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The impact of ISO 45001 certification on workers' health and safety: An empirical study of medium-sized enterprises in Algeria

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***Abstract*---**This article examines the impact of implementing a certified management system under the ISO 45001 standard on workers' health and safety (WHS) in a region that has been little explored in this field. An empirical study was conducted on thirty medium-sized enterprises located in various regions of Algeria. Through a structured questionnaire addressed to different company managers, the overall results initially reveal a significant improvement in working conditions, risk prevention, and safety culture following certification. A comparative analysis of the results by industry sector, conducted subsequently, highlighted variations in impact depending on the sector, with particularly strong perceptions in the construction sector.

***Keywords*---**ISO 45001, Health and Safety, OHS, Standard Impact, Algeria
JEL Codes :**28**; **J81**; **L15**; **M14**

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Introduction

Workers' health and safety represent a major challenge for companies, influencing their performance, reputation, and employee satisfaction. Occupational hazards can lead to significant costs in terms of accidents, occupational diseases, and productivity losses. In response to these challenges, the ISO 45001 standard, published in 2018, provides an international framework aimed at improving the management of occupational risks and promoting a safe and healthy work environment.

This standard is based on a proactive approach focused on prevention and continuous improvement. It encourages companies to identify hazards, assess risks, and implement control measures to protect employees' physical and mental health. Obtaining ISO 45001 certification demonstrates a company's commitment to WHS, thereby enhancing its credibility and competitiveness in the market (Asbury, 2023).

This article analyses the impact of this certification through an empirical study conducted on thirty medium-sized Algerian enterprises. The research question addressed is: To what extent does ISO 45001 certification influence workers' health and safety within medium-sized enterprises in Algeria? The objective is first to identify the tangible effects of this certification on a global scale, then to assess the influence of sectoral specificities on its impact.

Although numerous studies have explored the impact of ISO 45001 on workplace health and safety, they have primarily focused on international contexts (Podrecca et al., 2024). Conversely, very few studies have been conducted in the Algerian context, where economic, regulatory, and organisational specificities can significantly influence the adoption and effectiveness of this standard. This study stands out for its focus on Algerian enterprises, offering a novel local perspective and filling a gap in the existing literature.

1. Theoretical Framework

1.1. The Importance of Workplace Health and Safety for Companies

Ensuring workers' health and safety is of strategic importance to businesses. Reducing workplace accidents and occupational diseases contributes to improved productivity, reduced costs associated with work stoppages, and enhanced employee motivation. A well-established safety culture fosters a positive work environment and enhances the company's reputation (Park et al., 2013).

- **Reduction of Accidents and Occupational Diseases as a Productivity Lever**

Reducing workplace accidents and occupational diseases has both direct and indirect impacts on corporate productivity. Directly, fewer incidents lead to reduced work stoppages, lower medical costs, and decreased compensation expenses. This enables companies to maintain business continuity, optimise human resource management, and minimise disruptions in the production chain.

Indirectly, a safe and healthy work environment promotes employee motivation and engagement. When workers feel protected, they are more likely to fully invest in their tasks, thereby improving their efficiency and performance. Additionally, reducing stress related to occupational risks contributes to better mental health and lower absenteeism (McCunney, 2001).

Preventive measures and awareness campaigns also reinforce safety culture within the company, creating a climate of trust and collaboration (Găureanu et al., 2019). Employees become more vigilant and adopt responsible behaviours, thereby reducing errors and negligence-related incidents. In the long run, this preventive culture fosters smoother and more efficient work dynamics, ultimately increasing overall productivity.

Reducing workplace accidents and occupational diseases also enhances the company's reputation among clients, partners, and investors. A company recognised for exemplary health and safety practices enjoys a competitive advantage, strengthening its market position and ability to attract and retain high-quality talent.

- **Effective WHS Management to Reduce Costs Related to Work Stoppages**

An effective WHS management system significantly reduces both direct and indirect costs associated with work stoppages. Directly, it helps decrease expenses related to medical care, compensation, and repairs of equipment damaged during accidents (Bayram, M et al., 2017). By reducing the number of work stoppages, the company also minimises the cost of temporary replacements and productivity losses.

At the organisational level, business continuity is ensured through a healthy and fully operational workforce. This prevents production delays and maintains product and service quality. Reduced absences also improve team management and limit workload imbalances, thereby preventing stress and fatigue.

Furthermore, managing occupational risks enhances employee motivation and engagement. A safe and healthy work environment fosters employee well-being, reducing absenteeism and turnover. This staff stability leads to better team cohesion, more efficient knowledge transfer, and increased productivity.

Companies that effectively manage WHS risks improve their image among clients, partners, and regulatory authorities (Fernández-Muñiz et al., 2012). They avoid financial penalties for non-compliance with safety standards and reduce legal costs resulting from workplace accident litigation. By strengthening their reputation and optimising operational costs, these companies enhance their competitiveness in both national and international markets.

- **Effective OHS Management to Enhance Employee Motivation**

Effective occupational health and safety (OHS) management plays a fundamental role in strengthening employee motivation. A safe and healthy work environment directly contributes to workers' physical and mental well-being, creating

conditions conducive to better professional performance. When employees feel protected and supported, they develop a sense of belonging and recognition that boosts their engagement and productivity (Nkrumah, E. N. K et al., 2021).

The implementation of preventive measures and awareness initiatives demonstrates the company's commitment to safeguarding employees' health, thereby reinforcing their trust and satisfaction. This proactive approach reduces stress associated with occupational risks and fosters a calmer work climate, conducive to focus and efficiency. By limiting accidents and incidents, it also helps maintain a positive atmosphere where employees feel safe and valued.

Moreover, the active involvement of workers in the risk management process promotes their sense of responsibility and commitment. When consulted and engaged in decisions regarding their safety, they develop a sense of control and mastery over their work environment (Turner, B. A, 2019). This participation helps to enhance their intrinsic motivation and job satisfaction.

Recognising employees' efforts in maintaining safety and celebrating achievements strengthens their sense of accomplishment and motivation to uphold safe behaviours. Thus, effective OHS management is not limited to risk prevention; it serves as a key driver for fostering employee fulfilment and improving overall business performance.

- **Effective OHS Management to Strengthen Workplace Safety Culture**

Effective occupational health and safety (OHS) management significantly contributes to establishing and reinforcing a sustainable safety culture within the company. This culture is based on a collective awareness of occupational risks and the commitment of all employees to safeguarding their own safety and that of their colleagues (Nielsen, 2014). When an organisation integrates OHS into its core values, it creates an environment where safety becomes a shared priority rather than merely a regulatory obligation.

Open and transparent communication plays a key role in developing this culture. By encouraging dialogue across different hierarchical levels, employees feel heard and valued, which motivates them to report hazardous situations without fear of retaliation (Flin & Yule, 2004). Continuous training and awareness campaigns strengthen the necessary knowledge and skills to identify and prevent dangers while embedding safe behaviours into daily routines.

The active participation of workers in designing and improving safety processes enhances their involvement and sense of responsibility. By integrating OHS into management practices and performance objectives, the company fosters a climate of trust and cooperation that encourages compliance with safety regulations and reduces risky behaviours.

A strong safety culture helps improve the company's reputation and attractiveness to potential talent. Employees thrive in an environment where their well-being is a priority, increasing their satisfaction and loyalty. In the long run, this preventive approach not only reduces workplace accidents and occupational

diseases but also minimises costs associated with work stoppages, equipment repairs, and legal disputes, thereby strengthening the company's sustainability and competitiveness.

- **Effective OHS Management to Improve and Strengthen Corporate Reputation**

Effective occupational health and safety (OHS) management plays a decisive role in strengthening a company's reputation. A well-structured OHS policy demonstrates the company's commitment to employee well-being, enhancing its image among stakeholders, including clients, investors, business partners, and regulatory authorities (Xu, 2024).

Firstly, reducing workplace accidents and occupational illnesses showcases the company's ability to manage risks and ensure a secure working environment. This performance, often measured through indicators such as accident frequency and severity rates, bolsters the company's credibility in the market. Clients and partners tend to favour businesses that adhere to OHS standards, as this reflects their seriousness and reliability.

Secondly, a proactive approach to OHS management helps prevent legal disputes and fines related to non-compliance with regulations, thereby protecting the company's image. A company that meets international standards such as ISO 45001 gains increased recognition and can use this certification as a mark of quality and professionalism. This distinction serves as a competitive advantage, facilitating access to new markets and improving relationships with international partners.

Furthermore, corporate transparency regarding OHS, through the communication of results and best practices, enhances the trust of investors and shareholders. These stakeholders are increasingly considering environmental, social, and governance (ESG) criteria, of which OHS is an integral part. By highlighting efforts to ensure employee health and safety, the company improves its ESG rating and attracts responsible investment.

A positive reputation in OHS is also key to attracting and retaining talent (Honore & Murphy, 2013). Job seekers look for work environments where their well-being is prioritised, and a company recognised for its exemplary OHS practices attracts highly qualified professionals. Additionally, current employees are more likely to remain in an organisation that prioritises their safety, reducing turnover rates and fostering team stability. By cultivating a culture of safety and well-being, the company strengthens its image as a responsible and ethical employer, consolidating its long-term reputation.

1.2. The ISO Initiative in OHS Management

Given the strategic importance of occupational health and safety (OHS) management for businesses, the International Organisation for Standardisation (ISO) has taken an interest in this field to provide a reference framework that enables organisations to structure and effectively integrate OHS principles into

their overall management system. This approach addresses the need to prevent occupational risks, ensure worker well-being, and comply with legal and regulatory requirements.
The creation of the ISO 45001 standard aligns with this objective, offering companies of all sizes a proactive and systematic risk management model related to health and safety (Karanikas et al., 2022). By setting clear guidelines and promoting continuous improvement, this standard helps organisations anticipate and control potential hazards while fostering a culture of prevention and responsibility.

ISO developed this standard based on international best practices, ensuring that it is adaptable to various professional contexts. By integrating OHS into daily management processes, companies can not only enhance employee well-being but also improve their performance, competitiveness, and market reputation. This initiative thus contributes to creating safer and healthier workplaces while supporting corporate social responsibility and sustainable development objectives.

The ISO 45001 standard is built on a proactive approach to managing occupational risks. It emphasises leadership involvement, worker participation, and continuous improvement. According to Dupont et al. (2022), certification helps reduce workplace accident rates and strengthen safety culture. However, some authors highlight challenges in adopting the standard, particularly due to costs and the need for ongoing training.

ISO 45001 provides a reference framework to help businesses prevent occupational risks and promote a safe and healthy work environment. Unlike reactive approaches, this standard encourages proactive risk management. It urges companies to identify and control hazards before they cause harm, thereby reducing incident rates and improving employee well-being.

1.3. Structure of the ISO 45001 Standard

Published in March 2018 by the International Organisation for Standardisation (ISO), the ISO 45001 standard replaces OHSAS 18001 and incorporates best practices in occupational health and safety. It follows a continuous improvement approach and aligns with other management standards such as ISO 9001 (quality) and ISO 14001 (environment). The ISO 45001 standard is structured around several key chapters:

- Organisational Context (Chapter 4): Identifying stakeholder needs and expectations, as well as risks and opportunities related to OHS.
- Leadership and Worker Participation (Chapter 5): Management commitment and active employee involvement in safety initiatives.
- Planning (Chapter 6): Hazard identification, risk assessment, and setting OHS objectives.
- Support (Chapter 7): Resources, competencies, communication, and documentation required for implementing the management system.
- Operational Activities (Chapter 8): Implementation of preventive and control measures to manage occupational risks.

- Performance Evaluation (Chapter 9): Monitoring, measuring, and analysing results to assess system effectiveness.
- Continuous Improvement (Chapter 10): Identifying improvement opportunities and implementing corrective actions.

1.4. The Contribution of Certification to Managing OHS Aspects

According to several studies (Domingues et al., 2017; Dilokwattanakul et al., 2023; Karanikas et al., 2022; Morgado et al., 2019), ISO 45001 certification can help businesses structure their occupational health and safety approach by establishing clear and effective processes. It can facilitate proactive risk identification and the implementation of appropriate preventive measures. By involving all employees, it can strengthen the safety culture and build a climate of trust. Additionally, it can enhance regulatory compliance and reduce costs associated with workplace accidents and occupational diseases, thereby improving overall business performance.

Certification also encourages systematic and documented management of OHS processes, making monitoring and continuous improvement easier. It allows for clear role definition, ensures transparent communication, and involves all hierarchical levels.

Moreover, implementing this standard promotes the development of a prevention culture, where every employee takes an active role in their own safety and that of their colleagues. This results in greater awareness of risks and a reduction in incidents. Certification also provides competitive advantages, as it enhances the company's image among clients, partners, and regulatory authorities. Finally, it helps boost employee motivation and engagement, as they work in a safer and more well-being-oriented environment.

2. Study Methodology

This research adopts a quantitative approach based on a structured questionnaire addressed to managers of a sample of 42 medium-sized companies located in various regions of Algeria. To diversify responses and obtain a more representative perspective, five questionnaires were sent to five different managers within each company.

A total of 145 completed and validated questionnaires were collected, forming a final sample of 29 companies. The sample consists of companies operating in the industrial, construction, and industrial services sectors. All selected companies have held ISO 45001 certification for at least five years.
The questionnaire includes three main sections:
Company Profile: Industry sector, company size, and certification duration.
Impact of Certification on Workplace Conditions.
Impact of certification on the control of accidents in the workplace
The collected data were analysed using descriptive statistics to identify key trends and correlations.

2.1. Study Objectives

The objective of this study is to analyse business managers' perceptions regarding the impact of implementing an occupational health and safety management system (OHSMS) compliant with the ISO 45001 standard. Secondly, the study aims to assess whether sector-specific characteristics influence this impact.

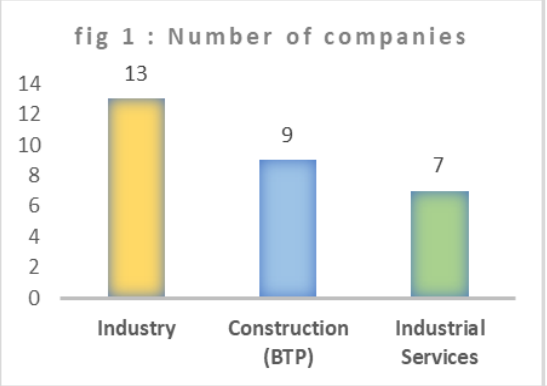
3. Study Results and Discussion

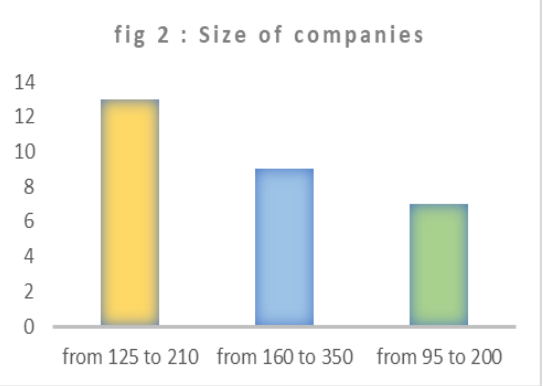
3.1. Company Profile

The table below presents the profile of the studied companies, highlighting their industry sector, size, and number of employees.

Table 1: Profile of the Companies Analysed in the Study

Number of Companies	Industry Sector	Size (Number of Employees)
13	Industry	Between 125 and 210 employees
9	Construction (BTP)	Between 160 and 350 employees
7	Industrial Services	Between 95 and 200 employees



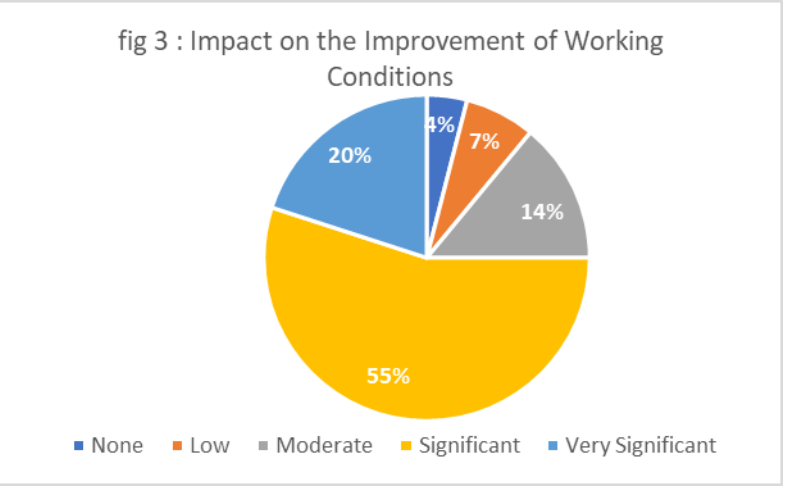


3.2. Impact of the ISO 45001 Standard: Overall Results

- **Impact on the Improvement of Working Conditions**

Table 2: Impact on the Improvement of Working Conditions

Scale	None	Low	Moderate	Significant	Very Significant
Response in %	4%	7%	14%	55%	20%



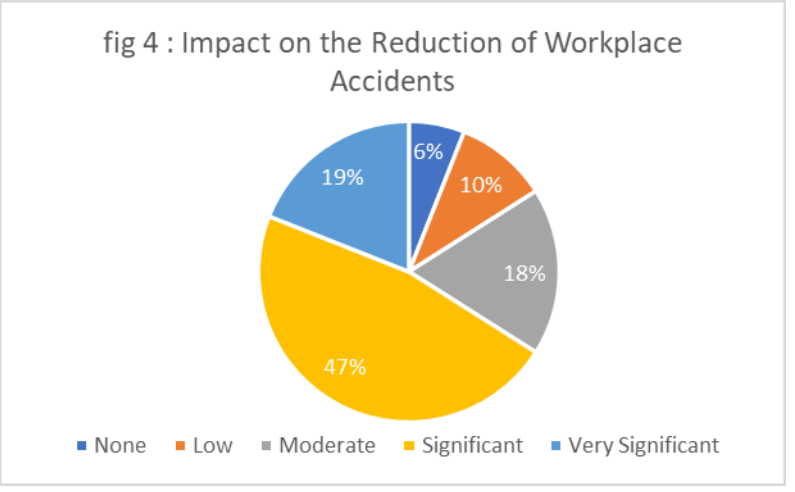
Test and Interpretation

The chi-square test for the distribution of responses shows a result of **x^2 = 84.3 with a p-value = 2.14e-17**. The hypothesis of uniform distribution is rejected, indicating that respondents' perceptions vary significantly. The majority considers ISO 45001 to have a significant impact, either important or very important. The results show that the majority of respondents (55% + 20%) perceive the impact of ISO 45001 on the improvement of working conditions as significant or very significant, respectively. 4% of respondents believe the impact is negligible, while a smaller proportion considers it low (7%) or moderate (14%). These findings suggest that ISO 45001 is widely perceived as having a positive impact on working conditions, with a strong trend towards high levels of impact.

- **Impact on the Reduction of Workplace Accidents**

Table 3: Impact on the Reduction of Workplace Accidents

Scale	None	Low	Moderate	Significant	Very Significant
Response in %	6%	10%	18%	47%	19%



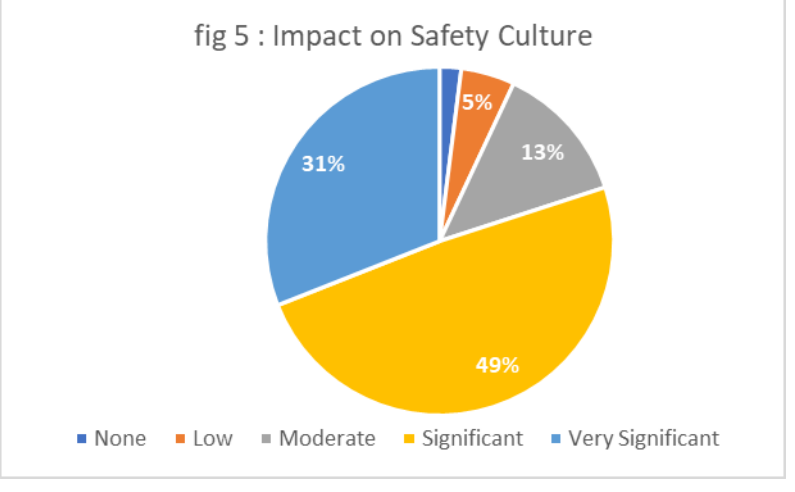
Test and Interpretation

With a chi-square value of 51.5 and a p-value of 1.75e-10, these results also indicate that the distribution of responses is not uniform. This confirms that ISO 45001 is generally perceived positively in terms of accident reduction. The majority of respondents (47%) consider the impact of ISO 45001 on accident reduction to be significant, while 19% rate it as very significant. Only 6% of respondents believe the impact is negligible, 10% consider it low, and 18% perceive it as moderate.

- **Impact on Strengthening the Safety Culture**

Table 4: Impact on Safety Culture

Scale	None	Low	Moderate	Significant	Very Significant
Response in %	2%	5%	13%	49%	31%



Test and Interpretation

The chi-square test and p-value also indicate that the hypothesis of a uniform distribution of responses is rejected (x^2 = 81.0, p-value = 1.07e-16). Here again, ISO 45001 is widely perceived as having a positive impact on strengthening the safety culture. The majority of respondents (49%) consider the impact to be significant, while 31% rate it as very significant. Only 2% of respondents believe the impact is negligible, 5% consider it low, and 13% perceive it as moderate.

3.3. Impact of the ISO 45001 Standard: Comparison of Results by Industry Sector

In this second part of the study, we analyse the data by segmenting it according to the industry sector of the companies. The objective is to adopt a comparative approach to highlight potential differences in the perception of the impact of the ISO 45001 standard on two key aspects:

- Improvement of working conditions
- Accident control

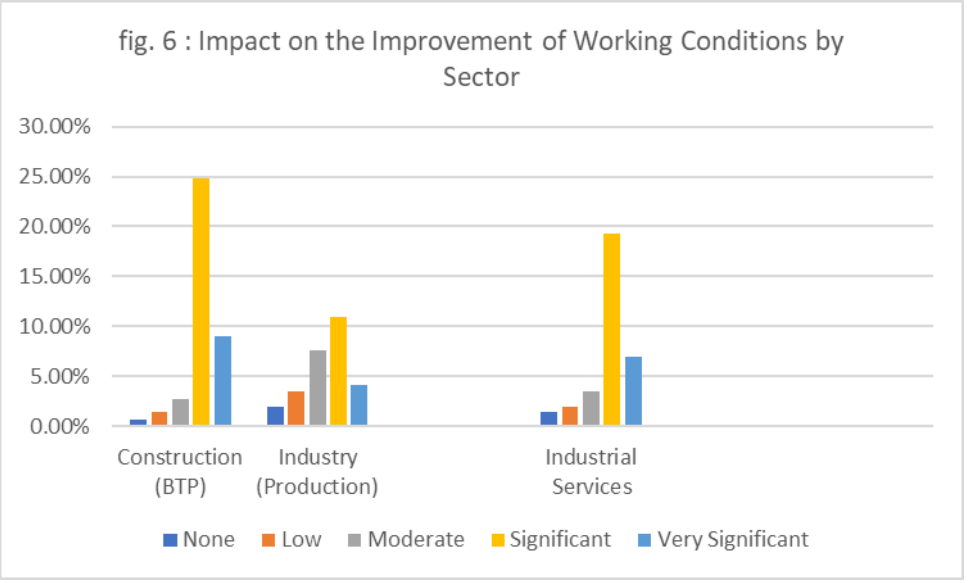
The analysis will consider the specific characteristics of each sector.

- **Comparative Analysis of the Impact on the Improvement of Working Conditions**

The results in the table below allow us to compare the perception of ISO 45001's impact on the improvement of working conditions across three distinct sectors: construction (BTP), industry (manufacturing/production), and industrial services.

Table 5: Comparison of the Impact on the Improvement of Working Conditions by Sector

Sector	None	Low	Moderate	Significant	Very Significant
Construction (BTP)	0.7%	1.4%	2.75%	24.8%	8.96%
Industry (Production)	2%	3.45%	7.6%	11%	4.13%
Industrial Services	1.37%	2%	3.45%	19.3%	6.9%



Interpretation:

- *Construction Sector (BTP):* The construction sector appears to clearly recognise the importance of ISO 45001, with the majority of respondents considering its impact as significant or very significant. This aligns with the fact that this sector is more exposed to challenging working conditions on construction sites, where risks are higher. However, there is also a group of individuals who believe the impact remains limited, which may suggest uneven implementation of the standard or sector-specific challenges.
- *Industry (Production) Sector*: The industrial production sector demonstrates a more nuanced perception of ISO 45001's impact, with most respondents rating it as moderate or significant. Risks in this sector may be perceived as better managed due to existing safety procedures, which could explain why ISO 45001 does not appear to bring about a major transformation.
- *Industrial Services Sector*: While the results in this sector are relatively positive, with a significant proportion of employees considering the impact as significant or very significant, lower perceptions (none or low impact) suggest that the benefits of the standard may be seen as less direct or immediate compared to other sectors.

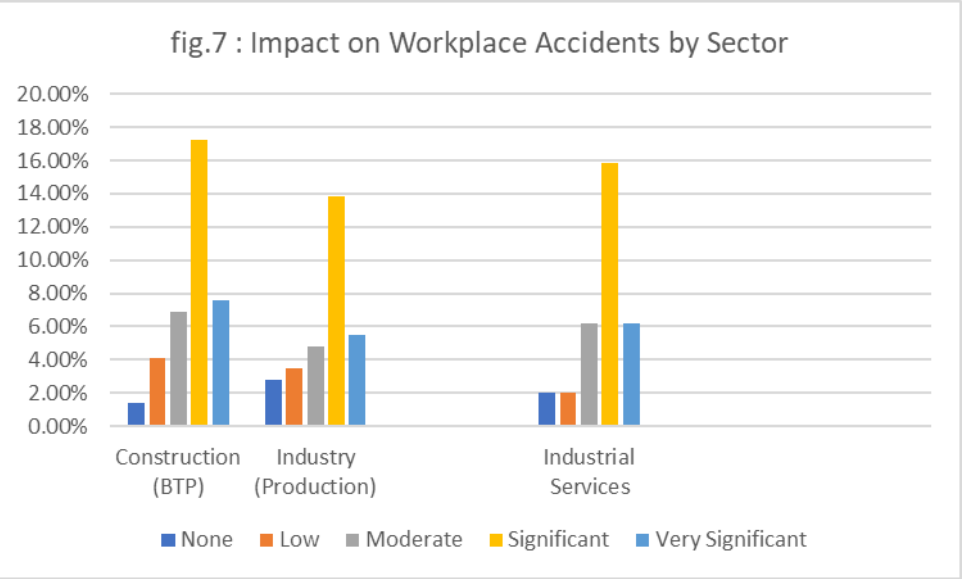
These findings indicate that the impact of ISO 45001 on improving working conditions varies significantly across sectors, largely due to differences in risk exposure and the specific nature of work environments. Construction companies seem to perceive the impact of the standard more strongly, likely due to the particularly challenging working conditions in this sector. In contrast, the industrial and industrial services sectors exhibit a more moderate perception of the standard's impact, possibly reflecting well-established safety practices that make the effect of ISO 45001 less immediately noticeable.

- **Comparative Analysis of the Impact on Workplace Accidents**

The results presented in the table below allow for a comparison of the perception of ISO 45001's impact on accident control across three distinct sectors: construction (BTP), industry (production), and industrial services.

Table 6: Comparison of the Impact on Workplace Accidents by Sector

Sector	None	Low	Moderate	Significant	Very Significant
Construction (BTP)	1.37%	4.13%	6.9%	17.24%	7.6%
Industry (Production)	2.76%	3.45%	4.8%	13.8%	5.5%
Industrial Services	2%	2%	6.2%	15.86%	6.2%



Interpretation:

- *Construction Sector (BTP):* Construction companies seem to perceive a moderate impact of ISO 45001 on the reduction of workplace accidents, with the majority considering its effect as significant or very significant. However, the presence of respondents who rate the impact as negligible or low could indicate challenges in the uniform application of the standard or difficulties in adapting it to the sector's specific risks.
- *Industry (Production) Sector*: The industrial production sector appears to have a more measured perception of ISO 45001's impact on accident reduction, with a higher number of respondents rating the impact as low or negligible. This could suggest that pre-existing safety measures in the industry make the effects of ISO 45001 less noticeable in terms of accident reduction.
- *Industrial Services Sector*: The results in this sector are fairly similar to those in industrial production, with a positive perception of ISO 45001's impact on accident reduction, although a notable proportion of respondents view the

impact as moderate. Given that this sector is exposed to risks in both industrial and service environments, there is recognition of the standard's benefits, but to a lesser extent than in other sectors.

In summary, the impact of ISO 45001 on workplace accident reduction varies across industry sectors, with stronger perceptions of impact in higher-risk sectors, such as construction, where respondents acknowledge a significant effect. However, the industrial and industrial services sectors show more measured results, suggesting that these sectors already have rigorous safety measures in place, making the impact of ISO 45001 less evident to workers. Construction companies, being particularly vulnerable to site-related risks, seem to benefit the most from ISO 45001. However, additional efforts are needed to maximise its impact in sectors where structured safety protocols are already well established.

Conclusion

The literature review highlights the importance of worker health and safety for business performance. Effective risk management enhances productivity and reduces costs associated with workplace accidents. It also underscores the positive impact of ISO 45001 certification on managing OHS aspects by promoting preventive practices and strengthening safety culture.

However, while numerous international studies have been conducted, limited research focuses on the Algerian context. This gap justifies the need to examine the impact of ISO 45001 within Algerian companies to provide empirical data tailored to this specific setting.

The empirical study assessed business managers' perceptions regarding the implementation of an occupational health and safety management system (OHSMS) compliant with ISO 45001. Using a quantitative approach, we collected and analysed 145 questionnaires from 29 companies in the industry, construction (BTP), and industrial services sectors, all of which had been ISO 45001 certified for over five years. The findings indicate that ISO 45001 is widely perceived as having a positive impact on several aspects of OHS management:

- A significant improvement in working conditions, considered important or very important by the vast majority of respondents.
- A reduction in workplace accidents, though perceptions of this impact vary across sectors.
- A considerable strengthening of safety culture within companies.

The sectoral comparative analysis highlights notable differences in the perceived effects of ISO 45001. Construction companies (BTP), which face higher occupational risks, seem to benefit the most from certification. In contrast, industrial and industrial services companies display a more moderate perception, likely due to pre-existing safety measures before adopting the standard.

In conclusion, this study confirms that ISO 45001 plays a key role in improving occupational health and safety, although its impact varies depending on sector-specific factors and the maturity level of risk management practices in each

company. These findings emphasise the need for tailored implementation strategies to maximise the benefits of certification according to the characteristics of each industry.

Future research could further explore this analysis by examining additional organisational and human factors that may influence the effectiveness of the standard. Longitudinal studies or complementary qualitative approaches could provide deeper insights into its long-term impact.

Limitations and Research Perspectives

This study has certain limitations that restrict the generalisation of results. The sample, limited to 30 medium-sized Algerian companies, does not allow conclusions to be extrapolated to other types of organisations. Additionally, the methodology relies on subjective statements from HSE managers, which may introduce perception bias. The evaluation of certification impact was conducted over a relatively short period, whereas long-term effects warrant a more in-depth analysis. Finally, organisational and cultural factors, such as management commitment and resistance to change, remain underestimated in this study. In terms of research perspectives, several avenues could be explored:

- Expanding the sample to include other economic sectors and companies of different sizes for greater representativeness.
- Comparing certified and non-certified companies to refine the assessment of ISO 45001's actual benefits.
- Investigating the integration of new technologies in OHS management to offer innovative recommendations.
- Conducting a more in-depth analysis of organisational factors that enhance the effectiveness of certification.
- Evaluating the economic impact of ISO 45001 to provide further insights into its long-term benefits.

These research directions will contribute to a deeper understanding of certification impact and help guide businesses towards optimised strategies for occupational health and safety management.

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