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SWOT/AHP APPROACH TO IDENTIFY STRATEGIC PRIORITIES FOR ESTABLISHING A SAFETY AND HEALTH MANAGEMENT SYSTEM FOR SMES

Jae-young Yoo¹, Dong-Hyung Lee² and Sung Min Bae^{3*}

¹Department of Smart Production and Management Engineering, Hanbat National University, Daejeon, Republic of Korea

²Department of Industrial and Management Engineering, Hanbat National University, Daejeon, Republic of Korea

³Professor, Department of Industrial and Management Engineering, Hanbat National University, Daejeon, Republic of Korea

*Corresponding Author: Sung Min Bae : loveiris@hanbat.ac.kr

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ABSTRACT

This research addresses the challenges small and medium-sized enterprises (SMEs) encounter in establishing their safety and health management systems. These challenges include limited resources, lack of expertise, and the absence of systematic risk management systems. By identifying strategic priorities for constructing safety and health systems, this study proposes methods to facilitate their smoother development. The research methodology employed a SWOT-AHP approach to set strategic priorities for enhancing safety and health management in SMEs. This involved identifying internal strengths and weaknesses, as well as external opportunities and threats, related to the construction of the safety system within SMEs. Key elements were selected from each category for evaluation. The results revealed 'worker participation' as the most crucial factor in the strengths category, while 'lack of management commitment' was identified as the most significant weakness. 'Improvement in safety and health performance' was assessed as the most critical opportunity, and 'lack of executive leadership' was considered the greatest threat. This research is anticipated to significantly enhance safety and health management standards in SMEs by providing a novel approach to constructing their safety and health management systems.

Keywords: safety and health management systems, SMEs, SWOT analysis, AHP, Strategic priorities

1. INTRODUCTION

In the field of industrial safety and health management, the need for small and medium-sized enterprises

(SMEs) to establish a Safety and Health Management System (SHMS) is increasingly growing. SMEs face issues such as limited resources, lack of specialized knowledge, and the absence of systematic risk management systems, seriously threatening safety. This not only impacts the health and safety of employees but also negatively affects the overall competitiveness and sustainability of SMEs. According to a 2023 survey by the Korea Chamber of Commerce and Industry targeting 641 companies with fewer than 50 employees, the majority of these SMEs are still inadequately prepared for the Serious Accident Punishment Act. This situation further emphasizes the need for SMEs to establish a SHMS.

The survey revealed that SMEs struggle with compliance with safety regulations (53.7%), securing safety management personnel (51.8%), and excessive cost burdens (42.4%) in dealing with the Serious Accident Punishment Act[1]. This suggests the need for a tailored SHMS for SMEs. Existing studies propose various approaches and strategies for implementing SHMS in SMEs, but there is a lack of research identifying specific strategic priorities tailored to the characteristics and environment of SMEs. In particular, these studies, often focused on large corporations or specific industrial sectors, indicate the need for a customized approach considering the management characteristics and limited resources of SMEs. This research aims to fill this gap.

This study uses a methodology integrating SWOT analysis and AHP to establish strategic priorities for strengthening the SHMS in SMEs. This methodology enables SMEs to clearly understand their strengths and weaknesses, exploit opportunities presented by the external environment, and effectively respond to potential threats. The elements of strengths, weaknesses, opportunities, and threats of the SHMS in SMEs were determined by reviewing existing studies and synthesizing elements proposed by researchers. The results of this study are expected to help establish actionable strategies for enhancing the SHMS in SMEs. In particular, it provides useful guidelines on the importance of safety and health management and specific implementation methods for policymakers, business managers, and general employees. Additionally, this research addresses possible aspects of implementing a SHMS in situations where traditional models are difficult to apply due to poor operating methods and scarce resources of SMEs. This involves exploring the complex interactions between organizational culture, employee behavior, and safety practices, and providing a more comprehensive understanding of the unique ecosystem within SMEs.

In conclusion, this research contributes to academic discussions by providing a new approach to the SHMS in SMEs and offers implications for practical application in real SME environments. This study supplements existing literature and focuses on the specific needs of SMEs, proposing feasible and effective customized solutions and recommendations in this context. The findings of this research are expected to enhance and improve the competitiveness of SMEs by creating a safer and more productive working environment, which is crucial for policy formation, managerial decisions, and ultimately enhancing safety and health management in SMEs. This research plays an important role in enhancing the overall understanding of safety and health management in SMEs and in providing concrete directions for the establishment of effective safety and health systems.

1. THEORETICAL BACKGROUND

The Safety and Health Management System (SHMS) is a documented framework designed to enable organisations to manage safety and health activities in the workplace systematically and autonomously. Operating on a continuous improvement cycle of Plan-Do-Check-Action (PDCA), initiated by top management's setting of safety and health goals and policies, the Safety and Health Management System (SHMS) encompasses key elements such as legal compliance, efficient risk management, and heightened responsibility for employee safety and health. This enables SMEs to foster a safer work environment, mitigate potential risks, and fulfill legal obligations. The Korea Accreditation Board (KAB) defines this as a part of the management system where organizations develop and implement safety and health policies and manage associated risks[2].

Recent research has explored diverse approaches for improving and effectively operating SHMS, particularly in light of the Serious Accident Punishment Act. A 2023 study suggested enhancements to SHMS after the implementation of the act. Another study examined SHMS's impact on accident prevention and management in public institutions, underscoring its significance in the public sector. Investigations into safety management in large construction companies stress the crucial role of SHMS in this industry. Research has shown that safety leadership and leader trust have a significant impact on safety behavior. This influence is mediated by worker participation and safety knowledge, highlighting the importance of organizational safety culture. Doctoral dissertations and studies addressing the development and activation of safety and health management systems in response to the Serious Accident Punishment Act, and

strategies for adhering to the act through ISO 45001 and disaster mitigation activities, probe ways to fortify SHMS in alignment with international standards. A study conducted in 2022 examined the integration of the Serious Accident Punishment Act with management systems and work efficiency. The study analysed the effects of this integrated approach on organisational efficiency. Further research on efficient SHMS operation strategies post-act implementation and disclosure items in safety and health management systems for major accident prevention offer practical strategies and methodologies for accident prevention [2,3,4,5].

These studies highlight the increasing importance of SHMS following the implementation of the Serious Accident Punishment Act and the exploration of various approaches and strategies for effective system establishment and operation. However, research on effectively building and operating safety and health systems in SMEs is still lacking. This research aims to fill this gap by focusing on the unique challenges and needs of SMEs. It seeks to explore ways to efficiently establish a safety and health system in SMEs, positioned in limited resources and harsh environments, to improve employee safety and welfare.

The Analytic Hierarchy Process (AHP) is a systematic and structured approach for making complex decisions. Based on the concept of hierarchical problem analysis, AHP quantitatively assesses the relative importance or preference of alternatives on a ratio scale. This method is particularly useful in decision-making scenarios with multiple criteria, systematically comparing various factors and helping to prioritize them. SWOT-AHP analysis is used in various practical application areas such as site selection for business targets, defining performance evaluation criteria, public policy formulation, and selection of market entry products. SWOT-AHP analysis is a multi-criteria decision-making tool that integrates Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis and Analytic Hierarchy Process (AHP). SWOT analysis is used in various contexts of organizational or project management to evaluate strategic options, identifying and classifying internal factors (strengths and weaknesses) and external factors (opportunities and threats). Developed by Thomas L. Saaty, AHP conducts pairwise comparisons among these factors to set the relative importance or weights of SWOT factors, using an absolute judgment scale that converts subjective assessments into numerical values.

The combination of SWOT and AHP is useful in multi-criteria decision-making scenarios. It systematically compares various factors and helps to prioritize them. SWOT-AHP analysis finds application in various practical areas such as site selection for business targets, defining performance evaluation criteria, public policy formulation, and selection of market entry products. Several studies have used SWOT-AHP analysis to decompose and structure problems, measure the relative importance and preferences of evaluation elements and alternatives on a ratio scale. Recent studies that have utilized the SWOT/AHP methodology have shown effective strategy formulation and decision-making in various fields. A 2024 study analysed the efficiency of an international airport's logistics sector from a micro-perspective in the field of public policy and social infrastructure. The study evaluated the environment using a SWOT Matrix and quantified importance and priorities through AHP analysis to propose optimal strategic alternatives. Similarly, a 2022 study used SWOT/AHP analysis to explore strategies for enhancing the competitiveness of logistics warehouses related to Busan New Port. In the field of impact assessment for new and revised systems, a 2021 study used SWOT/AHP analysis to derive decision-making priorities for industrialization policies of the 6th industry in response to the 4th Industrial Revolution. In the same year, another study analyzed SWOT factors for domestic venture companies to establish strategies in preparation for the 4th Industrial Revolution, providing direction for policymakers. In the field of marketing strategy formulation, recent studies have focused on developing strategies for international market competitiveness analysis of fresh food and post-COVID-19 operation strategies for traditional restaurants in Gangwon Province. Furthermore, a study conducted in 2022 used SWOT-AHP analysis to establish a global management strategy for Korea's infant and children's book publishing industry [6,7,8,9,10,11]. These studies demonstrate the effectiveness and applicability of the SWOT-AHP methodology in various fields and times, validating its use in this research.

2. RESEARCH METHODOLOGY

The study employed the SWOT-AHP methodology to establish strategic priorities for strengthening the Safety and Health Management System (SHMS) in small and medium-sized enterprises (SMEs). The first step involved performing a SWOT analysis to identify internal strengths and weaknesses, and external opportunities and threats related to the establishment of a safety system in SMEs. This section is a review of existing literature, analyzing and synthesizing the opinions of previous researchers on the strengths, weaknesses, opportunities, and threats of the SHMS. Four key elements were selected as evaluation items within each category. This list includes various evaluation items such as systematic management,

continuous improvement, compliance with regulations, worker participation, resistance to change, lack of resources, complexity, weak commitment from management, improvement in safety and health performance, enhancement of corporate image, productivity improvement, increased social demands, regulatory changes, high risk in specific industries, lack of leadership from management, and excessive construction costs[12,13,14]. [Table 1] displays the primary and secondary factors identified in the reviewed literature.

[Table 1] Selection of factors for research

Parent factors	Subfactors	References
Strengths	Systematic management	Song, I. H., Kim, K. S., Ryu, J. M., Kim, C. S., & Park, S. Y. (2022)., Lee, B. R. (2023)., Woo, S. S. (2022)., Son, I. M. (2012)., Choi, W. J. (2022)., Kim, P. G. (2023)., Jeong, J. S. (2023)., Korea Occupational Safety and Health Agency (KOSHA) (2022)., Kim, P. G., Chae, H. Y., Kim, S. I., & Jeong, K. H. (2022)., Lee, J., Jung, J., Yoon, S. J., & Byeo, S. H. (2020)., Jorgensen, T. H., Remmen, A., & Mellado, M. D. (2006)., Zeng, S. X., Shi, J. J., & Lou, G. X. (2007).
	continuous improvement	
Weaknesses	compliance with laws and regulations	Song, I. H., Kim, K. S., Ryu, J. M., Kim, C. S., & Park, S. Y. (2022)., Lee, B. R. (2023)., Woo, S. S. (2022)., Son, I. M. (2012)., Choi, W. J. (2022)., Jeong, J. S. (2023)., Kim, P. G. (2023)., Jeong, J. S. (2023)., Korea Occupational Safety and Health Agency (KOSHA) (2022)., Zeng, S. X., Shi, J. J., & Lou, G. X. (2007)., Kim, P. G., Chae, H. Y., Kim, S. I., & Jeong, K. H. (2022).
	worker participation	
Opportunities	Resistance to change	Song, I. H., Kim, K. S., Ryu, J. M., Kim, C. S., & Park, S. Y. (2022)., Lee, B. R. (2023)., Woo, S. S. (2022)., Son, I. M. (2012)., Choi, W. J. (2022)., Jeong, J. S. (2023)., Kim, P. G. (2023)., Jeong, J. S. (2023)., Korea Occupational Safety and Health Agency (KOSHA) (2022)., Zeng, S. X., Shi, J. J., & Lou, G. X. (2007)., Kim, P. G., Chae, H. Y., Kim, S. I., & Jeong, K. H. (2022).
	Lack of resources	
	Complexity	
	Lack of management commitment	
Threats	Improved health and safety performance	Song, I. H., Kim, K. S., Ryu, J. M., Kim, C. S., & Park, S. Y. (2022)., Lee, B. R. (2023)., Woo, S. S. (2022)., Son, I. M. (2012)., Choi, W. J. (2022)., Korea Occupational Safety and Health Agency (KOSHA) (2022)., Jørgensen, T. H., Remmen, A., & Mellado, M. D(2006), Zeng, S. X., Shi, J. J., & Lou, G. X. (2007),
	Improved corporate image	
	Increased productivity	
	Increased social demands	
Threats	Changes in regulations	Song, I. H., Kim, K. S., Ryu, J. M., Kim, C. S., & Park, S. Y. (2022)., Lee, B. R. (2023)., Woo, S. S. (2022)., Son, I. M. (2012)., Choi, W. J. (2022)., Kim, P. G. (2023)., Jeong, J. S. (2023)., Korea Occupational Safety and Health Agency (KOSHA) (2022)., Kim, P. G., Yoon, S. J., & Byeo, S. H. (2020)., Jorgensen, T. H., Remmen, A., & Mellado, M. D. (2006)., Zeng, S. X., Shi, J. J., & Lou, G. X. (2007).
	High risk in certain industries	
	Lack of executive leadership	
	Excessive implementation costs	

In the analysis model, each area comprises four specific items, resulting in a total of 16 evaluation items. The evaluation items for the upper factors of the model include strengths such as a systematic approach, continuous improvement, adherence to legal and regulatory requirements, and worker participation. The weaknesses encompass resistance to change, resource shortages, complexity, and a lack of management commitment. For opportunities, the sub-factors include improvement in safety and health performance, compliance with legal and regulatory requirements, enhancement of corporate image, and productivity improvement. Finally, the sub-factors for threats consist of industry-specific risks, resource shortages, regulatory changes, and resistance to change.

Following the SWOT analysis, the primary objective was to identify strategic priorities for establishing the SHMS in SMEs. The evaluation criteria encompassed strengths, weaknesses, opportunities, and threats, with detailed factors being the sub-elements of each criterion, forming a hierarchical structure. The importance of these elements was assessed through a survey conducted among nine safety and health experts and nine SME CEOs. Selecting qualified respondents was challenging due to the need for expertise

in SMEs' safety and health management systems and awareness of internal and external environmental changes. However, through effective networking and explaining the research, the survey was conducted among nine SME representatives and nine ISO 45001 auditors, yielding 18 valid responses. The respondents' demographics were evenly distributed, comprising nine CEOs and nine safety and health auditors, all with a minimum of 10 years of experience. The experience distribution included six experts with 10 to less than 20 years (33.3%), nine with 20 to less than 30 years (50%), and three with over 30 years (16.7%). Pairwise comparison matrices were constructed to assess the relative importance of each evaluation criterion and sub-factor on a 1-9 scale. Following the pairwise comparisons, weights were derived using the SWOT-AHP analysis to establish strategic priorities. This approach was effective for SMEs in optimally allocating resources and devising practical improvement measures. Based on the identified priorities, the study proposed specific strategies to enhance SMEs' health and safety systems, such as concentrating resources on critical elements and developing aligned execution plans.

The methodology delineated in this study offers a framework for SMEs to devise health and safety strategies tailored to their specific circumstances. By pinpointing and implementing strategic priorities for efficient risk management and accident prevention, SMEs can establish more practical and robust health and safety systems [2, 4, 5, 6]. [Figure 1] below illustrates the research model used in this study.

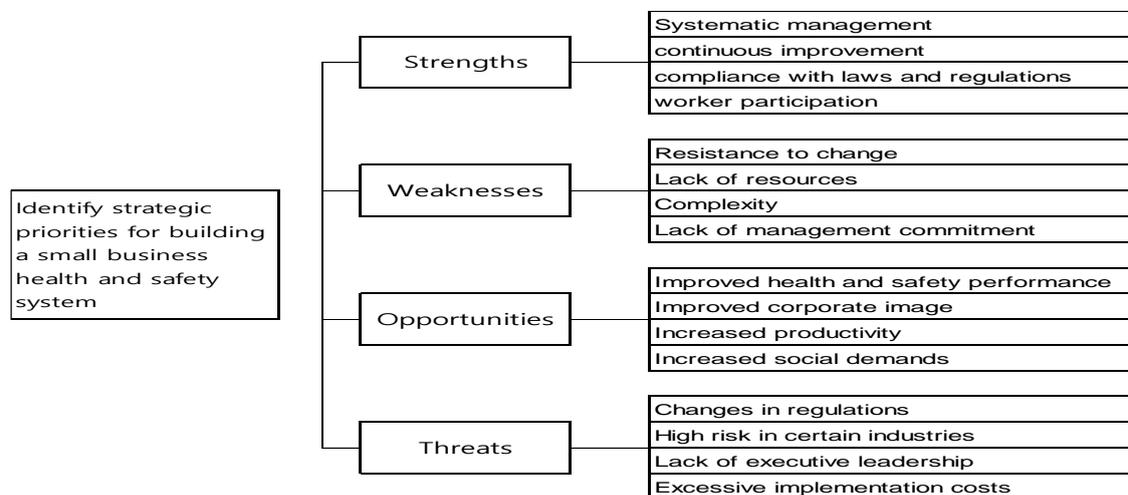


Figure 1: Research Models

3. DISCUSS SWOT-AHP ANALYSIS

In this study, a comprehensive 9-point scale Analytic Hierarchy Process (AHP) questionnaire, originally proposed by Thomas L. Saaty, was utilized. Each variable was accompanied by detailed explanations to ensure accurate comprehension by the respondents. The survey process was conducted with a total of 18 experts, consisting of both safety and health professionals and SME managers, through direct face-to-face and internet-based interactions. The group of respondents included 9 safety and health experts and 9 managers from various small and medium-sized enterprises[15,16].

Before the commencement of the survey, these experts were given time to familiarize themselves with the evaluation items. This preparatory phase included providing them with preliminary explanatory materials about the SWOT-AHP analysis system. Such steps were crucial in ensuring the respondents had a comprehensive understanding of the criteria they were assessing.

The survey method allowed respondents to examine pairwise comparison figures for assessing the relative importance of each competency element within the AHP framework. Subsequently, these individual importance scores were aggregated to ascertain the cumulative relative importance of the evaluation criteria across all respondents. This approach enabled a detailed analysis of the data.

A key aspect of the study's methodology was the stringent verification of the logical consistency of each expert's response data. This was accomplished by calculating consistency indices, essential for confirming the validity of the individual data provided by each respondent.

The AHP model analysis was performed using an AHP analysis feature provided by a cloud-based automation site specifically designed for social science research. This platform utilized R software, a potent tool in statistical and analytical computing. Within the realm of AHP analysis, the Consistency

Ratio (CR) serves as an important indicator for assessing the reliability of respondents' evaluations. The CR is defined as the Consistency Index (CI) divided by the Random Index (RI). Generally, a CR value of 0.1 to 0.2 or lower is indicative of reliable responses.

In this study, surveys with a CR value of 0.2 or lower were deemed to have sufficient reliability. All 18 participating experts met this criterion, affirming the overall reliability of the survey. The weights for the experts' responses were calculated comprehensively using the geometric mean, providing a balanced and statistically sound approach to data analysis. Detailed information about the reliability of the study is presented in [Table 2].

[Table 2] Confidence analysis results

Category	λ -max	CI	C.Ratio
Identify strategic priorities for building a small business safety and health system	4.01194	0.00398	0.00442
Strengths	4.01657	0.00552	0.00614
Weaknesses	4.01451	0.00484	0.00538
Opportunities	4.01209	0.00403	0.00448
Threats	4.00986	0.00329	0.00365

The AHP analysis, as elaborately detailed in [Table 3], offers an insightful evaluation of the relative importance of various elements within the Safety and Health Management System (SHMS) in small and medium-sized enterprises (SMEs). These elements are effectively categorized into four main categories: strengths, weaknesses, opportunities, and threats, each playing a crucial role in influencing the overall safety and health management environment within these enterprises.

In this comprehensive analysis, the impact and relevance of these four categories were thoroughly investigated. The analysis revealed that internal strengths, with a score of 0.33929, are the most influential, underscoring their central role in the SHMS. Opportunities followed with a score of 0.27091, highlighting potential areas for growth and improvement. Weaknesses and threats were also carefully evaluated, recording scores of 0.19653 and 0.19327, respectively. This distribution of scores sends a clear message to SMEs about the importance of leveraging internal strengths in the development of their safety and health systems. Additionally, capturing external opportunities, especially those aligning with market expectations such as compliance with regulations like the Serious Accident Punishment Act, holds significant benefits. The suggested strategic approach involves a balanced focus on exploiting internal strengths and external opportunities while addressing inherent weaknesses and external threats.

[Table3] AHP analysis results

Parent factors	Subfactors	Importance (%)	Ranking within an item
Identify strategic priorities for building a small business safety and health system	Strengths	0.33929	1
	Weaknesses	0.19653	3
	Opportunities	0.27091	2
	Threats	0.19327	4
Strengths	Systematic management	0.22333	3
	continuous improvement	0.19542	4
	compliance with laws and regulations	0.23117	2
	worker participation	0.35008	1
Weaknesses	Resistance to change	0.20202	3
	Lack of resources	0.27254	2
	Complexity	0.19046	4
	Lack of management commitment	0.33498	1
Opportunities	Improved health and safety performance	0.33085	1
	Improved corporate image	0.23085	3
	Increased productivity	0.25974	2
	Increased social demands	0.17856	4
Threats	Changes in regulations	0.20831	4
	High risk in certain industries	0.21675	3

	Lack of executive leadership	0.29371	1
	Excessive implementation costs	0.28123	2

A detailed analysis of the sub-factors within these categories revealed 'worker participation' (0.35008) as the most prominent strength. This was followed by 'systematic management' (0.22333), 'regulatory compliance' (0.23117), and 'continuous improvement' (0.19542). These results emphasize the importance of transitioning to an employee-involved safety culture in SMEs, where active worker participation plays a key role in the effectiveness of safety systems and compliance. The most significant issue in the weaknesses category was identified as 'lack of management leadership' (0.33498). This figure surpasses other concerns such as 'resource shortage' (0.27254), 'complexity' (0.19046), and 'resistance to change' (0.20202), highlighting the urgent need for strong and committed leadership to successfully implement and maintain SHMS. In the opportunities domain, 'improvement in safety and health performance' (0.33085) was considered the most critical, followed by 'productivity improvement' (0.25974), 'enhancement of corporate image' (0.23058), and 'increasing societal demands' (0.17856). This reflects the growing societal and market expectations for SMEs to adopt and adhere to advanced safety practices. Lastly, in the threats category, 'lack of management leadership' (0.29371) and 'excessive implementation costs' (0.28123) were identified as the most significant, followed by 'high risks in specific industries' (0.21675) and 'regulatory changes' (0.20831). These findings highlight the complex challenges faced by SMEs in maintaining a balance between implementing robust safety systems and overcoming resource constraints and leadership issues.

Therefore, the AHP analysis provides a comprehensive perspective on the SHMS environment in SMEs, advocating a dynamic and strategic approach where strengths are leveraged and opportunities are seized to effectively address weaknesses and mitigate threats. This methodology serves as a guide for SME leaders and safety professionals in prioritizing key areas essential for developing effective safety and health management systems. It also aids in enhancing safety standards and securing a competitive advantage in a market increasingly focused on safety. Based on the insights from the AHP analysis, a TOWS analysis was further conducted. This analysis aimed to establish strategic priorities for constructing a safety and health system, seeking viable solutions. It included developing strategies that integrate worker participation with improvements in safety and health performance (SO strategy), address the lack of management leadership with enhancements in safety and health performance (WO strategy), combine worker participation with the gap in management leadership (ST strategy), and correlate the lack of management leadership with the challenges of excessive implementation costs (WT strategy). The results of this TOWS analysis are systematically presented in [Table 4], offering a clear direction for strategic decision-making in SMEs regarding the construction of their SHMS.

[Table4] TOWS Analytics

		S	W
		S1 (0.22333)	W1 (0.20202)
		S2 (0.19542)	W2 (0.27254)
		S3 (0.23117)	W3 (0.19046)
		S4 (0.35008)	W4 (0.33498)
O	O1 (0.33085)	S4O1 Strategies	W4O1 Strategies
	O2 (0.23085)	The active participation of workers in safety and health education and improvement activities is encouraged by offering incentives, thereby continuously enhancing the overall safety and health performance of the organization.	By recognizing existing safety and health risks and effectively managing them, the safety and health performance is continuously improved.
	O3 (0.25974)		
	O4 (0.17856)		
T	T1 (0.20831)	Through the active participation of workers, the leadership vacuum of management is filled, and organizational growth is promoted through an innovative, employee-led approach.	The strategy of strengthening management's leadership and willpower enhances the cohesion and efficiency of the organization, moving towards innovatively improving the corporate culture and performance through the participation and innovation of employees.
	T2 (0.21675)		
	T3 (0.29371)		

	T4 (0.28123)	T3S4 Strategies	T3W4 Strategies
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In the formulation of the SO (Strengths-Opportunities) strategy, the critical linkage of Worker Participation (S4) with the objective of Improvement in Safety and Health Performance (O1) was highlighted. It's vital to foster an environment where workers are actively involved, contributing to the enhancement of overall safety and health performance in the organization. Furthermore, the integration of Systematic Management (S1) with aims like Productivity Increase (O2) and responding to the Growth in Social Demands (O3) is deemed essential for boosting organizational efficiency and fulfilling the evolving social expectations.

Within the framework of the WO (Weaknesses-Opportunities) strategy, the association of Lack of Management Commitment (W4) with Improvement in Safety and Health Performance (O1) underscores the importance of fortifying management's leadership and commitment. This strengthening is seen as a pivotal step in enhancing safety and health performance and, in turn, solidifying the overall safety and health system. Additionally, the strategy of aligning Complexity (W3) with Growth in Social Demands (O3) is proposed, suggesting an approach to simplify complex safety and health systems while adapting them to meet societal demands effectively.

The ST (Strengths-Threats) strategy involves the strategic coupling of Worker Participation (S4) with Lack of Management Leadership (T3). This connection aims to bridge the leadership gap through enhanced employee participation, thereby fostering organizational growth and resilience. Moreover, creating a link between Systematic Management (S1) and Regulatory Changes (T1) underscores the necessity of developing strategies that enable an organization to respond adeptly to regulatory shifts through well-organized management practices.

Finally, addressing the WT (Weaknesses-Threats) strategy, establishing a connection between Lack of Management Commitment (W4) and Excessive Implementation Costs (T4) signifies the need for strategic approaches that not only reinforce management commitment but also ensure the development of cost-effective safety and health systems. This strategy is critical for managing expenses while maintaining high safety standards. Furthermore, the relationship between Resource Shortage (W2) and High Risks in Specific Industries (T2) underlines the need for effective strategies that can address significant industry-specific risks even in scenarios of limited resources, ensuring safety standards are not compromised due to resource constraints.

5. CONCLUSION

This study conducted a SWOT-AHP approach to identify strategic priorities for the establishment of Safety and Health Management Systems (SHMS) in small and medium-sized enterprises (SMEs). The analysis model was set up with four areas: Strengths, Weaknesses, Opportunities, and Threats, and included 16 specific items. The model was analyzed using the AHP technique.

Upon comprehensive examination of the analysis results regarding strategic priority identification for SHMS implementation in SMEs, the most critical element highlighted was 'Worker Participation' (0.32707). This emphasizes the importance of active participation and input from workers in organizational safety and health management. Next, 'Lack of Management Commitment' (0.34592) emerged as a major weakness, indicating that proactive leadership and commitment from management are essential for the successful implementation of SHMS. 'Improvement in Safety and Health Performance' (0.34258) was identified as the most significant opportunity, underscoring the need for ongoing efforts to enhance safety and health performance. Finally, 'Lack of Management Leadership' (0.29838) and 'Excessive Implementation Costs' (0.26795) were identified as major threats, suggesting that strengthening leadership within the organization and adopting cost-effective approaches are crucial.

The key findings of this study include the importance of worker participation, the necessity of active involvement and leadership from management, and the significance of strategic approaches for sustainable improvement in safety and health performance. These findings can be utilized as foundational data for subsequent research and provide significant practical implications for the actual establishment and operation of Safety and Health Management Systems (SHMS) in small and medium-sized enterprises (SMEs). This study is expected to contribute to the improvement of safety and health management in SMEs by presenting specific strategies and directions for overcoming the unique challenges faced by SMEs and establishing effective safety and health management systems.

However, a limitation of this study is that it did not explore practical methods for establishing the safety and health system in SMEs, beyond identifying priorities. Further research is needed to explore how to

implement the strategic priorities identified in this study in a practical context.

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