NAVIGATING INSTITUTIONAL PRESSURES: ASSESSING SUSTAINABILITY AND SUPPLY CHAIN MANAGEMENT PRACTICES IN THE OIL AND GAS INDUSTRY OF A DEVELOPING ECONOMY

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ABSTRACT

Purpose – This paper empirically investigates the influence of coercive, normative, and mimetic pressures on sustainability and supply chain management (SCM) practices in a developing economy's oil and gas industry. It examines the moderating role of firm size on these relationships, focusing on the three dimensions of the triple bottom line (TBL) approach: environmental, economic, and social sustainability.

Design/methodology/approach—The hypotheses were tested using data from a comprehensive survey of 144 oil and gas firms operating in Nigeria. The analysis employs regression models to explore the direct effects of institutional pressures on SCM and sustainability practices and the moderating influence of firm size.

Findings—The findings confirm that coercive and normative pressures significantly enhance sustainability and SCM practices. However, mimetic pressures did not exhibit a significant impact. Additionally, firm size did not moderate the relationships between institutional pressures and sustainability or SCM practices, indicating that these pressures affect firms uniformly regardless of size.

Originality/value – This study contributes to the evolving literature on sustainability by understanding how different institutional pressures influence the adoption of sustainability and supply chain management practices in the oil and gas industry from a TBL perspective. It uniquely highlights the limited role of mimetic pressures and the uniform influence of institutional pressures across firms of varying sizes.

Keywords – Institutional pressures, Triple bottom line, Sustainability, Supply chain management practices, Oil and gas industry

INTRODUCTION

The increasing global focus on sustainability has highlighted significant challenges in achieving consensus on sustainable practices, especially within industries with high environmental and social impacts, such as the oil and gas (O&G) sector (Bansal, 2005). These challenges are further exacerbated in developing countries, where regulatory frameworks and economic constraints often lag behind those of developed nations, making it difficult for organizations to meet elevated standards of environmental and social performance (Wijethilake et al., 2017; Fores and Fernandez-Yanez, 2023). The O&G industry, in particular, faces substantial pressure to mitigate land degradation, uphold human rights, and eliminate exploitative labour practices, which are core elements of sustainable development that remain contentious and complex to implement consistently (Aragon-Correa et al., 2018; Haleem et al., 2022). Sustainability, defined by the Brundtland Commission (1987) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs," has evolved to encompass multifaceted dimensions including economic, environmental and social responsibilities (Dyllick and Hockerts, 2002). Elkington (1998) introduced the concept of the Triple Bottom Line (TBL), urging organisations to balance profit, people, and the planet in their performance metrics (Goel, 2010).

In developing countries, organisations within the O&G industry face substantial pressures to adhere to elevated standards of environmental stewardship, mitigate land degradation, eliminate exploitative labour practices, and uphold human rights (Wijethilake et al., 2017; Bansal, 2005). These pressures, examined through the lens of institutional theory, reveal how mimetic, normative, and coercive forces drive organisations toward conformity in sustainability practices (DiMaggio and Powell, 1983; Suchman, 1995). While numerous studies have investigated the impact of these pressures, the emphasis has predominantly been on singular aspects of sustainability or specific types of institutional pressures, often neglecting a comprehensive approach that equally considers the TBL dimensions (Haleem et al., 2022; Fores and Fernandez-Yanez, 2023). Previous research has predominantly focused on individual dimensions of sustainability, often isolating environmental practices from social and economic aspects (Haleem et al., 2022). This fragmented approach fails to capture the holistic impact of institutional pressures as conceptualised by the Triple Bottom Line (Elkington, 1998). Additionally, much of the existing literature centres on developed countries, with limited insights into the unique challenges and dynamics developing nations face (Fores and Fernandez-Yanez, 2023). This geographic bias overlooks the nuanced interplay between institutional pressures and sustainability practices in contexts where regulatory frameworks and economic constraints differ significantly from those in more developed regions.

Institutional theory suggests that organizations are shaped by their institutional environments, with coercive, mimetic, and normative pressures significantly influencing their behaviours and practices (DiMaggio and Powell, 1983). These pressures, which dictate the adoption of practices and policies to gain legitimacy and societal approval, are especially potent in developing economies due to the complex interplay of regulatory bodies, international standards, and unique socio-economic conditions. Coercive pressures from regulatory mandates and legal requirements, mimetic pressures from industry-wide practices and competitive benchmarks, and normative pressures driven by professional standards and societal expectations (Oliver, 1991) often push organizations towards conformity. However, these pressures can also be inconsistent and misaligned with local contexts, which limits their effectiveness in promoting sustainable practices. While institutional pressures play a crucial role in shaping organizational strategies, particularly in sustainability (Clemens and Douglas, 2005; De Prins et al., 2014), their impact on developing economies is underexplored. Existing literature primarily focuses on developed regions, often neglecting how unique challenges in these settings influence the adoption of sustainability and supply chain management (SCM) practices (Bansal, 2005; Wijethilake et al., 2017). This oversight presents a significant gap, as institutional theory does not fully account for the variations in organizational responses to these pressures in developing contexts, where regulatory enforcement,

economic constraints, and cultural differences can alter expected outcomes (Engert et al., 2016). By focusing on these dynamics within developing economies, new insights can be added to the literature, enhancing our understanding of how institutional pressures can be adapted or restructured to effectively drive sustainable practices in high-impact industries like oil and gas.

Firm size plays a critical moderating role in how companies respond to institutional pressures, especially in developing economies where resource disparities are more pronounced (Zheng and Iatridis, 2022). Larger firms generally have more resources and a greater capacity to implement comprehensive sustainability and supply chain management (SCM) practices, while smaller firms often face significant constraints due to limited resources and capabilities (McKinsey, 2013). This disparity can create variations in how firms of different sizes navigate institutional pressures: larger firms may leverage their resources to adopt proactive sustainability strategies driven by coercive and normative pressures to maintain legitimacy and competitive advantage, whereas smaller firms may be restricted to compliance with minimum regulatory requirements due to financial and operational limitations (Zheng and Iatridis, 2022). In developing economies, these variations are further magnified by inconsistent enforcement of regulations and differing levels of institutional support, which makes understanding how firm size shapes organisational responses crucial (Zheng and Iatridis, 2022). Despite its significance, the moderating role of firm size in the relationship between institutional pressures and sustainability outcomes in the oil and gas industry remains understudied. The existing literature often overlooks the unique dynamics of smaller firms, which, unlike their larger counterparts, struggle to align with stringent sustainability expectations due to economic and capacity challenges prevalent in developing regions (McKinsey, 2013). Addressing this gap could enrich the literature by highlighting how firm size influences the effectiveness of institutional pressures in driving sustainability and SCM practices, providing new insights into tailoring institutional frameworks that accommodate the resource constraints of smaller firms in developing economies.

This study aims to fill these critical gaps by providing an integrated analysis of the influence of institutional pressures on sustainability and SCM practices within the O&G industry, with a specific focus on developing countries. By incorporating firm size as a moderating variable, this research explains how different organisations navigate institutional demands and implement sustainable practices. This approach not only critiques the limitations of prior studies but also advances the discourse on sustainable development in one of the world's most consequential industries.

This paper is structured as follows: the introduction sets the context, highlighting the growing importance of sustainability in high-impact industries, particularly in developing economies, and introduces the main research questions. The theoretical framework section explains the role of coercive, mimetic, and normative pressures in shaping organizational behaviour, leading to the development of specific hypotheses. The methodology details the research design, including data collection and analysis methods, and addresses key validation issues such as common method variance and multicollinearity. Results and analysis present the findings, demonstrating how institutional pressures affect sustainability and supply chain management and the moderating role of firm size. The discussion interprets these findings, linking them back to the theoretical framework and practical implications. The paper concludes by summarizing key insights, acknowledging limitations, and suggesting directions for future research.

THE THEORETICAL CONCEPTS OF INSTITUTIONAL PRESSURES, SUSTAINABILITY AND SUPPLY CHAIN MANAGEMENT PRACTICES

The concept of institutional pressures has been pivotal in understanding organisational behaviour within various sectors, particularly through the lens of institutional theory. As defined by Kostova and Roth (2002), institutional pressures encompass coercive, mimetic, and normative forces that influence organisations to conform to certain norms and practices to gain legitimacy. These pressures compel organisations to align their strategies and operations with prevailing institutional norms, ensuring their

acceptance and success within their respective environments. Coercive pressures arise from formal and informal demands exerted by other organisations upon which they are dependent, as well as from cultural expectations within society (DiMaggio and Powell, 1983). These pressures include government regulations, societal expectations, and demands from powerful stakeholders. Coercive pressures in the oil and gas industry, particularly in developing economies, manifest through stringent environmental regulations and compliance requirements. Such regulations often mandate firms to adopt sustainable practices to mitigate environmental degradation and promote social welfare (Aragon-Correa et al., 2018). For instance, compliance with environmental laws necessitates the implementation of practices that reduce emissions and manage waste effectively (Bansal, 2005). Normative pressures stem from the values and norms propagated by professional networks, industry associations, and educational institutions. These pressures drive organisations to adopt legitimate and appropriate practices within their professional community (Scott, 2001). In sustainability, normative pressures encourage oil and gas companies to engage in practices that promote social equity and environmental integrity. Organisations often adopt these practices to align with industry standards and enhance their reputation (Martinez-Ferrero and Garcia-Sanchez, 2017). For instance, industry associations may advocate for adopting corporate social responsibility (CSR) initiatives that ensure fair labour practices and community engagement (Huq and Stevenson, 2020). Mimetic pressures occur in response to uncertainty. Organisations tend to mimic the practices of successful peers to gain legitimacy and reduce uncertainty (Meyer and Rowan, 1991). In the oil and gas industry, mimetic pressures drive companies to emulate the sustainability practices of industry leaders to enhance their competitive position and legitimacy. This imitation is often driven by the perceived success of these leaders in achieving sustainability goals and gaining stakeholder approval (Aerts et al., 2006). For instance, firms may adopt green technologies or sustainable supply chain practices successfully implemented by leading companies in the industry (Kraus et al., 2020).

As defined by Gallardo-Vazquez and Sanchez-Hernandez (2014), sustainability encompasses the integration of economic, social, and environmental dimensions, often referred to as the Triple Bottom Line (TBL). This concept, popularised by Elkington (1998), emphasises the need for organisations to balance environmental integrity, social equity, and economic prosperity. Environmental integrity involves practices that safeguard natural resources for future generations, such as reducing emissions and preventing environmental degradation (Kozica and Kaiser, 2012). Social equity ensures fair and beneficial practices within the labour market and society, including fair wages and health care coverage (Bansal, 2005). The economic dimension ties organisational growth to broader economic prosperity, promoting long-term competitiveness and viability (Dyllick and Hockerts, 2002). Despite the clear theoretical underpinnings of sustainability, there remains considerable confusion about its practical implementation in the oil and gas industry. Most empirical studies focus narrowly on environmental sustainability, often neglecting the comprehensive TBL approach (Cardoso de Oliveira Neto et al., 2018). While some studies address environmental (Soni et al., 2020) or social issues (Mariappanadar and Kramar, 2014), few integrate all three dimensions of sustainability (Haleem et al., 2022).

Supply chain management practices are critical for firms' operational efficiency and competitive advantage. Li et al. (2006) defined supply chain management practices as a set of activities undertaken by an organisation to promote effective management of its supply chain. These practices include strategic supplier partnerships, customer relationships, information sharing, and logistics integration. Effective supply chain management ensures that products are delivered in a timely and cost-effective way, enhancing customer satisfaction and firm performance. In the oil and gas industry, supply chain management practices are crucial due to the complex and dynamic nature of the industry. Implementing sustainable supply chain practices can significantly reduce environmental impacts and enhance social equity. For instance, strategic supplier partnerships can ensure that suppliers adhere to environmental and social standards, while effective logistics integration can minimise carbon emissions and reduce costs (Kraus et al., 2020).

INSTITUTIONAL PRESSURES AND SUPPLY CHAIN MANAGEMENT PRACTICES IN THE OIL AND GAS INDUSTRY

Coercive Pressures and Supply Chain Management Practices

Coercive pressures arise from political influence and the pursuit of legitimacy through compliance with regulations imposed by government bodies and legal systems (DiMaggio and Powell, 1983; Kreuzer, 2017). Regulatory mandates and legal requirements have been shown to significantly impact organisational practices, especially in areas related to environmental management and labour laws (Aragon-Correa et al., 2018; Bansal, 2005). Compliance with these regulations is essential to avoid legal repercussions, financial penalties, and reputational damage (Lopez-Fernandez and Pasamar, 2019; Oliver, 1991; Wijethilake et al., 2017). In the oil and gas industry, firms face stringent regulations aimed at mitigating environmental impacts and ensuring operational safety. These regulatory frameworks compel companies to adopt comprehensive supply chain management (SCM) practices to meet compliance standards. For instance, firms are required to implement rigorous environmental management systems, health and safety protocols, and sustainability reporting mechanisms to adhere to legal standards (Bansal, 2005; Aragon-Correa et al., 2018). Energy price volatility and the environmental consequences of greenhouse gas emissions add layers of complexity to these regulatory demands. Zafeiriou, Arabatzis, Tampakis, and Soutsas (2014) underscore how fluctuating energy markets compel firms to adopt strategies that mitigate emissions while maintaining compliance, demonstrating the dual pressures of economic volatility and regulatory oversight in driving SCM adaptations. However, while coercive pressures are hypothesised to influence the adoption of SCM practices positively, empirical evidence is required to validate this relationship. Previous studies suggest that coercive pressures can drive significant changes in organisational behaviour, particularly in industries with high regulatory oversight (Kreuzer, 2017; Aragon-Correa et al., 2018). The natural gas sector offers illustrative insights into how regulatory and market-driven coercive pressures intersect. According to Drosos et al. (2019), industrial customer satisfaction in Greece's natural gas market is significantly shaped by regulatory frameworks, highlighting how compliance not only mitigates risks but also enhances stakeholder relationships. This dynamic reinforces the broader role of regulations in fostering sustainable practices within supply chains. Nonetheless, the effectiveness of these pressures in promoting sustainable SCM practices remains an area of ongoing research.

H1a: Coercive pressures are positively related to implementing SCM practices in the oil and gas industry.

Normative Pressures and Supply Chain Management Practices

Normative pressures are driven by the norms, values, and expectations within an industry or professional community. These pressures encourage organisations to conform to established standards to gain legitimacy and social approval (Kostova and Roth, 2002; Peters and Heusinkveld, 2010). According to Baek et al. (2012), firms more sensitive to normative pressures are more likely to adopt practices that align with societal norms and values, thereby enhancing their legitimacy. In the context of sustainability, normative pressures often manifest through industry standards, trade associations, and professional bodies that advocate for environmentally and socially responsible practices (Aragon-Correa et al., 2018). For example, companies may adopt sustainability reporting standards such as the Global Reporting Initiative (GRI) or participate in initiatives like the United Nations Global Compact to demonstrate their commitment to sustainability (Perez-Batres et al., 2010). Such practices enhance a company's reputation and create a competitive advantage by attracting environmentally conscious investors and customers (Huq and Stevenson, 2020). The volatility of energy markets further accentuates the role of normative pressures, particularly in industries where environmental and economic goals intersect. Zafeiriou, Arabatzis, Tampakis, and Soutsas (2014) argued that energy price fluctuations and the associated focus on reducing emissions necessitate adopting practices that align

with societal expectations for sustainability. These dynamics reinforce the importance of normative pressures in guiding organisational responses to environmental challenges.

The oil and gas industry, characterised by significant environmental and social impacts, faces substantial normative pressures to adopt sustainable supply chain management (SCM) practices. These pressures often stem from stakeholders, including regulatory bodies, non-governmental organisations (NGOs), and the public, who demand greater transparency and accountability regarding environmental and social performance (Roszkowska-Menkes and Aluchna, 2017). Companies in this industry are expected to implement robust SCM practices that minimise environmental harm and promote social welfare, aligning with broader societal values and expectations. Empirical insights from the natural gas market illustrate how normative pressures shape industry practices. Drosos et al. (2019) highlighted that industrial customer satisfaction is increasingly linked to sustainability efforts, demonstrating how societal expectations can drive organisations to integrate sustainable practices into their operations to remain competitive and legitimate. Previous research has highlighted the critical role of normative pressures in driving sustainability practices. For instance, studies have shown that normative pressures are more influential than coercive or mimetic pressures in promoting corporate social responsibility (CSR) behaviours and sustainability reporting (Martinez-Ferrero and Garcia-Sanchez, 2017). These findings suggest that companies attuned to normative pressures are more likely to integrate sustainability into their core operations, including SCM practices. Arabatzis, Petridis, Galatsidas, and Ioannou (2013) provide further evidence by proposing a conceptual model for resource supply chains, emphasising the role of demand-driven scenarios in shaping sustainable practices. This underscores the potential for normative pressures to foster innovative solutions in resource-intensive industries such as oil and gas. However, the extent to which normative pressures influence SCM practices in the oil and gas industry requires further empirical investigation. While normative pressures theoretically promote adopting sustainable practices, the actual impact on SCM practices within the highly regulated and competitive oil and gas sector has not been fully explored.

Given the theoretical and empirical insights, it is posited that H1b: Normative pressures are positively related to implementing SCM practices in the oil and gas industry.

Mimetic Pressures and Supply Chain Management Practices

Mimetic pressures are characterised by replicating successful or legitimate practices within a specific industry. These pressures are particularly potent in highly uncertain environments, where organisations look to industry leaders as models to emulate (Combs et al., 2009). This phenomenon has been widely observed in adopting corporate environmental reporting, where companies mimic the practices of perceived leaders to enhance their legitimacy and align with industry norms (Aerts et al., 2006). In the context of supply chain management (SCM), mimetic pressures can lead organisations to adopt similar practices as their peers to remain competitive and legitimate in the eyes of stakeholders (Wang and Verma, 2012). For instance, companies may implement environmentally friendly policies or corporate social responsibility (CSR) initiatives simply because these practices are prevalent among leading firms in their industry. However, the extent to which these imitative practices translate into substantial improvements in SCM performance is a critical area of investigation (Barreto and Baden-Fuller, 2006). The volatility of energy prices and the need for organisations to address greenhouse gas emissions further amplify mimetic pressures in industries such as energy production and supply chains. As Zafeiriou, Arabatzis, Tampakis, and Soutsas (2014) highlight, the interconnectedness of energy prices and environmental concerns creates additional incentives for organisations to emulate practices that align with sustainability goals. This underscores the role of mimetic pressures in driving the adoption of practices to mitigate environmental and economic risks.

The oil and gas industry, known for its significant environmental impact and regulatory scrutiny, is particularly susceptible to mimetic pressures. Companies in this sector often face intense scrutiny from stakeholders, including regulatory bodies, NGOs, and the public, leading them to adopt similar SCM

practices as industry leaders to enhance their legitimacy and mitigate risks (Roszkowska-Menkes and Aluchna, 2017). For example, adopting sustainability reporting and green supply chain practices can be seen as a response to mimetic pressures, as companies strive to emulate the practices of more successful or legitimate peers (Martinez-Ferrero and Garcia-Sanchez, 2017). Moreover, the dynamics of customer satisfaction and energy market trends play a pivotal role in shaping these mimetic behaviours. As Drosos et al. (2019) demonstrated, the natural gas market exhibits substantial pressure to maintain high levels of customer satisfaction through practices that align with broader sustainability objectives. This further reinforces the inclination of organisations to adopt industry norms and practices perceived as both sustainable and economically viable. Despite the prevalence of mimetic pressures, their actual impact on SCM practices in the oil and gas industry remains underexplored. While mimetic pressures theoretically drive the adoption of best practices, the effectiveness and depth of these imitative strategies in enhancing SCM performance require further empirical validation. Adopting practices without a clear strategic alignment or genuine commitment may result in superficial compliance rather than substantive improvements (Huq and Stevenson, 2020). For instance, the supply chain dynamics of renewable energy resources, such as fuelwood, reveal how mimetic pressures can shape resource management strategies. Arabatzis et al. (2013) highlighted the importance of conceptualising demand scenarios to develop robust and sustainable supply chains, which is critical for industries aiming to align with environmental and economic imperatives.Empirical studies have shown mixed results regarding the influence of mimetic pressures on organisational practices. Some research suggests that mimetic pressures can significantly improve corporate practices, particularly in areas such as environmental reporting and CSR (Teo et al., 2003; Perez-Batres et al., 2010). However, other studies indicate that the impact of mimetic pressures may be limited, as organisations may adopt practices superficially to gain legitimacy without integrating them into their core operations (Barreto and Baden-Fuller, 2006). In the oil and gas industry, where environmental and social responsibilities are critical, the role of mimetic pressures in driving SCM practices warrants closer examination. Companies may adopt SCM practices that appear legitimate and align with industry norms, but the extent to which these practices are effectively implemented and lead to tangible improvements remains questionable. Given the theoretical and empirical insights, it is posited that H1c: Mimetic pressures are positively related to the implementation of SCM practices in the oil and gas industry.

INSTITUTIONAL PRESSURES AND SUSTAINABILITY IN THE OIL AND GAS INDUSTRY

Coercive Pressures and Sustainability

Coercive pressures originate from regulatory bodies, legal mandates, and other forms of formal authority that compel organisations to adopt specific practices to comply with external demands (Meyer and Rowan, 1991). In the context of sustainability, these pressures are manifested through environmental regulations, legal requirements, and enforcement mechanisms aimed at reducing the environmental impact of industrial activities (Aragon-Correa et al., 2018). Given its significant environmental footprint, the oil and gas industry is particularly susceptible to such pressures. Despite the theoretical expectation that coercive pressures drive sustainability practices, empirical findings have been mixed. While some studies demonstrate a positive relationship between regulatory pressures and environmental performance (Bansal, 2005; Lopez-Fernandez and Pasamar, 2019), others argue that compliance-driven approaches may lead to minimalistic or superficial sustainability efforts, often referred to as "greenwashing" (Delmas and Burbano, 2011). Therefore, it is crucial to empirically test whether coercive pressures indeed lead to substantive sustainability practices in the oil and gas industry.

Hypothesis 1d: Coercive pressures are positively related to sustainability in the oil and gas industry.

Normative Pressures and Sustainability

Normative pressures arise from values, norms, and expectations established by professional bodies, industry standards, and societal norms (Scott, 2001). These pressures influence organisations to adopt

practices considered appropriate or desirable within their institutional context (Kostova and Roth, 2002). In the sustainability domain, normative pressures are exerted by stakeholders such as NGOs, industry associations, and the broader community, advocating for responsible environmental practices and corporate social responsibility (Huq and Stevenson, 2020). Research indicates that normative pressures can significantly enhance sustainability practices by embedding environmental and social norms into organisational culture (Martinez-Ferrero and Garcia-Sanchez, 2017). However, the effectiveness of normative pressures in driving comprehensive sustainability strategies, particularly in industries with high environmental risks like oil and gas, remains debated. Critics argue that normative pressures may lead to symbolic compliance rather than genuine integration of sustainability into core business strategies (Baek et al., 2012).

Hypothesis 1e: Normative pressures are positively related to sustainability in the oil and gas industry.

Mimetic Pressures and Sustainability

Mimetic pressures occur when organisations imitate the practices of peers or industry leaders perceived as successful or legitimate (DiMaggio and Powell, 1983). This form of isomorphism is particularly prevalent in uncertain environments, where organisations seek to reduce uncertainty by adopting the strategies of more established or respected firms (Teo et al., 2003). In terms of sustainability, mimetic pressures drive companies to emulate the environmental practices of leading firms to enhance their legitimacy and competitive positioning (Aerts et al., 2006). Empirical studies on mimetic pressures reveal a complex picture. While imitation can lead to widespread adoption of best practices and standards (Perez-Batres et al., 2010), it can also result in superficial adoption without deep integration, primarily driven by the desire for legitimacy rather than performance improvement (Barreto and Baden-Fuller, 2006). In the oil and gas sector, where sustainability challenges are profound, the extent to which mimetic pressures lead to genuine sustainability improvements needs thorough investigation.

Hypothesis 1f: Mimetic pressures are positively related to sustainability in the oil and gas industry.

INSTITUTIONAL PRESSURES AND FIRM SIZE

Coercive Pressures and Firm Size in the Oil and Gas Industry

Coercive pressures stem from regulatory bodies, legal requirements, and other authoritative entities that enforce compliance through mandates and sanctions (DiMaggio and Powell, 1983). In the oil and gas industry, these pressures are particularly salient due to stringent environmental regulations and the potential for severe penalties for non-compliance (Aragon-Correa et al., 2018). Larger firms often have more resources and capabilities to comply with regulatory requirements and may thus be more responsive to coercive pressures (Bansal, 2005). Conversely, smaller firms struggle with compliance due to resource constraints, potentially leading to differing impacts based on firm size.

Hypothesis 2a: The company size moderates the relationship between coercive pressures and SCM practices in the oil and gas industry.

Hypothesis 2d: The link between coercive pressures and sustainability in the oil and gas industry is moderated by company size.

Normative Pressures and Firm Size

Normative pressures arise from the expectations of professional bodies, industry standards, and societal norms that dictate acceptable organizational behaviours (Scott, 2001). These pressures are significant in promoting sustainability practices, as firms seek to align with industry norms and gain legitimacy through socially and environmentally responsible actions (Martinez-Ferrero and Garcia-Sanchez, 2017). Larger firms, with more visibility and scrutiny from stakeholders, may be more susceptible to normative pressures, leading to a higher likelihood of adopting comprehensive SCM and sustainability

practices. In contrast, smaller firms might prioritise survival and immediate financial performance over normative compliance (Huq and Stevenson, 2020).

Hypothesis 2b: The company size moderates the relationship between normative pressures and SCM practices in the oil and gas industry.

Hypothesis 2e: The link between normative pressures and sustainability in the oil and gas industry is moderated by company size.

Mimetic Pressures and Firm Size

Mimetic pressures compel organisations to imitate the practices of successful or legitimate firms, especially in uncertain environments (DiMaggio and Powell, 1983). This imitation can drive the adoption of best practices in SCM and sustainability as firms seek to emulate industry leaders to enhance their legitimacy (Aerts et al., 2006). The influence of mimetic pressures may vary with firm size, as larger firms often set the standards that smaller firms follow. Smaller firms, facing limited resources and higher uncertainty, may be more inclined to mimic the practices of larger, successful firms to gain competitive advantage and legitimacy (Barreto and Baden-Fuller, 2006).

Hypothesis 2c: The company size moderates the relationship between mimetic pressures and SCM practices in the oil and gas industry.

Hypothesis 2f: The link between mimetic pressures and sustainability in the oil and gas industry is moderated by company size.

METHODOLOGY

Data for this study were collected through a comprehensive survey of companies operating in the Nigerian oil and gas (O&G) industry, focusing on firms with more than 100 employees. The sample was drawn from various segments within the O&G supply chain, including upstream, midstream, and downstream operations. This approach ensures the inclusion of diverse organisational perspectives influenced by institutional pressures (IP). The Lusha.com Online Database, a comprehensive directory of oil and gas companies operating in Nigeria, was employed to identify firms that met the size criterion. The selected sample focused on the O&G sector due to its significant exposure to environmental, social, and economic pressures, making it an ideal context to explore the influence of institutional pressures on the Triple Bottom Line (TBL) perspective of sustainability (Yang et al., 2019) and supply chain management practices. The choice of this industry aligns with previous research that highlights the intense sustainability efforts undertaken within this sector (Bebbington et al., 2012).

Initial contact was made via telephone with all firms in the sample to explain the study's purpose, request their participation, and discuss the logistics of questionnaire distribution. Each firm received two questionnaires addressing IP, supply chain management practices, and sustainability's economic, social, and environmental dimensions. The targeted respondents were the managing directors and marketing managers, who were considered reliable sources for perceiving IP. Out of the 432 firms contacted, 144 returned completed questionnaires from both the MD and marketing manager, resulting in a final sample of 288 responses and a response rate of 33.33%. To assess non-response bias, we compared respondents with non-respondents based on industry membership, number of employees, and revenue. The t-test for equality of means for independent samples indicated no statistically significant differences between the groups, suggesting that non-response bias was not a concern in this study. Hypotheses were tested using the multiple regression model. Moderation analyses were conducted using the PROCESS macro (Model #4 from Hayes, 2017) on 5,000 bootstrapped samples with a 95% confidence interval. This robust statistical approach ensures the reliability and validity of the findings (Keenan et al., 2006).

Measures

In this study, we utilised existing multi-item scales to measure the constructs of interest, which were validated through a series of analyses. All variables were assessed using a five-point Likert scale. The reliability and validity of the measures were initially tested through exploratory factor analysis (EFA) using the varimax rotation method (Luque-Martínez, 2000) with SPSS v.22. This analysis confirmed the expected dimensionality of all scales. Subsequently, confirmatory factor analysis (CFA) was conducted for each construct, adhering to the guidelines outlined by Hair et al. (1999). The results presented in Table 1 provide a comprehensive examination of the convergent and discriminant validity of the constructs used in this study. The average variance extracted (AVE) for all constructs exceeded the critical threshold of 0.5, indicating strong convergent validity, as Fornell and Larcker (1981) recommended. This suggests that the items used in the constructs are well-correlated with their underlying theoretical concept, providing evidence that the constructs accurately measure what they intend to. Moreover, discriminant validity was confirmed using Fornell and Larcker's (1981) criterion, which states that the AVE for each construct should be greater than the squared correlations between constructs. This criterion was met, indicating that the constructs are distinct from one another and do not overlap significantly, thus supporting the discriminant validity of the measurement model. Cronbach's alpha values ranged from 0.63 to 0.80, exceeding the acceptable threshold suggested by Bagozzi and Yi (1988), which indicates adequate internal consistency. This is considered sufficient in the context of the inherent difficulties associated with data collection at the company level, as Xiao and Björkman (2006) discussed.

Institutional Pressures

Institutional pressures (IP) were measured using an adapted version of the scale developed by Kostova and Roth (2002), which effectively captures coercive, mimetic, and normative pressures. Each of the four items was used for coercive and mimetic pressures, and five items were used for normative pressures. For confirmatory analysis purposes Coercive pressures had one item (CoP1) dropped due to low factor loadings. The retained items (CoP2, CoP3 and CoP4) exhibited high factor loadings (0.927, 0.928 and 0.854), supporting this sub-construct's convergent validity. Similarly, two items were excluded for mimetic pressures, with the remaining items (MiP2 and MiP3) showing acceptable factor loadings (0.769 and 0.663). Normative pressures retained all items, demonstrating strong factor loadings ranging from 0.814 to 0.874 and a Cronbach's reliability coefficient of 0.9, underscoring its internal consistency and validity.

Sustainability

Sustainability was measured using Gallardo-Vazquez and Sanchez-Hernandez's (2014) scale, designed to capture corporate social responsibility through the lens of Elkington's Triple Bottom Line (TBL) framework (Elkington, 1998). The original validated scale includes three items for the economic dimension, four for the social dimension, and four for the environmental dimension. One item (ECSUS1) was excluded for economic sustainability, but the remaining items demonstrated robust factor loadings between 0.761 and 0.890, with a Cronbach's alpha of 0.799. Social sustainability retained four items with factor loadings ranging from 0.782 to 0.881 and a Cronbach's alpha of 0.735. Environmental sustainability showed strong factor loadings between 0.733 and 0.851, with a Cronbach's alpha of 0.884, indicating high internal consistency and reliability across the dimensions.

Supply Chain Management

Supply chain management (SCM) practices were measured using the scale developed by Li et al. (2006). This construct was measured through various sub-variables, including customer relationship management, supplier relationship management, logistics and distribution, information sharing, and internal environmental management. This comprehensive scale covers various aspects of SCM, ensuring a robust measurement of the construct. Items with low factor loadings, such as CRM1, were

dropped. The remaining items across these sub-variables exhibited high factor loadings (e.g., CRM2-CRM6 ranging from 0.851 to 0.910), with Cronbach's alphas ranging from 0.792 to 0.925, confirming the reliability and validity of the measurement model.

Moderating Variables

Firm size is a critical factor in understanding the dynamics of the oil and gas industry, particularly how this variable interacts with institutional pressures and organisational outcomes such as sustainability and supply chain management (SCM) practices. Firm size is crucial for understanding organisational capabilities and resource availability, influencing how firms respond to external pressures and implement sustainable practices (Darnall, Henriques, & Sadorsky, 2010). This study used firm size, measured by the number of employees and revenue, to elucidate its moderating effects on these relationships. Firm size, with an average of 120 employees and a standard deviation of 112.8, varied significantly across the sample, ranging from 100 to 1,200 employees. Revenue ranged from $1.9 to $61.2 million, averaging $11.63 million.

INSERT TABLE 1 HERE

Inter-group Agreement (Data Aggregation)

To gather data on institutional pressures (IP), supply chain management practices, and the economic, social, and environmental dimensions of sustainability, the MD and the marketing manager from each firm were asked to complete the questionnaire. This dual-response approach aimed to mitigate social desirability in responses and to ensure that the data reflected a shared reality within each firm. It was anticipated that the responses from the two managers would be consistent, reflecting a common understanding of the firm's practices and pressures. The inter-group agreement coefficient (rwg) was utilised to measure the consistency of responses, as recommended by Bliese and Halverson (1998). The rwg values (table 2), which indicate the level of agreement between the respondents, were calculated following the methodology proposed by James et al. (1984). The average rwg values were 0.90 for coercive pressures, 0.89 for mimetic pressures, and 0.90 for normative pressures. For supply chain management, the rwg was 0.92. The rwg values for sustainability's economic, social, and environmental aspects were 0.92, 0.91, and 0.92, respectively. These high rwg values confirm a strong inter-rater agreement, indicating that the data collected from the MDs and marketing managers were consistent and supports the reliability of the aggregated data and suggests that the influence of social desirability was minimised.

INSERT TABLE 2 HERE

To address Common method variance (CMV) in this study, procedural and statistical remedies were employed: The study collected data from two different respondents within each organisation (Managing Directors and marketing managers), which helped to diversify the data sources and reduce the likelihood of CMV. Harman's single-factor test was conducted to test for CMV statistically (table 3). This test involved an exploratory factor analysis (EFA) without rotation on all key variables to determine if a single factor accounted for the most variance. The results indicated that no single factor emerged, and the first factor explained less than 50% of the total variance, suggesting that CMV was not a significant issue. Multicollinearity was assessed using the Variance Inflation Factor (VIF) and tolerance values for the independent variables in the regression models. VIF values and tolerance statistics were calculated for each predictor variable in the regression models. VIF values above 10 or tolerance values below 0.1 indicate problematic multicollinearity. The VIF values for all variables were below the critical threshold of 10, and tolerance values were well above 0.1, indicating that multicollinearity was not a significant concern in the regression analyses.

INSERT TABLE 3 HERE

Model of Analysis

The models for this study were meticulously chosen to align with the research objectives, which are to assess the impact of institutional pressures on sustainability and supply chain management (SCM) practices and to examine the moderating role of company size in these relationships within the oil and gas industry. The specified models are as follows:

$$\boldsymbol{SCM^{A}}_i = \alpha_0 + \alpha_1\boldsymbol{CoP}_i + \alpha_2\boldsymbol{NoP}_i + \alpha_3\boldsymbol{MiP}_i + \alpha_4\boldsymbol{SIZ}_i + \alpha_5\boldsymbol{CoP*SIZ}_i + \alpha_6\boldsymbol{NoP*SIZ}_i + \alpha_7\boldsymbol{MiP*SIZ}_i + \alpha_8\boldsymbol{REV}_i + \alpha_9\boldsymbol{NoE}_i + u_i \quad \ldots\ldots\ldots\ldots 1$$

$$\boldsymbol{SUS^{A}}_i = \beta_0 + \beta_1\boldsymbol{CoP}_i + \beta_2\boldsymbol{NoP}_i + \beta_3\boldsymbol{MiP}_i + \beta_4\boldsymbol{SIZ}_i + \beta_5\boldsymbol{CoP*SIZ}_i + \beta_6\boldsymbol{NoP*SIZ}_i + \beta_7\boldsymbol{MiP*SIZ}_i + \beta_8\boldsymbol{REV}_i + \beta_9\boldsymbol{NoE}_i + u_i \quad \ldots\ldots\ldots\ldots 2$$

These models rest on several critical assumptions. Firstly, it is assumed that there is a linear relationship between the dependent variable and each independent variable. Secondly, both the dependent and independent variables are considered to be continuous random variables that are normally distributed. Thirdly, the random error terms (ui_uj) for different observations are assumed to be independent, meaning the covariance between any ui_ui and uj_uj (where i≠ji \neq ji□=j) is zero, indicating that the value of the error term in one period is not influenced by its value in another period. Lastly, the explanatory variables are presumed to be non-collinear, implying that when the model includes multiple explanatory variables, they are not completely correlated.

Normality of Data

Ensuring the normality of data is a pivotal step in validating the appropriateness of the chosen statistical analyses, particularly when parametric methods are applied. Parametric analyses are contingent upon the assumption that the data follows a normal distribution, while non-parametric methods are typically reserved for data that do not meet this criterion (Field, 2013). This study conducted a rigorous normality assessment on all dependent variables to confirm their suitability for parametric analysis. The normality test was executed by visually examining histograms, a robust graphical tool that provides clear insights into data distribution (De Veaux, Velleman, & Bock, 2019). Figures 1 and 2 illustrate the histograms used in this analysis. These histograms effectively display the distribution of data points, allowing for an immediate visual assessment. A close inspection of the histograms in Figures 1 and 2 reveals that the data exhibits the hallmarks of a normal distribution. Both histograms display bell-shaped curves symmetric around the mean, indicating that the data points are evenly distributed. This symmetry and bell shape are strong indicators of normality, corroborating the assumption required for parametric statistical analyses (Ghasemi & Zahediasl, 2012). As a result, the data meets the criteria for conducting parametric analyses, ensuring the validity and reliability of subsequent statistical tests and interpretations (Benjamin et al., 2018).

INERT FIGURES 1 AND 2 HERE

Analyses and Results

The correlation analysis in Table 4 offers critical insights into the relationships among the dependent, independent and moderator variables within institutional pressures, supply chain management (SCM) and sustainability (SUS). This analysis is essential for understanding the complex interplay among these variables and their implications for SCM and sustainability practices. All independent factors, dependent variables, and moderator variables, except for Mimetic Pressures (MiP), exhibit a positive association with both SCM and sustainability. This highlights the significant and multifaceted relationships between these variables. Notably, Coercive Pressures (CoP) demonstrate a strong positive correlation with both SCM (r = .769**) and sustainability (r = .532**). This significant positive relationship suggests that increased coercive pressures are associated with enhanced SCM and

sustainability practices, aligning with the institutional theory, which posits that external pressures can drive organisational compliance and performance improvements (DiMaggio & Powell, 1983). Normative pressures (NoP) also show a robust positive association with SCM (r = .808**) and sustainability (r = .662**), indicating that higher normative pressures correlate with better performance in these domains. This supports the notion that organisations conform to societal norms and standards, leading to improved sustainability outcomes (Scott, 2008).

In contrast, Mimetic Pressures (MiP) exhibit a modest inverse relationship with SCM (r = -.041) and a slight direct relationship with sustainability (r = -.017). This indicates that mimetic pressures involving imitation of other organisations may not significantly drive SCM practices and have a minimal impact on sustainability. This finding aligns with previous research suggesting that mimetic behaviours might not always lead to substantial improvements in performance (Liu et al., 2010). The number of employees (NoE) shows a modest positive correlation with SCM (r = .041) and sustainability (r = .052). Although these correlations are relatively weak, they suggest that larger organisations might have more resources to implement effective SCM and sustainability practices (Carter & Easton, 2011). Revenue (ReV) also exhibits a weak positive correlation with SCM (r = .008) and sustainability (r = .017), indicating that financial performance may have a slight influence on these practices. Firm size (FMZ) is positively correlated with SCM (r = .048) and sustainability (r = .024), albeit with modest correlation coefficients. This suggests that larger firms may be better positioned to leverage economies of scale and resources to enhance their SCM and sustainability initiatives (Darnall, Henriques, & Sadorsky, 2010).

INSERT TABLE 4 HERE

Analysis of the Regression Models

This study employed two regression models to assess the relationships between the independent and dependent variables, specifically Institutional pressures, Supply Chain Management (SCM), and Sustainability (SUS). The results are indicated in Table 5. The F-statistic was utilised to evaluate the fitness of the models by testing the null hypothesis that all regression coefficients are zero. Both Model 1 and Model 2 yielded F-test statistics with p-values of 0.000, indicating strong evidence against the null hypothesis and confirming significant relationships between the variables. This underscores the robustness of the models in capturing the dynamics of SCM and sustainability influenced by institutional pressures. In multiple regression analyses, the R-squared value measures the proportion of variance in the dependent variable explained by the independent variables. Model 1, focusing on SCM, has an R-squared value of 0.770, signifying that the independent variables account for 77.0% of the variability in SCM. This high R-squared value indicates a strong model fit. Model 2, addressing sustainability, has an R-squared value of 0.468, indicating that the independent variables explain 46.8% of the variability in sustainability. While lower than Model 1, this R-squared value still reflects a substantial explanatory power, highlighting the complexity of sustainability outcomes. The Durbin-Watson (DW) statistic was employed to assess autocorrelation in the residuals of the regression models. Values around 2 for both models suggest the absence of significant autocorrelation, confirming the independence of residuals, which is crucial for the validity of the regression results (Durbin & Watson, 1950). The Variance Inflation Factor (VIF) values were examined to evaluate multicollinearity among the independent variables. The VIF values in both models are below the common threshold of 10, indicating that multicollinearity is not a significant issue and that the estimates of the regression coefficients are reliable (O'Brien, 2007).

In Model 1, which explores SCM, Coercive Pressures (CoP) and Normative Pressures (NoP) exert significant positive influences on SCM, with p-values of 0.000 and VIF values indicating stable estimates. This suggests that regulatory and normative expectations drive improvements in SCM practices. Conversely, the number of employees (NoE) negatively affects SCM. However, this relationship is not statistically significant (p = 0.582), indicating that firm size, in terms of employee count, may not directly impact SCM as previously thought (Carter & Easton, 2011). Model 2, which

investigates sustainability, also shows that CoP and NoP have significant positive effects on SUS, with p-values of 0.000. This indicates that firms under higher coercive and normative pressures tend to perform better in sustainability, aligning with the institutional theory that external pressures can enhance organisational compliance and performance in sustainability practices (DiMaggio & Powell, 1983). However, Mimetic Pressures (MiP) did not show significant effects on either SCM or SUS, with p-values of 0.642 and 0.658, respectively. This might reflect that imitating other organisations' practices does not necessarily lead to substantial improvements in these areas (Liu et al., 2010). Importantly, the interaction terms (CoP_FMZ, MiP_FMZ, and NoP_FMZ) in both models suggest no significant moderation by firm size, with p-values well above 0.05. This indicates that firm size does not significantly alter the impact of institutional pressures on SCM and sustainability outcomes, suggesting that these pressures affect firms uniformly regardless of size.

INSERT TABLE 5 HERE

Test of Hypotheses

In the first step, we present the results for the direct relationships between institutional pressures (IP) and Supply Chain Management (SCM) practices and Sustainability (SUS) (H1a, H1b, H1c, H1d, H1e, and H1f). The results in Table 5 show that coercive pressures were directly and statistically related to SCM practices. The hypothesis was confirmed for SCM practices (p-value = 0.000), providing full support to H1a. Concerning Hypothesis 1b, which posits the relationship between normative pressures and SCM practices, Table 5 shows that the direct effect of normative pressures is positive and statistically significant for SCM practices (p-value = 0.000), supporting the hypothesis strongly. Conversely, Hypothesis 1c, which addresses mimetic pressures, was not supported. The p-value for mimetic pressures (0.642) is above the significance level, indicating no significant relationship with SCM practices. The results of our analyses also fully supported Hypothesis 1d. Table 5 shows that coercive pressures positively and directly affected sustainability, achieving statistical significance (p-value = 0.001), thereby confirming Hypothesis 1d. Similarly, Hypothesis 1e was supported as normative pressures had a statistically significant impact on sustainability (p-value = 0.000). However, Hypothesis 1f was not supported, as mimetic pressures did not show a significant relationship with sustainability (p-value = 0.658).

Finally, we investigated the moderating role of firm size on the relationships between institutional pressures and SCM practices and sustainability (H2a, H2b, H2c, H2d, H2e, and H2f). The interaction terms for coercive pressures and firm size (CoPFMZ) were not statistically significant for both SCM practices (p-value = 0.504) and sustainability (p-value = 0.125), indicating that firm size does not moderate the impact of coercive pressures. Similarly, the interaction terms for normative pressures and firm size (NoPFMZ) were not significant for SCM practices (p-value = 0.484) and sustainability (p-value = 0.519), suggesting no moderating effect. Lastly, the interaction terms for mimetic pressures and firm size (MiP*FMZ) also showed no significant moderation effect on SCM practices (p-value = 0.902) or sustainability (p-value = 0.507). These findings indicate that while coercive and normative pressures significantly influence SCM practices and sustainability, mimetic pressures do not have a substantial impact. Furthermore, firm size does not moderate the effects of institutional pressures on these organisational outcomes, suggesting a uniform influence of these pressures regardless of firm size.

DISCUSSION AND CONCLUSION

The primary objective of this study was to enhance the understanding of how institutional pressures shape sustainability and supply chain management practices within the oil and gas industry in a developing economy, with particular attention to the moderating influence of firm size. This research advances existing literature by simultaneously examining the impacts of coercive, normative, and mimetic pressures and highlighting how firm size modulates these effects, offering critical insights into the distinct challenges faced by firms in resource-constrained and institutionally diverse contexts.

Theoretical Implications

The findings from this study underscore the significant role of institutional pressures in shaping organisational behaviour in the oil and gas industry, particularly in developing countries where regulatory and economic landscapes differ markedly from those in developed regions. This research corroborates the tenets of institutional theory, which posits that organisations conform to external pressures to gain legitimacy and societal approval (DiMaggio and Powell, 1983). This study's results highlight that coercive pressures from regulatory bodies and legal mandates have a pronounced positive impact on both SCM practices and sustainability outcomes. This is consistent with previous studies demonstrating that regulatory compliance drives organisations to adopt rigorous environmental and social practices (Aragon-Correa et al., 2018; Bansal, 2005). The significant positive relationship between coercive pressures and sustainability (p-value = 0.001) supports the hypothesis that regulatory frameworks compel firms to engage in substantive sustainability practices. These results align with findings by Haleem et al. (2022), who observed that regulatory mandates in the oil and gas sector serve as critical drivers of environmental sustainability. Similarly, Zafeiriou et al. (2014) emphasised that regulatory pressures, compounded by energy price volatility and emission reduction targets, heighten firms' incentives to adopt sustainable practices to mitigate both economic and environmental risks.

Similarly, normative pressures, driven by industry standards and societal norms, strongly correlate with SCM practices and sustainability. This aligns with the view that normative pressures foster adherence to socially accepted standards and enhance organisational legitimacy (Martinez-Ferrero and Garcia-Sanchez, 2017). The statistical significance of normative pressures on SCM practices (p-value = 0.000) and sustainability (p-value = 0.000) indicates that aligning with industry norms is crucial for firms to maintain their social license to operate. Drosos et al. (2019) also highlight how normative pressures, particularly customer-driven expectations, influence sustainability practices in the natural gas market, underscoring the growing societal demand for transparent and responsible operations across the energy sector. Conversely, mimetic pressures, which involve imitating practices from industry leaders, did not significantly impact SCM practices or sustainability. This finding challenges the assumption that mimetic isomorphism improves organisational performance (Liu et al., 2010). The lack of significant results (p-values of 0.642 and 0.658 for SCM practices and sustainability) suggests that imitation without strategic alignment may result in superficial compliance rather than genuine improvements. This aligns with findings by Arabatzis et al. (2013), who argued that while adopting best practices can enhance supply chain models, these practices must be adapted to local contexts and aligned with organisational goals to achieve meaningful outcomes.

Practical Implications

From a practical standpoint, these findings offer critical insights for managers in the oil and gas industry, especially in developing economies. The pronounced impact of coercive and normative pressures underscores the need for firms to engage proactively with regulatory bodies and industry associations to stay ahead of compliance requirements and industry standards. Given the significant positive effects of these pressures on sustainability and SCM practices, firms should invest in robust compliance programs and actively participate in industry initiatives that promote sustainability. For example, the integration of sustainability into supply chains, as asserted by Carter and Easton (2011), could serve as a strategic focus for firms aiming to enhance both compliance and operational efficiency. Moreover, frameworks such as the one proposed by Arabatzis et al. (2013) for resource allocation in supply chains could provide valuable guidance for tailoring sustainable practices to specific industry needs. The results also suggest that while mimetic pressures might not independently drive substantial improvements, they should not be entirely disregarded. Firms can benefit from selectively adopting best practices from industry leaders, provided these practices are aligned with their strategic objectives. This selective imitation can enhance legitimacy and potentially lead to competitive advantages.

Furthermore, the analysis revealed that firm size does not significantly moderate the relationship between institutional pressures, SCM practices, and sustainability. This finding implies that institutional pressures exert a uniform influence across firms of different sizes, highlighting that large and small firms must address these pressures effectively. Larger firms, with more resources, may have an advantage in implementing comprehensive sustainability and SCM practices, but smaller firms must also develop strategies to comply with regulatory and normative expectations.

Limitations and Future Research

Despite its contributions, this study has several limitations that should be addressed in future research. The cross-sectional design limits the ability to draw causal inferences. Longitudinal studies could provide deeper insights into how institutional pressures and firm responses evolve over time. Additionally, while relevant, the focus on the Nigerian oil and gas industry may limit the generalisability of the findings. Future research should consider multiple developing economies to validate and extend these findings. Also, as highlighted by Broman and Robert (2017), future studies could also explore how strategic sustainable development frameworks are implemented across industries to assess their adaptability and scalability in diverse regulatory and economic contexts.

Moreover, while this study incorporated firm size as a moderating variable, other organisational characteristics, such as corporate governance structures, ownership types, and leadership styles, could influence how firms respond to institutional pressures. Exploring these factors could provide a better understanding of the interplay between institutional pressures and organisational practices.

In conclusion, this study reaffirms the critical role of institutional pressures in driving sustainability and SCM practices in developing economies' oil and gas industry. By addressing these pressures proactively, firms can ensure compliance and legitimacy and contribute to broader societal goals of sustainable development. The findings in this study echo the conclusions of Ijaz Baig and Yadegaridehkordi (2023), who identified institutional pressures as pivotal in aligning corporate strategies with triple-bottom-line objectives. Future research should continue exploring these dynamics to support the evolution of sustainable practices in high-impact industries.

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Appendices:

Table 1: Convergent Validity

Main variable	Sub-Variables	Code	Factor Loading	Cronbach Reliability
Institutional Pressures	Coercive pressures	CoP1	dropped	0.851
		CoP2	0.927	
		CoP3	0.928	
		CoP4	0.854	
	mimetic pressures	MiP1	dropped	0.518
		MIP2	0.769	
		MiP3	0.663	
		MiP4	dropped	
	normative pressures	NoP1	0.874	0.9
		NoP2	0.821	
		NoP3	0.872	
		NoP4	0.844	
		NoP5	0.814	
Sustainability	Economic Sustainability	ECSUS1	dropped	0.799
		ECSUS3	0.890	
		ECSUS7	0.761	
	Social Sustainability	SOCSUS1	0.782	0.735
		SOCSUS2	0.881	
		SOCSUS3	0.849	
		SOCSUS4	0.811	
	Environmental Sustainability	ENSUS1	0.733	0.884
		ENSUS2	0.782	
		ENSUS3	0.851	
		ENSUS4	0.825	
Supply Chain Management Practices	Customer Relationship Management	CRM1	dropped	0.925
		CRM2	0.851	
		CRM3	0.910	
		CRM4	0.894	
		CRM5	0.846	
		CRM6	0.855	
	Supplier Relationship Management	SRM1	0.826	
		SRM2	0.855	
		SRM3	0.881	
		SRM4	0.795	
	Logistics and Distribution	LD1	0.851	
		LD2	0.917	0.827

		LD3	0.816	
	Information Sharing	IS1	0.758	0.792
		IS2	0.894	
		IS3	0.865	
	Internal Environmental Management	IEM1	0.818	0.844
		IEM2	0.939	
		IEM3	0.866	
	Green Procurement and Production Management	GPPM1	0.836	0.881
		GPPM2	0.908	
		GPPM3	0.871	
		GPPM4	0.831	

Source: Authors own work

Table 2: Statistical Table Supporting Validation:

Variable	**rwg (Inter-group Agreement)**
Coercive Pressures	0.90
Mimetic Pressures	0.89
Normative Pressures	0.90
Supply Chain Management	0.92
Economic Sustainability	0.92
Social Sustainability	0.91
Environmental Sustainability	0.92

Source: Authors own work

Table 3: CMV and Multicollinearity Assessment

Variable	**Factor Loading (Harman's Test)**	**VIF**	**Tolerance**
Coercive Pressures	< 50% (Total Variance)	1.655	0.604
Mimetic Pressures	< 50% (Total Variance)	1.023	0.978
Normative Pressures	< 50% (Total Variance)	1.657	0.603

Variable	Factor Loading (Harman's Test)	VIF	Tolerance
Firm Size	< 50% (Total Variance)	1.010	0.990
Coercive * Firm Size	< 50% (Total Variance)	1.857	0.539
Mimetic * Firm Size	< 50% (Total Variance)	1.021	0.980
Normative * Firm Size	< 50% (Total Variance)	1.863	0.537
Number of Employees	< 50% (Total Variance)	2.080	0.481
Revenue	< 50% (Total Variance)	2.086	0.479

Source: Authors own work

Table 4: Correlation Matrix

	SCM	SUS	CoP	MiP	NoP	NoE	ReV	FMZ
SCM	1	.758**	.769**	-.041	.808**	.041	.008	.048
SUS	.758**	1	.532**	-.017	.662**	.052	.017	.024
CoP	.769**	.532**	1	-.053	.625**	.046	.030	.034
MiP	-.041	-.017	-.053	1	-.058	.015	-.026	.031
NoP	.808**	.662**	.625**	-.058	1	.055	.001	.006
NoE	.041	.052	.046	.015	.055	1	.723**	.025
ReV	.008	.017	.030	-.026	.001	.723**	1	.039
FMZ	.048	.024	.034	.031	.006	.025	.039	1

Source: Authors own work

Table 5: Regression analysis

	Model 1			Model 2		
	Coeff	**p-value**	**VIF**	**Coeff**	**p-value**	**VIF**
Const	0.605	0.001		2.062	0.000	
CoP	0.357	0.000	1.653	0.123	0.001	1.656

MiP	0.010	0.642	1.023	0.012	0.658	1.022
NoP	0.490	0.000	1.655	0.392	0.000	1.657
FMZ	0.007	0.312	1.010	0.002	0.783	1.009
CoP_FMZ	-0.012	0.504	1.857	-0.034	0.125	1.857
MiP_FMZ	0.002	0.902	1.021	-0.012	0.507	1.021
NoP_FMZ	0.013	0.484	1.863	0.015	0.519	1.863
NoE	-0.005	0.582	2.080	0.001	0.914	2.120
ReV	0.002	0.897	2.086	0.001	0.927	2.130
N		287			287	
F-test	102.518	0.000		27.063	0.000	
r-squared	0.770			0.468		
DW	1.708			1.829		
Dependent		*SCM*			*SUS*	

Source: Authors own work

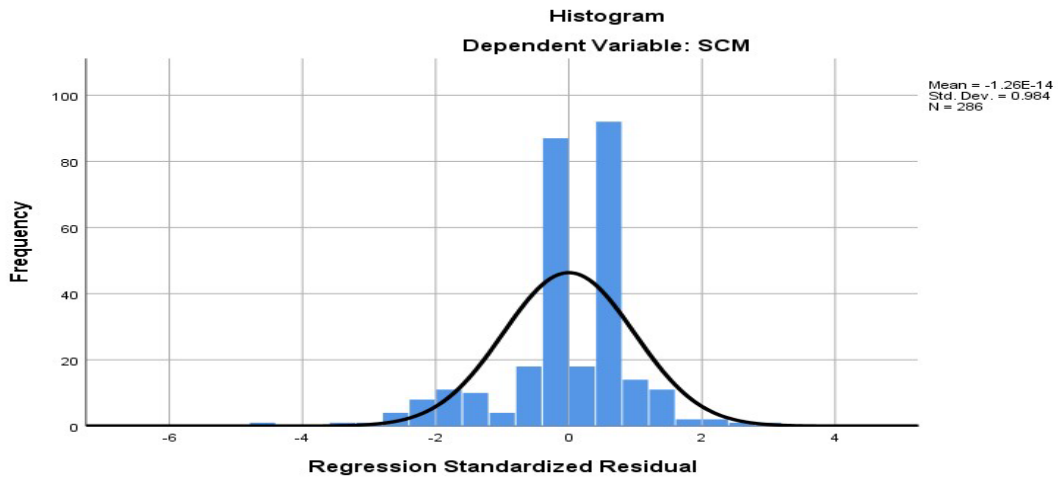

Figure 1: Supply Chain Management (Source: Authors own work)

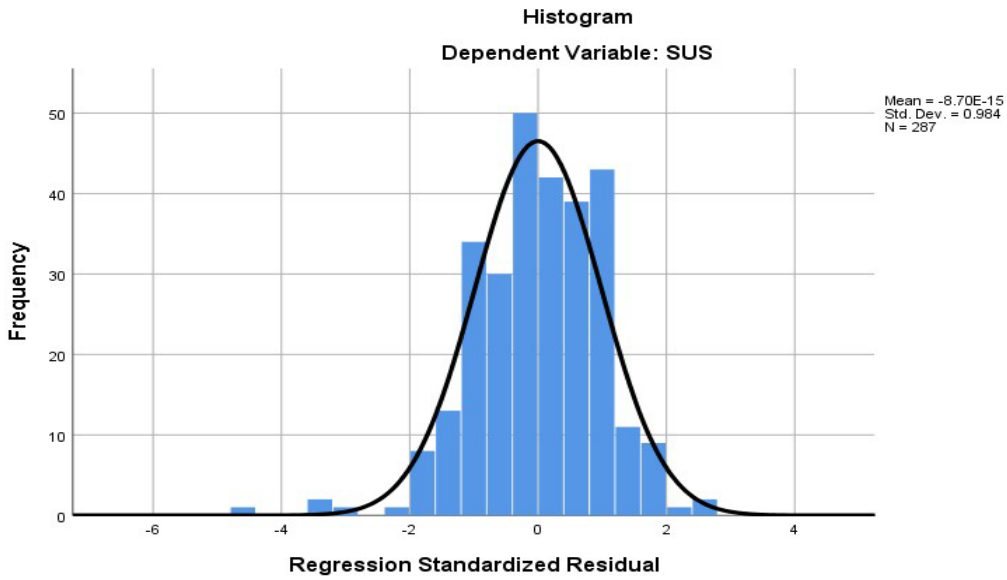

Figure 2: Sustainability (Source: Authors own work)