

Due Diligence Dimensions and Ranking Methodologies for Supplier Selection Process on Oil and Gas Projects

Shobhendu Prabhakar[#]

[#]Project Quality Manager, TechnipFMC, Houston, TX, USA

Abstract — Supplier selection is a key process in procurement phase of any oil and gas project. Thorough due diligence in supplier selection process not only ensures selection of a superior supplier that can deliver equipment and procurement services in a cost effective manner and according to the project specifications but also mitigate risks in oil and gas project execution. This research paper discusses different dimensions of due diligence process, analyses ranking methodologies and suggests risk mitigation actions while selecting suppliers on oil and gas projects.

Keywords — Supplier selection, Procurement, Global sourcing, Oil and gas industry, Oil and gas projects, and Logistics.

I. INTRODUCTION

Procurement in itself is a big industry within the spectrum of humongous oil and gas industry. According to one research, cost of purchased products and/or services can account for more than 50% of an oil and gas company's average cost. In the similar vein, another research shows that purchasing and global sourcing expenditure can account for more than 40% of overall cost in many industries. Thus, it will be fair to assume that procurement spending is among one of the significant portions of overall spending on an oil and gas project. While suppliers are major players in supplying the equipment and/or services, EPCI (Engineering, Procurement, Construction and Installation) companies and operators are major stakeholders. Since selection of a superior or mediocre supplier can make or break an oil and gas project, it is critically important to select a superior and high quality supplier that can supply equipment and/or services that are cost effective, comply with the specified requirements and do not risk schedule. This article discusses different dimensions of due diligence in the supplier selection process that EPCI companies and operators should thoroughly review before bid and placing a purchase order. This article also analyses two approaches to rank suppliers based on their scores on individual dimensions during supplier selection due diligence process.

II. SUPPLIER SELECTION DUE DILIGENCE PROCESS DIMENSIONS

There are different dimensions of due diligence in the supplier selection process that should be looked at when selecting a supplier on an oil and gas project.

A. Supplier qualification and approval

Typically, companies in the oil and gas industry have a supplier database. Before the bid phase, procurement personnel (typically a buyer) should check the company's approved supplier list. If the supplier is not found in the database, first step will be to start supplier qualification process based on company procedure. If the supplier is on company's approved list, then procurement personnel should also check whether particular location that supplier plans to use for the project is approved or not.

B. Supplier's past working history with the company and/or it's clients

Checking supplier's past history brings enormous value in selecting the right supplier for an oil and gas project. This check process unveils performance and working relationship aspects and signals the procurement personnel of any past issues while working with the supplier. Selecting a known competent supplier with successful past working history can provide cost savings for the oil and gas project and to the company.

C. Technical capabilities

Assessment of supplier's technical capabilities is critical as it provides the company with a confidence that the supplier will be able to meet specified requirements. While performing technical assessment, company's engineering team should closely look at supplier past design experience with the specific equipment and thoroughly analyse quality of supplier's engineering team.

D. Fabrication facilities

For highly critical equipment (cost, schedule or complex processes) fabrication, company's engineering and quality teams should perform a comprehensive visit of supplier's fabrication facilities. This comprehensive visit should include understanding supplier's fabrication process, workload of fabrication facility, shifts/day, working

hours, qualifications and certifications of fabrication workforce, inventory control, material storage, special process (such as welding, non-destructive testing and coating etc.) capabilities, ratio of work split (in house vs subcontracted) and sub-supplier management process.

E. Logistics network

Often times, this dimension does not get its due importance. While supplier's engineering capabilities and fabrication facilities are critical, its logistics network is equally important because the equipment has to be packed, preserved and shipped somewhere. Knowing supplier's logistics proficiencies in advance allows company to plan ahead and take proactive actions to avoid any logistical issues.

F. Performance feedback

Analysing past performance feedback on a particular supplier can provide early signals on potential issues that may arise in future. It will be prudent that company's procurement personnel ask the supplier about actions taken to resolve issues in the past. Equally important will be that company's project team verifies themselves whether the actions taken were quick fixes or were effective corrective actions.

G. Change order records

A mere look at the change order log from past projects that were executed by a particular supplier for a company can tell a story whether the supplier will execute the to be awarded purchase order within budget or there will be a cost spill. A more zoomed in look at past change orders from a supplier will help project team to understand specific trend or one off situations.

H. Post-delivery issues and warranty claims

It will be fair to state that corrective actions to rectify a defect are less costly while the equipment is in the fabrication facility than at offshore. Project teams should look out for number and type of post-delivery issues and warranty claims by gathering data from past projects. This data is useful in selecting the supplier to understand magnitude of CAPEX (Capital expenses) upfront vs OPEX (Operating expenses) later on.

I. Supplier Management System

Company's quality professional should perform a review and audit supplier's management system to understand their policies, procedures and value chain. Scope and extent of this review and audit should be detailed out based on supplier's past history with the company and criticality of the equipment. One area of this exercise should be critically look at key quality performance indicators such as non-conformances, defect rate and corrective action

requests with respect to supplier's management system.

J. Organigram

Clear identification of key project personnel and communication channels is key to successful job completion. Therefore, company should ask for project specific organigram to understand key players from supplier's side for project execution.

K. Financial status and credit risk rating

Depending on company's own financial situation and risk averseness, the company should establish a minimum credit rating threshold to allow or deter potential suppliers from bidding process.

L. Organization culture

This dimension plays an important role to understand driving forces, values and attitude of supplier's personnel. Understanding these aspects can help company to determine whether the supplier will be a fit culturally or not.

M. Responsiveness

Company's procurement personnel should check with past project personnel on supplier's approach towards providing responses and time in responding and resolving issues that might have occurred in the past.

N. Geopolitical attributes

Oil and gas industry is spread across the globe and many times suppliers are international. Before selecting a supplier, company should also pay heed to geopolitical conditions of the country. Geopolitical conditions include political scenario of the country, labour unions, and currency fluctuations. Due diligence on these factors will help the company to identify geopolitical risks working with an overseas supplier and hedging steps to be taken towards these risks.

O. Arbitrations and litigations

Company's procurement personnel should also check past track records of the suppliers in terms of arbitrations and litigations. This exercise will tell the company a compelling story about the suppliers' reputation and working relationships with other similar companies.

In essence, all these dimensions make a web (Fig. 1), analysing and paying attention to this web is critical to the supplier selection due diligence process on any oil and gas project.



Fig. 1 Supplier Selection Due Diligence Process Web

III. ANALYSIS OF DIFFERENT RANKING METHODS

In order to analyse which suppliers are best suited for company to either invite to bid or place purchase orders with, following methods may be helpful.

A. Total Ranking method

In this method, all dimensions of supplier selection are equally weighted. Company procurement personnel should assign scores to the perspective suppliers on a defined scale for each of abovementioned supplier selection dimension based on due diligence performed by the company. An example of scale can be 1 through 10, with 1 being the lowest score and 10 being the highest score. All scores for each supplier should be added to determine total score (Fig. 2).

Supplier selection dimension	Rating (1- lowest, 10- highest)
Supplier qualification and approval	
Supplier's past working history with the company and/or its clients	
Technical capabilities	
Fabrication facilities	
Logistics network	
Performance feedback	
Change order records	
Post-delivery issues and Warranty claims	
Supplier Management System	
Organigram	
Financial status and credit risk rating	
Organization culture	
Responsiveness	
Geopolitical attributes	
Arbitrations and litigations	
Total	

Fig. 2 Supplier Selection – Total Score

Further, the suppliers should be ranked from first to last on the basis of final total scores (Fig. 3).

Supplier Name	Rating (total)	Ranking
Supplier 1		
Supplier 2		
Supplier 3		
Supplier 4		
Supplier 5		

Fig. 3 Supplier Selection – Ranking based on Total method

Though this method provides guidance to the company procurement personnel in ranking perspective suppliers, it has a drawback since all the supplier selection due diligence dimensions are given equal weightage. In order to overcome this drawback, following weighted total ranking method can be used.

B. Weighted Ranking method

Company personnel should assign weights to different supplier selection dimensions in this method. Weights should be assigned after taking into consideration – risks, criticality of equipment, and any other important factors (to the company). Subsequently, to come up with a weighted rating, weight should be multiplied by the rating (Fig. 4). This should be done for each supplier selection due diligence dimension. In mathematical terms, following is the formula to calculate “weighted rating” scores.

$$WR_i = W_i * R_i$$

Where ‘i’ is the supplier selection dimension.

Supplier selection dimension	Weight (1- lowest, 10- highest)	Rating (1 – lowest, 10- highest)	Weighted rating (Weight*Rating)
Supplier qualification and approval			
Supplier's past working history with the company and/or its clients			
Technical capabilities			
Fabrication facilities			
Logistics network			
Performance feedback			
Change order records			
Post-delivery issues and Warranty claims			
Supplier Management System			
Organigram			
Financial status and credit risk rating			
Organization culture			
Responsiveness			
Geopolitical attributes			
Arbitrations and litigations			
Total			

Fig. 4 Supplier Selection – Total Weighted Score

Similar to “total ranking” method, weighted rating scores for all dimensions should be added to determine total weighted rating score for each supplier (Fig. 5).

Supplier Name	Weighted rating (total)	Ranking
Supplier 1		
Supplier 2		
Supplier 3		
Supplier 4		
Supplier 5		

Fig. 5 Supplier Selection – Ranking based on Weighted Method

Lastly, the suppliers should be ranked from highest to lowest on the basis of their total weighted rating scores. This method eliminates the limitation that total ranking method has.

IV. SUPPLIER SELECTION DUE DILIGENCE AS RISK MITIGATION

Due diligence in supplier selection process is a progressive step towards risk mitigation on oil and gas projects. Knowing in advance about suppliers’ technical capabilities, fabrication facilities, special process expertise, organization culture, project team organization, past working history, responsiveness on communication and issue resolution, change order history and management of change orders, post-delivery issues, warranty claims management, geopolitical risks, financial situation, supplier management system and management of sub-suppliers, provides company and project management teams with meaningful information on risks and prepares them to take necessary actions to mitigate involved risks.

V. CONCLUSIONS

Since a good portion of overall procurement and supply chain cost is paid to the suppliers on any oil and gas project, a detailed due diligence in supplier selection process is prevalent. Proper attention to each and every due diligence dimension analysed in this paper by company and project procurement, project management, engineering management and quality management teams is likely to provide assurance to company and its clients on selecting suppliers that are cost effective, technically sound and that match with company’s culture. By performing comprehensive due diligence in the supplier selection, companies can also identify risks involved early in the project and implement necessary mitigation actions to ensure projects are executed effectively and efficiently.

Disclaimer: This paper does not represent any TechnipFMC position, and it is in no way related to TechnipFMC.

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