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Unearthing the pressures: An assessment of the sustainability focus and supply chain management practices adopted by global oil and gas titans

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journals.sagepub.com/home/ea**Augustine Okeke¹**  and **Lukman Jimoh Rahim²**

Abstract

This study aims to explore the influence of institutional pressures on the global oil and gas industry's prioritisation of sustainability and supply chain management (SCM) practices. This study conducted a thorough analysis of 15 prominent oil and gas companies across Europe, Asia and America over a span of 10 years. The study employed a mixed-method approach, combining qualitative content analysis of annual reports with quantitative analysis of variance to assess the companies' commitment to sustainability practices in response to different institutional pressures. The findings uncovered notable variations in the prioritisation of economic, social, environmental and stakeholder sustainability across different continents. The study also highlighted various institutional pressures that impact these companies, including regulatory demands, Paris Agreement objectives and non-governmental organisation expectations. Notably, these companies displayed different levels of responsiveness to these pressures, which impacted their SCM and sustainability strategies. This research also highlights the intricate relationship between institutional pressures and sustainability within the oil and gas industry. This implies that companies should develop strong sustainability strategies that align with external pressures to improve their competitive advantage. For policymakers, the study suggests the development of more robust regulatory frameworks that consider the varying sustainability practices across different regions. Furthermore, it promotes the need for additional research to investigate the effectiveness of these strategies in real-world applications, establishing a foundation for well-informed policy choices that support a sustainable future in the oil and gas industry.

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Keywords

Oil and gas industry, sustainability policies, supply chain management, institutional pressures, empirical analysis, content analysis, analysis of variance

Introduction

In contemporary times, with urgent environmental issues and a growing focus on unsustainable business practices, it is crucial to prioritise sustainability in oil and gas supply chain management (SCM). The importance of this matter has been emphasised by Okogwu et al.,¹ Ahmad et al.^{2,3} and Wilding et al.⁴ who acknowledge the distinct capacity of sustainability initiatives to address the intricate economic, social and environmental challenges associated with the oil and gas industry.⁵ Stakeholders, including regulatory bodies, are also placing increasing pressure on global oil and gas companies in Europe, Asia and America to align their practices with sustainability mandates,⁶ requiring them to comply with government regulations and ISO standards like ISO 14001 and ISO 26000. Therefore, it is imperative to urgently improve sustainability within the SCM of the oil and gas industry. This sense of urgency arises in the face of increasingly pressing global environmental challenges and heightened regulatory and societal expectations aimed at addressing the significant socio-environmental impact of the industry. As emphasised by Okogwu et al.¹ and Rentizelas et al.,⁵ the oil and gas sector is currently facing a pivotal moment. The sector's complex and high-risk operations require strong sustainability and SCM practices. These practices have the potential to greatly reduce the sector's environmental impact while also ensuring its economic and social sustainability.

The growing focus on sustainability in the oil and gas industry has heightened the academic discussion, especially when determining the importance of sustainability issues within supply chains in the face of external pressures. It is worth mentioning that there is a lack of research regarding the influence of institutional pressures (IPs) on SCM practices and sustainability in the oil and gas sector, especially across different continents.^{7–10} Given the growing societal concerns surrounding environmental issues and the availability of energy resources, it becomes increasingly important to closely examine the sustainability practices of oil and gas companies and the underlying motivations behind them. However, prior studies have primarily concentrated on limited aspects of sustainability, frequently overlooking thorough assessments and neglecting to analyse the influence of IPs on SCM practices and sustainability in the oil and gas sector.^{2,11,12} In addition, previous research has predominantly focused on environmental issues, neglecting the wider institutional factors that impact SCM practices and sustainability.^{9,10} There is a significant lack of empirical research that examines the impact of IPs (coercive, normative and mimetic) on the sustainability strategies of oil and gas companies in various geopolitical contexts.^{9,13} Also, most prior studies have failed to comprehensively examine how these dimensions of IPs intersect and influence SCM practices in the oil and gas sector.^{14,15}

Similarly, the prior studies on sustainability and SCM within the oil and gas industry have yielded fragmented and incomplete results due to variations in global sustainability pressures¹¹ and the research findings. First, evidence from the synthesis of the literature review conducted indicates that the articles concentrated on a single aspect of sustainability, either economic,^{14–16} social^{5,17} and/or environmental^{18–20} with less attention paid to other facets of sustainability. Due to the absence of a comprehensive sustainability approach, various implications on other sustainability aspects were overlooked. Secondly, most research^{2,3,5,12} failed to analyse the influence of IPs on sustainability and SCM practices as none of these studies assessed how these pressures

influence SCM practices and sustainability in the oil and gas industry. Thirdly, these studies^{5,13,14,21–23} mostly used mono method, making it impractical to examine via mixed methods the veracity of these claims and findings.

This study is, therefore, motivated by the acknowledgement of a significant void in the current body of research regarding incorporating sustainability into SCM practices amidst different IPs. This is particularly true because previous studies have primarily concentrated on individual aspects of sustainability, such as the economic, social or environmental factors. However, these studies have not thoroughly investigated how these dimensions intersect and impact SCM practices in the oil and gas industry.^{14,15}

With most oil and gas companies expanding globally, this study seeks to address the gaps in knowledge by using institutional theory to analyse the challenges of incorporating sustainability into SCM. By utilising institutional theory as a fundamental framework, this study provides a comprehensive and insightful comprehension of sustainability within the oil and gas industry, covering economic, social and environmental aspects. In contrast to previous research that primarily concentrated on corporate social responsibility and environmental management, this study sheds light on the coercive, mimetic and normative isomorphic processes that influence sustainability practices in the industry.²⁴ This approach helps comprehend companies' variegated responses to external influences and explores the potential of these pressures to enforce or encourage sustainable practices within the industry.

This research employs a mixed-method approach, analysis of variance (ANOVA) and content analysis of annual reports from 15 prominent oil and gas companies across Europe, Asia and America. The study offers a comparative perspective on how various institutional environments impact corporate sustainability strategies. This approach addresses significant questions on (i) the prioritisation of sustainability issues within supply chains and (ii) the extent to which IPs catalyse or hinder the adoption of sustainable SCM practices. Therefore, the rationale for this study is to enhance theoretical comprehension and provide practical insights that can assist oil and gas companies in aligning their SCM strategies with the increasing need for sustainability. With this research, we aim to contribute substantially to the literature on institutional theory and SCM. We seek to comprehensively understand the intricate dynamics within one of the most globally scrutinised industries.

In the following sections, we thoroughly review the literature, focusing on sustainability, SCM practices and IPs. Next, we elaborate on the methodology used in this study, followed by a detailed explanation of the results obtained from the data analysis. Our findings are carefully examined and discussed, leading to the presentation of our conclusions. Lastly, we acknowledge the limitations of this study and suggest avenues for future research in this field.

Literature review

Theoretical framework

DiMaggio and Powell's Institutional Theory²⁵ provides the theoretical foundation of this research, which offers a framework for comprehending how external forces influence organisational behaviours and practices, especially in highly regulated and publicly scrutinised industries like oil and gas. According to institutional theory, organisations' operations and strategic choices are greatly influenced by the institutional environment, which includes regulatory frameworks, social norms and cultural expectations.²⁶ This theory is particularly relevant to our study because it examines how internal corporate strategies and external pressures interact with SCM and sustainability practices in the oil and gas industry.

Institutional theory is well-suited for this study for a variety of reasons. This theory provides valuable insights into why organisations within the same industry may adhere to certain norms while deviating in other areas. This is of utmost importance in the oil and gas industry, where companies encounter comparable external pressures but frequently demonstrate distinct approaches to sustainability and SCM.²⁷ By utilising this theory, the study can thoroughly examine the coercive, mimetic and normative IPs that impact these variations. The theory also thoroughly explores how companies react to the expectations and demands set by governments, non-governmental organisations (NGOs), stakeholders and the general public. These responses are essential for understanding how sustainability issues are prioritised and addressed in supply chain practices across various regions and regulatory environments.²⁵

Institutional theory is also closely tied to the research questions as it offers a framework to analyse how external pressures impact the prioritisation of sustainability issues (first research question) and influence SCM practices (second research question). The institutional theory as used in this study sheds light on how oil and gas companies make decisions regarding sustainability issues within their supply chains as external pressures, such as regulatory mandates, industry benchmarking, professional standards and societal expectations, drive firms to align their sustainability practices with the demands of the environment. This theoretical perspective helps to analyse and understand the factors that contribute to the prominence of sustainability issues in various markets. Examining the varying intensities and types of IPs makes it possible to identify the reasons behind the critical issues in environmental, social and economic sustainability. This enables examining how these pressures influence companies to reshape, resist or adopt SCM practices and sustainability strategies to establish credibility and gain a competitive edge.²⁸

The institutional theory provides a framework for evaluating the effects of IPs on SCM practices in the oil and gas industry. This study examines the extent to which companies incorporate sustainability into their SCM. It investigates whether this integration is driven by external factors such as legal requirements, the desire to imitate successful practices of other companies, or the need to conform to cultural and ethical expectations. Through a rigorous academic analysis of these influences, the study can uncover patterns and variations in SCM practices and their effectiveness in improving sustainability outcomes.

This study utilises institutional theory to explore the IPs that influence the adoption of sustainability practices by oil and gas companies. Additionally, it analyses the wider implications of these practices within the context of SCM. This approach addresses the central research questions and enhances the theoretical discourse by utilising institutional theory in a complex, global industry under intense environmental scrutiny, and demands increased transparency and accountability. Therefore, institutional theory plays a crucial role in shaping the empirical analysis of this study and deepening our comprehension of the strategic adjustments that companies undertake to address IPs.

Empirical review

“A few studies have addressed sustainability, SCM and IPs. Liu et al.²¹ and Zhu and Sarkis²⁹ explored how IPs influence firms’ intentions to adopt sustainable SCM practices. These studies argue that external pressures, such as regulations and industry standards, significantly shape sustainability priorities within the industry. The literature, however, underscores the variability in sustainability practices across global oil and gas giants, with Glover et al.¹⁹ highlighting the role of IPs in shaping sustainable practices across supply chains. Similarly, Hoejmose et al.¹³ examined the effect of IP on cooperative and coercive ‘green’ supply chain practices, emphasising that firms

respond differently to these pressures. Rentizelas et al.⁵ investigated the role of IP in managing sustainable supply chains in the oil and gas industry, emphasising the need to align practices with performance. Yang²³ analyses the impact of IPs on green SCM and performance within the context of container shipping. Zeng et al.³⁰ explore the influence of IPs on sustainable SCM and circular economy capability in Chinese eco-industrial park firms. Their study reveals that IPs encourage firms to adopt circular economy practices, contributing to improved sustainability performance. Dubey et al.³¹ examined the relationship between leadership, operational practices, IPs and environmental performance, highlighting the role of IPs in driving green supply chains.

Assessing these studies reveals several important insights and challenges. While institutional theory provides a lens through which to view organisational behaviour, its application to the oil and gas sector raises important issues, especially in relation to concepts like IPs and isomorphism.²⁵ First, even though institutional theory argues that organisations seek legitimacy by imitating others' effective and successful practices, it is important to examine the extent to which successful practices are replicated in the oil and gas sector. This warrants careful scrutiny and analysis. The industry's globalised nature and diverse stakeholder landscape present distinct challenges, which can result in varied responses to IPs. Furthermore, the theory's emphasis on conformity ignores the difficulties in balancing local adaptations and international standards, especially regarding SCM and sustainability practices.

Additionally, as an extension, institutional theory emphasises the significance of fulfilling a wide range of stakeholder expectations.³² Nevertheless, applying this theory in the oil and gas industry presents numerous obstacles. Stakeholders, including governments and local communities, frequently have divergent demands, challenging companies to prioritise their sustainability initiatives effectively. In addition, the impact of stakeholders differs across different continents, which adds complexity to the implementation of consistent sustainability and SCM practices. European corporations, for example, contend with strict environmental requirements,³³ while American enterprises must navigate regulatory compliance and respond to consumer activism.³⁴ Asian firms operating in culturally diverse settings must carefully navigate the expectations of different stakeholders.³⁵ Consequently, the adoption of SCM approaches within the oil and gas industry can be greatly influenced by IPs from these stakeholders³⁶ and Darnall et al.³⁷ Due to these pressures, European firms, known for their commitment to compliance and adherence to strict regulations, may frequently incorporate sustainability principles into their SCM practices.³⁸ On the other hand, American companies may strongly emphasise efficiency and innovation due to market-driven limitations.³⁹ In contrast, Asian enterprises may adopt hybrid SCM practices that combine global standards with unique local characteristics.⁴⁰ The globalised nature of the oil and gas sector and international agreements such as the Paris Agreement and Sustainable Development Goals could also influence how companies balance regional adaptations with global conformity in their SCM practices.⁴¹ Nevertheless, even with these prevailing pressures, it is unclear if they lead to a notable variation in sustainability and SCM practices within the industry.

In addition, the empirical studies that have examined the impact of IPs on sustainability and SCM practices in the oil and gas industry have revealed notable discrepancies and sparked debates among scholars. There is an ongoing debate regarding the effectiveness of voluntary initiatives versus mandatory regulations in promoting sustainability commitments. Some researchers argue in favour of voluntary initiatives,⁵ while others emphasise the indispensability of mandatory regulations.³⁰ The contrasting viewpoints highlight the intricate nature of managing IPs and SCM practices.^{42,58} It emphasises the intricacy of these dynamics and the necessity for thorough analysis. Furthermore, the scholarly literature highlights significant differences in sustainability practices among oil and gas companies, which questions the idea of uniformity within the industry.

Some companies strongly emphasise sustainability to improve performance, while others take a more varied approach.³¹ This suggests that various factors at play influence decision making in this industry. This emphasises the necessity of more research on the interactions between IPs, sustainability and SCM practices in the oil and gas sector, especially in light of the changing regulatory environments and global environmental consciousness.

Sustainability in the oil and gas industry

“The definition of sustainability that emerged from the Brundtland Commission in 1987 is based on integrating economic, environmental and social factors.⁴⁵ Elkington’s⁴⁶ framework emphasises the intersection of these three components, highlighting the need for organisations to integrate ecological, social and financial performance to improve human wellbeing.⁴³ Carter et al.⁴⁴ emphasised the significance of Elkington’s contribution to sustainability by defining sustainability as ‘a strategic, transparent integration and achievement of organisation’s social, environmental, and economic goals in coordination with other supply chain members’. Sustainability presents a significant challenge to the oil and gas sector because conventional production patterns are not sustainable, and alternative models based on renewable energy are not yet fully developed. This conflict arises from the need to adopt renewable energy.^{2,3,47,48} The industry struggles to shift to sustainable practices while juggling stakeholder pressures, ecological concerns, economic viability and societal wellbeing.^{2,3} Oil and gas companies are under increased pressure to improve safety standards, lessen their environmental impact and reduce pollution due to decades of environmental disasters and public scrutiny.^{47,48} High-profile incidents like oil spills, major pollution and never-ending stories about the need to cut carbon emissions have firmly placed oil and gas sustainability in the spotlight. Oil and gas companies face significant pressure to mitigate their environmental impact, prevent future spills, leaks, waste, and emissions that pollute air, land, and water, and minimise accidents, flare-ups, and fires in their facilities. Additionally, they face criticism for wasting and depleting vital resources, particularly water, which is particularly problematic for fracking operations given the global drought crisis and the damage oil extraction causes to valuable land. In light of these pressing concerns, there has been a lack of comprehensive investigation into the impact of IPs on sustainability and SCM practices within the oil and gas industry.^{47–49} Previous research has primarily concentrated on promoting corporate social and environmental responsibility, neglecting the particular sustainability concerns that oil and gas companies address in response to external pressures.^{47–49} This gap in the literature highlights the need to analyse the sustainability issues that oil and gas companies prioritise in their supply chain practices due to IPs. This study seeks to shed light on the relationship between IPs, sustainability priorities, and SCM practices in the oil and gas industry, filling this research gap.

Supply chain management practices

SCM practice is defined by Li et al.⁵⁰ as a series of actions carried out by an organisation to improve the effective management of its SC. Li et al.⁵¹ viewed it as the collection of actions carried out by organisations to support effective SCM. Pires asserts that it is associated with activities to transform the management of business processes in the supply chain. Van der Vaart and Van Donk⁵² believe that SCM practices are concrete actions or technologies that play a significant role in the engagement of the focal firm with its suppliers and consumers. Accordingly, SCM practice is considered a multi-dimensional notion; however, consensus on a common set of constructs that constitute SCM practices does not exist in the SCM discipline. As some scholars have a wide view of supply chain

practices,^{53–57} while others take a more restricted view of the constructs.^{10,58–60} This supports the notion that various industries may have varied approaches to implementing SCM. Previous research suggests that various sectors may have adopted distinct supply chain practices.^{53–57} It follows, therefore, that a set of supply chain practices may not be appropriate for all industries or sectors since data from prior research shows that various countries and industries may have a varied set of SCM practices. As a result, it is critical that research is undertaken to reveal a distinct set of supply chain practices in the oil and gas sector, as a set of constructs appropriate for the oil industry is required to identify the effect of IPs on the practices of SCM in this industry.

A variety of factors have been identified as influencing SCM practices. These include the company's position in the chain and its field of operation,^{50,51,61} the industrial sector⁶² and the relationship between SCM practises and elements of the institutional environment in which it operates.⁶³ This means that a company's implementation of SCM practices can be influenced by many environmental factors and affected by both positive and negative pressures. Bon et al.⁶⁴ argued that institutional environmental pressures on organisational practices are mainly characterised by restraints and rationality that organisations show towards and receive from the outside world and the external demands to which the organisation can respond. These pressures can serve as an essential driving factor of firm SCM practices as every firm must contend with institutional factors in their SCM practices. As a result, it is argued in this study that how organisations respond to institutional environmental pressures regarding SCM practices varies depending on a variety of variables linked to the organisations, such as resources, infrastructures, market, fiscal and political conditions, population patterns, factor endowments, natural capital, production and economic environments institutional characteristics, their size and how they perceive or interpret these pressures. These institutions and institutional variables shape corporate policies, perceptions, pressures and practice selection⁶⁵ and, as a result, SCM practices. It is the assessment of the influence of these pressures emanating from the oil and gas industry's institutional environment and its effect on SCM practices that this study beams its light on.

Reviewing and consolidating the literature found many perspectives on SCM practices. Mahruf,⁶⁶ and Li et al.⁵¹ categorised SCM practices as strategic supplier relationship management, outsourcing, cycle time compression, continuous process flow and information sharing. Tan et al.⁶⁷ used purchasing, quality and customer relationship management to represent SCM practices in their empirical study. Yildiz Çankaya and Sezen⁶⁸ included in their list of SCM practices concentration on core competencies, internal lean practices, use of inter-organisational systems such as electronic data interchange, and the elimination of excess inventory levels by postponing customisation towards the end of the supply chain. Govindan et al.⁶⁰ identified six aspects of SCM practices: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and Distribution and Logistics capability. Fantasy et al.⁶⁹ identified SCM's concept as an agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, supplier relationship and internal lean practice. Most of these numerous studies have considered SCM practices from multiple perspectives; however, all of them agree on the fact that their primary goal is assessing how these practices enhance the sustainable performance of the firm.^{22,51,70,71} Consequently, the SCM practices adopted in this study integrate the findings from the existing literature. However, unlike these previous studies, this study seeks to ascertain how IPs influence these practices rather than how this practice can lead to sustainable performance, as is prevalent in the existing research. The practices selected for measuring SCM practice in this study include strategic supplier relationships, customer relationships, internal lean practices and distribution and logistics. These four constructs cover upstream (strategic supplier relationship), downstream (customer relationship management) and what the organisation does to eliminate waste at the midstream (internal lean practice), and how they carry out distribution

and logistics in the Oil and Gas supply chain, unlike previous studies^{2,3,56,72} whose focus was either on upstream or downstream segments. Table 1 shows the categorisation of SCM practices used in this research, with each classification emphasising a conceptual approach.

Institutional pressure influences on SCM practices and sustainability

Institutional theory offers a valuable framework for comprehending the obstacles faced by the oil and gas industries in Europe, America and Asia, particularly in the context of SCM practices and stakeholder pressure.⁹² The theory suggests that external IPs, such as regulatory frameworks, norms and stakeholder expectations, influence organisations. Examining the application of institutional theory in these regions yields valuable insights into the dynamics shaping stakeholder pressures and SCM practices within the oil and gas sector. Stakeholder pressure is explained using institutional theory, which indicates that organisations comply with institutional expectations to legitimize their operations. In Europe, stringent environmental regulations and increasing emphasis on social responsibility drive stakeholder pressures.⁹³ European oil and gas companies face demands from diverse stakeholders, including government bodies, environmental groups, and communities, necessitating a robust response to environmental and social concerns. In America, a dynamic regulatory landscape, activism and public scrutiny contribute to stakeholder pressures. Asian oil and gas companies, operating in diverse socio-cultural contexts, navigate expectations from governments, local communities and global investors. Considering the Supply Chain Management Practices, institutional theory emphasises organisations' isomorphism or mimetic behaviour, suggesting that they imitate successful practices to gain legitimacy. In Europe, where sustainability is a focal point, oil and gas companies align their SCM practices with stringent environmental and social standards, including adopting eco-friendly technologies and transparent supply chain processes. In America, where market-driven approaches often prevail, companies emphasise efficiency and innovation in SCM practices to gain a competitive advantage. In Asia, a region characterised by diverse cultural and regulatory landscapes, companies may adopt hybrid SCM practices that integrate global standards with local nuances. Moreover, global IPs beyond regional variations, such as international agreements on climate change and sustainable development goals, shape the behaviours of oil and gas companies across Europe, America and Asia. Multinational corporations face the challenge of navigating diverse regulatory environments while adhering to global sustainability expectations. This underscores the importance of balancing local adaptation with global conformity in SCM practices (Table 2).

Table 1. Supply chain management (SCM) practices.

SCM practices	References
Supplier relationship management	Li et al., ⁵¹ Gold et al., ⁷³ Ashby et al., ⁷⁴ Kumar and Rahman ⁷⁵ , Gandhi et al. ⁷⁶ , Duque-Uribe et al. ⁷⁷ , Al-Shboul et al. ⁵³
Customer relationship management	Tan and Lim ⁷⁸ , Govindan et al. ⁷⁹ , Lopes de Sousa Jabbour et al. ⁸⁰ , Wong et al., ²² Das, ^{70,71} Wang and Dai ⁸¹
Internal lean practices	Yildiz Çankaya and Sezen, ⁶⁸ Li et al., ⁵¹ Azevedo et al., ⁸² Martínez-Jurado and Moyano-Fuentes ⁸³ , Cook et al. ⁸⁴ , Assumpção et al.
Distribution and logistics	Govindan et al. ⁷⁵ , Markley and Davis ⁸⁵ , Abbasi and Nilsson ⁸⁶ , Ciliberti et al. ⁸⁷ , Ali et al. ⁸⁸ , Dey et al., ⁹⁰ Seuring and Müller ⁸⁹ , AuYong et al. ⁹¹

Table 2. Company profile.

Name	Revenue (billion)	Net income (billion)	Headquarters	Continent	Number of employees	Stock exchange listed
Royal Dutch Shell	£25	£11.9	London, England	Europe	83,000	LSE
BP PLC	£213	£3.03	London, England	Europe	72,500	LSE
Total	\$209.4	\$11.446	Courbevoie, France	Europe	104,000	EURONEXT PARIS, FWB, NYSE
Equinor	\$61.2	\$4.6	Stavanger, France	Europe	20,000	NYSE, OSE
ENI	€69.88	€148	Rome, Italy	Europe	32,053	BIT, NYSE, FTSE
CNOOC	\$104	\$18.33	Beijing, China	Asia	98,750	
JX Holdings	\$10.38	\$1.59	Tokyo, Japan	Asia	24,691	TYO, NAG
Petronas	\$46.06	\$26.5	Kuala Lumpur, Malaysia	Asia	48,000	
PTT	\$5.5	\$0.297	Bangkok, Thailand	Asia	29,296	SET
SINOPEC	\$13 billion	\$2.7	Beijing, China	Asia	249,142	SSE, SEHK, NYSE, LSE
Apache Corp	\$ 6.315	\$3.553	Houston, Texas	America	3163	NASDAQ
Canadian Overseas Petroleum	\$0.681	\$0.303	Calgary, Canada	America	11	LSE, CSE
Chevron	\$158.9	\$14.82	California, USA	America	51,900	NYSE
ConocoPhillips	\$38.73	\$6.26	Houston, Texas USA	America	11,400	NYSE
ExxonMobil	\$ 279.3	\$20.84	Irving Texas, USA	America	71,000	NYSE

BIT: Borsa Italiana; CSE: Canadian Securities Exchange; FWB: Frankfurt Stock Exchange; LSE: Frankfurt Stock Exchange; NAG: Nagoya Stock Exchange; NYSE: New York Stock Exchange; OSE: Oslo Stock Exchange; SEHK: Stock Exchange of Hong Kong; SET: Stock Exchange of Thailand; SSE: Shanghai Stock Exchange.

IP can serve as an essential driving factor of firm SCM practices⁶⁴ as every company must struggle with institutional considerations in its management practice to fulfil the needs of regulators, customers and the public.¹³ As Abdalla and Siti-Nabiha⁷² noted in the oil and gas industry in Sudan, several external and internal pressures shape sustainability and SCM practices. The how companies react to these pressures has become critical in determining their abilities to solve sustainability issues and improve SCM practices. IP can be defined as ‘internal and external pressures that the companies feel from stakeholders’ and are a major driver of sustainability (p. 647).⁹⁴ The three major IPs are mimetic, coercive and normative.⁹⁵

Coercive pressures are a collection of official and informal pressures applied on an organisation by other organisations on which it is reliant.²⁵ Government agencies are entities that may influence an organisation’s behaviour, for example, through regulation.⁵ Normative pressure on the other hand results from a business’ socialisation within its institutional environment.⁹⁶

Professionalisation is the primary source of normative pressures.⁵⁵ DiMaggio and Powell²⁵ initially proposed that various groups associated with professionalisation exert normative pressures, such as educational institutions promoting cognitive behaviour, industry groups and associations professionals, and NGOs interested in a particular industry. However, a growing body of empirical evidence suggests that customers are a significant component of this pressure since they have a direct or indirect stake in the company.⁵⁹ In this vein, Mimetic pressures develop when a firm copies the practices of successful industry rivals⁵⁹ in a bid to avoid uncertainty and risk or reproducing successful organisations' methods or structures.³¹ Understanding these three IPs affects how the firm views the business world and its SCM practices and sustainability.^{25,42} Because of IPs exerted on firms, firms often seek social legitimacy, competitive advantage, and improved performance and submit to IPs for sustainability based on social, economic and environmental demands.⁷² This argument suggests that IPs from the institutional environment can strongly affect a firm's predisposition towards sustainability and SCM practices.³ Therefore, IPs can be essential for sustainability efforts and emphasis and may impact SCM practices in the oil and gas industry.

Institutional theory, which 'examines how external pressures influence a company to adopt an organisational practice' is mostly used in research to study the various categories of IPs and their consequences on sustainability and management practices.¹³ Therefore, institutional theory provides a suitable frame to investigate interactions between IPs and a company's sustainability emphasis and supply chain practices.⁹⁴ Although IP is an important aspect of sustainability and SCM, limited studies have examined how IPs exerted on oil and gas companies influence their sustainability and SCM practices. Previous sustainability and SCM research were predominantly from the viewpoint of the influence of these pressures on company economic performance, which are often framed as a given in predominantly survey studies and focused on environmental sustainability.^{16,19,95} However, the influence of these pressures on SCM practices and how it affects sustainability have not been thoroughly examined. Furthermore, although institutional theory argues that IPs impact sustainability and SCM practice adoption, researchers question whether this link is direct or indirect.⁵⁹ This research will contribute to helping resolve this empirical argument.

Methods

This study utilised a mixed-method approach, incorporating qualitative content analysis and quantitative ANOVA analysis, to provide a thorough understanding of the emphasis on sustainability and SCM practices among oil and gas companies in Europe, Asia and America. This approach is suitable as it incorporates qualitative insights from textual data with quantitative statistical analysis, providing a more comprehensive exploration of the research questions.⁹⁷ The textual content of annual reports from selected oil and gas companies was analysed using qualitative content analysis. This approach provided valuable insights into these organisations' sustainability reporting practices and SCM strategies.⁹⁸ This qualitative approach allowed for identifying and categorising themes related to sustainability emphasis, IPs, and SCM practices, providing a thorough understanding and contextualisation of the data.⁹⁹ In addition to the qualitative analysis, a quantitative ANOVA analysis was performed to statistically evaluate the variations in sustainability emphasis and SCM practices among oil and gas companies across different continents.¹⁰⁰ ANOVA analysis was used to identify significant variations in sustainability priorities and SCM practices, providing empirical evidence to support qualitative findings and strengthen the study's rigour and validity.¹⁰¹

By combining qualitative and quantitative methods to thoroughly examine sustainability and SCM practices in the oil and gas industry, this research provides valuable insights for researchers, practitioners and policymakers, contributing to a deeper understanding of the subject.¹⁰² This study

can cross-validate the findings using mixed methods, making the outcomes more reliable and stronger.⁹⁷

The sample selection process for this study involved purposively selecting prominent oil and gas companies from Europe, Asia and America known for their exceptional track record in sustainability reporting and substantial stakeholder pressure in relation to their sustainability initiatives. Fifteen companies were carefully chosen using a meticulous case selection strategy and their annual report over the past decade (2011–2020) were used. The aim was to gain in-depth understanding and comprehensive insights into the research problem.^{103,104} These companies, recognised as influential figures in sustainability reporting, were expected to provide valuable insights into the importance of sustainability in organisations under significant scrutiny.

The selection of the oil and gas industry as the focus of this study is based on its significance as a critical case, considering the sector's worldwide importance and the increased attention it has received since the Deepwater Horizon spill in 2010.^{2,3,72,105} There is a significant ethical dilemma for companies in this sector due to the discrepancy between their reported sustainability focus and their actual actions and instances of greenwashing.^{47,48,56,107} The annual reports of these companies from 2011 to 2020 were reviewed, obtained from the London Stock Exchange and the Financial Analysis Made Easy (FAME) database. This approach aligns with previous research on annual reports as a trustworthy source for assessing sustainability practices and communication.^{108,109}

This study focused on analysing paragraphs from annual reports, which were selected for their ability to provide a comprehensive understanding of the information's meaning and context. The chosen paragraphs were taken from previous research conducted by Guthrie and Abeysekera¹¹⁰ and Guthrie and Gibson.¹¹¹ An analytical approach was used to validate the accuracy of specific terms by identifying the paragraph in which they appeared and analysing their usage in detail. This process helped to strengthen the reliability of the data inferences.

In this study, paragraphs from the annual reports served as the unit of analysis, chosen for their ability to comprehensively understand the information's meaning and context.^{110,111} A Key Word In Context (KWIC) approach was employed to verify the accuracy of specific terms by identifying the paragraphs in which they appeared and analysing their usage in detail, thereby enhancing the validity of the data inferences. Categories for content related to sustainability, IPs and SCM practices were established by drawing on previous research and the principles of institutional theory. The categories presented in appendices 1 and 2 consisted of four for sustainability, three for IPs and four for SCM practices. These categories were carefully chosen to ensure they were mutually exclusive, following the recommendations of Weber.¹¹² The coding criteria were developed using established survey-based measures from the literature, and the coding rules were derived from the characteristics and aspects found in academic sources. A thorough evaluation was carried out on 45 annual reports from 15 chosen companies to gain insights into the reports' organisation, emphasis and user-friendliness. Afterwards, the content of 145 annual reports was categorised independently using Nvivo and then entered into SPSS for additional empirical analysis using ANOVA. The ANOVA sought to assess the statistical significance of variations in sustainability emphasis, SCM practices and the underlying pressures among oil and gas companies in Europe, Asia and America. In order to conduct ANOVA analysis in SPSS, the content categories were combined into variables and assigned appropriate codes for different continents.

To carry out the ANOVA, the four content categories for SCM practices were consolidated (Lean practices, Customer Relationship Management, Distribution and Logistics, and Supplier Relationship) into one variable (SCM Practices), and the sustainability subcategories of economic (Cost, Energy Demand, Financial Performance, Market Expansions, and Price Volatility), environmental (Renewables, Environmental Impact, Waste, and Emissions) and social

(Community Involvement, Employee Engagement, Human Rights, and Safe and Healthy Workplace) were consolidated into three variables, economic, social and environmental, respectively. The continents were also coded as Europe = 1, Asia = 2 and America = 3 for the purpose of the ANOVA analysis in SPSS.

Results and analysis

The descriptive analysis in Table 3 highlights notable patterns in the focus on sustainability and SCM practices among oil and gas companies in Europe, Asia and America. Notably, Asian companies ($M = 3.066$) place a greater emphasis on the economic aspect of sustainability in comparison to European ($M = 2.941$) and American ($M = 2.662$) companies. This suggests that regional priorities vary among the companies.¹⁰⁶ On the other hand, American ($M = 2.662$) firms place a greater emphasis on the social aspect of sustainability compared to European ($M = 2.330$) and Asian ($M = 2.506$) companies. This indicates that different stakeholder pressures and societal expectations influence reporting practices among these regions.¹⁰⁷

Table 3. Descriptives.

		N	Mean	Standard deviation	Standard error	95% Confidence interval for mean		Minimum	Maximum
						Lower bound	Upper bound		
Economic sustainability	America	435	2.662	1.2999	.0623	2.540	2.785	1.0	5.0
	Europe	699	2.941	1.2939	.0489	2.845	3.037	1.0	5.0
	Asia	412	3.066	1.2314	.0607	2.946	3.185	1.0	5.0
	Total	1546	2.896	1.2878	.0328	2.832	2.960	1.0	5.0
Social sustainability	America	435	2.517	1.2886	.0618	2.396	2.639	1.0	4.0
	Europe	699	2.330	1.3050	.0494	2.234	2.427	1.0	4.0
	Asia	407	2.506	1.3184	.0654	2.378	2.635	1.0	4.0
	Total	1541	2.430	1.3062	.0333	2.364	2.495	1.0	4.0
Environment sustainability	America	399	1.451	.4982	.0249	1.402	1.500	1.0	2.0
	Europe	697	1.624	.4847	.0184	1.588	1.660	1.0	2.0
	Asia	394	1.624	.4849	.0244	1.576	1.672	1.0	2.0
	Total	1490	1.578	.4941	.0128	1.553	1.603	1.0	2.0
Stakeholder and long-term sustainability	America	405	1.393	.4889	.0243	1.345	1.440	1.0	2.0
	Europe	640	1.448	.4977	.0197	1.410	1.487	1.0	2.0
	Asia	371	1.358	.4802	.0249	1.309	1.408	1.0	2.0
	Total	1416	1.409	.4918	.0131	1.383	1.435	1.0	2.0
SCM practices	America	434	2.136	1.0385	.0498	2.038	2.234	1.0	4.0
	Europe	699	2.316	1.2190	.0461	2.226	2.407	1.0	4.0
	Asia	418	2.316	1.2372	.0605	2.197	2.435	1.0	4.0
	Total	1551	2.266	1.1785	.0299	2.207	2.324	1.0	4.0
Pressures	America	444	5.446	2.7498	.1305	5.189	5.702	1.0	9.0
	Europe	714	2.857	2.7893	.1044	2.652	3.062	1.0	9.0
	Asia	420	6.695	9.2270	.4502	5.810	7.580	3.0	89.0
	Total	1578	4.607	5.5685	.1402	4.332	4.882	1.0	89.0

SCM: supply chain management.

In addition, European companies ($M = 1.448$) seem to place a higher emphasis on stakeholder and long-term sustainability factors compared to American ($M = 1.393$) and Asian ($M = 1.358$) companies. This highlights the potential differences in corporate governance structures and regulatory environments.¹⁰⁵ Also, European ($M = 2.316$) and Asian ($M = 2.316$) firms place greater importance on SCM practices than American ($M = 2.136$) companies. This could indicate variations in operational strategies and industry norms.⁷² However, Asian oil and gas companies ($M = 6.695$) place significantly higher importance on sustainability and SCM pressures compared to their European ($M = 2.857$) and American ($M = 2.446$) counterparts. This indicates different levels of responsiveness to external influences and regulatory frameworks.⁹⁵ These findings call for additional research into the factors contributing to variations in sustainability reporting and SCM practices across different regions and have significant implications for policymaking, corporate governance and industry practices. Further analysis using ANOVA will determine the statistical significance of these observed variations, offering valuable insights into the wider implications for policymaking, corporate governance and industry practices.¹⁰⁰ This analytical approach will thoroughly examine the factors influencing the oil and gas industry's sustainability and SCM practices, contributing to a better understanding of regional dynamics and strategic priorities.¹⁰¹

The Levene test for homogeneity of variance was significant, suggesting that there are variations in the variances among the observed groups. As a result, it was not possible to assume equal variances. The ANOVA results presented in Table 4 highlight significant differences in the average focus on different dimensions of sustainability among oil and gas companies in Europe, Asia and America. Firstly, there is a significant difference in the focus on economic sustainability among the three regions, suggesting that they have different strategic orientations and priorities when managing the industry.¹⁰⁹ Furthermore, there are notable variations in the focus on social

Table 4. ANOVA.

		Sum of squares	df	Mean square	F	Significance
Economic sustainability	Between groups	37.084	2	18.542	11.330	.000
	Within groups	2525.150	1543	1.637		
	Total	2562.234	1545			
Social sustainability	Between groups	12.594	2	6.297	3.704	.025
	Within groups	2615.016	1538	1.700		
	Total	2627.611	1540			
Environment sustainability	Between groups	8.751	2	4.375	18.342	.000
	Within groups	354.718	1487	.239		
	Total	363.469	1489			
Stakeholder and long-term sustainability	Between groups	2.051	2	1.025	4.259	.014
	Within groups	340.197	1413	.241		
	Total	342.248	1415			
SCM practices	Between groups	10.136	2	5.068	3.662	.026
	Within groups	2142.422	1548	1.384		
	Total	2152.558	1550			
Pressures	Between groups	4330.279	2	2165.139	76.511	.000
	Within groups	44,570.122	1575	28.298		
	Total	48,900.401	1577			

ANOVA: analysis of variance; SCM: supply chain management.

sustainability ($F_{2,1538} = 3.704$, $p = 0.025$) and environmental sustainability ($F_{2,1487} = 18.342$, $p = 0.000$), indicating diverse strategies for tackling societal and environmental issues across different regions.¹⁰⁶ In addition, there are significant statistical variations in the emphasis placed on stakeholder and long-term sustainability ($F_{2,1413} = 4.259$, $p = 0.014$), SCM practices ($F_{2,1548} = 3.662$, $p = 0.000$) and sustainability and SCM pressures ($F_{2,1575} = 76.511$, $p = 0.000$) among oil and gas firms in Europe, Asia and America. The findings highlight the complex nature of the industry's sustainability governance and SCM, emphasising the need for a deep understanding of regional dynamics and regulatory frameworks.⁹⁵ To analyse the distinct differences between different regions across continents and determine which areas deviate significantly, a post hoc multiple comparisons analysis, as outlined in Table 5, is necessary. This analytical approach allows for a detailed examination of regional disparities and provides insights into the wider implications for policy formulation, corporate governance and industry practices.¹⁰⁰

Given that results indicated a statistically significant difference between European, Asian and American oil and gas companies' emphasis on various sustainability and SCM practices, a post hoc comparison using Dunnett's T3 was conducted to see where the differences exist among the three continents. The test result revealed that American ($M = 2.662$, $SD = 1.2999$) oil and gas companies' emphasis on the economic aspect of sustainability was significantly different from that of European ($M = 2.941$, $SD = 1.2939$) and Asian ($M = 3.066$, $SD = 1.2314$). However, no significant difference was detected between the emphasis of European and Asian oil and gas companies on economic sustainability. On the social aspect of sustainability, no significant differences were detected between the emphasis of European, Asian and American oil and gas companies. However, on the emphasis on environmental sustainability, American ($M = 1.451$, $SD = 0.4982$) oil and gas companies' emphasis was significantly different from that of European ($M = 1.624$, $SD = 0.4847$) and Asian ($M = 1.624$, $SD = 0.4849$) oil and gas companies with no significant difference existing between the environmental sustainability emphasis of European and Asia oil and gas companies. Concerning stakeholder and long-term sustainability emphasis, there was a significant difference between European ($M = 1.448$, $SD = 0.4977$) and Asian ($M = 1.358$, $SD = 0.4802$) oil and gas companies, with no significant difference found between American and European as well as American and Asian oil and gas companies. Also, the SCM practices emphasis of American ($M = 2.136$, $SD = 1.0385$) oil and gas companies was significantly different from that of European ($M = 2.316$, $SD = 1.2190$) and Asian ($M = 2.316$, $SD = 1.2372$) oil and gas companies. However, the emphasis of the SCM practices of European and Asian oil and gas companies was not significantly different. Lastly, the pressure to emphasise sustainability in the SCM practices of American ($M = 5.446$, $SD = 2.7498$) oil and gas companies was significantly different from that of European ($M = 2.857$, $SD = 2.7893$) and Asian ($M = 6.695$, $SD = 9.2270$) oil and gas companies. Similarly, the emphasis on the pressure for sustainability in European ($M = 2.857$, $SD = 2.7893$) oil and gas companies' SCM practices significantly differed from that of Asian ($M = 6.695$, $SD = 9.2270$) companies.

Discussion of findings

This study's findings highlight the significant role that the environmental dimension plays in the supply chain of the oil and gas industry, affecting operations throughout the entire process, from production to consumption. In line with previous studies,⁵⁴ companies in this industry strongly emphasise environmental factors. They acknowledge the connection between human existence and the natural world and understand the importance of preserving it. The annual reports of these companies often emphasise environmental concerns such as climate change, reducing emissions, and transitioning to renewable energy sources, which aligns with the findings of various

Table 5. Multiple comparisons.

Dependent variable	Dunnnett T3	(I) Continent	(J) Continent	Mean difference (I-J)	Standard error	Significance	95% Confidence interval	
							Lower bound	Upper bound
Economic sustainability	Dunnnett T3	America	Europe	-.2793*	.0792	.001	-.469	-.090
		Europe	Asia	-.4035*	.0870	.000	-.612	-.195
			Asia	-.1242	.0779	.298	-.311	.062
Social sustainability	Dunnnett T3	America	Europe	.1868	.0791	.054	-.002	.376
		Europe	Asia	.0111	.0899	.999	-.204	.226
			Asia	-.1757	.0819	.094	-.372	.020
Environment sustainability	Dunnnett T3	America	Europe	-.1730*	.0310	.000	-.247	-.099
		Europe	Asia	-.1732*	.0349	.000	-.257	-.090
			Asia	-.0003	.0306	1.000	-.073	.073
Stakeholder and long-term sustainability	Dunnnett T3	America	Europe	-.0558	.0313	.207	-.131	.019
		Europe	Asia	.0341	.0348	.696	-.049	.117
			Asia	.0899*	.0318	.014	.014	.166
SCM practices	Dunnnett T3	America	Europe	-.1802*	.0679	.024	-.343	-.018
		Europe	Asia	-.1798	.0784	.035	-.367	.008
			Asia	.0004	.0761	1.000	-.182	.182
Pressures	Dunnnett T3	America	Europe	2.5888*	.1671	.000	2.189	2.989
		Europe	Asia	-1.2493*	.4688	.024	-2.372	-.126
			Asia	-3.8381*	.4622	.000	-4.946	-2.731

*The mean difference is significant at the 0.05 level.
SCM: supply chain management.

studies.^{113–115} The observed variations in emphasis across the three continents may arise from factors such as regulatory compliance, environmental standards, consumer demand for eco-friendly products and the pursuit of competitive advantage.¹¹⁶ The significant focus on climate-related issues and the integration of renewable energy sources demonstrates companies' increased recognition of the importance of environmental sustainability in the oil and gas industry.³ It is however possible that this increased awareness may not lead to significant changes in sustainable supply chain practices but rather indicates a growing recognition of environmental issues.

Analysing social sustainability within the oil and gas industry is marked by diverse efforts focused on community participation, employee commitment, human rights and safety. Although companies discuss these issues in their annual reports, there is a significant variation in the emphasis and strategies they use. The difference in approach may arise from the common belief held by some businesses, especially in North America, that placing a greater emphasis on social and environmental sustainability could potentially hinder economic sustainability due to the related expenses.^{117–119} In addition, the companies under analysis showcase a strong dedication to supporting local communities and fostering economic development through a wide range of initiatives, including education, arts, athletics, healthcare and various other programmes. This is in line with the United Nation's Sustainable Development Agenda, which emphasises the need for companies to consider both their objectives and their impact on the community.^{90,120,121} These companies also strongly emphasise safety, with each organisation having unique safety protocols and priorities. For example, Shell strongly emphasises safety as one of its core values. Chevron prioritises process safety, while ExxonMobil has made significant progress in reducing lost-time incidents. Sinopec has implemented a comprehensive approach to health, safety and the environment through its SAFE programme, and BP recognises the importance of continuously improving accident-prevention measures.

The analysis highlights the key factors considered crucial in the oil and gas industry for ensuring supply chain sustainability. These factors include energy demand, financial performance, market expansion and price volatility. While cost considerations are also considered, they are relatively less significant. This emphasis highlights the long-lasting impact of financial factors on the development of operational strategies and sustainability efforts in these companies.^{47,48} This focal point holds significant importance, especially considering the projections that suggest a significant increase in energy demand, with fossil fuels expected to account for a substantial 81% of the energy produced by 2035¹²⁵. However, it is important to acknowledge the negative environmental and social consequences arising from these fossil fuel's unsustainable and irresponsible exploitation. Recognising and addressing these concerns requires a careful and thorough understanding of the changing energy demands. This is crucial for promoting economic stability and ensuring energy security.³ This also highlights the importance of oil and gas companies adjusting their sustainability strategies to match the changing energy landscapes and minimise the potential consequences of relying too heavily on fossil fuels.

The analysis of the oil and gas companies highlights their recognition of the importance of improving value for various stakeholders in their sustainability efforts. It is worth mentioning that European and American firms can consistently provide long-term value to their shareholders, which is often reflected in their financial performance. This has been observed in studies conducted by Sandberg et al.,¹²⁶ Panjaitan et al.¹²⁷ and Foley et al.¹²⁸ When faced with industry challenges, these organisations focus on being more flexible and competitive. Their main goal is to maximise profits and returns for stakeholders, rather than simply focusing on quantity and scale.^{128–130} This strategic shift is evident in corporate affirmations, like BP's commitment to sustainable, safe and responsible operations, with a strong emphasis on creating long-term value for stakeholders, and

Shell's dedication to maintaining financial, operational and cultural resilience for its stakeholders)^{124,125} This statement highlights a shift from conventional approaches focused solely on making money, indicating a more comprehensive organisational philosophy prioritising creating long-term value and engaging with stakeholders. Similarly, the analysis uncovered a collective focus among the oil and gas companies on attaining long-term growth, benefiting the organisation and its shareholders. BP, for example, emphasises the importance of creating long-term stakeholder value as a key aspect of its sustainability efforts, highlighting a strategic alignment with long-term growth objectives.¹³¹ Similarly, ExxonMobil is dedicated to advancing long-term growth ambitions while prioritising stakeholder interests, exemplifying a unique approach to sustainable development.¹³¹ Equinor emphasises the importance of its new growth strategy in shaping the company's trajectory and providing tangible benefits to stakeholders, highlighting a path towards sustainable value creation.¹³² The companies in this industry also emphasised the importance of flexibility in addressing the obstacles associated with promoting sustainable long-term growth. This approach enables them to adapt quickly to changes in the supply chain and allocate resources optimally.¹³² These companies have embraced a culture of adaptability and innovation, allowing them to take advantage of emerging opportunities and effectively address evolving sustainability imperatives within the oil and gas sector.

The findings further highlight the importance of implementing Lean production systems, managing customer and supplier relationships, and optimising logistics and distribution in the analysed oil and gas companies. The Lean SCM framework, known for its focus on optimising production processes, is notable for its commitment to reducing waste and improving environmental, social and quality aspects.¹³³ This aligns with current discussions highlighting the importance of reducing waste and improving operational efficiency to promote sustainable supply chain operations.¹³³ In addition, the strong focus on logistics highlights a comprehensive approach to achieving economic, ecological, legal and reputational advantages.⁹⁰ This reinforces previous research that emphasises the crucial role of logistics in maximising resource efficiency and reducing environmental effects.⁹⁰ Additionally, the companies' emphasis on fostering strong customer and supplier relationships highlights the importance of incorporating sustainability principles throughout the supply chain.¹³⁵ By actively involving suppliers in defining product specifications and environmental goals and considering social issues like labour practices, these companies demonstrate a forward-thinking approach to promoting sustainable supply chain practices.¹³⁵ The uncertainties due to the Russia/Ukraine war and COVID-19 pandemic have significantly disrupted SCM practices. This has led companies to re-evaluate their operational strategies in response to the ever-changing market dynamics.¹³⁶ Nevertheless, acknowledging prevailing uncertainties highlights these companies' remarkable resilience and adaptability as they navigate through turbulent environments, all while remaining steadfast in their commitment to supplying society with vital energy resources.¹³⁶ This resilience reflects the current discourse promoting the need for organisations to be agile and adaptable to effectively respond to changing external factors.¹³⁶

The analysis also uncovered an intricate interaction of IPs that influence sustainability and SCM practices in the oil and gas industry. Host country laws and regulations are crucial in shaping company practices, requiring them to integrate sustainability goals into their SCM operations.¹³⁷ The potential consequences of losing operating licences highlight the significant risks of not complying with these regulations, leading companies to strongly emphasise adhering to regulatory frameworks.¹²² In addition, technological advancements are bringing about significant changes in energy production, leading to a fundamental shift in sustainability and SCM practices.¹³⁸ Major players in the industry, such as BP, Chevron, and Shell, are taking the lead in investing in advanced technologies to address intricate sustainability issues.¹²³ It is worth mentioning that companies are

facing significant pressure to adjust their SCM practices to prioritise environmental stewardship. This is due to the implementation of strict emissions regulations and global climate agreements, including the Paris Agreement.¹²³ The need to reduce greenhouse gas emissions and increasing stakeholder scrutiny has strengthened the industry's commitment to adopting sustainability measures.¹³⁹ The increasing pressure for environmental accountability, supported by NGOs and local communities, highlights the industry's need to embrace socially responsible practices.¹²⁴ In light of this context, companies are proactively strengthening their reputation by conducting thorough sustainability audits and promoting sustainable practices throughout their value chains.¹²⁴ In addition, the forces of inter-firm competition and the impact of multinational peers highlight the ever-changing dynamics that shape sustainability and SCM practices in the oil and gas sector.²⁵ Adhering to industry benchmarks and global standards highlights the significance of conforming to stay competitive in various landscapes.²⁵

Our findings challenge the notion that emphasis on sustainability is just a superficial strategy known as 'greenwashing'. Instead, it highlights the significant potential in effectively addressing concerns related to SCM.¹³⁴ In line with the findings of Raj¹⁴⁰ and Adams and Harte,¹⁰⁸ this study highlights the significant importance of annual reports in effectively communicating corporate social responsibility messages and presenting a socially responsible image to stakeholders. Utilising annual reports as a means of transparent communication allows stakeholders to make well-informed decisions regarding the sustainability practices of the oil and gas industry.^{108,140} In addition, this study provides a comprehensive framework for understanding and addressing sustainability emphasis and SCM practices by placing our assessment within the broader context of sustainability, SCM and institutional theory literature.²⁵ The findings highlight the importance of oil and gas companies actively engaging in stakeholder dialogue to navigate the complex landscape of competing pressures and demands.²⁵ By recognising the importance of involving stakeholders, companies can gain insights into their concerns and needs, leading to cooperative problem-solving in their SCM practices. Additionally, staying informed about emerging energy technologies is crucial for companies to take advantage of growing opportunities and move towards a more sustainable energy future. Integrating sustainable energy technologies into SCM strategies promotes environmental responsibility and strengthens companies' ability to adapt in a world that is becoming more aware of carbon emissions (Al-Amin and Zairi, 2014). This highlights the importance of focusing on sustainability and involving stakeholders in reshaping SCM practices in the oil and gas industry.

Implications of findings

This research contributes significantly to the discussion on sustainability emphasis and SCM practices in the global oil and gas industry, specifically among European, Asian and American firms. The study has numerous academic implications: Through a comprehensive analysis of sustainability efforts on different continents, this research enhances our comprehension of how regions address environmental and social issues. This observation forms a strong basis for comparative studies and scholarly analysis. The study's examination of IPs and organisational responses provides a comprehensive understanding of the dynamic relationship between external influences and firm behaviours. This adds to the existing institutional theory literature, strengthening the theoretical frameworks in sustainability and SCM. Emphasising the crucial role of annual reports in conveying sustainability messages underscores the significance of communication strategies in shaping stakeholder perceptions. Additional research in this field has the potential to shed light on successful methods of communicating sustainability. Highlighting the importance of stakeholder engagement

strategies, this study emphasises companies' need to effectively navigate various pressures. Further investigation can explore methods for the successful involvement of stakeholders.

This research also provided practical and policy implications for the oil and gas industry: It is essential for companies to place a strong emphasis on transparency when it comes to sustainability reporting. This is crucial to address the concerns of customers and society as a whole and protect and maintain their reputations. Understanding regional regulatory frameworks and differences is essential for companies to develop effective sustainability strategies and SCM practices. Comprehending and tackling NGO concerns and stakeholder issues are crucial for companies to formulate effective engagement strategies. It is essential for companies to integrate sustainable energy technology into their SCM to successfully transition to a low-carbon energy future.

In addition, this research provides policy recommendations with significant and immediate consequences: It is important for companies to develop strategies tailored to specific regions to optimise operations and promote sustainability. By aligning with local requirements, companies can ensure that their practices are effective and beneficial for their communities. It is important for multinational corporations to actively participate in collaborative efforts to promote sustainable practices and encourage collective responsibility. Policymakers should consider tailoring regulations to address the unique sustainability challenges that companies face in various regions. This approach will encourage compliance without placing excessive burdens on businesses. It is crucial to emphasise the importance of environmentally friendly practices, especially within American corporations, to encourage the adoption of sustainable initiatives. It is essential for organisations to embrace region-specific best practices and implement proactive risk mitigation strategies to strengthen their supply chain capabilities and achieve sustainable growth. By implementing targeted strategies, stakeholders can collaboratively strive for a future that is more mindful of the environment and better equipped to withstand challenges.

Conclusions

This study has revealed valuable insights with practical implications and scholarly contributions. Our investigation into SCM practices and sustainability within the oil and gas industry has expanded existing frameworks in institutional theory, opening up new avenues for scholarly investigation. By thoroughly examining sustainability practices in oil and gas companies in Europe, Asia and the United States, we offer new insight into how different continents approach environmental and social issues. Our main focus was investigating the relationship between SCM practices, sustainability emphasis and IP in the oil and gas sector. Our research reveals that organisations' decisions are heavily influenced by external factors, such as the environment and social pressures. As a result, organisations often respond in symbolic ways. However, we also found that there are instances where sustainable SCM practices were not driven by external pressures but rather used as strategies by companies to enhance their image without truly advocating for sustainability. Our findings have significant implications for future research within the oil and gas industry. Although we have found instances where external pressures and sustainability focus coincide, it is still unclear how effective these external pressures are in enhancing SCM practices and sustainability. This highlights the wider uncertainty in global governance regarding determining the most efficient approach to achieving sustainability in the oil and gas industry.

Our analysis uncovered significant variations in the global focus on sustainability and SCM practices among oil and gas companies. American companies strongly emphasise achieving economic and environmental sustainability, while their European and Asian counterparts prioritise social and environmental sustainability. In addition, the differences in stakeholder priorities and

the emphasis on long-term sustainability demonstrate the contrasting strategic orientations of European and Asian companies. In addition, American organisations demonstrate unique priorities in their SCM practices. Understanding and effectively navigating these geographical disparities is paramount when making informed decisions, formulating strategic plans, and promoting a more sustainable and resilient global oil and gas sector.

Although our study faced certain limitations, these provide valuable avenues for future exploration. We encourage further research to investigate whether the emphasis on sustainability leads to concrete changes in SCM practices and to analyse the institutional factors that drive these changes. Our thorough validation processes involving statistical analysis provide valuable methodological insights for researchers in similar fields. These insights can help guide the comprehensive content analysis of annual reports. The practical implications of our findings are of utmost importance for the oil and gas industry. Our research provides valuable insights for practitioners in understanding the intricate relationship between IPs, sustainability emphasis and SCM practices. It highlights the significance of sustainability reporting, stakeholder engagement and the integration of sustainable energy technology. These insights play a crucial role in shaping decision-making processes within the industry, helping companies adjust their strategies and practices to meet regional regulatory demands and stakeholder expectations. Integrating sustainable energy technology into SCM is environmentally responsible and essential for staying relevant in a shifting industry landscape.

Overall, this study's significant contributions to the academic field and its practical relevance make it an important resource for enhancing our knowledge of sustainability emphasis and SCM practices in the oil and gas industry. Although we recognise some constraints, our research provides a good basis for future investigations, especially in exploring the tangible effects of prioritising sustainability and the role of institutions, particularly in indigenous oil and gas companies in developing nations. We strongly recommend using survey questions to measure the impact of sustainability emphasis on SCM practices. This approach encourages more in-depth research and provides valuable insights into the intricacies of this multifaceted industry.

Data availability statement

The datasets utilised in this article to support the results and analysis can be accessed by the public through the following link: <https://data.mendeley.com/datasets/m8wpd5yyx5/1>. The dataset is stored in the Mendeley Data repository and is accessible to the general public.

The author certifies that full adherence to ethical considerations and requisite permissions was maintained during the collection and dissemination of this dataset, encompassing participant consent and data privacy. The provided data is adequate for the purposes of interpreting, replicating, and expanding upon the findings outlined in the article.

By storing the data in a publicly accessible repository, the research's integrity, discoverability and reusability are enhanced, allowing the broader scientific community to verify and expand upon the study's contributions. It is highly recommended that authors utilise the hyperlink provided to access the data for the purpose of conducting additional research and referencing.


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