REVIEW ARTICLES

Critical Success Factors in Occupational Safety and Health Management System: A Review Existing Literature

Muslihah Ahmad Mahmmud[1], *Emilia Zainal Abidin[1], Hamdan Rahmat[3], Haslinda Hashim[3]

[1] Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences, UPM Serdang, 43400, Universiti Putra Malaysia, Selangor
[2] Amosh Consultancy 249 Tingkat 3 Jalan Meru Batu 2, 41050, Klang, Selangor
[3] School of Business & Economics, UPM Serdang, 43400, Universiti Putra Malaysia, Selangor

ABSTRACT

Occupational Safety and Health Management Systems (OSHMS) play a crucial role in systematically managing risks and preventing injuries and illnesses in organisations. To ensure effective implementation of OSHMS, it is essential to focus on key critical success factors (CSFs) which leads to successful OSH performance. This is a review which aims to identify CSFs related to OSHMS implementation in organisations. Literature searches were conducted via Scopus and ScienceDirect online databases to identify articles published between the year 2008 to 2019. Search terms such as "critical success factor", "success factors'', "occupational safety and health management system", "occupational health", and "management system" were used as keywords and a traditional review concept was selected. Inclusion criteria involved English articles available in open-access journals or subscribed search engines, focusing on CSFs and/or OSHMS. The main themes of CSFs were summarised into categories fitting the Socio-Technical approach. Five studies were selected and reviewed, representing the aviation, construction and chemical industry sectors. These studies employed various tools involving questionnaires, qualitative techniques and structured interviews to determine CSFs. The identified CSFs primarily revolved around internal factors such as management commitment and leadership, cost and resource allocation and employee participation. These CSFs can serve as key areas to support the effective implementation of OSHMS and organisations can focus to improve their own internal factors to enhance their OSHMS implementation and ensure the safety, health, and well-being of their workers. This review provides valuable insights for organisations seeking a scalable framework for guiding OSHMS implementation basedon the identified CSFs.
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Keywords: Occupational health and safety; Critical success factors; Continual improvement; Management system, OSH performance

Corresponding Author:
Emilia Zainal Abidin, PhD
Email: za_emilia@upm.edu.my
Tel: +603 97692643

INTRODUCTION

Management systems are used in daily decision-making processes in business and organisations, whether involving procurement or expanding business in general (1). A successful organisation needs an adequate designated management system as a solid foundation for constructing its performance and continuous improvement. A management system is a way on how the organisation manages the interrelated parts of its activities to achieve primary stated objectives in a simpler form (2). In terms of safety and health, Occupational Safety and Health Management System (OSHMS) is a systematic, open and comprehensive process that manages risks associated with safety and health (2–4). A complete management system involves managerial elements such as allocating responsibilities, planning activities, structuring the organisation, implementing work processes, procedures or instructions and providing resources to enable the development, implementation, achievement and to review and maintain Occupational Safety and Health (OSH) policy for an organisation (5). One of the most important uses of OSHMS is that it acts as a tool to command organisations to overcome hazards in a consistently structured manner. OSHMS also ultimately reduces injuries and illnesses and improves the well-being of workers and all interested parties. However, observing only the standard requirements may not be sufficient and there is a need for supporting factors such as knowledge of pertinent information, understanding and compliance with legislation framework, on-going risk assessment and good OSH practice (6).

To ensure OSHMS is functioning successfully in an organisation to accomplish targets, there is the need to identify and focus on several factors that will support

the implementation of effective OSHMS (7). For example, a previous study has found that organisations with good occupational safety and health achievements have high degree of supportive relationship which contributes to its success (8). Such factors have been proven to be essential and its existence would ensure the organisation accomplishes set targets and objectives. These elements are known as critical success factors (CSFs). There are CSFs which has been identified as key in management system implementation in organisation and its method has been defined as identifying elements, tasks or requirements of success (9). The process was initially developed to align information technology planning with the strategic direction of an organisation (10). Rockhart (11,12) defined CSF as a limited number of areas that, if they are satisfactory, ensure successful competitive performance for the organisation. In other words, CSFs represent those managerial or enterprise areas that must be given special and continual attention to bring about high performance (13). According to Ronald (14), in his study, CSFs in OSH is revealed as a specific part of Loss Control Management in which it deals with managing the level of safety risk within a workplace while providing a degree of synergy and overlaps with others. Subsequently, CSF forms a fundamental part of the risk management process and proposes adequate implementation for practical impacts and outputs. In his study, Ronald (14) also showed that CSF is the indicator to determine the level of success for organisations within the context of the respective management system. Organisations must consistently implement key CSFs to achieve the target within the appropriate time frame. Among the CSFs identified at organisations are the support of the senior management and worker involvement and participation from all levels and functions (15).

OSHMS has been widely complied by various workplaces as these organisations have found that OSHMS support in many ways. OSHMS has improved business transparency, productivity and competitiveness and provides an adequate element for the decision-making process, effectively avoiding occupational accidents (16). Osilla et al. (17), in their study, revealed that the financial returns of disease involving management programs found that the avoidance of medical costs shows positive returns for the employer achieved within two years for many conditions such as asthma and diabetes. A study in the United Kingdom indicated a positive correlation between the costs of accidents for prevention measures and reduction of work-related accidents (18). In their study, Fernández-Muñiz et al. (19) proved that 455 companies in Spain that comply with safety measures for certification proclaim positive improvements in safety, competitiveness, and financial performance. OSHMS also promotes workers' health and satisfaction, improves the company image internally and externally, minimises the cost of processes, improves the organisations' vision, and increases competitiveness and profitability (20). However, the success of OSHMS depends on several factors, from the characteristics and nature of the work and the impact of the outside factors (21).

According to the Malaysian Occupational Safety and Health Act 1994 (Act 514) (22), section 16 explained that organisations need to have a system of work to be used at the workplace. There is no compulsion to have a certified system to manage OSH, but there is a need for a system nevertheless (23). OSHMS is a tool to assist organisations in improving the safety culture and ensuring compliance to OSH legislation and other requirements that an organisation subscribes to. In OSH Master Plan 2020 (24) the highlighted points for OSHMS are to improve awareness, the commitment of the employers and workers, knowledge as well as skills. To manage OSH risks, especially in sectors identified as high-risk such as construction, agriculture, manufacturing and services (24). OSH issues at the workplace have become more complex in technological advancements in work performance. To tackle this issue, organisations will have no choice but to be more creative and innovative in managing OSH comprehensively in a cost-effective way.

Various OSHMS-based standards, guidelines and audits are implemented within the public, private, and non-profit sectors. The government established the Malaysian OSHMS framework, first introducing Malaysian Standard (MS) 1722 in 2003 (25) and introducing the internationally-recognised standard of OHSAS 18001 (23). The MS1722 was based on the ILO Guidelines to provide requirements on Occupational Safety and Health Management System (OSHMS) and foundation for the development of OSH systems in an organisation (26). Changes in 2018 saw the existing standards of the updated version of MS 1722:2011 (25) and OHSAS 18001:2007 (4) being phased out with the introduction of ISO 45001 since March 2018 (27). The ISO 45001 is a new international Occupational Safety and Health Management Systems introduced by the International Organisation of Standardisation (2). According to the Department of Standards Malaysia, the number of certified organisations for OSH in Malaysia for ISO 45001 is 43, OHSAS 18001 is 1,031, and MS 1722 is 230. The use of management systems in Malaysia is increasing yearly, with the number of certification scopes and organisations for OSHMS reaching 2,708 in 2021 (28). It is expected that more organisations will obtain ISO 45001 certification due to various business operational needs in the coming years (29).

Even with the existence of a system in organisations to cater for OSH issues and provide efficient solutions, there is a chasm in the understanding of factors that

influence the success of OSHMS. It is vital that factors influencing the success of OSHMS implementation be placed for improvements to be made in organisations, increasing the safety and health of employees and finally increasing the success rate of these organisations. As such, this review was developed to identify a concise summary of CSF components in the implementation of OSHMS as reported in various sectors. It is expected that CSFs identified will serve as the main key point to assist in supporting the effective implementation of OSHMS in other organisations in and outside of Malaysia.

MATERIALS AND METHODS

This article is a traditional literature review of the existing literature on CSFs in the implementation of OSHMS that involves different kinds of industrial sectors. The subscribed electronic databases used to search for online articles are Scopus and Science Direct. The keywords used to search for literature based on this study's objective were "critical success factors'', "success factors", "Occupational science and health", "occupational science and health management system", safety culture, and "management system" in a number of distinct permutatiaons and combinations. The date range of the search was initially specified between the year 2015-2019. However, the range of years had to be widened up until 2008 due to scarcity of related literature within this topic. In addition, some of the articles used in this review were obtained from the articles' references. The inclusion criteria employed in this methodology includes the following: written in English, available in open access journal/ subscribed search engines and focuses mainly or in part on critical success and/or OSHMS.

Study Selection

Electronic database search yielded a total of thirty-six records. These articles included those published in original articles, review articles and conference proceedings. From the initial assessment, a total of 24 articles that met the inclusion criteria were obtained. For relevance, the articles titles and abstract were screened and from the 24 articles, a total of five studies were found to be suitable for review. The flowchart of the review execution is as shown in Figure 1. The selected articles were published between 2008 and 2019. These articles show the significance of these studies and are cited in most of the articles chosen. Due to the scarcity of related articles, it was not possible to do a formal systematic review or meta-analysis. Instead, a traditional review concept was selected, giving priority to the few observational studies that were available and briefly summarising the main themes using the Socio-Technical System approach (30). Initial explanation focuses on descriptive explanation of the organisations involved and the methods used to determine CSFs in these organisations.

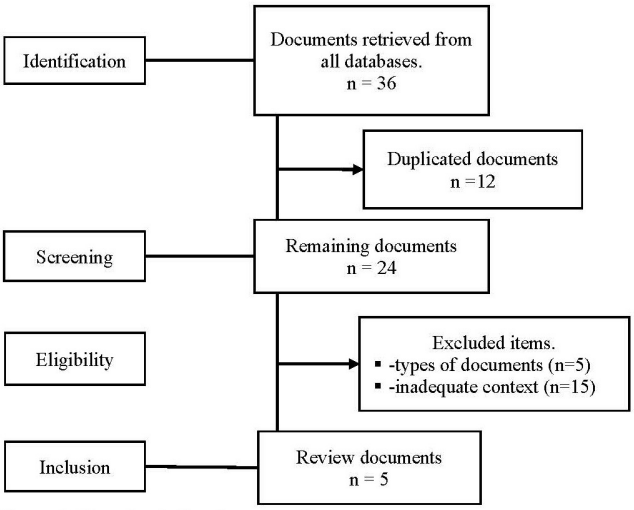

Figure 1: Flowchart of review execution

Figure 1 : Flowchart of review execution.

Themes of CSFs components were then identified for the five review papers and it was recategorised into the subsystems according to the Socio-Technical approach.

RESULTS

Descriptive Analysis of the Studies

The studies consisted of studies from the Asian region including Thailand, India, China and there was one study from Turkey. Aksorn and Hadikusumo (31) study from Thailand aims to identify and quantitatively emphasise the success factors implemented in OSH programs in construction industries based on respondents' perceptions and factor analysis. The study of Vinodkumar and Bhasi (32) from India studied safety management variables in chemical producing industries which have been certified with different types of management systems. The study by Chen et al. (33), performed in China in a semiconductor factory, emphasises the importance of performance indicators in implementing OSHMS. In their research, Yiu et al. (34) evaluated the Safety Management System's effectiveness to improve the safety of construction and identified all the factors that could affect the implementation at Hong Kong. Karakavuz and Gerede (15) from Turkey indicated the factors affecting the success of OSHMS activities implemented in their aviation-based industry. Table I presents the distribution of the included studies in this review and some background information.

Methodology used to determine CSFs

There were several methods used to determine CSFs. Aksorn and Hadikusumo (31) determined CSFs using several methods including using validated CSFs' questionnaires. These CSFs were validated by 40 experts, consisting of senior safety officers that have ten years or more of experience in construction safety, construction safety managers and safety engineers. These experts were asked to score the CSFs with 1 as essential, 2 as

Table I : Summary of the reviewer literature related to critical success factors on OSHMS

Author (Country) Industry	Participant	Research Approach	Research Design	Type of Analysis	Analysis	Results
Aksorn & Hadikusumo (31) (Thailand) Construction industry	40 experts (project managers, safety engineers, senior safety officers)	Mixed method	Self-reported questionnaire Interview	Mean score T-test	To find the highest mean ranking.	Mean rankings from project managers and safety personnel: 1. Management support (4.66) 2. Appropriate safety education and training (4.5) 3. Teamwork (4.47) 4. Clear and realistic goals (4.44) 5. Effective enforcement scheme (4.43)
				T-test	To test and determine the factors having an enormous influence on a safety program's success	The factors were considered as 'high impact' on success rate when significant difference showed 95% confidence level.
				Confirmatory Factor Analysis (CFA)	the value of factor loading exceeding 0.5(Hair et al., 1988)	The four components were meaningfully renamed as (1) worker involvement,(2) safety prevention and control system, (3) safety arrangement, and (4) management commitment.
Vinodkumar and Bhasi (32) (India) Chemical industry	1566 workers of large chemical industrial units	Quantitative	self-reported questionnaire	Confirmatory Factor Analysis (CFA)	To verify the unidimensionality, convergent validity and reliability of the six safety management practices and safety behaviour scales.	The values higher than 0.5 where $p < 0.05$, confirm convergent validity for all success factors. All the items load with factor loading range between 0.5 and 0.75. The variance percentage showed all seven scales higher than 50% and the success factors have good unidimensionality.
				One-way ANOVA	To test the hypotheses advanced.	show that certified and non-certified organisations differ significantly concerning all the six safety management practices and safety behaviour.
Chen et al. (33) (Taiwan, China) printed circuit board (PCB) industry	11 semiconductor manufacturers	Quantitative	Self-reported questionnaire	Mean score	To find the highest mean ranking	The top three condition performance indicators chosen by the OHSAS specialists were occupation accidents statistics, employee health and safety consciousness and frequency of unsafe employee conducts
Karakavuz & Gerede (15) (Turkey) Air transport industry	9 Experts	Qualitative	Interview, nominal group technique	Nominal Group Technique (NGT)	To receive data directly from the practitioners who are experts in this field.	Sixty-three success factors, under 11 categorised were identified by the participants.
				12-point priority rating	To find out the relative importance of all the critical success factors	Professional independence of OHS practitioners (76), place of the senior management's OHSMS commitment in the implementation (55), senior management's awareness of OHSMS implementations (43)
				Likert-type scale rating	To find out the relative importance of all the critical success factors	Resource allocated by senior management to OSHMS implementations(40), professional independence of OHS practitioners(39) and continuity of OHSMS audits (38)
Yiu et al. (34) (Hong Kong, China) Construction industry	13 safety practitioners	Qualitative	Structured interview	Structured interview	To verify the factors and attributes that are relevant to SMS applications. The interviews asked about: - critical success factors - the perceived benefits - potential difficulties of implementing SMS	The critical success factors were visual senior management commitments and the competency of safety managers. Perceived benefits were reduced accidents, improved safety audit compliance, and better cost allocation and project management. At the same time, potential difficulties were high stress for project completion and high labour turnover rates.

useful, and 3 as not essential or not necessary. The mean rankings of CSFs were analysed using a mean score and next were grouped via confirmatory factor analysis using statistical software. This study also used questionnaire surveys designed by integrating all the 16 CSFs that were validated. The questionnaire focused on perceptions that influenced success factors during the implementation of safety programs. Additionally, Aksorn and Hadikusumo (31) conducted case studies which involved three construction companies by doing interviews to validate the reliability of the CSFs for these organisations.

Vinodkumar and Bhasi (32), in their studies, compared CSFs between industries certified with the OHSAS18001 and ISO9001 system using questionnaire surveys. The questionnaire was rated on a five-point Likert Scale to measure agreement level of identified CSFs indicated by the respondents. The questionnaire was constructed based on theories and previous literature and in addition to new items that suit the local working practice and culture. Afterwards, the questionnaires were discussed and validated by senior experts from academia and industries. In order to verify its convergent validity, unidimensionality and reliability of success factors, confirmatory factor analysis was used as a statistical technique for verification.

Chen et al. (33) used survey questions that were developed based on environmental management systems standard (ISO 14001), OSH management system standard (OHSAS 18001) and criteria from BS 88001 to evaluate safety performance. This questionnaire utilised a five-point Likert scale to measure respondents' agreement levels on identified CSFs.

In contrast, Karakavuz and Gerede (15) conducted a qualitative method that used the Nominal Group Technique (NGT) for more consistent answers compared to traditional interviewing techniques to obtain reliable CSFs. The study participants included senior OSH managers and experts within the industry of aviation sector which consisted of ground handling and catering companies. The authors then obtained sixty-three success factors, and then these CSF were recategorised into eleven categories. Two different methods were used to determine relative importance: the "12-point priority rating" and "Likert-type scale rating". The Likert-type scale rating was used to indicate the participants' importance of the factors in the list.

Finally, Yiu and colleagues (34) conducted a study where CSFs were obtained from structured interviews involving safety practitioners to verify local safety practitioners' perceptions towards CSFs. Results were analysed according to the thematic analysis.

Summary of Critical Success Factors

Generally, management commitment and support, cost and resource allocation and safety training and education were among the most frequently cited CSFs that were observed from the reviewed articles.

Critical Success Factors

The most highlighted CSFs from the literature was top management commitment and support (Table II). In the study of Aksorn and Hadikusumo (31), the highest mean ranking was support from management (component) with mean value of 4.66. Chen et al. (33) mentioned that the most influential CSF was top management promises and support, with an average score of 4.64. While Yiu and colleagues (34) reported that the most influential CSF was evidence of senior management commitments. In the study of Vinodkumar and Bhasi (32), management commitment was ranked as the top three ranked CSFs (3.87). Karakavuz and Gerede (15) indicated that senior management's commitment as the second-ranked CSFs with a rating of fifty-five.

Then followed by training and education on OSH (mean score=4.53) as the second influential ranked CSF in research of Aksorn and Hadikusumo (31) because they believed work-related accidents can be reduced in construction industries. While Chen et.al (33) stated education and training as their third ranked CSF with average score of 4.36. In the study of Vinodkumar and Bhasi (32), the highest ranked CSF was safety behaviour (4.02), followed by safety training (4.00). Vinodkumar and his friends (32) believed that safety behaviour and safety training are interconnected for successful participation of staffs to implement OSHMS in organisation.

Apart from that, cost and resources allocation were among the highly voted as CSF based on literature. From the study by Aksorn and Hadikusumo (31), sufficient resource allocation was grouped as safety arrangement together with good communication, delegation of authority and responsibility. This was because Aksorn and his colleagues friends believed that all these CSFs were interrelated and crucial as the success of a safety program primarily relies on the allocation of resources such as an adequate number of staff members, time, funds, information, safety techniques, facilities and also tools (31). Based on Likert type scale rating in the study of Karakavuz and Gerede (15), resource allocated by senior management to OSHMS implementation was rated as the highest score (40). They also added that the success of the system required human and financial resources. Yiu et. al (34) stated that cost spend on safety issues was highly recognised by respondents from structured interviewed. Table II represent CSFs of the five literatures reviewed in further detail. To visually

Table II : Sub-components of CSFs according to the literature reviewed

Research	Type of analysis	Sub-components of Critical Success factors	Interpreted Components*	Components based on Socio-technical System Approach
Aksorn & Hadikusumo (31)	Factor loading (exceed 0.50)	1. Positive group norms	Worker involvement and participation	Social subsystem – Personal factors
		2. Personal attitude		
		3. Personal motivation		
		4. Continuing participation of workers		
		1. Effective enforcement scheme	Safety prevention and control system	Technical subsystem
		2. Appropriate supervision		
		3. Equipment acquisition and maintenance		
		1. Good communication	OSH communication	Technical subsystem
		1. Delegation of authority and responsibility	*Safety arrangement*	Social subsystem – Organisational factors
		1. Sufficient resource allocation	Cost and resource allocation	Social subsystem – Organisational factors
		1. Top management support	Management commitment	Social subsystem – Organisational factors
		2. Teamwork		
		3. Clear and realistic goals		
Vinodkumar and Bhasi (32)	Confirmatory factor analysis and step-wise regression	1. Management commitment	Management commitment	Social subsystem – Organisational factors
		1. Safety training	OSH training	Social subsystem – Personal factors
		1. Safety communication	OSH communication	Technical subsystem
		1. Safety rules and procedures	OSH rules	Technical subsystem
Chen et al. (33)	Questionnaire	1. Top management promises and support	Management commitment	Social subsystem – Organisational factors
		1. PDCA continuous improvement	Continuous improvement	Technical subsystem
		1. Participation of all employers	Worker involvement and participation	Social subsystem – Personal factors
Karakavuz & Gerede (15)	12-point priority rating	1. Professional independence of OHS practitioners	*Safety arrangement*	Social subsystem – Organisational factors
		1. Place of the senior management's OSHMS commitment in the implementations	Management commitment	Social subsystem – Organisational factors
		2. Senior management's awareness of OSHMS implementations		
	Likert-type scale rating	1. Resource allocated by senior management to OSHMS implementation	Cost and resource allocation	Social subsystem – Organisational factors
		1. Professional independence of OHS practitioners	Safety arrangement	Social subsystem – Organisational factors
		1. Continuity of OSHMS audits	External audits	External subsystem
Yiu et al. (31)	Literature review & structured interview	1. Visible senior management commitment	Management commitment	Social subsystem – Organisational factors
		2. Safety leadership of senior management		
		1. Cost spends on safety issues	Cost and resource allocations	Social subsystem – Organisational factors
		2. Allocation of adequate manpower		
		3. Provision of adequate time		
		1. Personal quality of safety manager	Competency of safety managers	Social subsystem – Personal factors
		2. Personal competency of safety manager		
		3. Training and education of project manager		
		4. Safety behaviours of project manager		

* Interpreted component named based on subcomponents of critical success factors

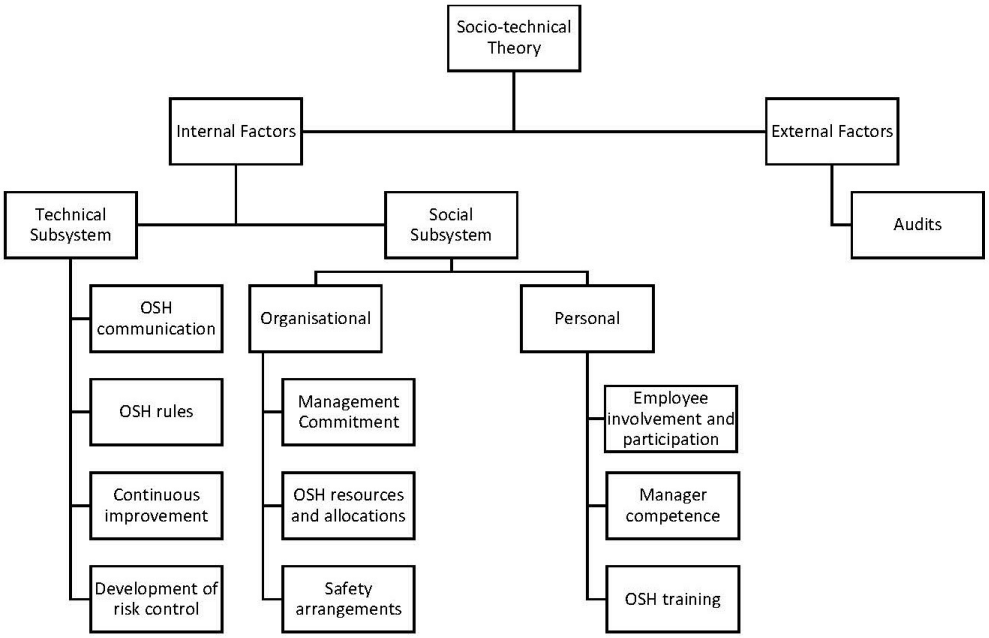

Figure 2 : Socio-technical Sysytem approach to categorisation of CSFs for OSHMS Implementation.

represent the factors identified, Figure 2 further summarised the identified CSFs components into internal and external elements using the Socio-Technical System approach (35, 36) to enable logical categorisation of the results into a structure that could be easily understood.

DISCUSSION

This review attempted to cover the literature on determining CSFs related to OSHMS implementation that involved different industries. CSFs are key areas that must go right for the organisations to flourish and attain organisational goals (12). The studies included in the analysis focused on identifying and quantifying the success factors of OSH programs in various industries in different countries, such as Thailand, India, China and Turkey. Different methodologies were employed to determine these success factors, including questionnaires validated by experts, comparative surveys between certified systems, the use of standardized scales for measuring agreement levels, qualitative techniques for obtaining reliable factors, and structured interviews with safety practitioners. The small number of literature found showed the scarcity of research within this niche area of OSH.

It was observed in these studies that CSFs with similarities in characteristics were consistently grouped under a suitable umbrella term as component to best represent the factors. There is no standard CSFs that has been established in literature however the ISO45001:2018 has listed several important CSFs that has been shortlisted. Based on the studies reviewed, several key critical factors were found and from the analysis, the factors were classified into key categories. It was found from this review, 1) commitment of top management and leadership, 2) cost and resource allocations and 3) employee participation and cooperation are among the most frequently identified CSFs by the authors. To enable meaningful comparison to be made, the CSFs identified in this review were categorised using the theory of Socio-Technical approach (35, 36).

The theory of the Socio-Technical approach is used in complex organisational work design that recognise the interaction between people, machine, environment, work activities and organisational structures in the workplace (36). This approach was used in a previous study by Rahmi and Ramdhan (30) which summarised CSFs into a diagram of internal and external factors (Figure 2). The internal factors were further divided into social and technical subsystem. The social subsystem consists of organisational factors and personal factors while the technical factors are OSH communication, OSH rules, continuous improvement and development of risk control. Organisational factors include management commitment, OSH resources and allocations and safety arrangement. Personal factors include employee involvement and participation, manager competence and OSH training. Finally, external factors comprise of enforcement of OSH regulations, availability of OSH support and authority, external audit certification, incentives provided by external entities, customer demands, market competition, corporate reputation and influences stemming from international trade.

The findings of this review emphasised the importance of internal factors which play a vital role as they encompass the dynamics of an organisation and understanding and optimising these factors ensure effective coordination between people and technology, leading to enhanced productivity, innovation, and overall organisational success in the ever-evolving safety and health landscape (30). An important point which also needs to be considered is that most participants surveyed in the articles reviewed held managerial positions in the organisations.

Importance of leadership and cost allocations has been primarily emphasised in literature (15, 31-34) and in standard documentations such as the ISO 45001:2018. In Malaysia for instance, the Occupational Safety and Health Master Plan 2021-2025 (OSHMP25) (37) specifically places priority on OSH Ownership and Leadership in Program 1 of Strategy 2. The main element of management commitment at workplaces ties in closely to accountability and leadership of the employer itself. As a result, all efforts for OSH implementation at workplaces will be easier, effective and successful when management commitment is evident.

Senior management needs to fulfill their commitment in real-life conditions (15) as they are the foundation for an effective OSHMS implementation. According to ISO 45001, top management should develop, lead, and promote a culture in their organisation that supports the OSHMS' intended outcomes. In the Vinodkumar and Bhasi (32) research study, top management commitment was assessed based on the top management's priority for corrective actions, safety, attendance to safety meetings, incident investigations and provision of adequate personal protective gear. In addition, adequate allocation and support will stem from committed management who observe, assess and willing to improve OSHMS from time to time (15). The activities suggested by OSHMP25 for effective implementation of OSH focuses mainly on the employer which includes to balance the element of safety, health, quality and productivity of employer for OSH accountability (37). OSHMS will need to be integrated into the business processes and to do so resources will need to be adequately provided.

However, the commitment itself is incomplete without leadership. Leadership and commitment have become the main anchor for various industries (38). Leadership is recognised as a key consideration for a safer workplace and builds confidence among the workers, upgrading competence and adherence to safety (39). Strong and visible leadership with commitment from the management, an organisation has high potential to demonstrate high performance, minimise the risks and improve the safety management system.

The findings of this review give precedence to employee participation and cooperation. Employee participation is also one of the activities emphasised by OSHMP25. Generally, OSHMP25 seek to increase cooperation among employer and employee by promoting effective communication to strengthen OSH culture. Daft (40) in his discussion proposed that managers of organisations need to be involved in setting achievable targets and plans to make them responsible for establishing organisational' goals and are given the authority to use the resources. The organisation will need to set forth a process in which workers are consulted at relevant functions are given the opportunity to participate in the actions related to developing, planning, implementing and evaluating to continuously improve the OSHMS (2). This is because involving employees, especially in decision-making, can enhance the productivity and determination of individuals and organisations (41). Downey-Ennis et al. (41) also indicated that involving employees in decision-making increases productivity and competitiveness among individuals and the organisation. In six-sigma theory, employee participation is essential to increase employee satisfaction, increase motivations, organisational performance and effectiveness were boosted and towards better implementation (42).

There are several limitations found in this study. We included only several key sectors that has been involved in studies which seeks to determine CSFs in the implementation of OSHMS due to the scarcity of literature and its outdated nature. Most studies in this review have focused on high-risk industrial sectors. The methodologies used in these studies were varied based on self-reported response and perceptions from experienced stakeholders and there are no standardised metrics, especially quantitative methods, which can be used to measure CSFs. For future research, there is a need for more standardised methods of quantifying CSFs to produce key results which can be generalised to other sectors. This is important in order for such outcomes to be used as a reference in the implementation of OSHMS in their organisations.

CONCLUSION

This study identified the CSFs of OSHMS implementation as reported in the literature using structured interviews and questionnaire surveys. The findings revealed that the support of senior management, resources and worker involvement were critical factors to OSHMS implementation. CSFs identified will serve as the main key point to assist in supporting the effective implementation of OSHMS in other organisations which can be scalable. Successful OSHMS implementation in developing countries like Malaysia will improve the future growth of businesses, allow an adaptable safety management framework to be established and implement a holistic safety monitoring system for organisations. This suit with the OSHMP aims to

increase public awareness of OSH in order to establish OSHMS as part of the business.

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