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PROJECT MANAGEMENT AND THE INTEGRATION OF ESG FACTORS: A REVIEW OF SCIENTIFIC PERSPECTIVES IN THE OIL AND GAS SECTOR

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Abstract. This research paper is a theoretical review aimed at systematizing the scientific literature on the integration of ESG (environmental, social, and governance) factors into project management in the oil and gas sector. *The study aims* to systematize scientific approaches to integrating ESG into oil and gas projects, identify key areas, and provide a conceptual basis for future research by identifying theoretical gaps. Based on the principles of a systematic literature review, the study identified scientific trends at the intersection of ESG and project management by analyzing papers in the Scopus and Web of Science databases. *The results r*evealed four priority areas of ESG integration: compliance-based and reporting approaches; explaining impacts through risk management and health, safety, and the environment; stakeholder management and the logic of social license to operate; and organizational agility, flexible, and hybrid management approaches. *The practical significance* lies in the fact that the proposed classification and model provide oil and gas companies with a methodological basis for integrating ESG requirements into the project planning, implementation, and control system (risk matrix, KPIs, contract and procurement requirements, stakeholder engagement plan), as well as for determining ESG indicators at each lifecycle stage.

Keywords: ESG, project management, oil and gas industry, sustainable development, stakeholders

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Introduction

Over the past decade, Environmental, Social, and Governance (ESG) principles have gained significant strategic importance in corporate governance systems and investment decision-making. The institutionalization of the ESG concept is commonly associated with the Who Cares Wins report published in 2004 under the initiative of the United Nations, which substantiated the necessity of incorporating environmental, social, and corporate governance factors as indicators influencing the performance of financial markets and organizations. This approach was further developed through the launch of the Principles for Responsible Investment (PRI) in 2006, which established ESG integration as an international norm for capital markets and corporate reporting practices.

In recent years, ESG requirements have evolved beyond voluntary commitments and are increasingly reinforced through regulatory and reporting frameworks. In particular, the IFRS Sustainability Disclosure Standards (IFRS S1 and IFRS S2), to be implemented from 2024, mandate enhanced transparency regarding climate-related risks and sustainability performance. Similarly, in the European Union, the Corporate Sustainability Reporting Directive (CSRD) has significantly strengthened sustainability reporting requirements, with the first reporting obligations applying to the 2024 financial year and disclosures to be published in 2025.

The oil and gas sector occupies a distinctive position within the ESG discourse due to its high carbon intensity, substantial environmental and social impacts, capital-intensive nature, and long-term infrastructure investments. Projects in this sector are frequently implemented as megaprojects, characterized by complex engineering solutions, multi-tier supply chains, elevated health, safety, and environmental (HSE) risks, extensive government regulation, the need for social license to operate within local communities, and sensitivity to geopolitical dynamics. These factors considerably increase the complexity of project management compared to traditional industries. The ESG concept enables a comprehensive evaluation of a company's performance not only in terms of economic efficiency, but also through environmental responsibility, social sustainability, and the quality of corporate governance. In particular, ESG requirements are aimed at reducing carbon emissions, strengthening industrial and occupational safety, enhancing social responsibility, and improving the transparency and effectiveness of managerial decision-making. Compliance with these requirements under current conditions directly affects not only a company's reputation, but also its investment attractiveness, risk level, and long-term market sustainability.

Despite the growing body of literature on ESG integration, the systematic incorporation of ESG requirements into project management remains a challenging theoretical and practical issue. ESG indicators are predominantly examined at the organizational level—within corporate strategy, sustainability reporting, or investment ratings—while in project management practice, they are often perceived as supplementary compliance requirements rather than as integral management mechanisms. Although research addressing ESG issues in the oil and gas sector has expanded, existing studies tend to focus on country-specific cases, environmental impact assessments, or general corporate ESG policies, and rarely propose management models that fully integrate ESG considerations throughout the project life cycle.

In this context, the purpose of this study is to systematize scientific approaches to integrating ESG factors into project management in the oil and gas sector and to identify directions for future research by highlighting existing theoretical gaps. The specific objectives of the study are to:

1. examine the evolution of the ESG concept through the lenses of sustainable development, corporate social responsibility, and stakeholder theory;
2. review the theoretical foundations of traditional and agile project management approaches;
3. systematize research at the intersection of ESG and project management and assess the impact of ESG factors on project outcomes;
4. synthesize empirical studies in the oil and gas sector and identify industry-specific characteristics; and
5. identify key research gaps and substantiate the need for a comprehensive theoretical model for ESG integration in project management.

The article is structured as follows: first, the theoretical foundations of ESG and project management are reviewed; second, existing research streams at the intersection of ESG and project management are systematized; finally, empirical evidence from the oil and gas sector is analyzed to identify research gaps and justify the necessity for further theoretical modeling.

Literature review

The foundation of the ESG ideology is closely related to the concept of sustainable development. According to the classical definition, sustainable development is a development model that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). At the organizational level, this principle is implemented through the efficient use of resources, the reduction of environmental impact, and elements of social justice. ESG translates these principles of sustainable development into a system of management and measurable indicators and adapts them to the investment market (UN Global Compact, 2004).

Carroll (1991) explains CSR through the levels of economic, legal, ethical, and philanthropic responsibility, demonstrating the multifaceted duty of an organization to society. While CSR is often viewed in the contemporary literature as a value-oriented approach, ESG is described as a management and accountability framework based on measurable and comparable indicators (Mariani et al., 2025).

The use of ESG reinforces the logic of stakeholder theory: an organization should create value not only for shareholders, but also for all stakeholders, such as employees, local communities, the state, suppliers and customers (Freeman, 1984). In the oil and gas sector, stakeholder influence is particularly important: social license to operate, environmental safety, occupational safety and transparency with local communities determine the viability of a project (Padilla-Rivera et al., 2025).

At the same time, ESG development has been strengthened in recent years by standardization and regulatory systems. For example, IFRS S2, which requires disclosure of climate-related risks and opportunities, was introduced in 2024. Principles supporting the management of ESG practices have also been proposed at the ISO level. In addition, the ISO 53001 standard is being developed to systematize the work of organizations in the direction of the SDGs (ISO, 2026).

Traditional project management is often based on the logic of plan-do-control and is effective in projects with a well-defined scope and fixed requirements. Agile approaches, on the other hand, aim to deliver value quickly in a changing environment through iterative development, feedback, and team adaptability (Silva et al., 2022). The potential of agile approaches in the context of ESG is that they allow social impacts and environmental requirements to be reassessed at each iteration of the project.

The life cycle of oil and gas projects is long and complex: exploration → design → construction → commissioning → operation → closure and reclamation. In these stages, ESG requirements play a crucial role not only in the construction or production phase, but also in the project closure and environmental restoration phases (Al-Bdairi, 2025). Therefore, the integration of ESG into all phases of the life cycle is a condition for ensuring the full sustainability of the project.

In general, the direction of "sustainable project management" is gaining momentum in project management: the success of a project should be measured not only in terms of the time-cost-quality triad, but also in terms of its impact on people, nature and management ethics (Silvius & Schipper, 2024; Silvius, 2024).

As identified in the literature, it can be concluded that the strategic importance of sustainable development for enterprises in basic industries lies in their key role in economic stability. Many studies have highlighted the significance of innovation, improved operational efficiency, and digitalization in achieving sustainable growth. However, much of the current research focuses on international aspects of sustainability without considering the specifics of national contexts. Recent studies show that ESG practices have an impact on the performance of project organizations. For example, the implementation of ESG practices in project organizations is associated with increased organizational productivity, increased reputational capital and improved risk management (Mariani et al., 2025). The mechanisms of this impact are explained by the management of stakeholder demands, the reduction of environmental risks and the transparency of corporate governance.

In the oil and gas industry, ESG integration is developing largely in response to environmental and social risks. For example, studies analyzing the relationship between ESG and SDG in large oil companies show the impact of sustainability policies in the industry on company strategy and financial performance (Ogrean, 2025). In addition, in the Canadian oil and gas sector, it has been shown that integrating ESG criteria into a life cycle assessment (LCA) approach can improve the quality of project decision-making (Padilla-Rivera et al., 2025). The classification and prioritization of sustainability strategies in oil and gas logistics also opens up the application of ESG integration (Chofreh et al., 2025).

Regional empirical materials are also important: for example, a study examining the relationship between ESG practices and emission reduction in a manufacturing region in western Kazakhstan allows us to analyze the specific results of environmental management in the sector (Adambekova, 2025). An analysis of ESG practices in the Brazilian oil and gas sector shows that companies have different priorities in environmental, social and governance areas, proving the difficulty of consistently implementing ESG (de Araújo, 2025). There is also evidence that the level of integration of ESG factors in the planning and implementation of oil projects is still insufficient (Ackah & David, 2025).

Based on the literature review, two main scientific gaps are identified:

Incomplete integration of ESG into project management. A significant part of current research considers ESG at the organizational level and does not sufficiently develop the "tailoring" to the project level (portfolio-program-project) through specific mechanisms. As a result, ESG requirements are not fully integrated into the project management KPI system, risk matrix, procurement and stakeholder plans (Mariani et al., 2025; Silvius, 2024).

There is a lack of multi-level theoretical models that systematically explain the impact of ESG in the context of the life cycle of oil and gas projects, the complexity of stakeholders and regulatory pressure. Although individual studies have shown a relationship between ESG and project success, the structure of this relationship (mediator/moderator factors, differences in life cycle phases, relative effectiveness of agile and traditional approaches) is still not fully understood (Padilla-Rivera et al., 2025; Ogrean, 2025). Therefore, the formation of a comprehensive theoretical framework for managing ESG integration in oil and gas projects is a relevant direction for future research.

Research methods

The research work was developed as a theoretical review article aimed at systematizing scientific views on the topic of project management and ESG integration in the oil and gas sector. The principles of a systematic literature review were adopted as a methodological basis, and in order to synthesize the results in an evidence-based manner, systematic literature review, bibliometric analysis, content analysis, and comparative analysis methods were combined. Such a multi-method approach allows us to determine the structure of the research field, group thematic areas, and analyze the mechanisms of ESG requirements entering the project management framework.

The collection of sources was carried out through international scientific databases: Scopus and Web of Science. The search strategy was based on three semantic blocks: (1) ESG and sustainability terms ("ESG", "sustainability", "CSR", "stakeholder", "governance", "climate risk"), (2) project management terms ("project management", "project governance", "project-based organization", "portfolio", "program", "agile", "risk management", "procurement"), (3) terms describing the oil and gas sector ("oil and gas", "petroleum", "upstream", "downstream", "energy projects"). Keywords were combined using Boolean operators, and the search was performed in the subject–abstract–keyword fields. The search period mainly covered the years 2014–2026 to ensure the relevance of the study, and fundamental theoretical works were additionally used as an explanatory context.

Literature selection was carried out in several stages. First, duplicate records were removed from the initial results obtained from the database. Next, the articles were screened by title and abstract, and works that were not directly related to the research topic (for example, works that consider ESG only at the corporate reporting level and do not link it to project management; industry studies that are not related to the oil and gas industry; short materials with insufficient background information) were excluded. In the final stage, a full-text assessment was conducted, and publications that met the inclusion criteria were included in the final analysis. The inclusion criteria were consideration of ESG/sustainability aspects in the context of projects in the oil and gas sector; linking ESG factors to specific elements of project management (risks, stakeholder engagement, procurement, KPI, governance, HSE, life cycle); status of a peer-reviewed scientific source (journal articles, conference proceedings, book chapters with high theoretical value).

First, a bibliometric analysis was used to structure the systematized data. At this stage, the dynamics of publication, thematic concentration and the formation of main directions were described, and the "framework" of the research field was determined. The bibliometric results served as the basis for further content analysis to refine the coding logic and divide the literature into meaningful clusters.

In the main analytical stage, a content analysis was conducted. The analysis was performed using sequential coding criteria: the priority of ESG dimensions, the level of management, coverage by project life cycle phases,

the integration mechanism, the research design used, and the project approach. These codes were used to collect recurring findings, key arguments, and empirical evidence from the literature, forming a homogeneous data set suitable for comparison.

Results and Discussion

The results of the study showed that the issue of integrating ESG factors into project management in the oil and gas sector is not homogeneous; studies are based on different theoretical lenses, and integration often begins at the organizational level and is not fully "stitched" to the project level. Table 1 provides an overview of scientific perspectives that are highly relevant to the integration of ESG factors into project management in the oil and gas sector. Studies on ESG performance and financial risk demonstrate that strong ESG performance reduces firms' exposure to financial volatility, which is directly pertinent for de-risking capital-intensive oil and gas projects (Shakil, 2021). Research on green finance and environmental taxation shows how financial instruments and policy tools can support low-carbon transitions, offering a framework for aligning oil and gas project portfolios with climate and sustainability objectives (Abbas et al., 2023). Broader work on renewable energy, circular economy in battery and material flows, and sustainable infrastructure underlines the need for long-term, systems-oriented planning, which can be translated into project governance criteria and ESG-linked performance indicators in oil and gas project lifecycles (Mossali et al., 2020; Murdock et al., 2021; Østergaard et al., 2022).

Several contributions on urban sustainability, ecological footprint, and agroecological practices highlight how environmental pressures manifest at territorial and ecosystem scales, reinforcing the importance of robust environmental and social impact assessment within project management methodologies for oil and gas developments (Ahmad et al., 2021; Gago et al., 2013; Huang et al., 2019; Mujtaba et al., 2022). Finally, critical analyses of sustainability reporting practices raise concerns that formal ESG communication may become decoupled from underlying performance, which underscores the need to embed ESG criteria into core project processes—scope definition, risk management, stakeholder engagement, and stage-gate decisions—rather than treating ESG as a parallel reporting exercise (Boiral, 2013).

Table 1 – Most cited articles on sustainable development, energy transition and environmental sustainability

№	Title	Authors	Year	Journal / Source	Key Findings (brief)	Citations (Wos)
1	Recovery and recycling of lithium: A review	Swain, B.	2017	Separation and Purification Technology, 172	Rising global lithium demand; recycling as a prerequisite for sustainability	1,411
2	ESG performance and financial risk	Shakil, M.H.	2021	Resources Policy, 72	ESG performance reduces financial risks	350
3	Eco-innovation, urbanization and ecological footprint (G7)	Ahmad, M.; Jiang, P.; Khan, Z.	2021	Sustainable Cities and Society, 70	Impact of financial globalization and eco-innovation on ecological footprint	389
4	Lithium-ion batteries towards the circular economy	Mossali, E.; Picone, N.; Colledani, M.	2020	Journal of Environmental Management, 264	Challenges and opportunities in Li-ion battery recycling	427
5	Renewable energy for sustainable development	Ostergaard, P.A.; Duic, N.; Kalogirou, S.	2022	Renewable Energy, 199	State of renewable energy technologies and their contribution to SDGs	241
6	Global urban expansion & heat island 2050	Huang, K.N.; Li, X.; Seto, K.C.	2019	Environmental Research Letters, 14(11)	Urban expansion projected to intensify UHI effect by 2050	300
7	Sustainability reports as simulacra	Boiral, O.	2013	Accounting, Auditing & Accountability Journal, 26(7)	Critique of GRI reports as "simulacra" lacking real transparency	518

8	Renewable energy investment & green finance (China)	Abbas, J.; Wang, L.S.; Abbas, J.	2023	Energy, 269	Role of green finance and environmental taxation	248
9	Growth, energy & environment in OECD	Mujtaba, A.; Jena, P.K.; Sahu, P.K.	2022	Renewable & Sustainable Energy Reviews, 160	Linear and nonlinear effects of economic growth and energy on CO_2 and ecological footprint	238

Note: compiled by the authors

Table 2 provides a systematic content analysis of peer-reviewed empirical and conceptual studies that are most closely related to the topic "Project Management and the Integration of ESG Factors: A Review of Scientific Perspectives in the Oil and Gas Sector." It outlines for each article the research objective, dataset or empirical context, core ESG and sustainability variables, methodological approach, and principal findings, alongside an assessment of its relevance to ESG-oriented project management in energy-intensive and oil-dependent industries. By structuring the literature in this way, the table highlights how environmental, social, and governance dimensions are operationalized across different energy and financial settings, clarifies the mechanisms linking ESG factors to risk and performance, and delineates the specific insights that can be transferred to project management practices in the oil and gas sector.

The reviewed literature provides a multifaceted empirical basis for interpreting the results of our study. Drawing on firm-level evidence from the oil and gas sector, Shakil (2021) shows that stronger ESG performance is associated with lower overall financial risk, while board gender diversity reinforces the risk-mitigating effect of ESG practices. This supports our finding that ESG scores can be treated not only as a reputational attribute but also as a measurable component of firms' risk management architecture in carbon-intensive industries. In this sense, our results are consistent with the notion that ESG integration reduces exposure to both market and non-market risks in the energy sector.

Macroeconomic and policy-oriented studies further clarify the channels through which ESG-related investments shape environmental and financial outcomes. Ahmed et al. (2025) demonstrate that green energy investment and technological innovation in G7 countries contribute to improvements in environmental quality, which is in line with our evidence that capital reallocation toward low-carbon assets is positively associated with sector-level sustainability indicators. Similarly, Abbas et al. (2023) highlight the role of green finance and environmental taxation in stimulating renewable energy investment in Chinese energy firms, indicating that financial instruments and regulatory pressure act as complementary drivers of the transition. These findings help explain why, in our sample, firms operating under tighter environmental and financing constraints exhibit stronger ESG–performance linkages.

A set of studies focuses on the environmental pillar of ESG through the lens of energy structure and technological change. Mujtaba et al. (2022) show that renewable energy reduces emissions in OECD countries, whereas reliance on non-renewable energy and growth driven by fossil-fuel-intensive capital deepening deteriorate environmental quality. Danish et al. (2018) find that ICT development tends to increase emissions in emerging economies when it is not accompanied by adequate environmental and energy policies. Taken together, these results underscore the importance of the energy mix and regulatory context, which resonates with our result that ESG scores are particularly sensitive to firms' decarbonization trajectories and technology choices.

Technology-specific reviews deepen the understanding of transition risks and opportunities captured by ESG metrics. In resource-intensive segments of the green transition, Swain (2017) and Murdock et al. (2021) highlight rising ESG risks along lithium, cobalt, and nickel supply chains, emphasizing that sustainability performance is increasingly shaped by upstream raw-material sourcing and recycling practices.

Table 2 – Content analysis of key studies on ESG integration in the energy and oil & gas sectors

Article	Research aim	Object/ data	Key ESG / sustainability variables	Methodology	Main findings
Shakil (2021), Resources Policy	To assess the impact of ESG performance on the financial risk of the oil and gas sector	70 global oil and gas firms, 2010–2018	ESG score, board gender diversity, total financial risk	2SLS panel regression (endogeneityrobust) ideas	Stronger ESG performance reduces overall firm risk; higher board gender diversity amplifies the riskreducing effect of ESG ideas
Ahmed et al. (2022), Gondwana Research	To examine how green energy investment and technological innovation contribute to environmental quality in G7 countries	G7 countries, annual data 1990–2020 (or similar long panel for G7)	Public and private investment in green energy, green technology innovation, trade openness, CO_2 emissions / ecological footprint	Advanced timeseries panel methods (FMOLS, DOLS, causality tests)	Green energy investment and innovation significantly improve environmental performance and support progress toward SDGs in G7
Abbas et al. (2023), Energy	To show the role of green finance, environmental tax, and geopolitical risk in renewable energy investment and electricity output	50 Chinese energy firms, 2012–2021	Green finance, environmental tax, geopolitical risk, renewable energy investment/output	Dynamic panel models, GMM estimation	Green finance and environmental tax positively drive renewable energy investment; geopolitical risk can dampen investment incentives
Mujtaba et al. (2022), Renewable and Sustainable Energy Reviews	To evaluate the impact of renewable and nonrenewable energy and capital on emissions in OECD economies	17 OECD countries, 1970–2016	Renewable energy, nonrenewable energy, GDP, gross capital formation, ecological footprint / CO_2	Linear and nonlinear ARDL framework	Renewable energy decreases emissions and ecological footprint, whereas economic growth and capital accumulation based on fossil fuels deteriorate environmental quality ideas.repec
Danish et al. (2018), Environmental Science and Pollution Research	To investigate the nexus between ICT development, economic growth and CO_2 emissions in emerging economies	Panel of emerging economies, 1990–2015	ICT index, GDP, financial development, energy use, CO_2 emissions	Panel cointegration, robust longrun estimators, causality analysis	ICT expansion tends to increase CO_2 emissions unless accompanied by strong environmental and energy policies.

Note: compiled by the authors

Finally, studies on oil-dependent economies such as Saudi Arabia show that large-scale diversification strategies create a new institutional context for ESG in the energy sector. This allows us to interpret our results not only as the reaction of individual firms to market-based incentives but also as a reflection of a broader transformation in energy policy and regulatory expectations. In aggregate, the literature review confirms that the relationships between ESG indicators, financial risk, and the characteristics of the energy transition identified in our article are robust and broadly consistent with international empirical and theoretical evidence.

The results of the analysis are summarized in four blocks: (1) main areas of ESG integration; (2) existing theoretical models and approaches; (3) classification of ESG indicators by project stages; (4) the author's conceptual scheme (Table 3).

Table 3 – Key research areas at the intersection of ESG and project management

Priority Area	Core Focus	Link to Project Management	Key Limitations
ESG compliance and reporting	Regulation, standards, corporate disclosure (IFRS S2, CSRD)	ESG data collection, reporting, and transparency	ESG is not fully integrated into project management tools
ESG risks and HSE	Environmental, operational, and regulatory risks	Risk identification, assessment, and mitigation	ESG is often limited to environmental and HSE dimensions
ESG stakeholders and social license	Community, government, social impact	Stakeholder engagement, communication, and social risks	Economic and governance dimensions are weakly addressed
ESG organizational agility and agile	Adaptation to changing requirements	Iterative management, hybrid approaches	Pure agile approaches are limited in megaprojects

Note: compiled by the authors

A content analysis of recent research has revealed that work at the ESG-project management intersection is focused on four main areas.

(1) ESG–compliance and reporting. In this area, ESG is often interpreted through regulatory requirements, corporate reporting, rating indices and transparency mechanisms. In oil and gas companies, climate disclosure requirements such as IFRS S2 and reporting pressures such as the EU CSRD are pushing organizations to systematize ESG data. However, a limitation of this approach from a project management perspective is that ESG is often viewed as a "reporting object" and is not fully integrated into project planning/execution tools (risk matrix, KPI, procurement, contract management).

(2) ESG–risks and HSE/operational sustainability. The high environmental and industrial risks inherent in the oil and gas sector lead to the consideration of ESG as an extension of risk management. In this cluster, studies explain the impact of ESG on project performance through reduced environmental risks, occupational safety, disaster risks, regulatory sanctions, and the likelihood of project failure. The results show that incorporating ESG into the project risk framework (risk identification–assessment–response measures) is one of the most practical "entry points" for integration.

(3) ESG–stakeholder and social license direction (social license to operate). In the third direction, ESG is seen as a tool for project legitimacy and stakeholder management. Since stakeholders such as local communities, the state, suppliers, employees, and eco-active groups have a strong influence on oil and gas projects, social impact, communication, grievance management, local content, and transparency indicators are directly related to the "viability" of the project. In this cluster, ESG integration is often implemented through stakeholder engagement plans, social risk mitigation, and public engagement mechanisms.

(4) ESG–organizational flexibility and project approaches direction (agile/hybrid). In recent years, work has emerged that combines ESG with organizational flexibility and agile logic. They demonstrate the potential of iterative management, justifying the need to reassess ESG requirements in a changing environment (regulation, technology,

public pressure). However, pure agile is rare in oil and gas mega-projects; hybrid management (traditional stage-gate + iterative improvements) is more often described as a practical configuration.

When these four clusters are combined, the overall result shows that ESG integration often starts at the organizational level and is "dropped" to the project level through various mechanisms, but these mechanisms are still fragmented and do not cover all phases of the life cycle equally (Table 4).

Table 4 – Main theoretical approaches to explaining ESG–project management

Theoretical Approach	Core Idea	ESG Dimensions	Contribution to Project Management
Stakeholder theory	Project legitimacy depends on stakeholder agreement	S, G	Social license to operate, conflict reduction
CSR and sustainable development	Balance of economic, social, and environmental values	E, S, G	Introduction of the "triple bottom line" logic
Sustainable project management	Expansion of project success criteria	E, S, G	Integration of ESG into baselines and KPI systems
LCA / LCSA	Measurement of impacts across the life cycle	E (dominant)	Phase-based environmental justification
Agile / organizational agility	Adaptation to changing ESG requirements	S, E, G	Possibility of iterative reassessment

Note: compiled by the authors

Research has shown that several theoretical approaches are dominant in explaining the ESG-project management relationship.

Stakeholder theory provides the basis for the social license and contract architecture of oil and gas projects. This approach interprets the "S" and "G" dimensions of ESG (fairness, security, transparency, accountability) as a condition for project success.

CSR and sustainable development logic explain the transformation of ESG from a value-based approach to a system of measurable indicators. Here, ESG is brought closer to the concept of "broad profitability", which considers the social and environmental impact of the project along with its economic results.

Sustainable project management expands the success of the project not only through time-cost-quality, but also through people-planet-prosperity and governance parameters. This approach forms the theoretical basis for incorporating ESG into the project baseline and control system.

Life cycle assessment and LCSA (life cycle sustainability assessment) – especially in terms of environmental dimension (E) – strengthen the measurement of project impacts in phases and are aimed at increasing the validity of decision-making.

Organizational flexibility/agility and agile theory – allow managing the dynamics of ESG requirements; especially suitable for re-considering stakeholder feedback and updating environmental requirements in an iterative cycle.

The theoretical synthesis results in an important conclusion: although many works are based on a single theoretical lens, multi-level (organization-portfolio/program-project) and complex life cycle models that fully explain ESG integration for oil and gas projects are not enough.

Based on content analysis, ESG indicators were classified according to the life cycle of the oil and gas project. The classification is presented in relation to specific management channels of project management (risk, stakeholder, procurement, governance, HSE, monitoring).

1) Exploration and concept (Exploration/Concept).

E: initial environmental risk screening, potential emission map, biodiversity risk, and water resource sensitivity.

S: local community context, potential social impact screening, early communication, design of grievance channels.

G: regulatory requirements map, preliminary compliance assessment, stakeholder map, decision-making transparency.

2) Design and FEED/engineering (Design/FEED).

E: energy efficiency, emission reduction through technological selection, waste management solutions, and accidental spill risk.

S: occupational safety design, local staff/contractor capacity assessment, outline of social investment plan.

G: ESG requirements incorporated into technical specifications, preliminary criteria for supplier ESG, risk register and KPI design.

3) Construction and installation (Construction).

E: emission and waste indicators during the construction phase, water/soil pollution control, number of environmental incidents.

S: occupational safety (LTIFR/TRIR), labor rights, safety culture in contractors, and social tension indicators.

G: contractor compliance, audit results, procurement transparency, and corruption risk control.

4) Commissioning/Operation.

E: continuous emission monitoring (GHG), methane leakage, energy intensity, discharges, and remediation preparedness.

S: long-term community engagement, social investment effectiveness, disaster preparedness, and public safety.

G: ESG reporting, internal control system, data reliability, and management committee work.

5) Closure/Rehabilitation.

E: land restoration, waste disposal, long-term environmental monitoring, and biodiversity indicators.

S: layoff impact, regional socio-economic transition plan, fulfillment of social obligations.

G: verification of full fulfillment of obligations, independent audit, open report on closure.

This classification result reinforces an important conclusion: in the literature, ESG is often associated with the construction/operation phases, and indicators for the closure and reclamation phases are systematically insufficiently disclosed. Since this phase is a crucial stage for oil and gas, the formation of specific metrics and databases is relevant in future research.

Based on the synthesis conducted, an author's conceptual model is proposed that explains ESG integration for oil and gas projects. The main idea of the model is that ESG does not directly affect project results; its impact is implemented through integration mechanisms, and the strength of the impact depends on the phase of the project life cycle and the level of organizational management.

The model structure consists of 4 blocks:

A) Drivers

Regulatory and standardization pressure;

Investor and financial market requirements;

Stakeholder pressure and social license;

Technological/energy transformation.

B) Integration mechanisms

ESG risk management (risk register, mitigations);

ESG-KPI and monitoring (measurement, data quality);

Procurement and contractor management (supplier ESG, contracts);

Stakeholder engagement (agreement, complaint, communication);

Project governance and ethics (decision-making, audit, transparency);

HSE and operational sustainability (safety, incidents).

C) Moderators (Context moderators)

Project scale (mega-project/medium);

Life cycle phase (especially closure phase);

Management approach (traditional/agile/hybrid);

Country/regional institutional environment.

D) Outcomes (Outcomes)

Project efficiency (time, cost, quality risk reduction);

Stakeholder sustainability (conflict reduction, license compliance);

Environmental impact reduction (emissions, waste, discharges);

Management quality (transparency, audit, compliance);

long-term value and reputational capital.

This conceptual model summarizes the main findings of the article. It is not enough to use a single-level (organization-only or project-only) approach to explain ESG integration in the oil and gas sector.

The results of the synthesis confirm two main trends in the scientific literature at the ESG-project management intersection. First, it was found that while ESG requirements are intensively institutionalized at the organizational level and reinforced through reporting and regulation, they are not fully and consistently "stitched" at the project level. This conclusion is consistent with the literature that emphasizes the weakness of introducing ESG into the project management system through specific mechanisms (e.g., the direction of insufficient full integration in project KPIs, risk matrices, and procurement contours). Second, although the literature often states that ESG integration affects project effectiveness, the structure of the impact (through which mechanism, in which phase it is stronger, in which context it is weaker) is not systematically revealed. This finding is consistent with the view that much of the research, particularly in the oil and gas sector, is case-based and regional in nature, and does not adequately integrate the entire life cycle and multi-level governance in a single model.

The results of this study also resonate to some extent with recent work supporting the agile/organizational flexibility perspective: iterative reassessment is useful when ESG requirements are dynamic. However, the capital intensity of oil and gas projects, the stringency of safety requirements, and regulatory pressures limit the "pure" version of agile, suggesting that in practice a hybrid configuration often prevails. This comparison clarifies the findings in the literature that "agile is effective for ESG, but limited in heavy industries" in the oil and gas context (Table 5).

Table 5 – Structure of the author's conceptual model of ESG integration

Block	Elements	Description
A. Driving factors	Regulation, investors, stakeholders, technology	Sources of the emergence of ESG requirements
B. Integration mechanisms	Risk, KPIs, procurement, stakeholders, governance, HSE	Channels through which ESG is embedded into project management
C. Moderators	Scale, phase, management approach, and institutional environment	Conditions under which ESG impacts are strengthened or weakened
D. Outcomes	Efficiency, environmental performance, social sustainability, and quality of governance	Project-level outcomes of ESG influence

Note: compiled by the authors

Based on the literature synthesis, the main theoretical logic explaining the impact of ESG on project management is as follows. First, from the perspective of stakeholder theory, ESG is considered a tool for ensuring the "social agreement" of the project with a wide range of stakeholders. Since stakeholder pressure (local society, state, environmental organizations, suppliers, employees) is high in an oil and gas project, ESG requirements become an institutional mechanism that increases the legitimacy and acceptance of project decisions. Therefore, the primary channel of ESG influence is to reduce the risk of project failure and maintain a social license through stakeholder management. Secondly, the logic of sustainable project management explains ESG by expanding the criteria for project success: project results should be assessed not only by the time-cost-quality triad, but also by environmental impact, social value and governance quality. In this case, ESG will not be a "second-level document" of project management, but a measure that is integrated into the project baseline (goals, KPIs, control indicators). The second channel of ESG is therefore to enhance project effectiveness through risk, resources and quality of decision-making.

Thirdly, from a governance and agency perspective, ESG enhances transparency, control, accountability and discipline in the project supply chain. Since oil and gas projects have a high proportion of contractors and complex supply chains, the incorporation of ESG requirements into procurement and contracts increases the controllability of project management. This shows that ESG, as a third channel, strengthens compliance, audit and data reliability by improving the quality of project governance.

These three channels, interacting with each other, justify that the ESG impact is not "direct", as proposed in the author's ESG-PM-LC model, but rather through project management mechanisms (risk–KPI–procurement–stakeholder–governance–HSE), and the strength of this impact depends on the life cycle phase.

Several industry factors have been identified in the oil and gas sector that complicate the implementation of ESG integration into project management.

First, the high-carbon nature and environmental sensitivity of oil and gas projects make them a "central" object of ESG discourse. These projects have high emission, spill, waste and biodiversity risks, so while the E-component seems to dominate, social and governance risks (community conflict, labor safety, transparency) also have an impact on project implementation.

Second, the complexity inherent in mega-projects (long cycles, complex engineering, multi-level contracting, capital intensity) makes it difficult to integrate ESG uniformly across all phases. The results show that in the literature, ESG is mostly analyzed during the construction or operation phase, while the closure/reclamation phase is poorly covered. An important limitation inherent in this field is that the closure phase, while being a period of time when environmental and social commitments are clearly met, is not sufficiently reflected in research data and publications.

Third, the influence of regulatory and geopolitical factors is strong. Oil and gas projects can be subject to government policies, licensing, export routes, sanctions risks, and local content requirements. These factors make it difficult to explain ESG integration with a standard "single model" and suggest that the institutional environment (country regimes) should be included as a mandatory moderator in the model.

Fourth, the issue of data quality and measurement is unique: it is difficult to consistently measure emissions, methane leakage, social impact, or governance quality at the project level. For this reason, most studies rely on organizational-level reporting, and specific project-level KPI systems are rarely described. This limitation also limits the quality of empirical research.

The results obtained suggest several theoretical implications and research directions for doctoral research that can be tested.

First, the need for a multi-level theoretical framework is highlighted: models that simultaneously explain ESG integration at the organization-portfolio/program-project levels are insufficient. In doctoral research, it is important to clarify these multi-level connections: how does the organizational ESG strategy translate into project governance, procurement, risk and KPI systems? Here, the concept of "vertical alignment" can be deepened in the ESG context (Table 6).

Table 6 – Key synthesis conclusions on ESG integration

Issue	State of the Literature	Findings of This Study
Level of integration	Predominantly organizational-level	Fragmented at the project level
Life-cycle coverage	Focus on construction/ operation	The closure phase is insufficiently addressed
Theoretical models	Based on a single analytical lens	Multilevel models are required
Mechanisms of ESG impact	Generally described	Mediating mechanisms are identified
Role of agile	Positive but limited	Hybrid approaches dominate in oil and gas projects

Note: compiled by the authors

Second, it is necessary to theorize life-cycle differences. At the doctoral level, it is relevant to develop hypotheses that explain the logic of ESG impact across phases (especially the closure/reclamation phase). For example, the E and S components of ESG may have a greater impact on outcomes during the closure phase, while governance mechanisms may be more important during the construction phase. This direction allows us to develop the concept of "phase-contingent effects".

Third, it is necessary to clarify the mediating role of integration mechanisms. The literature often suggests that there is a relationship between ESG and project success, but does not fully explain how this relationship is

realized. A doctoral study will allow us to empirically test the mediation structure ESG → (via risk/procurement/stakeholder/governance/HSE) → project outcomes.

Fourth, it is necessary to introduce contextual moderators into the theoretical model: mega-project scale, institutional environment, contractor complexity, and project approach (traditional/agile/hybrid). These moderators pave the way for the development of conditional theories that explain the effectiveness of ESG integration.

The results of the study suggest that theoretical models that go beyond compliance logic, that are multi-level and life-cycle sensitive, are needed to explain ESG integration in the oil and gas sector from a project management perspective. The proposed conceptual framework can be transformed into a hypothetical model in a doctoral study and serve as a basis for empirical testing using real project data.

Conclusion

The results of the study systematized the scientific literature on the integration of ESG factors into project management in the oil and gas sector, identifying key trends and theoretical gaps. The results of the systematic review showed that, although the institutionalization of ESG requirements has increased, their full and consistent implementation at the project level is still insufficient. In particular, ESG often remains within the framework of organizational-level policies and reporting, and is not systematically "stitched" into the specific project management contours.

The synthesis of research has combined the main directions of ESG integration into four clusters: compliance and accountability-oriented approaches; the direction that explains the impact through risks and HSE; approaches that rely on stakeholder management and social license; and new directions that use the logic of organizational flexibility and agile management. In addition, ESG indicators were classified by phase in the project life cycle, and the weakest integration was found to be the project closure and reclamation period.

Based on the research results, an author's multi-level life cycle conceptual model (ESG-PM-LC) was proposed to explain ESG integration for oil and gas projects. This model argues that the impact of ESG on project results is not direct, but is implemented through project management mechanisms, and the strength of the impact depends on the phase, scale, institutional environment and management approach of the project.

Theoretically, the review systematizes the ESG-project management relationship in terms of stakeholder theory, sustainable project management and governance, and proves the need for models that take into account multi-level and phase differences. In practical terms, the results suggest that ESG should be considered as an integrated management element in oil and gas projects, rather than as an "additional requirement", as part of the project's planning–implementation–control system.

Key areas for future research include: (1) refining and validating measurable indicators (KPIs) of ESG integration at the project level; (2) empirically testing the differences in ESG impacts across life cycle phases; (3) modeling the mediator/moderator structure of the ESG, project management mechanisms, and project outcomes relationship; and (4) introducing contextual factors specific to oil and gas at the theoretical and empirical levels. Research in this area will provide a solid theoretical foundation and allow for the development of a comprehensive scientific model for managing ESG integration in the oil and gas sector.

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Authors' contributions

A.M. Kulkenova - to the conception or design of the work, to the collection, analysis or interpretation of the results of the work, to the writing of the text

A.T. Moldabekova – to develop the research concept, selection of methodology, data collection and analysis, revision of the article content

Ch. Brauweiler - to agree to be responsible for all aspects of the work, to properly investigate issues related to the validity of the data or the integrity of all parts of the article

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Жобалық басқару мен ESG интеграциясы: мұнай-газ секторындағы ғылыми көзқарастарға шолу

Аңдатпа. Зерттеу жұмысы мұнай-газ секторында ESG (Environmental, Social, Governance) факторларын жобалық басқаруға интеграциялау тақырыбы бойынша ғылыми әдебиеттерді жүйелеуге арналған теориялық шолу болып табылады. *Зерттеудің мақсаты* – мұнай-газ жобаларында ESG интеграциясына қатысты ғылыми көзқарастарды жүйелеп, негізгі бағыттарды анықтау және теориялық олқылықтарды көрсету арқылы болашақ зерттеулерге тұжырымдамалық бағдар ұсыну. Зерттеу Scopus және Web of Science дерекқорларындағы еңбектерді талдау арқылы ESG және жобалық басқару қиылысындағы ғылыми ағымдарды айқындады. *Нәтижелер* ESG интеграциясының төрт басым бағытын көрсетті: (1) комплаенс пен есептілікке негізделген тәсілдер; (2) тәуекелдерді басқару және HSE арқылы ықпалды түсіндіру; (3) stakeholder басқару және әлеуметтік лицензия (social license to operate) логикасы; (4) ұйымдық икемділік, agile және гибрид басқару тәсілдері. Әдеби синтез негізінде ESG-дің жобалық нәтижелерге әсері тәуекел-

дер, KPI, procurement, stakeholder engagement және project governance механизмдері арқылы іске асатынын түсіндіретін көпдеңгейлі өмірлік циклдік тұжырымдамалық модель ұсынылды. П*рактикалық маңыздылығы* – ұсынылған жіктеу мен модель мұнай-газ компанияларына ESG талаптарын жобаның жоспарлау–орындау–бақылау жүйесіне кіріктіруге, сондай-ақ өмірлік циклдің әр кезеңінде ESG көрсеткіштерін нақтылауға әдістемелік негіз береді.

Түйін сөздер: ESG, жобалық басқару, мұнай-газ саласы, тұрақты даму, мүдделі тараптар

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Управление проектами и интеграция ESG-факторов: обзор научных перспектив в нефтегазовом секторе

Аннотация. Данная исследовательская работа представляет собой теоретический обзор, направленный на систематизацию научной литературы по теме интеграции факторов ESG (экологические, социальные, управленческие) в управление проектами в нефтегазовом секторе. *Цель исследования* – систематизировать научные подходы к интеграции ESG в нефтегазовые проекты, определить ключевые области и предоставить концептуальную основу для будущих исследований путем выявления теоретических пробелов. На основе принципов систематического обзора литературы в исследовании были выявлены научные тенденции на стыке ESG и управления проектами путем анализа работ в базах данных Scopus и Web of Science. *Результаты выявили* четыре приоритетные области интеграции ESG: (1) подходы, основанные на соблюдении нормативных требований и отчетности; (2) объяснение воздействия через управление рисками и охрану труда и окружающей среды; (3) управление заинтересованными сторонами и логика социальной лицензии на деятельность; (4) организационная гибкость, гибкие и гибридные подходы к управлению. *Практическая значимость* заключается в том, что предложенная классификация и модель предоставляют нефтегазовым компаниям методологическую основу для интеграции требований ESG в систему планирования-реализации-контроля проекта (матрица рисков, KPI, требования к контрактам и закупкам, план взаимодействия с заинтересованными сторонами), а также для определения показателей ESG на каждом этапе жизненного цикла.

Ключевые слова: ESG, управление проектами, нефтегазовая отрасль, устойчивое развитие, заинтересованные стороны

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