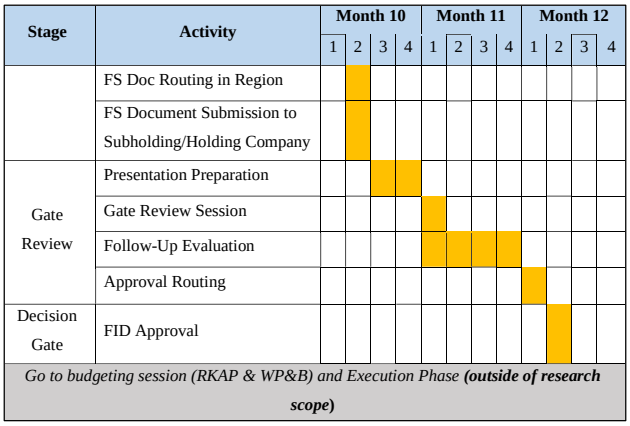

Figure 5. Project Schedule After Cutting Time Duration Initiatives

Before the cutting time duration initiatives, the proposal phase ends in week 1 of month 24 or around two years. After the improvements, the proposal phase is estimated to end in week 2 of month 12 or around one year. It can be interpreted that the total amount is reduced by one year.

DISCUSSION

The RKAP phase often starts in May and being finalized in July. RKAP is followed by WP&B for Exploration Function that often starts in August and being finalized in November. Then, the projects can proceed to execution phase to start with permit licensing, procurement, site preparation, and so on. The well drilling is to be drilled the next year. Therefore, the proposal phase should have finished with the approval of FID by April.

Table 7. New Project Schedule Metric as Business Solution

Stage	Time Period	Remarks
NPR	June-July of the year before RKAP and WP&B; two years before the expected year of well drilling execution	Generation of NPR after July can still count in the quarterly KPI; but not enough time to be ready for RKAP & WP&B the next year
TAP	August-September of the year before RKAP and WP&B; two years before the expected year of well drilling execution	Generation of TAP after September can still count in the quarterly KPI; but not enough time to be ready for RKAP & WP&B the next year
Technical Discussion	September-October of the year before RKAP and WP&B; two years before the expected year of well drilling execution	-
Operational Challenge Session	October-December of the year before RKAP and WP&B; two years before the expected year of well drilling execution	-
Operation Discussion	December of the year before to January of the year of the RKAP & WP&B; one year before the expected year of well drilling execution	-
FS Document Submission	Writing from January-February of the year of RKAP and WP&B and submit in March; one year before the expected year of well drilling execution	The current condition with progress percentage of writing FS is changed to submission of FS. Submitting FS document after March can still be counted as progress in KPI; but not enough time to be ready for RKAP & WP&B this year

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Gate Review	March-May of the RKAP and WP&B that year; one year before the expected year of well drilling execution	-
FID Approval	May of the year of RKAP and WP&B; one year before the expected year of well drilling execution	The current condition with no target for FID approval is changed with the establishment of target of getting FID approval in May at the latest
Execution Phase	May-July is internal RKAP discussion and agreement for the following year	-
	August is the external WP&B discussion and agreement for the following year	-
	Stages in the execution phase	-

CONCLUSION

The bottleneck issue lies in the proposal phase of exploration well drilling investment that is reflected from the well drilling execution realization and other activities in proposal phase as well such as Pre-Funneling stage and Funneling stage, and the last stage which is FID Approval that has no target. Pre-Funneling stage is critical for NPR and Funneling stage is critical for TAP, both in resource quantity unit and being scored per quarterly. Meanwhile the FID Approval stage has no target, resulting in unmeasurable timeline to proceed to execution phase.

The root causes of this issue are challenge session follow-ups that re-occurred too often and for too long, lack of coordination, longer time to gather data, tough FID approval for proposals with high uncertainty subsurface evaluation, difficulties to finish evaluations, and longer time for waiting on senior advisors to consult about the evaluation. The corrective actions based on the qualitative analysis is from making a process mapping to show the dependency of each task, also value-added and non-value-added analysis to define the importance of each task along the proposal phase.

The result of the qualitative analysis is that there are tasks that can be eliminated by changing the process mechanism, and there are tasks that can be executed in parallel through adding executor of the process and standardizing scope of the process. The corrective actions based on the quantitative analysis is from positive deviation of time duration and setting the time limit benchmarking on budget allocation event RKAP and WP&B and execution year of well drilling. The result of the quantitative analysis is that the proposal phase should start no later than May, so that FID Approval could be obtained by May the next year. Then proceed to RKAP that starts on May and WP&B that starts from August. The fastest a well drilling can be executed is in the following year of FID approval or two years after starting the proposal phase.

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