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The Impact of Integrated Management Systems (IMS) on Enhancing Performance in Quality, Health, Safety, and Environmental (QHSE) Management: A Case Study of Algerian National Petroleum Companies ENAFOR and ENTP

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Abstract:

This research investigates the influence of the Integrated Management System (IMS) on enhancing performance within the domains of quality, environment, and occupational health and safety in Algerian petroleum enterprises. The study is grounded in the principles of IMS, which consolidates various performance aspects to optimize operational effectiveness and employee well-being. A quantitative research methodology was employed, involving a survey of 100 managers and employees from ENAFOR and ENTP—two Algerian petroleum firms based in Hassi Messaoud. Data were gathered through a structured questionnaire to assess the IMS's impact on the specified performance areas. The results demonstrate that IMS significantly improves workforce performance, with quality management yielding the greatest benefits, whereas environmental considerations exhibit the least influence. The discussion underscores the necessity of a well-structured IMS implementation, advocating for enhanced operational integration to boost efficiency and mitigate risks. The findings recommend that Algerian petroleum firms adopt a more cohesive IMS strategy, ensuring

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alignment among quality, environmental, and safety protocols to foster sustainable performance. Strengthening environmental management efforts may further contribute to employee engagement and overall performance enhancement. This study offers valuable insights into the practical applications of IMS within high-risk industries, highlighting the importance of an integrated approach to quality, safety, and environmental management.

Keywords: Integrated management system, Organizational performance, Quality management, Environment, Occupational health and safety, Algerian petroleum enterprises.

1. Introduction

In today's dynamic business landscape, where environmental and health concerns are intensifying alongside the growing demand for high-quality standards, the Integrated Management System (IMS) has become a crucial mechanism for steering organizations toward comprehensive excellence. IMS offers a unified framework that integrates quality management, environmental sustainability, and occupational health and safety, fostering improved efficiency and long-term viability. This multidimensional approach enables organizations to achieve strategic objectives in a balanced manner while adapting to an increasingly competitive and evolving business environment.

The oil extraction industry is among the primary contributors to environmental degradation, as it generates substantial waste and pollution. In Algeria, oil-related activities account for approximately 40% of total industrial waste (UNEP, 2014). In 2019 alone, the sector produced an estimated six million tonnes of waste (AP, 2020). Given Algeria's continued high levels of oil and gas production, waste generation is projected to remain substantial. Recent reports indicate that the country remains one of the leading oil and gas producers (Saleh, 2023). Additionally, the discovery of new oil reserves has contributed to the stabilization of Algeria's petroleum resources.

Despite the concerted efforts of the Algerian government and petroleum companies to enhance waste management, mitigate environmental impacts, and improve occupational safety and quality standards, persistent challenges hinder the effectiveness of these initiatives. The increasing levels of waste and pollution in the oil sector underscore the urgent need for integrated and comprehensive strategies. The absence of a cohesive management system that links quality, environmental concerns, and health and safety measures results in fragmented efforts and suboptimal performance in addressing these pressing issues.

Therefore, this study seeks to examine the role of IMS in enhancing the performance of local petroleum companies, ensuring greater operational efficiency and sustainability. Specifically, it aims to explore how IMS contributes to improvements in quality, environmental management, and occupational health and safety within Algerian petroleum enterprises, with a focus on ENAFOR and ENTP.

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Several sub-questions emerge from the central research inquiry, particularly regarding the extent to which implementing the Integrated Management System (IMS) influences operational quality and production efficiency, as well as the anticipated benefits for local petroleum companies facing industry-specific challenges. To address this research question, the following primary hypothesis has been formulated:

"The Integrated Management System (IMS) does not contribute to enhancing the overall performance of petroleum sector companies."

From this main hypothesis, the following sub-hypotheses are derived:

- IMS does not play a role in improving the quality performance of Algerian petroleum companies.
- IMS does not contribute to enhancing occupational health and safety performance within Algerian petroleum companies.
- IMS does not improve environmental performance in Algerian petroleum companies.

This study is of significant importance as it underscores the role of IMS as a strategic tool for achieving a competitive edge in the Algerian petroleum sector. It contributes to economic growth and sustainable development by enhancing corporate performance and effectiveness, particularly in the domains of quality, environmental management, and occupational health and safety. The study also emphasizes the necessity of environmental conservation and reducing the adverse effects of oil-related activities, aligning with sustainable development goals and the preservation of natural resources.

By offering practical recommendations for shaping effective policies, this research aids petroleum companies in overcoming challenges associated with IMS implementation, fostering a safer and more efficient work environment while improving worker safety. Furthermore, it provides reliable data that enriches the existing knowledge on IMS application in the Algerian context, laying the groundwork for future research in this field.

This study aims to achieve the following objectives:

- Conduct a comprehensive analysis of IMS's role in enhancing performance within Algerian petroleum companies, focusing on quality, health, safety, and environmental (QHSE) aspects, while examining its potential to create a competitive advantage.
- Assess the impact of IMS on operational quality and production efficiency by exploring the relationship between system implementation and enhanced productivity, offering innovative perspectives on optimizing this interaction.
- Investigate the environmental advantages of IMS adoption, emphasizing the balance between economic development and environmental preservation in the petroleum industry.

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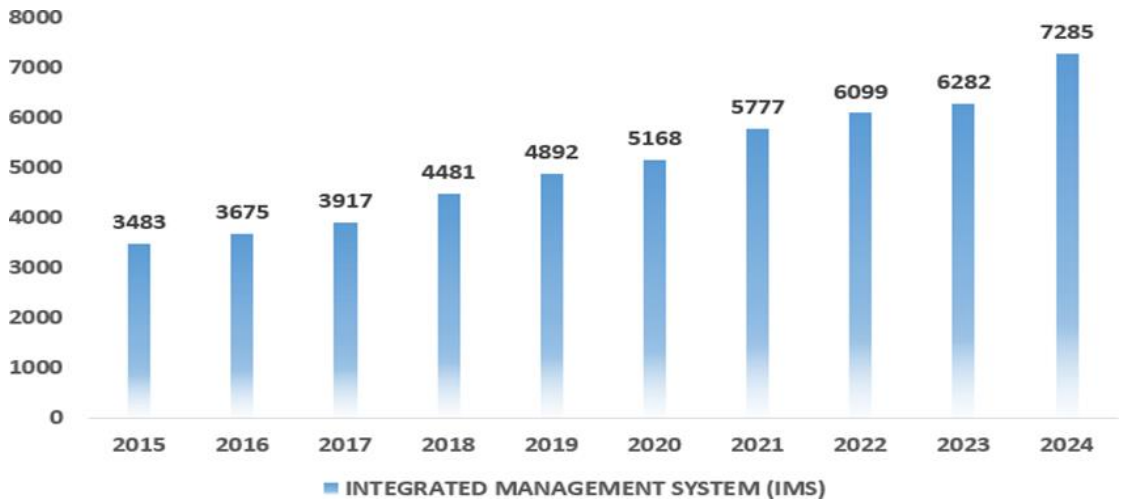
- Examine IMS's contribution to occupational health and safety improvements and propose innovative strategies to mitigate risks, ensuring a secure and productive work environment.
- Identify the key challenges in IMS implementation within ENAFOR and ENTP and provide practical recommendations for optimizing operational efficiency by minimizing risks and obstacles.
- Offer strategic recommendations for petroleum companies to align with international best practices in integrated management, thereby enhancing their global competitiveness and advancing sustainability leadership.

2. THEORETICAL FRAMEWORK

Recent research highlights the necessity of integrating management systems—including quality, health and safety, and environmental frameworks—within the petroleum industry to enhance environmental performance. Such integration not only improves operational efficiency but also mitigates the adverse effects of production. However, achieving full alignment and adopting comprehensive management approaches remain essential for fostering sustainability and promoting continuous improvement.

Academic studies indexed in *Scopus* indicate a growing scholarly interest in Integrated Management Systems (IMS), with researchers increasingly recognizing them as a strategic tool for improving organizational efficiency and resilience, particularly in complex and demanding environments. Given the ongoing exploration of IMS applications and benefits, this field is expected to attract further research attention in the future.



Source: Scopus database 2024.

Figure 1: The Development of Published Research on the "Integrated Management System" (IMS) in the Scopus Database from 2015 to 2024.

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2.1. Development of Research on the Integrated Management System (IMS) in Scopus (2015–2024)

Between 2015 and 2024, the number of publications indexed in the *Scopus* database on Integrated Management Systems (IMS) grew significantly, rising from 3,483 in 2015 to 7,285 in 2024. A notable increase occurred during the COVID-19 pandemic (2020–2021), marking a turning point in the research trend. This surge likely reflects the growing recognition of IMS as a strategic tool for risk management, business continuity, and organizational adaptability during periods of crisis. The upward trajectory suggests that IMS is increasingly regarded as an effective mechanism for enhancing efficiency and resilience, a trend expected to persist in future research.

IMS consolidates quality, environmental, health, and safety management into a single, unified system. This integration minimizes redundancy, optimizes processes, and enhances administrative efficiency by aligning objectives while simplifying evaluation and monitoring procedures (Rajabalinejad et al., 2020). Moreover, IMS fosters interdepartmental collaboration, facilitates access to critical data, and strengthens compliance with international standards, ultimately improving organizational agility and operational effectiveness (Slavnetskova & Kazakova, 2019).

Historically, management systems functioned independently. However, the introduction of standardized frameworks such as ISO 9001 (quality management), ISO 14001 (environmental management), and ISO 45001 (occupational health and safety) has encouraged an integrative approach. This shift not only enhances efficiency and regulatory compliance but also advances sustainability initiatives and mitigates environmental impact (Ikram et al., 2019).

The IMS framework is built on five fundamental pillars that form its structural foundation (Domingues et al., 2015). The first is policy, which defines an organization's strategic vision and objectives. The second, planning, translates these objectives into actionable steps. The third, implementation and operation, ensures the effective execution of plans based on best practices. The fourth phase, evaluation and corrective actions, assesses performance and addresses challenges. Finally, management review facilitates comprehensive analysis and continuous improvement. These pillars function in synergy to drive innovation and organizational development (Torneo & Mojica, 2020).

2.2. The Role of the Integrated Management System (IMS) in Enhancing Performance and Competitiveness

The Integrated Management System (IMS) enhances organizational performance and competitiveness by unifying policies and procedures, thereby fostering a cohesive work environment that strengthens capability, motivation, and productivity. Through this

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integration, IMS promotes a safe and transparent workplace culture that encourages continuous learning and professional development, aligning employee performance with ethical and professional standards (Obaid et al., 2021).

A key advantage of IMS is its role in demonstrating corporate commitment to social responsibility and environmental sustainability. By ensuring compliance with international standards such as ISO 9001 (quality management), ISO 14001 (environmental management), and ISO 45001 (occupational health and safety management), organizations enhance their credibility among stakeholders. This adherence to global benchmarks reinforces market positioning, builds stakeholder trust, and contributes to operational excellence. Furthermore, IMS offers a strategic competitive advantage by optimizing resource allocation, reducing waste, improving process efficiency, and enhancing organizational adaptability to evolving market demands (Domingues et al., 2015).

In the modern business landscape, high competitiveness is imperative for global success, compelling companies to adopt advanced management systems based on international best practices. Strategic decisions made by top management not only influence short-term financial outcomes but also shape long-term sustainability by addressing environmental and social challenges (Bernardo et al., 2017). The IMS framework integrates three interrelated systems—the Quality Management System (QMS), the Environmental Management System (EMS), and the Occupational Health and Safety Management System (OHSMS**)**—into a unified structure that enhances efficiency, consolidates efforts, and optimizes resource utilization. This integration improves regulatory compliance, enhances workplace safety, strengthens internal communication, and fosters interdepartmental coordination, ultimately leading to increased innovation and continuous improvement (Buyya et al., 2024).

Despite its benefits, IMS implementation faces several challenges, which can be categorized into internal and external barriers. The primary obstacles hindering IMS adoption include organizational resistance, resource limitations, and regulatory complexities, among others (Bautista-Rodríguez et al., 2024).

2.3. Barriers and Benefits of Implementing an Integrated Management System (IMS)

Barriers to IMS Implementation

Despite its advantages, the successful implementation of an Integrated Management System (IMS) is often hindered by internal and external barriers, which can significantly impact an organization's ability to fully integrate and benefit from the system.

- **Internal Barriers**: These include limited financial resources, insufficient knowledge, skills, and training among management and employees, increased workload due to additional processes, low awareness of IMS benefits, and a short-term orientation that discourages long-term strategic investments.

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- **External Barriers**: Organizations may also face limited institutional support, a lack of experienced consultants to provide guidance, poor-quality information about IMS frameworks, and conflicting recommendations that create ambiguity in implementation (Bautista-Rodríguez et al., 2024).

Addressing these barriers is essential for organizations to fully capitalize on IMS and enhance their overall performance.

2.3.1. Benefits of IMS Implementation

Overcoming these challenges enables organizations to achieve substantial benefits through IMS adoption. The integration of management systems into a unified framework enhances efficiency by reducing redundancy, streamlining processes, and consolidating evaluations and audits. This approach minimizes administrative costs, optimizes resource utilization, and reduces operational downtime, thereby improving overall productivity (Barbosa et al., 2022).

In the oil and gas industry, IMS implementation is particularly critical due to the sector's operational complexity and risk factors. Given the industry's strict health, safety, and environmental (HSE) regulations, integrating Environmental and Social Responsibility (ESR) criteria within IMS fosters sustainability by optimizing resource consumption, reducing carbon emissions, and mitigating environmental impacts. Moreover, IMS adoption enhances corporate reputation and stakeholder trust by reinforcing social and environmental commitments (Rocha et al., 2007).

Additionally, IMS cultivates a culture of sustainability by increasing employees' environmental awareness and actively involving them in achieving sustainability objectives. This engagement fosters a responsible and ethical work environment, strengthening long-term environmental stewardship within the organization (Roscoe et al., 2019).

2.3.2. Challenges in IMS Adoption

Despite these benefits, industries with complex processes often struggle with IMS implementation. Employee resistance to change remains a significant challenge, particularly in organizations where technical skills required for IMS adoption are insufficient. This resistance complicates the transition process and impedes the realization of IMS objectives, necessitating targeted training and strategic change management to facilitate effective implementation (Nunhes & Oliveira, 2020).

2.4. Challenges and Strategies for Implementing an Integrated Management System (IMS) in Algeria's Petroleum Sector

2.4.1. The Role of ENAFOR and ENTP in Algeria's Energy Strategy

In Algeria, the National Exploration Corporation (ENAFOR) and the National Corporation for Well Works (ENTP) are among the most prominent local companies operating in the

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energy sector. As subsidiaries of SONATRACH, these companies play a crucial role in Algeria's strategy to exploit its energy resources and enhance national energy independence. Specializing in oil and gas field exploration and development, their core activities include well drilling and maintenance, while ancillary services such as transport and hospitality further support their operations. By integrating advanced technologies and scientific methodologies, ENAFOR and ENTP strive to improve operational efficiency while prioritizing human resource development and sustainability policies to ensure environmental protection.

A significant emphasis is placed on employee skill development and fostering a workplace culture centered on safety and sustainability. However, similar to other oil and gas companies, these organizations encounter substantial challenges in implementing an Integrated Management System (IMS) due to the interplay of economic, organizational, and regulatory factors within a complex operational environment.

2.4.2. Challenges in IMS Implementation

1. **Complexity and System Integration:** The successful integration of quality, safety, and environmental management systems in petroleum companies requires strategic coordination and well-defined objectives. A lack of clear guidelines and effective managerial oversight can reduce operational efficiency, escalate costs, and negatively impact overall performance (Oliveira Júnior et al., 2024).

2. **Resource Allocation Constraints:** The implementation of an IMS is often constrained by limited financial and human resources, inadequate trained personnel, and weak managerial support. These limitations hinder technological investment, operational efficiency, and the ability to adapt to market fluctuations, posing significant challenges to IMS integration (Ronalter et al., 2022).

3. **Employee Engagement and Resistance to Change:** Employee disengagement and resistance to change represent major obstacles to IMS adoption. A lack of commitment, adaptability, and acceptance among employees reduces the effectiveness of policy implementation and undermines the overall success of the system (Oliveira Júnior et al., 2024).

4. **Regulatory and Environmental Compliance:** Petroleum companies must comply with stringent environmental regulations, necessitating continuous investment and rapid adaptation to evolving legal frameworks. Non-compliance with these standards can result in legal penalties, reputational damage, and operational inefficiencies (Попова & Попов, 2023).

5. **Weak Technological Infrastructure:** The development and maintenance of a robust IT infrastructure are essential for supporting IMS functions. However, insufficient investment

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in digitalization and ongoing system management can lead to inefficiencies, ultimately hindering the seamless integration of an IMS (Wang & Sha, 2014).

2.4.3. Strategies for Overcoming IMS Implementation Challenges

To address these challenges and facilitate the successful implementation of IMS in Algeria's petroleum sector, several strategic measures should be adopted:

- **Investment in Training and Capacity Building**: Enhancing employee competencies through targeted training programs will improve IMS adoption and operational efficiency. Adequate financial resources should be allocated to support continuous professional development.
- **Strengthening Environmental Commitment**: Companies should invest in environmentally sustainable technologies, improve waste management systems, minimize carbon emissions, and optimize natural resource consumption. Encouraging the use of renewable energy sources will further ensure compliance with environmental standards and enhance corporate reputation.
- **University-Industry Collaboration**: Addressing local skills shortages requires collaborations between petroleum companies and academic institutions to develop specialized educational programs focused on IMS. Such initiatives will help produce a workforce equipped with expertise in integrated management systems, thereby ensuring long-term sustainability in the sector.

By implementing these measures, local petroleum companies can enhance their competitiveness, operational efficiency, and compliance with international standards, ensuring sustainable growth in Algeria's energy sector.

Furthermore, continuous monitoring of regulatory changes is essential to ensure compliance with evolving standards. Organizations should periodically update policies and procedures to facilitate effective change management. Additionally, awareness and education initiatives should be developed to enhance employee acceptance and engagement in IMS implementation.

Investing in technological infrastructure is crucial to supporting the integration and optimization of IMS processes. Establishing joint task forces can enhance interdepartmental coordination, ensuring that IMS implementation aligns with organizational objectives. Finally, companies should adopt flexible strategic approaches to mitigate the impact of oil price fluctuations, ensuring the sustained allocation of resources for IMS development and implementation, even during periods of economic uncertainty.

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3. METHODOLOGY

3.1 Research Approach

This study employs a descriptive-analytical approach to provide a comprehensive assessment of the effectiveness of the Integrated Management System (IMS) in enhancing operational efficiency, strengthening corporate commitment, improving productivity and quality, and mitigating risks for employees. Additionally, the study examines the environmental implications of petroleum company activities by analyzing the impact of IMS on overall organizational performance. Specifically, the research explores the relationship between IMS implementation and performance improvements in quality management, environmental sustainability, and occupational health and safety within local petroleum companies in Algeria.

3.2 Study Instrument

To collect the necessary data, a structured questionnaire was designed and distributed to a sample of managers and employees from ENAFOR and ENTP, two leading petroleum companies in Algeria. The questionnaire aimed to assess various aspects of IMS implementation and its impact on corporate performance in the domains of quality, environmental management, and occupational health and safety (OHS).

The questionnaire comprised two main sections :

1. Demographic Information: Collected personal and professional details of the respondents.

2. IMS Implementation and Performance Assessment:

- The first subsection evaluated the requirements and challenges of IMS application.
- The second subsection measured corporate performance in quality management, OHS, and environmental sustainability, based on predefined performance improvement criteria for each domain.

A five-point Likert scale was employed to gauge respondents' perceptions of IMS effectiveness in these areas. The collected data were analyzed using SPSS v29, allowing for hypothesis testing and examining the relationships between variables to derive precise conclusions regarding the influence of IMS on corporate performance.

3.3 Study Population and Sample

The study targeted managers and employees from ENAFOR and ENTP to assess the impact of IMS on quality, environmental management, and occupational health and safety performance within Algeria’s oil sector during the first quarter of 2024.

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A total of 120 questionnaires were distributed, with 95 valid responses returned for statistical analysis. The sample consisted of 100 employees from various managerial levels, evenly divided between the two companies (50% from ENAFOR and 50% from ENTP), ensuring a balanced representation of perspectives.

4. RESULTS AND DISCUSSION

4.1. Study Sample Characteristics

The table below presents the demographic and personal information of the participants included in the study sample.

Table 01: **Demographic Information and Responses of the Study Sample**

Variables	Categories	Total of subjects (n)	Percentage (%)
Gender	Male	76	80
	Female	19	20
Age	20 to 29	16	17
	30 to 39	29	30
	40 to 49	33	35
	50 years and above	17	18
Education level	Professional	4	4
	Secondary or less	25	26
	University	38	40
	Postgraduate	28	30
Professional experience	less than 5 years	13	14
	05 to less than 10 years	40	42
	10 to less than 15 years	25	26
	More than 15 years	17	18
Function type	Specific position*	19	20
	Engineer	38	40
	Administrative	23	24
	Worker **	15	16

* = Director, Heads of Departments and Departments.

** = technical, professional.

Sources: SPSS Outputs.

Findings Based on the Data in Table 1:

- **Gender Distribution:** Analysis of the gender variable reveals that the total study sample consists of 95 individuals, with males comprising a significant majority of 80% (76 individuals), while females account for only 20% (19 individuals). This disparity highlights a notable gender gap within the work environment of the surveyed companies. The distribution can be attributed primarily to the nature of the production sector, which tends to rely

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predominantly on a male workforce due to job-specific demands. Additionally, the geographical location of these companies, often distant from urban centers, may further limit employment opportunities for women. This gender imbalance underscores the need for strategic employment policies aimed at increasing female participation, which could enhance workforce diversity and operational efficiency.

- **Age Distribution:** An analysis of the age variable indicates that the most represented age group is 40–49 years, comprising 34.7% of the total sample. This reflects the significance of experienced professionals who contribute to the industry during their peak career stage. Employees aged 30–39 make up 30.5% of the sample, demonstrating the presence of mid-career professionals who play a critical role in sustaining productivity. Meanwhile, the 20–29 age group constitutes 16.8%, indicating the emergence of a younger workforce entering the sector. In contrast, individuals aged 50 and above represent 17.9%, highlighting the need for effective knowledge transfer strategies to prepare the next generation of employees. Overall, the findings emphasize the value of age diversity in petroleum companies and underscore the importance of balanced recruitment and succession planning to ensure long-term organizational sustainability.

- **Educational Level:** An analysis of the educational background of the study sample indicates that university degree holders constitute the largest proportion at 40.0%, demonstrating the preference of petroleum companies for academically qualified individuals who contribute to innovation and organizational growth. Postgraduate degree holders make up 29.5% of the sample, reflecting their role in enhancing efficiency and driving continuous improvement. Meanwhile, 26.3% of participants have a secondary education or lower, emphasizing the necessity for upskilling and professional development initiatives. Notably, vocational qualification holders account for only 4.2%, suggesting a limited reliance on this category and highlighting the need for specialized training programs to strengthen technical expertise in the sector.
- **Professional Experience:** The distribution of the study sample based on professional experience reveals that employees with 5 to less than 10 years of experience form the largest group, representing 42.1% of the total sample (95 individuals). This indicates the significance of mid-career professionals who contribute to organizational efficiency and performance. Employees with less than 5 years of experience comprise 13.7%, reflecting an influx of new talent into the industry, which fosters innovation and adaptability. Those with 10 to less than 15 years of experience account for 26.3%, representing a highly experienced segment capable of knowledge transfer. Finally, employees with over 15 years of experience make up 17.9%, underscoring their critical role in mentoring and providing strategic guidance to newer workforce members.
- **Job Function:** A review of the job function variable indicates that the majority of respondents hold senior positions within the surveyed companies. Quality, Health, Safety,

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and Environment (QHSE) engineers form the dominant group, comprising 60% of the total sample, with 56 out of 64 engineers represented. Their significant presence underscores their essential role in ensuring the credibility of this study's findings and achieving its research objectives. Additionally, administrative staff and professional workers collectively account for 40% of the sample, highlighting their contribution to the study's reliability. The diverse representation of job roles enhances the comprehensiveness of the analysis, ensuring that multiple perspectives are considered, thereby facilitating the development of effective workplace strategies.

4.2 Hypothesis Testing

4.2.1 Testing the Main Hypothesis

The study's main hypothesis was examined using appropriate statistical methods. The hypothesis states: *"There is no role for SMI in enhancing the overall performance of companies in the petroleum sector."* The results of the analysis are presented as follows:

Table 2: One-way ANOVA analysis of variance for the main hypothesis

Importance	Sum Squares	ofdf	Mean Square	F	Sig.	R	R^2
Regression	**26.403**	**1**	**26.403**	**941.4**	**0.000**	**0.874**	**0.6005**
Residual	**12.688**	**93**	**0.0136**				
Total	**39.091**	**94**					

Source: Outputs of SPSS29

The results presented in the table indicate that the significance level (Sig) is 0.050, demonstrating the statistical significance of the study model. This finding suggests that SMI plays a role in enhancing the overall performance of companies in the petroleum sector. The correlation coefficient (R) of 0.874 signifies a very strong positive relationship between SMI and overall performance. Furthermore, the coefficient of determination (R^2) reveals that 60.05% of the variance in the dependent variable (overall performance) can be attributed to changes in the independent variable (SMI), while the remaining 39.95% is influenced by other factors not accounted for in the study model.

Table 3: Test the significance of the regression coefficients according to the _T_ statistic

	B	Std. Error	Standard Coefficient Beta	T	Sig.
Constant	**0.5339**	**0.5176**	**-**	**1.5929**	**0.000**
SMI	**0.5843**	**0.5818**	**0.874**	**19.5139**	**0.001**

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Source: Outputs of SPSS29

The findings derived from the table confirm that SMI plays a positive role in enhancing the overall performance of companies in the petroleum sector. The calculated T value (6.50) exceeds the critical tabular T value, underscoring the strength of this relationship. Additionally, the significance level (Sig) is 0.05, which is below the conventional threshold of 0.05, further validating the statistical significance of the results. Moreover, the Beta coefficient of 0.874, corresponding to 87.40%, demonstrates a strong positive effect of SMI on overall performance. Consequently, based on these findings, the null hypothesis stating that *"there is no role of SMI in increasing the overall performance of companies in the petroleum sector"* is rejected.

4.2.2 Testing the Sub-Hypotheses

4.2.2.1 Testing the First Sub-Hypothesis

The first sub-hypothesis states: *"There is no role of the integrated management system (SMI) in enhancing the performance of Algerian local petroleum companies in the field of quality."* The hypothesis was tested using appropriate statistical methods, and the results are presented as follows:

Table 4: ANOVA analysis of variance for the first sub-hypothesis

Importance	Sum Squares	ofdf	Mean Square	F	Sig.	R	R^2
Regression	**56.23**	**1**	**56.23**	**140.58**	**0.000**	**0.7756**	**0.6017**
Residual	**37.22**	**93**	**0.4**				
Total	**93.45**	**94**	**56.23**				

Source: Outputs of SPSS29

The results presented in the table indicate that the significance level (Sig) is 0.000, confirming the statistical significance of the study model. The correlation coefficient (R) is 0.7756, demonstrating a strong positive relationship between the integrated management system (SMI) and performance in the industrial sector with regard to quality.

Furthermore, the coefficient of determination (R^2) is 0.6017, signifying that 60.17% of the variation in the dependent variable (enhancing overall company performance) is attributable to changes in the independent variable (SMI). The remaining 39.83% of the variance is influenced by other factors not accounted for in the study model.

Table 5: Test the significance of the regression coefficients according to the _T_ statistic

	B	Std. Error	Standard Coefficient Beta	T	Sig.
Constant	**-1.023**	**0.287**		**-3.564**	**0.001**

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SMI	**1.235**	**0.071**	**0.781**	**17.411**	**0.000**

Source: Outputs of SPSS29

The results presented in Table 5 confirm that SMI has a significant positive impact on quality. The calculated T value of 17.411 exceeds the critical tabular value, reinforcing the strength of this relationship. Additionally, the significance level (Sig) is 0.000, which is below the threshold of 0.005, further affirming the statistical significance of the findings.

Moreover, the standardized Beta coefficient is 0.781, equivalent to 78%, indicating a strong positive effect of SMI on quality. Based on these results, the first sub-hypothesis, which states that *"there is no role of SMI in enhancing the performance of Algerian local petroleum companies in the field of quality,"* is rejected.

4.2.2.2 Testing the Second Sub-Hypothesis

The second sub-hypothesis states: *"There is no role for SMI in enhancing the performance of Algerian local petroleum companies in the field of occupational health and safety."* The hypothesis was tested using appropriate statistical methods, and the results are as follows:

Table 6: ANOVA analysis of variance for the second sub-hypothesis

Importance	Sum Squares	ofdf	Mean Square	F	Sig.	R	R^2
Regression	**33.685**	**1**	**33.685**	**264.254**	**0.000**	**0.743**	**0.5521**
Residual	**22.132**	**93**	**0.240**				
Total	**55.817**	**94**	**-**				

Source: Outputs of SPSS29

The results presented in the table indicate that the significance level (Sig) is 0.000, which is below the threshold of 0.05. This confirms the statistical significance of the study model and demonstrates that SMI plays a role in improving occupational health and safety (OHS) performance in Algerian local petroleum companies.

The correlation coefficient (R) is 0.743, signifying a strong positive relationship between SMI and OHS. Additionally, the coefficient of determination (R^2) is 0.5521, indicating that 55.21% of the variation in the dependent variable (OHS) can be attributed to changes in the independent variable (SMI). The remaining 44.79% of the variance is influenced by other factors not considered in the study model.

Table 7: Test the significance of the regression coefficients according to the _T_ statistic

	B	Std. Error	Standard Coefficient Beta	T	Sig.
Constant	**-0.987**	**0.250**	**-**	**-3.948**	**0.000**

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SMI	**1.523**	**0.214**	**0.856**	**7.015**	**0.000**

Source: Outputs of SPSS29

The findings presented in Table 7 confirm that SMI has a significant positive impact on occupational health and safety (OHS) performance in Algerian local petroleum companies. The calculated T value exceeds the tabulated critical value, reinforcing its statistical significance. Additionally, the significance level is below the 0.05 threshold, further validating the reliability of the results.

Furthermore, the Beta coefficient is 0.856, indicating that 85.60% of the variation in OHS performance can be attributed to SMI, demonstrating a strong positive effect. Consequently, the second sub-hypothesis, which posits that 'there is no role of SMI in increasing the performance of Algerian local petroleum companies in the field of occupational health and safety,' is rejected.

4.2.2.3 Examination of the Third Sub-Hypothesis

The integrated management system (IMS) does not contribute to enhancing the environmental performance of local petroleum companies in Algeria.

Table 8: ANOVA analysis of variance for the third sub-hypothesis

Importance	Sum Squares	ofdf	Mean Square	F	Sig.	R	R^2
Regression	**3.826**	**1**	**3.826**	**21.237**	**0.000**	**0.367**	**0.135**
Residual	**31.236**	**93**	**0.339**				
Total	**35.062**	**94**					

Source: Outputs of SPSS29

Based on the data presented in the table, the significance level (Sig) is recorded at 0.000, which is below the threshold of 0.05. This confirms the statistical significance of the study model. Furthermore, the findings indicate that the integrated management system (SMI) plays a role in the environmental domain. The correlation coefficient (R) is measured at 0.367, suggesting a weak but positive relationship between SMI and environmental performance. Additionally, the coefficient of determination (R^2) reveals that 13.50% of the variance in the dependent variable (environmental performance) is attributed to changes in the independent variable (SMI), while the remaining 86.50% is influenced by other factors not accounted for in the model.

Table 9: Test the significance of the regression coefficients according to the _T_ statistic

	B	Std. Error	Standard Coefficient Beta	T	Sig.

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Constant	**2.356**	**0.236**		**9.424**	**0.000**
SMI	**0.332**	**0.021**	**0.346**	**15.810**	**0.000**

Source: Outputs of SPSS29

Based on the table above, the integrated management system (SMI) demonstrates a positive impact on environmental performance. The significance level (Sig) is 0.000, which is below the 0.05 threshold, confirming the statistical significance of the model. Additionally, the computed T-value stands at 15.810, surpassing the critical value. The standardized coefficient (Beta) is recorded at 0.346, indicating a positive relationship between SMI and environmental performance. The findings suggest that 34.60% of the variance in environmental performance is attributed to changes in SMI. Consequently, the third sub-hypothesis, which posits that "SMI has no role in enhancing the environmental performance of local petroleum companies," is rejected.

The study has produced several key findings, summarized as follows:

✓ Establishing a positive alignment between quality, occupational safety, and environmental requirements contributes to improved performance in the oil sector while fostering employee loyalty and commitment to local petroleum companies.

✓ The integrated management system plays a vital role in creating a safe and sustainable work environment by reducing workplace accidents and enhancing conditions that promote creativity and productivity.

✓ A well-structured integrated management model enables companies to balance economic objectives with environmental and social responsibilities.

✓ Implementing an integrated management system enhances the operational efficiency of Algerian petroleum companies by improving coordination among processes, reducing costs, and increasing productivity in a competitive landscape.

✓ The system supports compliance with international standards related to quality, environmental management, and occupational health and safety, strengthening Algerian companies' ability to navigate regulatory challenges and improve their global standing.

✓ By fostering a safer and more structured work environment, the system boosts employee productivity and effectiveness, reduces occupational hazards, and enhances job satisfaction.

✓ The system optimizes the management of environmental resources, mitigating pollution risks associated with oil extraction activities and contributing to national environmental protection objectives.

✓ The integrated management system enhances the competitiveness of Algerian companies by improving their reputation in both regional and international markets, facilitating investment attraction, and reinforcing their competitive position.

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5. Conclusion

This research underscores the significance of the Integrated Management System (IMS) as a strategic tool that enhances both the efficiency and effectiveness of Algerian local petroleum companies. The study has demonstrated that IMS is not merely a managerial framework but a comprehensive approach that integrates quality, environmental sustainability, and occupational health and safety into corporate operations. By embedding international values and standards into the objectives of petroleum companies, IMS strengthens sectoral competitiveness and ensures long-term sustainability. The in-depth analysis of its impact on ENAFOR and ENTP highlights its role in fostering sustainable performance and cultivating a corporate culture centered on continuous improvement and development.

Based on these findings, the following recommendations are proposed for petroleum companies:

- Prioritizing the environmental dimension to maximize its positive influence on overall performance, while reinforcing the integration of quality, occupational health, and safety measures to achieve sustainable operational efficiency and mitigate long-term environmental risks.
- Investing in advanced quality management systems and adopting international best practices and standards to drive high and sustainable performance, enhance operational efficiency, and bolster competitiveness within the evolving oil market.
- Ensuring the widespread implementation of the IMS across all divisions, accompanied by continuous employee engagement and curriculum development to enhance performance in quality, environmental management, and occupational health and safety.
- Strengthening internal and external communication through active engagement and awareness-building initiatives to improve the company's reputation and stakeholder relations.
- Expanding the adoption of modern, environmentally friendly technologies as a fundamental aspect of corporate strategy, while engaging in innovative environmental initiatives to minimize ecological impacts.
- Promoting a culture of continuous learning by integrating specialized training programs and interactive workshops that empower employees to comprehend the significance of IMS and its impact on their professional development and workplace quality.
- Establishing collaborative partnerships with international organizations to leverage global expertise in integrated management, positioning Algerian petroleum companies as regional leaders in efficiency and sustainability.
- Implementing comprehensive training programs to increase staff awareness of IMS principles and applications, thereby enhancing their ability to apply the system effectively.
- Developing a robust risk management strategy that integrates modern technologies to ensure occupational health and safety while addressing environmental concerns.

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- Strengthening efforts to enhance environmental performance and reduce the negative impact of production activities by adopting effective waste management policies and minimizing emissions from petroleum operations.
- Promoting awareness campaigns focused on occupational health, improving workplace healthcare services, and advancing occupational medicine practices.
- Elevating the level of occupational health and safety culture within petroleum companies to ensure a safer and more efficient work environment.
- Incorporating worker well-being and quality of life considerations into occupational health and safety management to foster a more productive and sustainable workplace.
- Enhancing resource efficiency by adopting sustainable practices, such as rationalizing the consumption of natural resources (e.g., water and energy) and encouraging the transition towards renewable energy sources.
- Cultivating a culture of innovation and continuous improvement to adapt to evolving market demands and drive sustainable organizational performance.

All in all, achieving long-term success in the oil industry necessitates a comprehensive approach that integrates performance optimization, quality management, and corporate social responsibility. The IMS provides a strategic framework to balance these dimensions by fostering innovation and continuous development as key drivers of sustainable growth. By implementing these recommendations, ENAFOR and ENTP can strengthen their capacity to address industry challenges, enhance operational efficiency, mitigate risks, and align more effectively with international standards.

Moreover, IMS will play a crucial role in fostering a safer and more sustainable work environment, reinforcing environmental and social responsibility, and enhancing the competitive standing of Algerian petroleum companies. Given the persistent challenges facing the sector, future research should focus on strategies to overcome implementation barriers, particularly in environmental sustainability. Investigating the obstacles that hinder the full integration of environmental management within IMS and developing mechanisms to optimize operational efficiency, reduce costs, and enhance safety measures will be instrumental in enabling Algerian companies to compete effectively on a global scale and contribute to national sustainable development.

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