Risk and Opportunities Analysis for DBC (Design Build Competition) Bidding Strategy as Alternative for EPC Petrochemical in Indonesia [1, 2]

By Rachmad Ramila SA, CCP

Abstract

There are many delays and cost overruns in a project. One of the reasons is that other consultants and contractors carry out the work, so there may be differences in understanding the scope details. Then came the idea to combine FEED and BED stages to be done by one party. For this reason, analyzing the risks and opportunities that arise in the bidding method is necessary.

This study will use the SWOT-UPP analysis method to determine risk and opportunity analysis for both internal and external risks. From these results, we obtain the opportunity-threat ratio for each analysis.

The result of this study is that the DCB Bidding Method is appropriate for a project using the DBC bidding method for Petrochemical Industries in Indonesia. However, it is necessary to monitor and manage internal risks. Therefore, for internal factors, the classification is Low Opportunity and High Threat. In contrast, the category is recommended to be processed for external factors because it gets an O/T score of more than one.

Keywords: Risk and Opportunities, Design Build Competition, Alternative Bidding Strategy, EPC Petrochemical Indonesia, Schedule Delay, Cost Overrun

Introduction

"Capital projects are long-term, capital-intensive investments to build, supplement, or enhance capital assets. Large scale and the relative costs determine the capital project to other investments involving less planning and resources. Infrastructure projects such as railways, roads, and dams are the most common investment projects. Additionally, these projects include

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[2] This paper was originally prepared during a 6-month long Graduate-Level Competency Development/Capacity Building Program developed by PT Mitrata Citragraha and led by Dr. Paul D. Giammalvo to prepare candidates for AACE CCP or other Certifications. https://build-project-management-competency.com/our-faqs/

assets such as subways, pipelines, refineries, power plants, land, and buildings."[3] "Capital projects in some sectors are particularly complex. For example, withinside the worldwide oil and fuel line industry, sizable investments are being made in unconventional resources like shale oil, oil sands, and deep-water projects. Owner/operators in this industry deal with multiple joint venture partners; engineering, procurement, and construction (EPC) firms; contractors; and suppliers, making collaboration among the stakeholders crucial."[4]

But in fact, there are many delays in project scheduling which, of course, result in over budget. The literature shows that only "19% of study participants from North American firms said their companies finish projects on budget."[5]

Country	Industry	Major Causes of Time and Cost Overrun
China	Civil Engineering Project	"Lack of resources due to lack of contractor/capital, Unexpected ground conditions, Low bids, inexperienced contractors, competition with existing utilities"[6]
Iran	Pipeline Construction Project	"Imported materials, unrealistic project duration, custom materials, land acquisition, order changes"[7]
Oman	Oil and Gas	"Inaccurate cost estimates, poor planning, frequent design changes, labor/skill shortages, high machine costs"[8]
Iran	Oil and Gas	"Inaccurate cost estimates, poor planning, frequent design changes, labor/skill shortages, high machine costs"[9]
Tanzania	Construction Project	"Delays in design changes, delays in paying contractors, delays in information, funding issues, poor project management, compensation issues, sources of disagreement regarding the evaluation of completed work."[10]

Table 1 "Summary of Major Causes of Time and Cost Overruns in The Reviewed Literature"[11]

[3] Barron, Adam. (2022). Capital Project. Retrieved from https://www.investopedia.com/terms/c/capital-project.asp
[4] Kennedy, Sheila. (2012). 8 factors that predict capital project success. Retrieved from https://www.plantservices.com/home/article/11333021/8-factors-that-predict-capital-project-success
[5] Inspectivity. (2015). Oil Price Downturn Creates Need for 'Cost Culture' in Industry. Retrieved from https://inspectivity.com/latest-news/19-finish-oil-gas-projects-within-budget/
[6] Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm
[7] Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm
[8] Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm.
[9] Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm
10 Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm
11 Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm

"Analysis by Oil & Gas Authority (OGA) reveals project delayed on average almost a third over budget in 10 months. This result comes despite record capital spending during the same period. The report states, "This analysis shows trends in cost overruns and project delays."[12] "The reasons may be out-of-control weather, natural disasters, shortage of natural resources, etc. But too often, project delays are caused by problems such as a lack of coherent understanding, adaptation to the inevitable change that accompanies each project, agreement by all parties, and poor communication. Communication, or lack thereof, is the number one reason for project delays in many industries."[13]

Causes of delays and cost overruns from the literature obtained state that "the five most significant reasons were

- Changing of design and scope by the client during construction,
- Poor planning and scheduling of the project,
- Design errors,
- Inadequate comprehension of the scope of work in the tender stage,
- Underestimating costs and schedules/overestimating benefits."[14]

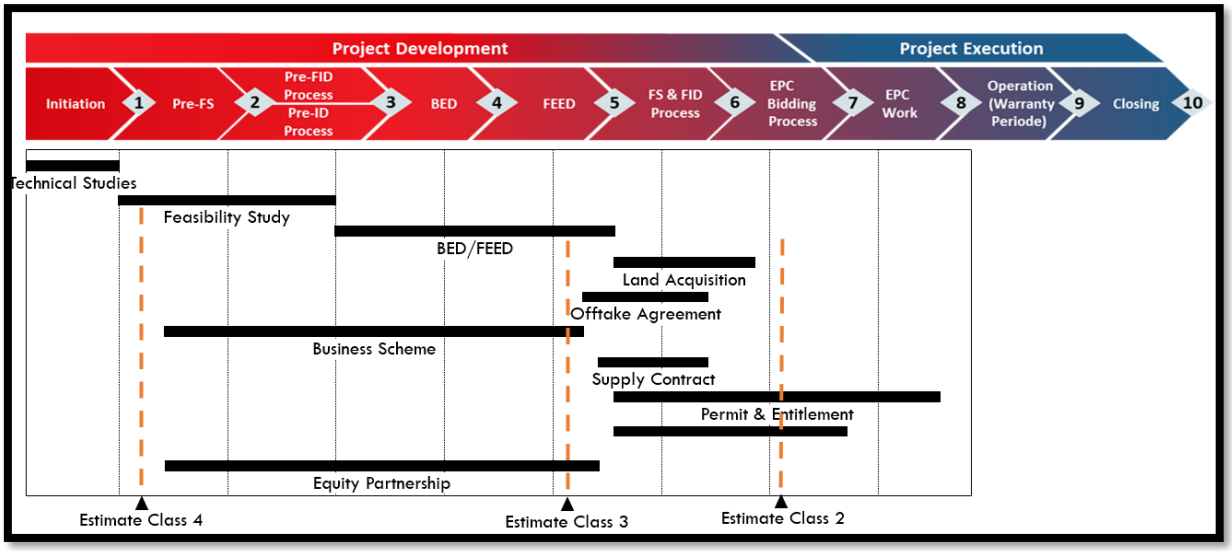

Figure 1 "Stages of Construction of Asset Process Plants in several companies in Indonesia"[15]

A project must go through all the stages described in Figure 1. These deficiencies may arise with the many steps in a task by different parties. For example, from Figure 1, usually, for the BED,

[12] The Newsroom. (2017). Most oil and gas projects are late and over budget. Retrieved from: https://www.scotsman.com/business/most-oil-and-gas-projects-are-late-and-over-budget-1454818
[13] Psenka, Mike. (2019). The Root Cause of Project Delays and the Math Behind It. Retrieved from https://www.constructionexec.com/article/the-root-cause-of-project-delaysand-the-math-behind-it.
[14] Seddeeq, B. A. (2019). Time and Cost Overrun in the Saudi Arabian Oil and Gas Construction Industry. Retrieved from https://www.mdpi.com/2075-5309/9/2/41/htm
[15] Wardhana, R. (2022). Knowledge Sharing Project Financing RDMP RU V Balikpapan Engineering Services PT. Kilang Pertamina Internasional.

FEED to EPC stages of work, the work is carried out by other consultants and contractors, so there may be differences in understanding the details of the scope, which will have an impact on schedule delays and exceeding budget. Then came the idea to combine several stages of the project into one party so that the designer understands the scope of his work.

An alternative bidding method appears from the conventional EPC by combining the FEED and BED stages. The purpose of combining these stages is to minimize the lack that occurs, as mentioned in the literature above. With these alternatives, it is necessary to analyze how the opportunities and risks that will arise are compared to conventional bidding methods to overcome problems, especially those that cause schedule delays and cost overruns.

This research should find the answers to the questions below:

- What risks and opportunities arise in the DBC bidding method scheme?
- What classification of Opportunity and Threat for the DBC Bidding Method?
- Considering the risks and opportunities, is it appropriate for a project to use the DBC bidding method for Petrochemical Industries in Indonesia?

Methodology

The methodology used in analyzing this paper uses seven steps from the Engineering Economics book. "The 7-step process is also used for decision-making Within the design process shown in the right column in Figure 2. In this case, the activities of the design process inform the relevant steps of the economic analysis process. Figure 2 shows the general relationship between actions in the design process and steps in the economic analysis process."[16]

[16] Sullivan, G. W., Wicks, M. E., & Koelling, C. P. (2018). Engineering economy 16th Edition. Chapter 1 Cost Concepts and Design Economics, Page 7

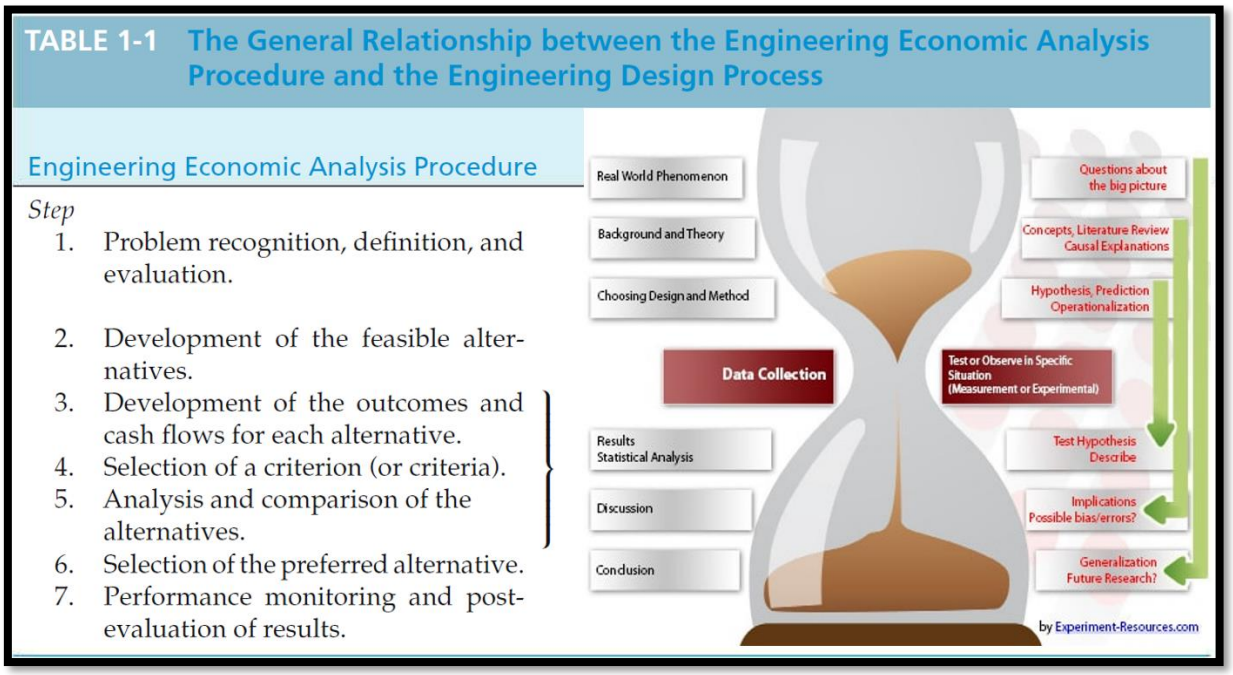

Figure 2 "Engineering Economic Analysis Procedure"[17] & "Steps of the Scientific Process" [18]

Problem Recognition, Definition, and Evaluation

The refining & petrochemical generally use several stages in determining a project:

Feasibility / Conceptual Studies

"A feasibility study evaluates the practicality of the proposed plan or project. A feasibility study analyzes the feasibility of a project to determine whether the project or initiative is likely to be successful. The study also aims to identify potential issues and problems while pursuing the project."[19]

Basic Engineering (BED) / Pre-FEED Studies

"Basic engineering is the detailed planning and engineering basis for procurement and construction, defining technical requirements for joint planning, manufacturing, construction,

[17] Sullivan, G. W., Wicks, M. E., & Koelling, C. P. (2018). Engineering economy 16th Edition. Chapter 1 Cost Concepts and Design Economics, Page 7.
[18] Martyn Shuttleworth (2008). What is Research? Retrieved from: https://explorable.com/what-is-research
[19] Team, The Investopedia. (2022). Feasibility Study. Retrieved from: https://www.investopedia.com/terms/f/feasibility-study.asp#:~:text=A%20feasibility%20study%20is%20an,venture%20is%20likely%20to%20succeed.

operation, and maintenance of equipment and facilities. Therefore, estimated project cost in the Basic Engineering stage can add a contingency to +/- 15 ~ 30%."[20]

FEED (Front End Engineering Design)

"Front End Engineering Design, or FEED, is an engineering design approach adopted before detailed engineering, procurement, and construction. It is a crucial engineering design phase to control project expenses and thoroughly plan a project before bid submission. Benchmark studies have shown that FEED constitutes roughly 2% of the project cost but properly executed FEED projects can reduce up to 30% of the expenses during design and execution. After conceptual design or feasibility study, the primary engineering phase is front-end engineering design. Therefore, FEED is also known as Front End Loading or Front-End Engineering."[21]

EPC (Engineering, Procurement, Construction) Stage

"Many companies in the renewable energy and energy sector typically use EPC (engineering, procurement, and construction) (or turnkey) contracts for complex infrastructure projects. This contract establishes the relationship between the Owner and the contractor to provide expert or technical services. The principal or Owner agrees with an EPC contractor in an EPC contract. EPC contractors subcontract to various subcontractors to perform specific parts of the work. As a result, Responsible not only for the technical aspects of the project but also for equipment procurement, facility, plant or project design, and construction."[22]

Commissioning and Start-Up

"Commissioning and Start-up is the transitional phase between plant construction completion and commercial operations. It encompasses all activities that bridge these two phases, including systems turnover, checkout of systems, commissioning of systems, the introduction of feedstock, and performance testing."[23]

[20] Team, Project Definition. (2015). Basic Engineering. Retrieved from https://www.theprojectdefinition.com/basic-engineering/
[21] Dey, Anup Kumar. (2021). What is Front End Engineering Design or FEED Engineering? FEED vs Detailed Engineering (PDF). Retrieved from: https://whatispiping.com/front-end-engineering-design-feed/
[22] Lieu, Anthony. (2020). What are Engineering, Procurement & Construction Contracts?. Retrieved from: https://legalvision.com.au/what-are-engineering-procurement-and-construction-epc-contracts/
[23] Institute, Construction Industry. (2022). Commissioning, Startup & Handover. Retrieved from: https://www.construction-institute.org/resources/knowledgebase/knowledge-areas/commissioning-startup-handover

	Primary Characteristic	*Secondary Characteristic*		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Table 2 "Cost Estimate Classification Matrix for Process Industries"[24]

	ESTIMATE CLASSIFICATION				
	CLASS 5	**CLASS 4**	**CLASS 3**	**CLASS 2**	**CLASS 1**
MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES	**0% to 2%**	**1% to 15%**	**10% to 40%**	**30% to 75%**	**65% to 100%**
General Project Data:					
Project Scope Description	Preliminary	Preliminary	Defined	Defined	Defined
Plant Production/Facility Capacity	Preliminary	Preliminary	Defined	Defined	Defined
Plant Location	Preliminary	Preliminary	Defined	Defined	Defined
Soils & Hydrology	Not Required	Preliminary	Defined	Defined	Defined
Integrated Project Plan	Not Required	Preliminary	Defined	Defined	Defined
Project Master Schedule	Not Required	Preliminary	Defined	Defined	Defined
Escalation Strategy	Not Required	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	Not Required	Preliminary	Defined	Defined	Defined
Project Code of Accounts	Not Required	Preliminary	Defined	Defined	Defined
Contracting Strategy	Not Required	Preliminary	Defined	Defined	Defined

[24] AACE International, Recommended Practice No. 18R-97. (2013). Cost Estimate Classification System, Page 3 of 15, AACE International, Morgantown, WV.

Engineering Deliverables:					
Block Flow Diagrams	S/P	P/C	C	C	C
Plot Plans	NR	S/P	C	C	C
Process Flow Diagrams (PFDs)	NR	P/C	C	C	C
Utility Flow Diagrams (UFDs)	NR	S/P	C	C	C
Piping & Instrument Diagrams (P&IDs)	NR	S/P	C	C	C
Heat & Material Balances	NR	P/C	C	C	C
Process Equipment List	NR	S/P	C	C	C
Utility Equipment List	NR	S/P	C	C	C
Electrical One-Line Drawings	NR	S/P	C	C	C
Design Specifications & Datasheets	NR	S/P	C	C	C
General Equipment Arrangement Drawings	NR	S	C	C	C
Spare Parts Listings	NR	NR	P	P	C
Mechanical Discipline Drawings	NR	NR	S/P	P/C	C
Electrical Discipline Drawings	NR	NR	S/P	P/C	C
Instrumentation/Control System Discipline Drawings	NR	NR	S/P	P/C	C
Civil/Structural/Site Discipline Drawings	NR	NR	S/P	P/C	C

Table 3 "Estimate Input Checklist and Maturity Matrix (Primary Classification Determinate)"
25

Tables 1 and 2 show the relationship between the Feasibility, BED, FEED, and EPC stages with the Estimation Class and Deliverables required at each stage.

Bidding Process

"The bidding process (also known as bidding process) is a method of selecting the best service provider or supplier by comparing offers based on certain criteria. For example, product owners, clients, or project teams may need to outsource services or purchase goods to meet project deliverables. In this case, selecting cooperating organizations or subcontractors is crucial to the project's success. The bidding process provides a way to evaluate a partner's competence before awarding a contract. The process is essential for organizations who want to work with the public sector, but is also common in industries such as construction, game development, and advertising."[26]

[25] AACE International, Recommended Practice No. 18R-97. (2013). Cost Estimate Classification System, Page 13 of 15, AACE International, Morgantown, WV.
[26] Donato Hannah. (2022). Bidding and Tendering Process. Retrieved from: https://project-management.com/bidding-tendering-process/

Bidding Strategy

Several cases in Indonesia apply several procurement methods for the construction sector. In general, the procurement method chosen is the traditional EPC, where the contractor works on the scope of the EPC based on the FEED document provided by the Owner during the bidding process. However, recently there have been other procurement method options, such as DFC (Dual FEED Competition), where two contractors are selected to compete in developing FEED documents and conducting details to work on the EPC construction. Another procurement method that can be an option is DBC (Design Build Competition), where the contractor will work with the common licensor and non-common licensor who will bring their respective technologies in developing the BED and developing in the FEED phase and more detail in the EPC phase.

Options other than traditional EPC appear to look for procurement methods with more benefits, one of which is a faster procurement duration so that the project can run as quickly as possible. Another reason is related to the large number of orders that arise due to three stages (BED, FEED, and EPC stages) carried out by different parties, so there are details of items missed between stages. Therefore, combining stages such as the DFC and DBC methods came here. However, we need to weigh the risks and opportunities of each technique so that the process and the final results obtained can be as expected.

Managing Risk & Opportunity

"Risk Management and Opportunity Management has become somewhat controversial in project management. Many leading organizations treat opportunity and risk as two sides of the same coin- in every risk, there is an opportunity, and for every opportunity, there are risks. While this may be true, It is not helpful for project governance experts to provide expert advice and guidance to project managers and other key stakeholders."[27]

This research should find the answers to the questions below:

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- What classification of Opportunity and Threat for the DBC Bidding Method?
- Considering the risks and opportunities, is it appropriate for a project to use the DBC bidding method for Petrochemical Industries in Indonesia?

Development of the Feasible Alternatives

The author will use the SWOT Analysis method to determine the Risk and Opportunity Analysis.

[27] Giammalvo, P.D., & PTMC. (2021). Unit 6 – Managing Risk and Opportunity. Retrieved from: https://build-project-management-competency.com/1-4-1-6-unit-6/

SWOT Analysis

"Strengths and weaknesses are inner to the organization. That is, it is something that you have some control over and can change. Examples include team members, patents and intellectual property, and location. Opportunities and threats are external. That is, it occurs outside the organization in the larger market. You can seize opportunities and protect yourself from threats, but you can't change them. Examples are competitors, raw material prices, and customer buying habits. A SWOT analysis organizes key strengths, weaknesses, opportunities, and threats into an organized list, usually displayed in a simple 2-by-2 grid."[28]

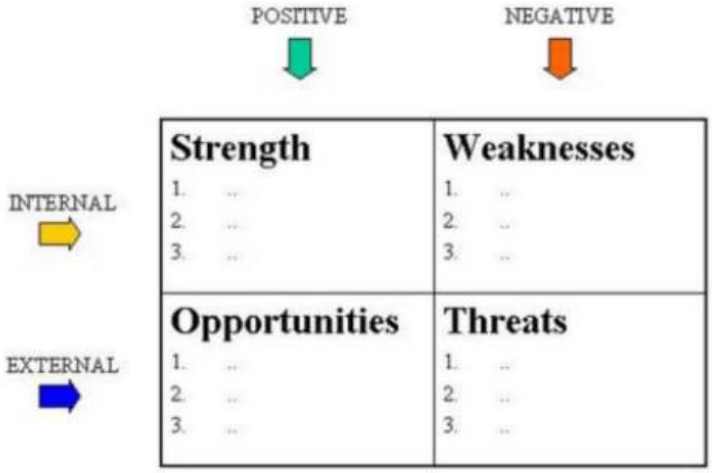

Figure 3 "SWOT Analysis Template"[29]

Result Expansion and Cash Flows for each Alternative

"A SWOT analysis consists of several steps with actionable factors before and after analyzing the four elements. A SWOT analysis generally involves the following steps:

1. **Determine Your Objective**
   SWOT analysis can be broad. However, if the analysis leads directly to a goal, it will produce more value.

2. **Gather Resources**
   Each SWOT analysis is different, and companies may need additional data sets to support the compilation of other SWOT analysis tables.

[28] Parsons, N. (2022). What Is a SWOT Analysis and How to Do It Right (With Examples). Retrieved from: https://www.liveplan.com/blog/what-is-a-swot-analysis-and-how-to-do-it-right-with-examples/
[29] Giammalvo, P.D., & PTMC. (2021). Unit 6 – Managing Risk and Opportunity. Retrieved from: https://build-project-management-competency.com/1-4-1-6-unit-6/

3. **Compile Ideas**
   For each of the four elements of a SWOT analysis, the group responsible for conducting the analysis should start by enumerating the ideas within each category.

4. **Refine Findings**
   Clean up your view with a list of ideas for each category. By refining the thoughts that everyone had, companies can focus only on the best ideas or the most significant risks to the company.

5. **Develop the Strategy**
   They list their strengths, weaknesses, opportunities, and threats. So, it's time to turn your SWOT analysis into a strategic plan. Analysis team members get an itemized list of items within each category and create a comprehensive program that guides the original goals."[30]

After making the above 5 points, we can create a list for each component below:

Strength	**Weaknesses**
• Contractor High Responsibility, Owner Low Responsibility • The tender duration will be shorter • Synchronization between stages is smoother • Apply to green projects or renovation projects	• Double cost due to 2 teams to be paid • The boundaries of the project become wider and require more technical details • The uncertainty factor becomes wider • Requires two different teams to review the design, thus requiring more personnel • Challenging conditions for the Owner, who must make it fair for all contractors
Opportunities	**Threats**
• With 2 concept designs, there is a choice of technology • With innovation for every contractor who has designed from the contractor's basic design so that it can reduce CAPEX costs • Can minimize the potential for change orders • Potential to have a more complicated technology	• Each resident is in a different place, so that can be doubt about confidentiality • The potential for one member of the consortium to have problems will affect the entire consortium • Schedule deliverables between licensors and contractors that are not synchronized • Schedule delays due to pandemic

Table 4 "SWOT Analysis"[31]

[30] Kenton, Will. 2022. SWOT Analysis: How to With the Table and Example. Retrieved from: https://www.investopedia.com/terms/s/swot.asp
[31] By Author

Selection of a Criterion (or Criteria)

After determining the classification in the form of the SWOT table above, we then identify internal risk and external risks using the Dr. template. Kenneth F. Smith, PMP on SWOT-UPP Analysis. This analysis requires our assessment of the ten aspects of the SWOT-UPP template by considering the data we have determined in table 4. Figures 4 and 5 show the evaluation. **Appraisal - Reality Check / Situation Assessment**

Opportunity Probability	Importance Impact	A. Opportunities - For Implementing Organization & Target Beneficiary	Opportunity Score
1=Weak to 5=Strong	1=Low to 5=High		102
3	4	Goal: Consistency with Implementing Organization's Strategic	12
3	3	Economic Impact: Estimated Revenue Generation	9
3	3	Social Benefit for Targeted Beneficiaries	9
3	4	Future Potential for Implementing Organization	12
4	3	Implementing Organization's Strengthening/Growth	12
4	3	Implementing Organization's Resource Utilization	12
2	2	Political/Customer/Public Perception of Implementing Organization	4
3	4	Sustainability After Project Completion	12
4	4	Budget Cost (5 = Low; 1 = high)	16
2	2	Project Manager's Assessment of Desirability	4
Threat Probability	Importance Impact	B. Inherent Threats (i.e., "Known" Risks) in implementing the Proposed Project	NET THREAT SCORE
1=Weak to 5=Strong	1=Low to 5=High		145
3	4	Customer Commitment: [Appraisal: 5=Weak;1=Strong *Exception to General Rating]	12
5	5	Schedule: How to set a schedule [Appraise:1=Bottom Up. 5=Top Down	25
3	5	Length: Project Duration [1=Short/Low --> 5=Long/High	15
4	5	Organizational Experience: With Similar Project [1=Much--> 5=None]	20
5	2	Participation: Stakeholder Involvement in Project Design [1=Much-->5=None]	10
4	5	Resource Coordination: Number of Suppliers/Contractors [1=Few-->5=Many]	20
3	5	Time for Requirement Appraisal/Assessment [1=Long-->5=Short]	15
3	5	Project Technology [1=Simple-->5=Complex]	15
3	3	Geographic Distribution [1=Limited-->5=Extensive]	9
2	2	Project Feasibility Assessment: [1=Good-->5=Poor]	4

Figure 4 "Internal Risk Analysis"[32]

[32] Giammalvo, P.D., & PTMC. (2021). Unit 6 – Managing Risk and Opportunity. Retrieved from: https://build-project-management-competency.com/1-4-1-6-unit-6/

OPPORTUNITIES

		%Weight Importance	Probability 1=Low; 5=High	Impact 1=Low; 5=High	Opportunity (P x I)	Weight Opportunity
1	Choice of Technology	20%	3	4	12	2.4
2	CAPEX Cost	15%	2	3	6	0.9
3	Change Order Reduced	20%	3	2	6	1.2
4	Complicated Technology	15%	2	2	4	0.6
5					0	0
RELATIVE WEIGHT OF OPPORTUNITY		70%				5.1

THREATS

		%Weight Importance	Probability 1=Low; 5=High	Impact 1=Low; 5=High	Risk Exposure (P x I)	Weight Risk Exposure
1	Confidentiality case	10%	2	3	6	0.6
2	Internal Consortium Issue	5%	1	5	5	0.25
3	Scheduling Licensor - Contractor	10%	3	4	12	1.2
4	Pandemic	5%	2	3	6	0.3
5					0	0
RELATIVE WEIGHT OF THREATS		30%				2.35

Figure 5 "External Risk Analysis"[33]

Finding

Analysis and Comparison of the Alternatives

After doing the calculations in Figure 4, we can plot it into a diagram that reflects which levels of risk and opportunity are determined. In Figure 6, the graph divides into four quadrants. The SWOT-UPP Analysis internal factor analysis results show that the DBC Bidding Method scoring is in the Low Opportunity High Threat Quadrant. It shows that the results of SWOT-UPP do not recommend using DBC Bidding Method, or if you still want to do it, special tips are needed to manage the identified risks.

[33] Giammalvo, P.D., & PTMC. (2021). Unit 6 – Managing Risk and Opportunity. Retrieved from: https://build-project-management-competency.com/1-4-1-6-unit-6/

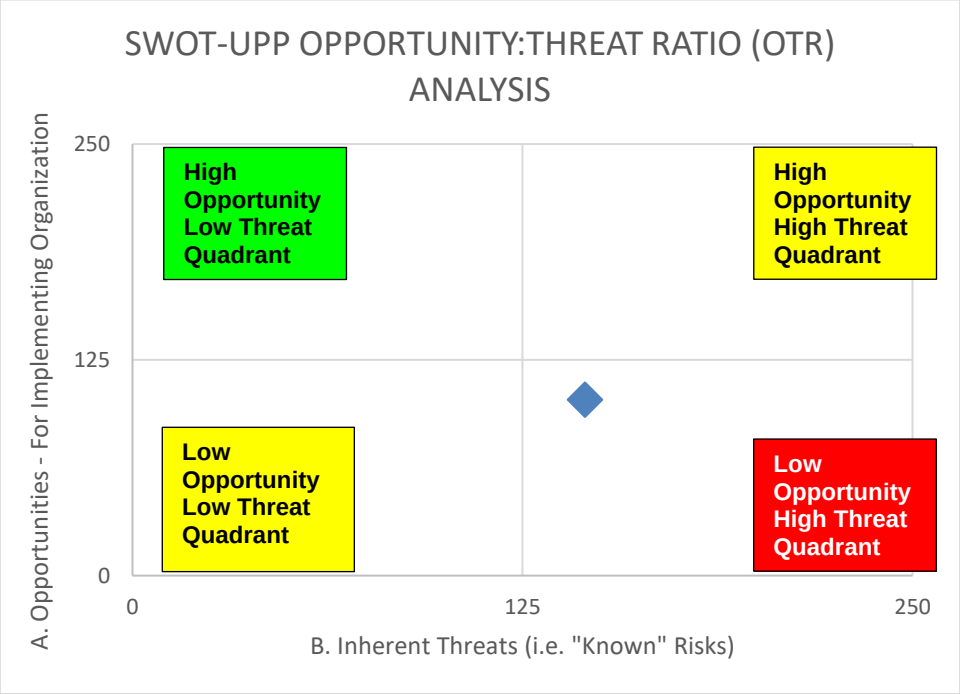

Figure 6 "Internal Risk - Opportunity: Threat Ratio Diagram"[34]

For External factors based on Figure 5 with EFE (External Factor Evaluation) analysis and the following calculations are obtained below, the score is above one, so DBC's bidding method recommends continuing.

	Opportunity	Threats
	5,10	2,35
EFE SCORE (O/T)	2,17	

Table 5 "Summary External Factor Evaluation – Opportunity and Threat"[35]

Selection of the Preferred Alternatives

From the previous step, we can see that the DBC Bidding Method scoring results are not very good for internal risk but good enough for External Risk. The level of importance and potential impact of the threat that is higher than the opportunity causes this Condition to occur. Based on the DBC bidding method scheme, internal risks, schedules, and costs are the parts that are affected and have a high impact. Therefore, the scoring in that section is significant, and low-medium impact internal risk opportunities do not compensate for this case.

[34] By Author
[35] By Author

On External risk, the value is quite good. We can see that applying the DBC Bidding Method is feasible because the impact probability is greater than the threat. Moreover, from the Owner's perspective, it looks more profitable based on the opportunity points described in Figure 5. Although the threat points have a large enough impact, The probability is relatively small if you can monitor it with intense communication between all parties to control the risk.

Performance Monitoring and Post-Evaluation of Results

Based on the above calculation, the DBC Bidding Method has identified essential opportunities and risks, both external and internal factors. According to the author, using the DBC Bidding method is generally feasible even though Figure 6 gets a bad rating, but it needs to control the identified threats. Opportunity optimization must also be done to obtain added value in the DBC Bidding Method.

Conclusion

The purpose of this research should find the answers to the questions below:

- **What risks and opportunities arise in the DBC bidding method scheme?**
  The Risks and Opportunities of the DBC Bidding Method were analyzed using the SWOT analysis method described in Table 4. The bidding method has advantages and disadvantages. Management, stakeholders, and players consider every factor in DBC's bidding method.

- **What classification of Opportunity and Threat for the DBC Bidding Method?**
  The classification type consists of internal and external factors, where each aspect has its opportunity and threat assessment. For internal factors, the classification is Low Opportunity and High Threat, while for external factors, the category is recommended to be processed because it gets an O/T score of more than 1.

- **Considering the risks and opportunities, is it appropriate for a project to use the DBC bidding method for Petrochemical Industries in Indonesia?**
  Yes, but it is necessary to monitor and manage risks, especially internal risks, because, as described in Figure 4, Low Opportunities and High Threats.

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