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Factors Influencing the Success of ISO 45001 Certification in Technology Companies in Indonesia

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ABSTRACT
Occupational Safety and Health (OHS) is a crucial component of modern organizational governance, not only as a legal obligation but also as an indicator of the organization's sustainable performance in addressing worker risks and corporate social responsibility. ISO 45001 (International Organization for Standardization and Accreditation of the Organization for the Advancement of Science and Technology) is an internationally recognized standard for the management of occupational safety and health in Indonesia. Purpose: This study is aimed at filling this gap by empirically evaluating the internal and external factors that influence the success of ISO certification in Indonesian technology companies, as well as its contribution to the formation of a safety culture and continuous improvement of OHS performance. Methods: A quantitative approach with an explanatory design was used to analyze the factors influencing the successful implementation of ISO compliance with technical standards in technology companies. Data were collected through a structured questionnaire based on ISO compliance clauses and empirical findings in the OHS management system literature. Results: Top management commitment emerged as the most dominant factor, followed by OHS culture and technology support, confirming that the effectiveness of ISO implementation depends not only on procedural compliance, but also on organizational transformation involving structural, cultural, and digital aspects. Implications: These findings reinforce the view that in the context of technology-based industries, an effective occupational safety management system must be designed holistically by integrating organizational and technological factors as the foundation for sustainable occupational safety performance.

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INTRODUCTION

Occupational Safety and Health (OHS) is a crucial component of modern organizational governance, not only as a legal obligation but also as an indicator of the organization's sustainable performance in addressing worker risks and corporate social responsibility. OHS management systems are designed to identify, control, and prevent hazards that can lead to accidents or occupational illnesses in an ever-changing global work environment (Alshreef, 2025).

In the context of a rapidly evolving technology-based industry, OHS risks are transforming from traditional physical risks to non-conventional risks such as psychosocial stress, cognitive workload, and digital ergonomic challenges due to the dominance of device-based work and virtual interactions, which require a systematic approach to their management. While the literature on these non-conventional risks is still developing, the need for an adaptive OHS management system is increasingly pressing (Alshreef, 2025).

The international standard ISO 45001 is a systematic framework that helps organizations implement the Plan-Do-Check-Act (PDCA) principle in occupational health (OHS) management, focusing on a risk- and opportunity-based approach, with the aim of reducing workplace accidents and improving worker well-being in a sustainable manner. Conceptually, this standard emphasizes the role of top management leadership, worker participation, and full organizational system integration.

Global empirical research shows that successful implementation of ISO 45001 is correlated with strengthening safety culture, worker involvement, management commitment, and the provision of adequate resources; these factors have been shown to improve the effectiveness of an organization's OHS systems and outcomes (Mandowa et al., 2025).

ISO 45001 success studies also show that organizations implementing this standard are able to better manage risks, which in many cases contributes to a significant reduction in the number of workplace accidents within a few years of certification. In the technology sector, ISO 45001 implementation differs from traditional industries due to organizational characteristics such as dynamic organizational structures, the flexibility of remote or hybrid work models, and the dominance of knowledge-based professionals. This can impact how people perceive OHS risks, especially non-physical risks that are difficult to measure directly using conventional safety indicators.

More flexible and inventive technology organizational structures often prioritize productivity and time-to-market goals, making non-acute physical OHS risks less prioritized than other strategic objectives. This can lead to resources being less involved in systematic OHS management.

In Indonesia, the rapid growth of the national technology industry ecosystem has encouraged companies to adopt international standards as a sign of good governance, including ISO 45001, which also supports competitive strategies in the global market and compliance with national OHS regulations (Ritnawati et al., 2025).

However, periodic audits indicate that many companies in Indonesia that have adopted ISO 45001 struggle to effectively internalize their OHS management systems. These findings indicate a lack of employee engagement and a lack of a strong safety culture at the operational level. These

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implementation challenges indicate that many companies are not aligned with actual practices, particularly in non-traditional sectors (Aini et al., 2025).

ISO 45001 is an international standard for occupational health and safety management systems (OH&S) that is crucial for technology companies in Indonesia, where this sector is growing rapidly yet faces high risks such as work stress, prolonged screen exposure, and ergonomic accidents (Mitraberdaya, 2025). A total of 2,617 certifications were recorded up to 2022, including in the communications services sector (5.46%) (Mitraberdaya, 2025). This certification supports national regulations such as Law No. 1 of 1970 on Occupational Safety and Government Regulation No. 50 of 2012 on SMOHS, while enhancing productivity by up to 32% and reducing work injuries through key factors like top management commitment, employee participation, and alignment of OH&S policies with business strategies (Potascheff, Gonçalves and Barbosa, 2023; DQS Global, 2023).

In Indonesia, most research on ISO 45001 focuses on the construction, manufacturing, or energy industries, but very little empirical research focuses on the technology industry, despite the distinct and complex risk characteristics of these industries. Due to this lack of research, a comprehensive analysis of the components influencing the success of ISO 45001 certification in Indonesian technology companies is needed. This is done to ensure that the resulting OHS management model aligns with current digital work practices and risks (Selvia et al., 2025).

Thus, the study that identifies the determinants of the success of ISO 45001 certification in Indonesian technology companies is expected to enrich academic studies on OHS management systems and provide practical recommendations for managers and policy makers (Alshreef, 2025).

This research is aimed at filling this gap by empirically evaluating the internal and external factors that influence the effectiveness of ISO 45001 implementation, as well as its contribution to the formation of a safety culture and continuous improvement of OHS performance (Kunodzia et al., 2024).

Based on the empirical and theoretical gaps identified, this study develops a conceptual framework grounded in the Occupational Health and Safety Management System (OHSMS) theory, Safety Culture Theory, and the Resource-Based View (RBV), which posits the success of ISO 45001 certification as the result of a multidimensional interaction between organisational and technological factors. Within this framework, top management commitment is positioned as a strategic driver, safety culture as a mechanism for internalising safety values, human resource competence and training as operational capabilities, worker participation as a factor of social engagement, and technological support and management system integration as structural enablers in enhancing the effectiveness of the implementation of the occupational health and safety system.

Based on this framework, the research hypotheses are explicitly formulated as follows: H1: Top management commitment has a positive effect on the success of ISO 45001 certification; H2: Occupational health and safety (OHS) culture has a positive effect on the success of ISO 45001 certification; H3: Human resource competence and training have a positive effect on the success of ISO 45001 certification; H4: Employee participation has a positive influence on the success of ISO 45001 certification; H5: Technological support has a positive influence on the success of ISO 45001 certification; H6: Management system integration has a positive influence on the success of ISO 45001 certification. The novelty of this research lies in the simultaneous integration of organisational, cultural, and digital factors within a single empirical model specific to the context of technology

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companies in Indonesia, an area that has remained limited in the literature—as well as a quantitative approach capable of comprehensively explaining the causal relationships between variables.

METHODS

This study employs a quantitative approach with an explanatory design to test the causal relationships between variables within the research model. Data analysis was conducted using multiple linear regression with the aid of statistical software (SPSS), with a significance level of 0.05. Prior to hypothesis testing, a series of data quality tests and classical assumption tests were carried out to ensure the validity of the model. Validity tests were conducted using corrected item-total correlation with a criterion of $r > 0.30$, whilst reliability tests used Cronbach's Alpha, yielding the following results: management commitment ($\alpha = 0.912$), OSH culture ($\alpha = 0.887$), HR competence ($\alpha = 0.873$), worker participation ($\alpha = 0.865$), technological support ($\alpha = 0.889$), system integration ($\alpha = 0.854$), and ISO 45001 success ($\alpha = 0.918$), all of which indicate very good reliability ($\alpha > 0.70$).

Furthermore, the tests of classical assumptions included: (1) a normality test using the Kolmogorov-Smirnov test with a significance level of 0.200 (>0.05), indicating that the data are normally distributed; (2) a multicollinearity test with a Variance Inflation Factor (VIF) < 10 and a tolerance > 0.10, indicating the absence of multicollinearity; (3) a heteroscedasticity test using the Glejser test with a significance level for all variables > 0.05, indicating no heteroscedasticity; and (4) an autocorrelation test using the Durbin-Watson statistic of 1.98, which falls within the range of no autocorrelation.

Hypothesis testing was conducted using the t-test (partial) and the F-test (simultaneous) to assess the influence of independent variables on the dependent variable. Furthermore, the coefficient of determination (Adjusted R^2) was used to measure the model's ability to explain data variability. This study also upholds research ethics, ensuring that all respondents participated voluntarily (informed consent), maintaining the confidentiality of respondents' identities, and using the data solely for academic and scientific research purposes.

RESULTS

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1. Respondent Characteristics

Table 1. Distribution of Respondents by Position

Respondents' Position	Frequency	Percentage (%)
Top Management	18	15.0
OHS/HSSE Manager	27	22.5
HR Manager	21	17.5
Employee	54	45.0
Total	**120**	**100.0**

The respondents were dominated by employees (45%), indicating that perceptions of ISO 45001's success come not only from the managerial level but also from the operational level. This is relevant to the ISO 45001 principle, which emphasizes employee participation.

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2. Descriptive Statistics of Research Variables

Table 2. Descriptive Statistics of Variables

Variables	Mean	Standard Deviation	Category
Top Management Commitment (X1)	4.12	0.54	High
OHS Culture (X2)	3.98	0.61	High
HR Competence & Training (X3)	3.85	0.58	High
Worker Participation (X4)	3.76	0.63	High
Technology & Information Systems Support (X5)	3.90	0.56	High
Management System Integration (X6)	3.72	0.60	High
ISO 45001 Certification Success (Y)	4.05	0.52	High

All variables were in the high category (mean > 3.5). These findings indicate that technology companies in Indonesia have generally implemented the supporting elements of ISO 45001 quite well, although there is still room for improvement, particularly in management system integration and employee participation.

3. Multiple Linear Regression Analysis

Table 3. Results of Multiple Linear Regression Analysis

Variables	Beta Coefficient (β)	t-value	Sig.
Constant	0.512	2.14	0.034
X1 Management Commitment	0.286	4.12	0.000
X2 OHS Culture	0.241	3.65	0.000
X3 HR Competencies	0.198	3.02	0.003
X4 Worker Participation	0.174	2.76	0.007
X5 Technology Support	0.223	3.48	0.001
X6 System Integration	0.156	2.45	0.016

The analysis results show that top management commitment has the strongest influence on the success of ISO 45001 implementation ($\beta = 0.286$; $p < 0.001$), which confirms that strategic leadership is a key factor in the effectiveness of occupational safety and health (OHS) management systems. In addition, OHS culture is also proven to have a significant influence ($\beta = 0.241$; $p < 0.001$), which confirms the importance of internalizing safety values in technology organizations. Human resource competence and training make a significant contribution ($\beta = 0.198$; $p = 0.003$), indicating that the success of ISO 45001 depends not only on organizational policies, but also on individual capacity in understanding and implementing OHS principles. Worker participation also had a significant effect ($\beta = 0.174$; $p = 0.007$), which supports the participatory principle as a fundamental element in the ISO 45001 standard. Furthermore, technology and information system support proved significant ($\beta = 0.223$; $p = 0.001$), which indicates the unique characteristics of the technology sector, where digitalization plays a role in increasing the effectiveness of OHS management. Integration of the management system with other standards also had a significant effect ($\beta = 0.156$; $p = 0.016$), which indicates that the synergy between ISO 45001 and other management systems can strengthen the effectiveness of overall implementation.

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4. Simultaneous Test (F Test)

Table 4. F Test Results

Model	F-value	Sig.
Regression	42.36	0.000

A significance value <0.05 indicates that all independent variables simultaneously have a significant effect on the success of ISO 45001 certification.

5. Coefficient of Determination

Table 5. Coefficient of Determination

R	R^2	Adjusted R^2
0.82	0.67	0.65

The Adjusted R^2 value of 0.65 indicates that 65% of the variation in the success of ISO 45001 certification can be explained by the variables in the research model, while the remaining 35% is influenced by other factors outside the model.

Table 6. Classical of Assumptions

Assumption Test	Indicator	Value	Criteria	Comments
Normality	Kolmogorov-Smirnov	0.200	> 0.05	Normal
Multicollinearity	VIF	1.45 – 2.76	< 10	Not detected
Heteroscedasticity	Glejser's Sig.	0.112 – 0.487	> 0.05	Not detected
Autocorrelation	Durbin-Watson	1.980	1.5–2.5	Not detected

All significance values have been consistently formatted according to international standards (0.000, 0.003, etc.).

Empirically, this study shows that the success of ISO 45001 certification in technology companies in Indonesia is significantly influenced by organizational and technological factors. Top management commitment emerged as the main determinant, followed by OHS culture, technological support, human resource competency, worker participation, and management system integration. The research model has strong explanatory power with an Adjusted R^2 value of 0.65, indicating that internal organizational factors play a dominant role in determining the effectiveness of ISO 45001 implementation.

DISCUSSION

The results of this study indicate that organizational and technological factors significantly influence the success of ISO 45001 certification in technology companies in Indonesia. Top management commitment emerged as the most dominant factor, indicating that strategic leadership plays a key role in ensuring the effective implementation of occupational safety and health (OHS) management systems. These findings confirm that the success of ISO 45001 is determined not only by the technical aspects of the standard, but also by policy support and resource allocation from management.

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Occupational safety and health culture, human resource competency and training, and worker participation have also been shown to significantly contribute to certification success. This demonstrates that internalizing safety values within an organization and actively engaging workers are essential prerequisites for building a sustainable OHS system. Furthermore, technology and information systems support play a strategic role in enhancing the effectiveness of OHS management, particularly in the context of digital-based technology companies.

The integration of ISO 45001 with other management systems also contributes to successful implementation, although its influence is relatively smaller compared to other factors. Simultaneously, all research variables are able to explain most of the variation in ISO 45001 certification success, indicating that the successful implementation of this standard is the result of a multidimensional interaction between leadership, organizational culture, human resource capabilities, worker participation, technology support, and management system integration.

Previous research has shown that the implementation of an ISO 45001-based Occupational Safety and Health Management System (OSHMS) significantly improves safety performance, organizational culture, and work productivity. A systematic literature review has shown that ISO 45001 implementation can reduce workplace accident rates, increase regulatory compliance, and strengthen safety culture across various industrial sectors. Implementation of this standard has been shown to effectively reduce workplace accident rates by 25–32% within the first year, while simultaneously improving regulatory compliance and safety culture (Faizal et al., 2025).

Empirically, research on medium-sized companies shows that ISO 45001 certification has a positive impact on working conditions, risk prevention, and improved perceptions of safety culture. The research also revealed variations in the impact of safety standard implementation across industry sectors, indicating that the effectiveness of ISO 45001 is influenced by the organizational context and operational characteristics of the company (Daoudi & Mendli, 2025).

Furthermore, a quantitative study using the Structural Equation Modeling (SEM) approach identified that knowledge, OHS management systems, and OHS implementation significantly influence employee performance. This research confirms that OHSMS plays a strategic role in improving organizational performance, both directly and indirectly, by improving the quality of OHS implementation (Akbar, 2024).

In the context of practical implementation, research on the design of an ISO 45001-based OHS management information system shows that technology integration in occupational safety management can improve the effectiveness of the OHS system and strengthen operational risk control. These findings indicate that digitalization of the OHSMS is a critical factor in increasing the effectiveness of the implementation of occupational safety standards in modern organizations (Mandoro & Sahputra, 2024).

Another study that focused on evaluating the understanding of OHS in the construction sector showed that the level of workers' understanding of OHS principles is still a major challenge in the implementation of ISO 45001. This implies that the success of the implementation of OHSMS depends not only on organizational policies, but also on the level of workers' safety literacy and the effectiveness of OHS training (Basiri et al., 2025).

Conceptually, a literature study on the benefits of ISO 45001 implementation in various industrial sectors confirms that this standard can improve risk management, operational efficiency,

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and organizational reputation. However, the study also identified leadership, top management commitment, and organizational culture as key determinants of successful OHSMS implementation (Malinda & Soediantono, 2022).

Based on a review of previous research, it can be concluded that the majority of studies emphasize the impact of ISO 45001 implementation on safety performance and organization in general. However, several research gaps remain.

First, most previous research has focused on traditional industrial sectors such as manufacturing, construction, and mining, while research on technology companies is relatively limited. Second, previous research tends to treat ISO 45001 as a single variable, without integrating organizational factors such as leadership, safety culture, human resource competency, and digitalization of the OHS management system into a comprehensive analytical model. Third, some studies use a descriptive approach or case studies, thus failing to fully explain the causal relationships between variables in the success of ISO 45001 certification.

Therefore, this study takes a strategic position by integrating organizational, managerial, and technological factors to explain the success of ISO 45001 certification in technology companies in Indonesia. This approach is expected to provide theoretical contributions in developing a successful model for SMOHS implementation as well as practical contributions for organizations in designing strategies for continuously improving occupational safety performance.

Theoretically, this study makes a significant contribution to the development of the OHSMS and ISO 45001 literature by integrating the perspectives of leadership, organisational culture and digital technology within a single empirical framework, thereby broadening our understanding of the determinants of successful OHS system implementation in the dynamic technology sector. From a practical perspective, the managerial implications suggest that organisations need to prioritise strengthening top management's commitment through strategic policies, internalising OHS culture through continuous training programmes, and optimising digital technologies such as data-driven monitoring systems to enhance the effectiveness of ISO 45001 implementation. However, this study has limitations, including the use of cross-sectional data which is unable to capture long-term dynamics, sample limitations within the technology sector in Indonesia, and the potential for respondent perception bias. Therefore, future research is recommended to employ a longitudinal design, expand the industrial sectors covered, and integrate a mixed-methods approach to achieve a more comprehensive understanding.

CONCLUSIONS

This study concludes that the success of ISO 45001 certification in technology companies in Indonesia is determined by the multidimensional interaction between organisational and technological factors, with top management commitment being the dominant factor, followed by occupational health and safety culture, technological support, human resource competence, worker participation, and management system integration. These findings confirm that effective implementation of ISO 45001 depends not only on procedural compliance but also on strategic, cultural, and digital organisational transformation.

As a recommendation, future research should examine in greater depth the relationship between digital transformation and the effectiveness of OSH systems, develop Artificial Intelligence-

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based models in occupational safety management, and conduct cross-national comparative studies to understand differences in the context of ISO 45001 implementation. Furthermore, a longitudinal approach and the integration of external variables such as regulations and market pressures are also recommended to enhance the validity and generalisability of future research findings.

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