

Ethical Dilemmas in Oil & Gas Procurement: A Systematic Literature Review

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Abstract

This systematic review delves into the significant ethical dilemmas prevalent in Oil & Gas procurement, focusing on bribery, fraud, and conflicts of interest. It analyzes how these unethical practices negatively affect corporate performance and erode stakeholder trust. The review explores potential solutions, including stricter regulatory frameworks and the implementation of value-based management. The role of the Sarbanes-Oxley Act (SOX) in promoting ethical procurement is also considered. Furthermore, the integration of AI, blockchain, and IoT offers unprecedented opportunities to cultivate ethical conduct throughout the supply chain. However, it is essential to proactively mitigate potential risks related to data privacy, security, and algorithmic bias. By leveraging the synergistic power of these 3 technologies, the Oil & Gas sector can move towards a better ethical procurement future, characterized by more transparent, accountable, and ultimately, responsible supply chains.

Keywords

Procurement Ethics, Oil & Gas, Bribery and Corruption, Fraud Prevention, Value Based Management, SOX, E-Procurement, AI, Blockchain, IoT

1. Introduction

Ethical procurement forms the bedrock of responsible business conduct, representing an unwavering commitment to integrity, fairness, and strict adherence to compliance standards across all procurement activities. However, the procurement landscape is persistently challenged by ethical risks such as bribery, fraud, and conflicts of interest, which can severely erode business value, damage stakeholder trust, and lead to significant legal and financial repercussions.

Procurement is essential for businesses, managing funds and investment decisions. Effective procurement—acquiring the right product at the right time and

price—generates significant cost savings and maintains competitiveness through strategic sourcing, supplier management, and negotiation. Conversely, poorly managed procurement can negatively impact earnings. As well, inventory management is crucial to procurement, as purchasing unnecessary or excessive inventory, even at favorable prices, can lead to costly storage, especially for perishable goods. If so, ineffective inventory control burdens finance and reduces profitability.

Procurement scams involve fraudulent activities by employees or vendors to secure projects or manipulate contracts. These unethical practices include duplicate invoices, collusion with favored suppliers, and other deceptive actions. Such behavior damages a company's reputation and can lead to the loss of key customers and suppliers. As stated by [Price Waterhouse \(2022\)](#), the energy, utilities, and mining sector, which includes Oil & Gas companies, experienced a significant increase in fraud over the past year. In 2019, 23% of organizations in this sector reported fraud incidents, which was higher compared to the global average of 13%.

Despite being a serious offense, procurement fraud is often driven by personal gain or revenge, with perpetrators disregarding the risks. Organizations combat this through robust internal controls, vendor due diligence, segregation of duties, and transparency. They also implement ethics policies and codes of conduct, establish reporting hotlines, and conduct regular audits to detect and prevent fraud ([Husser et al., 2014](#)).

Simultaneously, the Association of Certified Fraud Examiners (ACFE) published a report specifically on occupational fraud in the Oil & Gas industry. Their study found that the median loss due to purchasing fraud in this sector was \$200,000, with 14.5 months being the median duration of fraud before detection ([Saudi Aramco, 2014](#)). Additionally, it is estimated that globally, Oil & Gas companies lose approximately 5% of their annual revenue due to various forms of deception. Considering the significant revenues earned by the industry, this translates to billions of dollars lost each year ([Department of Communication, 2017](#)).

According to the National Whistleblower Center (<https://www.whistleblowers.org/oil-gas/>), the 2016 Global Fraud Survey shows that, in the Oil & Gas and mining industry, 43% of employees would engage in fraud to meet financial targets and 35% would engage in fraud to help a business survive a downturn. As well, the 2020 Global Study on Fraud and Abuse by Association of Certified Fraud Examiners, the energy sector was the fifth most affected by fraud in the previous 12 months and the second-highest industry under the survey's listing of median loss from fraud ([Jordan & Zauner, 2021](#)).

A code of business also called a code of conduct or ethics, provides guidelines and principles for acceptable behavior within an organization. It acts as a moral compass, promoting integrity, transparency, and responsible actions in all business operations, reflecting the organization's values, mission, and vision, and guiding employee decision-making and behavior at all levels. It emphasizes core

principles like honesty, respect, fairness, and accountability, establishing a positive and ethical work environment. Key components of a code of business often include guidelines on conflicts of interest, diversity and inclusion, confidential information protection, legal and regulatory compliance, fair competition, and responsible financial management. It may also cover environmental sustainability, health and safety, anti-bribery, and anti-corruption. In parallel, other various factors influence it: 1) Favoritism being the most prevalent unethical issue in UAE Oil & Gas procurement; 2) Organizational culture playing a significant role in mitigating unethical behavior; 3) Correlation between the prevalence of unethical bribes and employee pension contributions; 4) Weaknesses in financial audit systems within company procurement committees.

In an era of rapid technological advancement, the present authors believe that artificial intelligence (AI), blockchain, and the Internet of Things (IoT) are emerging not only as tools for operational optimization but also as powerful mechanisms for bolstering transparency, enhancing accountability, and ultimately fostering a culture of ethical conduct within procurement processes. If bribery, fraud, conflicts of interest, codes of conduct, hefty fines, and imprisonment, for instance, only respect the human and the law perspective, certainly the technological dimension may take on this wicked problem (like obesity, drug trafficking, nuclear weapons, homelessness, and social injustice) with no definitive and ultimate solution.

Under this imperative of ethical procurement in the digital age, the present literature review examines key ethical challenges faced by purchasing management, with some focus on the Oil & Gas industry. It is structured as follows: Sections 2 and 3 discuss some realities of Oil & Gas procurement and SOX (Sarbanes-Oxley Act)-UAE anti-fraud law. The subsequent Section 4 with its 7 sub-sections sections explores various fraud-related topics, including ethical theories, conflicts of interest, bribery, and social responsibility. Section 5 stresses the role of AI, blockchain and IoT in this matter. This writing concludes with a broad summary and list of references.

2. The Particular Case of Procurement in Oil & Gas

Procurement in the Oil & Gas industry differs significantly from procurement due to its nature and specific requirements such as (Brindle & Delday, 2018):

1) Global scope and scale: Oil & Gas companies are often multinational corporations operating in multiple countries with various legal and regulatory frameworks. Their activities involve supply chains spanning exploration, drilling, production, transportation, and distribution, complex operations that require managing relationships with numerous suppliers, contractors, and service providers across different regions (Figure 1).

2) High-risk environment: The Oil & Gas industry operates in a high-risk environment, dealing with hazardous materials, complex machinery, and often extreme conditions. Specialized equipment and services, such as offshore drilling

rigs, are required. Procurement in this industry necessitates strict adherence to safety standards to protect human life, the environment, and other assets. Ethical considerations involve ensuring suppliers and contractors meet safety regulations, have adequate certifications, and employ responsible practices (Figure 2).

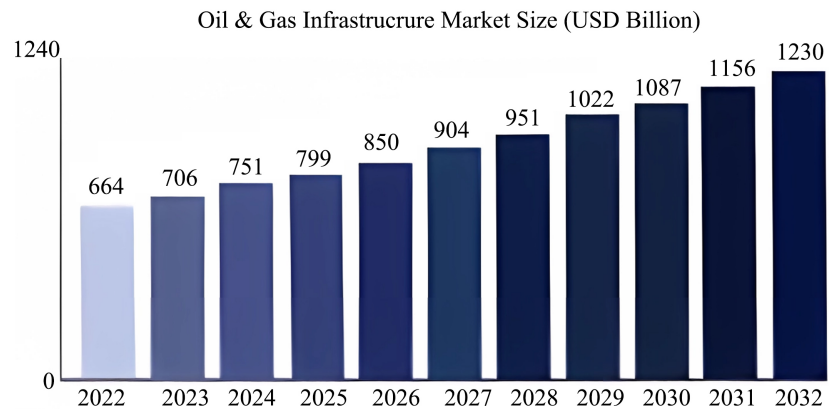


Figure 1. The global Oil & Gas market size poised to grow at a compound annual growth rate of 6.35% during the forecast period from 2023 to 2032 (Energy & Power, 2023).

Region	2022 Production (Thousand B/D)	YoY Change	Share of World Supply
Middle East	30,743	+9.2%	32.8%
North America	25,290	+5.3%	27.0%
CIS	14,006	+0.9%	14.9%
Africa	7043	-3.5%	7.5%
Asia Pacific	7273	-1.4%	7.8%
South & Central America	6361	7.2%	6.8%
Europe	3,131	-8.6%	3.3%

Figure 2. Major Oil producing regions in 2022 (Rao, 2023). For reference, B/D signifies barrels-per-day and YoY stands for year-over-year.

3) Regulatory compliance: Oil & Gas companies must navigate a web of regulations. Compliance with local, national, and international laws is crucial throughout the purchasing process. These regulations cover areas such as environmental impact, health and safety, labor rights, anti-corruption, and revenue transparency. Ethical procurement management involves assessing suppliers' compliance with these regulations, conducting due diligence, and ensuring all parties follow ethical practices.

4) Long-term contracts and relationships: The Oil & Gas sector often involves large, long-term contracts due to the substantial investment required. These contracts may extend for several years, involving complex negotiations and pricing arrangements. As expected, the longevity of relationships with suppliers and contractors is crucial to mitigate risks and ensure continuity of operations with a reliable supply chain.

5) Supply chain challenges due to the scarcity and strategic nature of resources. Procurement managers must ensure a secure supply of essential resources, including crude oil, natural gas, equipment, and spare parts. The involvement of geopolitical factors adds complexity, as trade restrictions and political developments can disrupt supply chains. Ethical considerations include fair and transparent ordering practices, combating corruption, and responsible sourcing to ensure sustainability and social responsibility (Duggan, 2016).

3. The Sarbanes-Oxley Act (SOX) and Federal Law No. (19) on Combating Commercial UAE Fraud

The numerous scandals stemming from unethical business practices have stressed the critical importance of ethical conduct in today's globalized business environment (Haron & Mahzan, 2018). The Enron scandal, a major corporate fraud in the early 2000s, severely damaged the reputation of a leading energy company. Enron, once admired for its innovation, collapsed due to fraudulent accounting and financial statement manipulation designed to inflate profitability (McLean & Elkind, 2003). Enron's fraudulent activities, including hiding debt and overstating revenue, unraveled in 2001, culminating in bankruptcy. This scandal caused significant financial losses for investors and employees, while also exposing weaknesses in corporate governance and regulatory oversight (Fox, 2004). Therefore, Enron served as a catalyst for regulatory reform.

In response to scandals like Enron and WorldCom (Herath & Walker, 2019), the Sarbanes-Oxley Act (SOX) was enacted to prevent future corporate disasters (Kenton, 2022) by mandating internal controls for accurate financial reporting, imposing stricter penalties for fraud, and enhancing auditor independence. It also emphasizes ethical conduct, protects whistleblowers, and strengthens audit committee oversight.

While primarily applicable to US public companies, SOX has had a global impact. Many countries, including the UAE, have adopted similar regulations to improve financial system transparency and accountability. SOX has encouraged companies worldwide to implement stronger internal controls and cultivate a culture of ethics and integrity (Kenton, 2022).

UAE Federal Law No. (19) of 2016, also known as the "Federal Law on Combating Commercial Fraud," aims to tackle fraudulent activities in the UAE's commercial sector. This law strengthens the legal framework for commercial transactions, protecting both consumers and businesses. It outlines penalties for commercial fraud (where suppliers may overcharge, submit duplicate invoices, or bill

for services not rendered, bid rigging-suppliers collude to manipulate the bidding process and inflate prices and supplier collusion, where multiple suppliers secretly agree to submit non-competitive bids), including fines, imprisonment, license revocation, and other measures to prevent counterfeit goods, and consumer reporting channels, for instance.

Recognizing the link between commercial fraud and intellectual property (IP) infringement, this law emphasizes stricter enforcement of trademark and copyright laws, along with mechanisms to prosecute IP violations. Given the transnational nature of commercial fraud, it also highlights international cooperation and adherence to relevant standards and conventions. Finally, this law promotes education and awareness initiatives to inform businesses, consumers, and other stakeholders about the risks and consequences of commercial fraud, empowering them to detect and report fraudulent activities.

4. Perspectives on Ethics

4.1. Ethical Theories in Procurement and Purchasing

Utilitarianism focuses on maximizing good for the greatest number (maximizing overall happiness or utility). In procurement, this means prioritizing the public interest, as emphasized by [Amayi & Ngugi \(2013\)](#) regarding Kenyan procurement policies. Deontology emphasizes duty and moral principles. [Hassim et al. \(2011\)](#) argue that procurement professionals have a moral obligation to act ethically, regardless of personal cost, adhering to a code of conduct. [Sarawa and Masud \(2020\)](#) incorporate ethical conduct as a moderating factor in their public procurement compliance model, grounding it in virtue ethics. [Nagitta et al. \(2022\)](#) highlight public procurement specialists as gatekeepers, expected to prioritize organizational interests over personal gain, guided by virtue ethics.

Bribery and corruption present significant ethical challenges. From a utilitarian perspective, they are condemned due to the harm they inflict on the public and organizational reputation. Deontologically, they are inherently unethical, violating moral duty. [Mukabi et al. \(2021\)](#) highlight the need for ethical influencers to combat corruption in Kenyan youth procurement programs. [Rotich et al. \(2021\)](#) examine the role of codes of conduct in promoting fairness and transparency in Kenyan schools, aligning with virtue ethics.

Environmental and social responsibility align with deontological ethics, emphasizing moral obligations to society and the environment where organizations must consider the broader implications of their decisions on sustainability and social welfare ([Hassim et al., 2011](#)).

Technology integration in procurement raises ethical concerns regarding data privacy, algorithmic bias, and automation. Utilitarianism and deontology can guide ethical technology use by focusing on consequences and moral duties. [Nagitta et al. \(2022\)](#) discuss human-centered AI in the public sector, emphasizing the gatekeeping role of procurement professionals in ensuring ethical AI practices.

While values are essential, they are insufficient for virtue ethics (developing

good character and acting virtuously). Ethically ambiguous practices, like gift-giving and preferential treatment, exist. If [Ferrell and Gresham \(1985\)](#) classified individual, organizational, and cultural factors, [Hunt and Vitell \(1986\)](#) emphasized individual perception while [Nebenzahl et al. \(2001\)](#) identified individual differences, interpersonal, and organizational factors as antecedents of ethical decision-making.

4.2. Conflict of Interest

A conflict of interest arises when personal interests, financial gain, or external pressures compromise a person's or group's professional judgment ([Parent et al., 2020](#)). A typical example comes from the inner ties between families and individuals working for them. Decisions influenced by such conflicts can be biased, unfair, or unethical, potentially harming stakeholders. These researchers assessed the economic and social consequences of the Russia-Ukraine conflict, highlighting the complexities of such situations, particularly when businesses have financial or strategic interests in the affected region.

In healthcare, [Parent et al. \(2020\)](#) examined the ethical and practical challenges of introducing heart transplantation from non-resuscitated donors after cardiac death in the United States, emphasizing the need to ensure that organ procurement and allocation are not influenced by the interests of transplant professionals and healthcare institutions. [Caplan et al. \(2019\)](#) and [Bernal et al. \(2019\)](#) confirm that conflicts of interest in healthcare, such as misallocation of resources, can have severe ethical implications, including suboptimal patient care and decreased public trust.

[Lin-Schilstra & Fischer \(2020\)](#) note that consumers also face ethical dilemmas, similar to those faced by businesses, such as deciding whether meat products are ethically sourced. [Lee and Jin \(2019\)](#) explored the impact of unethical marketing on brand perception and loyalty, highlighting how conflicts of interest can arise when businesses prioritize profit over ethics, potentially damaging customer loyalty.

As confirmed by [Esan et al. \(2024\)](#), conflicts of interest, inadequate oversight, and lax enforcement of ethical standards emerge as key drivers of unethical behavior within procurement processes by creating an environment conducive to misconduct, where personal gain often takes precedence over organizational interests. Moreover, regulatory scrutiny and legal repercussions further compound the negative impact, leading to financial penalties, litigation, and loss of market credibility.

4.3. Bribery and Corruption

Bribery involves offering, giving, receiving, or soliciting something of value to influence an official or someone with public or legal obligations. Corruption is a broader term encompassing dishonest behaviors like bribery, embezzlement, nepotism, and abuse of power. As [Bizoi and Bizoi \(2023\)](#) note, these unethical actions

undermine social equity, hinder economic growth, and erode public trust in government.

Nepotism, or favoritism towards relatives or close associates, is a serious concern in procurement, particularly in sectors like the Nigerian Oil & Gas industry, where contracts have significant financial value. Individuals involved in procurement may use personal or family connections to secure lucrative contracts, potentially excluding qualified competitors and violating principles of meritocracy and equal opportunity (Smith, 2010), including biased vendor selection and preferential contract awards.

Rustiarini et al. (2019) used the “fraud diamond” framework to investigate the causes of public procurement fraud, identifying opportunity (the circumstances that allow fraud to occur), pressure (the motivation behind committing fraud), rationalization (the justification used by the fraudster to excuse their actions), and capability (the individual’s traits and abilities that enable them to carry out the fraud) as key contributing factors. Financial or other pressures can lead individuals to succumb to these temptations.

Meanwhile, Mathiba (2020) examined the impact of corruption and bribery in South African public procurement during the COVID-19 pandemic. The urgency of pandemic-related procurement created opportunities for unethical behavior, and his research highlights how political pressure, weak oversight, and lack of transparency can foster a culture of corruption.

Effective enforcement mechanisms and independent courts are essential for holding offenders accountable (Bizoi & Bizoi, 2023). Combating procurement corruption requires transparency and accountability where public access to procurement documents and records is crucial (Amemba et al., 2013). For these authors, independent audit bodies, whistleblower protection, and reporting channels are also vital components of this accountability framework.

4.4. Supplier Relationships and Fairness

Bendixen and Abratt (2007) emphasize the complex nature of supplier-buyer relationships, focusing on business identity, ethics, and reputation. A company’s corporate identity, rooted in its values and principles, influences its interactions with suppliers. Ethical businesses, as noted by Damali (2012), build strong, long-term partnerships with suppliers based on mutual respect and collaboration. Goebel et al. (2012) further stress the importance of ethical culture in supplier selection, arguing that a company’s commitment to ethical behavior prioritizes suppliers who operate ethically.

Naude et al. (2013) discuss issues of fairness, transparency, and ethics in public procurement, highlighting the need for effective supplier relationship management (SRM) to ensure equity and openness. Onserio & Kamaara (2023), focusing on Kiambu County, Kenya, illustrate the importance of SRM for healthcare organizations, emphasizing the need for stable supplier relationships to guarantee a consistent supply of essential medicines and services.

Alhammadi (2019), in his doctoral work, stresses proactive measures to strengthen supplier relationships, such as open communication, timely payments, and contract adherence, to promote fairness and transparency. Fourie and Malan (2021) suggest technology-based solutions, like blockchain, for ethical procurement management. Blockchain's immutable record of transactions can reduce unethical behavior and create a more balanced power dynamic between buyers and sellers. It enables the tracking of products from their origin to the end consumer and this traceability helps to verify the authenticity of products, reduce fraud, and ensure that suppliers are adhering to agreed-upon standards.

4.5. Environmental and Social Responsibility

Quarshie et al. (2016) explore the link between corporate social responsibility (CSR) and supply chain sustainability. With growing awareness of environmental and social impacts, organizations are increasingly integrating sustainability into their supply chains, including sustainable resource use, eco-friendly packaging, and fair labor practices. Many companies have adopted sustainable sourcing policies to minimize negative environmental effects and demonstrate social responsibility. Sustainable sourcing goes beyond legal compliance, considering the well-being of communities, resource conservation, and environmental impact mitigation. These researchers also emphasize transparency and accountability in supply networks, arguing that organizations should openly communicate their environmental efforts, be accountable for their decisions, and undergo regular audits to ensure ethical and sustainable practices.

Stahl et al. (2020) examine the role of human resource management (HRM) in business sustainability and social responsibility. They analyze HRM from various perspectives, highlighting its importance in achieving long-term business success. Sustainability encompasses environmental, social, and economic factors, while HRM plays a crucial role in aligning these factors with business goals. Key HRM responsibilities include talent management, employee engagement, and embedding sustainability within the company culture. HRM should also engage with both internal (e.g., employees) and external (e.g., investors, community) stakeholders.

Bowen's (2013) work demonstrates the evolution of CSR from a profit-maximization focus to a broader consideration of social and environmental impacts. Modern business practices now integrate sustainability and social responsibility. These ethical obligations can be traced back to Bowen's (2013) research on the "social duties of the businessman" (it moves beyond the traditional view of businesses solely existing to maximize profits, and instead emphasizes their obligations to the broader society), which included values like fair treatment of employees, community engagement, and environmental consciousness, alongside profit generation.

4.6. Transparency and Accountability in Public Procurement

Transparency in public contracts means clear and understandable procedures for

everyone involved. Komakech (2016) argues that public trust in procurement is vital for good governance, requiring open bids, clear selection criteria, and transparent evaluation. This openness prevents favoritism and corruption, ensuring fair competition.

Basheka (2017) emphasizes the importance of transparency in government contracting for poverty reduction in developing countries. Public awareness of spending allows for greater accountability, enabling citizens to demand better services and ensuring funds are used effectively for public programs.

Loi and Spielkamp (2021) highlight the need for accountability in AI-driven public procurement. AI can process vast amounts of procurement data, identifying patterns, anomalies, and potential red flags that might indicate fraud or corruption. This allows for deeper spend analysis, revealing inefficiencies and opportunities for cost savings. Likewise, machine learning can detect suspicious bidding patterns, conflicts of interest, and other indicators of fraudulent activity, preventing corruption and ensuring that public funds are used responsibly. Yet as technology's role grows, accountability mechanisms are crucial for ethical AI use, preventing algorithmic bias and providing recourse for unfair decisions.

As well, smart contracts can automate payment processes, reducing the risk of delays or disputes. This aligns with Shu et al.'s (2011) argument that accountability systems (like audits and regulations) are essential for combating corruption and ensuring responsible use of public funds. Certainly, transparency and accountability are intrinsically linked. Transparency enables public and oversight scrutiny of procurement, while accountability ensures consequences for unethical or illegal actions (Shu et al., 2011). Bashuna (2013) also stresses the importance of honesty and accountability among procurement professionals to guarantee responsible spending and fair processes.

4.7. Technology and Value-Based Management

Recent research highlights the transformative potential and ethical complexities of integrating advanced technologies into e-procurement. Studies show that big data analytics can drive environmental sustainability by providing insights into supplier practices and carbon footprints, enabling more ethical supplier selection (Agrawal et al., 2025). Similarly, artificial intelligence offers opportunities to automate processes and improve government procurement efficiency, though concerns regarding transparency and algorithmic bias (Bansal et al., unpublished).

The fundamental benefits of digitizing procurement workflows include reduced human error, enhanced accountability through audit trails, and improved security through features like encryption and electronic signatures. Moreover, real-time transaction monitoring can proactively detect and mitigate fraud, safeguarding financial and reputational integrity (Adjorlolo et al., 2025).

The evolution of e-procurement to version 4.0, incorporating technologies like the Internet of Things (IoT) and blockchain, introduces both new opportunities and challenges. IoT sensors and RFID tags can track goods in real-time through-

out the supply chain, from manufacturing to delivery while providing real-time inventory levels, automate reordering, and prevent stockouts or overstocking. It can also supervise the condition of equipment and assets, predicting maintenance needs and preventing costly downtime. In the end, the data collected may be used for auditing purposes. On the other hand, the decentralized nature of blockchain makes it difficult to tamper with data, enhancing the security of sensitive procurement information.

While these technologies promise automation and productivity gains, they also raise critical concerns about data privacy, cybersecurity, and ethical AI decision-making, particularly in the public sector, where fairness and accountability are paramount (López González et al., 2024). Furthermore, the adoption of e-procurement impacts supplier and employee relations, creating ethical dilemmas that require careful consideration. Though efficiency and cost reduction are important, they must be balanced against ethical supplier practices (López González et al., 2024). Staying abreast of market trends, technological advancements, and regulatory changes is crucial for maintaining competitiveness (López González et al., 2024).

In industries such as multinational Oil & Gas, navigating diverse regulatory and cultural environments necessitates robust ethical frameworks. Companies are adopting comprehensive governance, stringent codes of conduct, and compliance programs, alongside ethics training and stakeholder engagement, to ensure ethical alignment (Bakare et al., 2024).

Lastly, value-based management (VBM) is emerging as another critical approach, shifting the focus from mere cost reduction to aligning procurement with broader strategic objectives. VBM encourages evaluating the entire lifecycle costs of goods and services, not just the initial purchase price, where e-procurement can be configured to track and analyze these costs, including maintenance, repairs, disposal, and other related expenses. This leads to more informed decisions that prioritize long-term value. Moreover, VBM ensures that purchasing activities align with the organization's overall strategic goals, that is, e-procurement can be used to track and measure the impact of procurement decisions on key performance indicators (KPIs), such as profitability, customer satisfaction, and sustainability. Irreversibly, value-based procurement looks for innovative solutions from suppliers, helping the organization to stay ahead of the competition.

In the Oil & Gas sector, VBM involves evaluating suppliers based on quality, reliability, and sustainability, and considering the long-term value of procurement decisions, including total cost of ownership and risk management, especially given the industries volatility (Bakare et al., 2024).

5. AI, Blockchain and IoT: The Further Dimension to Enhance Detection and Prevention of Ethical Risks

Already underlined before, the analysis of extensive procurement transaction data via machine learning algorithms allows for the identification of anomalies that

may signal fraud. Such patterns include duplicate invoices, unusual payment amounts, and suspicious bidding. Ukraine's Prozorro platform effectively leverages this capability to monitor procurement activities, identify high-risk tenders, and facilitate stakeholder reporting, transitioning from a reactive to a preventive anti-corruption strategy (Yukins & Kelman, 2022; Lim et al, 2022). Similarly, Brazil's Alice tool assists auditors by highlighting potential embezzlement and anti-competitive practices through data analysis before contract finalization (Menke et al., 2024).

AI automates supplier vetting, identifies potential conflicts of interest, and enforces regulatory adherence, mitigating procurement risks. Nevertheless, ethical considerations, specifically algorithmic bias, must be addressed to ensure fairness and prevent discrimination (Convington, 2024). Technically, data bias in AI training can skew recommendations, favoring established suppliers and perpetuating inequities. To counteract this, AI models must be adjusted, and mechanisms must be in place to review and modify AI-generated recommendations, ensuring accountability and preventing systemic exclusion of supplier groups.

Still, several companies have successfully adopted AI to enhance ethical procurement practices. H&M utilizes it for demand sensing, making its supply chain more environmentally responsible by tracing material origins and optimizing resource consumption (Cosgrove, 2020). IBM's Responsible Sourcing Blockchain Network (RSBN) incorporates AI to ensure traceability and transparency in sourcing (IDTechEx, 2019). Unilever partners with Google Satellite Imagery to trace its sourcing and ensure responsible environmental practices (Labbe, 2020). Adidas employs AI-driven supply chain analytics to identify ethical and sustainable suppliers, aiming for carbon neutrality (Jairick, 2024).

On the other hand, a blockchain decentralized ledger system provides a secure and transparent record of every transaction, making it exceptionally difficult for unauthorized individuals to alter critical procurement data, enhancing traceability throughout the procurement journey (Rapid Innovations, 2024). The reduction of the traditional reliance on potentially fallible third-party verifiers is another side-effect of this technology. Notable examples include Walmart's implementation for tracing the origins of food products, ensuring safety and quality control (Sharma & Kumar, 2021) whereas Everledger's use of blockchain to track the provenance of diamonds, guaranteeing they are conflict-free and ethically sourced (Pöll, 2024).

Nevertheless, the adoption of blockchain in procurement is not without challenges. The technology itself can be complex, requiring specialized expertise that may not be readily available within organizations. The initial costs associated with implementing blockchain infrastructure and integrating it with existing procurement systems can also be substantial. Moreover, some blockchain networks face scalability issues, struggling to efficiently handle the high volumes of transactions typical of large-scale procurement operations (Singh et al., 2023). Positively, adopting a phased approach, starting with small pilot projects and scaling gradually based on the insights gained, can help manage risks and ensure a smooth transition.

As an extension, smart contracts strengthen ethical procurement where all terms of the agreement are written into code, enabling automatic execution when pre-defined conditions are met. This reduces the necessity for intermediaries, including payments upon delivery verification (Legitt, 2024).

Several real-world applications illustrate the potential of blockchain and smart contracts in ethical procurement. SAP Ariba has integrated both platforms to automate various procurement processes, including payment processing and compliance checks (AMT Consulting, 2024) while JPMorgan Chase has developed its blockchain platform, Quorum, to facilitate faster and more secure financial transactions, particularly beneficial for international supply chains (Boosty Labs, 2024).

At last, IoT applications enable the real-time collection of data on the location, condition, and overall status of goods as they move through the various stages of the supply chain. This real-time visibility improves inventory management by providing accurate and up-to-date stock levels, reduces potential losses due to damage, and ultimately, enhances customer satisfaction through more reliable and transparent service (Khan et al., 2023).

Leading logistics companies like DHL, shipping giants such as Maersk, and e-commerce leaders like Amazon are actively utilizing IoT technologies for real-time tracking and comprehensive monitoring of their supply chain operations (Kern, 2021). As well, IoT sensors are vital in monitoring the temperature of sensitive pharmaceuticals during transit, ensuring their safety in tracking the origin and journey of raw materials (Bouazzi et al., 2025).

Analogous to blockchain, IoT also presents ethical considerations and potential challenges. Data privacy is a primary concern, as the collection and use of data from numerous sensors raise questions about who owns this information and how it is being utilized. The interconnected nature of IoT devices also creates potential security risks and vulnerabilities to cyberattacks (Sasi et al., 2024). The increasing automation driven by IoT may also lead to concerns about job displacement within the supply chain workforce (Filippi et al., 2023).

Again, companies are successfully leveraging IoT to enhance ethical practices within their supply chains. Nestlé utilizes IoT for ensuring the traceability and quality assurance of agricultural products, monitoring conditions from farm to consumer (Lukacs et al., 2025) whilst BayWa Global Produce uses IoT in collaboration with blockchain to optimize the logistics of fresh produce, ensuring timely and careful delivery (Maxwell, 2024). Intel utilizes its Connected Logistics Platform, incorporating IoT, to monitor the quality and integrity of goods during transportation, particularly for perishable items (Wolfenstein, 2024).

6. Conclusion

This literature review has explored a broad spectrum of contemporary ethical challenges in procurement. While issues of transparency, fairness, and supplier relationships remain critical, ethical considerations also encompass sustainability, data privacy, algorithmic bias, and accountability.

Ethics in Oil & Gas procurement present a complex landscape with unique challenges since it holds significant economic interests and global reach. Procurement decisions often require balancing economic factors with environmental and social responsibilities, reflecting the inherent tension between profitability and sustainability. Positively, the high-value nature of business contracts increases the risk of corruption, bribery, and conflicts of interest, demanding strong ethical frameworks and compliance mechanisms.

Furthermore, the global operations of Oil & Gas companies raise ethical concerns related to human rights, environmental protection, and fair labor practices, underscoring the importance of cultivating a culture of ethical awareness, transparency, and accountability to effectively manage the industry's intricate ethical landscape.

However, the genuine power to mitigate ethical risks in procurement lies in the combined use of AI, blockchain, and IoT. This synergy creates a significantly stronger ethical procurement framework. IoT devices gather real-time supply chain data, which blockchain secures and transparently records. AI then analyzes this data, revealing patterns and anomalies for better risk assessment. This integrated system improves traceability, verifies ethical sourcing, automates compliance, and detects fraud more effectively than individual ones.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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