

An Exploratory Study for Performance Improvement through Supplier Client Services Framework

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Abstract: - This research is aimed to study on supplier relationship management particularly on service procurement of the oil and gas industry in Malaysia. Volatile oil price and COVID-19 pandemic required oil and gas companies to re-evaluate their supply chain strategies to minimise the impact. One of the strategies was to build better relationships with suppliers. Based on literature, services procurement is much more complex than goods procurement. The literature reviewed the topic of the oil and gas industry, outsourcing and subcontracting and supplier relationship management. In details, different elements of supplier relationship management are discussed such as its model, benefits, influencing factors and types of suppliers and relationships were discussed. From the literature review, a conceptual framework was developed. "Case study" is adopted as the research method as it provides sophisticated insight on the research topic. Four companies were interviewed to understand the supplier relationship management process. The research findings show that there are different supplier relationship management processes adopted by the four companies selected for case study. All companies agreed that they gained benefits with better supplier relationships. However, all the companies are facing difficulties in implementation of supplier relationship management. In addition, the interviewees expect their suppliers to be more competent in terms of cost, time and quality to contribute to a better buyer-supplier relationship. The conceptual framework is revised based on the research findings and presented as one of the findings.

Key-Words: - Supply Chain Management, Performance Management, Supply Collaboration, Oil and Gas Sector, Procurement and Supply Chain, Supplier-Client Services

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1 Introduction

Supplier relationship management (SRM) is becoming increasingly relevant today. In today's oil and gas (O&G) businesses, companies are required to reassess their supply chain to face the challenges and the competitive market. Companies need to pay closer attention to their supplier relationships, same as how they approach their customers. O&G companies faced several crises in 2020. The markets were struck by COVID-19 pandemic which disrupted the supply chains. Contractors and suppliers in the industry are facing issues to perform the delivery on time and on budget. Besides COVID-19, collapsing oil prices also bring crisis to all players in the industry. The oil and gas operators have reduced their operating budgets and certain projects were being put on hold. Operators and contractors are keen to look for solutions to reduce operating costs and construction costs. The pressure is then passed to the suppliers by instructing or forcing them to reduce the price. Indeed, the cost can be reduced by doing so, but it does not bring long term benefit to the buyers. Buyers should seek for a better approach in managing the issue where one of it is through SRM.

SRM, from the term itself, clearly is about managing relationships with the suppliers. Every supply chain is started with suppliers as the source of raw material and ended with consumers as the end user of the product or service. A system which manages supply chain is called supply chain management (SCM). Studies defined SCM as a process or activity that handles the production flow starting from raw material until it is delivered to the consumer in the final product form [1]. Sourcing is one of the important components in SCM where it sources suppliers for the required goods and services and at the same time, to manage supplier relationships [2]. The activity of sourcing does not end at receiving the required goods or services, but relationships with suppliers need to be monitored and managed. Both buyers and sellers can work together to enable price reduction or come out with innovation that is more cost effective. With this approach, buyers can meet the cost reduction objective while suppliers' benefits are not neglected. O&G industry are usually categorised into three segments which are upstream, midstream, and downstream. The raw material in this industry is crude oil and gas. Figures 1 & 2 illustrate

the value chain of crude oil and gas. The value chains show how the crude oil and gas are transformed into end products and delivered to end users.

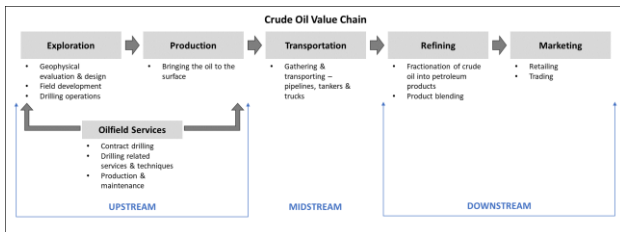


Figure 1. Crude Oil Value Chain [3]

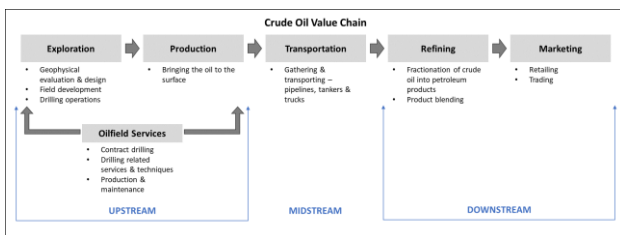


Figure 2. Natural Gas Value Chain [3]

Upstream is also known as the exploration and production sector where the activities involved are oil and gas reservoirs exploration and then extracting the hydrocarbons from the Earth. Both crude oil and gas have similar activities in the upstream and usually the activities will be at the offshore. Midstream involves processing, transportation, and storage. Transportation is the major activity in midstream where it transfers the hydrocarbon gathered from upstream to refineries and petrochemical plants. Pipeline, tankers, barges and railways are used in transportation. In downstream, it involves converting the raw material into the finished products through refining, then the end products will be marketed, traded, and distributed to consumers.

Before the downturn of the O&G industry in 2015, the industry was one of the most profitable businesses in the world. Today, oil businesses perform the other way round. Dropped in oil demand and oil price with the effect of COVID-19 pandemic have impacted the profit of the oil companies. Studies suggests oil and gas exploration and production companies lost USD 1 trillion revenue in 2020 [4]. Saudi Arabia, one of the heavily oil dependent countries would like to restructure its government department to less depend on oil revenue due to the oil price drop [5]. Experts believed that O&G industry's outlook will remain negative and will only recover when the pandemic recedes [6].

2 Research Background and Scope

2.1 Oil and Gas Industry in Malaysia

First oil well and the only onshore oil well in Malaysia was discovered by Shell in Miri, Sarawak in 1910 [7]. The rich oil reserves in Malaysia have attracted many foreign players such as Shell, Esso, Murphy and etc to operate in Malaysia. The petroleum activities keep expanding until today, where Malaysia is now one of the biggest oil producers in Asia [8] with average daily production of 1.7 million barrels of oil in 2018 [9]. Besides oil, Malaysia is also the world's fifth largest exporter of liquefied natural gas [10]). Malaysia's oil and gas are grouped into three regions which are Peninsular Malaysia, Sarawak, and Sabah. These three regions have approximately 614,100 square kilometres that are available for exploration and production activity. Malaysia's oil and gas activities are governed by Petroleum Development Act 1974. Under this act, Petroliaam Nasional Berhad [9], Malaysia's national oil company was formed in 1974 to manage the oil and gas resources in Malaysia [11].

Malaysia's O&G industry is not spared from the impact of low oil price and COVID-19 pandemic. Petronas has recorded a loss of RM3.4 billion in the third quarter of 2020 in contrast to the net profit of the third quarter of 2019 [12]. Due to depression from the market conditions, Petronas has reduced their capital expenditure (CAPEX) to maintain the company cash flow in this hardship period [13]. This decision has brought a huge impact to the other players within the industry. Reducing capex by Petronas results in lower activity levels in which project delays and less contract award happens.

2.2 Research Problem and Scope

Many literatures promote the importance and benefits that could bring if SRM are well developed in the process. Undoubtable that maintaining a good supplier relationship could help companies in many ways. Studies highlighted that the companies which have strong relationships with their suppliers can mitigate the impact of COVID-19 pandemic by reconfiguring the supply chain to maintain the supplies [14]. The importance of having a good supplier relationship is aware by companies. As oil and gas are complex in terms of its technology used and its high risk, highly competent suppliers are required by the industry. However, many companies are still not taking the matter seriously as they believe that there are other suppliers that are available for them. Studies [15] has identified few issues from the existing SRM. First, the companies are too focused on cost reduction as the main agenda. Innovation,

sustainability, and legality are ignored as it requires long term investment and against the cost reduction objective. Second, the procurement personnel are lacking SRM competencies and skills. Third, the business objectives between buyer and supplier are not aligned where they pursue their own self-interest. Hence, there is a need to understand the SRM in the O&G industry in detail, especially in services procurement. Procurement of services are more complex compared to goods [16]. Services are with characteristics such as heterogeneous, perishable, and intangible that caused higher risk in services procurement [17]. Previous studies urged that relationship is driver in managing projects especially for services. The authors described services as a complex set activity that required skills and expertise with involvement of few parties [18]. Based on literature, the following research questions and research objectives are identified for this research shown in table 1.

Table 1. Comparison of Different Frameworks [89]

Research Questions	<ol style="list-style-type: none"> 1) How companies in Malaysia’s Oil and Gas industry manage the supplier relationship management processes? 2) How supplier relationship management helps services procurement processes? 3) What are the issues encountered in the supplier relationship management process? 4) What are the supplier competencies that contribute to success of supplier relationship management?
Research Objectives	<ol style="list-style-type: none"> 1) To understand how companies manage the supplier relationship management processes. 2) To ascertain how supplier relationship management helps services procurement processes. 3) To investigate what are the issues encountered in the supplier relationship management process. 4) To identify what are the supplier competencies that contribute to success of supplier relationship management.

SRM in services procurement in Malaysia’s O&G industry will be gathered from companies that have a large scale of plants and projects to manage in which they need to handle numerous suppliers from engineering services until maintenance services. This research covers four areas as per the research objectives. The first area is to find out how Malaysia’s oil and gas companies manage the SRM. The literature review findings on the SRM framework will be used to compare with the case study interview results. Second area is to study how SRM could help

in services procurement. To answer this, researcher will investigate the procurement process from the research companies to understand the impact of SRM to the procurement activities. Third area is to identify the issues and challenges in the SRM process. Fourth area is to discover the supplier competencies that companies want their suppliers to have to have a better buyer supplier relationship. There are limited studies in SRM in the O&G industry. Many studies focus on SCM such as on the framework, strategies, and issues, but not really focusing and discussing specifically on SRM. Hence, this study is significant to investigate details on SRM in the O&G industry. This study will help to understand the SRM process in different oil and gas companies and subsequently, to help companies to enhance their SRM process by either understanding other players’ processes or overcoming the weaknesses in their current process.

Besides, the study will create awareness among other players in the industry by pointing out the benefits gained through effective SRM. Other players could also refer to this research to establish their own SRM process. Also, this research could help suppliers to improve themselves by understanding the competencies that their client is looking at.

3 Literature Review

This research intends to study and explore the SRM among Malaysia’s O&G companies in term of its processes, benefits gained from SRM, challenges in SRM implementation and contribution of suppliers’ competencies in SRM success. To better understand the above, this chapter reviews and discusses the literature on O&G industry, outsourcing and subcontracting in the O&G industry, SRM, factors influencing SRM, benefits of SRM, types of relationships and types of suppliers.

3.1 Oil and Gas Industry

Before outsourcing and subcontracting are discussed, the stages in the oil and gas projects and services involved will be explained first. This will provide a picture of the complexity in the oil and gas projects and why outsourcing and subcontracting are necessary. As discussed, the O&G industry is complex as it involves many suppliers either locally or internationally for one project. Malaysia Petroleum Resources Corporation (MPRC) has grouped the types of services and equipment required in the O&G industry based on five categories which are: 1) exploration; 2) development; 3) production; 4) decommissioning; and 5) products [19]. Further, various types of services are listed to support the O&G industry as shown in Figure 3. There is no one-stop solution company that can provide all the

required products, equipment and services which lead complex supply chains. Outsourcing and subcontracting are two common terms in SCM. Often, these two terms are used interchangeably by business without being aware of the difference as both are allocating jobs outside the company. For this research purpose, outsourcing and subcontracting will be used synonymously.

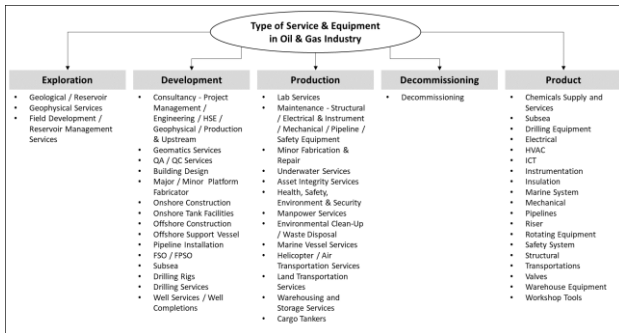


Figure 3: Services and Equipment Types in Oil and Gas Industry [19]

Outsourcing or subcontracting is one of the common strategies used by most oil and gas companies to obtain required materials and services. Oil and gas projects are highly complex, extortionate and involve advanced technology [20]. Outsourcing and subcontracting certain scopes are needed as the companies might not have technology or staff to perform the scopes. Also, companies do not want to hire staff to perform the short-term scopes. Studies mentioned that the O&G industry rely on third party suppliers to deliver the product and services to minimise the operating cost, transfer supply chain risk to their supplier and overcome the expertise limitation [21]. Another study suggested four factors that need to be considered before making any outsourcing decision: 1) whether suppliers can provide better price and quality; 2) whether the activities are the company's core competencies which bring cost advantage or product differentiation; 3) the risk if the activities are performed in house; and (4) whether the outsourcing will bring business process improvement [22]. Companies need to evaluate the advantages and disadvantages before making any outsourcing decision. The supply chains in oil and gas industries are complex as they involve a huge supply base due to outsourcing and subcontracting strategy. Managing the supply chain becomes more crucial in the current low and uncertain oil price era. Studies [23] mentioned that one of the methods to improve current oil and gas supply chain is by enhancing supplier collaboration. The authors emphasised the

need of having a successful supply chain in oil and gas as it helps to reduce cost, increase production, and meet market demand. Collaborative working arrangements by partnering and framework arrangement is now a trend in the supply chain [24].

3.2 Supplier Relationship Management (SRM)

SCM is evolving to meet the market condition and requirement. Today, the SCM is emphasising on the importance of suppliers where more activities are in place to promote the relationship with suppliers. According to [25], there are seven periods of evolution of purchasing and supply chain management in which SCM only gained its importance in period 7, the twenty-first century. The purchasing is now integrated with business processes and customer's requirements where SRM is having a strategic role in purchasing [25]. One of the objectives in SCM is to create good and long relationships with suppliers, subsequently, bring improvement to the company [26]. Consulting studies [27] found out that top procurement levels would like to increase the collaboration level with their suppliers with aims to gain advantages from the relationship. Indeed, suppliers are important stakeholders by integrating with companies [28] but suppliers' interests are often not being considered. Through SRM, it helps companies to meet suppliers' needs and bring satisfaction to the suppliers. There are many SRM definitions from different studies and academicians.

- SRM is important element in SCM to manage suppliers through better relationships [29].
- SRM is a strategy that builds an effective supplier network which can help to gain maximum value from supplier [30].
- SRM as a comprehensive approach that manages suppliers by streamline and makes more effective the interaction with suppliers [31]
- SRM as tool helping companies improve supply chain performances & gain competitive advantage [32].
- SRM creates a common frame of reference that helps in buyer and supplier's communication and improves supplier performance [33]
- SRM is a process that manages suppliers in the entire sourcing lifecycle from identifying the correct supplier, negotiating the contract, executing the order and payment [34].
- Studies urged that SRM need to be well executed then only can enjoy advantages from it. SRM is used to decide the types of relationships and to what extent companies should intervene with the suppliers [35].

From all the various definitions as stated above, all the pointed SRM is a process that helps to manage suppliers and build good relationships between buyers and suppliers. And by having effective SRM, suppliers could create more value to buyers.

3.3 Activities in Supplier Relationship Management

‘Productive supplier relationships do not just happen’ [31]. Efforts and commitment from both buyers and suppliers are needed. This section discussed the activities involved in SRM from the buyer perspective. Different frameworks and models are proposed to ensure the SRM is implemented effectively and efficiently.

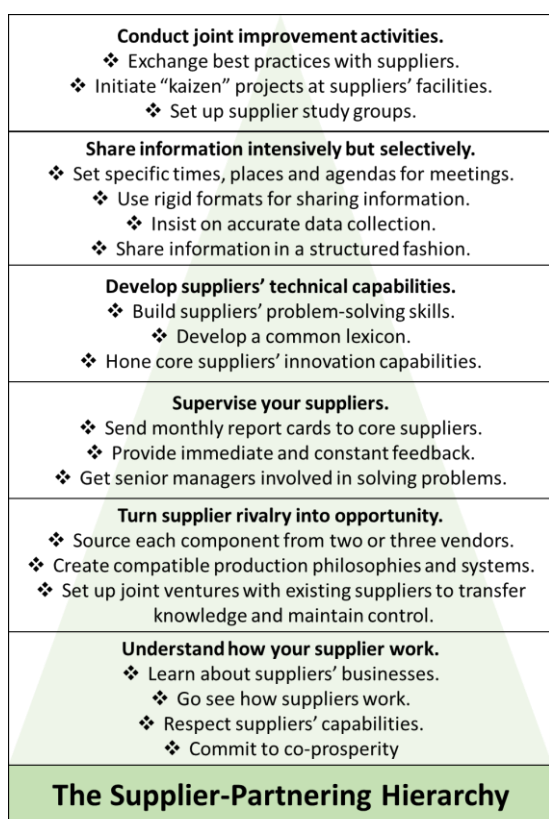


Figure 4: The Supplier-Partnering Hierarchy [36]

All these models consist of many activities in which some of them are having common characteristics and objectives. However, not all frameworks or the activities proposed by the authors are suitable in every company. Toyota and Honda are great examples of successful SRM implementation companies. Studies compared the model between these two companies and concluded that the two companies were using the six steps model which is known as “The Supplier-Partnering Hierarchy”, as shown in Figure 4 [36]. First step of the model is to understand how suppliers work. Toyota and Honda believe that understanding their suppliers’ work will

build a strong foundation for the relationship. Also, through understanding, trust to suppliers can be built. Second step is to turn supplier rivalry into opportunity. Toyota and Honda always develop few suppliers but not rely on one supplier only. Joint ventures between suppliers are encouraged by Toyota to promote knowledge transfer. Third step is to supervise suppliers’ monthly reports and, to get supplier’s top management to be involved in problem solving. Supplier technical capabilities development is the fourth step. Toyota and Honda have invested to improve their first-tier suppliers and they ensure their suppliers understand their requirements. The next step is intensive information sharing (IS) to suppliers. Toyota and Honda believe constant communication is important to make their suppliers feel respected and important. Last step is to conduct joint improvement activities. Toyota and Honda stationed their engineers in the supplier’s office to improve the operations and processes.

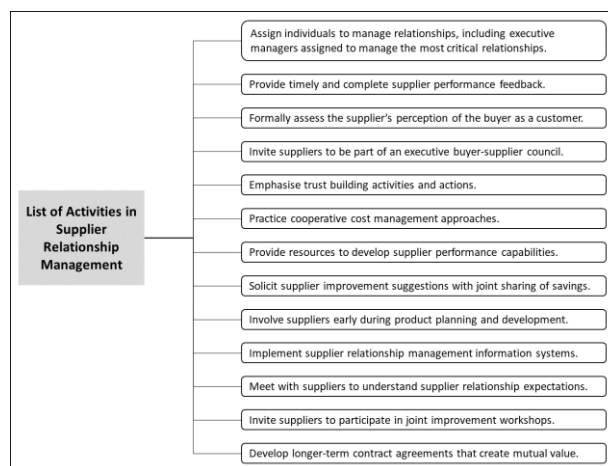


Figure 5: Trent’s SRM Framework [37]

Earlier studies mentioned buyers should be proactive to promote SRM and build trust to ensure a successful relationship. Author proposed a list of activities that need to be carried out from the buyer and those activities are shown in Figure 5. The activities are clear enough which do not require further explanations [37]. Meanwhile, [38] proposed that SRM consist of two parts which is strategic and operation. The authors mentioned that SRM should be a macro business process hence, frameworks as illustrated in Figure 6 were developed. The strategic SRM process consists of five sub-processes where it provides structure on how to maintain and develop the relationships with suppliers by integrating the firm with suppliers. The operation SRM process consists of seven sub-processes where it shows how to develop and maintain the product and service

agreements. The SRM team needs to review the corporate, marketing, manufacturing, and sourcing strategies to know which products or services that contribute the most to the company's success. Tailored product and service agreement (PSA) for different suppliers can help to ensure both parties' needs are well taken care. For non-key suppliers, standard PSA will be sufficient but for key suppliers, different treatments will be required. Mutually beneficial PSA will be formed with key suppliers where communication and improvement plans will be included. Win-win situations need to be created to ensure both parties will commit to the relationship. Studies [38] described relationship management as the key element in SCM. SRM and customer relationship management form critical linkages and these relationships will bring a huge impact to a company's performance.

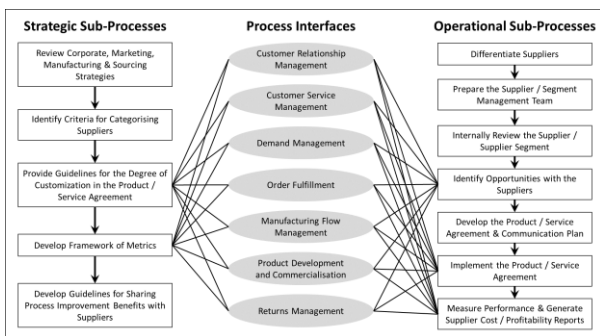


Figure 6: Lambert-Schwieterman's SRM Framework [38]

Studies also urged that SRM should be part of the business process with support of proper tools [15]. Having strategic partnerships are now focused by top management and SRM is needed to do this. Companies try to reduce cost, reduce supply risk, and leverage supplier capabilities from SRM. In addition, companies realise collaboration with suppliers is necessary to have procurement excellent. However, SRM is not going well due to the capability of the procurement team and, some companies do not include procurement as a business centric function. SRM should not be a standalone process without integrating with other processes. PWC has come out with six activities that are required to apply successful SRM as illustrated in Figure 7. These activities help to explicitly explain the SRM process with 'one language'. Innovation, sustainability, legality, and resilience are the key drivers for [39] in their research paper have developed an integrative SRM framework with aim to analyse the effectiveness of integrative concept to overall SRM functions as shown in Figure 8.

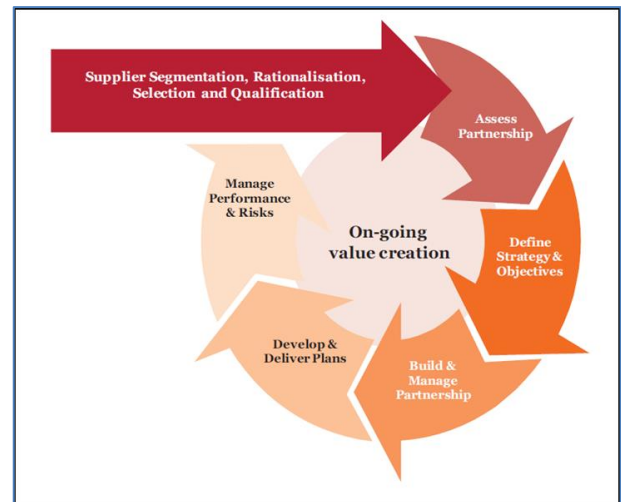


Figure 7: PWC's SRM Framework [15]

The authors included the continuous improvement on top of the purchasing strategies, supplier selection, collaboration and supplier assessment and development. Studies [30] proposed a similar framework which consists of purchasing strategy formulation, supplier selection, supplier performance evaluation (SPE) and collaboration.

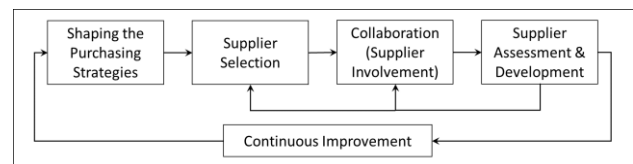


Figure 8: SRM Framework [39]

Studies by Deloitte (2015) in its Global Chief Procurement Officer (CPO) Survey 2014 mentioned that there was a plan to increase supplier collaboration level by chief procurement officer [27]. Also, the survey found out that there is no clear framework on SRM which causes the inefficiency in managing the supplier. Hence, Deloitte has come up with the framework as shown in Figure 9 which consists of supplier segmentation, governance, supplier performance management (SPM) and supplier development. These activities are recurring for improvement. Of course, even with SRM framework, establishing an effective SRM is still challenging. Five steps were proposed by Deloitte to boost success rate of SRM:

1. Choose the right suppliers.
2. Clear alignment with internal and external stakeholders.
3. Go for win-win business relationship.
4. Have defined and specific objectives and goals.
5. Long term commitment in the relationship.

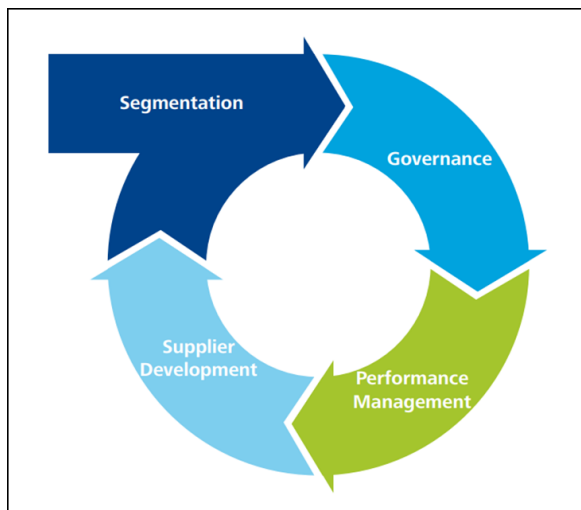


Figure 9: Deloitte's SRM Framework [27]

With SRM, Deloitte believes it could increase the collaboration and bring improvement to the companies. Sourcing remains an important way to create value to a company but with SRM elements come into picture, the way of sourcing has changed as well [40]. Sourcing plus SRM emphasise on long term agreement with value and output as the drivers.



Figure 10: Accenture's SRM Framework [40]

There are three degrees of success proposed by Accenture which is to first establish a framework and roadmap, followed by a pilot phase which involves only few suppliers and lastly, deploy broadly with more suppliers. As shown in Figure 10, the framework consists of SPM, supplier development, supplier collaboration and supplier qualification & accreditation which is supported by sourcing and contract management. Traditional approaches no longer bring fruitful rewards and Accenture urged

that SRM need to be applied to enjoy the benefits that could be brought by SRM. Different authors proposed different requirements in the SRM process. Table 2 summarises the comparison of the different frameworks. Trent's framework is excluded from the summary as it is more towards proposed activities that can help buyers to become more proactive in SRM instead of a framework that guides companies to shape the SRM process.

Table 2: Comparison of Different Frameworks

Author	Liker & Choi (2004)	Lambert & Schwieterman (2012)	PWC (2013)	Park et al. (2010)	Deloitte (2015)	Accenture (2011)
Process	Understand supplier	Review corporate, marketing, manufacturing & sourcing strategies	Supplier segmentation, rationalisation, selection & qualification	Shaping purchasing strategies	Segmentation	Supplier performance management
	Turn supplier rivalry into opportunity	Identify criteria for segmenting suppliers	Assess partnership	Supplier selection	Governance	Supplier development
	Supervise supplier	Provide guidelines for the degree of differentiation in the PSA	Define strategies & objectives	Collaboration	Performance management	Supplier collaboration
	Develop suppliers' technical capability	Develop framework of metrics	Build & manage partnership	Supplier assessment & Supplier development	Supplier development	Supplier qualification & accreditation
	Information sharing with supplier	Develop guidelines for sharing process improvement benefits with suppliers	Develop & deliver plans			
	Conduct joint improvement activities	Differentiate suppliers	Manage performance & risks			
		Form supplier management team				
		Internal review the supplier				
		Identify opportunities with the suppliers				
		Develop PSA				
	Implement PSA					
	Supplier performance measurement					

Highlighted colours are the similar processes among them. Shaping strategy, supplier segmentation, SPM and supplier development appear in most of the model and framework. However, these steps do not appear at the same stage in the process. Studies by [38] and [39] proposed the first step shall be shaping strategies before segmenting suppliers and form contracts with them. Similarly, [15, 27] suggested that supplier segmentation is the first step of SRM. Accenture put the SPM as the first step while other frameworks proposed SPM to be in the later stage of SRM [40]. This is because in Accenture's model, the sourcing and contract management act as linked processes that impact on SRM. SPM appears in all the models and frameworks. All authors urged that SPM needs to be carried out to measure supplier performance from time to time. Supplier performance is directly impacting the buyer performance in terms of cost, quality, and time. Hence, it is essential to measure supplier

performance from time to time, to ensure suppliers could provide their best services and to ensure suppliers could improve their service quality. Through SPM, buyers could also eliminate those suppliers that could not comply with the requirements. SPM is not the end of SRM. Studies suggested that supplier development needs to be conducted after performance evaluation [15,27,36,38,39]. Besides monitoring supplier performance, buyers should also help in their supplier's growth. Supplier's growth is aimed to improve supplier competency or even to trigger innovation from supplier. Through supplier development, improvement such as lead times, business alignment between buyer and supplier, resolving serious quality issues and reducing cost can be achieved [48]. As a conclusion, there is no specific SRM process suitable for which industries. Companies need to design SRM processes that align with their business goal. External consultants can be hired to help create a suitable SRM framework if companies do not have expertise in SRM.

3.4 Factors Influencing SRM

Based on literature reviews, there are many factors influencing the performance of SRM. Different authors or researchers have identified numbers of factors, and these factors will be discussed in the following sections. Each factor will be discussed separately, but they are interrelated and influencing each other.

3.4.1 Trust

Trust is the most essential element in every relationship. Studies defined trust as 'a willingness to rely on an exchange partner in whom one has confidence' [41]. According to [42], business relationships are generated from trust and trust is the central component of it. This statement is supported by [43] where the authors' believed trust is central to successful relationships as it influences relationship commitment. With trust, buyers and suppliers will commit to building relationships. Earliest studies [44] stated that there are three type of trust which is: 1) contractual trust where both buyer and supplier are keeping promises as agreed in contract or order; and 2) competence trust where buyer trusts that supplier is competent to execute without inspection; and 3) goodwill trust where both buyer and supplier trust that both their interest are taken care and mutual benefit is emphasised.

3.4.2 Commitment

Commitment is another essential element in maintaining relationships. Commitment and trust are

not separable as commitment is required to maintain trust. Authors [45] stated that commitment is when a business partner would like to have the relationship remain by repeating the transactions and attaching to each other through longer contractual period length. Research measured commitment in three variables which are affective commitment, expectation of continuity and willingness to invest [46].

3.4.3 Communication

Communication is a process of transferring messages. To maintain a relationship, communication is needed, and this applies to supplier relationships as well. Consistent communication between buyer and supplier through appropriate communication channels helps information sharing happens. According to [47], communication helps suppliers to understand buyer's expectations then improve supplier performance. Transparent and clear communication reduce the potential hiccups and provide effective solutions when conflicts arise [48].

3.4.4 Power

The buyer's power is not always dominant in all situations. Both buyer and supplier need to understand a clear view of their power position in the supply chain to apply the correct strategy or way to treat the relationship. Studies [49] proposed a buyer and supplier power matrix as shown in Figure 11, which provides a comprehensive view of the power regime.

		Buyer Power Relative to Supplier	
		High	Low
Supplier Power Relative to Buyer	Low	Buyer Dominance (>) Few buyers / many suppliers Supplier is highly dependent on buyer High supplier's switching cost / low buyer's switching cost Supplier's offering is a standardised commodity	Interdependence (=) Few buyers / few suppliers Supplier is highly dependent on buyer High supplier's switching cost / high buyer's switching cost Supplier's offering is a relatively unique
	High	Interdependence (0) Many buyers / many suppliers Supplier has little dependent on buyer Low supplier switching cost / low buyer's switching cost Supplier's offering is a standardised commodity	Supplier Dominance (<) Many buyers / few suppliers Supplier no little dependent on buyer Low supplier's switching cost / high buyer's switching cost Supplier's offering is a relatively unique

Figure 11: Buyer and Supplier Power Matrix [49]

Porter introduced the five forces model to analyse industry competition. From the Porter's Five Force Framework as shown in Figure 12 there are two power forces carried by buyer and supplier but here, the buyer refers to the buyer's customer hence, the same will not be discussed. Same concept as Cox's buyer supplier power matrix, where high supplier power means supplier has dominant over buyer. The supplier's power is depending on the uniqueness of the offered services and if they are easy to be substituted [50].

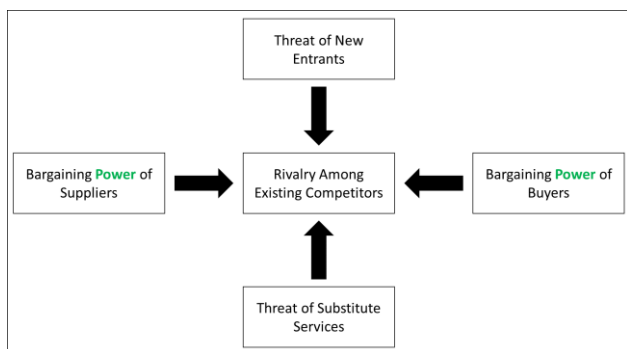


Figure 12: Porter's Five Forces Framework [50]

There are two types of power identified by Park, [51] namely mediated power and non-mediated power. Coercion power, reward power and legitimate power are categorised as mediated power while information power, expert power and reference power are categorised as non-mediated power.

3.5 Benefits of Supplier Relationship Management

Procurement is no longer an administrative function in any company. Now, the companies are taking the procurement activities seriously. They realize the importance of suppliers in helping them to support them in this complex market. Companies should focus and invest more to maintain a good relationship with suppliers to enjoy long-term benefits from the relationship. There are many papers showing the positive results of having SRM in the company. This section will discuss the benefits gained from SRM. SRM is all about improving and building long term relationships between buyer and supplier. [52] mentioned that SRM promotes open communication, and both parties work together for a common goal. SRM works towards win-win relationships and overcome adversarial relationships [53]. Open communication and information exchange helps buyers and suppliers have better understanding of each other. This also improves the efficiency when problems can be tackled efficiently by both parties [54].

One of the key activities in SRM is supplier development. Companies realise that they are much dependent on their suppliers to compete in the intense market. Studies defined supplier development as an effort by the buyer's company to improve their suppliers' performance and capability to meet their short-term and long-term needs [55]. Customers are becoming more demanding as they expect higher quality with lower price. Cost reduction [15,27], quality improvement [56] and lead time reduction [57] are resulted from SRM implementation.

Studies by [58-60] stated that SRM helps to gain competitive advantage to buyers' organisations. All the benefits mentioned earlier help to drive competitive advantage. SRM is not just extracting benefits from suppliers, it also improves the procurement process [60] and supply chain performance [61]. Supply risk brings serious harm to the business. Supply shortages, increasing price, delivery failure and discontinued products are examples of supply risk [62]. Sudden attack from COVID-19 has caused major supply chain disruption. Most companies were not ready to face the crisis and its impact on their operations. Supply chain resilience is now the priority where most companies are adapting their business models to increase the supply chain resilience [63]. Having a priority relationship with suppliers could help overcome the matter as suppliers will continue to support the business operation [59].

3.6 Supplier Types

Supply chain risks happen in all forms and the COVID-19 pandemic is one unforeseen disaster that strikes suddenly. The pandemic has caused disruption globally where many companies are not prepared for it. Studies [64] mentioned one of the actions that could be taken by companies is to work with their key suppliers to ensure the continuity of supplies. Studies categorised suppliers into three groups as strategic suppliers, important suppliers and transactional suppliers shown in Figure 13 [35]

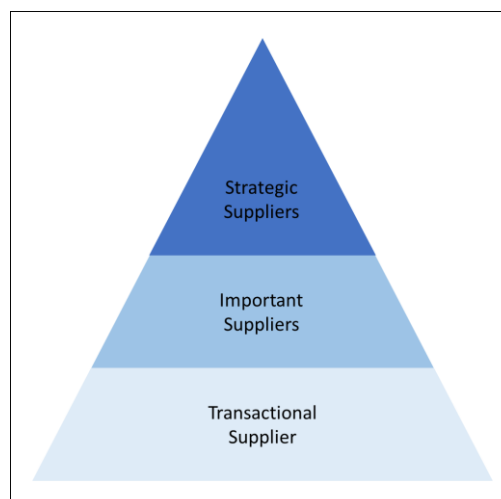


Figure 13: Type of Suppliers [35]

Transactional supplier is the group with most suppliers where authors proposed that not much SRM intervention is required for them. This is because the products or services required are quite generic which are not too critical to the company. No regular review

is required, perhaps only occasionally when problems occur for corrective purposes. It will be most of the time once off purchase or single transaction. Second category is important suppliers where these suppliers require a certain level of intervention by the buyer. In this category, buyers will go for short to medium term master or framework agreement. It rarely will go for a long-term contract in this category. Third is strategic supplier which represents the most important supplier to the buyer's company. These suppliers are strategically important as they bring most values to the company. Products and services supplied by the strategic supplier are critical and strategic where buyers will go for a long-term contract.

Meanwhile, [65] classified suppliers into four groups which are vendor, preferred supplier, exclusive supplier, and partner. The four groups of relationship are differentiated based on their operational characteristics as illustrated in Figure 14. Vendor is the supplier who offers a standard product or service where there is a large pool of this category in the market. Normally the contract is short term only with unit rate as basic. Buyer will perform competitive bidding and source from the cheapest offer. Since the supplier's products and services are standardised, there will be less communication happening. Preferred supplier, the second relationship type is where the supplier provides more complex and specialist products and services. The number of suppliers in this category is much lesser compared to vendor categories. Hence, buyers intend to have longer contract duration to avoid switching suppliers frequently.

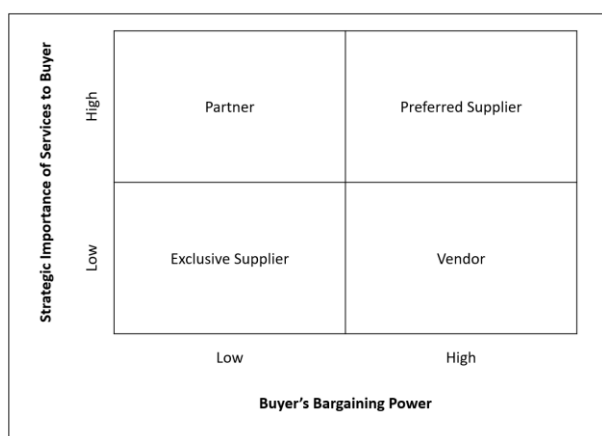


Figure 14: Type of Suppliers by Tang [65]

More information exchange occurs as buyers will request information from suppliers. For the third relationship type, the exclusive supplier is those who provide proprietary and unique products or services

which only have very few suppliers in the market. The contract duration is longer, and buyers will frequently provide information to suppliers to meet their requirements. Sole source is the sourcing strategy used in this type of relationship. Last type is a partner where it is quite like exclusive suppliers. The main difference is that it involves more commitment between both parties such as profit and risk sharing. Senior management involvement is critical to ensure the relationship can be long run.

3.7 Relationship Types

Relationships play an important role in businesses. Eric McFarlane, the head of strategy and execution of Fairmarkit said that COVID-19 pandemic has changed the game where a close relationship could help a company go through the crisis [66]. EY Americas [67] stressed the same thing where restructuring the buyer-supplier relationship into a partnership model can help to generate greater benefits. However, the relationships need to be managed carefully to avoid adversarial buyer-supplier relationships [68]. Conflicts may happen if both parties try to gain short term benefits by pressuring each other without considering the impact to the business in the long term. Studies [35,69] stated that not all relationships with suppliers are equally important. Different products or services have different values and weightages to the company which lead to different levels of buyer-supplier relationship. Further that relationships are developed in five stages as illustrated in Figure 15 [69].

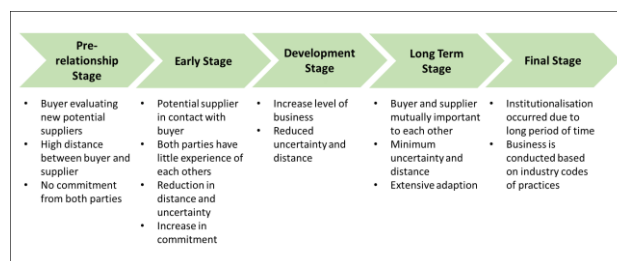


Figure 15: Stages in Relationship [69]

Many models were introduced to categorise the type of the supplier relationships. Following are the types of supplier relationships that have been identified.

Four Cs of Supplier Relationships [37]

Studies had proposed four types of supplier relationship, namely counterproductive, competitive, cooperative, and collaborative [37]. Authors believed that by applying the correct type of relationship to their suppliers, it could help the company to apply correct strategies to deal with suppliers. The first type

is counterproductive relationships, which is also known as lose-lose relationships. Both buyer and suppliers are concerned about their own interest only while relationship management is ignored. Counterproductive relationship is aggressive, and it is not recommended. There is no value created nor help in short- and long-term business growth. Despite no benefit gain, counterproductive relationships still exist. One example provided is that the buyer will use legal action to settle any dispute.

Competitive relationship is the second type of relationship which is a win-lose type of relationship. Each side will try to maximise the value gain from the relationship. This is normally applied by the buyer side when they are purchasing lower value items or services or those with large substitutions available in the market. Buyer tends to use competitive biddings and short-term contracts to fulfil their requirements, and this reflects that the buyers only concern their own interest without considering creating possible or new opportunities with the suppliers. Competitive relationships are quite common in the market and the author suggested that most of the relationships should be competitive.

Third type of “C” relationship is a cooperative relationship, and it is different from the other two relationships discussed earlier. The main difference is that it creates a win-win situation for both parties. This relationship promotes information sharing and creates value from closer interactions. Long term contracts are utilised in cooperative relationships by having suppliers to be involved in early stages such as during product development. Buyer and suppliers will collaborate and work together to improve supply chain performance and to create mutual benefits.

Collaborative relationship is the last relationship model which is also known as creative relationships. This is also a win-win type of relationship. It involves only a small number of suppliers or key suppliers, but it is the most intensive relationship compared to the other three relationships discussed earlier.

The Relationship Portfolio [49]

Studies [49] looked at the relationship in two aspects which are the way of working and the commercial intent of both parties. Way of working refers to the operational aspect of how each party conducts the procurement process. The author further split the way of working into two sub-aspect which are arm’s length and collaboration. Arm’s length is the most common type of way of working where buyers provide their requirements to the seller and the seller executes the order without further effort. Hence, arm’s length relationship is mostly for short term contracts. Meanwhile, in a collaborative relationship,

extra efforts are invested by both parties. Both parties will work towards the same goal by sharing information and resources. This type of relationship is for long term contract duration. Another aspect is the commercial intent of buyer and supplier during the transaction. If either buyer or supplier’s main intention is to obtain maximum value from the transaction, it is known as adversarial value appropriation. Alternatively, if both parties are willing to have an open discussion on the commercial aspects with mutual aim to have a better outcome, it is known as non-adversarial value appropriation. Figure 16 illustrates the two-dimensional areas based on the above-mentioned aspects in the relationship portfolio proposed by [49].

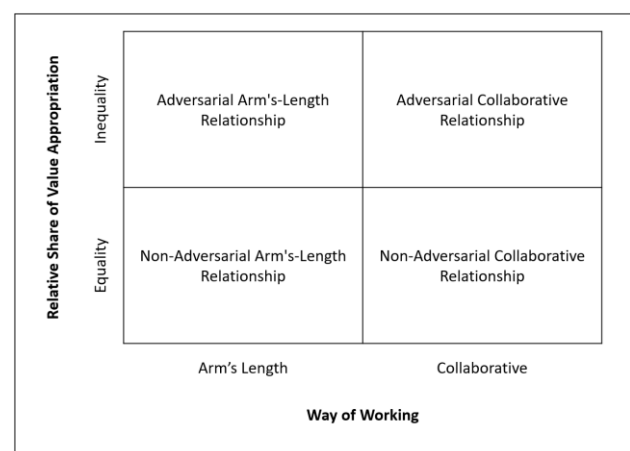


Figure 16: The Relationship Portfolio [49]

The Relationship Model [70]

Authors [70] identified three factors when managing relationships by looking at both external and internal aspects of relationship. The three factors are as follows:

- 1) *the product characteristic and its technology.*
- 2) *the competition in the upstream market; and*
- 3) *the suppliers' capabilities in the marketplace.*

Based on these three factors, researchers shaped the relationship model as shown in Figure 17. The model consists of four cells which includes market exchange, captive buyer, strategic partnership, and captive supplier. In the market exchange relationship, both buyer and supplier require only low specific investment. The products involved are normally standardised due to mature technology, hence, there is little, or no customisation required. The market characteristics are stable or having some decline in demand however, it is still competitive due to availability of many suppliers. In this market exchange relationship, suppliers usually do not have proprietary technology on the products or services so

buyers can easily switch suppliers, as such, it is causing suppliers to not have much bargaining power, and agreement in is generally short-term.

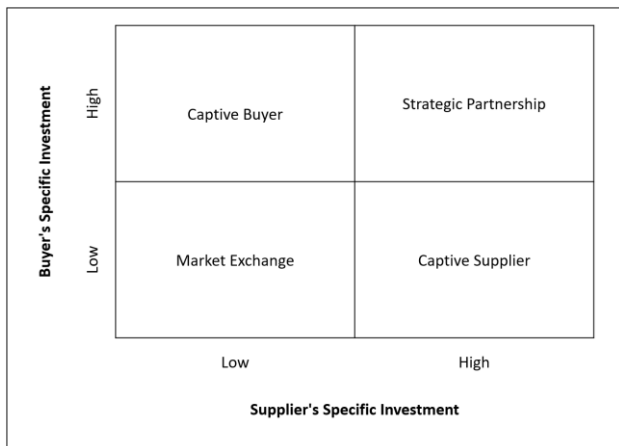


Figure 17: The Relationship Model [70]

In a captive buyer relationship, buyer's specific investment is high while supplier's specific investment is low. The products are complex with some customisation however, the technology is mature enough. The market is quite stable with few suppliers available, and those suppliers are heavily required by buyers for their proprietary technology. This brings suppliers a stronger bargaining power. Next relationship to be discussed is strategic partnership relationship. High buyer and supplier investment is required in this category of relationship. The product is technically complex due to new technology. High customisation level is needed, and it requires strong engineering expertise to be involved. Both parties need to invest a huge amount of capital to ensure the product is successful. The market is extremely competitive and rapidly growing. As mentioned earlier, the product is complex hence, it requires both parties to be active in research and innovations with strong technical capabilities. Captive supplier is the last relationship in the model. In this relationship, buyers do not need to invest much but the supplier is with high investment. The product involved is complex with new technology from the supplier. Suppliers need to have strong capabilities in both financial and research & development. The market is growing fast with intense competitions. Due to more technologies evolving, buyers often switch suppliers which causes suppliers to have limited bargaining power.

3.8 Research Conceptual Framework

Figure 18 illustrates the conceptual framework based on the literature review covered above. The framework is developed based on the summary shown in Table 1 by incorporating the important

SRM activities. It can be noticed that earlier models proposed by [11,27,39,40] are cycle processes where the activities are kept repeating to have continuous improvement in SRM process. The cycle is starting from shaping strategy, followed by supplier segmentation, SPE, supplier recognition and supplier development. Then, the process repeats again by maintaining the same suppliers or adding new suppliers to the business. Besides having continuous improvement, the cycle also helps to ensure the SRM align in companies' objective and strategy which might change depending on market condition and end customers' requirement.

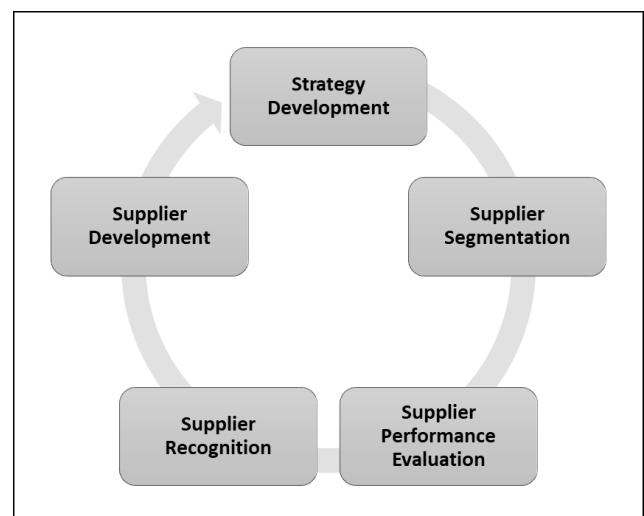


Figure 18: Conceptual Framework [89]

The literature reviews a few frameworks or procedures which are proposed to carry SRM. All the models may be applicable to be used by the companies, which depending on the companies' supply chain strategies and operating models. However, it is impossible to compare all the frameworks with the case studies. Thus, a conceptual framework is developed to help in when comparing and analysing the case studies' SRM procedures. Based on the literature review, SRM can bring many benefits to the companies. Despite the benefits, the companies are still not able to carry out the SRM efficiently and effectively based on the findings from PWC. This gives a rise to researcher to study the benefits of SRM enjoyed by Malaysia's O&G companies and the challenges they may face during SRM implementation. Furthermore, the literature reviews the factors influencing the SRM but did not talk on the suppliers' competencies. Hence, this element will be investigated to find out what buyers expect towards their suppliers. Despite the growth of the O&G industry in Malaysia, the study in SRM to the industry could not be identified. The existing

research are focusing on other industries such as banking [71], healthcare [72], multiple industries [73], automotive [74] and manufacturing [75]. Above research are some examples from each industry but none of them are meant for the O&G industry. This is the research gap identified; hence, this research aims to explore the SRM in the O&G industry.

4 Research Approach

There are many approaches used to conduct research by different researchers. There is no right or wrong method, but it is more important to choose suitable methods that fit the research. This research aims to answer the following research questions [89]:

- [1] How companies in Malaysia’s Oil and Gas industry manage the supplier relationship management processes?
- [2] How supplier relationship management helps services procurement processes?
- [3] What are the issues encountered in the supplier relationship management process?
- [4] What are the supplier competencies that contribute to success of supplier relationship management?

This section discusses the research philosophy, approach, method, strategy, and research sample that were identified and adopted within this research. For this research, interpretivism is the most suitable research philosophy. Interpretivism is subjective where it is based on people’s experience and understanding on the subject including researchers themselves [76]. This research is to study the SRM process of different companies where different approaches might be adopted.

4.1 Research Philosophy and Approach

The goal for this research is to explore and provide understanding on the implementation of SRM processes in different companies. Interpretivism is about gathering information from different research participants [77] and this provides deeper understanding on social worlds [78]. For this research, semi structured interview is the medium used to collect primary data which allows researcher to explore the different views of SRM from different companies. This research is about exploring the SRM process by collecting data from different companies, hence an inductive approach is adopted. Researcher will need to explore and interpret the SRM implementation in terms of the procedures, benefits, issues, and suppliers’ competencies in promoting SRM. From this research, researcher can gain better insights in SRM in Malaysia’s O&G industry and find out the connection or relationships between the

data. The results findings will then be compared with the existing literature. SRM processes from different companies will be summarised and theory is expected to be generated based on the findings. This aligns with an inductive approach to build theory by exploring phenomenon and identifying the patterns.

There are three types of research methods which are quantitative, qualitative, or mixed methods. Quantitative method emphasises on numerical data [78] and it has four distinctive elements namely data measurement, causal influence, generalisation and finding replication [79]. Qualitative research uses text and image data [80] which is non-numerical data [78] with aim to make valid inferences [81]. Mixed method is a combination of quantitative and qualitative research methods. [78] further split the mixed method into concurrent mixed method where quantitative and qualitative methods will be applied parallelly and sequential mixed method where quantitative or qualitative methods will be applied one after another. From the research philosophy and research approach discussed in the previous section and characteristics of the three research methods mentioned in above, qualitative research is selected as the research method for this research. Qualitative research design has two types of data collection techniques which are mono method and multi method. The mono method uses only a single data collection technique while the multi method is combining a few data collection techniques. Mono method is selected by researcher for this research.

4.2 Research Strategy

Studies [80] suggested there are five strategies that can be used to carry out the qualitative research as shown in Table 3.

Table 3: Characteristic of Research Strategy

Research Strategy	Characteristic
Narrative	Collect stories; Sources of narrative such as biographical study, autoethnography, life history and oral history [80]. Based on participants’ experience; In-depth method is the primary data collection method [78]
Phenomenological	Exploration of phenomenon based on participants’ common experience [80]. Poor in generalisation; Based on philosophy and psychology [82].
Grounded Theory	Theory is generated or developed from the participants’ common experience [80]
Ethnographic	Culture study to a social group through observation [82, 78]. Study of the shared pattern of the cultural group [80]
Case Study	Study and analysis of case; Can be single or multiple case study [80]. Generate insight from case; Case can refer to such as people, event, or business [78].

The strategies that are suitable for qualitative study will be narrative research, phenomenological research, grounded theory research, ethnographic research, and case study research. Research strategies are important as it is a plan that helps researcher to meet research objectives and answer the research questions [78,81]. The most suitable research strategy to be adopted in this search will be case study. This research is with the objective to study the SRM process in different companies. The boundary set for this research is the oil and gas companies in Malaysia and to focus on the SRM process of the services procurement. Sample sizes in case study strategy are normally small and for this research, four companies are chosen as samples. Therefore, case study will be the best strategy to be used to answer all the research questions and meet the research objectives.

4.3 Data Collection and Analysis Methods

Data collection consists of primary data collections and secondary data collections. Primary data is also known as original data [83], which is collected firsthand by researcher. Studies [81] proposed that there are four primary methods which are interviews, observations, questionnaires, and experiments that can be used to collect primary data. The primary data is meant for the specific research or project. Table 4 summarises the primary data collection methods mentioned earlier. Based on the discussions, researcher will conclude the most suitable method for this research with justification. In this research, semi-structured interview is selected as the primary data collection method. Semi structured interview is the best fit method for this research. The interview will be conducted with procurement expertise that oversee services procurement in the oil and gas companies. This research is with the objective to explore and understand the SRM implementation of Malaysia's oil and gas companies. From the interview, researcher will obtain data and information such as respondents' company background, information on their services procurement and SRM practice in their companies. By using semi structured interviews, it will not restrict the discussion based on the set of questions and this allows researcher to gain more insights from the interview sessions. Meanwhile, secondary data is those previously collected by others for other purposes [78]. Often, in a research, secondary data comes into picture before primary data [86]. Authors [78] has classified secondary data into three categories which are survey, document, and multiple sources. Secondary data is used to build up the literature review in this research for the subject area of O&G industry, SRM, types of relationship and

types of suppliers. The secondary data are obtained from various sources such as books or e-books, journals, research papers, publications from consulting firms, internet etc.

Table 4: Characteristics of Primary Data Collection

Primary Data Collection Method	Characteristic
Interviews	Used to collect quantitative data through highly structured questions or qualitative data through open-ended questions; Typically require more investment in time and money but it provides richness of information from the process [84]. Divided into structured, semi-structured and unstructured [85,78]. Can be carried out using F2F interview, phone call or video call interview.
Observations	Take place in laboratory or natural setting; non-participant observation and participant observation [83]. Suitable for non-self-report descriptive data [81].
Questionnaires	Normally used for positivist research with a list of structured questions; Suitable for large scale surveys; Can be self-completed by respondents or completed by researcher [83]. Face to face questionnaires is also known as structured interviews [78]. Different types of questions such as open and closed questions, multiple-choice questions, rating scales questions, and classification questions can be used in questionnaire design [83]. Need pilot tested prior being used to collect data to ensure the questionnaire can be answered without issue and modification can be done to refine it [78].
Experiments	Two types of experiments namely lab experiments and field experiments [83]. Experiment is used to study relationships between variables, and it is not a suitable method for exploratory and descriptive research [81]. Experimental design is used to examine the cause-and-effect relationships between independent vs dependent variables; Principally associated with quantitative research [78].

There are two ways to analyse data, either quantitatively or qualitatively. For quantitative data analysis, researchers need to make sure the data are quantitative data either numerical data or categorical data [78]. Numerical data are data that can be measured or counted numerically while categorical data are data which cannot be measured numerically where researchers need to categorise them based on the characteristics of the data [78]. Graphs, diagrams, and charts are used to present the data, and these will help researchers to examine the trends from the visual aids. Computer based software such as Excel, SPSS, STATAR and many more to name are available for

researchers to choose which one suits their research project. However, researchers need to understand the logic of the software and not blindly use the software else it will return inappropriate or inaccurate results. Qualitative data are opposite of quantitative data where the data are non-numerical or in verbal, words, and images form [78]. According to [81], there are three important steps: 1) data reduction; 2) data display; and 3) drawing conclusions. Qualitative data analysis is often more complicated than quantitative data analysis. This is because the data are more complex such as answers to open ended questions and transcripts of interviews. Same as quantitative data analysis, different software such as ATLAS, NVivo, Hyper Research and MAXQDA can be used to analyse qualitative data.

4.4 Proposed Research Method Framework

This section summarises the proposed research method framework for this research. Table 5 shows the research philosophy, research approach, research strategy and primary data collection method adopted. The justification of each selected method or strategy are justified in earlier sections.

Table 5: Proposed Research Method Framework

Item	Selected Method / Strategy
Research Philosophy	Interpretivism
Research Approach	Inductive
Research Method	Qualitative – Mono Method
Research Strategy	Case Study
Data Collection	Semi Structured Interview

Template analysis is applied to design the interview transcripts. According to [87], applying themes or codes can help researchers to organise the data in a meaningful manner. Table 6 shows the themes used in the interview transcripts. The identified main themes start from the company background, the procurement management and the SRM implementation. The participating companies for this research are the oil and gas companies that are based in Malaysia. Particularly, the companies are either oil and gas plants owners and Engineering, Procurement and Construction (EPC) contractors. The reason for selecting these two types of companies is because the number of suppliers involved are huge due to different scopes involved in operation and maintenance, and EPC work. The SRM process between companies will be compared and discussed. Prior to the actual interview sessions, the researcher identifies the companies and the personnel to be interviewed. Invitations are sent to confirm their

interest via phone call, email, or text message. Once the interviewees confirm or accept the invitation, interview questions are shared to them to allow them to understand and prepare for the interview.

Table 6: Theme used in Interview Transcript

Theme	Sub Theme
Company Background	Business Nature
	Mission & Vision
	Organisation Chart
Procurement Management	Project / Asset / Facilities Location
	Outsourced / Subcontracted Services
	Services Categorisation
Supplier Relationship Management	Interviewees' Opinion
	Software
	Processes
	Benefits
	Difficulties
	Expectations towards Suppliers

As mentioned earlier, semi structured interviews will be used to collect primary data from the various companies. Based on the literature review conducted, it is anticipated that different companies will have different SRM processes. Due to the movement control order enforced in Malaysia during this research due to COVID-19 pandemic, all the interviews are conducted through phone call or video call only. Since this research only collects data from few companies, the findings are not generalisable.

5 Data Collection and Findings

There are four case studies that will be discussed in this chapter. The interviews are grouped into three main themes: 1) company background; 2) procurement management; and 3) supplier relationship management. These four case studies will be analysed using cross case analysis based on the themes mentioned above.

5.1 Case Study Background

First theme of the interview is about interviewees' company background. In this research, the interviewees' company background can be divided into two groups which are petrochemicals manufacturer and EPC contractor. Case A and Case B are categorised as petrochemicals manufacturers whereas Case C and Case D both EPC contractors.

Case Study (A):

Case study A is Malaysia's national oil company, custodian of Malaysia's hydrocarbon resources, headquartered in Kuala Lumpur, Malaysia. The company is involved in a wide range of petroleum activities, including activities from upstream to downstream. Their portfolio is not limited to

hydrocarbon only, instead, they are venturing into renewable investment as well. The company has a global presence in more than 65 countries for different business interests. This makes them one of the world's top oil and gas companies. The company aims to become a progressive energy and solutions partner that brings a sustainable future. This is supported by the company's shared values and cultural beliefs where all employees work towards the same goal. Company A grew its brands successfully and nowadays it is not just known by Malaysian, but it is one of the global brands. The company's organisation chart is quite complex since it is a huge organisation with various businesses involved. However, for procurement related matters, the decision makers are usually depending on the value of the goods and services required. Generally, the purchase decisions are made by Vice President of Procurement for high value and Procurement Manager for low value.

Case Study (B):

Company B operates a petrochemical plant located in Port Dickson, Malaysia. The plant produces liquefied petroleum gas, petrol, diesel, and other chemical feedstocks for customers in Malaysia and Southeast Asia. In 2016, the company underwent a major structure change where the majority shareholder was transferred to another company which is a China company. This has strengthened the growth of the company. A 38% increase in revenue was registered in 2017 and the company has pumped approximately USD160 millions for major upgrading works. The company is a public listed company, however, according to the interviewee, the organisation chart is not complicated since the company is promoting a lean management style. The organisation consists of six directors and eleven functional management members. The procurement department is led by a Contract and Procurement Manager. Most of the purchase decisions are made by the manager unless it involves high monetary value (limit of authority) which requires board approval.

Case Study (C):

Company C is a world leading maritime solutions and services provider, headquartered at Kuala Lumpur, Malaysia. The core businesses of the company are liquefied natural gas (LNG) and petroleum shipping, offshore business solutions, and marine and heavy engineering construction. The company operates worldwide especially for its LNG shipping businesses. The interviewee mentioned that there are five shared values that employees of company need to carry which are loyalty, integrity, professionalism,

and cohesiveness. These shared values help the company to go after the company's vision and missions. According to interviewee, integrity is the utmost value for the procurement department. Company C is a partly owned subsidiary company of Company A. Every business unit has their own procurement department since they have different business profiles. Interviewee is under Offshore Business Unit (OBU) which is related to floating solutions services. The procurement related decision maker will be dependent on whether it is project related or operation and maintenance related. For projects related, the decision maker will be Project Manager whereas for operation and maintenance related, the decision maker will be Procurement Manager or Senior Procurement Manager.

Case Study (D):

Company D is an integrated provider from engineering to construction for the O&G industry. Company D is handling projects within Asia Pacific with an office located in Kuala Lumpur, Malaysia. At the same time, Company D is also pursuing new opportunities in the region. Its corporate office is headquartered in Texas, United States. In Asia Pacific, most of the projects are related to offshore oil and gas facilities and pipelines. The company owns marine construction vessels and fabrication facilities which bring them strong technical capability in providing the best solutions to their customers.

Every project in the company has its own organisation chart, as such, every project has its own procurement team. The reporting line for the procurement function depends on the scale of the project. For larger scale projects, there will be one Project Subcontracts Manager, one Project Procurement Manager and a few Packages Manager reporting to the Project Supply Chain Manager. For small scale projects, there will be one Project Subcontracts Manager and one Project Procurement Manager. The ultimate decision maker for all procurement related matters will be Project Manager for the respective project. Company A and Company B are plant owners which have petrochemical plants in Malaysia. Company A is having several plants whereas Company B only owns one plant. Meanwhile, Company B and Company C are oil and gas EPC contractors.

5.2 Service Categorisation and SRM

All the four companies outsourced and subcontracted the services to third parties. As plant owner, Company A and Company B outsourced most of the required services to third parties. Since the equipment is complex, the engineers in the company are only

able to perform minor maintenance procedures as shared by the equipment providers. In case of any major breakdown or turnaround activity, the company will then request suppliers to perform the necessary services. Some services such as catering, grass cutting and janitorial are all outsourced instead of hiring employees as the company believes this will be more cost effective. For Company C and D, the EPC project is complex as it involves various construction tasks and requirements to deal with different parties to ensure the project is delivered on time and within the budget. Subcontracting and outsourcing are common as the company does not own all the required technologies and expertise for the project.

5.2.1 Services Categorization

Company A, B and C are having similar approaches in categorising services. The services categorisation is based on discipline such as civil and structure, electrical and instrument, health and safety, manpower supply, consultancy, and many more to name. Company D categorises services under three main groups namely fabrication, marine and engineering. Under each category, there is a pool of suppliers to perform the services.

5.2.2 Interviewees' Opinion on SRM

Interviewee A and Interviewee C are having similar opinions towards SRM. They mentioned that SRM is a systematic process to manage suppliers and to ensure the suppliers will provide the best service to the company. According to interviewee A, SRM can only succeed when the buyer-supplier relationships protocol is cooperative, stable, mutually beneficial, and disciplined across the entire supply chain for the company. Interviewee B claimed that SRM is about communicating with suppliers, building relationships with suppliers, and accessing suppliers' capability to enjoy the maximum benefit from the suppliers. Relationships with suppliers are as important as relationships with clients. Interviewee D stated that SRM is a cost cutting mechanism by creating a network with suppliers, enabling transmitting the cost-reduction agenda, anchoring buyer-supplier interactions and finding ways to pool supplier skills and to coordinate the efforts collectively.

All interviewees agreed that it is crucial to have SRM to be part of the procurement procedure and SRM is needed to be embedded in corporate procedure if possible. Regardless of petrochemical plants or contractors, almost sixty to seventy percent of the scopes are outsourced and subcontracted to suppliers. This shows the company heavily relies on the suppliers to deliver to the clients or customers.

Interviewee D mentioned that it is impossible for the company to win the new projects and to make revenue to the company without suppliers' involvement. Interviewee C stated that oil and gas companies are facing highly competitive environments, therefore, a business model which is as cost-efficient as possible is crucial to the companies. Interviewee A mentioned that the procurement personnel need to stay neutral with all suppliers to ensure a fair evaluation during tendering.

The procurement personnel need to walk a fine line in between building relationships and unbiased evaluation. Based on the respective discussion with interviewees, all of them are involved in SRM. Interviewee B mentioned that SRM is already embedded in their daily task whether the procurement personnel are practising it consciously or unconsciously. Activities such as evaluation, negotiation and discussion with suppliers are all considered as SRM. The statement is supported by Interviewee C as the interviewee mentioned that it is impossible for a services procurement personnel not to have any communication with suppliers as every supplier has their own solution to the service requested by the company, hence, clarification is unavoidable. Interviewee A highlighted that it is vital to reply to emails from the suppliers even if it is a small matter only to show respect to the suppliers.

5.2.3 Software for SRM

From the case studies, three out of four companies have software in supporting the SRM. Company A, B and C are using SAP Enterprise Resource Planning to deal with their procurement needs while Company D is using Oracle Cloud Applications.

Table 7: SRM Software between Case Studies

Case Study	Software	Function
A	SMART GEP	Bid submission, tender clarification, invoice submission and supplier appraisal
B	SQSS	Supplier registration and supplier appraisal
C	SAP SRM	Supplier registration, bid submission, invoice submission and supplier appraisal
D	DocuSign	Supplier registration

SAP and Oracle are the backbone to the procurement module, and each company uses a different system for SRM purposes. Table 7 summarises the SRM software used in each company.

5.3 SRM Processes and Case Findings

All the four companies have their own processes or activities for SRM. The SRM activities for each company are discussed in the following sub-sections.

5.3.1 Case Study (A)

Interviewee A claimed that the company has a systematic SRM system. The SRM activities are handled by various departments as listed below:

- *Supplier registration & segmentation* and annual audits are handled by Licensing and Registration (L&R) Team.
- *Supplier evaluations* are handled by the Operational Sourcing (OS) Team and Strategic Sourcing (SS) Team. The only difference between these two teams is OS will handle transactional suppliers whereas SS will handle key suppliers.
- *Supplier performance evaluation* is handled by the Contract Management (CM) Team.
- *Supplier recognition* and supplier engagement are handled by respective teams, if required.
- *Suppliers' development* is handled by Vendor Development (VD) Team

“Our SRM process is done by a few teams according to the activities. I would say we have a systematic approach in conducting SRM”.

Supplier registration happens when the OS and SS team would like to invite or award to a supplier that is not registered in the company system. The OS and SS team will perform technical evaluation with aid from the technical team while the L&R team will perform background check, financial evaluation, and other relevant checks prior to registering the supplier. The L&R team will perform an annual audit of all the registered suppliers to ensure they are complying with government and local authorities' requirements such as having valid certificates and licenses to conduct business. All these activities happen in the pre-award stage.

In the post award stage, the CM team will take over from the OS and SS team once the contracts are awarded. Supplier performance evaluations are conducted annually and upon completion of the services. There are five rankings in which the suppliers with outstanding performance will be in rank A and poorly performed suppliers will be in rank D. Rank A suppliers will be recognised by senior management to acknowledge their contributions to the company. For poorly performed suppliers, CM team will perform root cause analysis and discussion to rectify the issues. If the issues are with regards to HSE, the suppliers will be terminated as the company

will not withstand the suppliers that violate or do not take it seriously in HSE. Company A with support from the government and the other big oil and gas players in Malaysia is identifying numbers of potential local suppliers in different scopes to be developed. This vendor development program provides a platform to the local suppliers for further development and improvement. This program is not only helping the suppliers but, it will also bring benefits to the O&G industry and Malaysia's economy. Interviewee is satisfied with the current SRM process within the company. However, interviewee suggested that the company should focus on the supplier development program in East Malaysia, which is the place that the interviewee is currently serving. East Malaysia government enforced that local content needs to be prioritized before utilising West Malaysia suppliers. Most of the capable suppliers are currently from West Malaysia as most of the suppliers' offices are headquartered in West Malaysia. Although the company has a systematic SRM process, there is no training provided to employees on the subject. Interviewee claimed that it is sufficient for the procurement department to be involved in SRM. Interviewee stated that it will be better if only a single party deals with suppliers as it may cause complication and different voices in handling SRM if there are too many departments involved.

5.3.2 Case Study (B)

The procurement procedure in Company B is mainly on managing suppliers, but there are some procedures which are related to SRM such as supplier registration and evaluation, supplier performance review and supplier engagement. Interviewee B urged that all these activities are important to maintain high standards of the services provided by suppliers. In Company B, supplier registration is outsourced to the third party whereas the other activities are performed by the procurement team.

Interviewee mentioned that supplier's registration and evaluation is one of the common practices which are practiced by most of the oil and gas companies. All suppliers need to be evaluated in terms of technical capability and financial strength before registering them into the supplier database. In this step, suppliers will be segmented according to their capabilities, types and services offered. The evaluation process does not end when suppliers are registered to the system. Annual audits are conducted to maintain the quality of the suppliers. In addition, Company B has prioritised local suppliers as the company wants to develop the local suppliers.

In Company B, supplier performance review is conducted annually and when the services are completed. Interviewee claimed that the supplier performance review is sufficient as the end users are monitoring the supplier's performance based on their progress report. Any issue that arises will require suppliers to rectify, else, no payment will be released to the suppliers. The review report will be shared to suppliers for them to understand their performance and area of improvement. Company B believes that the engagement with suppliers is important as suppliers are one of the key stakeholders that can bring big impacts to the business. Maintaining communication channels with the suppliers helps them to have a better understanding of the company's needs. The company can listen to suppliers' voices on the business process. Interviewee believed that their current SRM is adequate but there is room for improvement. Interviewee proposed to include supplier development as part of the SRM process in the company.

"We would like to leverage on local suppliers as the cost will be cheaper than importing the services from overseas."

The company would like to leverage on the local suppliers, but many of the suppliers are still not meeting the company's technical requirements. Interviewee mentioned that the company needs to provide training or development programs to boost the local suppliers' capabilities, else, the local suppliers will hardly compete with those overseas companies. If local suppliers can perform on par with the overseas companies, the company is able to enjoy a lower cost, and this can provide the company with a long-term business partner to do business with.

So far, there is no training on SRM being provided to the procurement team. The company only provides training such as negotiation, business writing and effective communication training as the company believes all these skills are more relevant to the procurement team. Interviewee would like to have top management to be involved in the SRM. Interviewee believed that it would be easier to build business relationships by involving high management from both parties instead of working level.

5.3.3 Case Study (C)

There is no specific team handling the SRM related matter. As highlighted by interviewee C, SRM is every procurement personnel's responsibility. Each procurement personnel should be aware that they are representing the company to deal with the suppliers.

In fact, there is no specific procedure from the company on the SRM process. The procurement process is only providing guidelines on how to perform the sourcing activity until close out. Interviewee highlighted that there are three activities related to the SRM which are buyer-supplier communication, supplier registration and segmentation and supplier performance evaluation. According to the interviewee, communication is important in maintaining a healthy buyer-supplier relationship.

"I remembered my manager in my ex-company mentioned not replying to suppliers' email is a sin. It might sound over but it is true if we want suppliers to respond to us as well when we email them".

Generally, the procurement personnel will receive email or calls from suppliers asking for the latest development of the projects or is there any anticipated new project that will need their services. As long the information is not confidential, interviewee suggested that it can and should be shared to the suppliers. By sharing information, trust is built, and it will increase the supporting level from suppliers. Suppliers will be more willing to help if there is any ad hoc request to them. In projects and operations, IS helps to improve supplier performance which directly increases the quality and reduces the cost. Transparency in IS enables both parties to work efficiently as accurate decisions can be made without too many uncertainties.

The suppliers are segmented according to their technical capabilities and financial strengths during registration. FPSO, FSO and mobile offshore production unit (MOPU) are complex offshore facilities where the cost of constructing one of them could easily be more than half of a billion dollars. This requires the contractors and the suppliers to have strong technical strengths which are supported by strong financial. The company will not risk awarding the scope to a supplier with weak financial standing even if they have a good record as there is possibility that the supplier will stop work anytime if their cash flow crashes. Those suppliers with multiple capabilities and strong financial strength will be listed as Tier 1 suppliers. Annual audits will be conducted to check the suppliers' latest state to make sure the suppliers are 'healthy' and able to perform the job as required. Suppliers' performance is linked to the company's performance. The company needs to ensure suppliers are performing as stipulated in the contract. Company B practises two review cycles in a year which is mid-year review and year-end review. Then, close-out performance review is conducted

upon completion of the particular contract. The end user, HSE Department and Quality Department will provide review and comment on the supplier. If there are concerns raised, a meeting will be conducted with the suppliers' management to identify the root cause and subsequently, rectify the issue.

Interviewee believed that the current SRM activities in the company is sufficient to cater the company's needs. However, interviewee suggested that there is a need to establish proper guidelines and procedure for SRM. Junior level procurement personnel might not have a clear idea on SRM, and it is important to set up the procedure to standardize and to ensure the whole procurement department is having the same practice and understanding on SRM. There are no additional activities that should be included in the current SRM activities. Researcher suggested to consider supplier development and supplier acknowledgement as additional activities, but interviewee believed that those activities are not necessary.

"It is hard to develop suppliers as it requires the company to fork out resources to train the suppliers. Suppliers should self-develop to increase their competency as the O&G industry is a competitive market. Furthermore, the company should not bias any suppliers due to competition acts in Malaysia. It might have caused some issues if we could not justify why a supplier is selected for development, especially services. If the company could not treat all suppliers equally or justify the reason, then, the supplier development exercise is not encouraged."

For supplier recognition, interviewee believed that it is also not necessary.

"We awarded the suppliers, and they should provide their services up to industrial requirements. It is their responsibility to perform their scope as we do pay them as per agreed price. Suppliers also build their track record while having profit from the jobs."

So far, there is no training related to SRM being provided to the procurement team in the company. Interviewee suggested that end users for the respective services should be involved in supplier engagement. Procurement department will oversee the commercial aspect while end users will take care of the technical aspect.

5.3.4 Case Study (D)

As Company D is mainly project oriented and the projects are in multiple locations, hence, there is no specific team handling SRM matters for services, however, there is one specific team which is handling

the supplier registration. Each project procurement team will handle their own suppliers without interfering with each other. There are three main activities carried by the company in SRM which are supplier registration, supplier performance evaluation and information sharing.

Supplier registration is initiated by the procurement team when the supplier is not registered in the database. Procurement personnel will request the supplier registration (SR) team to take care of this process. SR team will send email initiation to the supplier and request the supplier to submit documents such as ISO certificate, HSE Policy, organisation chart, Quality Policy, and other documents for further evaluation. Once evaluation is done, the supplier will be registered in the database then the procurement team can start to interact with the supplier to request quotation or to issue purchase orders. Supplier performance evaluation is carried out by respective project procurement personnel until completion of the services. The evaluation is necessary to determine future selection of suppliers for use and to gather lessons learnt for on-going or future new projects. The result will be shared to suppliers as well for their improvement.

Company D has continuously increased ability and willingness to share information about engineering details, fabrication and construction processes, and target costs. This shared information enables the company and suppliers to increase their degree of collaboration, and this leads to better engineering design and lower cost. However, most of the time, this is performed via emails or teleconferences only as suppliers are normally located in different countries.

5.4 Benefits of SRM

All the interviewees recognised the benefits of SRM as it does help in the procurement process.

Reduce Cost

From the interviews, all interviewees claimed that SRM helps in reducing the procurement cost. Interviewee B mentioned that SRM can help the company to further explore the opportunities from the suppliers by driving cost down and bringing more cost-efficient operation. SRM encourages information sharing between the company and suppliers. Suppliers will have a better understanding of the project requirement, subsequently, they can propose a solution that is more cost effective. Interviewee A looked at a bigger picture of cost saving which is the total cost of ownership.

Interviewee A mentioned, *“Buyer often did not look at the total cost of ownership. They only try to obtain the lowest procurement price without considering operating cost and maintenance cost incur in future. This is because they are not aware of it but the main reason is this is not in their key performance indicator, hence they don’t care”*.

Interviewee A stated that should not look at purchase price only, instead, it is required to include the operating cost and maintenance cost throughout the asset’s life span. By having SRM, suppliers will be transparent in sharing the cost information and they can advise companies on spares and maintenance cost. Interviewee A also highlighted that having SRM could reduce company operating cost. Less man hours are required for sourcing activities by having long term contracts in place as a result from strong suppliers’ relationship with few key suppliers. SRM could help the company further explore the opportunities from the suppliers by driving cost down and bringing more cost-efficient operation. Good relationships can help the company to be able to negotiate for more discount, better payment terms and longer contract duration. This helps the company in driving revenue while enjoying better quality.

Improve Suppliers’ Quality

Improvement in suppliers’ quality was mentioned by Interviewee A, B and C as one of the benefits from SRM. According to the interviewees, this is achieved by having regular and consistent communication with the suppliers. Meetings, forums, and emails are the medium to flow and receive the information between company and suppliers. With these communications, suppliers can align better with the company's strategy and the company will also have a better understanding of the supplier’s operation model. Interviewee C mentioned that suppliers normally will provide proposals as per the scopes without proposing extra solutions to the company. Through information sharing, suppliers offer alternative solutions, thus generating more value to firm.

Reduce Supply Risk

Interviewee B and D highlighted that SRM can reduce supply risk and uncertainty. Equipment breakdown in the plant is a major disruption in Company B. This will cause a stop in production where the company will suffer loss from it. By having good relationships with suppliers, suppliers will be willing to respond immediately by expediting the repairing work, in case there is an emergency. Suppliers will not try to take advantage of the emergency event. Interviewee D mentioned that one of the company’s projects in India faced major

disruption due to the COVID-19 pandemic. Interviewee D shared:

“We are not ready to deal with the COVID-19 at that time. The Indian government suddenly announced the nationwide lockdown where the subcontractors are required to stop work immediately. However, we have ongoing installation work that could not afford any stop work. Glad that some local Indian subcontractors took initiative to obtain approval from local authority to resume the work”.

This shows maintaining good buyer-supplier relationships helps the buyers’ companies go through the hard times with full support from the suppliers.

Better Buyer Supplier Relationships

Interviewee C and D stated that SRM helps to improve and build closer relationships with suppliers. Better relationships with suppliers increase efficiency in work. Suppliers will be more supportive in assisting even though the request is ad hoc and requiring them to respond in a short window. Working in a project requires everything to move fast, delay in making decisions may cause delay of construction progress. Most of the time, the information is required from suppliers. By having closer relationships, suppliers will be more collaborative to provide support to the company.

5.5. Challenges for SRM Implementation

All companies are having their own obstacles during SRM implementation. Few issues were mentioned and some of the issues are highlighted a few times by the interviewees. The following sub-sections will discuss the four issues identified from the interviewees.

Lack of Proper Designed Procedure

Interviewee C and Interviewee D claimed that their SRM process is not properly or systematically designed. According to interviewee C, each member in the team has a different understanding on SRM and they are conducting the SRM activities based on their own understanding. Interviewee D stated that without proper SRM process, procurement personnel will not know the right way to practice the SRM. Different projects will have their own practices as there is no standardised procedure. Both interviewees believed that their companies would need to form a taskforce or to hire consultants to design the SRM framework. Interviewee B mentioned *“Sometimes I heard my staff come out with the term SRM. But I believe they do not understand SRM completely”*.

During implementation, people focus more on managing the suppliers, but not much focus on building a good relationship with suppliers. As a lead of the contract and procurement department, interviewee believed that this is not a righteous mindset for the company's long run. According to the interviewee, this situation happens because the written guidelines of SRM is all about managing suppliers and nothing about building relationships.

Lack of Skills and Awareness

People are always the main challenge in any procedure implementation, either in terms of skills or mindset, said by Interviewee A. Even with proper procedure in place, people might not practise it due to lack of awareness and lack of skills. All four case studies companies highlight this as one of the challenges faced. SRM requires the procurement personnel to be good in soft skills to manage the relationship.

Interviewee B said *“The term SRM is rarely heard or used in the company. Most of the procurement personnel believed that it shall be suppliers who need to maintain a good relationship with them instead the other way round. Unfortunately, even I sometimes will have this mindset”*.

Also, high volume of work causes the procurement personnel not willing to spend effort to build the relationship. At the same time, end users do not appreciate the relationship as they always have a mindset that they can always go for another supplier in case the current supplier is not supportive enough. All these mindsets discourage the SRM implementation. All four companies did not provide training on SRM to their procurement employees. The companies only offer their employees training on functional skills such as negotiation, contract management, and analysis skills. As mentioned earlier on, the procurement personnel of these four companies did not have enough awareness or skills in SRM. The lack of skills and awareness discourage the SRM implementation.

Lack of Top Management Commitment

Interviewee B and C said that their top management are not really taking SRM seriously. Interviewee C highlighted that SRM requires commitment from top management to invest in people, technology, and resources. Currently, their top management are more concerned about the cost saving instead of having a good buyer supplier relationship. Interviewee B urged that top management should get involved as

building business relationships should not be the responsibility of the procurement department only.

Technology

Interviewee D stated that Company D is lacking in having the proper digital tools to perform SRM activities. Currently, there is no proper system handling SRM activities in Company D. For example, supplier performance evaluation is done manually by using excel datasheets.

Interviewee D mentioned *“Doing things manually is not effective and wasting time. Everyone is tight with core tasks such as tendering, handling variation orders and settling issues from suppliers. Performing supplier performance evaluation in excel is time consuming which I will choose to put it aside first”*.

Interviewee D urged that the company needs to provide a platform or system which can handle SRM digitally. If the SRM is continued to be conducted manually, this will add burden to the team and might cause a decrease in productivity.

5.6 Expectation towards Suppliers

In general, all four interviewees would like their suppliers to be able to improve in three elements which are cost, quality, and delivery time. They expect suppliers to be able to deliver the product with highest quality as per the schedule. In terms of cost, suppliers need to improve their costing by innovation and collaboration. Suppliers should not find a 'loophole' in the contract to claim for variation orders as it will increase the cost to the company. Interviewee C and D would like their suppliers to be more active and transparent in sharing information and ideas to the company. Suppliers usually will have better ideas to improve the operation, but they are reluctant to share as it does not bring benefit to them. Interviewees believed that good relationships require commitments from both parties where sharing innovative ideas will promote a better relationship. Besides, all interviewees would like their suppliers to improve their customer service level to bring more satisfaction to the company in terms of responsiveness and technical capability.

5.7 SRM Process Comparison between Research Findings and Conceptual Framework

The following section describes the SRM process comparison between conceptual framework and research finding. Highlighted colours are similar processes among them. Based on the comparison, Case Study A is almost identical to the conceptual framework. Company A is operating petrochemical plants that focus on MRO. Furthermore, Company A

is rich in manpower and monetary ability that enable them to invest in SRM. Case Study B, C and Case Study D have the same SRM process but not like the conceptual framework. Supplier recognition and supplier development are not in Case Study B due to limited resources despite Company B is a normal scale petrochemical plant.

Table 8: SRM Process Comparison between Research Findings and Conceptual Framework

Conceptual Framework	Case Study – Company A	Case Study – Company B	Case Study – Company C	Case Study – Company D
Strategy Development	Supplier Registration & Segmentation	Supplier Registration	Supplier Segmentation	Supplier Registration
Supplier Segmentation	Supplier Evaluation	Supplier Evaluation	Supplier Performance Evaluation	Supplier Performance Evaluation
Supplier Performance Evaluation	Supplier Performance Evaluation	Supplier Performance Review	Supplier Communication	Supplier Communication
Supplier Recognition	Supplier Recognition	Supplier Engagement		
Supplier Development	Supplier Development			
	Supplier Engagement			

They are more focused on the engineering aspect. Case Study C and Case Study D are due to the nature of the companies. The companies are focusing on the construction process instead of spending time building relationships with the suppliers. In the procurement department, the strategy involved is the sourcing strategy. However, based on the case studies, it is not much related to SRM. The preferred sourcing strategy is competitive bidding to obtain the best price and quality. Supplier evaluation is considered the same or as part of supplier segmentation based on the explanation from all the interviewees. Interviewees explained supplier evaluation is conducted during supplier registration and used to segment the supplier based on their profile and capability. Based on all the case studies, supplier engagement and communication are critical elements in the SRM process. Interaction with suppliers creates trust and increases commitment level in the relationships.

The interview sections with four interviewees help the researcher identify areas such as their opinions on SRM, the software used, the SRM process, the benefits, and challenges from SRM and their expectation towards suppliers. In line with the research objectives, this section will only focus on the SRM on its process, benefits, challenges, and the suppliers' competencies. Process wise, each company has their own process to carry out SRM. However, the practice is quite similar in supplier registration and supplier performance reevaluation. These two activities are identified as key activities in SRM. Case Study A has the most comprehensive

SRM practice compared to other case studies as they have supplier recognition and supplier development as part of the process. All case studies enjoyed benefits from SRM. All of them agreed that SRM could help reduce the cost and meanwhile some of them get better suppliers' quality, better relationship with suppliers and reducing the supply risk. Four challenges have been identified from the case studies which are lacking in terms of procedure, lack of skills and awareness, top management involvement and technology support. When asked about their expectation towards suppliers, all of them would like their suppliers to have competency in terms of cost, quality, and delivery time. These three are the basic elements yet the most important element in any business.

6 Conclusions and Future Recommendations

Based on the conducted research and the key findings, conclusions of this research are discussed to address the research questions. The research findings and literature reviews will be compared. Limitation of the research and recommendations for future study are covered as well. This section outlines the research findings to answer the four research questions. Refined conceptual framework will be presented based on the research findings in this section as well.

The *first research question* is to understand how the oil and gas companies manage the SRM. From the literature reviews, it is noticeable that there are different SRM procedures or activities proposed by different authors. From the case studies findings, all four companies have different procedures to carry out SRM. In fact, instead of mentioning it as different procedures, it will be more appropriate to describe it as simple or comprehensive procedures. Table 9 shows the SRM process from all the case studies. Through the case study comparisons, it is observed that Company A and Company B are having high similarity in SRM activities while Company C and Company D are similar by having simple SRM activities. From the findings, it can be noticed that the nature of the company affects the SRM process. Companies such as Company A and Company B where the procurement is focused on maintenance, repair, and operation (MRO) are having better and comprehensive SRM. For EPC nature companies such as Company C and Company D, they are having simpler forms of SRM. All four companies have similar SRM processes which are supplier registration, supplier evaluation and supplier performance evaluation.

Table 9: Summary of SRM Processes / Activities between Case Studies

Case Study	SRM Processes / Activities	Remark
Case Study – Company A	<ol style="list-style-type: none"> 1. Supplier registration & segmentation 2. Supplier evaluations 3. Supplier performance evaluation 4. Supplier recognition 5. Supplier development 6. Supplier engagement 	<p>Company A is having a most comprehensive SRM process, and activities compared to other case studies.</p> <p>Company A is operating as a petrochemical plant company.</p>
Case Study – Company B	<ol style="list-style-type: none"> 1. Supplier registration 2. Supplier evaluations 3. Supplier performance review 4. Supplier engagement 	<p>Company B is quite like Company A with some lacking. Company B is also a petrochemical plant company.</p>
Case Study – Company C	<ol style="list-style-type: none"> 1. Buyer-Supplier communication 2. Supplier registration & segmentation 3. Supplier evaluation 	<p>Company C is having a simple SRM process and activities. Company is an EPC contractor.</p>
Case Study – Company D	<ol style="list-style-type: none"> 1. Supplier registration 2. Supplier performance evaluation 3. Buyer-supplier communication 	<p>Company D is having a simple SRM process and activities. Company D is an EPC contractor.</p>

Hence, these three activities are necessary in SRM. Activities such as supplier recognition, supplier development and supplier engagement are for those companies that are having more resources in terms of money, time, and manpower to perform. For the EPC contractors, they are more focusing on managing suppliers rather than developing a good relationship.

Table 10: Summary of Benefits of SRM and Case Studies

Benefits of SRM	Case Study
Reduce cost	Company A, B, C & D
Improve suppliers' quality	Company A, B & C
Reduce supply risk	Company B & D
Better buyer supplier relationship	Company C & D

Second research question is to find out how SRM can help in services procurement. There are four identified benefits from the interviewees. Table 10 shows the benefits gained from the case studies. All interviewees are having the same opinion that the SRM could help to reduce the procurement cost. This is achieved by information sharing between both parties, innovation from suppliers and price negotiation from better relationships. Three interviewees claimed that SRM could improve suppliers' quality through better understanding between both buyers and suppliers. A better

understanding helps better alignment which promotes more efficient outcomes. Based on literature review, supplier development is one of the activities that improve supplier performance. Reduce supply risk and better buyer-supplier relationships are each mentioned by two interviewees as benefit of SRM. Through comparisons of key findings and analysis it is concluded that the benefits from both findings are aligned.

Third research question is to investigate the issues encountered in the SRM process. From the interviews, all interviewees highlighted that they are facing difficulties when managing SRM. Table 11 summarises issues encountered by four companies.

Table 11: Summary of Issues / Challenges Encountered during SRM Implementation between Case Studies

Issue / Challenge	Case Study
Lack of proper designed procedure	Company B, C & D
Lack of skills and awareness	Company A, B, C & D
Lack of top management commitment	Company B & C
Technology	Company D

From the research finding, only Company A has a much well designed SRM procedure. Other companies are without well designed SRM procedures. The companies need to enhance the SRM to align with their business and bring more value to the companies by creating competitive advantage. But having a well-designed procedure is not sufficient. The employees need to have the right skills and awareness and at the same time, getting involvement from top management is also crucial to carry out the SRM effectively. Finally, investment in the SRM system is needed to maximise the SRM value and ensure SRM can be implemented efficiently.

Fourth research question is about the competencies that suppliers should be equipped to contribute to the success of SRM. Maintaining good relationships require commitments from every party involved. Suppliers need to be competent to attract buyers to commit in the relationship. From the case studies results, all four companies are focusing on cost, quality, and delivery time. This means that the suppliers need to be able to deliver the best in these three elements to build buyer's confidence and trust towards them. All four companies also expect the suppliers to provide the best customer service level to them. Based on the research findings the earlier proposed conceptual framework is redefined as shown in Figure 19. Strategy shaping or building is required to establish an effective SRM. The

procurement team needs to work up a strategy by forming an action plan with consideration of service types and suppliers involved [39].

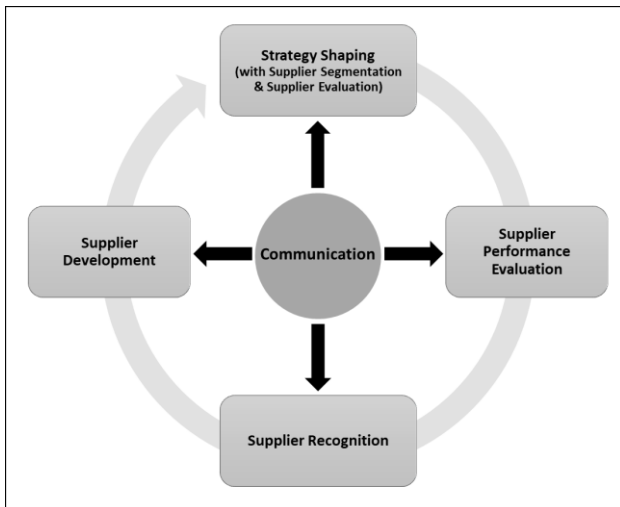


Figure 19: Redefined Conceptual Framework

Supplier segmentation and supplier evaluation is part of the strategy shaping. Not all suppliers bring the same impacts to the companies. Suppliers need to be segregated based on their impacts with results obtained from supplier evaluation. After that, the suppliers are awarded based on respective sourcing strategy on the services. Then, supplier performance evaluation comes into picture as it helps to maintain the service quality and the relationship. Continuous supplier performance evaluation is a requisition for supplier recognition and supplier development activities [88]. This could be done through regular meetings and discussion by providing and collecting feedback from both buyers and suppliers. Rewarding suppliers helps to strengthen the relationship and at the same time, it could motivate other suppliers. Then, certain suppliers will be involved in the supplier development program with the aim to improve their performance, business alignment of both parties and innovation that creates competitive advantage to the buyers. The process needs to repeat again to bring continuous improvement. In all stages, active communication either written or verbal medium with suppliers is crucial to build trust and commitment in the relationships.

This research is based on the case study method which provides great insights from each of the cases, however the findings are with some shortcomings. The followings describe the limitations for this research. There is no generalisation from the research. This research has a limited sample with four case studies where two are petrochemical plants companies and another two are EPC contractors. Besides that, only one interviewee represents each

company, and this means only one opinion is gathered in each case study. Due to the case study method, the results from small sample size could not reach generalisation in theory. Moreover, the research is restricted with the boundary such as limited to services procurement, location, and types of companies. This research is focused on the petrochemical plants and EPC contractors in Malaysia on services procurement where the results could not be generally applied to other oil and gas companies in other countries and material procurement. Few recommendations are suggested to address the limitation in this research. As highlighted in paper, there is no generalisation for this research. The research can be broadened by increasing the number of samples and to obtain findings from more than one interviewee in the respective company. Quantitative research and analysis method can be adopted to obtain larger data sets. These will help to bring generalisation to the research. The restriction in geological location can be overcome by expanding the future research to other oil and gas companies in other countries. This will help to investigate the SRM practice to a larger extent and provide a more comprehensive view of SRM in the O&G industry.

Also, this research is focusing on the buyers' experience and understanding in SRM. Hence, the researcher suggests conducting a study on suppliers' view on the SRM as an extension to this research. This proposed research could help companies such as buyers to understand their suppliers' experiences in the SRM and subsequently, improve their SRM process.

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