



Project Selection of Indonesian Local Oil and Gas Service Company Using Analytical Hierarchy Process (AHP)

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ABSTRACT: PT Duta Wisesa Servisindo or PT. DWS is a local Indonesian company that offers services in the oil and gas sector. This company was founded in 2015 when world oil prices were falling and used this momentum to invest in assets, especially in cementing units used for drilling and workover work. At the beginning of the establishment of PT. DWS believes that they can become the main local Indonesian oil and gas services company in Indonesia, because many local competitors stopped their businesses during the 2015 crisis.

In 2023, world oil prices have improved, at the end of 2023 PT. DWS received 4 job offers from SOE and private sector to work on in early 2024, namely the Jambi Project, Lampung Project, Jambi Project and Cepu Project, but due to unit limitations, this company could only choose 3 job offers to work on. Because PT. DWS does not yet have a decision-making process. In this research, the Analytical Hierarchy Process or AHP is used to provide recommendations for 3 projects that are recommended to be taken by the company.

In this AHP assessment, the criteria used as assessment parameters are marketing and sales, customers, financial feasibility, administration and project specifications, each of these criteria has several sub-criteria with a total of 13 sub-criteria. Based on the assessment, the criterion with the highest weight is financial feasibility (51.4%) and the sub-criterion with the highest weight is ability to pay (22.9%). After the assessment was carried out, based on the ranking, the 3 projects that were recommended to be taken were the Jambi project (33.4%), Cepu Project (30.7%) and Lampung Project (19%). Based on the assessment results, it can be seen that service users from the BUMN sector dominate compared to the private sector because they have the ability to pay and have high profitability compared to private companies, even though private companies are superior in terms of payment, administration and equipment requirements.

KEYWORDS: Analytical Hierarchy Process, AHP, Oil and Gas Service, Project Selection, Service Company.

INTRODUCTION

The Indonesian Ministry of Finance's Warta Fiskal (2016) claimed that international crude oil prices grew every year until 2008, when they fell. In 2009–2013, they surged again. However, crude oil prices have fallen since 2014. WTI oil dropped from USD 110 in 2014 to USD 27 in January 2016. Indonesian crude oil cost 44% less in 2014 and 40% less in 2015. January-November 2014 oil and gas revenues were IDR 265 trillion; January-November 2015 revenues were IDR 111 trillion, up 58.1 percent. Indonesian exploration declined from 64 wells in 2014 to 35 in 2015 due to the oil price (PWC, 2017). The CEO noted that the oil industry change created financial challenges, layoffs, and business closures.

PT. DWS' CEO showed innovation by creating an oil business in 2015 despite the shortage. After the temporary phase, the CEO felt confident the oil business would recover. This was a great chance for the CEO to invest on cementing units and other oil and gas equipment. If it survives this phase, the CEO believes this company will grow. PT. DWS, an independent local oil services company, offers cement stimulation, tool and testing, fracturing, coil tubing, and oil control. The CEO claimed several local competitors were unable to overcome the scarcity and change, reducing their number. The CEO suggested this environment might make the company one of the few strong and resilient local oil service suppliers, providing them an edge.

Being robust local oil service contractors provides them an edge. The organization receives many job offers. In early 2024, PT. DWS was offered drilling and/or workover projects in Jambi, Lampung, Cepu, and East Borneo. Private and SOE clients propose these jobs offer. There are several deals. Due to its limited cementing service units, PT. DWS cannot accept all bids. Keeps the organization from accepting all job offers. Thus, the company should pick the most beneficial and influential project. However, the organization still makes choices through leadership team debate without a structure. Thus, only specific traits may be considered.

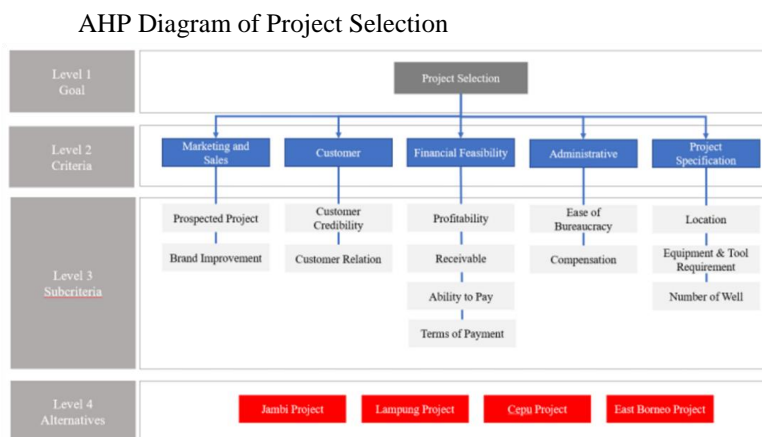


Decision makers must choose amongst strategic options to achieve their aim. Therefore, a holistic approach is necessary. The Analytical Hierarchy Process (AHP) quantify subjective judgments in MCDM reliably and robustly (Tavana et al., 2023). The Analytical Hierarchy Process (AHP) is becoming crucial in decision-making. A project evaluation and selection procedure was created utilizing this project management method. Paleie, Lalic (2009)

RESEARCH METHOD

In this research the main method to create a decision is by using Analytical Hierarchy Process (AHP), this method is using both quantitative and qualitative approach, since this method will be quantified and weight the value of the qualitative criteria and sub-criteria.

The data collection method would be using an interview, digital survey and document review. The interview is conducted at the beginning of the research to understand the background, current issue and the environment of the PT. DWS, the respondent for this initial interview is the CEO of the PT. DWS. then the author conducted a literature study and created an AHP diagram for project selection. Below is the AHP Diagram for project selection that has been approved by the respondents of PT DWS.



There are 6 respondents selected for this research, all the respondents are from the BOD level and Managerial Level. After the AHP diagram are approved by all the respondents, the digital survey is distributed to all respondents. This digital survey is using AHP tools called BPMSG by Klaus D. Gopel. This tools will help to calculate the weight of each criteria and sub criteria, and it will also help to derive the local priorities of alternatives.

RESULT AND DISCUSSION

The data collection for this analysis is using the questioner from an AHP online system called BPMSG, developed by Klaus D. Geopel. The tools also helped to process the data obtained from the questioner. The tools were able to inputmultiparticipant with various weight and consensus, it also allowed the user to determine the consistency ratio for each input. From the BPMSG data, it is possible to conduct analysis for the weight of Criteria, weight of sub-criteria and deriving local priorities for the alternatives. Below is the analysis of those component.

A. Weight Analysis of Criteria

After comparing each criterion pairwise with AHP online. In the table above, the BOD and Managers rank financial feasibility as the most essential factor in job selection. This criterion is essential, weighting 51.4% compared to others. DWS must consider the company's cash flow while choosing a work or project, thus the financial profile of each project or customer must be carefully considered to maintain excellent cash flow. Other criteria have fewer sub-criteria than financial feasibility. Project requirements weigh 23.3% of the project's technical aspects after financial feasibility. This criterion also considers project operational complexity. DWS favours simpler projects. Customer criteria rank third at 12.1%. The lowest weight is 6.2% for marketing and sales. The BOD and managers believe global competitors prefer SOE projects over private ones since the value of the job is lower, hence DWS seeks



to serve the less popular private sector market. by MNC competitors, and individual clients want DWS services. The BOD and Managers believe marketing and sales are not a priority.

Table 1

Criteria	Weight	Rank
Marketing & Sales	6.2%	5
Customer	12.1%	3
Financial Feasibility	51.4%	1
Administrative	7.0%	4
Project Specification	23.3%	2
CR	1.6%	
AHP Consensus	83.3%	

B. Sub Criteria Weight Analysis

Table 2

Criteria	Global Priorities	Sub-Criteria	Local Priorities	Local Rank	Global Priorities	Global Rank
Marketing and Sales	6.2%	Prospected Project	77.7%	1	4.8%	8
		Brand Improvement	22.3%	2	1.4%	13
CR	0.0%					
AHP Consensus	86.9%					

The marketing and sales factors weigh the least at 6.2%. It involves brand enhancement and prospecting. Local priorities favour prospected projects above brand improvement. Local priority weighs prospected projects 77.7% and brand improvement 22.3%. Prospected projects are more essential than brand improvement since they link to DWS's future job prospects. Higher prospects help DWS continue sales operations. Brand improvement sub-criteria has the lowest worldwide priority weight at 1.4%, ranking 13th. The BOD and Managers agree that DWS brand recognition is not necessary and that society should not know about it. In negotiations, the DWS's main customer is the private sector, but in marketing, the private sector is expected to approach the DWS to offer the job, while the DWS must decide whether to accept or reject potential customers. AHP Consensus is 86.9%, indicating excellent leader agreement.

Table 3

Criteria	Global Priorities	Sub-Criteria	Local Priorities	Local Rank	Global Priorities	Global Rank
Customer	12.1%	Customer Credibility	40.9%	1	5.0%	6
		Customer Relation	59.1%	2	7.9%	7
CR	0.0%					
AHP Consensus	55.2%					

Globally, customer criteria ranks 3rd with 12.1%. Local prioritisation weighs customer credibility 40.9% and customer relation sub-criteria 59.1%. The global rank gives customer relations 7.9% weight and consumer credibility 5%. Customers help DWS build its network, making them valuable. In addition to relationships with the core user, the network includes vendors and other potential users. This indirectly affects marketing and sales objectives and DWS customer involvement.

Table 4

Criteria	Global Priorities	Sub-Criteria	Local Priorities	Local Rank	Global Priorities	Global Rank
Financial Feasibility	51.4%	Profitability	21.9%	3	11.3%	3
		Receivable	7.7%	4	4.0%	10
		Ability to Pay	44.5%	1	22.9%	1
		Term of Payment	25.8%	2	13.3%	2
CR	0.7%					
AHP Consensus	65.3%					



Financial feasibility has the highest priority among all of criteria. Global priority weight for this criteria is 51.4%. Ability to pay has 44.5% local priority, while receivable has 7.7%. The top three global priority for financial feasibility subcriteria are ability to pay (22.9%), duration of payment (13.2%), and profitability (11.3%). DWS's experience shows that some projects are based on contract value, have a high value, and have good payment terms, but when the work is done, the payment process is sometimes not smooth because the customer has financial issues, which increases DWS receivables. Meanwhile, contract payment conditions might be utilised to negotiate billing. Despite being barely 4% of global priorities, receivable is still important. Despite the low weight of receivables in global priority, clients with receivables can be prioritised for re-employment because they can help with payments/invoicing.

Table 5

Criteria	Global Priorities	Sub-Criteria	Local Priorities	Local Rank	Global Priorities	Global Rank
Administrative	7.0%	Ease of Bureaucracy	62.7%	1	4.4%	9
		Compensation	37.3%	2	2.6%	12
CR	0.0%					
AHP Consensus	45.5%					

Administrative criteria are 7% global priority. Its subcriteria are bureaucratic ease and compensation. Locally, bureaucracy easing weighs 62.7% and globally 4.4%. Local priority weight compensation is 37.3% and global priority 2.6%. Based on local priority of sub-criteria, DWS chooses projects with less bureaucracy, even when customers pay more for logistics, food, crew accommodations, and other services. However, AHP consensus is just 45.5%, which is low, indicating little respondent agreement. This may be because each division has different task preferences.

Table 6

Criteria	Global Priorities	Sub-Criteria	Local Priorities	Local Rank	Global Priorities	Global Rank
Project Specification	23.3%	Location	14.4%	3	3.4%	11
		Equipment & Tool Requirement	38.0%	2	8.9%	5
		Number of Well	47.6%	1	11.1%	4
CR	2.0%					
AHP Consensus	53.0%					

Project specification requirements rank 2nd globally with 23.3% weight. The number of wells is the biggest sub-criterion, 47.6% in local priority and 11.1% globally. Tool requirements follow with 38% local and 8.9% global priority. hence these two subcriteria are global priorities 4th and 5th. The more wells, the longer the work period, which may effect the project's contract value, so the more wells, the higher the profitability. The simpler the tool specification request, the better for DWS, as DWS wants to work where the tools are accessible and does not need to outsource or invest extra to buy them.

Table 7

Criteria	Sub-Criteria	pGlb	Alternatives			
			Jambi Project	Lampung Project	Cepu Project	Projek Kalimantan Timur
Marketing and Sales	Prospected Project	4.8%	40.6%	8.6%	43.5%	7.3%
	Brand Improvement	1.4%	34.7%	7.7%	48.3%	9.4%
Customer	Customer Credibility	5.0%	42.8%	6.0%	40.9%	10.2%
	Customer Relation	7.2%	41.5%	19.5%	24.3%	14.8%
Financial Feasibility	Profitability	11.3%	47.6%	13.2%	32.0%	7.2%
	Receivable	4.0%	26.2%	23.5%	30.0%	20.4%
	Ability to Pay	22.9%	46.4%	7.8%	38.9%	6.9%
Administrative	Term of Payment	13.3%	22.4%	31.5%	16.2%	29.8%
	Ease of Bureaucracy	4.4%	7.2%	38.6%	8.4%	45.8%
	Compensation	2.6%	21.8%	21.1%	25.0%	32.1%
Project Specification	Location	3.4%	8.1%	48.7%	35.7%	7.5%
	Equipment & Tool Requirement	8.9%	9.2%	35.9%	14.9%	40.0%
	Number of Well	11.1%	35.7%	11.8%	43.5%	9.0%
Group Result			33.4%	19.0%	30.7%	16.9%



According to the assessment results, Jambi has 33.4%, whereas Cepu has 30.7%. The least percentage option is East Borneo Project at 16.9%, whereas Lampung has 19%. Jambi and Cepu project results are comparable since both are State Owned Enterprise projects with major weight. Lampung and East Borneo projects for private consumers have a considerable value differential. This shows that SOE work is preferred above private sector work. The table shows that SOE projects are more profitable and able to pay than private sector initiatives, which have the greatest global priorities at 22.9%. Private projects outperform SOE in payment terms. Respondents claimed SOE terms of payment are longer than private sector terms, but SOE enterprises will pay for the service done, even if it takes longer. SOE project has higher consumer credibility and prospected project scores. Private sector initiatives benefit from ease of bureaucracy, equipment, and tool requirements, as well as payment terms. SOE projects may request more paperwork and equipment specifications during the proposal and tender process because to their complicated bureaucracy. Unlike private initiatives with bureaucratic ease values exceeding 35%, the Jambi and Cepu projects have bureaucratic ease values of 7.2% and 8.4%, respectively. The second SOE project scores below 15% in the equipment and tools need sub-criteria, while the second private sector project scores above 35%. Since DWS can only execute 3 of 4 projects in January, it should chose Jambi, Cepu, and Lampung. due of its top-3 rating. Since it ranked last, the East Borneo project was rejected.

CONCLUSION

An AHP model identifies key parameters for oil and gas service industry project prioritisation. This research uses marketing and sales, customer, financial feasibility, administrative, and project specification to prioritise projects. There are 13 subcriteria for those 5 criteria. According to the research, 51.4% of worldwide priorities are financial feasibility, emphasising the necessity for cash flow health. The top three global priorities for financial feasibility sub-criteria are ability to pay (22.9%), duration of payment (13.2%), and profitability (11.3%). This AHP research also shows that Jambi Project (33.4%), Cepu Project (30.7%), and Lampung Project (19%) are the top competitors based on critical criteria. This analysis shows that SOE initiatives have stronger ability to pay, credibility, and perceived profitability than private sector enterprises. However, private sector initiatives have better payment terms, fewer bureaucratic hurdles, and simpler equipment needs.

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Cite this Article: Wibisono Adhi Pradana S.T., Yudo Anggoro (2024). Project Selection of Indonesian Local Oil and Gas Service Company Using Analytical Hierarchy Process (AHP). International Journal of Current Science Research and Review, 7(1), 395-400