

The Guidelines for Preparation of Certified ISO 45001: The Occupational Health and Safety Management System

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Abstract

Occupational health and safety factors are critical for conducting business in the industrial sector, as well as maintaining sustainable business practices in the social aspect. This research focuses on studying the guidelines for preparation for ISO 45001 certification and developing them into a structural equation model. The study utilised a combination of qualitative and quantitative approaches to gather data. A survey was conducted among representatives of safety committees responsible for OHS in industries certified under ISO 45001. The survey used a questionnaire and had a total of 500 respondents. The statistics used in this study include descriptive, inferential, and multivariate statistics. The study on the Guideline for Preparation for Certified ISO 45001 ranks the four components in order of importance as follows: 1) Workforce readiness component ($\bar{X} = 4.11$) The most important observation is: Specify key safe work practices in the Job Description for all positions. 2) Alliance readiness component ($\bar{X} = 4.01$) An important observation in ISO45001 is the need to collaborate with stakeholders. 3) Information readiness component ($\bar{X} = 4.00$) The most important observation is KPIs to prepare a readiness plan. 4) Resource readiness component (\bar{X}

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= 4.00). It is critical to consistently ensure that all equipment is prepared for use. The hypothesis testing results indicate no significant difference, at the 0.05 level, in the importance of preparation guidelines for small and medium-sized businesses compared to large businesses. The analysis of the developed structural equation model showed that it met the evaluation criteria and aligned with the empirical data. The chi-square probability value was 0.477, the relative chi-square value was 1.003, the goodness-of-fit index was 0.956, and the root mean square error of approximation was at a level of 0.002.

Keywords: Structural Equation Modelling, OHSAS 18001, ISO 45001, TIS 18001.

Introduction

The idea of "sustainable business practices," also referred to as ESG (Environmental, Social, and Governance), is receiving significant recognition among businesses in various industries. This approach extends beyond mere enhancement of business performance and growth; it strives to attain long-term sustainability by taking into account the environmental, social, and governance impacts of business operations. ISO 45001 plays a crucial role in enhancing the environmental and social aspects of ESG guidelines, fostering strength and resilience. Effective occupational health and safety management plays a crucial role in enhancing the efficiency of industrial businesses. By prioritising the improvement of the workplace conditions, it aims to prevent and minimise work accidents, while also safeguarding the occupational health of workers and minimising any negative impact on their well-being. Addressing work-related illnesses can help minimise expenses associated with accidents and compensations. This approach will have a direct impact on the quality of the population, society, and the work environment, as well as the surrounding communities that may be influenced ([Wattanakomo, 2023](#)).

Considering the constant and rapid growth of the industrial sector, the negative consequences of accidents in this field can have a significant impact on various aspects such as costs, assets, businesses, and human resources. These areas are given utmost importance ([Wattanakomol, 2021](#)). There are various levels of severity. This could potentially disrupt operations, impacting local communities, the environment, and even having repercussions at a national scale for major industries. The main objective of ISO 45001 is to minimise and manage the potential risks faced by employees and other individuals, enhance the overall safety of business activities, and enhance the organization's standing as a responsible entity towards its workforce and the wider society. The ISO 45001 was derived from the "BS OHSAS 18001 Occupational Health and Safety Management System" standard, incorporating elements from BS 8800, international standards, and OHSMS standards of different certification bodies. Furthermore, the ISO 45001 has been designed to align with ISO 9001 and ISO 14001 in order to facilitate integration into a unified management system. In the ever-

expanding world of international trade, new obstacles are arising in the realm of workplace health and safety. Global benchmarking, improving working environment standards, and fostering a culture of safety in the workplace have become increasingly crucial.

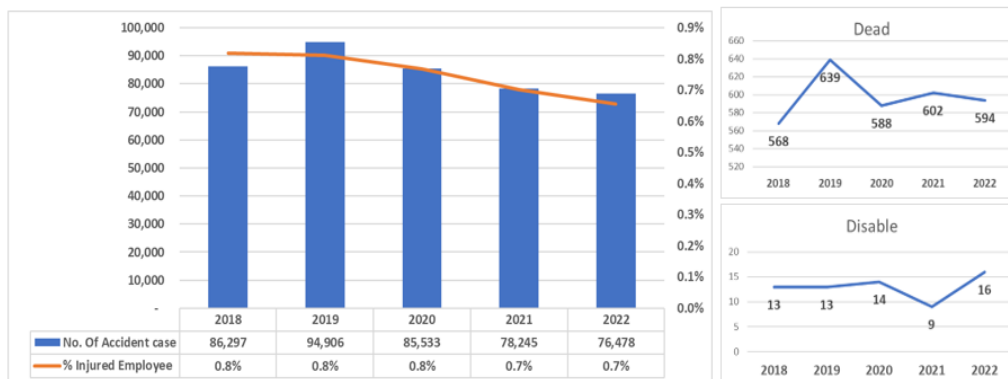


Figure 1: Occupational injury or illness in Workplace, Dead and Disable in Thailand in 2018-2022.

(Social Security office in Thailand 2023)

According to the data on occupational injury and illness rates from 2018 to 2022, there has been fluctuation and a minor decline in the rate of occupational injury and illness. Nevertheless, the rate continues to be significantly higher when compared to businesses in developed countries. The rates of occupational death and disability from 2018 to 2022 have not exhibited a decline. It is evident that there is still much work to be done in the industrial sector to address the ongoing concerns surrounding occupational health and safety.

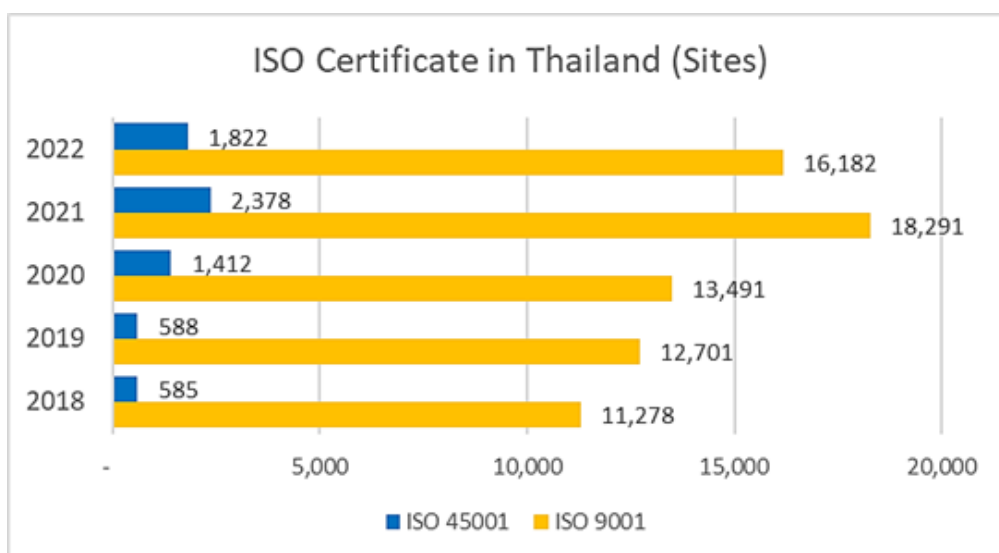


Figure 2: Comparison of ISO 45001 and ISO9001 certification in 2018-2022.

(www.iso.org, 2023)

Thailand lacks awareness of ISO 45001 certification standards. Based on the survey data from ISO's 2022 report, the number of certifications decreased from 556 in 2021

to 1,822, representing a decline of 23.4%. The penetration rate of ISO 45001 is only 11.3%, in comparison to the 16,182 ISO 9001 certifications. The statement suggests that ISO 45001 lacks widespread recognition and that the procedures for obtaining system certification remain unclear.

The Research Objectives are as follows:

1. To study the components of the Guideline for Preparation to Certified ISO 45001 Occupational Health and Safety Management System.
2. To develop the structural equation model of the Guideline for Preparation for the Certified ISO 45001 Occupational Health and Safety Management System.

Literature Review

The concept of "Readiness" discussed by [Simon \(1984\)](#) regarding effective learning goes beyond just intellectual aptitude. It emphasises the importance of a holistic approach that includes both physical and mental well-being. The study conducted by [de Jesus Pacheco, Junior and de Matos \(2021\)](#) highlights the importance of "Readiness" in the context of preparing for ISO 45001 certification. This concept encompasses four key elements: Physical, Intellectual, Environment, and Motivation. These elements serve as a guideline for individuals seeking to meet the requirements of ISO 45001, as outlined by [Šolc et al. \(2022\)](#).

1. Information Readiness: Information Management – (IM) ([Fernández-Muñiz, Montes-Peon, & Vazquez-Ordas, 2007](#)) explores the cycle of organisational activities. To instill a sense of trust in the advantages of acquiring knowledge Crucial in decision making is considering the acquisition and source of the information. The access and dissemination of data information, changes, secure storage, and disposal of the data are all important considerations. Having a strong grasp of ISO 45001 determination is crucial when it comes to preparing for ISO 45001 Certification ([Šolc et al., 2022](#)). The programme should be widely shared within the organisation to ensure its success.
2. Resources Readiness: Financial resources play a crucial role in project implementation, facilitating significant changes and the attainment of desired results ([Wantanakomol, 2021](#)). However, it is crucial to have effective control, as inadequate budget management can result in substantial project cost overruns. The quality of project inputs and outcomes is crucial for project success. By utilising top-notch resources and maintaining rigorous quality standards, organisations can achieve outstanding outcomes that are in line with project goals ([Frefer et al., 2018](#)). Budgets are usually set up prior to the start of planned activities, offering a clear overview of expected expenses and sources of revenue. This proactive approach enables organisations to make well-informed financial choices, distribute resources efficiently, and minimise potential financial risks ([Kovaleva et al., 2016](#)).

3. **Workforce Readiness:** Human Resource Management (HRM) refers to the strategic and comprehensive management of an organization's most valuable resource—its people. It encompasses a variety of strategies focused on attracting, nurturing, inspiring, and retaining a top-performing workforce that contributes to the overall success of the organisation. Employees who are highly motivated tend to be more engaged, dedicated, and productive, which ultimately benefits the organisation as a whole. The success of any business relies on the effective coordination and collaboration of its team members, fostering a cohesive and productive team aligned with common principles and objectives.

4. **Alliance Readiness:** Adopting stringent safety systems is now important for industrial firms aiming to broaden their market presence, improve customer satisfaction, and bolster their international reputation. By concentrating occupational health and safety (OHS) standards in manufacturing operations, companies can realize numerous advantages that encourage sustained growth and achievement (da Silva & Amaral, 2019).

The conceptual framework of The Guideline for Preparation to Certified ISO 45001 is displayed in Figure 3.

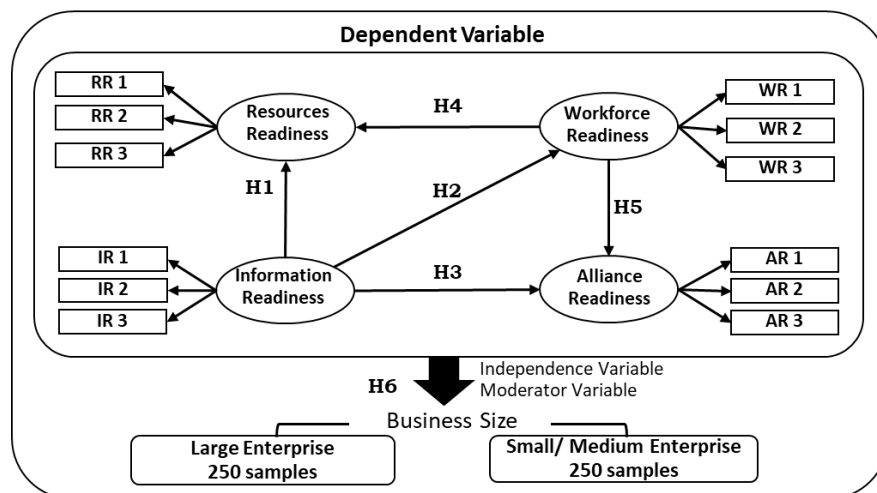


Figure 3: The Conceptual framework for the guideline for preparation to be certified ISO 45001.

Research Methodology

This research employs a mixed methodology, as recommended by the Doctor of Business Administration Programme Executive Committee at the Industrial Business Administration Faculty of Business Administration, King Mongkut's University of Technology North Bangkok. This study was carried out in Thailand by surveying certified ISO 45001 industrial organisations. The research consists of three steps as outlined below:

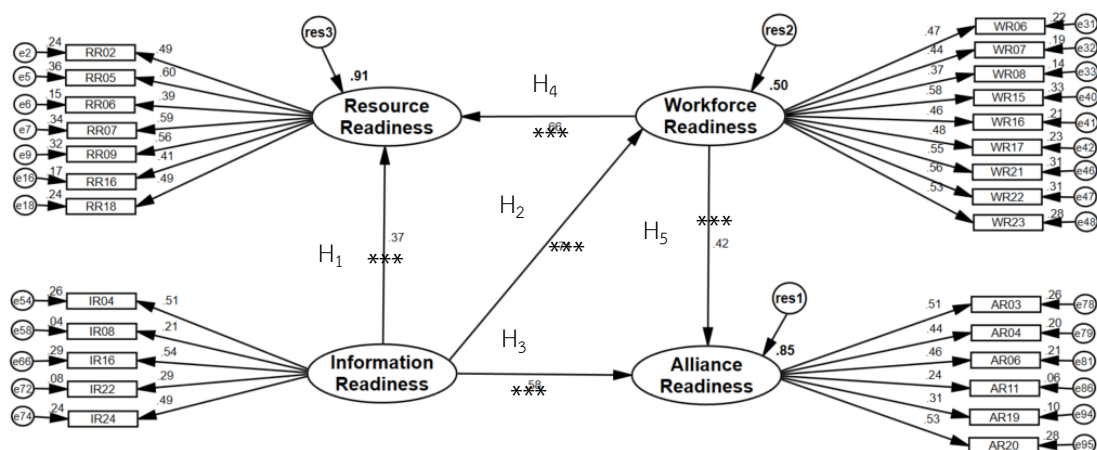
Step 1: The research employed a qualitative approach: In-depth interviews were conducted with 9 experts who were carefully chosen for their expertise. The panel consisted of three executives from business/industry, three experts from government organisations, and three experts from educational institutes.

Step 2: The quantitative methods used were: There were a total of 1,822 cases of organisations that were certified under ISO 45001. Based on the study conducted by [Kazutaka \(2012\)](#), a sample size of 500 was considered suitable. A multi-stage sampling method was utilised, with 250 samples from small-medium businesses and 250 samples from large businesses chosen through a lottery method for probability random sampling.

Step 3: The qualitative research used: The structural equation model was validated using Focus Group Discussion techniques. A purposive random sampling method was employed to select 11 qualified individuals.

Results

1. The analysis of the guideline for ISO 45001 certification preparation ([Šolc et al., 2022](#)) identifies four elements: Workforce Readiness, Alliance Readiness, Information Readiness, and Resources Readiness. These elements are derived from the literature review and are hypothesised to have interrelated and influential effects in this research. The empirical data yielded statistically significant results at the 0.001 level, with a p-value of 0.477, CMIN/DF of 1.003, GFI of 0.956, and RMSEA of 0.002. This finding aligns with existing literature and empirical evidence, and satisfies the evaluation criteria established by [Arbuckle \(2012\)](#). The structural equation model for the preparation of ISO 45001 certification, as shown in [Figure 4](#), has been improved.



Chi-square = 319.800, df = 319, p = .477
CMIN/DF = 1.003, GFI = .956, RMSEA = .002

Figure 4: Structural equation model of the guideline for preparation to certified ISO 45001.

2. The results of 5 hypotheses in the Structural equation model found that H 1: Information Readiness element directly influences the Resources Readiness element

statistical significant at 0.001 level has Standardized Regression Weight at 0.37 level, H2: The Information Readiness element directly influences the Workforce Readiness element statistically significantly at 0.001 level has the Standardized Regression Weight at 0.71, H3: The Information Readiness element directly influences the Alliance Readiness element statistically significantly at the 0.001 level, with a Standardized Regression Weight of 0.58. H4: The Workforce Readiness element directly influences the Resources Readiness element statistically significantly at the 0.001 level, with a Standardized Regression Weight of 0.66. H5: The Workforce Readiness element directly influences the Alliance Readiness element statistically significantly at the 0.001 level, with a Standardized Regression Weight of 0.42.

3. The significance of ISO 45001 certification preparation guidelines. The guidelines' significance is evident in the average score of 4.04, indicating a high level. Each aspect was rated at a high level with four elements of importance: The Workforce Readiness element has an average score of 4.11. The average score of the Alliance Readiness element is 4.01. The Information Readiness element has an average score of 4.00 with a standard deviation of 0.36. The Resources Readiness element has an average score of 4.00 (S.D.= 0.37).

4. A comparative analysis of the importance levels for ISO 45001 certification preparation guidelines based on business size. A t-test comparing the importance levels between large and small-medium businesses revealed no significant overall difference. However, large businesses showed significantly more focus on the guidelines for ISO 45001 certification preparation compared to small-medium businesses, with statistical significance at the 0.05 level (Table 1).

Table 1: The importance of the Guideline for Preparation to be Certified ISO 45001.

Element of the guideline for preparation to be certified ISO 45001	Small- Medium			Large			The t-Value	The P-Value
	\bar{X}	S.D.	Level of Importance	\bar{X}	S.D.	Level of Importance		
In Overall	4.04	0.31	High	4.01	0.32	High	1.17	0.24
1. Workforce Readiness	4.11	0.36	High	4.10	0.37	High	2.21	0.03*
2. Alliance Readiness	4.04	0.32	High	3.97	0.36	High	0.81	0.42
3. Information Readiness	4.01	0.35	High	3.98	0.37	High	0.65	0.52
4. Resources Readiness	4.01	0.38	High	3.98	0.35	High	0.49	0.62

Discussion and Conclusion

1. The Workforce readiness element was found to be the most important element, with an average score of 4.11. This finding aligns with the research conducted by Górný (2014) in their study on a conceptual lean implementation framework based on change management theory. Research consistently shows that employee preparedness is crucial for achieving ISO 45001 certification.

2. The study revealed that the 'Resources Readiness' Element, which encompasses the inspection of equipment such as forklifts, lifts, steam boilers, gas, electricity and others to ensure their constant operational readiness, achieved an average score of 4.42. This is consistent with the findings of the study conducted by [Frefer et al. \(2018\)](#) titled "Overview Success Criteria and Critical Success Factors in Project Management." The well-maintained state of machinery and equipment is due to regular inspections, preventive maintenance, routine malfunction checks, and scheduled repairs based on a preventive maintenance programme and expected lifespan.

3. The results of comparing the levels of importance to the guideline for preparation to certified ISO 45001 occupational health and safety management system, divided by the size of the business, did not show any statistically significant difference at the 0.05 level. This finding aligns with the research conducted by [Watson, Blackstone and Gardiner \(2007\)](#) on "Effective Project Management with Theory of Constraint," which suggests that project success is not solely determined by the size of the business. Instead, the key to successful project completion lies in skillfully navigating the project lifecycle and strategically prioritising tasks.

4. In analysing the results of the hypothesis test, it is evident that Information Readiness has the strongest impact on Workforce Readiness, as indicated by a significant Standardised Regression Weight of 0.71. According to the research conducted by [Şimşit, Günay and Vayvay \(2014\)](#), it has been found that promoting knowledge, emphasising communication, and ensuring that efforts reach all levels and departments of an organisation can have a positive impact on employee readiness. Efficient knowledge collection and management, combined with effective information management practices, will help in organising knowledge assets for optimal organisational advantage.

5. The analysis revealed that the Information Readiness element significantly influenced the Alliance Readiness element, as indicated by a standardised regression weight of 0.87. This finding aligns with previous research conducted by [Meindl et al. \(2021\)](#) on "Perceptions of Responsibility for Workplace Safety in manufacturing environment". Effective communication plays a crucial role in various aspects, such as knowledge sharing from government agencies, government-supported promotional projects, collaboration with local communities, and engagement with consultants and certification bodies. These factors have a significant impact on the preparation for ISO 45001 certification. Education and knowledge sharing among all personnel in the organisation, including management, operational staff, and business partners, promote a positive attitude, encourage cooperation during periods of change, and enhance work performance.

Successful preparation for ISO 45001 certification requires comprehensive knowledge dissemination and effective communication across all levels of the organisation, including stakeholders. These factors encompass empowering employees, promoting collaboration, and maintaining and ensuring the availability of equipment.

Suggestions

After conducting extensive research on the guidelines for preparation to be certified ISO 45001, the researcher puts forth two recommendations as guidelines for both public and private sectors in preparing their organisations in various aspects, including Workforce, Resources, Information, and Alliance to achieve ISO 45001 certification.

Recommendations for Policy Level

- a) It is crucial for government agencies involved in the industry to develop policies that encourage and support the sharing of knowledge, training, and long-term policy development. This will help in making ISO 45001 a mandatory standard for general industrial businesses.
- b) The Revenue Department, Customs Department, and state-owned banks under the Ministry of Finance should collaborate to establish a policy framework that facilitates direct measures, such as low-interest short-term loans, and indirect measures, such as income tax deductions and import tax deductions for machinery and equipment, to enhance occupational health and safety. These measures should be regarded as specific incentives for businesses that have attained ISO 45001.

Recommendations for Operational

Workforce Readiness: A comprehensive approach is necessary to address all aspects of an organization's operations, including its human resources. An essential aspect of this preparation entails the precise delineation of safe work procedures and their integration into job descriptions for all roles within the organisation.

Alliance Readiness: Gaining ISO 45001 certification goes beyond the boundaries of a company's internal operations. It requires a collaborative approach that involves external stakeholders, especially business partners, to establish a supportive ISO 45001 Implementation.

Information Readiness: Sharing knowledge and information throughout the organisation, from top-level management to frontline staff and business partners, promotes a positive mindset, fosters collaboration during times of change, and enhances work performance. Information establishes key performance indicators essential for business operations. Create a comprehensive plan to successfully achieve certification for the ISO 45001 standard system, while also establishing an effective feedback mechanism. Please submit a formal complaint regarding any safety-related defects in the workplace. Encourage employees to collaborate and contribute to ongoing development and improvement efforts.

Resources Readiness: Conducting thorough inspections of all equipment prior to each shift to ensure their proper functioning and detect any potential safety hazards. Establishing a comprehensive preventative maintenance programme to uphold the

quality and reliability of tools, appliances, and infrastructure. This involves routine inspections, maintenance, and repairs to reduce the likelihood of breakdowns or malfunctions. Take into account the possible hazards that may arise during the design and planning phases of the factory layout, production building structure, and interior design. Give top priority to features that reduce risks and ensure safety.

Recommendation

This research study gathered data from the business sector in Thailand that has obtained ISO-45001 certification. Therefore, its results may not be appreciated by certain countries or cultures, but it can be effectively used as a guideline for future studies addressing the following issues:

1. Further research is needed to explore strategies for enhancing the capacity of SMEs to improve OHS. This study aims to identify strategies for improving OHS standards in SMEs to align with those of larger organisations.
2. Enhance human resource development in SMEs through strategies that support sustainable business operations, such as implementing training and capacity-building programmes. These programmes aim to equip employees with the necessary skills and knowledge to effectively manage OHS.
3. Examine the economic advantages of adopting an ISO 45001 OHS management system in SMEs. The cost savings, productivity gains, and reputational advantages associated with ISO 45001 certification have been quantified.

The results of these supplementary research areas could be shared to guide decision-making among SMEs in relation to the pursuit of ISO 45001 certification. This could encourage more SMEs to adopt the standard, fostering a culture of OHS excellence and contributing to a safer and healthier work environment.

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