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The role of environmental policies in shaping oil and gas operations: A comparative review of Africa and the USA

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Abstract

This study conducts a comprehensive comparative analysis of the impact of environmental policies on oil and gas operations in Africa and the United States, shedding light on the regulatory frameworks that govern these crucial industries. As global concerns about climate change and environmental sustainability continue to rise, the role of governmental policies in shaping the practices of oil and gas companies has become a focal point of discussion. The research explores the diverse approaches taken by African nations and the USA in formulating and implementing environmental policies for the oil and gas sector. It investigates the regulatory landscapes, enforcement mechanisms, and the degree of alignment with international environmental standards in each region. The study employs a multidimensional framework, considering economic, social, and environmental dimensions, to assess the effectiveness of these policies in mitigating the environmental impact of oil and gas activities. By conducting a comparative review, the research identifies best practices, challenges, and areas for improvement in both regions. It examines the balance between fostering economic growth through energy production and ensuring sustainable environmental practices. Additionally, the study delves into the socio-economic implications of these policies, evaluating their effects on local communities, employment, and overall well-being. Through the analysis of case studies, regulatory documents, and industry reports, this research contributes to the ongoing dialogue on the role of environmental policies in shaping the oil and gas sector. The findings aim to inform policymakers, industry stakeholders, and environmental advocates about effective strategies for promoting sustainable practices while supporting the energy needs of growing economies. Ultimately, the comparative insights offered by this study contribute to the development of globally applicable guidelines for environmentally responsible oil and gas operations.

Keyword: Oil and Gas; Environment; USA; Africa; Review

1. Introduction

The oil and gas industries play a crucial role in the global economy, providing the primary sources of energy and raw materials for various sectors (Hamzah & Marimuthu, 2020). However, the environmental impact of these operations has raised significant concerns regarding sustainability (Testa et al., 2020). The increasing awareness of environmental issues has led to a growing emphasis on the role of environmental policies in shaping the practices of oil and gas operations (Andriansyah et al., 2021). Environmental policies are becoming increasingly influential in regulating the

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activities of the oil and gas industries, aiming to mitigate their environmental footprint and promote sustainable practices (Lee & Park, 2020).

The global concerns about environmental sustainability have led to a shift in consumer behavior, with a growing demand for sustainable products and services (Siraj et al., 2022). Consumers are seeking relevant sustainability information about products to shape their purchase behaviors, emphasizing the importance of environmental sustainability in the market (Lamonaca et al., 2022). Furthermore, the transition towards a circular economy has become a crucial issue in pursuing more sustainable development, influencing various industries, including oil and gas (Testa et al., 2020).

In response to these concerns, there has been a growing emphasis on the nexus between innovation and environmental sustainability (Balsa-Barreiro et al., 2023). Innovative methods are being sought to promote industrial upgrading, clean energy, and social responsibility towards the environment (Balsa-Barreiro et al., 2023). Additionally, the role of non-governmental organizations (NGOs) in shaping environmental policies has been recognized, although their influence at the nation-state level may vary (Azis, 2022).

Environmental policies are also playing a significant role in influencing the management of natural resources and the environment in a sustainable manner (Andriansyah et al., 2021). The impact of government policies on environmental management has been studied, highlighting the importance of fair and firm environmental law enforcement and the application of environmental ethics (Andriansyah et al., 2021). Moreover, the implementation of robust environmental policies has been shown to strengthen the trade competitiveness of environmental goods, indicating the broader economic implications of environmental regulations (Lee & Park, 2020).

In conclusion, the increasing role of environmental policies in shaping oil and gas operations is a response to the global concerns about environmental sustainability. These policies are influencing consumer behavior, promoting innovation, and impacting the overall management of natural resources and the environment. As such, understanding the dynamics of environmental policies and their implications for oil and gas operations is essential for achieving sustainable and responsible practices in these industries.

2. Literature Review

Environmental policies play a crucial role in shaping oil and gas operations, particularly in regions like the Arctic and offshore zones (Dmitrieva et al., 2021). and Dmitrieva & Romasheva (2020) emphasize the significance of strategic sustainability and innovation in the development of oil and gas potential in the Arctic and its shelf zone. Additionally, Sher et al. (2021) highlight the importance of sustainable energy policies in driving innovations in renewable energy, which is essential for the energy transition. Furthermore, Ndubisi et al. (2020) discuss the greening of multinational enterprises in the oil, gas, and petrochemicals sector, emphasizing the role of organizational mindfulness in promoting environmental sustainability.

Moreover, the impact of environmental policies on trade competitiveness in industries such as the downstream palm oil industry is evident in the study by (Othman et al., 2023). The authors suggest that environmental policies may foster international competitiveness. Additionally, Kalu et al. (2022) emphasize the importance of energy intensity in financing the energy transition in a green sub-Saharan African environment, highlighting the interplay between environmental policies and economic development.

Furthermore, Hwang & Kim (2017) discuss the effects of environmental regulations on trade flow in manufacturing sectors, indicating the dynamic impact of environmental policies on industry practices. These studies collectively underscore the critical role of environmental policies in shaping oil and gas operations, driving sustainability, innovation, and international competitiveness.

2.1. Understanding the regulatory frameworks in Africa and the USA

Analyzing the regulatory frameworks in Africa and the USA reveals significant differences in enforcement mechanisms and alignment with international environmental standards. In Africa, the enforcement mechanisms for regulatory compliance, such as those related to financial reporting and business contracts, have been found to significantly impact the level of compliance with international standards (Borgi & Mnif, 2021). Additionally, the lack of effective institutions in Africa has been identified as a critical challenge for enforcing business contracts and ensuring compliance with regulations (Atiase et al., 2017). Furthermore, the constraints to integration in Africa include inadequate enforcement mechanisms for physical and soft infrastructure, such as enabling laws and policies (Kalu et al., 2020).

In contrast, the USA has been noted for its strict enforcement mechanisms, particularly in areas such as tax planning and corporate governance. Studies have found a negative relationship between the strength of home country enforcement and corporate tax avoidance, indicating the effectiveness of enforcement in regulating corporate behavior (Wang et al., 2019). Moreover, the USA's response to financial accounting scandals and the reform of corporate governance has been compared to that of other countries, highlighting the differences in regulatory responses and enforcement mechanisms (Sørensen & Miller, 2017).

Assessing the alignment with international environmental standards, it is evident that both Africa and the USA face socio-economic implications of their policies. In Africa, the socio-economic implications of policies related to land reform and sustainable development have been examined, highlighting the efforts to redistribute land equitably and secure land and water for food production (Nhamo et al., 2022). Additionally, the socio-economic and environmental concerns related to climate change vulnerability in North Africa have been emphasized, indicating the complex challenges faced by the region (Schilling et al., 2020). Furthermore, the need for good governance based on a sound socio-economic framework for environmental sustainability has been underscored in the context of South Africa (Msezane, 2023).

In the USA, the socio-economic implications of policies have been evident in the context of climate change resilience and the management of unconventional oil and gas extraction. The challenges related to water linkages within the population-environment-development nexus and the policy implications of unconventional oil and gas extraction have been studied, highlighting the complex interplay between environmental concerns, development, and policy (Esterhuysen et al., 2016). Moreover, the development of enforcement mechanisms for managing the environmental impacts of oil and gas extraction has been emphasized, indicating the importance of aligning policies with environmental considerations (Esterhuysen et al., 2017).

In conclusion, the regulatory frameworks in Africa and the USA exhibit distinct enforcement mechanisms and socio-economic implications. While Africa faces challenges related to the effectiveness of enforcement mechanisms and alignment with international standards, the USA demonstrates a more stringent approach to enforcement and a focus on addressing socio-economic and environmental concerns.

2.2. Comparative Analysis

Regulatory landscapes in Africa are shaped by country-specific policies and the influence of external actors such as France (Njoh, 2022). The role of policies and institutions in environmental sustainability is crucial, especially in the context of foreign direct investments (FDI) and their impact on environmental quality (Duodu et al., 2021; Duodu et al., 2021). Additionally, the governance structure and the role of indigenous knowledge in environmental governance are essential considerations for effective environmental policies in Africa (Egeruoh-Adindu, 2022). Furthermore, the potential implications of oil exploration and production on labor and employment in Africa highlight the need for comprehensive policies to maximize the gains from the oil sector (Ezenekwe et al., 2022).

In the USA, regulatory landscapes encompass federal and state-level regulations, with a focus on green growth, environmental taxes, and eco-innovation towards carbon neutrality targets (Chien et al., 2021). The integration of clean energy technologies into oil and gas operations is emphasized as a means to meet energy demands while reducing environmental burdens (Elgqvist et al., 2022; Ericson et al., 2019). Moreover, the effects of economic policy uncertainty and oil prices on carbon emissions are critical considerations for environmental policies in the USA (Zhang et al., 2021).

Enforcement mechanisms in Africa involve exploring policy adoption enablers for indoor air quality management and the influence of stakeholder dialogue, institutional commitment, and policy composition on improving air quality in higher educational institutions (Ndou & Aigbavboa, 2023). Additionally, the changing dynamics of Chinese oil and gas engagements in Africa and the role of African agency in shaping relations with China underscore the complexity of environmental governance in the region (Obi, 2019). Furthermore, the assessment of discovered and undiscovered oil and gas resources in Africa provides valuable insights for policy formulation and resource management (Modelevsky & Modelevsky, 2016).

In the USA, approaches for integrating renewable energy technologies in oil and gas operations are crucial for sustainable energy production (Ericson et al., 2019). The motivations for adopting environmental practices in the US craft brewery industry highlight the significance of understanding factors driving environmental engagement for sustainable and environmentally friendly operations (Sözen et al., 2021).

In conclusion, the regulatory landscapes in Africa and the USA are influenced by a myriad of factors, including country-specific policies, external actors, FDI, indigenous knowledge, and the integration of clean energy technologies. The enforcement mechanisms in both regions emphasize the importance of stakeholder engagement, institutional commitment, and policy composition for effective environmental governance. Understanding the implications of oil and gas operations on the environment and labor, as well as the integration of renewable energy technologies, are critical for shaping environmental policies in both Africa and the USA.

2.3. Environmental Impact Assessment

Environmental Impact Assessment (EIA) is crucial in evaluating the effectiveness of policies in mitigating environmental impact. Tchindjang (2018) emphasizes the importance of identifying possible environmental effects and proposing appropriate monitoring and mitigation measures to reduce adverse effects. Additionally, Chen et al. (2022) highlight the significance of environmental policy stringency and regulation in improving environmental performance. They discuss the impact of environmental policy stringency on pollution emissions and the effectiveness of environmental tax on carbon emissions. These studies underscore the importance of robust policies in mitigating environmental impact.

Case studies provide valuable insights into successful environmental management. Pinheiro et al. (2019) discuss how Environmental Impact Assessments and mitigation plans are integral to the national environmental policy of Brazil, highlighting the successful integration of such assessments into environmental management practices. Moreover, Mohamed et al. (2022) present a case study on Environmental Impact Assessment in construction activities, demonstrating the practical application of EIA in evaluating the impact of construction projects on the environment.

However, challenges exist in implementing and enforcing environmental policies. Hakala et al. (2019) point out the blind spots in Nordic environmental security policy, indicating a lack of recognition of structural impacts of environmental change in research and risk assessments. Furthermore, Resnik (2022) discusses the complexities of environmental justice and climate change policies, highlighting the potential disproportionate impact of climate change mitigation policies on low-income populations. These challenges underscore the need for comprehensive strategies to address the limitations in current environmental policies and ensure equitable implementation and enforcement.

In conclusion, the evaluation of policies in mitigating environmental impact, successful environmental management case studies, and challenges in policy implementation and enforcement are critical aspects of Environmental Impact Assessment. By considering these factors, policymakers and stakeholders can enhance the effectiveness of environmental policies and contribute to sustainable environmental management.

2.4. Socio-Economic Implications

The socio-economic implications of various activities have been a subject of extensive research. The impact on local communities, effects on employment and well-being, and the balance between economic growth and environmental sustainability are crucial aspects that have been studied extensively. Tourism, for example, has been found to have intense and wider socio-cultural impacts on local communities (Andlib et al., 2021). Additionally, the perception of local communities towards the impact and support of volunteer tourism has been highlighted as a vital dimension in volunteer tourism studies (Anuar et al., 2022). Furthermore, the socio-economic impacts of ecotourism development have been studied, revealing the degradation of natural resources and the break-up of religious traditions as negative impacts (Darda & Bhuiyan, 2022).

In terms of employment and well-being, precarious employment has been linked to the quality of employment and its relation to health and well-being in Europe (Julià et al., 2017). The relationship between self-employment and well-being has also been explored, with studies indicating that establishing this relationship is challenging due to simultaneous selection and contextual effects (Xiu & Ren, 2022). Moreover, the experience of self-employment has been found to impact facets of well-being, including satisfaction with job, leisure, and income (Litsardopoulos et al., 2022). Additionally, the relationship between precarious employment and subjective well-being in Korean wage workers has been investigated, revealing a negative impact on subjective well-being (Choi et al., 2020).

Balancing economic growth and environmental sustainability has been a key focus in various studies. Sustainable development and socioeconomic growth have been highlighted as being balanced through green economic recovery post-pandemic (Huang & Chang, 2022). Furthermore, sustainable tourism has been approached as an interlinked concept where socio-ecological sustainability depends on an acceptable balance between pressures and responses in coupled environmental, economic, and socio-cultural domains (Hovelsrud et al., 2021). The main challenge in achieving

sustainable development has been identified as the balance of economic, social, and environmental elements (Alinsari & Davianti, 2022).

In conclusion, the socio-economic implications of various activities have been extensively studied, shedding light on their impacts on local communities, employment, well-being, and the balance between economic growth and environmental sustainability. These studies provide valuable insights for policymakers and stakeholders to make informed decisions that promote sustainable socio-economic development.

2.5. Future Outlook and Emerging Trends

The future outlook and emerging trends of the role of environmental policies in shaping oil and gas operations in Africa and the USA are influenced by various factors. The USA-China trade policy uncertainty has implications for major global south indexes, triggering policy adjustments and uncertainty spillover to other economies (Akdağ et al., 2021). Additionally, state fracking policies in the United States vary based on factors such as institutional politics and resource capacity (Davis, 2017). Furthermore, corporate governance has a significant positive effect on the environmental policy index of sustainability reporting in oil and gas companies in Nigeria (Adewale et al., 2021). France has historically played an active role in shaping environmental policy in Africa, particularly in the context of multinational corporations and indigenous communities (Njoh, 2022). Moreover, U.S. oil and gas companies have shown a decreasing trend in operational efficiency and CO₂ emissions, reflecting an improvement in environmental efficiency following the adoption of energy transition policies (Jarboui, 2021).

In terms of regulatory frameworks, the collaborative process regulating oil and gas development in Colorado represents a potential model for regulating other emerging concerns, such as indoor air pollution from wildfires (Murphy et al., 2019). Environmental conservation policies, technological advancement, and modern industrial policies are recommended to effectively reduce CO₂ emissions in East African countries (Hlongwane & Daw, 2022). Furthermore, ensuring the environmental safety of offshore Arctic oil and gas projects is emphasized to mitigate environmental risks (Dmitrieva et al., 2021). In Nigeria, there is a need for recognition of oil and gas producing communities as partners in environmental management and development processes to address environmental degradation in the Niger Delta region (Agbonifo, 2016). The advocacy strategies of industry and environmental interest groups play a crucial role in oil and gas policy debates, highlighting the importance of stakeholder engagement (Kagan & Olofsson, 2023).

In addition, the integration of clean energy technologies into oil field operations is identified as a way to meet energy demand while reducing emissions and minimizing environmental burdens (Elgqvist et al., 2022). Climate change has been identified as having a significant impact on oil and gas operations and infrastructure, posing risks such as increasing temperature, flooding, and coastal erosion (Oyerinde, 2018). Furthermore, the development pace of the Chinese and Russian oil and gas industries is analyzed to identify trends and inform future strategies (Steblyanskaya et al., 2021).

Overall, the future outlook and emerging trends of environmental policies in shaping oil and gas operations in Africa and the USA are influenced by a complex interplay of economic, political, and environmental factors. These include trade policy dynamics, state-level regulatory frameworks, corporate governance, international influences, energy transition policies, stakeholder engagement, and climate change considerations.

3. Conclusion

This comparative review has provided valuable insights into the role of environmental policies in shaping oil and gas operations in Africa and the USA. The analysis encompassed regulatory frameworks, enforcement mechanisms, and socio-economic implications, utilizing a multidimensional framework. Key findings include the diversity in policy approaches, the varying degrees of alignment with international standards, and the challenges faced by both regions in balancing economic growth and environmental sustainability.

Policymakers should work towards harmonizing environmental standards within and across regions. Establishing common benchmarks will not only enhance the effectiveness of policies but also facilitate international cooperation and information exchange. Invest in the capacity building of regulatory agencies to ensure robust enforcement mechanisms. Adequate training, resources, and technological support are essential for effective monitoring and enforcement of environmental policies in the oil and gas sector.

Foster stronger engagement with local communities to address socio-economic concerns. Inclusivity and transparent communication will help build trust and ensure that the benefits of the oil and gas industry are distributed equitably.

Encourage the development and adoption of environmentally friendly technologies in oil and gas operations. Providing incentives for innovation can drive industry stakeholders to adopt cleaner and more sustainable practices.

This study contributes significantly to the global dialogue on environmentally responsible oil and gas operations by providing a nuanced understanding of policy effectiveness and socio-economic implications in diverse contexts. The comparative analysis serves as a valuable reference for policymakers, industry stakeholders, and environmental advocates worldwide, offering insights into best practices, challenges, and areas for improvement.

The research underscores the importance of a collaborative and holistic approach towards achieving environmental sustainability in the oil and gas sector. By identifying commonalities and differences in policy implementation, this study lays the groundwork for the development of globally applicable guidelines that promote responsible energy production while addressing the urgent need for environmental protection. It is our hope that these recommendations and findings inspire concerted efforts towards a more sustainable and equitable future for the oil and gas industry globally.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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