



A Systematic Literature Review

Impact of Purchasing Performance on Material Inventory and Sustainable Economic Level in Upstream Oil and Gas

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Abstract. This study is to reveal the effect of Purchasing Performance and Material Inventory Performance on the Level of Sustainable Economics in upstream oil and gas industries. We review the research based on the theory and previous empirical studies and use the Systematic Literature Review approach. The process found 28 articles and obtained them according to the criteria. Its results reveal that the effect of purchasing performance on material inventory performance has a significant relationship, and the effect of purchasing performance on company performance in the economic context has a significant relationship. However, research shows inconsistencies in the results, namely the impact of the performance of Material Inventory on Company Performance. The upstream oil and gas industry dynamics is causing Production Sharing Contract Contractors in the Plan of Development (POD) I (Initial POD) stage to face problems caused by a decline in their economic level. The impact of this issue led to further research into the cost aspect. This research addresses the issue within the context of Supply Chain Management (SCM), in accordance with previous researchers, which states that the performance of the SCM function has a significant impact on company performance, especially in terms of financial performance. Common practice is that the SCM role covers purchasing and inventory activities, which their roles support to operation and production activities. In the upstream petroleum industry, the roles of purchasing and material inventory are crucial for the company, since they deal with a huge amount of cost. In spite of this, SCM plays a crucial role, since it is the last gate in controlling the budget for upstream oil and gas operations. This research has difficulty finding articles that examine the same research variables in the upstream oil and gas industry. For this reason, this study uses a literature review approach. We anticipate the findings of this study to be a basis for further research, and decision-making and/or policy-making.

Keywords: Determinant Variable · Sustainable Economics Level · Purchasing Performance · Material Inventory Performance · Systematic Literature Review

1 Introduction

The upstream Petroleum industry was first discovered on August 27, 1859, in Pennsylvania by Colonel Drake [1], Upstream petroleum industry still has the main role in the economy of every country that has non-renewable resources. In Indonesia's context, since the discovery of oil for the first time in 1885 at the Telaga Tunggal 1 Sumatra Well, the role of the upstream oil and gas industry remains one of the country's largest revenues after taxes.

Upstream petroleum still plays a crucial role in supporting the world's energy needs, so this industry still has attractiveness and promising business opportunities for the future. The Petroleum Industry is a business activity that is a lot of challenges and has a special character within the industry [2], that is:

1. It deals with huge amounts of cash,
2. It applies high technology, and
3. It is a high business risk.

The basic principle in running a business is to get the maximum profit or return on investment even though there are risks in doing the business, as well as investors/entrepreneurs in the oil and gas industry who want returns that are higher than the risks they will bear up front [1]. Investors are dealing with businesses that look for returns in the near future. That is the basic concept. The tool for measuring return on investment usually uses the rate of return and the net present value concepts, which refer to investment theory [3], portfolio theory [4], and CAPM (Capital Asset Pricing Model) [5].

Investment theory states that investment will be healthy if the net present value from business activities generates zero value [6]. Keynes and Fisher [7, 8] explained that business investment could provide yields when the present value of expected future income, at a margin, equals the opportunity cost of capital.

Investors must consider the pattern of cooperation with the Government or owners of oil and gas fields when deciding to invest in upstream oil and gas activities or generally called oil exploitation, oil concession contracts in the world are broadly distinguished by a system based on the royalty/tax system (concession) and the contract system [9].

In the economic evaluation of an investment in upstream oil and gas in addition to oil and gas prices, there are three data needed [1] namely:

1. Production profile, made by reservoir technician from drainage mechanism analysis.
2. Cost of capital (Capital Cost) and operation (Operating Cost), based on data assessment of costs.
3. Contractual and fiscal conditions are the determining factors for decision-making.

The three key considerations in making investment decisions [10], are:

1. There is potential for some non-refundable fees.
2. There is uncertainty about the margin to be earned.

3. Investment decisions have potentially been delayed when more information is required to reduce uncertainty.

Upstream petroleum companies when deciding to invest in upstream activities, which are known as capital-intensive and high-risk industries, it is driven by economics according to the life of the project, predictions of long-term oil and gas prices, a portfolio perspective, and a strategic planning approach [11].

Along the journey, the upstream petroleum industry has the character of an industry that has fierce competition, high costs, and fluctuating prices; therefore, decision-making is a critical part [12]. Academic literature has formulated several basic concepts for deciding the investment in the upstream oil and gas industry for hundreds of years but only began utilizing them in the 1950s [11].

Investment decision-making is a crucial path in the upstream oil and gas industry at an early stage, considering it is based on the economic level of the project or the profits or returns that will be obtained. However, what is equally important is maintaining a sustainable economic level. Maintaining profits or returns and ensuring growth from time to time requires making investments. Business growth is considered sustainable in terms of revenue, margin, turnover, and leverage being maintained at current levels [13].

The oil industry's character of large, long-term, and high-risk investments and the peculiarities of the international petroleum cooperation mode, oil prices, and key contract elements play a central role in evaluating projects [14]. In carrying out exploration and production activities, companies that have invested must maintain a sustainable level of the economy from time to time. In an environment of massive competition, higher resource costs, and significant uncertainty in oil prices, companies are therefore required to implement strategies in running the organization so that the economic level can be maintained sustainably from time to time.

The upstream oil industry faces major challenges with future investments to meet the world's growing energy needs [11]. The International Energy Administration estimates that an energy investment project will require funds of USD 22 trillion (2006) in 2006–2030, while investment for developing oil and gas facilities will require \$ 9.6 trillion.

A high level of profitability, especially for companies engaged in oil and gas activities, is one of the main expectations of investors [15]. In the context of maximum profit, Investors must carry out financial due diligence and know the fundamentals of internal and external aspects in making decisions, as well as in the upstream oil and gas industry where investors must know the perspective from the economic aspect of investment supported by supporting data, and also look at the company's internal performance. It can provide prospects for achieving goals to obtain profitability over a certain period.

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The investment theory presented by Bush and Johston [16] explains that the present value theory is the foundation for making investment decisions. The present value is

calculated by discounting future cash flows to the present value and comparing it with the upfront costs incurred or required to be invested in the project. The theory is that investment costs are important to see the economic level of an investment, so this is a concern for further research on the influence of costs in the problems that arise today, especially related to the decline in the economic factor of a field. Speed in business is also the most important thing in supporting activities in this industry. A company will achieve a sustainable competitive advantage by creating a value chain consisting of main and supporting activities that contribute to the company's margins [17].

In investing decision-making in the upstream oil and gas industry, investors shall conduct an economic analysis of their investment, generally analyzing it by considering all aspects, including financial, fiscal, operational, and business convenience [16].

Apart from the financial aspect when deciding on investment in the oil and gas industry, investors also look at the fiscal term aspect that will be adopted in the contract. It is an important stage, bearing in mind that the fiscal period will affect the economic level of upstream investment. Therefore, Financial Due Diligence must be carried out comprehensively to maximize the returns that will be obtained when carrying out oil and gas production activities. Based on research conducted by Al Janahi et al. [18], Priaga and Daryanto [19], and Ariyon et al. [20], the fiscal term stipulated in the contract has a significant effect on the economic level of upstream activity, according to its aspect, oil and gas investors will be interested in investing as long as fiscal term offered is very attractive. The fiscal term is currently an important variable offered by every country to attract investors to conduct exploration and production activities in their country.

In the current dynamics in the upstream oil and gas industry, Contractors of Production Sharing Contracts, especially those still in the Plan of Development (POD) I stage (Initial POD), are facing problems that arise, namely the decline in the Internal rate of return (IRR) or the economy of the oil and gas. The data from Indonesia Upstream Oil and Gas in 2021 reveals that most oil and gas fields have a lower IRR Outlook POD than the initial IRR in POD (Original IRR according to the initial POD). Therefore it becomes part of the Contractor's journey in managing upstream oil and gas activities during the economic downturn of their fields.

In line with these problems and to maintain the field's economy, contractors generally propose additional incentives for it has made their investment for the Government after internal improvement efforts. Many factors contribute to the decline in the economic level of a field, mainly external and internal factors. External factors include the decline in oil and gas prices, while internal factors include the costs of production activities and upstream oil and gas operations. The Problems arise that underlie the need for this research.

The net profit is obtained from the company's remaining profits after deducting revenues and profits with costs and losses [21], based on its role in cost control for a company to increase the profit or economy of a project is crucial. Cost control is strongly influenced by aspects including technical aspects, aspects of Supply Chain Management ("SCM"), aspects of formality, and others.

This research focuses on aspects of SCM activities, especially purchasing and material inventory functions, as main roles in SCM. This study is in line with previous

researchers Al-Shboul et al. [22] and Iftikhar et al. [23], that pointed out the performance of the SCM function has a significant effect on the company's performance, especially the financial aspect. Commonly, a company treats SCM as a supporting function. However, the SCM function is critical in controlling budget spending in upstream oil and gas activities. It manages significant budget expenditures, which is more than 70% of budget expenditures based on data on Indonesia's upstream oil and gas activities.

Maintaining the economic level of exploitation activities is critical for both the Contractor and the Government of Indonesia. For the Contractor to maintain the economic level of the field being operated is a must and to ensure that the investment issued can generate the targeted profit, and also gives a signal to creditors and public investors considering that, in general, the investment funds owned by the Contractor use funds from Funding Institutions/ Financial Institutions and the public through shares. Referring to Signaling Theory [24] explains the signal in terms of information reflects the condition of a company will drive an investor's perspective. Referring to the Signaling Theory [24], explaining signals concerning information reflecting the condition of a company will encourage an investor's perspective. It relates a positive signal to the level of the economy, which will create confidence for investors and vice versa. According to that point, investors in their investments through operating oil and natural gas work areas can provide maximum profits/profits. In line with Contractors, it is also very important for the Government of Indonesia to maximize their takes from the oil and gas sector.

The dynamic conditions that are faced by the upstream oil and gas industry do not make the parties stop in these conditions or the challenges described above, especially those related to economic aspects. Apart from this, the upstream oil and gas industry is also facing other new challenges, such as:

1. Low Carbon Initiative, The world is committed to implementing a net zero carbon emission policy. This commitment impacts the upstream oil and gas industry by incurring new capital costs in the carbon management framework.
2. The Energy Transition, the shift from fossil energy to renewable energy, which is currently massive, will be an important concern in investment activities in the upstream oil and gas industry.
3. The non-conventional oil and gas approach is an alternative to increasing production. However, it requires relatively expensive costs to support these non-conventional activities.
4. The turbulent or unstable oil prices.

Management of costs becomes important as it is adaptive to current environmental conditions. It is in line with the results of research by Wahab et al. [25] Kalkan et al. [26], and Jasti and Kodali [27], that optimal cost management has an impact on company performance in other words maintaining profit growth.

Therefore, it is necessary to research the impact of Purchasing Performance on Sustainable Economics Level in upstream oil and gas, and the research is expected to be a reference for further research in researching, especially in the decision-making process, especially those related to the sustainable economic level and purchasing performance. This study will briefly discuss the background, literature review related to theory and previous research results, research methods, research selection, data collection processes, data items, and a discussion of results and conclusions obtained from this research.

RQ: Whether the Impact of Purchasing Performance and Material Inventory Performance on or Sustainable Economic Level in Upstream Oil and Gas can be identified through empirical research?

2 Literature Review

2.1 Sustainable Economics Level

The Hubbert Peak theory explains that the level of oil and gas production is assumed to follow a pattern on a bell-shaped curve, according to its journey after fossil fuel reserves (natural resource reserves) are discovered. Initial production increases and will continue to increase gradually, as production activities for extraction of oil and gas massively this impact at a certain point resulting in a decrease in oil and gas production. Many variables in the upstream petroleum industry influence decision-making on drilling and development activities and allocating capital across the company's portfolio [11].

To increase profits in their business, investors must have strength in the financial aspect and convince shareholders (banks, fund managers, etc.) to increase their funding. Therefore, companies can create production growth with increased reserve volume. The aspect is one of the important variables in upstream oil and gas activities with high capital-intensive characteristics. Many contractors use oil prices to determine drilling decisions by calculating the potential for lifting oil and gas. High oil prices stimulate drilling decisions because the economic structure will be more profitable. Still, conversely, when prices fall, the company tends to limit some of its exploration and development activities. Suppose these low prices persist for a long time. In that case, it results in decisions to close high-cost wells and delay development and exploration activities in other working areas or new ventures.

Investment decision-making in the context of capital-intensive and high-risk industries, such as upstream oil and gas, is generally based on full-cycle project economic analysis, long-term expected prices, portfolio decisions, and strategic reasons [11]. In particular, decision-making in determining upstream petroleum's investment prospects to prepare the resources needed to support its activities depends entirely on financial conditions, cash flows, business benefits, risk-taking preferences, competition in global capital markets, prospects for drilling, strategic plans, shareholders, and corporate responsibility.

Unpredictable oil and gas prices in the future and uncertain global conditions are the major factors for investors in allocating their capital to develop oil and gas exploration and production activities [28]. Investors in the upstream oil and gas sector, who are usually called contractors, when the Contractor spends capital to carry out exploration and production activities, then strategic efforts will assist in maintaining the economic level by always being responsive and adaptive to environmental changes so that the company can maintain sustainable profits. To maintain the economics of a field, the Contractor must focus on the following matters (Table 1) [1]:

Table 1. Variables to maintain the economy.

Profit Adding Variables	Profit Deducting Variable
Production	Cost
Price	Additional Investment
Additional production from development wells and <i>Improved Oil Recovery (IOR)</i>	Risk
	Environment
	Fiscal

As described previously, maintaining the economic level is strongly influenced by two aspects, namely increasing revenue and cost efficiency. However, along the way, many contractors will face challenges that need to be faced both from internal and external aspects, such as competitiveness, oil and gas prices, government policies, technological progress, business management, human and financial resources, the environment, and other aspects [16].

This study examines the economic level of an oil and gas field based on the aspect of sustainability (sustainable), while the meaning of sustainability (sustainability, noun) and to sustain (to maintain, transitive verb) refers to the original semantics, namely the ability to continue over some time. This research defines the sustainable economics level, referring to the concept of Sustainable Growth [13, 29]. The concept defines a sustainable growth rate as the percentage increase in annual sales consistent with defined financial indicators (target debt-to-equity ratio, target dividend payout ratio, target profit margin, and target ratio of total assets to net sales [29]).

The concept of Sustained Growth Rate [13] refers to the concept of business growth, which explains that a business has sustainable growth if the revenue, margin, and turnover obtained can be maintained at the current level, meaning that the profit margin movement on sales or revenue from one period to others is positive.

The sustainable economic level indicator uses the IRR Indicator: $IRR(t')$: $IRR(t)$. If the result is 1, then the economic behavior does not change in the current period compared to the original. Meanwhile, if it is above 1, then there is growth at the economic level and vice versa. Other used indicators are Net Present Value (NPV), Pay On Time (POT), and the ratio of revenue and cost (R/C ratio).

2.2 Expenditure

When developing a work area, the Cooperation Contract Contractor will incur a significant investment cost considering that this industry has a high investment character.

1. Exploration Fee
2. Exploration Drilling Cost
3. Logging Fee
4. Development Cost
5. Development Drilling Cost
6. Operation and Production Cost

7. Abandonment Site Restoration (ASR) fees.

The Economic Theory of Transaction Costs [30] defines transaction costs as the total costs associated with carrying out activities, such as planning, decision, plan change, and after-sales costs. In connection with maintaining the economic level, the theory explains that every decision must consider the operations and production aspects using a cost-effective and efficient approach. Expenditures associated with upstream oil and gas capital investment in Indonesia [31] explain:

1. Administrative expenses, which include licensing fees and rights to carry out exploration and exploitation;
2. Exploration expenditure, which includes all costs related to oil and gas exploration activities, including seismic, geological, and geophysical expenditures;
3. Development expenditures in the field, and
4. Production expenditure in connection with oil and gas production activities.

Under the accounting policy for Indonesia's upstream oil and gas activities, there are two types of expenditure, namely operating expenditure and capital expenditure, each of which is treated differently in cost recovery. The operator will charge the Operating expenditure to cost recovery within the current year, while they will charge the capital expenditure category using the depreciation approach.

2.3 Purchasing Performance

Purchasing Management is an activity that the company must strive for in obtaining goods or services from suppliers to support its operational activities. These activities generally include planning the purchasing of goods/services along with developing a purchasing strategy, establishing specifications or scope of work on what needs to be purchased according to requests from the user (user), selecting suppliers through the purchasing process for goods/services, preparing contracts/purchase notes, and speeding up/expediting the delivery or implementation of goods/services work.

Many scholars state that purchasing activities have played an important role for organizations since there has been a shift in roles leading to strategic activities in this decade. Strategic activities have experienced a significant increase, such as outsourcing activities and making or buying decisions [32]. Mostly, the articles selected state that many companies prepare their strategic plan by obtaining a buying strategy rather than deciding to make (making their own). The current unstable (volatile) conditions will encourage many companies to be more agile and sustainable by implementing strategic efforts to mitigate risks, such as shifting the burden to other parties (outsourcing) to support the company's needs for goods/services.

Purchasing Management concept adopts the theories of transaction cost analysis, network, and Resource-Based. This theory is the foundation for purchasing management, which is managed strategically to support the company's activities. Considering that purchasing is an important aspect of the company, the company has to apply performance measurement within purchasing activities consistently and align with the company's strategy [32, 33].

The company measures purchasing performance by indicating how efficiently and effectively purchasing organizations perform their jobs. The researcher defines efficiency as optimal in allocating resources to meet targets. In contrast, effectiveness is how precisely efforts are made to meet targets [34] as the definition of purchasing performance explained by Campbell et al. [35] that the performance of an organization is considered good in terms of all the targets set being achieved and implemented strategically. Similarly, the performance of the organization's purchasing function is considered good in terms of contributing to the organization with maximum and optimal results in spending management. Based on the concept of van Weele [32] explains that in measuring the performance of the purchasing function based on indicators of efficiency and effectiveness, the measurement of purchasing efficiency indicators is based on aspects of purchasing costs, product quality, and logistics. The effectiveness of purchasing is how appropriate and optimal the resources are used in the purchasing organization.

Purchasing performance in the industry is generally a success factor for companies because by contributing to competitive purchasing and acquisition of quality goods that place the organization's products or services. On the other hand, poor purchasing performance has caused organizational financial losses due to the delivery of poor-quality work materials, loss of value for money, and price increases. Low purchasing performance also contributes to declining profitability [36]. According to Migai [37], poor purchasing performance is a major obstacle to organizational growth because it causes delivery delays, increased defects, delivery of low-quality goods, or non-delivery.

2.4 Materials Inventory Performance

Gopalakrishnan and Haleem [38] explain that Material Inventory Management plays an important role in the continuity and growth of an organization's business. It means that effective and efficient management of inventory materials will create a competitive advantage for the company's sustainability and increase company value. Material Inventory Management and Purchasing Management are part of SCM activities. However, the financial aspect is also very attached, considering that inventory or material inventory consists of raw materials, work-in-process products, and finished products. It is an asset for the company that will be reported in the company's financial statements. Even though it is treated as an asset, it will provide more benefits or add value to the company during the last activity. For example, in manufacturing activities, where inventory material cannot provide added value if it is still stored in the warehouse as stock/inventory or raw material or in the work-in-process stage, but if it has become a finished product/finished product, it will have added value for the company.

The scope of Material Inventory Management activities [39] includes management of material replenishment, storage costs, stock control, valuation, prediction of inventory costs, quality management, returns and defects of material, and material storage. The basic foundation in inventory management is planning, implementing, and controlling the movement and storage of inventory materials that are carried out effectively and efficiently.

Scholars define inventory management as supporting operational activities, including planning, organizing, and controlling continuous inventory to control inventory value efficiently and manage material requirements effectively and in a balanced manner

between incoming and outgoing materials [40]. Inventory control is one of the key success factors in inventory performance, and its activities include ensuring the availability, utilization, control, and purchasing of inventory materials [41]. Inventory control can be translated as activities that combine aspects of time and quantity in the sense of efforts to obtain inventory materials promptly and in the right amount according to operational needs.

Balancing between supply and demand for inventory materials to reach an optimal inventory level is challenging. It is a continuous process, considering business needs are dynamic and react to the environment. Inventory material management will directly or indirectly affect the profitability of an organization. For that, it is very important in its management considering the need for special efforts in balancing operational needs. This effort is important considering that, in the event of an imbalance between supply and demand, it will affect as follows:

1. If the inventory material prepared is in excess to meet operational needs, it will impact excess inventory material.
2. On the other hand, an out-of-stock will occur if there is a shortage in meeting the material inventory needs.

It will ultimately be detrimental to operational and financial aspects. The solution in dealing with that issue is that many researches or studies have examined how to balance supply and demand at an optimal level, and it aligns with company performance and value-added. Since the mid-1990s, Jacoby [39] has identified an enormous increase in the annual number of inventory management articles. Researchers have conducted many researches or studies that have revealed the connection between the performance of Material Inventory Management and improved company performance.

2.5 Systematic Literature Review (SLR)

The systematic review is a systematic literature review method that collects secondary data, assesses research studies, and synthesizes findings qualitatively or quantitatively [42]. Another definition of SLR is a scientific process carried out to collect all related research results according to the aspects to be studied based on the process of identification, evaluation and interpretation, or in other languages that the SLR method is a process carried out by systematic review and identification of journals, as for the process carried out follows the steps according to the procedure [43].

The study used a systematic literature review method to identify, review, evaluate, and interpret all studies aligned with relevant criteria and the context of research interest. SLR has proven to be a method that can provide an overview of research trends, effectiveness, and coverage of field research in previous studies [44].

3 Research Methods

This type of research uses the Systematic Literature Review method, a research methodology or certain research and development carried out to collect and evaluate related research on a particular topic focus [43]. A Systematic Literature Review method consists of several stages as follows:

1. Defining Eligibility Criteria

The research aims to obtain the impact of Purchasing Performance and Material Inventory Performance on the Sustainable Economics Level in the Upstream Petroleum Industry.

2. Defining Information Sources

The database sources used in searching the literature in this study are Google Scholar and Scopus.

3. Study Selection

Study selection was conducted in 3 stages as follows:

- Using search keywords following the research objectives: Impact of Purchasing and Material Inventory Performance to Sustainable Economics Level in Upstream Oil and Gas. The search keywords entered were: (“Impact*”) OR (“Purchasing*”) OR (“Material Inventory*”) OR (“Performance*”) OR (“Determinant*”) OR (“Sustainable Economics Level*”) OR (“Upstream*”) OR (“Oil and Gas*”)
- Obtaining the articles based on titles, abstracts, and keywords within the eligibility criteria
- Obtaining the articles by reviewing and interpreting the content within eligibility criteria.

4. Data Collection Process

Data was collected manually by data extraction based on content analysis, including the type of article, journal name, year of publication, topic, title, research methodology, respondents/research data, and country of research location, while the variables used in this study were Purchasing Performance, Inventory Performance and Sustainable Economic Level in Upstream Oil and Gas.

5. Data Item Selection

Data items were obtained from articles which were then grouped by year of publication, researcher, country and sample, research objectives, research variables, and research results, especially related to the variable Influence of Purchasing Performance, Performance of Economic Level Sustainable Material Inventory in Upstream Oil and Gas, while the steps are as follows:

- Identification
Searched through Database of Google Scholar and Scopus.
- Screening
Screening the papers based on title and abstract.
- Eligibility
Full-text review of the papers.

- Inclusion

The papers selected are aligned with the Inclusion Criteria

6. Eligibility Criteria

Triandini et al. [43] explained that the eligibility criteria in this study included inclusion and exclusion criteria. The inclusion criteria in this study were:

- Literature in the form of scientific journals and proceedings.
- Sources of scientific journals and proceedings Google Scholar and Scopus.
- Scientific journals and proceedings have open access.
- Articles must be accessible in full text.
- Scientific journals and/or proceedings using English or Indonesian.
- The year of publication of scientific journals and/or proceedings between 2012–2022.
- Discussions in scientific journals and proceedings include the flow of.
 - purchasing performance purchasing on material inventory performance,
 - purchasing performance and material inventory performance on firm performance or sustainable economics level in upstream oil and gas activities or other industries.
- The researchers used qualitative methods to review the expected articles systematically.

4 Results and Discussion

4.1 Research Results and Qualitative Synthesis

Search results are on Google Scholar and Scopus. Database via keywords (“Impact*” OR o (“Purchases*” OR (“Inventory of Materials*” OR (“Performance*” OR (“Determinator*” OR (“Sustainable Economic Level*” OR (“Upstream*” OR (“Oil and Gas*” in 999 articles published from 2012 to 2021 written in English. The further process will evaluate and interpret the selected articles, therefore the articles are obtained based on the eligibility criteria according to the title, abstract, and keywords.

Based on the relationship according to these criteria, the remaining 28 articles were obtained. All of these articles examined the relationship between variables, as expected. Those discuss the relationship between Purchasing Performance to Material Inventory Performance and the relationship between Material Inventory Performance and Purchasing Performance to Sustainable Economics Level (see Table 2).

Most of the twenty-eight papers referred to in this study used regression analysis in analyzing the relationship between variables, and the others used the same method as this study, namely literature review.

4.2 Systematization of Determinants

From the 28 (twenty-eight) articles selected in the first selection, the impact on Sustainable Economics Level was further analyzed with the following additional criteria:

1. Material Inventory Performance and Sustainable Economics Level used as the dependent variable

Table 2. List of articles and qualitative synthesis.

Years	Author	Title	Country, Sample & Method	Purpose
2012	Bala dan Sharma [45]	<i>Purchasing Efficiency Impact on Inventory Valuation and Company's performance</i>	<ul style="list-style-type: none"> India The research uses a literature review method by utilizing the conceptual model. 	The research aims to examine the relationship of business and inventory performance to purchasing efficiency.
2012	Dobrzykowski, Hong dan Park [46]	<i>Building purchasing capability for firm performance: a service-dominant logic view</i>	<ul style="list-style-type: none"> USA The research uses data from 711 companies in 23 countries. This study uses exploratory factor analysis methods and T-tests on the variables studied. 	The study aims to reveal the relationships between purchasing capability and ultimately firm performance.
2012	Hofer <i>et al.</i> , [47]	<i>The effect of lean production on financial performance: The mediating role of inventory leanness.</i>	<ul style="list-style-type: none"> USA The research uses samples taken from 229 survey respondents, Secondary 82 Companies. This study uses a Technical Analysis by utilizing a regression model. 	The study aims to examine empirically the relationship between inventory leanness implementation and financial performance.
2012	Obermaier and Donhauser [48]	<i>Zero inventory and firm performance: a management paradigm revisited.</i>	<ul style="list-style-type: none"> Germany The research uses samples taken from 3057 firms. 	This research aims to reveal the impact of the zero inventory method on company performance.
2013	Isaacsona and Seifert [49]	<i>Inventory leanness, and the financial performance of firms</i>	<ul style="list-style-type: none"> Switzerland. The research uses samples taken from 4324 manufacturing companies from the US within the period 1980–2008. The study uses a technical analysis approach by using econometric analysis and a fixed effect estimator of instrumental variables. 	This paper aims to reveal the financial impact of lean inventory on company performance.
2014	Sobhani et al., [50]	<i>Strategic Purchasing and Financial Performance of Iranian Manufacturing Companies</i>	<ul style="list-style-type: none"> Iran The research uses a sample taken from Iranian manufacturing. The study uses a cross-sectional explanatory approach. 	The research aims to reveal the relationship between Strategic Purchasing and Firm Performance in the context of the financial aspect.

(continued)

Table 2. (continued)

Years	Author	Title	Country, Sample & Method	Purpose
2014	Chimwani et al., [51]	<i>Factors Influencing Purchasing Performance In The Kenyan Public Sector: Case Study Of The State Law Office.</i>	<ul style="list-style-type: none"> • Kenya • The research uses samples from 60 respondents or 10% of the target population of 60 staff. • This study uses a stratified sampling method. 	This research aims to reveal the factors that influence purchasing performance at the State Law Office
2014	Caniato et al., [33]	<i>Purchasing performance management systems: an empirical investigation.</i>	<ul style="list-style-type: none"> • Italy • The study uses a literature review method. 	This study aims to indicate the impact of purchasing performance on the efforts of suppliers.
2014	Goh and Lim [52]	<i>Centralizing Slow-Moving Items in a Retail Network – A Case Study.</i>	<ul style="list-style-type: none"> • Singapore • This research uses the case study method to measure the effectiveness of the proposed approach. 	This study indicates the impact of slow-moving goods inventory on retail performance.
2015	Prempeh [53]	<i>The impact of efficient inventory management on profitability: evidence from selected manufacturing firms in Ghana.</i>	<ul style="list-style-type: none"> • Ghana • The research uses cross-sectional data taken from 2004 to 2014 based on the annual reports listed companies on the Ghana Stock Exchange. • The study uses a regression model by utilizing an analysis approach. 	The study aims to reveal the relationship between inventory management in terms of efficiency and the profitability of manufacturing firms in the Ghana Context.
2015	García-Alcaraz et al., [54]	<i>The impact of purchasing and inventory management on operative performance in a supply chain.</i>	<ul style="list-style-type: none"> • México • The study uses 14 observed variables. • The study uses the Structural Equation Model (SEM). 	The research aims to reveal the impact of raw material purchasing on the inventory management administration and operative performance.
2016	Elsayedn and Wahba [55]	<i>Re-examining the relationship between inventory management and firm performance: An organizational life cycle perspective.</i>	<ul style="list-style-type: none"> • Egypt • The research uses samples from 84 Egyptian-listed firms between 2005 and 2010. • The study uses analysis techniques by utilizing multivariate regression analysis. 	The study aims to reveal the relationship between inventory-performance and the stage of the organization's life cycle.
2017	Ateş and van Raaij [56]	<i>The impact of purchasing strategy-structure (mis)fit on purchasing cost and innovation performance</i>	<ul style="list-style-type: none"> • Netherlands • The study uses data taken from 469 firms in ten countries. 	This research is to indicate the impact of purchasing strategy on purchasing cost and innovation performance.

(continued)

Table 2. (continued)

Years	Author	Title	Country, Sample & Method	Purpose
2017	Elkinga et al., [57]	<i>Financial Dependence, Lean Inventory Strategy, And Firm Performance</i>	<ul style="list-style-type: none"> · USA · The study uses data from 550 manufacturing firms and samples from 310 focal firms in connecting with 1,032 suppliers. · The study uses the Generalized Least Squares (GLS) method. 	The study aims to further investigate the moderating impact of dependence asymmetry on the relationship between lean inventory strategy and focal firm financial performance.
2018	Duangjan [58]	<i>Sustainable purchasing and business performance in manufacturing industries</i>	<ul style="list-style-type: none"> · China · The study uses a literature review method. 	The study aims to reveal the effect of sustainable purchasing on extend corporate social responsibility (CSR).
2018	Kumar et al., [59]	<i>Performance and Purchasing effects of Healthcare Supply Chain</i>	<ul style="list-style-type: none"> · India · The study uses data taken from primary data and secondary data. · The research uses the Structural Equation Model (SEM). 	The study aims to indicate the relationship between collaborative mechanisms and purchasing behavior, and supply chain management performance.
2018	Li [60]	<i>Cooperative purchasing and preactive inventory sharing –Channel balancing and performance improvement</i>	<ul style="list-style-type: none"> · China, · The study uses a Literature Review by using the <i>conceptual model</i>. 	The study aims to reveal the relationship between cooperative purchasing and the firm's profits.
2019	Abbey dan Ong'unya [61]	<i>Purchasing performance and profitability in foam mattress firms in Uganda</i>	<ul style="list-style-type: none"> · Uganda · The study uses samples taken from 40 departments and 200 respondents. · The study uses stratified and simple random sampling techniques using correlation and regression statistical analysis. 	The study examines the effect of purchasing performance on the profitability of Foam Mattress Firms in Uganda.
2019	Tasdemira dan Hiziroglu [62]	<i>Achieving cost efficiency through increased inventory leanness: Evidences from oriented strand board (OSB) industry</i>	<ul style="list-style-type: none"> · USA, · The study uses a six-step systematic optimization approach (SOA) using Time series and regression. 	The study aims to indicate the impact of inventory leanness on financial performance.
2019	Liu, Chiu dan Chiou [63]	<i>Improving the Performance of Purchasing and Inventory Management of Hospital Materials (Case of a Taiwanese Medical Centre)</i>	<ul style="list-style-type: none"> · Taiwan · The study uses a literature review method by utilizing the conceptual model. 	The study aims to reveal the impact of purchasing and inventory management performance on inventory policies.

(continued)

Table 2. (continued)

Years	Author	Title	Country, Sample & Method	Purpose
2019	Anbuudayasankar, et al., [64]	<i>Purchasing methodologies to optimize the inventory levels of spare parts</i>	<ul style="list-style-type: none"> • India • The study used a three-dimensional approach by utilizing ABC analysis. 	The research aims to examine the relationship between inventory management methods and the performance of inventory management in the context of effectiveness.
2019	Farooq [65]	Title: <i>Impact of Inventory Turnover on the Profitability of Non-Financial Sector Firms in Pakistan</i>	<ul style="list-style-type: none"> • Pakistan • The study uses samples from 79 companies from Pakistan's cement, sugar, and automotive sectors and data from 2006 to 2015. • The research uses analysis techniques by utilizing regression. 	The study aims to examine the effect of inventory turnover on company profitability.
2019	Khan dan Siddiqui [41]	<i>Impact of Inventory Management on Firm's Efficiency - A Quantitative Research Study on Departmental Stores Operating in Karachi</i>	<ul style="list-style-type: none"> • Pakistan • The Data was from 250 individuals from different departmental stores in Karachi. • The study uses Structural Equation Modeling (SEM). 	The study examines the relationship between various inventory management factors and a firm's efficiency.
2020	Ali et al., [66]	<i>Improved MRO Inventory Management System in Oil and Gas Company: Increased Service Level and Reduced Average Inventory Investment</i>	<ul style="list-style-type: none"> • Pakistan • The study uses ABC analysis method. 	This research indicates the relationship between maintenance, repair, and operating (MRO) inventory performance and improving production plant uptime.
2020	Schütza, Kässera, Blome and Foerst [67]	<i>How to achieve cost savings and strategic performance In purchasing simultaneously: A knowledge-based view</i> Author links open overlay panel	<ul style="list-style-type: none"> • Europe Company. • The study uses samples from 179 respondents (57% are managers, and 43% are non-managerial. • The study uses a confirmatory factor analysis (CFA) method. 	The study examines the effect of knowledge purchasing and purchasing integration on strategic costs and performance.
2021	Faustin, Gamariel, [68]	<i>Effect of Contract Management on Purchasing Performance in Procuring Entities: A Case of Rwanda Energy Group (Reg), Kigali</i>	<ul style="list-style-type: none"> • Rwanda • The study uses samples taken from 66 respondents. • The study uses the Pearson Product-Moment Correlation method. 	This study aims to indicate the relationship between contract management and Purchasing performance.

(continued)

Table 2. (continued)

Years	Author	Title	Country, Sample & Method	Purpose
2021	Kipchumba dan Keitany [69]	<i>Influence of inventory control systems on purchasing performance in the county government of uasin gishu, Kenya</i>	<ul style="list-style-type: none"> · Kenya · The study uses samples taken from 65 purchasing staff. · The study uses descriptive and inferential statistics methods. 	The study aims to reveal the relationship between the inventory control system and purchasing performance by reducing the risk of product shortages and avoiding lost sales.

2. As the independent variable, the study uses Purchasing Performance and Material Inventory Performance.
3. This study focuses on research on general industries that approach oil and gas.
4. The research reviews based on the similarity of characters on costs spent or spending through SCM activities

Based on the criteria above, the determinants, indicators, results, conclusions, and references of Sustainable Economics Level, the Table 3 reveal the result of the process (containing 37 indicators).

4.3 The Relationship Between Variable

1. The Impact of Purchasing Performance on Material Inventory Performance.
 Researchers used Purchasing Performance and Material Inventory Performance variables in their research and found 6 studies related [45, 54, 60, 62–64]. The result found a significant relationship between Purchasing Performance to Material Inventory Performance.
2. The Impact Purchasing Performance to Sustainable Economics Level
 The researchers use Purchasing Performance and Sustainable Economic Level variables (represented by firm performance), found 11 studies [33, 45, 46, 50, 51, 56, 58, 59, 61, 68]. The result found a significant relationship between Purchasing Performance to Material Inventory Performance.
3. The Impact of Material Inventory Performance on Sustainable Economics Level
 The researchers use Purchasing Performance and Material Inventory Performance variables in their study, found 9 studies [41, 47, 49, 52, 53, 57, 62, 66, 69]. The results found no significant relationship between Material Inventory Performance to Firm Performance Obermaier and Donhauser [48], Elsayed and Wahba [55], Farooq [65].

4.4 Discussion

The process selects 28 articles that explain the Effect of Purchasing Performance and Material Inventory Performance on the Sustainable Economic Level since the process can't find the Sustainable Economic Level variable. Therefore firm performance variable will represent Sustainable Economic Level, which has the same meaning. It is hard to

Table 3. Determinants of sustainable economics level.

Determinant Variable	Indicator	Result	Conclusion	Previous Research
Purchasing performance	<ul style="list-style-type: none"> • Quality • On-time delivery • <i>Inventory</i> performance • Cost Saving • Delivery • Flexibility • Ratio of purchasing operation expense to total purchase dollars spent • Ratio of purchasing operation Expense to sales revenue • Innovation • Sustainability • Quality of the materials purchased • Timely (on-time) delivery • Actual cost of materials against the target cost • Inventory planning • Order cycles establishment • Stock • Balancing Inventory • Tracking Purchasing • Performance Purchasing cycle time • Vendor Performance 	Positive	Consistent result	Haladu & Nashwan [70], Dissanayake et al. [71], Kuzey & Uyar [72], Orazalin & Mahmood [73], Dissanayake et al. [74], Amran & Haniffa [75]
Material inventory performance	<ul style="list-style-type: none"> • NOM (Net operating margin • NVDA (Number of days inventories • Inventory leanness • Holding cost per unit time for the cycle stock • Inventory costs • Service levels • ELIT (ELI total inventory) • ELIRM (ELI raw materials) • ELIWIP (ELI work in progress • ELIFG (ELI finished goods • RM = Raw Materials • FX = foreign exchange costs • IM = maintenance repairs and operating supplies • Maintenance Policies • Transportation cost • Holding cost • Ordering cost • Leanness inventory • Capacity Utilization • Firms' Efficiency • Inventory Accuracy • Lean Inventory System • Stock Availability • Stock-Out Cost Approach (SCA • Initial inventory • Ending inventory • Average inventory value • Turn Over Ratio (TOR • Calculating storage time • Turnover ratio (TOR) 	Positive	Inconsistent result	Koumanakos [76]; Hofer et al., [47]; Isaksson dan Seiferta [49]; Goh and Lim [52]; Prempeh [53]; Elkinga et al., [57] Tasdemira dan Hiziroglu [62]; Khan dan Siddiqui [41]; Ali et al., [66]; Kipchumba dan Keitany [69].

(continued)

Table 3. (continued)

Determinant Variable	Indicator	Result	Conclusion	Previous Research
	<ul style="list-style-type: none"> • Inventory to sales ratio • ROA (Return on assets) • ROE (Return on equity) • ROA = return on asset • ITO = inventory turnover • LOS = log of sale • NWC = net working capital • SGR = sales growth ratio 	Negative		Obermaier dan Donhauser [48]; Elsayed dan Wahba [55]; Farooq [65].

find similar research that is conducted in the upstream oil and gas industry, or the research conducted in its industry is rare. According to the issue, this study applies the process based on the following approaches to gather the conclusions:

- The similar character of the industry, such as an industry based on natural resources and capital intensive.
- Purchase budget vs. overall budget for the year.
- Material Inventory vs sales value.
- The process uses firm performance variables to represent Sustainable Economics Level.

1. The Impact of Purchasing Performance on Material Inventory Performance

This study indicates that there is a significant relationship between Purchasing Performance and Material Inventory Performance. This aligns with the Just In Time theory or Zero Stock Policy, which states that a low material inventory value can support better company performance. The role of the purchasing function in organizations today is one of the main variables that greatly influence optimal inventory management. This is because purchasing performance focuses on how efficiently and effectively purchasing organizations do their work. According to Achabal et al., [34], efficiency is described as using resources in the best way to fulfill a given strategy, while effectiveness is how well the organization’s goals are achieved.

The relationship between purchasing performance and inventory material performance that can be measured directly is the unit price of the material. If a decrease in the unit price of the material will impact the decrease in inventory value and storage costs which are indicators of the performance of the material inventory manager. Another measurable proof of relationship is when the purchasing function applies a contract that applies the just-in-time, consignment, or vendor-managed stock method, and the method will directly impact the decline in the value of material inventories. The explanations previously presented are universally applicable, which means it applies to every industry, including the upstream oil and gas industry. Based on this, it can be explained that the impact of Purchasing Performance on Material Inventory Performance, especially in the upstream oil and gas industry, has a significant positive relationship, this makes it easier for new researchers who want to study the relationship between purchasing performance. Using the indicators used by previous researchers can affect the performance of material inventories in other industries such as oil and gas.

2. The Impact of Purchasing Performance on Sustainable Economics Level

This study indicates that there is a significant relationship between Purchasing Performance and Sustainable Economics Level (represented by firm performance). In modern organizations, purchasing is a function that has an important role in business organizations and is one of the key success factors for company [77]. Over the years, purchasing literature has become an important topic to examine for the contribution of purchasing to corporate strategy and firm yields [78, 79]. Researchers have agreed on the important role of purchasing for companies to create added value for companies in terms of improving operations and financial performance [30, 80, 81]. Researchers are currently interested and focused on discussing and studying further aspects of improving purchasing performance concerning the activities of the early stages of company operations [82, 83].

The definition of performance described by Campbell et al. [84] is that performance is what the organization hires to do and is done well so that the existence of the purchasing function of an organization or company is expected to do its job or role well in order to contribute its performance to the company with maximum results.

The scope of Purchasing Management is the purchasing of goods/services to support operations/production activities in oil and gas. Purchasing Management is important considering the value of purchasing in upstream oil and gas business activities is a big number of USD with an estimate of 70% of the total budget (based on data on upstream oil and gas activities in Indonesia). Therefore, it becomes an interesting study to research the influence of Purchasing Performance on Material Inventory Performance and Sustainable Economics Level of Oil and Gas Field.

The research directly on oil and gas companies is still difficult to find, however, previous research that has been conducted in other industries can provide the same picture that purchasing performance has a significant influence on firm performance which in this context represents a sustainable economic level variable. Using previous research indicators, this approach provides convenience to new researchers who want to examine the relationship between purchasing performance and company performance, especially financial aspects or sustainable economic levels in other industries such as oil and gas.

3. The Impact of Material Inventory Performance to Firm Performance/ Sustainable Economics Level

The relationship between Material Inventory Performance and Firm Performance/Sustainable Economics Level was found to be inconsistent. The importance of performance in Material Inventory Management activities in every company, considering it will create added value for the company and its business continuity [85]. In this regard, it is necessary to measure the performance of the Material Inventory. The measurement must consider aspects of effectiveness, efficiency and accuracy as an important basis for measuring performance [38].

The scope of inventory management activities in the context of this research is the management of inventory materials to support operational/production activities in the upstream oil and gas sector, in order to support the following activities:

1. Drilling activities, such as casing, tubing, and conductors.
2. Project activities, such as pipes and fittings.

3. Operational activities, such as maintenance, repair, and operation (MRO) materials (engine units and spare parts).

Similar to the previous discussion related to purchasing management, inventory management in upstream oil and gas business activities is an interesting topic to discuss and study, considering that management has complex challenges and is based on data from Indonesian upstream oil and gas activities where the estimated ratio between the average material inventory and value oil and gas sales per year by 4% - 6% (this is heavily influenced by the selling price of crude oil and gas). In this regard, it is interesting to conduct research related to the effect of inventory performance on company performance related to financial aspects. Similar research conducted directly on oil and gas companies is still difficult to find, however, previous research that has been conducted in other industries found that the majority of studies have the same conclusion that the performance of material inventories has a significant effect on sustainable economics level, especially for industries with material value inventories that affect production costs significantly. However, based on the form of this relationship, inconsistent results were found in this study where there were results that had a positive effect and some had a negative effect. This can happen because of differences in research indicators used and different objects. These different conclusions can become a research gap for future researchers to complete the research gap.

5 Conclusions

Based on the designed inclusion and exclusion criteria, 28 studies were selected and identified. The analysis of the main study reveals that research related to the impact of Purchasing Performance and Material Inventory Performance on Sustainable Economic Level in Upstream Oil and Gas. The results of this study highlight that as follows:

1. The impact of Purchasing Performance on Material Inventory Performance has a significant impact within industries that have the same character as the upstream oil and gas industry,
2. The impact of Purchasing Performance on the Sustainable Economics Level which in this study is represented by company performance has a significant impact within industries that have the same character as the upstream oil and gas industry.
3. The relationship between Material Inventory Performance and Sustainable Economics Level (in this study, it is represented by the firm performance variable), where inconsistent results are obtained that there are positive and negative results. The difference in results is generally influenced by the magnitude of the value of material inventory, which has a relatively significant contribution to production costs, in addition to the causes of the differences that occur due to differences in research indicators used and different objects. These different conclusions can be a gap for further researchers to complete the study.

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