International Journal of Asian Social Science
ISSN(e): 2224-4441
ISSN(p): 2226-5139
DOI: 10.55493/5007.v12i7.4542
Vol. 12, No. 7, 217-229.
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URL: www.aessweb.com

IMPLEMENTATION OF OSH RISK MANAGEMENT AMONG SMEs IN MALAYSIA: A SYSTEMATIC LITERATURE REVIEW

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Article History
Received: 9 March 2022
Revised: 6 June 2022
Accepted: 17 June 2022
Published: 21 July 2022

Keywords
HIRARC
Malaysia
OSH
Risk
Risk management.

ABSTRACT

This study investigated the implementation of the occupational safety and health (OSH) risk management system, known as the Hazard Identification, Risk Assessment and Risk Control (HIRARC), in small-medium enterprises (SMEs) in Malaysia. Specifically, the implementation of the HIRARC system's challenges and weaknesses faced by SMEs were investigated based on a systematic literature review of two databases, namely SCOPUS and Google Scholar. The results show that there was scant work on the HIRARC system implementation and limited specific industries, such as construction and production. Additionally, the challenges faced by SMEs were categorised into the HIRARC system's weaknesses and the organisation's inadequacy in implementing the system. This study provided implications to the OSH regulators in continuously promoting the HIRARC system's significance while improving the system and encourage its assimilation among SMEs in Malaysia. This study is also hoped to provide some guidance to the SMEs in Malaysia in implementing OSH risk management system.

Contribution/ Originality: This study gives insights to the regulators specifically in developing countries on the challenges faced by SMEs in implementing OSH risk management system which can be used as input to inculcate the culture of risk management practices.

1. INTRODUCTION

In recent years, human well-being has become increasingly crucial, especially in industries and service giving sectors. People are spending most of their valuable hours at their respective workplaces. Incidentally, safe workplaces are critically related to an increase in productivity and innovation. However, there is an influx of workplace health and safety problems, and thus, the occupational safety and health (OSH) system has become vital for organisations. Each year, around 270 million people became victims of occupational injuries, fatal and non-fatal (Alli, 2008). Moreover, a recent International Labour Organisation (ILO) report estimated that two million global occupational fatalities occurred annually. Given these points, healthy and safe workers potentially enhance the company's bottom line and market share, broaden consumer reputation, and retain loyal customers.

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In various industrial countries, the OSH management system is extensive and comprehensive, proven by the consistently reduced accident rates. Nevertheless, the OSH in emerging companies were frequently overlooked, specifically in their industrial development policies and strategies (Jilcha & Kitaw, 2016). Most of these organisations primarily focus on increasing their production volume to ensure a sustainable profit. In developing countries such as Ethiopia, the risk of having a work-related injury is 10 to 20 times higher than in developed countries. Similarly, a factory worker in Pakistan is eight times more likely to suffer from work-related fatality than a factory worker in France. Generally, SMEs possess a worse safety record than large enterprises, where the most severe occupational accidents occur in agriculture, forestry, mining, and construction (Alli, 2008).

The Malaysian National Institute for Occupational Safety and Health (NIOSH) reported an increased rate of accidents over the years. Based on the statistical data, the accidents increased from 2.81 in 2015 to 2.93 in 2017 per 1,000 workers. On a similar note, the fatality rate elevated in 2015 from 4.84 to 4.90 in 2017 per 100,000 workers. The highest accident rate occurred in the manufacturing industry, followed by the agriculture and forestry and construction industries. Hence, the Malaysian government has made a progressive effort in enforcing laws and regulations for the employees and employers in the workforce.

In 2008, the Department of Occupational Safety Department (DOSH) introduced Hazard Identification, Risk Assessment and Risk Control, known as HIRARC, as part of the OSH management systems. The introduction of HIRARC as a risk management system is essential to prevent accidents from happening. The concept is vital for organisations to identify the hazard, analyse, and assess its associated risk, where they can then apply suitable control measures before the hazard occurs. Serving as essential risk management, HIRARC has also become a critical concept to planning, management and business operations. In essence, occupational injuries and accidents are caused by preventable factors, which could be eliminated by implementing existing measures and methods. This idea aligns with the department's preventive measures to ratify the law on OSH.

Despite the importance of HIRARC, little is known about its implementation as an OSH risk prevention system in this country, especially among SMEs. In Malaysia, SMEs contribute 99% of the business establishments, comprising 36 per cent of the country's gross domestic product. Since SMEs dominate Malaysian businesses, the improvements to workers' safety and health issues should be in line with Malaysian economic development. However, the SMEs in Malaysia faced many challenges from multiple aspects, specifically in adopting the OSH requirement with limited capital or financial support. Another challenge is the increase in accidents rate in the workplace, which might affect workers' health and safety and ultimately affect the business's goodwill (Surienty, 2018).

Hence, this study investigated the HIRARC system's implementation among SMEs in Malaysia. The second objective was to identify the challenges faced by the SMEs in the system's implementation as an OSH risk prevention system. Firstly, the flow of the paper is illustrated with the research methodology. Subsequently, the following section reviews related literature found in this study. The discussions on the findings are provided in Section 4, followed by Section 5, concluding with the implications and future research directions.

2. HAZARD IDENTIFICATION, RISK ASSESSMENT AND RISK CONTROL (HIRARC)

The process of HIRARC requires five steps comprising work activities, identify hazards, conduct risk assessment, apply control measures and monitoring. In the first step, work activities should be classified in accordance to their similarity, such as:

i. Geographical or physical areas whether within or outside premises.
ii. Stages in production or service process.

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iii. Not too big, e.g. building a car.
iv. Not too small, e.g. fixing a nut.
v. A defined task, e.g. loading, packing, mixing, fixing the door.

The second step of the process requires the organisations to highlight the tasks' critical operations that pose significant risks to the employees' health and safety. Furthermore, they must focus on the hazards of utilising specific equipment due to energy sources, working conditions, or activities performed. Hazards are classified into three primary groups, namely, health, safety, and environmental hazards. Any agent that can cause illness, such as severe and immediate (acute) effects or cause long-term (chronic) problems to an individual, can be identified as a health hazard. For example, noise-induced hearing loss is often difficult for the affected individual to notice until the issue deteriorates significantly.

Meanwhile, other health hazards include chemicals such as battery acid and solvents, work design (ergonomic), and biological, i.e., bacteria, viruses, dust and moulds. This hazard can be extended to physical agents, namely, energy sources strong enough to harm the body, specifically electric currents, heat, light, vibration, noise, and radiation. By definition, a safety hazard is any force strong enough to cause noticeable injury or damage to property. Safety hazards include slipping or tripping hazards such as wires that precariously run across floors and fire from flammable materials. Additional safety hazards include moving parts of machinery, tools and equipment, i.e., pinch and nip points. The final point is the environmental hazard, which is any form of inconspicuous substance released to the environment, causing harm or poisonous effects. For example, a worker who drains a glycol liquid to a storm sewer may not be aware of the effect on the environment.

All these three hazards can be identified using several methods, such as:

i. Workplace inspections.
ii. Task safety analysis or job hazard analysis.
iii. Preliminary investigations.
iv. Potential accident factors.
v. Failure analysis.
vi. Accident and incident investigations.

The hazards can also be identified by referring to the following documents and information:

i. Any hazardous occurrence investigation reports.
ii. First aid records and minor injury records.
iii. Workplace health protection programmes.
iv. Any results of workplace inspections.
v. Any employee complaints and comments.
vi. Any government or employer reports, studies and tests concerning the health and safety of employees.
vii. Any reports made under the regulation of Occupational Safety and Health Act,1994.
viii. The record of hazardous substances.
ix. Any other relevant information.

In ensuring a successful hazard identification process, the employer must determine individuals, department, or units in an organisation that is responsible for the identification task. Furthermore, the time frame for the identification must be determined to avoid delays in the HIRARC process. Lastly, the identified hazards must be compiled and recorded in a proper way for future reference.

In the third step, the hazards identified must be analysed to estimate the severity of their risk. The level of hazard severity is critical for the organisations to determine which hazard they need to prioritise first. For example, hazards that have high risk requires immediate action. The priority level is determined using the formula of the likelihood of risk to happen times severity of risk (likelihood of risk x risk severity = relative

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risk). This result can then be translated into a risk matrix to determine the risk priority. Tables 1-4 display the likelihood for the risk to occur, the severity of risk, risk matrix for relative risk assessment, and the action to be taken based on the risk priority.

Table 1. Likelihood of risk occurrence.

Likelihood	Example	Rating
Most likely	The most likely result of the hazard/event being realised.	5
Possible	It has a good chance of occurring and is not unusual.	4
Conceivable	It might occur sometime in the future.	3
Remote	It has not been known to occur after many years.	2
Inconceivable	It is practically impossible and has never occurred.	1

Source: DOSH (2008).

Table 2. Severity of risk.

Likelihood	Example	Rating
Catastrophic	Numerous fatalities, irrecoverable property damage, and productivity.	5
Fatal	Approximately one single fatality major if the hazard is realised.	4
Serious	Non-fatal injury, permanent disability.	3
Minor	Disabling but not permanent injury.	2
Negligible	Minor abrasions, bruises, cuts, first aid type injury.	1

Source: DOSH (2008).

The level of likelihood times severity of risk will produce the level of risk based on the risk matrix below:

Table 3. Risk matrix.

Likelihood	Severity				
	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Source: DOSH (2008).

High

Medium

Low

Table 4. Risk priority and action to be taken.

Risk	Description	Action
15-25	High	A HIGH risk requires immediate action to control the hazard as detailed in the hierarchy of control. Actions taken must be documented on the risk assessment form, including the date for completion.
5-12	Medium	A MEDIUM risk requires a planned approach to controlling the hazard and applies temporary measures if required. Actions taken must be documented on the risk assessment form, including the date for completion.
1-4	Low	A risk identified as LOW may be considered acceptable, and further reduction may not be necessary. However, if the risk can be resolved quickly and efficiently, control measures should be implemented and recorded.

Source: DOSH (2008).

The fourth step of the HIRARC process is to apply the control measures for each hazard identified, especially for high priority risk. Furthermore, organisations should determine the short-term and long-term

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controls for each of the hazards identified to mitigate the risk. Short-term controls are determined until permanent controls can be put in place, whereas long-term controls are determined reasonably. According to the guidelines by DOSH, four types of controls can be applied to mitigate the hazard risk from occurring, as shown in Figure 1.

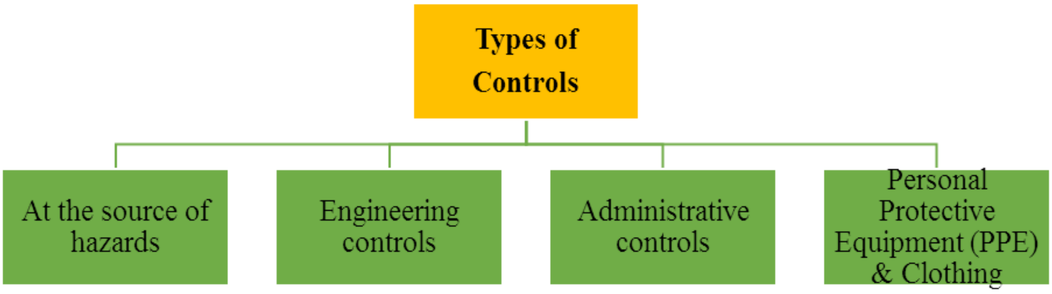

Figure 1. Types of controls to mitigate hazard risk.

Based on the Figure 1, hazard risk can be moderated at the source level, personal protective equipment (PPE) application, or via engineering or administrative controls. Generally, hazard risks can be prevented by eliminating the potential threat at the source. For instance, due to explosion hazards, the purchase and cutting up of scrapped fuel tanks must be halted while replacing harmful chemical less hazardous ones. If the organisation choose to use engineering controls, they can choose the options as presented in Table 5. Some of the hazards need administrative controls as shown in Table 6.

Table 5. Engineering controls.

Controls	Descriptions	Example
Redesign	Jobs and processes can be reworked to make them safer.	Containers can be made easier to hold and lift.
Isolation	If a hazard cannot be eliminated or replaced, it can sometimes be isolated, contained or otherwise kept away from workers.	An insulated and air-conditioned control room can protect operators from toxic chemicals.
Automation	Complex processes can be automated or mechanised. For example, computer-controlled robots can handle spot welding operations in car plants. Care must be taken to protect workers from mechanical hazards.	Computer-controlled robots can handle spot welding operations in car plants. Care must be taken to protect workers from robotic hazards.
Barrier	A hazard can be blocked before it reaches workers.	Special curtains can prevent eye injuries from welding arc radiation. Proper equipment guarding will protect workers from contacting moving parts.
Absorption	Baffles can block or absorb noise.	Lockout systems can isolate energy sources during repair and maintenance. Usually, the further a control keeps.
Dilution -	Some hazards can be diluted or dissipated.	Ventilation systems can dilute toxic gases before they reach operators.

Source: DOSH (2008).

For PPE, it is usually required when other controls are not feasible and where additional protection is needed. Furthermore, the workers must be trained to use and maintain the equipment properly, or the PPE may instead endanger their health. The controls determined need to be checked whether it has successfully solved the hazard risk, or maybe any other control measures are required. Moreover, the effectiveness of the controls determined must be monitored, regularly checked, and evaluated appropriately. This idea is crucial to ensure that the identified hazard risk can be prevented from happening in the organisations. In this case, the hazard risk can be mitigated and

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prevented earlier, given that the organisation abide by the strict guidelines. Overall, the last step of the HIRARC process is essential for organisations, and thus, DOSH has prepared a form for them to document and monitor the process.

Table 6. Administrative controls.

Controls	Descriptions
Safe work procedures.	The employer is expected to ensure that their workers follow the standardised safety practices. Additionally, the work procedures must be periodically reviewed and updated with the workers.
Supervision and training.	Initial training on safe work procedures and refresher training should be offered. Appropriate supervision is needed to assist workers in identifying possible hazards and evaluating work procedures.
Job rotations and other procedures reduce the hazard exposure time for the workers.	Workers can be rotated through jobs requiring repetitive tendon and muscle movements to prevent cumulative trauma injuries. Noisy processes can be scheduled when no one is in the workplace.
Housekeeping, repair, and maintenance programmes.	These programmes include cleaning, waste disposal, and spill cleanup. The tools, equipment, and machinery are unlikely to cause injury if kept clean and well maintained.
Hygiene.	These practices can reduce the risk of toxic materials being absorbed by workers or carry home to their families. For example, street clothing should be kept in separate lockers to avoid being contaminated by work clothing. Additionally, eating areas must be segregated from toxic hazards, and it is forbidden to eat in contaminated work areas. Where applicable, workers should be required to shower and change clothes at the end of the shift.

Source: DOSH (2008).

3. RESEARCH METHODOLOGY

Research objective 1 investigated how a risk management system is implemented in companies, preventing occupational hazards. Meanwhile, objective 2 explored the weaknesses in the current process of a risk management system implemented by companies, reducing occupational hazards. In achieving both objectives, we first used a systematic literature review as a technique for gathering data. This method is regarded as a reliable source of information, mainly high-quality reviews that include relevant studies, which minimise bias (Gough, Oliver, & Thomas, 2017). This method involves four steps: identifying relevant research, systematically critiquing research reports, synthesising findings, and understanding conclusions from the research.

Table 7. List of keyword search terms.

Population	Interest	Context
SME	Occupational safety and health	Implementation
	OSH	Implement
	Occupational safety	Practice
	Occupational health	Practice
	Hazard	Comply
	HIRARC	Compliance
	Health hazard	
	Safety	
	Accidents prevention	
	Health risk	
	Risk assessment	
	Occupational disease	
	Accidents	
	Safety management	

In the first step, we conducted a computer-based literature search in the following established databases: Scopus, Web of Science, ProQuest, and Google Scholar. To establish findings and minimise bias, we solely focused on peer-reviewed journal articles, avoiding grey literature, which is non-journal articles and reports.

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Furthermore, the search method was conducted based on the developed research questions. The keyword search terms followed a PICO (population or patient, interest and context) format determined from our research questions. Meanwhile, the search strategy combined sets of keywords derived from past studies, using AND/OR terms in Boolean logic, including at least one search term from each of the three PICO domains. The keywords for the search strategy are provided in Table 7.

The following criteria must be fulfilled to be included in this review. Firstly, the study should be published in English between 2009 and the current year, 2021, in a peer-reviewed journal, excluding abstracts. We started in 2009 because DOSH introduced HIRARC in 2008, which is the expected initial year of the guideline implementation. Correspondingly, the study should be conducted among SMEs in Malaysia. The other criteria addressed research question one, which requires investigating the OSH implementation and practices among SMEs in Malaysia. For the second research question, the study should mention the weaknesses of OSH practice in SMEs in Malaysia based on the data analysed.

Using the keywords, the computer-based literature search of the SCOPUS database resulted in 6505 articles. Nevertheless, the OSH risk management system or HIRARC research is still scarce after the screening. Two reviewers from the project (authors MM, M. and NAM, W.) independently screened these titles against the inclusion criteria (Table 1). Based on the agreed titles, they further screened the abstracts independently. In the next step, these articles were retrieved in full text and screened by all the authors; however, none of the articles met the inclusion criteria. The results indicate that there is a crucial need for more research in this area for further publication.

The computer-based literature search continued using the Google Scholar database. Our search using the inclusion criteria resulted in 53 articles using this database. Following the same step of the SCOPUS database, we finally chose five articles to include in our discussion. Therefore, using the two databases, five articles were included in this review. Figure 2 illustrates a flowchart of the inclusion process.

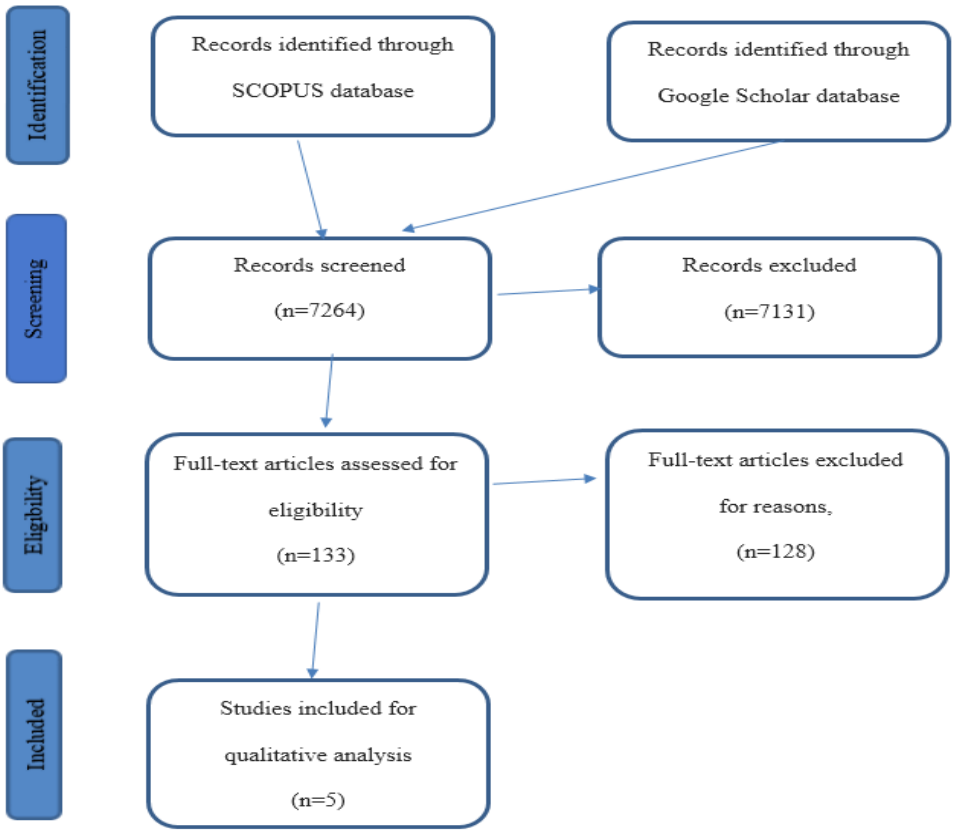

Figure 2. Inclusion process.

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4. LITERATURE QUALITATIVE ANALYSIS

4.1. Implementation of HIRARC System among SMEs in Malaysia

The HIRARC implementation's extensive review was conducted based on the five peer-reviewed articles selected to gain insight into its implementation or OSH risk management system in Malaysia, specifically in SMEs. Based on our analysis, four out of five articles that we have reviewed explained the use of HIRARC as an OSH risk prevention system. Table 8 presents the type of industries that were studied in the literature using the HIRARC system.

Table 8. List of industries investigated in previous literature.

No	Authors & Title of Article	Year of Publications	Industry or Organisation Types of investigation
1	Abas, Blismas, and Lingard (2021). Development of risk assessment tool using negative energy and argumentation theory for evaluating construction occupational safety and health risks.	2021	Construction
2	Belayutham and Ibrahim (2019). Barriers and strategies for better safety practices: The case of construction SMEs in Malaysia.	2019	Construction
3	Siong et al. (2018). Ergonomic assessment in small and medium enterprises (SMEs).	2018	Production
4	Othman et al. (2017). Risk assessment and control measures for the printing ink production process.	2017	Production

We then analysed how the HIRARC system was implemented in industries to answer our research question on its implementation. Three of the articles explained how HIRARC was implemented from the chosen four articles. For instance, Abas et al. (2021) described the HIRARC process in construction companies, which begins with a risk assessment relying heavily on OSH experts' opinions to identify risks. Apart from HIRARC, the author mentioned that the Construction Industry Development Board (CIDB) developed a quantitative safety and health assessment known as Safety and Health Assessment System in Construction (SHASSIC). This system enables risk identification, including data gathering components comprising document checks, workplace inspection, and employee interviews.

Meanwhile, the HIRARC process is explored in two production companies focusing on ergonomics risk (Siong et al., 2018). Similarly, the process begins with hazard identification but instead using interviews and an Industrial Accidental Prevention Association (IAPA) checklist based on the direct observation of SMEs' working activities. In this checklist, the criteria include records of injuries, employee comments, physical demands of work tasks, layout, condition of the workplace, characteristics of handled objects, and environmental conditions. These criteria can be extended to work clothing, PPE, and the organisations' work characteristics.

Next, a Yes or No answer is ticked based on the criteria through direct observation. After identifying the hazards of each working process, the HIRARC method is used to assess these hazards and their respective risks based on the severity and likelihood of their occurrence. Finally, the methods to control the risks are recommended. For instance, a study described the HIRARC process in printing ink production (Othman et al., 2017). The risks were identified using interviews with the production workers. Then, the risk level is identified based on the HIRARC guideline risk matrix by DOSH, where a hierarchy of hazard controls was proposed.

Based on these three articles reviewed, it can be concluded that the companies that implement HIRARC follow the same steps underlined by DOSH in this system. Nevertheless, the method of implementation differs in terms of how they identify or assess the risk. Table 9 summarises the method of risk identification approach used in the literature discussed above.

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Table 9. Method of risk identification adopted in the HIRARC system in previous literature.

No	Articles	Method of Risk Identification
1	Abas et al. (2021). Development of risk assessment tool using damaging energy and argumentation theory for evaluating construction occupational safety and health risks.	Document check, workplace inspection, and employee interviews.
2	Siong et al. (2018). Ergonomic assessment in small and medium enterprises (SMEs).	Interview and Industrial Accidental Prevention Association (IAPA) checklist. The checklist was provided based on direct observation of the operational activities in SMEs.
3	Othman et al. (2017). Risk assessment and control measures for the printing ink production process.	Employee interviews.

4.2. Challenges in the HIRARC Implementation

We investigated the challenges faced by SMEs in the OSH risk prevention system application despite the HIRARC implementation among SMEs in Malaysia. All the five articles discussed the challenges in HIRARC utilisation. Accordingly, these challenges have contributed to the weaknesses in implementing the system. The challenges can be divided into two parts: challenges or weaknesses in terms of the HIRARC system and the challenges or weaknesses of the organisation in implementing the HIRARC system.

4.2.1. Weaknesses of HIRARC System

The HIRARC system is the most well-recognised method in preventing OSH risk (Abas et al., 2021). Nevertheless, they criticised a lack of risk assessment methodology in the system, which reduces the system's efficiency in mitigating accidents. The assessment method prescribed by the HIRARC is generally quantitative, which relies heavily on OSH experts' opinions. Notably, this idea discouraged participation by other stakeholders such as designers and contractors in the construction industry. The HIRARC guideline explicitly provides a list of hazards of specific firm processes and presents the risks as snapshots. However, it does not provide profiling risks over time and thus fails to deal with the dynamic work environments in the long run.

Given these points, a new method is proposed for the OSH risk assessment by including the designers' participation in assessing risk (Abas et al., 2021). For instance, other stakeholders' participation, such as designers in the construction industry, is critical with introducing new technology in the construction industry known as IBS. The industrialised process of IBS was introduced as an alternative to an on-site construction project. Case in point, this process enables building components to be conceived, planned and fabricated in another place and then transported to the site. Thus, the participation of designers is crucial to assess the extent to which their design decisions mitigate the OSH risk in construction.

Notably, the designer's data on risk assessment can infer the risk ratings, namely, Extreme, High, Medium or Low. These ratings are derived from the agreed reasoning model by a panel of experts. Based on the risk report produced, designers must explain the design factors contributing to this inferred level of risk. Finally, the designers can choose whether to accept the level of risk, modify or proceed with the design features, to reduce the risk to an acceptable level.

4.2.2. Challenges of Risk Management Practice Within Organisation

Most of the articles on risk management practice among SMEs in Malaysia feature the challenges within the organisation in implementing HIRARC. In one of the studies, three factors were discussed that contributed to the weak implementation of safety practices. These factors include the cost of its implementation, poor safety culture within the organisation, and the insufficient safety aspect from the organisation's clients (Belayutham & Ibrahim, 2019). Moreover, the authors asserted that most SMEs in Malaysia exhibited constrained financial capability due to

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their small size, leading to less commitment to planning and implementing safety management practices and programmes.

In addition, SMEs lacked formal documentation and system since they preferred to use verbal communication compared to written form (i.e., in-house OHS policy and OHS system). Furthermore, they possessed limited knowledge of existing OHS Acts, regulations, codes of practices, hazards controls, and health effects. This phenomenon is due to the nature of SMEs that hire various unskilled workers with poor linguistic and cognitive ability who are difficult to be maintained. Hence, it has become a challenge for them to understand good safety practices. Another study presented the weakness of risk management practice in reporting accident cases (Kidam, Sahak, Hassim, Hashim, & Hurme, 2015). The accident occurrences in firms were poorly documented, which resulted from substandard input quality and investigation. Moreover, the root of these circumstances can be traced to the deficiency in analysis, incorrect evidence interpretation, and ineffective dissemination of the accident. As a result, these firms are unable to learn from the accident occurrences.

An analysis of 1,291 accident cases from DOSH and Social Security Organisation (SOCSO) databases was conducted using a data mining method. It was found that only one-third of the accidents perceivably provided the lessons learned on a comprehensive basis. For instance, these occurrences provided detailed investigation and reporting on the accidents that occurred. Meanwhile, the causal factors were identified, which ultimately provided the recommended corrective actions for each accident. Notably, the substandard reporting of the accidents is perceivably due to the inefficient implementation of the HIRARC system. Nevertheless, most accidents can be prevented using the existing knowledge and technology if the causes are known and foreseeable (Kidam et al., 2015).

5. DISCUSSION OF FINDINGS

Based on SOCSO report from 2010 to 2012, 80-90 per cent of work-related accidents reported originated from SMEs (Aziz, Baruji, Abdullah, Him, & Yusof, 2015). Hence, the government took the initiative by introducing the HIRARC system in 2008 to help organisations manage the OSH risks. Nevertheless, there is a constant increase in accident cases in Malaysia perennially. Notably, our analysis of previous works indicated that the SMEs' HIRARC system implementation was a part of their risk management process required by DOSH. Nonetheless, several challenges arise, which can be divided into two categories: the weaknesses of the HIRARC system and the weakness of the SMEs.

The weakness in the HIRARC system is due to the advancement of technology in the industries, especially in construction industries. Based on our analysis, it was found that DOSH has provided a comprehensive guideline for OSH risk management. However, the guideline only stresses risk identification within the organisation without considering the role of other stakeholders. In this case, these stakeholders are considered as part of the risk contributors of the hazardous activities. The HIRARC system is equipped with detailed methods for organisations to identify risks such as inspections, preliminary investigations, failure analysis, and documentation analysis. Regardless, these methods are emphasised to be only conducted by the persons in the organisations. For example, the IBS system in the construction industry exemplified that organisations do not frequently create risks. Instead, these risks originated externally, in which these organisations possessed related interests with the firms, i.e. the designers, and thus, they should be involved in the HIRARC system.

Zhao, McCoy, Kleiner, Mills, and Lingard (2016) stressed that safety management, especially in construction, required inputs from stakeholders across the design and construction phases. The stakeholders include architects, contractors, safety professionals, engineers, and designers. Nevertheless, based on the analysis, it was found that designers exhibited difficulty in reaching a consensus of perception compared to builders. Hence, designers frequently avoid involvement in construction-related matters, which exposes them to potential liability. If any misfortune occurs, it becomes unfair to them as they are not responsible under the contract. However, evidence

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showed that injury cases in the workplace bring claims against the design, and thus, significantly influence OSH (Fleming, Lingard, & Wakefield, 2007; Gambatese, Behm, & Rajendran, 2008).

Other weaknesses of HIRARC implementation that were primarily highlighted derived from the organisations. These factors include implementation costs, poor safety culture within the organisation, inadequate safety from the organisation's clients, and substandard reporting of OSH incidents. We believe that the causes come from the organisations' commitment and awareness towards OSH at the workplace. The cost of HIRARC is substantial, which required organisations' commitment in every aspect of OSH compliance, implementation, maintenance, and prevention.

Nevertheless, numerous organisations are unaware of the potential costs if they do not implement the system. In this sense, the organisations must bear several costs related to the ignorance of the system, which includes insurance, occupational diseases and accidents at work. Moreover, they must absorb the cost of reduced work efficiency and quality and sickness and absence due to working conditions (Rzepecki, 2012). Therefore, improved working conditions can be viewed as a significant investment to the organisations in the long term while creating value for the customers. According to Rzepecki (2012) various organisations possessed minimal knowledge on the essential cost of implementing an OSH management system. This inadequate knowledge can be extended to analysing the cost and benefits of implementing the system, resulting in an inadequate economic analysis.

Furthermore, the HIRARC system is a complex system, which is difficult and tedious to implement. The system specified several steps that required knowledge and understanding from the parties in the organisation. For example, to evaluate the OSH risks, organisations must determine the risks' severity and impact based on the guideline provided. Essentially, the HIRARC form is used to document and monitor the flow of the process. However, the form is tedious to fill, which is disadvantageous in recording and data storage. Currently, we are moving towards Industrial Globalisations 5.0 (IR 5.0), and thus, an electronic system is urgently needed. Accordingly, an electronic system is more user-friendly, easy to understand, and easy to monitor, saving more time, especially in the documentation process. More importantly, an electronic system can save crucial data from the HIRARC system for learning and monitoring purposes.

6. CONCLUSION

In this study, we investigated the HIRARC system's implementation and identified the challenges faced by the SMEs in Malaysia as an OSH risk prevention system. For this study, we used a systematic literature review using two established databases: SCOPUS and Google Scholar. Then, we selected and reviewed five articles, enabling us to achieve our research objectives based on the inclusion criteria. Notably, our literature analysis indicated that the HIRARC system had been used among SMEs in Malaysia. Nevertheless, studies on the topic are scarce and limited to specific industries such as construction and production.

Our extensive review indicated that the HIRARC system provided comprehensive guidance, albeit the system is criticised in part of the risk assessment. Previous literature indicated that the existing HIRARC system does not involve other stakeholders in risk identification, i.e., the designers in the construction industry. Accordingly, this idea was proposed given the new technology involved in the industrial revolution. Apart from the weaknesses of the HIRARC system, it was found that the most substantial challenge in implementing the OSH risks prevention systems is the insufficient awareness of the importance of OSH risk management systems among organisations. This predicament is derived from the inadequate safety culture within the organisation, substandard reporting of OSH incidents and poor investment of OSH risk management system.

The study's findings provided implications to the OSH regulators to continue promoting the importance of the OSH risk management system. This system provided more incentives for SMEs, encouraging them to invest in the management system. Meanwhile, the HIRARC system is a well-established system that can help SMEs manage OSH risks and prevent them consistently. Nevertheless, the system needs further improvement to ensure

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participation from firms' stakeholders in risks identification. Notably, the stakeholders' involvement in risk identification is essential to ensure that risks will be assessed and prevented earlier.

We believed that the HIRARC system would be more accessible and user-friendly if translated into an electronic system in line with industrial globalisation. Ultimately, the shift into a more efficient system may encourage more SMEs to invest in the OSH risk management system. The study is restricted to only two databases, namely, SCOPUS and Google Scholar. Thus, future research can extend the database to expand the inclusion process of this systematic literature review. Additionally, future studies can be conducted on the comparison study vis-à-vis the HIRARC practice in other developing countries, such as Indonesia and Thailand, with Malaysia.

Funding: This research is supported by the National Institute of Occupational Safety and Health Malaysia (Grant number: 100-TNCPI/GOV 16/6/2 (013/2020)).
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study.
Acknowledgement: The authors wish to express their gratitude to University Teknologi MARA Kelantan for the administrative support.

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