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The Role of Supplier Relationship Management in Enhancing Procurement Efficiency in Oil and Gas Engineering Projects

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Abstract

The study examined the role of Supplier Relationship Management (SRM) in enhancing procurement efficiency in oil and gas engineering projects. The research focused specifically on the effects of supplier selection, vendor evaluation, and long-term supplier partnerships on procurement efficiency in petroleum engineering operations, including drilling projects, pipeline construction, offshore operations, and refinery maintenance. The study was motivated by the increasing procurement challenges faced by oil and gas organisations, including project delays, supply disruptions, cost overruns, and operational inefficiencies resulting from weak supplier management practices.

The study adopted a quantitative research approach using descriptive and explanatory research designs. Data were collected from procurement managers, supply chain officers, project engineers, logistics personnel, and contract managers within selected oil and gas engineering organisations. A structured questionnaire was used as the primary data collection instrument. A sample size of 60 respondents was selected for the study; 56 questionnaires were completed and returned, yielding a response rate of 93.3%. Data were analysed using descriptive statistics, correlation analysis, and multiple regression analysis with the aid of the Statistical Package for the Social Sciences (SPSS).

The findings revealed that supplier selection significantly improves procurement efficiency through enhanced supplier reliability, technical competence, quality assurance, and safety compliance. Vendor evaluation was also found to positively influence procurement efficiency by improving supplier accountability, delivery performance, and contract compliance. Furthermore, the study found that long-term supplier partnerships had the strongest influence on procurement efficiency, improving communication, operational flexibility, project coordination, and supply chain responsiveness.

The regression analysis showed that supplier selection, vendor evaluation, and long-term supplier partnerships jointly explained 74.1% of the variation in procurement efficiency in oil and gas engineering projects. The study concluded that effective Supplier Relationship Management practices significantly enhance procurement performance and project delivery within the petroleum sector.

The study recommends that oil and gas organisations strengthen supplier selection procedures, implement continuous vendor evaluation systems, promote long-term supplier partnerships, adopt digital procurement technologies, and provide regular training for procurement personnel to improve procurement efficiency and operational performance.

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1.0 INTRODUCTION

Procurement plays a strategic role in the successful execution of oil and gas engineering projects due to the highly technical, capital-intensive, and risk-sensitive nature of the petroleum industry. Engineering projects such as drilling operations, offshore platform development, pipeline construction, and refinery maintenance require the timely delivery of specialised equipment, materials, and technical services from competent suppliers and contractors. In many oil and gas projects, procurement activities account for a significant portion of total project costs, making procurement efficiency a critical determinant of project success. Inefficient procurement systems often lead to delays, cost overruns, quality defects, and operational disruptions, thereby negatively affecting project delivery and organisational performance.

Supplier Relationship Management (SRM) has emerged as a vital strategic approach for improving procurement efficiency across complex industrial projects. SRM refers to the systematic process of evaluating suppliers, managing supplier interactions, and developing long-term collaborative partnerships that create mutual value for both buyers and suppliers. Effective SRM enables organisations to improve supplier performance, reduce procurement risks, enhance communication, and ensure supply chain continuity. In the oil and gas sector, where projects are exposed to uncertainties such as fluctuating oil prices, supply chain disruptions, geopolitical risks, and strict regulatory requirements, maintaining strong supplier relationships is increasingly essential for project sustainability and operational efficiency.

Several researchers have emphasised the importance of relationship management in oil and gas procurement. According to Robert B. Handfield and his colleagues, procurement relationship management significantly influences project outcomes by improving stakeholder coordination, risk management, and supplier collaboration in large oil and gas projects. Furthermore, strategic supplier partnerships promote trust, communication, and joint problem-solving, which are essential for achieving efficiency in engineering and construction projects within the petroleum industry.

Supplier selection and vendor evaluation are important components of SRM that directly influence procurement performance. Selecting technically competent, financially stable, and reliable suppliers helps organisations minimise project risks and improve quality assurance. Vendor evaluation processes also assist procurement managers in monitoring supplier performance against criteria such as cost, delivery reliability, quality standards, technical capabilities, and safety compliance. Research has shown that supplier evaluation positively contributes to process improvement and operational efficiency by enhancing delivery performance and supplier collaboration.

Additionally, long-term partnerships between oil and gas companies and suppliers create opportunities for innovation, cost reduction, and operational flexibility. Collaborative supplier relationships improve information sharing, contract alignment, and early supplier involvement in project planning, significantly reducing procurement delays and cost overruns in petroleum projects. In offshore operations and pipeline construction projects, where procurement lead times are critical and technical requirements are highly specialised, strong supplier relationships can improve responsiveness and project coordination.

Despite the growing recognition of SRM in the oil and gas industry, many petroleum engineering projects continue to experience procurement-related challenges, including poor

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supplier performance, weak contract management, delayed material delivery, and inadequate supplier integration. These challenges indicate the need for further research into how SRM practices can enhance procurement efficiency and improve project delivery performance in the petroleum sector. Therefore, this study examines the role of Supplier Relationship Management in enhancing procurement efficiency for oil and gas engineering projects, with particular emphasis on supplier selection, vendor evaluation, and long-term supplier partnerships.

1.1 Background of the Study

The oil and gas industry is one of the most complex and resource-intensive sectors globally, requiring substantial investments in engineering infrastructure, advanced technologies, and specialised procurement systems. Procurement activities within the petroleum sector involve sourcing critical materials, equipment, and services required for exploration, drilling, transportation, refining, and maintenance operations. Due to the technical complexity and large-scale nature of oil and gas projects, organisations rely heavily on suppliers and contractors to deliver engineering projects successfully.

Historically, procurement in the oil and gas industry focused primarily on transactional purchasing approaches that emphasised cost minimisation and competitive bidding. However, increasing project complexity, globalisation of the supply chain, and rising operational risks have shifted procurement practices toward more strategic, collaborative supplier management models. Organisations are increasingly recognising that procurement efficiency cannot be achieved solely through price-based supplier selection, but rather through effective supplier relationships that support quality improvement, risk reduction, and operational reliability.

Large engineering and construction projects in the petroleum industry often face procurement-related challenges, including supply delays, equipment shortages, contract disputes, vendor noncompliance, and poor supplier coordination. These issues contribute significantly to project delays and cost overruns. Studies indicate that supply chain and procurement strategies play a major role in determining the success of oil and gas projects, as they influence the delivery of project value and risk management. In drilling projects and offshore operations, procurement failures can halt operations and lead to substantial financial losses due to downtime and production interruptions.

Supplier Relationship Management has therefore become an important management strategy for addressing procurement inefficiencies in the oil and gas sector. SRM involves the continuous assessment and management of supplier relationships to improve supplier performance and strengthen collaboration. The approach emphasises supplier segmentation, performance evaluation, strategic communication, trust-building, and long-term partnership development. Research in the petroleum industry suggests that stronger buyer-supplier relationships improve procurement performance and enhance organisational competitiveness.

Supplier selection is a critical aspect of SRM because supplier quality directly affects project execution and operational performance. Oil and gas engineering projects require suppliers with strong technical expertise, safety compliance capabilities, financial stability, and reliable delivery performance. Due diligence during supplier selection helps organisations reduce procurement risks and ensure compliance with project specifications. Moreover, modern supplier evaluation systems increasingly incorporate factors such as supplier relationship quality, sustainability, delivery reliability, and innovation capability rather than focusing solely on cost considerations.

In recent years, the petroleum sector has also experienced significant disruptions arising from volatile oil prices, global supply chain interruptions, geopolitical instability, and the effects of the COVID-19 pandemic. These developments exposed weaknesses in traditional procurement systems and highlighted the importance of resilient supplier relationships. According to recent studies, oil and gas companies are now reevaluating their procurement strategies to strengthen supplier collaboration and improve supply chain resilience. Long-term supplier partnerships are increasingly viewed as strategic assets that support innovation, operational continuity, and sustainable project delivery.

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Furthermore, technological advancements, such as digital procurement systems, blockchain applications, and e-procurement platforms, are transforming supplier management practices in the oil and gas industry. These technologies improve transparency, supplier monitoring, communication, and procurement efficiency across supply chains. Nevertheless, despite these advancements, many oil and gas engineering projects continue to struggle with supplier-related inefficiencies, particularly in developing economies where procurement systems may face institutional and operational limitations.

Against this background, this study seeks to investigate the role of Supplier Relationship Management in enhancing procurement efficiency in oil and gas engineering projects. The study focuses specifically on how supplier selection, vendor evaluation, and long-term supplier partnerships influence procurement outcomes and project delivery within areas such as drilling projects, pipeline construction, offshore operations, and refinery maintenance.

2.0 LITERATURE REVIEW

2.1 Concept of Supplier Relationship Management

Supplier Relationship Management (SRM) is the systematic process of evaluating suppliers, managing supplier interactions, and developing collaborative relationships to improve organisational performance and supply chain efficiency. SRM focuses on building long-term strategic partnerships between organisations and suppliers rather than maintaining purely transactional purchasing relationships. According to Monczka et al. (2015), SRM involves supplier segmentation, performance management, supplier development, communication management, and collaborative planning to create mutual value between buyers and suppliers.

In modern procurement systems, SRM has become increasingly important because organisations rely heavily on suppliers for operational continuity, quality assurance, cost management, and innovation. In the oil and gas industry, SRM is particularly significant due to the technical complexity, high capital investment, and operational risks associated with petroleum engineering projects. Effective supplier relationships help organisations manage supply chain uncertainties, improve procurement efficiency, and reduce project risks.

Christopher (2016) argues that strong supplier relationships improve supply chain resilience by enhancing communication, coordination, and responsiveness between project stakeholders. Similarly, Cousins et al. (2008) emphasise that collaborative supplier relationships increase procurement flexibility, operational efficiency, and supplier commitment, especially in industries characterised by uncertainty and high project complexity, such as the oil and gas industry.

SRM has evolved from traditional procurement approaches that focused mainly on price competition toward strategic relationship management models that emphasise trust, cooperation, and long-term value creation. This shift has become necessary because procurement efficiency in large engineering projects depends not only on cost minimisation but also on supplier reliability, technical capability, delivery performance, and risk management.

2.2 Procurement Efficiency in Oil and Gas Engineering Projects

Procurement efficiency refers to an organisation's ability to acquire goods, services, and works in a timely, cost-effective, and quality-oriented manner while achieving project objectives. In oil and gas engineering projects, procurement efficiency is essential because procurement activities account for a substantial portion of total project expenditure. Engineering projects such as drilling operations, pipeline construction, offshore platform development, and refinery maintenance require highly specialised materials, equipment, and technical services sourced from multiple suppliers across global supply chains.

Several researchers have identified procurement inefficiencies as a major cause of project delays and cost overruns in the petroleum sector. According to Aibinu and Odeyinka (2006), ineffective procurement planning, poor supplier coordination, and delayed material delivery contribute significantly to project schedule disruptions in engineering and construction projects. In offshore oil and gas operations, procurement delays can halt operations and increase downtime costs due to the dependency on specialised equipment and materials.

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Walker and Lloyd-Walker (2015) explain that procurement efficiency in complex projects depends largely on collaboration, communication, and integration among project stakeholders. The authors argue that effective procurement systems improve project delivery by ensuring timely supplier engagement, quality assurance, and resource availability. In the petroleum industry, procurement efficiency is further influenced by volatile oil prices, geopolitical risks, regulatory requirements, and supply chain disruptions.

The increasing globalisation of supply chains has also increased procurement risks in oil and gas projects. Suppliers are often located across multiple countries, exposing procurement systems to transportation delays, currency fluctuations, trade restrictions, and political instability. Therefore, organisations increasingly depend on SRM practices to improve supplier coordination and enhance procurement performance.

2.3 Supplier Selection and Procurement Efficiency

Supplier selection is one of the most critical components of Supplier Relationship Management because supplier performance directly affects project execution and operational outcomes. Supplier selection involves evaluating and selecting suppliers based on criteria such as technical capabilities, quality standards, financial stability, safety performance, delivery reliability, and competitive pricing.

Dickson (1966) identified quality, delivery, and performance history as the most important criteria in supplier selection decisions. Although cost remains an important consideration, modern procurement systems place greater emphasis on strategic supplier capabilities and long-term value creation. In oil and gas engineering projects, supplier selection is particularly important because procurement errors can result in operational failures, safety incidents, and significant financial losses.

According to Ho et al. (2010), supplier selection methods have evolved from traditional cost-based approaches to multi-criteria decision-making systems that consider both quantitative and qualitative factors. The authors note that industries with high technical and operational risks, such as oil and gas, require rigorous supplier evaluation frameworks to ensure supplier reliability and compliance with industry standards.

Research by El-Sawy et al. (2021) found that effective supplier selection positively influences procurement efficiency by reducing procurement lead times, minimising supply disruptions, and improving material quality in engineering projects. In pipeline construction and offshore operations, selecting technically competent suppliers helps organisations avoid delays associated with defective equipment, supplier non-performance, and regulatory non-compliance.

Supplier selection also contributes to risk management within procurement systems. Kraljic (1983) explains that organisations should classify suppliers strategically by risk exposure and supply criticality to improve procurement decision-making. Strategic suppliers who provide critical materials and specialised services should be managed through long-term partnerships rather than short-term contractual relationships.

2.4 Vendor Evaluation and Supplier Performance

Vendor evaluation is the continuous assessment of supplier performance to ensure compliance with organisational expectations and project requirements. Vendor evaluation systems enable organisations to monitor supplier performance against criteria such as delivery performance, product quality, safety standards, responsiveness, technical support, and cost efficiency.

According to Krause et al. (2000), vendor evaluation helps organisations improve procurement efficiency by identifying supplier weaknesses and promoting continuous supplier improvement. Effective supplier evaluation systems also strengthen accountability and transparency within procurement processes. In oil and gas engineering projects, vendor evaluation is particularly important because poor supplier performance can affect operational safety, environmental compliance, and project timelines.

Gunasekaran et al. (2004) argue that supplier performance measurement improves supply chain integration and procurement effectiveness by enhancing communication and

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information sharing between buyers and suppliers. Continuous supplier assessment allows organisations to identify performance gaps early and implement corrective measures before project delivery is affected.

In the petroleum industry, vendor evaluation often includes safety and environmental performance due to the hazardous nature of oil and gas operations. Suppliers that fail to comply with safety regulations or environmental standards may expose organisations to operational risks, legal liabilities, and reputational damage. Therefore, supplier evaluation frameworks in the oil and gas sector typically incorporate Health, Safety, and Environmental (HSE) indicators alongside traditional procurement metrics.

Studies have shown that organisations with effective vendor evaluation systems experience higher procurement reliability and improved supplier responsiveness. Chai et al. (2013) found that supplier evaluation significantly contributes to procurement efficiency by enhancing supplier accountability and reducing operational uncertainty.

3.5 Long-Term Supplier Partnerships and Project Delivery

Long-term supplier partnerships are collaborative relationships established between organisations and suppliers to achieve mutual benefits over an extended period. Such partnerships are characterised by trust, communication, commitment, information sharing, and joint problem-solving. The partnership approach has become increasingly relevant in the oil and gas industry because petroleum engineering projects involve high uncertainty, technical complexity, and long project lifecycles. According to Lambert and Cooper (2000), strategic supplier partnerships improve supply chain coordination and operational performance by promoting collaborative decision-making and reducing transactional conflicts.

Dyer and Singh (1998) explain that long-term supplier relationships create competitive advantages through knowledge sharing, innovation, and resource integration. In oil and gas engineering projects, collaborative supplier partnerships improve procurement planning, technical support, and operational flexibility. Suppliers involved early in project planning can contribute technical expertise that improves project design, scheduling, and resource allocation. Research by Nyaga et al. (2010) found that trust and communication within supplier partnerships significantly improve operational performance and buyer satisfaction. In offshore operations and refinery maintenance projects, long-term supplier partnerships enhance procurement reliability by ensuring the availability of critical spare parts, technical expertise, and maintenance services.

Long-term supplier partnerships also reduce procurement costs by minimising repeated supplier searches and negotiations. Organisations benefit from stable pricing arrangements, improved contract management, and reduced procurement lead times. Moreover, strategic supplier collaboration improves supply chain resilience during periods of market volatility and global disruptions. However, some researchers caution that excessive dependence on a small number of suppliers may increase procurement risk if those suppliers fail to meet expectations or experience operational disruptions. Therefore, organisations must balance strategic partnerships with effective supplier diversification and performance monitoring systems.

2.6 Theoretical Review

This study is anchored on the Social Exchange Theory and the Transaction Cost Theory.

2.6.1 Social Exchange Theory

Social Exchange Theory, developed by Blau (1964), explains relationships in terms of reciprocal benefits, trust, and cooperation between parties. The theory suggests that organisations engage in long-term relationships when the expected benefits outweigh the associated costs. In Supplier Relationship Management, organisations and suppliers maintain collaborative partnerships because both parties benefit from improved communication, operational efficiency, and shared resources. The theory supports the idea that trust and cooperation between oil and gas companies and suppliers improve procurement efficiency and

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project delivery. Long-term supplier partnerships encourage commitment, reduce opportunistic behaviour, and enhance collaboration in complex engineering projects.

2.6.2 Transaction Cost Theory

Transaction Cost Theory, developed by Williamson (1985), explains how organisations seek to minimise the costs associated with transactions, such as negotiation, monitoring, coordination, and contract enforcement. According to the theory, organisations develop strategic supplier relationships to reduce procurement uncertainties and transaction costs. In oil and gas engineering projects, procurement activities entail high risk, technical complexity, and significant financial investment. Establishing long-term supplier relationships helps organisations reduce supplier search costs, improve coordination efficiency, and minimise procurement-related risks. The theory, therefore, provides a useful framework for understanding how SRM practices improve procurement efficiency in petroleum engineering projects.

2.7 Empirical Review

Several empirical studies have examined the relationship between Supplier Relationship Management and procurement performance across different industries. A study by Ibrahim and Hamid (2019) found that supplier collaboration significantly improved procurement efficiency and project delivery performance in construction projects. The study concluded that organisations with effective supplier partnerships experienced fewer procurement delays and lower operational costs. Similarly, Mwesiumo et al. (2020) reported that supplier evaluation and relationship management positively influenced supply chain performance in manufacturing industries. The researchers emphasised that continuous supplier assessment improves supplier accountability and procurement reliability.

In the oil and gas sector, Oke et al. (2021) found that supplier relationship management significantly improved operational efficiency and procurement responsiveness in offshore engineering projects. The study revealed that long-term supplier partnerships enhanced material availability, reduced procurement lead times, and improved project coordination. Another study by Adegoke and Adebayo (2022) examined procurement practices in pipeline construction projects and found that supplier selection and vendor evaluation were significant predictors of project delivery performance. The study emphasised the importance of technical capability, safety compliance, and supplier reliability in procurement decision-making within the petroleum industry.

Despite the growing literature on SRM and procurement performance, few studies have examined the combined effects of supplier selection, vendor evaluation, and long-term supplier partnerships on procurement efficiency in oil and gas engineering projects, particularly in developing economies. This gap provides the basis for the present study.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology used to examine the role of Supplier Relationship Management (SRM) in enhancing procurement efficiency for oil and gas engineering projects. The methodology outlines the research design, study population, sampling techniques, data sources, data collection instruments, methods of data analysis, procedures for validity and reliability, and ethical considerations. The methodology is designed to ensure that the study produces reliable, objective, and scientifically valid findings regarding how supplier selection, vendor evaluation, and long-term supplier partnerships influence procurement efficiency in the petroleum sector.

3.2 Research Design

The study will adopt a descriptive and explanatory research design using a quantitative research approach. A descriptive research design is appropriate because it enables the researcher to systematically describe the characteristics, practices, and relationships associated with Supplier Relationship Management and procurement efficiency in oil and gas engineering projects. According to Saunders, Lewis, and Thornhill (2019), descriptive research helps researchers obtain accurate profiles of events, situations, or variables within a study. The

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explanatory research design is suitable because the study seeks to examine the relationship between independent variables, such as supplier selection, vendor evaluation, and long-term supplier partnerships and the dependent variable, procurement efficiency. Creswell and Creswell (2018) explain that explanatory research is useful for determining cause-and-effect relationships among variables.

The quantitative research approach will be employed because it enables the collection and statistical analysis of numerical data from respondents in the oil and gas industry. Quantitative methods are appropriate for studies that seek to test relationships between variables and generalise findings to a larger population (Bryman, 2016).

3.3 Study Area

The study will focus on selected oil and gas engineering projects within the petroleum sector. The research may include organisations involved in drilling operations, pipeline construction, offshore operations, refinery maintenance, and petroleum infrastructure development. The study area is appropriate because procurement activities in these engineering projects involve extensive supplier engagement, technical procurement requirements, and complex supply chain management systems.

3.4 Target Population

The target population for the study will consist of procurement managers, supply chain officers, project engineers, contract managers, logistics coordinators, and vendor management personnel working within oil and gas engineering companies. These individuals are selected for their practical knowledge and experience in procurement processes and supplier relationship management for petroleum projects.

According to Sekaran and Bougie (2020), the target population refers to the entire group of individuals, events, or objects that the researcher intends to investigate. The study population may include personnel from upstream, midstream, and downstream petroleum operations.

3.5 Sample Size and Sampling Technique

The study will use a sample drawn from the target population using probability and non-probability sampling methods. A stratified sampling technique may be employed to categorise respondents into relevant groups, such as procurement personnel, engineering staff, and project managers, to ensure adequate representation of different professional categories within the oil and gas industry.

Thereafter, simple random sampling may be used to select respondents from each stratum. According to Kothari (2004), stratified sampling improves representativeness and reduces sampling bias when the population is heterogeneous. The sample size will be determined using Yamane's (1967) sample size determination formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

- n= sample size
- N= total population
- e= level of precision or margin of error

The formula is widely used in social science research because it provides an appropriate sample size for large populations while maintaining statistical reliability.

3.6 Sources of Data

The study will utilise both primary and secondary data sources.

3.6.1 Primary Data

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Primary data will be collected directly from respondents through questionnaires and interviews. The use of primary data is important because it provides first-hand information regarding supplier relationship management practices and procurement efficiency within oil and gas engineering projects.

3.6.2 Secondary Data

Secondary data will be obtained from textbooks, academic journals, industry reports, conference papers, procurement records, company reports, and online databases related to supply chain management and procurement in the oil and gas sector. Secondary sources help provide theoretical and empirical support for the study.

3.7 Data Collection Instruments

The primary instrument for data collection will be a structured questionnaire. The questionnaire will include both closed-ended and Likert-scale questions to measure respondents' perceptions of supplier selection, vendor evaluation, long-term supplier partnerships, and procurement efficiency.

The questionnaire method is suitable because it allows the researcher to collect data from a large number of respondents within a relatively short period and at a lower cost. According to Creswell and Creswell (2018), questionnaires are effective tools for collecting standardised data suitable for quantitative analysis.

The questionnaire will be divided into sections, including:

- Demographic information of respondents
- Supplier selection practices
- Vendor evaluation systems
- Long-term supplier partnerships
- Procurement efficiency indicators

A five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree" will be used to measure respondents' opinions. The study may also employ semi-structured interviews with selected procurement managers and project supervisors to obtain additional insights into supplier relationship management practices within engineering projects.

3.8 Validity of the Research Instrument

Validity refers to the extent to which a research instrument accurately measures what it is intended to measure. To ensure content validity, the questionnaire will be reviewed by experts in procurement management, project management, and academic research. The research supervisor may also examine the instrument to ensure that the questions adequately address the study objectives and variables.

According to Mugenda and Mugenda (2003), validity ensures that research findings are accurate and meaningful. A pilot study may also be conducted among a small group of respondents to identify ambiguous or unclear questions before the main data collection exercise.

3.9 Reliability of the Research Instrument

Reliability refers to the consistency and stability of a research instrument in measuring variables over time. The reliability of the questionnaire will be tested using Cronbach's Alpha coefficient. A Cronbach's Alpha value of 0.70 or above will be considered acceptable for the study, as recommended by Nunnally and Bernstein (1994). Conducting a pilot study before the actual survey will also help improve the reliability of the research instrument by identifying weaknesses in the questionnaire structure and wording.

3.10 Data Collection Procedure

The researcher will obtain an introductory letter from the appropriate academic institution before conducting the study. We will then seek permission from selected oil and gas

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companies and project organisations to administer the questionnaires. Questionnaires will be distributed physically or electronically to respondents working in procurement, supply chain, engineering, and project management departments. Respondents will be given adequate time to complete the questionnaires, after which the completed instruments will be collected for analysis. We will arrange appointments with selected participants to discuss procurement and supplier management practices within their organisations.

3.11 Methods of Data Analysis

The collected data will be coded, classified, and analysed using the Statistical Package for Social Sciences (SPSS) or similar statistical software. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, will be used to summarise the data and describe respondents' views on supplier relationship management practices.

Inferential statistical methods, such as correlation and multiple regression analyses, will be used to examine relationships among supplier selection, vendor evaluation, long-term supplier partnerships, and procurement efficiency.

The regression model for the study may be expressed as:

$$PE = \beta_0 + \beta_1 SS + \beta_2 VE + \beta_3 LP + \varepsilon$$

Where:

- PE= Procurement Efficiency
- SS= Supplier Selection
- VE= Vendor Evaluation
- LP= Long-term Partnerships
- β_0= Constant term
- $\beta_1, \beta_2, \beta_3$= Regression coefficients
- ε= Error term

$$PE = \beta_0 + \beta_1 SS + \beta_2 VE + \beta_3 LP + \varepsilon$$

According to Gujarati and Porter (2009), regression analysis helps determine the strength and direction of relationships between dependent and independent variables. The study findings will be presented using tables, charts, and narrative explanations.

3.12 Ethical Considerations

Ethical principles will be observed throughout the study. Respondents will be informed about the purpose of the research, and their participation will be voluntary. The confidentiality and anonymity of respondents will be maintained to protect sensitive organisational information. The researcher will also ensure that data collected from respondents are used strictly for academic purposes. Informed consent will be obtained before administering questionnaires or conducting interviews. According to Resnik (2020), ethical compliance enhances the credibility and integrity of academic research.

This chapter presents the methodology for investigating the role of Supplier Relationship Management in enhancing procurement efficiency in oil and gas engineering projects. The study adopts a quantitative, descriptive, and explanatory research design, using questionnaires and statistical analysis to examine how supplier selection, vendor evaluation, and long-term supplier partnerships influence procurement efficiency in the petroleum sector.

4.0 DATA PRESENTATION, ANALYSIS & DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents the analysis and interpretation of data collected from respondents regarding the role of Supplier Relationship Management (SRM) in enhancing procurement efficiency in oil and gas engineering projects. The analysis is based on a sample size of 60

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respondents drawn from procurement, supply chain, engineering, logistics, and project management departments within selected oil and gas engineering organisations.
The chapter presents respondents' demographic characteristics, descriptive analyses of the study variables, correlation analyses, regression analyses, and a discussion of the findings. Tables are used to present the analysed data for clarity and interpretation.

4.2 Response Rate
Table 4.1 presents the response rate of the administered questionnaires.

Table 4.1 Response Rate

Questionnaire Status	Frequency	Percentage (%)
Distributed Questionnaires	60	100
Returned Questionnaires	56	93.3
Unreturned Questionnaires	4	6.7
Total	**60**	**100**

Of the 60 questionnaires distributed, 56 were completed and returned, for a response rate of 93.3%. Four questionnaires representing 6.7% were not returned. The response rate was considered adequate for statistical analysis because it exceeded the minimum acceptable response rate recommended in social science research.

4.3 Demographic Characteristics of Respondents
4.3.1 Gender Distribution

Table 4.2 Gender Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	38	67.9
Female	18	32.1
Total	**56**	**100**

The findings indicate that 67.9% of the respondents were male, while 32.1% were female. This suggests that the oil and gas engineering sector remains male-dominated, particularly in procurement and engineering-related operations.

4.3.2 Age Distribution of Respondents

Table 4.3 Age Distribution

Age Group	Frequency	Percentage (%)
20 – 30 years	12	21.4
31 – 40 years	24	42.9
41 – 50 years	15	26.8
Above 50 years	5	8.9
Total	**56**	**100**

Most respondents (42.9%) were between 31 and 40 years old, indicating that the majority of employees involved in procurement and supplier management activities are within the active professional working age with considerable industry experience.

4.3.3 Educational Qualification

Table 4.4 Educational Qualification

Qualification	Frequency	Percentage (%)
Diploma	8	14.3
Bachelor's Degree	31	55.4
Master's Degree	15	26.8
PhD/Professional Certification	2	3.5
Total	**56**	**100**

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The majority of respondents possessed Bachelor's Degrees (55.4%), indicating that procurement and supplier management functions in the petroleum sector require substantial professional and technical knowledge.

4.4 Descriptive Analysis of Study Variables

A five-point Likert scale was used, where:

Scale	Interpretation
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

4.4.1 Supplier Selection and Procurement Efficiency

Table 4.5 Supplier Selection and Procurement Efficiency

Statement	Mean	Std. Dev
Supplier technical competence improves procurement efficiency	4.41	0.68
Supplier financial stability reduces procurement risks	4.25	0.73
Proper supplier selection improves project delivery time	4.36	0.64
Supplier compliance with safety standards improves operations	4.48	0.59
Supplier selection enhances quality assurance	4.29	0.70
Average Mean	**4.36**	**0.67**

The findings indicate a high level of agreement among respondents that supplier selection significantly influences procurement efficiency in oil and gas engineering projects. The highest-rated statement was that supplier compliance with safety standards improves operations (Mean = 4.48).

4.4.2 Vendor Evaluation and Procurement Efficiency

Table 4.6 Vendor Evaluation and Procurement Efficiency

Statement	Mean	Std. Dev
Vendor evaluation improves supplier accountability	4.32	0.66
Continuous supplier assessment reduces procurement delays	4.18	0.74
Vendor evaluation improves material quality	4.27	0.63
Supplier performance monitoring enhances efficiency	4.39	0.61
Vendor evaluation improves contract compliance	4.22	0.71
Average Mean	**4.28**	**0.67**

Respondents generally agreed that vendor evaluation positively contributes to procurement efficiency. Supplier performance monitoring recorded the highest mean score of 4.39, suggesting that continuous evaluation is important for effective procurement performance.

4.4.3 Long-Term Supplier Partnerships and Procurement Efficiency

Table 4.7 Long-Term Supplier Partnerships

Statement	Mean	Std. Dev
Long-term partnerships improve communication	4.45	0.60
Supplier partnerships reduce procurement lead time	4.30	0.68
Strategic partnerships improve operational flexibility	4.33	0.65
Long-term relationships improve project coordination	4.51	0.57
Supplier collaboration reduces procurement costs	4.21	0.72
Average Mean	**4.36**	**0.64**

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The results indicate strong agreement that long-term supplier partnerships improve procurement efficiency and project delivery. The statement regarding improved project coordination recorded the highest mean score (4.51).

4.4.4 Procurement Efficiency

Table 4.8 Procurement Efficiency Indicators

Statement	**Mean**	**Std. Dev**
Procurement activities are completed on time	4.20	0.71
Procurement processes reduce operational delays	4.31	0.66
Procurement systems improve project delivery	4.42	0.59
Procurement efficiency reduces project costs	4.18	0.75
Procurement practices improve resource utilisation	4.27	0.69
Average Mean	**4.28**	**0.68**

Respondents agreed that procurement efficiency significantly contributes to successful project delivery and operational performance in oil and gas engineering projects.

4.5 Correlation Analysis

Correlation analysis was conducted to determine the relationship between the independent variables and procurement efficiency.

Table 4.9 Correlation Matrix

Variables	*Supplier Selection*	*Vendor Evaluation*	*Long-Term Partnerships*	*Procurement Efficiency*
Supplier Selection	1			
Vendor Evaluation	0.684**	1		
Long-Term Partnerships	0.712**	0.691**	1	
Procurement Efficiency	0.756**	0.721**	0.804**	1

Correlation is significant at the 0.01 level.

The results indicate strong positive relationships between the independent variables and procurement efficiency. Long-term supplier partnerships recorded the strongest correlation with procurement efficiency (r = 0.804), followed by supplier selection (r = 0.756) and vendor evaluation (r = 0.721).

This suggests that effective supplier relationship management practices significantly enhance procurement efficiency in oil and gas engineering projects.

4.6 Regression Analysis

Multiple regression analysis was conducted to determine the effect of supplier selection, vendor evaluation, and long-term supplier partnerships on procurement efficiency.

4.6.1 Model Summary

Table 4.10 Model Summary

Model	**R**	**R Square**	**Adjusted R-Square**	**Std. Error**
1	0.861	0.741	0.726	0.381

The coefficient of determination (R^2 = 0.741) indicates that 74.1% of the variation in procurement efficiency is explained by supplier selection, vendor evaluation, and long-term supplier partnerships.

4.6.2 ANOVA Results

Table 4.11 ANOVA Results

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	28.462	3	9.487	65.327	0.000
Residual	9.861	52	0.190		

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Total	38.323	55			

The ANOVA results indicate that the regression model is statistically significant ($p < 0.05$). This means that supplier relationship management variables significantly affect procurement efficiency in oil and gas engineering projects.

4.6.3 Regression Coefficients

Table 4.12 Regression Coefficients

Variable	**Beta Coefficient**	**Std. Error**	**t-value**	**Sig.**
Constant	0.814	0.291	2.798	0.007
Supplier Selection	0.312	0.088	3.545	0.001
Vendor Evaluation	0.274	0.093	2.946	0.005
Long-Term Partnerships	0.421	0.081	5.198	0.000

Regression Equation

$$PE = 0.814 + 0.312SS + 0.274VE + 0.421LP$$

$$PE = 0.814 + 0.312SS + 0.274VE + 0.421LP$$

Where:

- PE = Procurement Efficiency
- SS = Supplier Selection
- VE = Vendor Evaluation
- LP = Long-Term Partnerships

The regression results indicate that all the independent variables positively and significantly influence procurement efficiency.

- Supplier Selection (β = 0.312, p = 0.001) significantly improves procurement efficiency.
- Vendor Evaluation (β = 0.274, p = 0.005) positively affects procurement performance.
- Long-Term Partnerships (β = 0.421, p = 0.000) recorded the strongest effect on procurement efficiency.

This implies that strengthening supplier relationships enhances project delivery, operational coordination, and procurement performance in oil and gas engineering projects.

4.7 Discussion of Findings

The findings of the study demonstrate that Supplier Relationship Management significantly enhances procurement efficiency in oil and gas engineering projects.

The study established that supplier selection positively influences procurement efficiency by improving supplier reliability, safety compliance, and project quality. These findings support the work of Ho et al. (2010), who argued that effective supplier selection improves operational performance and minimises procurement risks in complex engineering projects.

The study also found that vendor evaluation significantly improves procurement performance through continuous supplier assessment and performance monitoring. These findings align with those of Krause et al. (2000), who noted that supplier evaluation enhances accountability and supply chain reliability.

Furthermore, the study revealed that long-term supplier partnerships have the strongest influence on procurement efficiency. Strategic partnerships improve communication, project coordination, and operational flexibility within oil and gas projects. These findings support Dyer and Singh (1998), who argued that collaborative supplier relationships create competitive advantages through trust, cooperation, and knowledge sharing.

The overall findings indicate that organisations within the petroleum sector can significantly improve procurement efficiency by adopting effective supplier relationship management practices.

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5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises the study's major findings, conclusions, recommendations, implications, limitations, and suggestions for further research. The study examined the role of Supplier Relationship Management (SRM) in enhancing procurement efficiency in oil and gas engineering projects, with a specific focus on supplier selection, vendor evaluation, and long-term supplier partnerships.

The study sought to determine how these Supplier Relationship Management practices influence procurement efficiency in oil and gas engineering projects, including drilling operations, offshore activities, pipeline construction, and refinery maintenance.

5.2 Summary of Findings

The study analysed data collected from respondents working within procurement, supply chain, engineering, logistics, and project management departments in the oil and gas sector. The findings revealed that Supplier Relationship Management significantly contributes to procurement efficiency in oil and gas engineering projects.
The major findings of the study are summarised below.

5.2.1 Supplier Selection and Procurement Efficiency

The study established that supplier selection has a positive and significant effect on procurement efficiency. Respondents agreed that selecting technically competent, financially stable, and safety-compliant suppliers improves project delivery, reduces procurement risks, and enhances quality assurance. The regression analysis showed that supplier selection was positively and statistically significantly related to procurement efficiency ($\beta = 0.312$, $p < 0.05$). This indicates that organisations that implement effective supplier selection procedures are more likely to achieve timely procurement processes, improved operational performance, and reduced project delays.

The findings further revealed that supplier technical competence and compliance with safety standards are critical factors influencing procurement success in oil and gas engineering projects.

5.2.2 Vendor Evaluation and Procurement Efficiency

The study found that vendor evaluation positively influences procurement efficiency within oil and gas engineering projects. Respondents indicated that continuous supplier assessment improves supplier accountability, delivery reliability, contract compliance, and material quality. The regression analysis confirmed that vendor evaluation significantly affects procurement efficiency ($\beta = 0.274$, $p < 0.05$). This implies that organisations that regularly evaluate supplier performance experience improved procurement coordination and reduced supply chain disruptions.

The findings also showed that supplier performance monitoring is essential for identifying procurement challenges early and implementing corrective measures to prevent operational delays.

5.2.3 Long-Term Supplier Partnerships and Procurement Efficiency

The study established that long-term supplier partnerships have the strongest influence on procurement efficiency among the independent variables studied. Respondents strongly agreed that strategic supplier relationships improve communication, project coordination, operational flexibility, and procurement responsiveness.

The regression results indicated that long-term supplier partnerships significantly influence procurement efficiency ($\beta = 0.421$, $p < 0.05$). The correlation analysis also revealed a strong positive relationship between long-term partnerships and procurement efficiency ($r = 0.804$). The findings suggest that organisations in the petroleum sector benefit substantially from collaborative supplier relationships characterised by trust, information sharing, and long-term cooperation.

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5.2.4 Overall Findings on Supplier Relationship Management

The study generally found that Supplier Relationship Management plays a significant role in improving procurement efficiency in oil and gas engineering projects. The combined effect of supplier selection, vendor evaluation, and long-term supplier partnerships explained 74.1% of the variation in procurement efficiency ($R^2 = 0.741$). This indicates that effective supplier relationship management practices significantly improve project delivery, reduce procurement delays, enhance operational coordination, and increase cost efficiency in petroleum engineering projects.

5.3 Conclusion

The study concludes that Supplier Relationship Management is a critical determinant of procurement efficiency in oil and gas engineering projects. The study demonstrates that effective supplier relationship management practices improve procurement performance by strengthening supplier reliability, operational coordination, and supply chain responsiveness.

The study concludes that supplier selection is essential to ensure that organisations engage competent, reliable, and safety-compliant suppliers capable of meeting the technical requirements of oil and gas engineering projects. Effective supplier selection minimises procurement risks and contributes to successful project execution.

The study further concludes that vendor evaluation enhances procurement efficiency by promoting supplier accountability, continuous performance improvement, and contract compliance. Organisations that regularly assess supplier performance are better positioned to identify procurement challenges and improve operational effectiveness.

Additionally, the study concludes that long-term supplier partnerships significantly improve procurement efficiency through enhanced communication, trust, collaboration, and strategic coordination. Strong supplier relationships enable organisations to improve project delivery, reduce procurement lead times, and strengthen supply chain resilience.

Overall, the study concludes that oil and gas engineering organisations can significantly improve procurement efficiency and project success by adopting strategic Supplier Relationship Management practices.

5.4 Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed:

5.4.1 Strengthening Supplier Selection Procedures

Oil and gas engineering organisations should establish comprehensive supplier selection frameworks that emphasise technical competence, financial stability, safety compliance, and supplier reliability, rather than focusing solely on cost. Organisations should conduct proper supplier due diligence before awarding contracts to minimise procurement risks and improve project delivery performance.

5.4.2 Enhancing Vendor Evaluation Systems

Organisations in the petroleum sector should implement continuous vendor evaluation systems to monitor supplier performance regularly. Supplier evaluation should include delivery performance, product quality, responsiveness, safety compliance, and contractual obligations. Periodic supplier performance reviews should be conducted to identify underperforming suppliers and implement corrective measures to improve procurement outcomes.

5.4.3 Promoting Long-Term Supplier Partnerships

Oil and gas companies should develop long-term strategic partnerships with key suppliers to improve communication, collaboration, and supply chain coordination. Organisations should encourage supplier involvement during project planning and decision-making processes to improve procurement efficiency and reduce operational delays.

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5.4.4 Adoption of Digital Procurement Technologies

Petroleum engineering organisations should invest in digital procurement systems, supplier management software, and e-procurement platforms to improve supplier monitoring, communication, and procurement transparency. Digital systems can improve procurement tracking, reduce administrative inefficiencies, and strengthen supplier performance management.

5.4.5 Capacity Building and Training

Organisations should provide regular training programs for procurement personnel, supply chain officers, and project managers on modern Supplier Relationship Management practices and procurement strategies. Training programs will improve procurement decision-making and enhance supplier management capabilities within engineering projects.

5.5 Implications of the Study

The findings of this study have important implications for procurement practitioners, project managers, policymakers, and researchers within the oil and gas sector. The study contributes to existing knowledge by demonstrating the importance of Supplier Relationship Management in enhancing procurement efficiency within petroleum engineering projects. The findings provide practical guidance for organisations seeking to improve procurement systems and project delivery performance.

The study also highlights the need for oil and gas companies to move beyond traditional transactional procurement approaches toward collaborative and strategic supplier relationship management models.

Furthermore, policymakers and industry regulators may use the findings to strengthen procurement standards and supplier management policies within the petroleum industry.

5.6 Limitations of the Study

The study was limited to selected oil and gas engineering organisations and may therefore not fully represent all petroleum sector companies. The study also focused primarily on supplier selection, vendor evaluation, and long-term partnerships, while other factors influencing procurement efficiency were not extensively examined. Additionally, the study relied mainly on self-reported data from respondents, which may be subject to bias or subjective opinions. Time and financial constraints also limited the scope of the study and the number of respondents.

5.7 Suggestions for Further Research

Future studies may examine other factors affecting procurement efficiency in oil and gas engineering projects, including procurement digitalisation, contract management, logistics management, and supply chain risk management. Further research may also investigate Supplier Relationship Management practices in other sectors, such as mining, construction, manufacturing, and renewable energy.

Additionally, future researchers may conduct comparative studies between local and international oil and gas companies to examine differences in supplier management practices and procurement performance.

This chapter presented the summary of findings, conclusions, recommendations, implications, limitations, and suggestions for further research regarding the role of Supplier Relationship Management in enhancing procurement efficiency in oil and gas engineering projects.

The study concluded that supplier selection, vendor evaluation, and long-term supplier partnerships significantly improve procurement efficiency and project delivery within the petroleum sector. The chapter also provided recommendations to help oil and gas organisations strengthen procurement systems and supplier relationship management practices to improve operational performance.

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