THE STRATEGIES THAT SUSTAINABILITY MANAGERS NEED TO ESTABLISH TO FULFILL CLIMATE CHANGE INITIATIVES

EXPLORATORY STUDY WITHIN THE EGYPTIAN OIL&GAS SECTOR

الإستراتيجيات التي يحتاج مديرو الاستدامة إلى وضعها لتنفيذ مبادرات تغير المناخ دراسة استكشافية في قطاع البترول والغاز المصري

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Abstract Purpose: Climate change is one of the highest-ranking issues on the economic and social agenda, especially after setting the sustainable development goals (SDGs) and building the Paris Agreement which aimed to connect the global against the threat of climate change. Egypt seeks to implement these goals by setting Egypt's Vision 2030 for sustainable development, which is in line with the global trend. The oil and gas industry is the center of the global economy and national economy. The most important strategic issue facing the oil& gas industry today is climate change. As the earth's average temperature continues to rise with the accumulation of greenhouse gases GHG in the atmosphere. Most

greenhouse gas emissions are caused by burning of fossil fuels. This reality demands a change to our energy system.

The global sustainability agenda, the mitigation of climate change, and the transition toward a low carbon economy have become permanent features for stakeholders. Corporations are one of the main actors that will play a major role in the decarbonization of the economy. They need to put forward a net zero strategy and targets, transitioning to net-zero by 2050. The increased awareness of environmental impacts is forcing oil &gas companies to implement sustainability practices in response to stakeholder demands. This potential clash of environmental (E) and social (S) aspects of ESG factor, materialized in the companies' net zero transition, and its potential remedy, just transition, have important implications for corporate governance (G) and finance, especially for directors & executive managers duties

Aim and objectives: This study focuses on the strategies sustainability managers need to establish to fulfil climate changes initiatives within the oil and gas industry in Egypt, to achieve sustainable competitive advantage. Stakeholder theory alongside strategic management and sustainable competitive advantage comprise the conceptual framework that guide this study.

Design/methodology/approach: This exploring study collect data by interviewing sustainability managers who oversee environmental programs within the Egyptian oil &gas companies to generate themes that produce study findings, thereby deriving

a set of strategies for implementing climate change initiatives. These findings aim to provide insights that enable managers in the oil and gas industry to incorporate environmental practices and achieve sustainable operations. Additionally, the study contributes to the body of knowledge on corporate sustainability, benefiting scholars and practitioners in the field.

Main results: The key findings from this study provided insights into addressing the gap in managerial knowledge regarding effective strategies for implementing environmental initiatives within corporate structures to achieve sustainable performance. Developing and executing corporate sustainability strategies begins with analyzing the competitive landscape while considering shareholder interests and stakeholder needs, alongside evaluating market positioning, geographical conditions, resource availability, innovative technologies, research and development, organizational culture, experience, and internal capabilities.

Keywords: Climate Change, Sustainability, SDGs, Environmental Initiatives, GHG, Decarbonization, ESG, Egyptian oil& gas sector, Sustainability Managers

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ملخص الرسالة

الغرض: يعد تغير المناخ من القضايا ذات الأولوية العالية في الأجندة الاقتصادية والاجتماعية، خاصة بعد وضع أهداف التنمية المستدامة **"SDGs"** وإبرام اتفاقية باريس التي تهدف إلى توحيد العالم ضد تهديد تغير المناخ. وتسعي مصر إلى تطبيق هذه الأهداف من خلال وضع رؤية مصر 2030 للتنميه المستدامة والتي تتواكب مع التوجه العالمي. وبما أن صناعة النفط والغاز تعد محور أساسي في الاقتصاد العالمي والاقتصاد الوطني، فإن تغير المناخ هو القضية الاستراتيجية الأهم التي تواجه صناعة النفط والغاز اليوم. حيث تستمر درجات الحرارة العالمية في الارتفاع بسبب تراكم الغازات الدفيئة في الغلاف الجوي. ويُعزى معظم انبعاثات الغازات الدفيئة "**GHG**" إلى حرق الوقود الأحفوري، ما يستدعي الحاجة إلى تغيير نظام الطاقة. لذلك فقد أصبحت الأجندة العالمية للاستدامة، والتخفيف من تغير المناخ، والتحول نحو اقتصاد منخفض الكربون من أهم أهداف جميع المعنيين بهذه الصناعة. وتعتبر شركات النفط والغاز من بين الجهات الفاعلة الرئيسية التي ستلعب دورًا كبيرًا في إزالة الكربون من الاقتصاد. إذ يجب عليها وضع استراتيجيات وأهداف للوصول إلى صفر انبعاثات كربونية بحلول عام 2050. ولذلك فإن زيادة الوعي بالتأثيرات المناخية يدفع شركات النفط والغاز إلى تبني ممارسات استدامة استجابةً لمتطلبات أهداف التنمية المستدامة، مما قد يؤدي إلى تصادم بين الجوانب البيئية والاجتماعية لعامل **"ESG"**، والمتجسد في تحول الشركات نحو صفر انبعاثات من خلال تنفيذ

المبادرات البيئية التي تحمل تأثيرات هامة على حوكمة الشركات والتمويل، خاصة فيما يتعلق بواجبات المديرين والمديرين التنفيذيين.

الهدف: تركز هذه الدراسة على الاستراتيجيات التي يجب على مديري الاستدامة وضعها لتنفيذ مبادرات تغير المناخ في صناعة النفط والغاز في مصر لتحقيق ميزة تنافسية مستدامة. ويشكل كل من نظرية أصحاب المصلحة والإدارة الاستراتيجية والميزة التنافسية المستدامة الإطار المفاهيمي الذي يوجه هذه الدراسة.

منهجية البحث: تقوم هذه الدراسة الاستكشافية بجمع البيانات من خلال مقابلات مع مديري الاستدامة الذين يشرفون على الاستدامة في شركات النفط والغاز المصرية لوضع سمات تساعد في استخلاص نتائج الدراسة، ومن ثم استنتاج مجموعة من الاستراتيجيات لتنفيذ مبادرات تغير المناخ. تهدف هذه النتائج إلى توفير رؤى تمكّن المديرين في صناعة النفط والغاز من دمج الممارسات البيئية وتحقيق عمليات مستدامة. بالإضافة إلى ذلك، تسهم الدراسة في إثراء المعرفة حول الاستدامة المؤسسية، مما يعود بالفائدة على الأكاديميين والممارسين في المجال.

النتائج الرئيسية :قدمت النتائج الرئيسية من هذه الدراسة رؤى حول معالجة الفجوة في المعرفة الإدارية بشأن الاستراتيجيات الفعالة لتنفيذ المبادرات البيئية داخل هياكل الشركات لتحقيق أداء مستدام. ويبدأ تطوير وتنفيذ استراتيجيات الاستدامة المؤسسية بتحليل المشهد التنافسي مع مراعاة مصالح المساهمين واحتياجات أصحاب المصلحة، إلى جانب تقييم الوضع السوقي، والظروف الجغرافية، وتوافر الموارد، والتكنولوجيا المبتكرة، والبحث والتطوير، وثقافة المؤسسة، والخبرة، والقدرات الداخلية.

الكلمات المفتاحية :تغير المناخ، الاستدامة، أهداف التنمية المستدامة (**SDGs**)، المبادرات البيئية، الغازات الدفيئة(**GHG**) ، إزالة الكربون، الحوكمة البيئية والاجتماعية وحوكمة الشركات (**ESG**)، قطاع النفط والغاز المصري، مديري الاستدامة.

Chapter One: Introduction

1.1 Introduction:

Corporate sustainability has become a pressing topic of concern within society, extending across all global business realms, especially for managers working in environmental and social sustainability (ESS) roles (Rezaee, 2017)

Climate change is one of the highest-ranking issues on the economic and social agenda, especially after setting the sustainable development goals and building the Paris Agreement which aimed to connect the global against the threat of climate change. Furthermore, the vulnerabilities of the world ecosystem laid bare by the COVID-19 pandemic and the potential damage for the human and business life made the need for urgent action clear once again (Quitzow,2021).

The oil and gas industry is an essential partner in achieving the ambitions at the core of the SDGs. It can provide the affordable and reliable energy essential for economic growth, employment, education, eradication of poverty and global health. However, there are also sustainability challenges facing the sector. While supporting a growing global population's demand for energy, the industry must continue to scale-up its climate change action, curbing emissions from global energy production and use, and continue to play its part in a world aspiring to net-zero emissions (IPIECA, 2021)

Climate change is defined as the shift in climate patterns mainly caused by greenhouse gas emissions. Greenhouse gas emissions cause heat to be trapped by the earth's atmosphere, and this has been the main driving force behind global warming. The main sources of such emissions are the human activities which predominantly related to energy production, industrial activities (Fawzy,2020).

As the earth's average temperature continues to rise with the accumulation of greenhouse gases in the atmosphere, the stable functioning of earth's natural systems adjusts to the new, high-carbon reality and society begins to witness the effects of an altered natural environment and its impact on our lives and livelihoods. Most greenhouse gas emissions are caused by human activity, including the burning of fossil fuels. This reality demands a change to our energy system. Given this threat, governments are increasingly enacting policies to mitigate greenhouse gas emissions and investors in companies that sell fossil fuels are putting increasing pressure on management to show how they will navigate an energy system in transition. In addition, the economics of renewable energy are becoming increasingly attractive, creating potential alternatives to fossil fuels. Facing all these drivers, some oil and gas companies are strategizing to become "energy companies," adapting to this global energy transition (Ladislaw,2019)

The global sustainability agenda, the mitigation of climate change, and the transition toward a low carbon economy have become permanent features for stakeholders. Corporations are one of the main actors that will play a major role in the decarbonization of the economy. They need to put forward a net zero strategy and targets, transitioning to net-zero by 2050 (Shojaeddini,2019). The increased awareness of environmental impacts is forcing oil &gas companies to implement sustainability practices in response to stakeholder demands. The potential clash of environmental (E) and social (S) aspects of ESG agenda, materialized in the companies' net zero transition, and its potential remedy, have important implications for corporate governance and finance, especially for directors & executive managers duties (Hübel,B. & Scholz,H. ,2020). The question remains as to how corporations can maximize value, balance the triple components of sustainable investment, and achieve competitive advantage. The problem explored that the strategies sustainability managers need to establish have not yet been identified in all but large conglomerates (Wiesner, Chadee, & Best, 2017; Shahzad, M., Qu, Y., Zafar, A. U., Rehman, S. U., & Islam, T., 2020). Effective business strategies are of paramount importance in achieving corporate sustainability within firms (Borland, Ambrosini, Lindgreen, & Vanhamme, 2016 ; Mio, C., Panfilo, S., & Blundo,B. ,2020).

In today's market, environmental sustainability issues are

increasingly affecting corporate performance and gaining importance within businesses (Murmura, Bravi, & Palazzi, 2017). While several studies addressed business operations in general, managers remain absent of the knowledge on how to formulate and implement specific sustainability strategies for the numerous environmental development initiatives available (Satyro, Sacomano, Contador, Almeida, & Giannetti, 2017). Siegel (2009) stated that engaging in sustainability is considered a strategic management approach, emphasizing the need for research on corporate sustainability. Therefore, scholars and practitioners alike hold a growing interest and stake in sustainable development, derived from increased global concern for the environment over the past decade (Caiado, de Freitas Dias, Mattos, Quelhas, & Leal Filho, 2017; Bhutta, U. S., Tariq, A., Farrukh, M., Raza, A., & Iqbal, M. K. ,2022).

This study focuses on the strategies sustainability managers need to establish to fulfil climate changes initiatives within the oil and gas industry to achieve sustainable competitive advantage. Stakeholder theory alongside strategic management and sustainable competitive advantage comprise the conceptual framework that guide this study.

This exploring study collect data by interviewing sustainability managers who oversee environmental programs within the Egyptian oil &gas companies to generate themes that produce study findings, thereby deriving a set of strategies for

implementing climate change initiatives. These findings aim to provide insights that enable managers in the oil and gas industry to incorporate environmental practices and achieve sustainable operations. Additionally, the study contributes to the body of knowledge on corporate sustainability, benefiting scholars and practitioners in the field.

1.2 Research Problem:

Business managers are increasingly recognizing the significance of environmental issues (Elliot, 2013). The growing awareness of climate change and its environmental impacts has raised concerns among stakeholders (WEC, 2014). The emissions generated by industrial activities contribute to rising global temperatures, climate change, biodiversity loss, water scarcity, and other detrimental effects (IPCC, 2014). Among various industries, the oil and gas sector has come under scrutiny due to its greenhouse gas emissions and the associated environmental impacts (Talbot & Boiral, 2018). Stakeholders now demand that corporations take social and environmental responsibility seriously (Shaukat, Qiu, & Trojanowski, 2016). While the oil&gas industry is just one player in the climate change debate and GHG emissions discussion, it has a significant impact on ecosystem health and sets environmental performance standards for other industries (Talbot & Boiral, 2018). Corporate sustainability plays a crucial role in mitigating climate change, but there is no standardized solution for achieving it (Montiel & Delgado-Ceballos, 2014). Despite available resources on

corporate sustainability, many companies still struggle with environmental and social sustainability (Kiron et al., 2017). It is essential for companies to establish sustainability strategies that integrate environmental practices into their operations while ensuring profitability. The lack of substantiated strategies in environmental and social sustainability (ESS) management is a contributing factor to the inconsistent implementation of environmental initiatives in companies (Baumgartner & Router, 2017).

In Egypt, and in line with the Egypt 2030 vision, the oil and gas sector, as an engine of economic growth, has adopted a new strategy to further fulfil the aspirations of the Egyptian people. The sector embarked on a Modernization project, which aims to design and implement an integrated transformative program for Egypt's oil and gas sector. To support Egypt in achieving its sustainable development goals (SDGs), the oil and gas sector has adopted various operational efficiency practices (Egypt today,2019). Through the Modernization program, the Egyptian oil and gas sector aims to ensure the efficient functioning of the upstream, midstream, and downstream sectors. Significant progress has been made in the oil and gas sector in the past decade, thanks to the implementation of innovative decarbonization strategies that have revolutionized operations and unlocked previously unimaginable potential. By staying abreast of advancements and enhancing their strategies and plans for future, companies can anticipate even greater

accomplishments in the future. This study focuses on the managerial strategies required to implement environmental practices and achieve sustainable operations within the Egyptian oil& gas sector companies (Egypt oil & gas ,2023)

Considering these advancements, the problem is to explore how the Egyptian oil and gas companies can undergo a transitional process to enhance the operational effectiveness of the oil and gas sector through exploring effective strategies for addressing environmental concerns and provide managers with a research-based understanding of how to develop and implement these strategies.

1.3 Research Gab:

Many researches have been conducted on corporate sustainability strategies, for example (Koushyar, J.,2017), (Farnum, A.L.,2016), (Mouton, C. ,2017) and (Green, B. ,2019).However, this study reveals some research gaps:

I. There is still a lack of clarity on the formulation and implementation of these strategies especially in Egyptian oil &gas companies. Managers need guidance on how to integrate sustainable strategies into corporate structures and operations, as managers play a critical role in strategic planning and implementing practices within organizations. Proper management of environmental performance is the first step toward developing environmentally sustainable strategies. However, the process of how ESS managers bring about environmental sustainability within

organizations has not been extensively explored. Further studies are needed to understand how managers identify impactful environmental activities and the effects of ESS practices on operational sustainability. A significant business problem is the lack of concrete understanding among oil & gas industry managers regarding the long-term environmental effects of their operational practices.

II. From an organizational perspective, sustainability is a holistic approach that covers social, economic, and environmental issues that would be beneficial for current and future generations. A concept that considers simultaneously and equally the environmental, social and corporate governance (ESG), notes that corporate progression not only with economic growth, but with environmental sustainability and social responsibility. Therefore, managing these three aspects, represents one of the biggest challenges for the Egyptian Oil and Gas sector.

III. Based on a review of previous research studies. Unfortunately, there is no research have studied the gap between climate change initiatives implemented and sustainable operations within the Egyptian oil and gas companies and no research have explored the strategies employed by sustainability managers to fulfill climate change initiatives and to sustain economic growth at the same time.

1.4 Research Significance:

Climate change presents the single biggest threat to sustainable development everywhere and its widespread, unprecedented impacts disproportionately burden the poorest and most vulnerable. Urgent action to halt climate change and deal with its impacts is integral to successfully achieving all Sustainable Development Goals (SDGs). With the increasing importance given to sustainability and climate change nowadays, countries around the world are shifting their focus and efforts to changing the previous unsustainable growth framework that has been ineffective. (Lopez-Cabrales and Valle-Cabrera, 2020). The oil and gas industry is an essential partner in achieving the ambitions at the core of the SDGs and Climate Change Agreement. However, there are also sustainability challenges facing the sector. While supporting a growing global population's demand for energy, the industry must continue to scale-up its climate change action, curbing emissions from global energy production and use, and continue to play its part in a world aspiring to net-zero emissions. (IPIECA ,2017).

Egypt's transition to an energy away from fossil fuel is one of the critical challenges the oil &gas sector is currently facing, as it needs to investigate a more sustainable and cleaner energy and set up new approaches to analyze the interaction between the environment, energy and the country's development. "Sustainable Development Strategy" in February 2016, believing that sustainable development

is the guarantee for growth, development, and prosperity for future generations (EGYPT'S 2021VNR) .

In October 2016, The Egyptian oil& gas sector had set a Sustainable Energy Strategy, following Egypt 2030 vision for sustainability. The strategy covers three segments, which included the restructuring of the gas sector, the promotion of energy efficiency, and combating global warming by lessening greenhouse gas emissions. , within the implementation of the sustainable plan of Egypt's Vision 2030 with its economic, environmental and social dimensions (EOG magazine ,2017).

In November 2021, Egypt Oil & Gas Sustainability Committee has officially launched. The initiative aims to promote sustainability awareness in the Egyptian oil and gas sector. the work of the committee stems from a clear vision of the strategy, which works to achieve the concept of sustainable development, develop environmental, social and economic performance, achieve the role of the Egyptian petroleum sector in economic and sustainable development (EOG magazine,2021) . Based on the committee meeting, it was approved that a sustainability manager must be appointed in every company, and it is obligatory for all Egyptian oil and gas companies to place in their organizational structure a general administration specialized in sustainability.

In November 2022, Egypt hosted the 27th Conference of the Parties of the UNFCCC (COP 27), with a view to building on previous successes and paving the way for future ambition to

effectively tackle the global challenge of climate change. The COP27 climate conference concluded 20th November in Sharm el-Sheikh, adopted the final declaration which stressed "the urgent need for an immediate, deep, rapid and sustainable reduction of global greenhouse gas emissions, responsible for climate warming." and "accelerating a clean and equitable transition to renewable energy." The Ministry of Petroleum and Mineral Resources also organized the "Decarbonization Day" at COP27 which highlighted the local, regional, and global success of decarbonization in the oil and gas sector and hard-to-abate industries. As COP President, Egypt stewards the continuous global climate change agenda in line with the Sharm El-Sheikh Implementation Plan (EOG magazine,2022).

This study made a significant contribution to the Egyptian Oil &Gas sector in many ways:

I. Sustainability encompasses various aspects related to the environment, economy, and society, and is recognized as a global issue. With increasing awareness of environmental impacts and social justice, there is growing pressure on companies to embrace ecological and social sustainability (UNEP, 2019). This research made a valuable contribution to the ongoing efforts to address climate change and promote sustainable practices in the energy industry. The study also could provide practitioners with a deeper understanding of the significance of integrating environmental concerns into

strategic management. By offering practical strategies for implementing environmental initiatives to sustainability managers, energy companies can work towards achieving sustainable operations.

II. Considering worldwide ecological and social issues, it is crucial for companies to promptly implement sustainable strategies that provide comprehensive benefits to all stakeholders and minimize the effects of climate change (Tufano, P., Thomas, C., Haanaes, K,2023). The findings of this research could advance academic understanding of sustainability strategies and provide insights for managerial practices related to environmental responsibility. The study also raises important questions and encourages further investigation into the field of ecological and social sustainability

III. This study made a modest but valuable contribution to the academic knowledge and practical applications related to mitigating climate change and promoting sustainable operations. Specifically, it examined the role of corporate managers in planning and decision-making processes for developing and evaluating environmental initiatives. The primary objective is to explore the strategies required by sustainability managers to successfully implement environmental initiatives within the Egyptian petroleum energy companies.

IV. Furthermore, this study made a noteworthy contribution to identifying innovative approaches for attaining operational excellence and efficiency, thereby inspiring practitioners to foster innovation and pursue new business ventures. The primary target audience for this research consisted of sustainability managers and executive directors within the Egyptian petroleum companies who considered environmental factors during project planning. However, the findings of this study may also hold value for other stakeholders, including investors in oil and gas companies, policymakers responsible for environmental regulations, organizations involved in voluntary standards, and reporting groups.

V. The Egyptian Oil& Gas sector has about 145 companies that have strong contributions in their various areas of work. Therefore, managers of Sustainability units in those companies should be the core of the climate change problem solutions. This would require the implementation of significant changes within strategies, and it should be taking into consideration the environmental, social, and governance aspects (ESG). As being that a successful implementation of climate change initiatives within the Egypt Oil & Gas sector is vital for the country's ability to attain sustainability values and the climate change agenda. This study explores effective strategies for addressing

environmental concerns within the energy industry. Sustainability Managers with diverse backgrounds will benefit from comprehending and developing strategies for effectively implementing climate change initiatives within their respective companies.

1.5 Research Objectives:

The objective of this qualitative study is to explore the strategies sustainability managers need to establish to fulfil climate change initiatives within the Egyptian oil &gas companies and to understand how organizations engaged in sustainability practices. This exploratory study provides a framework of recommended strategies for implementing climate change initiatives within oil & gas companies to follow the Egyptian Oil & Gas sector Sustainability strategic main pillars (Energy Security, Financial Sustainability, Sector Governance) in line with the sector's decarbonization six pillars (Energy subsidy reform , Energy efficiency , Decarbonized natural gas , Renewable &Bio Energy , Decarbonization , Hydrogen)

1.6 Research Question:

Based on the research objectives, the research question investigates a gap within the scholarly body of knowledge regarding strategies for implementing climate change initiatives within oil& gas companies. Therefore, the following research question will guide the study: What are the strategies

sustainability managers need to establish to fulfil climate change initiatives within the Egyptian oil& gas companies?

1.7 Research Scope:

This study explores the implementation of sustainable strategies for establishing climate change initiatives, specifically focusing on sustainability managers within the Egyptian petroleum companies.

Chapter Two: Theoretical background and the literature Review:

2-2 Climate change:

2.2.1 Climate change definition:

Climate change refers to shifts in climate patterns largely due to greenhouse gas emissions from natural and human activities, such as energy production and land-use changes (Yue & Gao, 2018; Edenhofer et al., 2014). These emissions are causing global temperatures to rise, currently estimated at 1.0°C above pre-industrial levels, with projections to reach 1.5°C by 2030-2052. Climate change is associated with increased natural disasters, affecting millions and causing significant economic losses (Yue & Gao, 2018).

2.2.2 Climate change and energy:

Energy systems, crucial to climate change mitigation, contribute approximately 70% of urban CO_2 emissions due to urbanization (IPCC, 2015). Improving energy efficiency and adopting renewable energy are key steps toward mitigating

climate change. Urban areas, responsible for much of the energy demand, are focal points for reducing emissions through building energy efficiency, improved transportation, and enhanced heating/cooling systems

2.2.3 Environmental Performance:

Corporate environmental performance is increasingly demanded by stakeholders, as firms are expected to balance economic performance with environmental responsibilities. The stakeholder theory emphasizes maximizing value for both shareholders and environmental advocates (Garriga ,2014). Environmental sustainability is seen as beneficial to profitability and competitive advantage (Ranjan & Das ,2015). However, companies' approaches vary based on their specific strategies and interactions with environmental factors (Hussain et al., 2018).

2.2.4 Environmental Management:

Effective environmental management is critical for corporations to meet their economic and environmental goals. Integrating environmental practices can lead to productivity and innovation gains, creating competitive advantages and financial benefits through investments in green products, efficiency improvements, and emission reductions (Semenova & Hassel, 2015; Albertini, 2013).

2.2.5 Eco-Efficiency:

Eco-efficiency, defined as using resources to meet human needs while preserving the environment, encourages sustainable production and consumption practices (Figge & Hahn, 2004). While improvements have been noted, challenges remain in reducing energy consumption, material use, and waste generation (Samudhram et al., 2016).

2.2.6 Change within the Oil& Gas Industry:

As the oil and gas sector meets over 57% of global energy demand, it faces increasing pressure to adopt sustainable practices to mitigate climate change. Stakeholders urge the industry to focus on long-term sustainability over short-term profits, integrating environmental goals into their corporate strategies (Burritt et al., 2018). This shift requires managers to balance social, environmental, and economic considerations in their strategic planning.

2.2.7 Energy transition:

The global energy transition involves shifting to low-carbon, sustainable energy systems, essential for reducing greenhouse gas emissions. Under the Paris Agreement, countries, including Egypt, are working towards net-zero emissions by diversifying energy pathways and enhancing renewable energy use. Egypt's commitment to sustainable development aligns with its Vision 2030 and Integrated Sustainable Energy Strategy 2035, supported by the oil and gas sector (Morgunova & Shaton, 2022).

2.3 Sustainability:

2.3.1 Sustainability Definition:

Sustainability, once a peripheral concept, has now become crucial due to the pressing challenges of climate change and environmental degradation, largely driven by heavy reliance on fossil fuels (McCauley & Heffron, 2018). Research in sustainability transitions emphasizes the need for socio-technical shifts to address environmental, social, and economic issues (J.K, 2021). While sustainability emerged prominently in the 1980s, its roots date back centuries, with early efforts aimed at balancing resource use and environmental preservation (Markard et al., 2012; Caradonna, J. L.,2014). Modern definitions, as outlined by Stoddart (2011), focus on achieving an equitable distribution of resources across generations within a finite ecosystem.

2.3.2 The Emergence of Sustainable Strategies:

Corporate sustainability has evolved significantly since the 1950s. Early contributions from Bowen on social responsibility paved the way, and scholars like Hahn and Figge later incorporated sustainability into frameworks like the balanced scorecard (Carroll, 2016; Hahn & Figge, 2018). Porter and Kramer (2006) highlighted the strategic link between competitive advantage and corporate social responsibility. More recently, researchers have advocated for a holistic approach to sustainability, one that integrates social, environmental, and

economic values for better decision-making and assessment of corporate performance (Burritt et al., 2018; Hussain et al., 2018).

2.3.3 Sustainability Performance:

Sustainability performance encompasses economic, environmental, and social dimensions, often referred to as the "triple bottom line" (Schaltegger ,2016). Integrating these dimensions into corporate strategy can drive long-term success and competitive advantage (Epstein et al., 2014). Failure to consider environmental and social factors in decision-making may lead to reputational damage, regulatory issues, and loss of stakeholder trust (Figge & Hahn, 2005; Akisik & Gal, 2017). Scholars call for continued exploration into embedding sustainability within business models for sustainable financial performance (Wiesner et al., 2017).

2.3.4 Sustainable Control Systems:

Effective sustainability management requires integrating environmental, social, and economic factors into core business strategies (Morioka & Carvalho, 2016). The link between corporate sustainability (CS) and corporate financial performance (CFP) continues to be a key area for research (Rezaee, 2017). Managers play a crucial role in driving sustainable practices by aligning business operations with stakeholder values and ensuring adherence to the triple bottom line (Kruger et al., 2018). Scholars suggest further research to improve understanding and application of corporate sustainability strategies, especially in

alignment with global goals like the SDGs and the Paris Agreement (United Nations, 2020).

2.3.5 Theory and Strategy:

Stakeholder theory, introduced by Freeman in 1984, has become fundamental in shaping corporate sustainability strategies. It encourages businesses to balance shareholder returns with the interests of other stakeholders, including those focused on social justice and environmental protection (Hörisch et al., 2014). This theory underscores the role of corporations as responsible entities within society, tasked with preserving environmental and social welfare.

2.4 Corporate Sustainability:

2.4.1 Corporate Sustainability definition:

Corporate sustainability (CS) integrates social, economic, and environmental concerns to generate long-term value. According to Cornell (1987), the costs of corporate social responsibility (CSR) can be balanced by gains in efficiency, reputation, and quality, indicating that responsible practices can strengthen profitability. As social expectations evolve, Carroll (1991) suggests companies adopt adaptable sustainability frameworks to address present and future needs. Porter and Kramer (2002) underscore that sustainability can solve social and environmental issues while delivering shareholder returns. However, Epstein (2008) emphasizes the challenge of quantifying CS benefits, noting the need for continuous

reassessment due to economic and technological shifts. Stakeholders increasingly value CSR, as high corporate social performance (CSP) has been linked to additional investments) and sustainable reporting (Schreck & Raithel, 2018). CSR activities enhance output quality, innovation, risk mitigation, and profitability, according to Epstein (2008). Kiron, D. (2015) observe a shift from profit-focused models to strategic, stakeholder-inclusive approaches. Rezaee (2017) proposes integrating environmental, social, and governance (ESG) factors into corporate strategy, driving long-term value while meeting stakeholder expectations. The dynamic and context-specific nature of CS, as discussed by Montiel and Delgado-Ceballos (2014) and Glover et al. (2015), presents challenges for standardization. Continuous improvement and adaptability are essential for effective implementation across industries.

2.4.2 Implementing Sustainability in Corporations

Effective sustainability practices require balancing environmental, economic, and social priorities (Ranjan & Das, 2015). Shrivastava (1995) defines sustainable corporate achievement through elements like quality environmental management and ecological strategies. Rising environmental concerns compel companies to align with regulatory and social expectations (Bansal, 2013), which demand a balanced approach to emissions, resource use, and waste.

2.4.3 Corporate's Role in Society

The role of corporations has expanded beyond maximizing shareholder returns (Friedman, 1962; Freeman, 2001). The stakeholder theory suggests delivering value to all stakeholders, not just shareholders. Porter (1990) highlights that environmental objectives can align with financial performance by reducing waste and boosting efficiency. Porter and Van der Linde (1995b) argue that competitive advantage can be achieved by minimizing environmental impacts.

2.4.4 Corporate Social Responsibility (CSR)

CSR, historically defined as a corporation's responsibility to society (Bowen, 1953; Freeman, 1984), has evolved beyond profit-focused approaches (Porter, 1991). Porter and Kramer (2006) describe CSR to innovate, create opportunities, and gain a competitive edge. However, CSR can risk being superficial (De Oliveira, 2017). Integrating CSR into core business practices (Farnum, 2016) supports genuine, sustainable progress.

2.4.5 Social Component:

The social component of CS, a pillar of the triple bottom line (TBL), benefits financial performance through enhanced corporate social performance (CSP) (Waddock & Graves, 1997). CSR disclosure increases as companies recognize the financial benefits of CSR (Mamun, Shaikh, & Easmin, 2017). Aligning goals of managers and shareholders (Jensen & Meckling, 1976) encourages mutually beneficial outcomes. Strong stakeholder

relations improve brand image and financial results (Mazzei, Gangloff, & Shook, 2015).

2.4.6 Strategy as Practice:

To realize sustainability's potential for value creation, companies must embed sustainability in their strategies. Sroufe and Gopalakrishna-Remani (2018) emphasize clear managerial practices for justifying sustainability investments. Research shows integrating sustainable practices leads to competitive advantage in industries like energy (Pätäri et al., 2012). The Sustainability Performance Measurement system (Pérez-López, Moreno-Romero, & Barkemeyer, 2015) provides a framework for assessing CS effectiveness, stressing that sustainability initiatives need to be woven into strategic planning for meaningful impact

2.5 Measuring Sustainability:

2.5.1 Communicating Sustainability

Businesses assess sustainability by evaluating economic, social, and environmental dimensions to communicate progress effectively (Milne & Gray, 2013). Sustainability reporting (SR) plays a key role in transparency and stakeholder engagement (Varfolomeev et al., 2014), evolving from Daly's (1973) Overall Sustainability Index (OSI) model to the Balanced Scorecard (BSC) by Kaplan and Norton (1992), which Hubbard (2009) further adapted into the Sustainable Balanced Scorecard (SBSC).

2.5.2 The Balanced Scorecard

Kaplan and Norton's BSC provides a framework to measure financial and non-financial dimensions aligned with strategic objectives (Kaplan & Norton, 1996c). It integrates financial, customer, internal process, and learning perspectives to track intangible assets and foster organizational learning (Journeault, 2016). The BSC is iterative, supporting strategy refinement and facilitating a shared vision across the organization (Hahn et al., 2014). Though not a tool for strategy creation, it plays a vital role in translating strategy into actionable insights and learning (Kaplan & Norton, 2001a).

2.5.3 Sustainable Balanced Scorecard

The SBSC extends the BSC framework to incorporate sustainability goals, emphasizing environmental and social dimensions (Figge et al., 2002). By aligning non-financial metrics with economic outcomes, it supports a triple bottom line approach that considers ecological and social impacts (Journeault, 2016; Hubbard, 2009). However, critics argue that it lacks transformational impact, as it often aligns with traditional business practices rather than driving significant change (Hahn & Figge, 2018; Hansen & Schaltegger, 2016).

2.5.4 The Triple Bottom Line

The Triple Bottom Line (TBL) concept—focusing on people, profit, and planet—advocates for a balanced approach to sustainability (Elkington, 2001; UNEP, 2011). While earlier views suggested trade-offs between sustainability goals, Porter (1991) and Amarah (2015) argued for competitive advantages through balanced TBL pursuits. By integrating social and environmental dimensions, companies can create long-term value and fulfill broader responsibilities (Kim et al., 2015; Rezaee, 2017). The TBL offers a holistic sustainability framework that fosters competitive advantage and aligns business practices with stakeholder and environmental interests (Longoni & Cagliano, 2018).

2.5.5 ESG Scores

Environmental, Social, and Governance (ESG) scores are a framework for evaluating a company's management of risks and opportunities in these three areas, often influencing investment decisions. Higher ESG scores indicate effective risk management, making companies more appealing to ESG-focused investors (Harris.G, 2022). ESG scores help investors assess a company’s environmental impact, social responsibility, and governance quality, guiding investments that align with sustainable values. This approach, popular among millennials, has contributed to the growth of global ESG assets, which reached $3.9 trillion in 2021 (Esty, D. C., & Cort, T.,2020 ; Harris.G, 2022).

ESG scores serve as a metric for investors and decision-makers to evaluate companies' adherence to cultural and generational norms, linking ESG performance to profitability and corporate reputation (Kengkathran, S. ,2018). Initially developed for financial firms, ESG scores now extend across industries, helping companies enhance their reputation, reduce legislative pressures, and attract capital (Christensen D.M., Serafeim .G., 2022). While they mitigate risks by identifying potential hazards like corruption or environmental accidents, ESG scores are limited in evaluating positive impacts on societal and environmental well-being (Baker.,2022).The popularity of ESG scoring has grown due to its role in predicting financial risks, though small organizations still face challenges in measuring sustainable practices, particularly their long-term effects on communities and ecosystems (Sendawula, 2020).

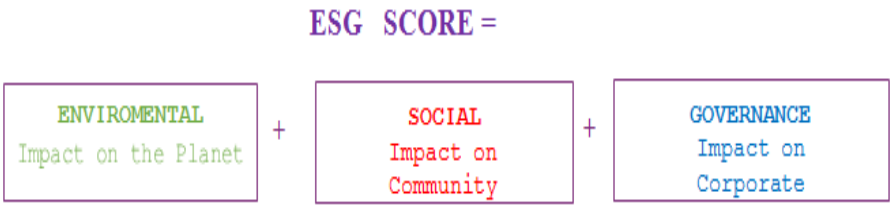


Fig. (1): ESG Score Calculating (Author 2023)

2.5.6 Integrated Reporting

Integrated reporting communicates both financial and nonfinancial performance to stakeholders, addressing environmental, social, and governance (ESG) factors crucial for sustainable operations. It includes key performance indicators (KPIs) on environmental issues like emissions, waste, and resource use, aligning corporate actions with stakeholder interests as per stakeholder theory (Rezaee, 2017). Integrated reports highlight strategies and risk management, providing senior management with insights for decision-making that satisfies shareholders and broader stakeholder needs (Hussain et al., 2018). By uniting different business aspects, integrated reporting fosters a cohesive strategy aimed at sustainable practices (Simnett and Huggins, 2015). However, the effectiveness of these reports in differentiating companies' sustainability efforts varies, and limitations in current accounting practices often hinder capturing the full scope of nonfinancial metrics (Sroufe and Gopalakrishna-Remani, 2018; Mohamed. W, 2017).

2.5.7 Strategic Reporting

Strategic reporting expands on integrated reporting by connecting sustainability and corporate governance with overall company performance, emphasizing the importance of environmental and social considerations (Klemes, 2015; Sroufe, 2017). Stakeholder interest in sustainability and transparency, including ESG and climate change, has increased, motivating

companies to disclose sustainability practices for a competitive edge (Schreck & Raithel, 2018). This reporting framework benefits companies by improving reputation, risk management, and loyalty, particularly for investors who value sustainability (Feng Jui & Yu-Cheng, 2015)

2.5.8 Standardized Reports

Standardized sustainability reports, like those developed under the Global Reporting Initiative (GRI), aim to provide a globally accepted framework to assess sustainability alongside financial performance (GRI, 2018). Despite being the most widely used reporting standard, GRI faces criticism for reliability issues, especially in accurately comparing sustainability practices (Talbot & Boiral, 2018). These reports aim to facilitate informed decision-making for investors, employees, and customers, demonstrating companies' commitment to sustainable practices (Akisik & Gal, 2017).

2.5.9 Disclosing Environmental Efforts:

Environmental disclosures, such as greenhouse gas (GHG) emission reports, serve regulatory purposes and assist agencies in developing climate policies (Mazzanti et al., 2016). While tensions exist between reporting for productivity and sustainability (Schulz & Flanigan, 2016), reports that disclose Corporate Social Responsibility (CSR) efforts align corporate actions with reputational and competitive goals, adding value to long-term financial performance (Tanggamani et al., 2018;

Sroufe & Gopalakrishna-Remani, 2018). Accurate reporting on environmental and social practices enhances both internal tracking and external communication, strengthening corporate sustainability and positioning in the market.

2.6 Sustainable Development:

2.6.1 Sustainable Development Definition

The concept of sustainable development (SD) is defined as the integration of balanced ecosystems, social equity, and economic stability, according to Bansal (2005). It encompasses economic prosperity, social responsibility, and environmental management, forming a tridimensional construct of sustainable corporate development. Engert et al. (2016) emphasize aligning strategic planning with stakeholder interests and moral stewardship, as initially introduced by stakeholder theorists like Cornell and Shapiro (1987) and Freeman (2001). Sustainable management frameworks encourage businesses to address community and environmental needs, which Robinson and Dechant (1997) found positively affect financial performance. This approach enables corporations to bridge the gap between sustainability goals and actionable outcomes.

2.6.2 Sustainable Development Goals (SDGs)

In 2015, the United Nations established the 17 SDGs to address global issues such as climate change and social inequities (UNSD, 2019). The oil and gas industry, though vital to economic growth, faces challenges in aligning with climate goals

and reducing emissions (IPIECA, 2021). The COVID-19 pandemic underscored these challenges, revealing vulnerabilities in the sector's risk management and business continuity plans (Razavi &Asgary & Khaleghi, 2022). With the 2030 deadline approaching, global cooperation and resilience are essential for SDG achievement.

2.6.3 Organizational Sustainable Development

Organizational sustainable development emphasizes aligning short- and long-term strategies with stakeholder needs, promoting lasting success (Campbell, 1997). Studies show that incorporating sustainable practices creates value for stakeholders and enhances financial performance (Gherghina & Vintila, 2016; Rezaee, 2017). This requires balancing short-term goals with comprehensive, sustainable strategies (Mazzei et al., 2015).

2.6.4 Sustainable Practices

Stakeholder expectations drive corporations to adopt transparent environmental, social, and governance (ESG) reporting. Companies with proactive sustainability measures often outperform competitors and demonstrate industry leadership (Schreck & Raithel, 2018). Rezaee (2017) advocates for a business model that integrates sustainability into corporate practices, enhancing brand value, customer satisfaction, and environmental stewardship.

2.6.5 Sustainable Value-Added

Businesses are challenged to balance economic, social, and environmental goals to achieve sustainable value (Figge, 2005). Carroll (2016) stresses that economic accountability remains a foundation for business, while Rezaee (2017) notes that creating long-term shared value is now central to corporate objectives. Integrating Sustainable Value-Added (SVA) methods allows companies to measure performance across financial and non-financial metrics.

2.6.6 Towards Sustainability Improvements

Standards such as ISO and SASB have introduced frameworks to enhance social and environmental reporting (ISO, 2004). Evidence supports the financial impact of CSR and ESG factors, underscoring their inclusion in financial assessments (Akisik & Gal, 2017). Sustainability frameworks, like the FSSD, offer guidance on aligning business practices with strategic goals, allowing better communication with stakeholders (Broman, 2017).

2.6.7 Strategies for Sustainability

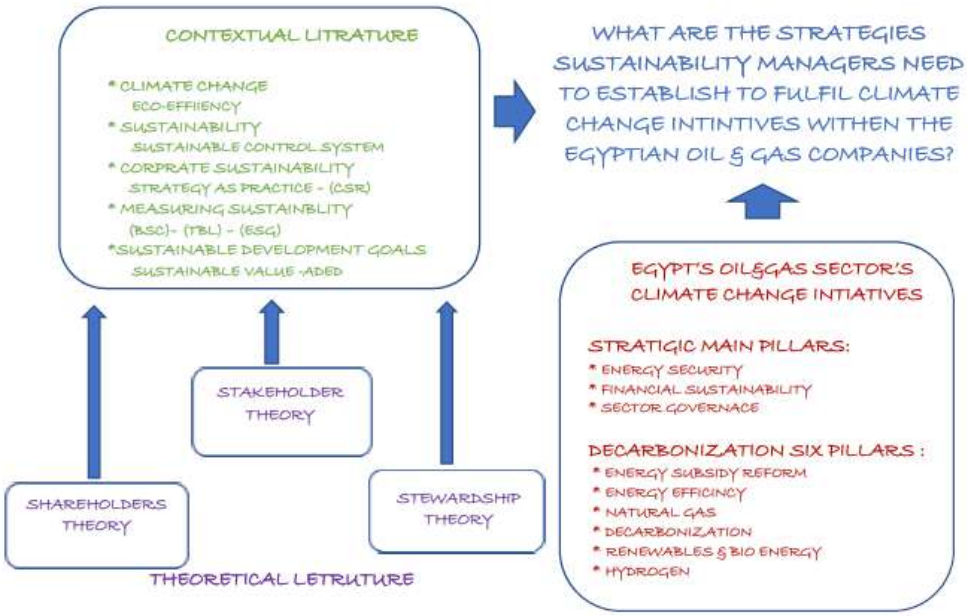
Sustainable strategies aim for enduring value and competitiveness by integrating environmental and social factors (Steurer et al., 2005). However, scholars point to a need for research on how these strategies translate into measurable corporate performance (Ditillo & Lisi, 2016) calls for formal managerial processes to implement sustainability strategies

effectively, suggesting that proactive approaches are critical to corporate sustainability.

2.7 Research Conceptual framework:

The conceptual framework of the study focused on environmental and social sustainability, specifically exploring the strategies employed by sustainability managers when implementing environmental initiatives within corporate operations. The framework provided an overview of the research question and its context, with the findings intended to benefit managers in the Egyptian petroleum energy companies who aim to achieve sustainable operations through the implementation of environmental initiatives. The study aims to bridge the gap between implemented environmental initiatives and achieved sustainable operations in the oil and gas industry by exploring the strategies used by sustainability managers. The findings will provide a framework of recommended strategies for effectively implementing environmental practices within the corporate structure of oil& gas companies, assisting managers in achieving sustainable operations. The primary audience for this study includes managers and executive directors of Egyptian petroleum energy companies that already incorporate or plan to incorporate environmental factors into their project planning to achieve sustainable operations. The study involves the collection of data from experienced professionals through live interviews. The study is limited to The Egyptian oil and gas sector companies

Fig.(2) shows the central concepts alongside the research question addressed in the study:



Chapter Three: Methodology and Data Analysis

3.1 Population:

The Egyptian Ministry of Petroleum and Mineral recourses consists of two sectors: Egyptian Oil& Gas sector and Egyptian General Mineral Recourses Authority. The Egyptian Oil& Gas sector comprises four state holding companies, namely the Egyptian General Petroleum Corporation (EGPC), Egyptian Natural Gas Holding Company (EGAS), Egyptian Petrochemicals Holding Company (ECHEM), and Ganoub El Wadi Petroleum Holding Company (GANOPE). These holding companies oversee a total of approximately 145 subsidiary

companies. The Egypt Oil & Gas Sustainability Committee which officially established in November 2021 with the objective of fostering sustainability awareness within the Egyptian oil and gas industry, aims to realize the principles of sustainable development, enhance environmental, social, and economic performance, and reinforce the role of the Egyptian petroleum sector in promoting economic growth and sustainable development (EOG,2021). To achieve these objectives, the initial step involves appointing a sustainability manager in each of the 145 companies. These managers, who are currently employed within the oil and gas companies, have relevant experience in their respective positions. They have backgrounds in areas such as environmental management, operations, or energy efficiency. As managers with sustainability responsibilities, they represent potential candidates for inclusion in the study. The total population of this study is all sustainability managers currently employed within the Egyptian Oil & Gas sector. The Oil and gas companies in Egypt can be categorized based on their operations into the following categories:

I. Upstream Companies: These companies are involved in the exploration and production stages of the oil and gas industry.

II. Midstream Companies: Midstream companies are responsible for the transportation, storage, and wholesale marketing of crude oil, natural gas, and refined petroleum products.

III. Downstream Companies: Downstream companies are involved in the refining, processing, distribution, and marketing of petroleum products. and distributed efficiently and safely to meet the energy needs of industries, transportation, and households.

IV. Service Companies: These companies provide various support services to the oil and gas industry. acquisition, and other technical and operational support to upstream, midstream, and downstream companies.

V. Integrated Companies:

Integrated oil and gas companies have operations across the entire value chain, from exploration and production to refining, marketing, and distribution.

A population within a study is defined as all the individuals/entities/cases that fit a specific criterion (Stebbins, 2008). This study specifically targets sustainability managers working in the oil and gas industry. Consequently, the total population under consideration encompasses all sustainability managers employed across 145 oil and gas companies in Egypt.

The study focuses on the population of sustainability managers within oil and gas companies, intending to capture the real-world experiences of professionals in this role. The study is particularly pertinent to managers actively engaged in implementing climate change initiatives within the Egyptian oil and gas sector.

3.2 Sample Size:

This study aimed to select a sample size appropriate for answering its research questions within a qualitative framework, where smaller samples allow for detailed data collection and analysis.

The study targeted managers from various companies within Egypt's oil and gas sector who had insights into sustainability strategies. Aiming for a sample size of 20-30, aligned with qualitative research guidelines, the study ensured a robust dataset by selecting participants with diverse professional backgrounds (Bryman, 2012). According to Mason's review of PhD studies, qualitative studies using interviews commonly involve 15-50 participants, with 20 as the average for grounded theory studies, affirming this study's target as suitable for detailed inquiry (Mason, 2010). While qualitative research does not prescribe a single optimal sample size, this study followed accepted ranges (20-30 participants) to ensure data richness, thereby allowing for a nuanced exploration of sustainability practices in Egypt's oil and gas industry.

3.3 Sampling Procedure

The sampling procedure was the selection of a subset from the defined population on which the study commenced (Bryman & Bell, 2011). Purposive sampling was appropriate for investigating emerging trends within the small, targeted data sample (Field, 2013; Leedy & Ormrod, 2015). Additionally,

interviews with select participants of specific characteristics allowed for the collection of relevant data from the most appropriate sources (Wiesner et al., 2017). Prior authors supported the use of purposive sampling of managers to study sustainability strategies within a specified population (Green, B. ,2019; Bancoro, 2016; Behjati, 2014; Farnum, 2016

While the research focused on the Egyptian oil&gas sector companies, which are considered to have deferent types, the researcher follows the following steps to define the sample size:

Step #1: Define the population: The total sustainability managers in the Egyptian oil&gas companies include 145 companies

Step #2: Subset the population according to the company type into five groups :

I. Upstream companies
II. Midstream companies
III. Downstream companies
IV. Services companies
V. Integrated companies (Holding companies)

Step #3: Sample selection: Given insights from prior research and a literature review regarding the optimal number of interviews, falling within the range of 20 to 30 participants, the researcher opted to choose four companies from each type as representatives for their respective populations. Therefore, the sample size used to conduct the study was (20 manager) as they are 4 manager from each type.

3.4 Data Collection Procedure:

Managers who possess experience in sustainability strategies contributed essential data for the comprehensive analysis of the research topic. The data considered the differences in manager's backgrounds and the categorization of companies within the Egyptian oil& gas industry.

To invite potential participants, an email sent through the Egyptian Oil & Gas Sector Communication platform, requesting their voluntary participation in the research study. The semi-structured interview format allows for follow-up questions to delve deeper into specific areas and encourage participants to provide further information (Rubin & Rubin, 2012).

Following suit with the previous studies, (Green, B. ,2019; Bancoro, 2016; Behjati, 2014; Farnum, 2016), The qualitative study employs live interviews following a predetermined interview protocol. The protocol developed by annotating the sequential steps to be taken in each interview.

The questions explore managerial activities related to sustainability practices, including successes, challenges, and concerns associated with implementing climate change initiatives. The questions were organized in a logical sequence, moving from broader concepts to more specific ones. The protocol and questions in this study have been adjusted to align with the considerations of the Egyptian oil and gas sector.

A set of 10 interview questions sent to each participant ahead of the interview. Expectations for each participant during the interview also explained, emphasizing the need for sharing their personal experiences and insights regarding professional responsibilities, business practices, scenarios, and organizational involvement in response to the interview questions.

3.5 Data Analysis Plan:

Data analysis proceeded through five steps:

- Compilation of interview transcripts from participants
- Sorting and cataloging information.
- Coding of text within the "QDA Miner software"
- Identifying themes.
- Interpreting theme relationships into meaning.

Fig. (3): Steps of thematic analysis employed

Final inferences and recommendations were based on theme identification. The identified elements for implementing climate change initiatives lead to recommended strategies, managers could apply them within the Egyptian oil&gas companies to achieve sustainable operations.

3.6 Validity:

The validity of a research study is the extent to which the results among the study participants accurately represent true findings among similar individuals outside the study. It is the

quality of research that assesses how well the results obtained from analyzing the data of the study participants reflect true findings among comparable individuals beyond the study's population.

This qualitative research relied on textual data to ensure the reliability, validity, and trustworthiness of its findings. Trustworthiness was ensured by employing four qualitative research constructs: credibility, dependability, confirmability, and transferability. Dependability in qualitative research is used to evaluate how participants assess the study's findings, interpretations, and recommendations based on the study data. Confirmability allows researchers to verify research findings conducted by other researchers (Lorelli et al., 2017).

Credibility is essential for establishing trustworthiness, demonstrating that the research findings truthfully represent reality (Yin, 2013). This study employed a suitable research method aligned with the research problem, specifically, an exploratory qualitative design. The data collection process utilized open-ended interview questions to elicit genuine, unbiased participant responses, and interpretations were meticulously detailed during the coding process to accurately reflect participant experiences (Thomson, 2011). All 20 interviews were recorded, and respondents received transcripts for feedback, expressing satisfaction without indicating missing information or requesting additional content.

Reflexivity, a critical component, ensured the credibility of this qualitative research by maintaining self-awareness in communication, thinking, and writing (Lorelli et al., 2017). Reflexivity was also including reflective discussions with an advisor employed to check the accuracy of findings and confirm that results were shaped by data, not the researcher's opinions (McGregor, 2018).

Dependability, a critical element of quality assurance in qualitative research, ensures consistent results when the study is replicated by other researchers using the same data sources within the same context (Lincoln & Guba, 1985). Achieving dependability involves accurately documenting analysis processes to ensure that findings are firmly grounded in the data (McGregor, 2018). Facilitating a detailed understanding of the research and data collection process, was ensured by providing a comprehensive report of research findings. Providing data from diverse sources enhanced dependability, as did employing an audit trail to record research methods and applying member checking for consistency and reproducibility (Moon et al., 2016).

Confirmability, where other researchers can validate similar outcomes, relies on an unbiased method of data collection and analysis (Lincoln & Guba, 1985). The research addressed confirmability by ensuring transparency, outlining procedures clearly, and detailing decisions through an audit trail (Lincoln & Guba, 1985; Stebbins, 2008). Criteria for the sample population

were outlined to demonstrate the trustworthiness of collected data, and adherence to the outlined procedures validated research findings, preventing unwarranted false conclusions (Creswell, 2014). promoting the trustworthiness of qualitative research, demonstrated that the accuracy of issues presented in the study reflected the researcher's experiences. Confirmability was grounded in the researcher's reflexivity, expressing self-awareness, opinions, and feelings about the topic, taking responsibility for the outcome of results (Moon et al., 2016; Lorelli et al., 2017).

Transferability, the ability to apply findings to similar situations without distortion, was maintained by explicitly defining the context in which results could be applied. Specifically, within the context of Egyptian oil and gas companies implementing environmental initiatives. The study provided accurate, detailed descriptions of participant selection and limitations to ensure that findings were applicable to the focus population (Larsson, 2009). It was associated with adapting findings to fit the context of current and future studies, was established by aligning with qualitative research principles. Proper transferability enabled other researchers to benefit from and draw similar conclusions as this study (Thorne, 2021). Descriptions of the study's nature, methodology, data collection, participant selection, analysis, and interpretation facilitated this transferability.

Chapter 4: Data Analysis, (Findings)& Discussion

The method chosen for this study was the qualitative methodology, which helped investigate the participant's behavior and views to help answer the research questions (Kelly, 2017)., Frequently it used to obtain an in-depth understanding of participant's perceptions by exploring thoughts or feelings through the collection of verbal or written data (Vass et al., 2017). In addition, the qualitative methodology can be flexible and adaptable to influence how the researcher collects and evaluates the data, which can be guided by the research questions (Köhler et al., 2019). Because this is an exploratory study where the researcher was looking to identify a phenomenon and gather data from different sources to answer the research questions, the best suitable method is qualitative research (Wrona & Gunnesch, 2016). The analysis of this study was done using a qualitative data analysis software program "QDA" Miner. This qualitative study used an exploratory research design and interviewed 20 sustainability managers to gather lived experiences for implementing climate change initiatives within the corporate setting. Section one provides the respondents' demographics. Section two provided preliminary data analysis in five stages: Documentation of the interview transcripts, Sorting and cataloging information, Coding of text, identifying themes, interpreting theme relationships into meaning, in section three, data analysis process is presented by using QDA Miner software. In the fourth section, Presentation and discussion of findings were applied.

4.1 Participant Demographics

The qualitative study called for the lived experience from qualified, knowledgeable managers of which could provide insight towards answering the research question. Participants must have been presently employed as a sustainability leader (although they previous titles) with focus on climate change initiatives.

4.2 Data Collection

The exploratory study collected data through live interviews with willing participants, specifically chosen to meet the selection criteria. Interviews were scheduled at mutually convenient dates and times either in person or virtually by using WebEx conferencing. Audio was recorded after obtaining permission from participants. Then, transcriptions were conducted to transcribe audio recordings from all 20 interviews, which were turned to electronic documents. Following completion, textual responses and field notes were uploaded into the qualitative data analysis software program, QDA Miner.

4.3 Data Analysis

Documentation of the interview transcripts:

A data analysis procedure outlined the steps taken to develop inferences from the study to arrive at conclusions. The approach for analyzing data in the exploratory study began by compiling interview notes and participant responses (Leedy & Ormrod, 2015). Transcribed participants were uploaded into a data

analysis software program where the researcher proceeded to code the data, followed by the identification of themes and ending with the establishment of relationships between categories (Creswell, 2014).

Sorting and cataloging information:

After transcriptions were uploaded, pre-analysis began with the perusal of information, reflection on narratives, and interpretation of participant responses to gain a general sense of ideas and overall impressions (Mayer, 2015)

Coding of text:

The analysis phase of this study employed coding to organize and interpret the data effectively.

Coding rules established a standardized system for categorization, which included defining terms and creating a code list for clarity (Benaquisto, 2008; Bengtsson, 2016).

QDA Miner, a software tool, supported the coding process, assisting in handling large data sets The use of software facilitated efficient coding but did not replace the researcher's role in making deductive conclusions based on the coded data (Rubin & Rubin, 2012). This approach reflects best practices in qualitative research by combining systematic coding with the researcher's analytical expertise.

Identifying themes:

The creation of themes was carried out by bracketing data units into thematic units, known as theoretical coding, based on contextual relevance (Guest, MacQueen, & Namey, 2012).

Glaser (1978) stated theoretical coding is conceptualizing how substantive codes were related to each other. Therefore, in order to proceed with this linking of codes, concepts, and categories in a single-story using memo and constant comparison method, the theoretical coding stage, was concluded successfully with establishing the main theme based on number of cods supporting the theme.

Major themes derived from codes occurred in the next phase of analysis using interpretive techniques to generate patterns (Yin, 2014). Identifying themes, patterns, and relationships within participant data, helped the researcher understand how the data will link and relate to the codes (Sechelski & Onwuegbuzie, 2019). In addition, during this step, the researcher identifies patterns that may emerge that are critical for the data analysis (Skjott Linneberg & Korsgaard, 2019). An analysis technique is a method used to translate data terms into themes (Corbin & Strauss, 2008). Themes were created by clustering data into categories based on common statements, terminology, and methods mentioned across the various sources (Levy et al., 2016). Descriptive summaries served to capture the central phenomenon each theme represented.

Interpreting theme relationships into meaning:

The final step is to summarize the data. In this last step, the researcher highlighted themes and information relevant to the study or contradict it (Cypress, 2019). During this process, the researcher had the opportunity to understand the participants, give meaning to the information, and identify phenomena that lead to a comprehensive understanding of participants' views and actions from their perspectives (Sechelski & Onwuegbuzie, 2019).

Finally, themes were prioritized by relevance to the research question, comprising the framework for recommended strategies in addressing the research problem (Bazeley & Jackson, 2013).

4.4 Data Presentation:

The participants in this study were asked 10 questions. The researcher arranged and organized the data collected from respondents into codes and themes, which came up from the data analysis (Lewis, 2016). Codes that supported each interview question were generated. Ten themes which came from the data analysis and the codes that combined to create the individual themes from the coded data of interview transcripts were presented in Table 5

Table 5 Constituent Interview Question, Codes and Identified Themes

Interview Questions	Codes	Themes
How would you describe your involvement with sustainability practices in your company?	• Stewardship /Ownership • Executive Support • Collective Responsibility	Supporting and Policies Compliance
Can you provide an overview of a typical day in the role of a sustainability manager	• Leadership • Team Collaborations • Shared Understanding	Engagements and Collaborative Efforts
Could you share your experience in developing standard procedures for environmental initiatives to follow the Egyptian Oil & Gas sector's Sustainability Strategy Pilers within your company?	• Establishing Objectives • Delivering Performance • Economic Viability	Performance and Financial Justifications
Based on your experience, how do Climate Change Initiatives impact operations in your division?	• Innovation & Technology • Developing Methods • Consistency in Efforts	Opportunities for Improvement
Describe your experience in managing environmental goals within your team.	• Proactive Management • Setting Priorities • Impact and Decisions	Planning and Execution
What challenges have you faced while implementing Climate Change Initiatives in your company?	• Awareness & Transparency • Resistance to Change • Time and Commitment	Adoptability and Fixability
Share some success stories from your past experience in implementing Climate Change Initiatives	• Managerial Advising • Standards of Practices • Community Aspects	Engagement and Lessons Learned
Can you provide examples that highlight the gap between proposed Climate Change Initiatives and their actual implementation in operations?	• Knowledge • Communication • Training and Educations	Comprehensive Understanding
Based on your company category, how are climate change Initiatives impact across the company's contribution in transition towards sustainability?	• Employee Viewpoint • Partners Opinion • Dynamic Economy	Stakeholder Perspective
In your opinion, what measures or strategies could enhance the implementation of Climate Change Initiatives within the petroleum industry?	• Evolving Practices • Benchmarking • Reporting	Monitoring and Evaluation

Chapter Five: Data Analysis and Discussion

The analysis of this thesis was done using a qualitative data analysis software program "QDA" Miner. Section one provides the data analysis given from "QDA" Miner application; this includes coding frequency, coding co-occurrences, participants similarity, code sequences finder, coding by variables, and words & phrases frequencies. A discussion of the results is given in section two.

5.1 Data Analysis

5.1.1 Coding Frequency

Coding frequency is an indicator to the number of times a code is applied to segments of interview transcripts, It indicates how often a particular theme appears in the dataset.

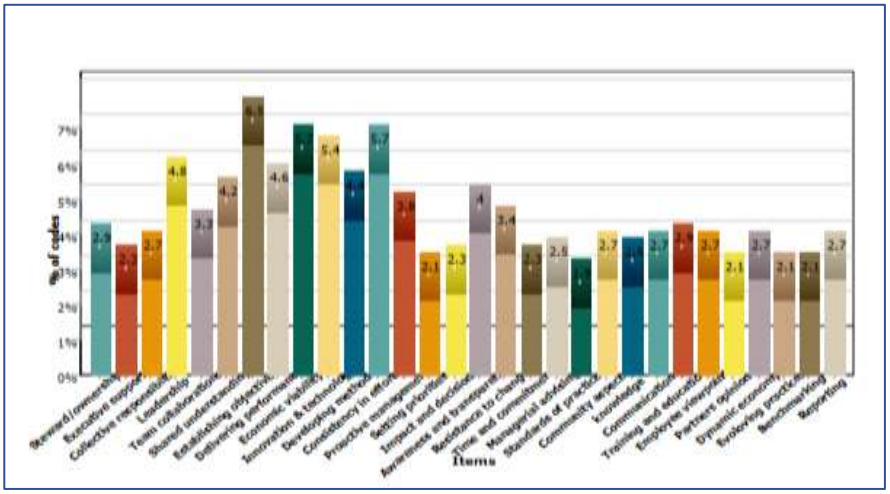


Fig. (4) Distribution of Cods (%)

Table 6: Themes Frequency

Theme	Code	Count	% Codes	Participant	% Participant	Nb Words	% Words
Policies and Regulatory Compliance	Steward/ownership	15	2.90%	14	70.00%	269	1.80%
	Executive support	12	2.30%	10	50.00%	304	2.00%
	Collective responsibility	14	2.70%	13	65.00%	282	1.90%
Engagements and collaborative efforts	Leadership	25	4.80%	16	80.00%	505	3.30%
	Team collaborations	17	3.30%	15	75.00%	346	2.30%
	Shared understanding	22	4.20%	17	85.00%	422	2.80%
Performance and Financial justifications	Establishing objectives	34	6.50%	20	100.00%	867	5.70%
	Delivering performance	24	4.60%	14	70.00%	435	2.90%
	Economic viability	30	5.70%	18	90.00%	807	5.30%
Opportunities for improvement	Innovation & technology	28	5.40%	16	80.00%	596	3.90%
	Developing methods	23	4.40%	13	65.00%	451	3.00%
	Consistency in efforts	30	5.70%	17	85.00%	640	4.20%
Planning and execution	Proactive management	20	3.80%	11	55.00%	399	2.60%
	Setting priorities	11	2.10%	11	55.00%	212	1.40%
	Impact and decisions	12	2.30%	11	55.00%	217	1.40%
Adoptability and flexibility	Awareness and transparency	21	4.00%	16	80.00%	473	3.10%
	Resistance to change	18	3.40%	13	65.00%	370	2.40%
	Time and commitment	12	2.30%	11	55.00%	237	1.60%
Engagement and lessons learned	Managerial advising	14	2.70%	9	45.00%	291	1.90%
	Standards of practices	10	1.90%	6	30.00%	230	1.50%
	Community aspects	13	2.50%	11	55.00%	288	1.90%
Comprehensive understanding	Knowledge	13	2.50%	10	50.00%	250	1.70%
	Communication	14	2.70%	11	55.00%	287	1.90%

	Training and education	15	2.90%	10	50.00%	330	2.20%
Stakeholder perspective	Employee viewpoint	14	2.70%	8	40.00%	326	2.20%
	Partners opinion	11	2.10%	9	45.00%	303	2.00%
	Dynamic economy	14	2.70%	9	45.00%	321	2.10%
Monitoring and evaluation	Evolving practices	11	2.10%	7	35.00%	248	1.60%
	Benchmarking	11	2.10%	10	50.00%	254	1.70%
	Reporting	14	2.70%	13	65.00%	289	1.90%

5.1.2 Coding Co-occurrences

Coding co-occurrences is an indicator to instances where two or more codes overlap or appear together in the same segment of data during the study analysis. In qualitative data coding, the researcher assigned codes to specific portions of interviews to identify themes. When multiple codes appear in the same text segment or are applied to the same data point, this is referred to as a co-occurrence.

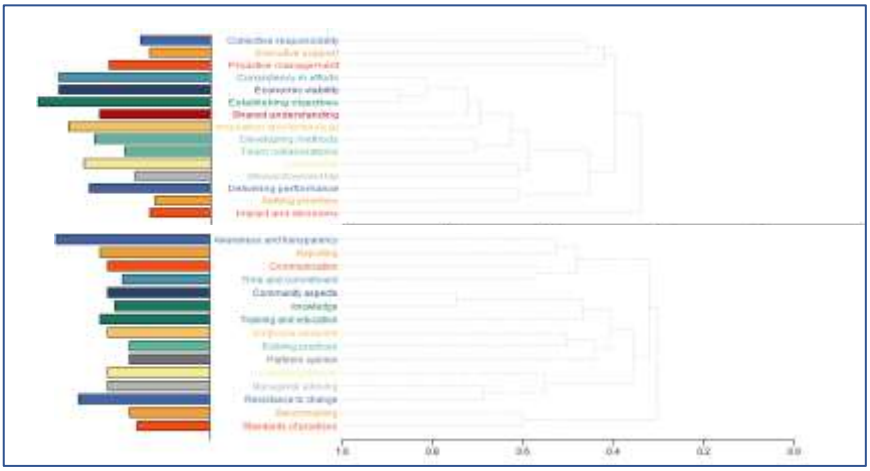
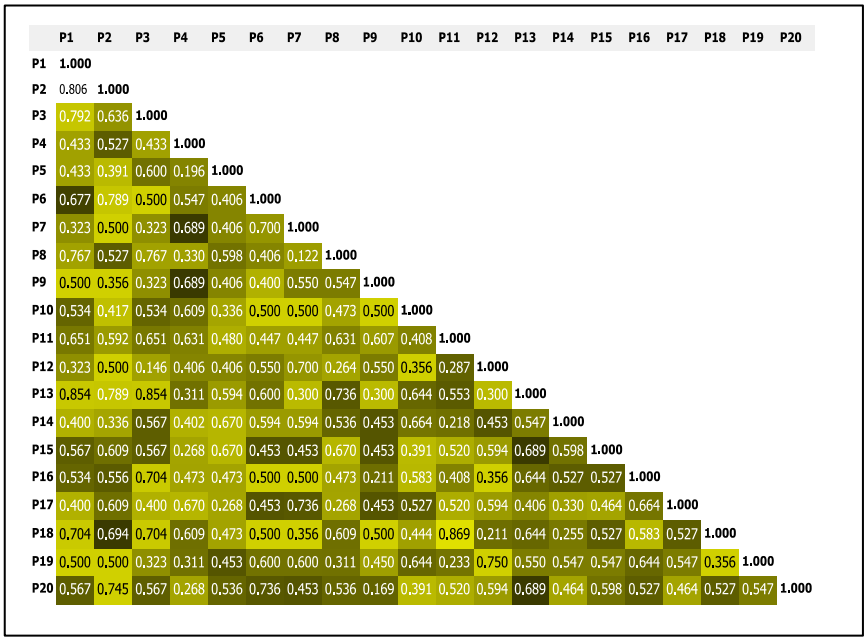


Fig. (5) Similarity Index: Cosine Frequency

1.1.3 Participants Similarity

Participant similarity refers to how closely participants are based on certain themes that emerge during the data collection process. Identifying and understanding participant similarity helped to analyze patterns responses and draw meaningful conclusions. Thematic similarity helps in identifying overarching ideas that are shared among participants leading to the development of strategies.



	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20
P1	1.000																			
P2	0.806	1.000																		
P3	0.792	0.636	1.000																	
P4	0.433	0.527	0.433	1.000																
P5	0.433	0.391	0.600	0.196	1.000															
P6	0.677	0.789	0.500	0.547	0.406	1.000														
P7	0.323	0.500	0.323	0.689	0.406	0.700	1.000													
P8	0.767	0.527	0.767	0.330	0.598	0.406	0.122	1.000												
P9	0.500	0.356	0.323	0.689	0.406	0.400	0.550	0.547	1.000											
P10	0.534	0.417	0.534	0.609	0.336	0.500	0.500	0.473	0.500	1.000										
P11	0.651	0.592	0.651	0.631	0.480	0.447	0.447	0.631	0.607	0.408	1.000									
P12	0.323	0.500	0.146	0.406	0.406	0.550	0.700	0.264	0.550	0.356	0.287	1.000								
P13	0.854	0.789	0.854	0.311	0.594	0.600	0.300	0.736	0.300	0.644	0.553	0.300	1.000							
P14	0.400	0.336	0.567	0.402	0.670	0.594	0.594	0.536	0.453	0.664	0.218	0.453	0.547	1.000						
P15	0.567	0.609	0.567	0.268	0.670	0.453	0.453	0.670	0.453	0.391	0.520	0.594	0.689	0.598	1.000					
P16	0.534	0.556	0.704	0.473	0.473	0.500	0.500	0.473	0.211	0.583	0.408	0.356	0.644	0.527	0.527	1.000				
P17	0.400	0.609	0.400	0.670	0.268	0.453	0.736	0.268	0.453	0.527	0.520	0.594	0.406	0.330	0.464	0.664	1.000			
P18	0.704	0.694	0.704	0.609	0.473	0.500	0.356	0.609	0.500	0.444	0.869	0.211	0.644	0.255	0.527	0.583	0.527	1.000		
P19	0.500	0.500	0.323	0.311	0.453	0.600	0.600	0.311	0.450	0.644	0.233	0.750	0.550	0.547	0.547	0.644	0.547	0.356	1.000	
P20	0.567	0.745	0.567	0.268	0.536	0.736	0.453	0.536	0.169	0.391	0.520	0.594	0.689	0.464	0.598	0.527	0.464	0.527	0.547	1.000

Fig. (6) Participant similarity Matrix

1.1.4 Coding Sequences Finder

In this qualitative study, Coding Sequence Finder refers to the process of identifying sequences in the codes that

emerge during the analysis of data. These sequences can reflect the order, flow, or relationships between participant responses. Understanding the sequence of codes provided insights into how participants experience, think about, or react to a phenomenon in stages or phases. It also revealed causal relationships, interactions, or dependencies between different themes and helped the researcher understand the processes participants go through,

<B>Freq of A = </B>15
<B>Freq of B = </B>24
<B>Expected Freq = </B>8.9
<B>B follows A = </B>7 (46.7%)
<B>A precedes B = </B>9 (37.5%)
<B>% of sequences = </B>13.6%

	Delivering performance	Economic viability	Innovation and technology	Developing methods	Consistency in efforts	Proactive management	Setting priorities	Impact and decisions
Steward/ownership	0.04	0.29	-1.14	-0.56	0.29	-0.16	0.47	1.25
Executive support	-0.2	-0.03	-0.61	-0.95	-0.81	0.73	-1.18	0.44
Collective responsibility	1.08	-0.09	-0.8	-0.15	-0.09	-0.07	-0.25	-0.9
Leadership	0.11	-0.8	-0.24	-1.79	-0.54	1.15	-0.51	0.87
Team collaborations	-0.63	0.22	0.49	0.55	-0.41	-0.82	0.72	0.04
Shared understanding	-0.86	0.54	-0.42	-0.98	-1.23	-1.07	0.42	-0.96
Establishing objectives	-1.6	-1.14	-0.14	-1.18	-1.14	-0.33	-1	-0.62

<B>Freq of A = </B>21
<B>Freq of B = </B>14
<B>Expected Freq = </B>7.9
<B>B follows A = </B>7 (33.3%)
<B>A precedes B = </B>7 (50.0%)
<B>% of sequences = </B>11.9%
<B>Z value = </B>-0.36

	Communication	Training and education	Employee viewpoint	Partners opinion	Dynamic economy	Evolving practices	Benchmarking	Reporting
Awareness and transparency	-0.36	-0.93	-0.36	-0.95	-0.36	-1.37	-0.53	-0.36
Resistance to change	-0.05	0.14	-2.47	-1.16	-0.05	-0.72	1.07	0.35
Time and commitment	2.01	-1.26	-1.14	-0.16	-0.62	-1.33	1.01	0.96
Managerial advising	-0.16	-0.31	-1.71	-0.8	-0.16	-0.8	-0.22	-0.68
Standards of practices	-1.81	-0.27	-1.38	-0.41	-1.38	-0.41	1.02	-1.38
Community aspects	0.42	0.7		-1.07	-0.05	-1.07	-0.01	-0.53
knowledge	-0.41	0.38	-1.39	0.65	0.08	0.65	0.65	-0.41

Fig. (7) Coding Sequences Matrix

5.1.5 Coding by Variables

Coding by variables helped the researcher to explore relationships between the data and these attributes, offering a way to compare themes across different participants.

- **Gender**

	Famale	Male
Steward/ownership	33.30%	66.70%
Executive support	41.70%	58.30%
Collective responsibility	14.30%	85.70%
Leadership	28.00%	72.00%
Team collaborations	29.40%	70.60%
Shared understanding	22.70%	77.30%
Establishing objectives	20.60%	79.40%
Delivering performance	25.00%	75.00%
Economic viability	30.00%	70.00%
Innovation and technology	28.60%	71.40%
Developing methods	26.10%	73.90%
Consistency in efforts	30.00%	70.00%
Proactive management	35.00%	65.00%
Setting priorities	18.20%	81.80%
Impact and decisions	33.30%	66.70%
Awareness and transparency	23.80%	76.20%
Resistance to change	11.10%	88.90%
Time and commitment	16.70%	83.30%
Managerial advising	23.10%	76.90%
Standards of practices	30.00%	70.00%
Community aspects	14.30%	85.70%
knowledge	15.40%	84.60%
Communication	28.60%	71.40%
Training and education	13.30%	86.70%
Employee viewpoint	50.00%	50.00%
Partners opinion	45.50%	54.50%
Dynamic economy	35.70%	64.30%
Evolving practices	27.30%	72.70%
Benchmarking	27.30%	72.70%
Reporting	35.70%	64.30%

- **Background**

	HSE	SP	HR	QUALITY	FIN	BD	PLANNING	ADMIN	PR
Steward/ownership	5.90%	7.70%	0.00%	5.00%	0.00%	2.60%	4.80%	6.30%	8.70%
Executive support	3.90%	15.40%	3.70%	5.00%	4.50%	0.00%	4.80%	0.00%	2.20%
Collective responsibility	3.90%	7.70%	3.70%	5.00%	4.50%	7.70%	6.00%	0.00%	0.00%
Leadership	7.80%	7.70%	3.70%	10.00%	4.50%	7.70%	8.40%	12.50%	8.70%
Team collaborations	5.90%	7.70%	7.40%	5.00%	4.50%	5.10%	3.60%	6.30%	6.50%
Shared understanding	5.90%	15.40%	11.10%	10.00%	9.10%	7.70%	3.60%	12.50%	4.30%
Establishing objectives	13.70%	7.70%	11.10%	20.00%	13.60%	7.70%	10.80%	6.30%	6.50%
Delivering performance	5.90%	0.00%	7.40%	0.00%	4.50%	12.80%	12.00%	6.30%	4.30%
Economic viability	7.80%	0.00%	11.10%	10.00%	4.50%	12.80%	9.60%	12.50%	10.90%
Innovation and technology	11.80%	15.40%	11.10%	5.00%	13.60%	7.70%	3.60%	12.50%	10.90%
Developing methods	9.80%	0.00%	3.70%	0.00%	18.20%	5.10%	6.00%	6.30%	10.90%
Consistency in efforts	7.80%	0.00%	7.40%	15.00%	4.50%	7.70%	12.00%	6.30%	13.00%
Proactive management	2.00%	15.40%	7.40%	5.00%	9.10%	5.10%	8.40%	6.30%	4.30%
Setting priorities	2.00%	0.00%	7.40%	0.00%	4.50%	5.10%	3.60%	0.00%	4.30%
Impact and decisions	5.90%	0.00%	3.70%	5.00%	0.00%	5.10%	2.40%	6.30%	4.30%
Awareness and transparency	9.50%	4.80%	9.50%	4.80%	14.30%	4.80%	33.30%	4.80%	14.30%
Resistance to change	11.10%	0.00%	11.10%	0.00%	0.00%	27.80%	33.30%	5.60%	11.10%
Time and commitment	16.70%	0.00%	16.70%	0.00%	8.30%	0.00%	33.30%	0.00%	25.00%
Managerial advising	15.40%	0.00%	0.00%	0.00%	0.00%	30.80%	23.10%	7.70%	23.10%
Standards of practices	20.00%	0.00%	20.00%	0.00%	0.00%	20.00%	40.00%	0.00%	0.00%
Community aspects	14.30%	0.00%	7.10%	7.10%	7.10%	21.40%	14.30%	7.10%	21.40%
knowledge	15.40%	0.00%	0.00%	15.40%	7.70%	23.10%	7.70%	15.40%	15.40%
Communication	21.40%	7.10%	7.10%	0.00%	14.30%	0.00%	28.60%	0.00%	21.40%
Training and education	13.30%	0.00%	13.30%	0.00%	13.30%	33.30%	13.30%	6.70%	6.70%
Employee viewpoint	14.30%	0.00%	0.00%	21.40%	7.10%	0.00%	21.40%	7.10%	28.60%
Partners opinion	27.30%	0.00%	0.00%	9.10%	9.10%	9.10%	18.20%	0.00%	27.30%
Dynamic economy	21.40%	0.00%	0.00%	7.10%	0.00%	21.40%	35.70%	0.00%	14.30%
Evolving practices	18.20%	0.00%	0.00%	9.10%	9.10%	45.50%	0.00%	9.10%	9.10%
Benchmarking	18.20%	0.00%	9.10%	0.00%	9.10%	18.20%	36.40%	0.00%	9.10%
Reporting	14.30%	7.10%	14.30%	0.00%	7.10%	21.40%	14.30%	0.00%	21.40%

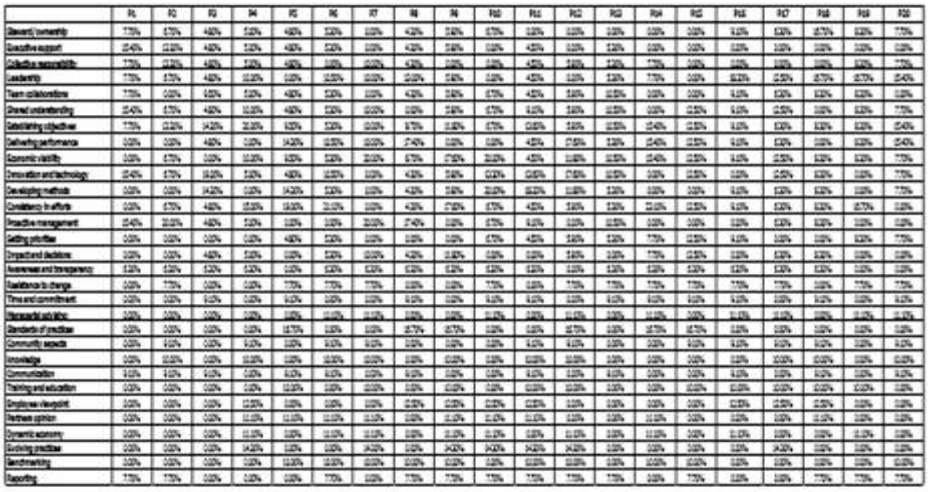
- **Experience:**

	8	9	10	12	13	15	16	17	18	19	20	21	22	27
Steward/ownership	6.70%	0.00%	0.00%	6.70%	6.70%	0.00%	6.70%	20.00%	6.70%	6.70%	20.00%	13.30%	6.70%	0.00%
Executive support	8.30%	8.30%	0.00%	8.30%	0.00%	0.00%	16.70%	0.00%	16.70%	0.00%	25.00%	8.30%	8.30%	0.00%
Collective responsibility	7.10%	7.10%	7.10%	0.00%	7.10%	7.10%	14.30%	0.00%	14.30%	0.00%	14.30%	14.30%	7.10%	0.00%
Leadership	12.00%	4.00%	4.00%	8.00%	8.00%	4.00%	4.00%	8.00%	4.00%	8.00%	24.00%	12.00%	0.00%	0.00%
Team collaborations	17.60%	5.90%	0.00%	5.90%	0.00%	0.00%	11.80%	11.80%	0.00%	5.90%	17.60%	17.60%	5.90%	0.00%
Shared understanding	18.20%	9.10%	4.50%	4.50%	4.50%	0.00%	13.60%	4.50%	4.50%	4.50%	13.60%	9.10%	4.50%	4.50%
Establishing objectives	8.80%	8.80%	2.90%	2.90%	5.90%	5.90%	5.90%	5.90%	5.90%	2.90%	23.50%	11.80%	5.90%	2.90%
Delivering performance	8.30%	4.20%	4.20%	8.30%	8.30%	8.30%	12.50%	0.00%	0.00%	4.20%	16.70%	8.30%	12.50%	4.20%
Economic viability	13.30%	3.30%	6.70%	3.30%	3.30%	6.70%	6.70%	13.30%	3.30%	3.30%	23.30%	3.30%	6.70%	3.30%
Innovation and technology	14.30%	10.70%	0.00%	7.10%	3.60%	0.00%	17.90%	10.70%	3.60%	0.00%	10.70%	14.30%	3.60%	3.60%
Developing methods	8.70%	17.40%	0.00%	4.30%	4.30%	0.00%	8.70%	17.40%	0.00%	4.30%	8.70%	13.00%	13.00%	0.00%
Consistency in efforts	6.70%	3.30%	0.00%	13.30%	0.00%	10.00%	3.30%	6.70%	3.30%	3.30%	23.30%	10.00%	13.30%	3.30%
Proactive management	15.00%	10.00%	10.00%	0.00%	0.00%	0.00%	10.00%	10.00%	15.00%	0.00%	25.00%	5.00%	0.00%	0.00%
Setting priorities	9.10%	9.10%	0.00%	9.10%	9.10%	9.10%	9.10%	9.10%	0.00%	9.10%	0.00%	9.10%	9.10%	9.10%
Impact and decisions	8.30%	0.00%	8.30%	8.30%	0.00%	8.30%	8.30%	8.30%	0.00%	0.00%	33.30%	8.30%	0.00%	8.30%
Awareness and transparency	9.50%	14.30%	4.80%	4.80%	0.00%	14.30%	4.80%	9.50%	4.80%	9.50%	14.30%	4.80%	0.00%	4.80%
Resistance to change	11.10%	0.00%	5.60%	5.60%	11.10%	5.60%	16.70%	5.60%	11.10%	11.10%	0.00%	5.60%	5.60%	5.60%
Time and commitment	8.30%	8.30%	0.00%	0.00%	8.30%	8.30%	0.00%	25.00%	0.00%	8.30%	8.30%	8.30%	8.30%	8.30%
Managerial advising	7.70%	0.00%	7.70%	15.40%	15.40%	7.70%	7.70%	7.70%	0.00%	15.40%	0.00%	15.40%	0.00%	0.00%
Standards of practices	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	20.00%	0.00%	0.00%	0.00%	30.00%	0.00%	20.00%	20.00%
Community aspects	7.10%	7.10%	7.10%	14.30%	14.30%	0.00%	14.30%	7.10%	7.10%	7.10%	7.10%	0.00%	0.00%	7.10%
knowledge	15.40%	7.70%	7.70%	7.70%	7.70%	0.00%	15.40%	7.70%	7.70%	0.00%	23.10%	0.00%	0.00%	0.00%
Communication	7.10%	14.30%	0.00%	14.30%	14.30%	0.00%	7.10%	7.10%	7.10%	7.10%	7.10%	7.10%	7.10%	0.00%
Training and education	6.70%	13.30%	6.70%	0.00%	0.00%	0.00%	20.00%	6.70%	0.00%	6.70%	13.30%	6.70%	6.70%	13.30%
Employee viewpoint	7.10%	7.10%	0.00%	0.00%	0.00%	0.00%	0.00%	28.60%	0.00%	7.10%	50.00%	0.00%	0.00%	0.00%
Partners opinion	0.00%	9.10%	9.10%	9.10%	0.00%	9.10%	0.00%	18.20%	0.00%	0.00%	36.40%	0.00%	9.10%	0.00%
Dynamic economy	0.00%	0.00%	7.10%	7.10%	0.00%	14.30%	7.10%	7.10%	0.00%	21.40%	28.60%	7.10%	0.00%	0.00%
Evolving practices	9.10%	9.10%	18.20%	0.00%	0.00%	0.00%	27.30%	9.10%	0.00%	0.00%	27.30%	0.00%	0.00%	0.00%
Benchmarking	0.00%	9.10%	9.10%	9.10%	9.10%	9.10%	9.10%	0.00%	0.00%	0.00%	18.20%	0.00%	18.20%	9.10%
Reporting	7.10%	7.10%	0.00%	7.10%	7.10%	0.00%	21.40%	14.30%	7.10%	0.00%	14.30%	7.10%	0.00%	7.10%

- **Type**

	UP STREAM	MID STREAM	DOWN STREAM	SERVICES	INTEGRATED
Steward/ownership	20.00%	20.00%	20.00%	13.30%	26.70%
Executive support	16.70%	16.70%	0.00%	33.30%	33.30%
Collective responsibility	7.10%	28.60%	7.10%	35.70%	21.40%
Leadership	28.00%	32.00%	12.00%	12.00%	16.00%
Team collaborations	23.50%	23.50%	11.80%	11.80%	29.40%
Shared understanding	27.30%	18.20%	9.10%	22.70%	22.70%
Establishing objectives	17.60%	20.60%	14.70%	14.70%	32.40%
Delivering performance	20.80%	33.30%	12.50%	16.70%	16.70%
Economic viability	16.70%	20.00%	23.30%	16.70%	23.30%
Innovation and technology	25.00%	14.30%	14.30%	21.40%	25.00%
Developing methods	30.40%	13.00%	17.40%	8.70%	30.40%
Consistency in efforts	23.30%	13.30%	20.00%	6.70%	36.70%
Proactive management	15.00%	30.00%	10.00%	35.00%	10.00%
Setting priorities	27.30%	27.30%	27.30%	9.10%	9.10%
Impact and decisions	16.70%	8.30%	25.00%	16.70%	33.30%
Awareness and transparency	33.30%	9.50%	28.60%	14.30%	14.30%
Resistance to change	22.20%	22.20%	16.70%	33.30%	5.60%
Time and commitment	16.70%	25.00%	41.70%	0.00%	16.70%
Managerial advising	38.50%	30.80%	15.40%	15.40%	0.00%
Standards of practices	0.00%	10.00%	30.00%	20.00%	40.00%
Community aspects	35.70%	14.30%	14.30%	28.60%	7.10%
knowledge	30.80%	7.70%	7.70%	30.80%	23.10%
Communication	35.70%	28.60%	7.10%	14.30%	14.30%
Training and education	26.70%	6.70%	20.00%	26.70%	20.00%
Employee viewpoint	21.40%	14.30%	28.60%	0.00%	35.70%
Partners opinion	18.20%	0.00%	27.30%	9.10%	45.50%
Dynamic economy	28.60%	7.10%	21.40%	14.30%	28.60%
Evolving practices	18.20%	0.00%	9.10%	45.50%	27.30%
Benchmarking	18.20%	18.20%	18.20%	18.20%	27.30%
Reporting	14.30%	28.60%	21.40%	28.60%	7.10%

- **Participant**



5.2 Discussion

Participants response highlighted the priority of strategic planning in integrating environmental practices within corporate operations to reduce environmental risks, address climate change, and respond to stakeholder concerns. The identified themes provided valuable insights into the research question and deepened understanding of the research problem. The ten primary themes were: Supporting and Policies Compliance, Engagements and Collaborative Efforts, Performance and Financial Justifications, Opportunities for Improvement, Planning and Execution, Adoptability and Fixability, Engagement and Lessons Learned, Comprehensive Understanding, Stakeholder Perspective, and Monitoring and Evaluation.

Data analysis revealed the ten key themes that shed light on the practical strategies employed by sustainability managers when implementing environmental initiatives in the Egyptian Oil& Gas companies. These themes suggested that providing sound business justification, embedding sustainability practices across the organization, and fostering a corporate culture shift are among the managerial strategies used to enhance corporate environmental performance, balance the triple bottom line (TBL), consider the ESG factor, and maintain profitability.

When comparing the findings to previous literature, it became evident that executive support and a commitment to continuous improvement were crucial for successfully implementing environmental initiatives (Kiron et al., 2017). Prior research also demonstrated that sustainability strategies positively impact firm performance. Achieving value across the bottom line requires a proactive stance, performance measurements, transparency with stakeholders, alignment of practices with corporate objectives, and the widespread adoption of core principles throughout the organization (Wijethilake, 2017).

The findings of this study highlighted key factors that drive sector success in transitioning to more sustainable practices, including executive support, financial investment, and stakeholder engagement. Leadership commitment, economic viability, and ongoing iterative efforts are critical for gaining a competitive edge in the industry (Small, 2017). The themes and

codes identified through data analysis contributed to the development of effective strategies that sustainability managers can implement in environmental initiatives to achieve competitive advantage, aligning with the study's research objective.

Chapter six: Findings, Conclusion, Limitation, Practical Implications and Recommendations for future research

Aligned with the study objective, the analysis has managed to present a comprehensive framework that includes very important relevant aspects of the sustainability strategies. This study addressed the issue that the strategies sustainability managers require to establish climate change initiatives have not yet been clearly identified (Wiesner et al., 2017). The purpose of this qualitative study was to explore the strategies needed by sustainability managers to implement climate change initiatives within the Egyptian oil & gas companies. The study aimed to identify sustainability strategies and propose a framework of effective approaches for integrating these initiatives in the oil and gas industry. Once these strategies are identified, sustainability managers can establish the processes and procedures necessary for responsible and sustainable operations (Wijethilake, 2017).

Using an exploratory research design, this qualitative study interviewed 20 sustainability managers to gather insights into their experiences implementing climate change initiatives within company settings. The researcher examined the professional

practices of sustainability experts within the oil& gas industry, using their insights to identify strategies that could be applied to oil and gas companies to implement climate change initiatives fulfilling the study's objective (Reiter, 2017). The findings are expected to benefit practitioners by offering a deeper understanding of how climate change initiatives can be integrated into strategic planning within the industry (Hansen & Schaltegger, 2016).

The primary limitations of this study included securing suitable candidates with the necessary qualifications and experience who were willing and available to participate posed a significant challenge. The study was also constrained by factors such as sample size, interview duration, and the need for participants to provide honest and unbiased responses.

Additionally, confidentiality concerns were addressed by ensuring that all participants fully understood the risks and parameters of the research, as evidenced by their signing of informed consent forms. Anonymous identifiers were used to protect participant privacy, and all data and documentation were rigorously safeguarded to maintain confidentiality

6.1 Findings and Conclusions

This research presents ten core findings derived from the major themes: (a) Supporting and policies compliance, (b)Engagements and collaborative efforts, (c)Performance and financial justifications, (d) Opportunities for improvement, (e)

planning and execution, (f) Adoptability and Fixability, (g) Engagement and lesson learning, (h) Comprehensive understanding, (i) Stakeholder perspective, and (j) monitoring and evaluation. These findings form the foundation of the strategic framework recommended for sustainability managers in the oil and gas industry to implement climate change initiatives and achieve a sustainable competitive advantage. A strategic framework identifies opportunities, assesses risks, and guides sustainable development efforts to achieve economic success (Baumgartner, 2014).

This qualitative study sought to enhance and deepen knowledge of sustainability strategies by exploring the perspectives of sustainability managers. After collecting and analyzing the data, the researcher addressed the research question and reached the following findings .

Finding 1: Successful sustainability initiatives demand active collaboration and participation from all levels of an organization

Finding 2: Sustainability cannot be achieved by a single group or department

Finding 3: Companies Must Balance Profitability and Environmental Responsibility

Finding 4: Creating opportunities for improvement within a company involves a strategic approach

Finding 5: Effective planning and execution are essential for achieving set goals.

Finding 6: Flexibility and adaptability are vital for success in the corporate environment

Finding 7: The broader impact on communities is important when making a diction

Finding 8: A comprehensive approach is vital for effectively integrating sustainability within an organization.

Findings 9: Managerial decision-making should be guided by stakeholder demands

Findings10: Monitoring and evaluation are essential for driving improvement, ensuring accountability, and maximizing the impact of initiatives.

Conclusion:

There is significant complexity, diversity, and specificity concerning corporate strategies for climate change initiatives. various companies have different interpretations of how to tackle climate change impacts. In conclusion, empirical research on the integration of corporate sustainability into strategic management remains need more investigation, and sustainability managers need more knowledge and training with limited understanding of how to formulate and implement environmental sustainability strategies.

6.2 Limitation and Delimitations

This study examined the assumptions, limitations, and delimitations surrounding an investigation into sustainability strategies in the oil and gas industry, specifically focusing on climate change initiatives. Key assumptions included the

relevance of the study to the industry and the suitability of the exploratory research design, as the research aimed to capture participants' lived experiences. Data saturation was reached after ten interviews, with an expectation that participant insights would reflect various levels of expertise.

Delimitations established the scope of the study, defining participant selection, interview length, and research focus. The sample was limited to 20 sustainability managers in Egypt's oil and gas sector with experience in climate change practices. Additionally, the focus was exclusively on climate initiatives, excluding other relevant sustainability topics like social justice and eco-efficiency, which could provide a more comprehensive understanding. Furthermore, the one-hour interview cap potentially constrained the depth of insights collected.

6.3 Practical Implications:

Sustainability is increasingly seen as essential for corporate strategies aiming to improve efficiencies, manage risks, and ensure long-term competitive advantage (Muja et al., 2014). Successful climate initiatives require embedding sustainability across corporate operations (Baumgartner, 2014; Burritt et al., 2018; Cavaleri & Shabana, 2018; Van Holt, T., & Whelan, T.,2021). This study addresses gaps in managerial strategies for addressing environmental issues within corporate frameworks, especially regarding sustainable performance and competitiveness.

Key findings highlighted a need for effective strategies, building on insights from Green,B. (2019) and this study, which recommend frameworks that involve clear stakeholder communication and alignment of corporate sustainability strategies with business goals. Effective strategy execution requires understanding market position, resource availability, technology, organizational culture, and internal capabilities. The proposed model includes steps like identifying risks, planning actions, ensuring consistency, measuring outcomes, and continuously evaluating and revising strategies.

Participants noted that peer pressure and customer demands drive sustainability efforts, particularly within competitive industries like energy, where environmental impacts are increasingly scrutinized. Sustainability strategies support corporate risk management, stakeholder engagement, and competitive positioning, particularly in the face of climate challenges (Wijethilake, 2017). Wijethilake further noted that strategic sustainability planning can directly enhance corporate performance and competitive advantage, although Hansen & Schaltegger (2016) argue that managerial processes remain critical for implementing these strategies effectively.

For industry professionals, this study underscores the value of aligning sustainability goals with corporate strategies. However, the findings are context-specific to the Egyptian oil and gas sector, with variability across geographical and organizational

contexts affecting their broader applicability. Practitioners should therefore adapt insights to individual circumstances, including stakeholder needs, corporate culture, and market dynamics, and consider evolving technologies that may offer new solutions for climate initiatives.

6.4 Recommendations for Future Research:

This qualitative study investigates sustainable environmental practices in the Egyptian oil and gas sector, offering insights for scholars and practitioners. The research combines industry expert interviews with recent literature to propose a strategic framework for sustainability managers in implementing environmental initiatives. The findings emphasize integrating environmental management into corporate strategy to support a sustainable competitive advantage (Dabhadkar, G. ,2015; Ranjan & Das, 2015; Jackson, A. W. ,2016; Satyro et al., 2017; Green.B, 2019; Barforoush, N., Etebarian, A., Naghsh, A., & Shahin, A. ,2021).

As the oil and gas sector faces evolving stakeholder concerns regarding climate change, research on environmental practices remains critical. Organizations are increasingly urged to prioritize ecosystem balance, which aligns with pressing industry and societal demands (Nwakile, C., Hanson, E., Adebayo, Y. A., & Esiri, A. E. ,2023). The study highlights several strategies to support corporate sustainability efforts:

Dedicated Sustainability Leadership: To champion sustainable practices, companies should appoint dedicated sustainability

managers or consultants with environmental expertise. Participants noted that existing employees often handled sustainability efforts as additional responsibilities rather than as primary roles. Embedding sustainability across all organizational levels and promoting a culture attentive to environmental impacts are essential.

Triple Bottom Line (TBL) and (ESG) Focus: Managers should strive to balance environmental, social, and economic objectives, enhancing long-term stakeholder value (Baumgartner & Rauter, 2017; Basile, V., Capobianco, N., & Vona, R., 2021). Research supports that TBL components are not inherently conflicting and can align with sustainable growth goals. Managers can secure stakeholder support by framing environmental initiatives in terms of their potential to increase business value and investment, beyond short-term profitability (Schulz & Flanigan, 2016; Zumente, I., & Bistrova, J. ,2021).

Executive and Employee Engagement: Strong executive backing is essential for resourcing environmental initiatives. Employee collaboration is equally important, fostered through open communication channels across organizational levels and external stakeholder transparency. Sustainability reporting, potentially in partnership with standardized agencies like SASB (2022), enhances accountability and reflects stakeholder interests (Argento et al., 2018; Sroufe & Gopalakrishna-Remani, 2018; Almagtome, A., Khaghaany, M., & Önce, S. ,2020).

Culture of Continuous Learning: The oil and gas sector should commit to iterative improvements, tracking sustainability performance, and exceeding regulatory requirements. Sustainability reporting with baseline metrics and peer comparisons can guide progress and demonstrate leadership in climate initiatives, helping companies secure a competitive edge through unique strengths and internal capabilities.

This study's framework encourages proactive environmental strategies within the oil and gas sector, recommending that companies view sustainability as an ongoing pursuit of organizational resilience and market advantage. However, given the distinct context of Egyptian oil and gas companies, applying these findings broadly may require adapting strategies to specific operational and geographic contexts.

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