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Delphi Study on the Difficulties of Safety Practice Implementation in Indonesia: A Case of Transportation Infrastructure Projects

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ABSTRACT

Despite the fact that health and safety practice at work has been promoted over decades, occupational injuries and fatalities continue to plague the construction industry particularly in developing economies like Indonesia. What are the major difficulties in implementing safety practices in Indonesian, and how do these challenges differ from those identified in previous research? This study aims at investigating the difficulties of implementing safety practices in Indonesian, specifically in the case of transportation infrastructure projects (TIPs). A perusal of past research successfully identified 16 fundamental difficulties to implement safety practices, mostly in the field of construction industry. Based on the expert's opinions, two difficulties were added by considering the characteristic of TIPs and domestic issue. A two-round Delphi survey was employed to obtain 16 experts' consensus on major fundamental difficulties in implementing safety practice at TIPs. The experts were academia, government agencies and practitioners having national occupational safety certificate and TIPs experienced. Most of experts agreed that difficulty in changing the workers' mindset and unsafe outward demeanour, the uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition), adversity of conducting safety supervision on TIP's sites, lack of safety awareness of workers (ignorance and disobey) and difficulty to enforce national standard and regulation as the five topmost difficulties of safety practice implementation at TIPs. The findings on the key issues hampering the implementation of safety practices in TIPs are very important for the project's stakeholders in designing strategy or program to improved safety implementation in similar projects. This study contributes to the existing literature by providing a detailed analysis of safety challenges specific to Indonesian transportation infrastructure projects, which have unique characteristics such as large-scale operations and complex infrastructure. While the Delphi survey method is effective for obtaining expert consensus, it may be subject to biases.

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1. Introduction

Over the years, people have perceived the development sites as an uncomfortable and unsafe milieu. This industry belongs to one of the most harmful prone industries (Abdolahi, Variani, & Varmazyar, 2021; Mohammadi, Tavakolan, & Khosravi, 2018) and has the most disreputable records in terms of occupational and safety reports among other sectors (Ansori & Widyanti, 2021; Belayutham & Ibrahim, 2019). The high rates of fatalities and injuries in construction, particularly those associated with outdoor work, work at heights, and complex on-site operations, have highlighted the inherent dangers of the industry (Ganah & John, 2015). Despite this sector hires around 7% of the global workforce, it contributes at least 30%-40% of lethal injuries (Gao, Chan, Utama, & Zahoor, 2016). While persistent efforts and hundreds of studies have been promoted to reform construction safety, the degree of construction accidents still frighten.

Implementation of safety practices in construction sites is still being a big challenge for most construction enterprises even for those establishing their own system for managing safety.(Hon, Chan, & Yam, 2012) In the developing economies, the tragic injuries and unhealthiness experienced by construction workforce is more dreadful (Durdyev, Mohamed, Lay, & Ismail, 2017; Manu, Emuze, Saurin, & Hadikusumo, 2019). For instance, representing over 7% of the total workforce, construction industry according to the National Social Security for Workers, counted approximately 30% of total occupational accidents in Indonesia (Mangiring & Lestari, 2018) which are also relatively high. In line with a massive infrastructure development project in the last few years, a number of fatalities during construction operation has been recorded and attracting national media attention. Like most of the other economies in transition and developing countries, Indonesian also confronts difficulties and challenges to enforce regulation and to implement a better safety practice. Safety practice in developing industries is still fully undeveloped and immaturity (Awwad, El Souki, & Jabbour, 2016), and the severity of safety problem has statistically increased due to the rapid acceleration of the construction sector growth (Ghanbari, Saadoon, & Mousavi, 2024).

Generally, infrastructure projects are complex. The projects are unique in terms of factors and site environment which require tough workers to undertake high physical, mental strength and dangerous duties in long time periods (Abu Aisheh, Tayeh, Alaloul, & Jouda, 2021). They are poor sanitary and services and directly exposed to extreme weather condition (Eppenberger & Haupt, 2003), intensive workers and heavy equipment involved, amount of materials, complicated operation and management activities which could increase the accident frequency more higher than generic projects (Guo, Li, & Li, 2013; Kamar, Ahmad, Derus, & Azman, 2019). Though the practice of occupational health and safety has been familiarized for decades, the infrastructure projects in developing and emerging industries still suffers from work related accidents. Reflecting to both attributes, the uniqueness of infrastructure projects and safety practice implementation problem existing in developing countries, this study aims at investigating the difficulties of implementing safety practices in Indonesian, specifically in the case of transportation infrastructure projects (TIPs). Understanding the difficulties would be essential to reduce accidents rate and if properly catered, may improve project safety performance.

2. Literature Review

Past studies perceive that barriers exist in implementing safety management systems in construction projects in different countries and perspectives (Chileshe & Dzisi, 2012; J. Y. Y. Wong, Gray, & Sadiqi, 2015; Yiu, Sze, & Chan, 2018). Hon et al. (2012) investigated safety practice implementation at refurbish and small rehabilitation works associated with construction works in Hong Kong and found that the primary difficulties were safety resource limitation, changing the workers mindset and lack of safety supervision. In Australian construction industry, cost for implementing safety, language diversity, education level and change to new safety mindset constitute the fundamental barriers to implement occupational health and safety reform (Loosemore & Andonakis, 2007). In Palestinian construction sector, the leading problems were poor safety training, absence of management assurance and practical guidance, unsupervised activity and no budget for safety investment, non-trained skills and inadequate equipment (Ammad et al., 2020; Enshassi, Arain, & Al-Raee, 2010). Wilson and Koehn (2000) studied the problem in implementing safety practices faced by main contractors and subcontractors. According to the researchers, on one side, main contractors have difficulty to monitor safety practice implemented by subcontractor's workers due to the limitation of safety knowledge and the characteristic of work specialties which need different safety procedures. On the other sides, the subcontractors have a shortage of safety resources to adhere safety roles required by main contractors and by the regulation at the same time. In other words, it is hard to harmonize safety vision with workers' subcontractors (Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2009; Gao, Chan, Lyu, Zahoor, & Utama, 2018). Amplifying to the frustrations faced by the subcontractors, Chileshe and Dzisi (2012) found that lack of knowledge, information and guidance, cost and time restriction as barriers for implementation of safety practice in small and medium construction enterprises. Other fundamental barriers that are identified in literature include standardize safety management system due to site conditions (Hon et al., 2012; Stephen & Hunt, 2002), admonish workers' unsafe habits when operating equipment (Fernández-Muñiz et al., 2009) and implement safety rewards and punishments (Belayutham & Ibrahim, 2019; Mohammadi et al., 2018).

Study of Abu Aisheh et al. (2021) on safety implementation challenges in infrastructure works in Gaza identified three types of barriers namely safety policy, management and behaviour and cultural. Barrier to implement safety rewards and punishments indicated by no reward for contractor committed to safety program and no punishment for those who disobey safety regulation are the major barriers regarding safety policy. In terms of management barriers, safety officers have insignificant

authority in project while the number of them is unproportionate to project size. These two barriers reflect to the lack of seriousness about safety from project management and difficulty to find/have safety resources (Bottani, Monica, & Vignali, 2009; Choudhry, Fang, & Ahmed, 2008). Regarding behaviour and cultural barrier, the researchers identified that in many projects, disobeyed workers to safety program were still allowed to work by supervisors. Besides, new workers who are prone to accidents and high turnover rate of frontline workers also indicate the lack of seriousness about safety. Nawaz et al. (2020) investigated health and safety factors in Orange Line Metro Train, a mega transportation infrastructure in Pakistan. They identified unsafe to work practice, poor safety condition, health/environment derivation, inappropriate emergency procedure, and ignorance of adopting safety regulation as the top principal difficulties. Disreputable safety practices negatively predispose the safety management ideas towards a safe work environment as a consequence (Belayutham & Ibrahim, 2019).

3. Methodology

This study employed quantitative research methods to address the objective. Initially, a literature review was performed to identify safety implementation difficulties and resulted 16 difficulties. Three safety experts with over ten years experiences as safety professionals and national safety trainers were interviewed to verify and complement the difficulties of safety practice implementation in the domestic context and infrastructure project specific. They agreed to include the uniqueness of TIPs and difficulty to enforce national standard and regulation related occupational health and safety. Therefore, this study adopted 18 difficulties to be further examined by designing a Delphi survey questionnaire.

The Delphi method is a practical procedure for diminishing the degree of information partiality gained from expert panels, and it tolerates to acquire of expert's opinions and decisions in handling many-sided problem. One of the benefits of the method is attaining for panellists' agreement through a recurring assessment (Utama, Rohman, Zahoor, & Maqsoom, 2022). Thus, the Delphi method was employed for attaining a fair-minded judgements of industry specialists on the difficulties of implementing safety practice in TIPs. In order to reduce ambiguity and improve accuracy when it comes to expert's opinions, the Delphi survey should be conducted as part of a reiterative survey (Hallowell & Gambatese, 2009) in two to seven rounds (Adnan & Morledge, 2003). This study used a two-round Delphi survey to reduce expert's reluctance and attrition when responding to repetitive questionnaires.

A total of 23 industrial experts representing contractors, consultants, academia and government representatives involved in first round survey, but only 16 of them returned the second-round questionnaires back. Thus, the data obtained from 16 questionnaires resulting of first and second survey were analysed further. In fact, the number of panellists in a Delphi study remains debatable. Increasingly larger sample sizes may not significantly improve the finding validity (Vogel et al., 2019) The number of experts can range from 10 to 50, but seven are still acceptable (Hon et al., 2012). Gao et al. (2018) opined that in the field of Construction Management research, Delphi survey requires at least eight to 12 experts. Despite the number of the expert, the quality and diversity of expert representation in terms of discipline and organization background is favored to encapsulate a comprehensive knowledge base. Skulmoski, Hartman, & Krahn (2007) opined that among the Delphi panel's requirement is the expert panelists should have knowledge and experiences with the issue under discussion, willingness and sufficient time to partake in a multi-round Delphi. In this study, the number and requirement of experts were scientifically fulfilled. As described in Table 1, member of expert group were experienced, knowledgable, top and senior management and industrial stakeholders.

Table 1. Profile of industrial expert group

Demography data	Category	Frequency	Percent
Organization	Academia	3	18.75
	Government representative	2	12.50
	Contractor	7	43.75
	Consultant	4	25.00
Position	Professor	2	12.50
	Senior lecturer	1	6.25
	Project manager	3	18.75
	Safety leader/manager	6	37.50
	Principle consultant	4	25.00
Year of experience	5-10 years	2	12.50
	11-15 years	6	37.50
	16-20 years	6	37.50
	> 20 years	2	12.50

In the first round Delphi survey, the questionnaire consisted of two parts. Part A included profiles of the expert and Part B asked the experts to ranked the relative importance of the difficulties. A 5-point Likert-type scale was adopted, with 1 indicating the least important and 5 representing very important. The mean score of the difficulties from the first-round surveys were then evaluated to provide relative rankings. The mean score was obtained from the sum of scores given by respondents on a the difficulties divided by the number of respondents (16 experts). The mean score indicates the experts' responses tendency on each difficulty. The results of the first-round were circulated to the same experts. In this second-round, experts were requested to contemplate their decisions in the first-round by considering the average score of expert group opinions. The main goal of this procedure was to reach a compromise and achieve consistency in group opinion instead of an individual promise.

Kendall's coefficient of concordance (W) was calculated to show whether a consensus among experts was reached. The W score ranges from 0 to 1 showing a lack of agreement and a perfect agreement among experts respectively. It is necessary to

calculate Chi-square distribution values to test the significance since the number of ranked difficulty items was more than seven.20 The Wilcoxon signed-rank test was employed to compare the repetitive mensuration in two stages of Delphi survey by evaluating the mean ranks. A significant Wilcoxon signed-rank test describes significant difference between the experts' ranks in the two sequences (Ameyaw, Hu, Shan, Chan, & Le, 2016). The Kruskal-Wallis test was applied to observe the experts' ranks comparison on difficulties of safety practice implementation in expert's organization, position and years of experience. The Delphi method assists to improve group consensus and results a ranking which is more reliable.

4. Results and Discussion

Based on the result of two rounds the Delphi survey, the expert groups identified the top five difficulties to implement safety practice in TIPs to be difficulty in changing the workers' mindset and unsafe outward demeanour, the uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition), adversity of conducting safety supervision on TIP's sites, lack of safety awareness of workers (ignorance and disobey), and difficulty to enforce national standard and regulation related occupational health and safety.

The use of Delphi method successfully increased the ranking consensus amongst 16 experts. As shown in Table 2, the W score improved significantly from 0.739 to 0.761in the first round and in second round respectively, meaning significant agreement among expert panel was justified. The chi-square scores in the two rounds were 201.652 and 206.866 respectively, which were both statistically significant. Thus, the two cycle Delphi study successfully improved consensus among experts and reliability of the result. The Wilcoxon signed-rank test was utilized to compare the reiterated assessment in two concatenation survey.

Table 2. Results of Delphi survey

The difficulties	1st round		2nd round	
	Mean	Ranking	Mean	Ranking
Difficulty in changing the workers' mindset and unsafe outward demeanour	4.31	1	4.38	1
The uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition)	4.31	1	4.25	2
Adversity of conducting safety supervision on TIP's sites	4.19	2	4.13	3
Lack of safety awareness of workers (ignorance and disobey).	4.13	3	4.00	4
Difficulty to enforce national standard and regulation related occupational health and safety	4.00	4	4.00	4
Difficulty to implement safety rewards and punishments	3.69	6	3.81	5
Difficulty in finding or having safety resources in TIPs	3.75	5	3.63	6
Lack of safety management system standards	3.31	7	3.44	7
The absence of safety training for workers	3.13	8	3.25	8
Revamp safety awareness of parties involved	3.31	7	3.13	9
Poor level of workers' education	2.63	11	2.81	10
High turnover rate of frontline workers in TIPs	2.75	10	2.69	11
Limited or no cost budgeted for safety in contract	2.38	13	2.50	12
Frailty of communication and harmonization safety vision to workers and subcontractors	2.50	12	2.44	13
Lack of time to deal with OSH issues in the projects	2.25	14	2.31	14
Lack of project management commitment	2.25	14	2.25	15
Lack of safety commitment from owners/clients	2.06	15	2.25	15
Lack of safety leadership	2.06	15	2.06	16
N	16		16	

The difficulties	1st round		2nd round	
	Mean	Ranking	Mean	Ranking
Kendall's coefficient of concordance (W)	.739		.761	
Chi-square ($\chi 2$)	201.652		206.866	
Sig.	.000		.000	

Table 3 presents that the 18 difficulties were insignificant indicating that significant difference between the experts' ranks of items was lacking in the two iterations.

Table 3. Wilcoxon Signed-Rank test of two rounds Delphi survey

The difficulties to implement safety practice in TIPs	Wilcoxon Signed-Rank test	
	Z	Asymp. Sig.
Difficulty in changing the workers' mindset and unsafe outward demeanour	-.877	.380
The uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition)	-577	.564
Adversity of conducting safety supervision on TIP's sites	-.447	.655
Lack of safety awareness of workers (ignorance and disobey).	-1.134	.257
Difficulty to enforce national standard and regulation related occupational health and safety	-2.449	.014
Difficulty to implement safety rewards and punishments	-1.027	.305
Difficulty in finding or having safety resources in TIPs	-.832	.405
Lack of safety management system standards	-.500	.617
The absence of safety training for workers	-.577	.564
Revamp safety awareness of parties involved	-.277	.782
Poor level of workers' education	-.187	.852
High turnover rate of frontline workers in TIPs	-.905	.366
Limited or no cost budgeted for safety in contract	-.042	.967
Frailty of communication and harmonization safety vision to workers and subcontractors	-.471	.637
Lack of time to deal with OSH issues in the projects	-.632	.527
Lack of project management commitment	.000	1.000
Lack of safety commitment from owners/clients	-.302	.763
Lack of safety leadership	.000	1.000

To compare the expert's opinion within the three groups (organization, position and years of experience), the Kruskal-Wallis test was employed. As illustrated in Table 4, each group presents insignificant results meaning the null hypothesis testing was not rejected for all difficulties. In other word, an agreement on the ranking of difficulties was achieved among all kind of subgroups of organization, position and years of experience. This results also assert that the overall, the experts have similar perception on the difficulties of implementing safety practices in TIPs.

Table 4. Kruskal-Wallis Test in Round-Two Delphi

The difficulties to implement safety practice in TIPs	Kruskal-Wallis test Asymp. Sig.		
	Organization	Position	Year of Experience
Difficulty in changing the workers' mindset and unsafe outward demeanour	.688	.700	.881
The uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition)	.940	.947	.929
Adversity of conducting safety supervision on TIP's sites	.216	.280	.536
Lack of safety awareness of workers (ignorance and disobey)	.551	.517	.887
Difficulty to enforce national standard and regulation related occupational health and safety	.360	.713	.069
Difficulty to implement safety rewards and punishments	.940	.644	.451
Difficulty in finding or having safety resources in TIPs	.892	.931	.664
Lack of safety management system standards	.975	.960	.312
The absence of safety training for workers	.720	.394	.929
Revamp safety awareness of parties involved	.360	.526	.290
Poor level of workers' education	.566	.893	.536

The difficulties to implement safety practice in TIPs	Kruskal-Wallis test Asymp. Sig.		
	Organization	Position	Year of Experience
High turnover rate of frontline workers in TIPs	.236	281	.252
Limited or no cost budgeted for safety in contract	.709	.540	.340
Frailty of communication and harmonization safety vision to workers and subcontractors	.975	.718	.870
Lack of time to deal with OSH issues in the projects	.528	.810	.186
Lack of project management commitment	.210	.186	.343
Lack of safety commitment from owners/clients	.414	.586	.069
Lack of safety leadership	.100	.075	.373

Difficulty to change the workers' safety mindset and unsafe outward demeanour is the most top challenge to implement safety practices in TIPs. Back to Maslow theory, the second layer of the hierarchy of needs is safety, after the physiological needs (e.g. foods, water and clothes) at the bottom layer. People do not think about safety before their physiological needs are fulfilled satisfactorily. Correspondingly, majority of Indonesian construction workers are part of those live below the national poverty line, it implies that they still suffer for fulfilment of basic needs. This condition gradually sets in minds that safety, particularly in the context of occupation, has not been an essential need, so it can be disregarded. Safety mindset means how a person thinks about safety. According to Dweck (2008) quoted from Botha et al. (2020), it reflects the caring environment and realism of the working relationship fostered by leadership and experience in the organization, and it perpetuates a degree of employee responsibility towards safety as a result. The latter researchers further added that a poor safety mindset implies a potentially harmful work culture, possibly demotivated workers, and a lack of their participation. Research on education evinced that mindset and learning have positive correlation (Raheem & Issa, 2016). Changing one's mindset toward safety is actually hard, but education and sufficient training could possibly shift it (Hon et al., 2012). The problem of providing adequate safety training is that most construction workers are impermanent personnel of the company and they are frequently changed at any time, depending on project needs. A factual example of unsafe outward demeanour in Indonesian construction sites is used to find workers performing works or operating equipment while smoking or listening to music from their gadgets. Lingard and Rowlinson (2004) proclaimed that more than 80% of incidents at work were triggered by unsafe conducts and behaviours of workers. Controlling working habit is a tough challenge, because it is partly conducted by religious beliefs, norms and attitudes (Raheem & Issa, 2016). These authors further argued that in some extent, safety culture could change personal's unsafe behaviour through an integrated system of planning, management, training and education rather than a set of safety procedure.

The uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition) ranked in the second as the main difficulty of implementation safety practice. The uniqueness of TIPs substantially expose frontline workers in perils and accidents. Typical infrastructure projects, TIPs such as trans-national highway, toll roads and railways generally parallel with several attributes included mostly located in remote and isolated area, complicated construction works, a lot of materials and the use of massive heavy equipment and different types of workers and specialists involvement. Therefore, they need more complex project management structure and activities to deal with various types of risk (Guo et al., 2013; Kamar et al., 2019). These characteristics practically affect how difficult the safety management system implemented in TIPs. For instance, remote or isolated area of TIPs influences on the difficulty to have safety resources. Meanwhile, complexity of construction and unidentified site situation predispose on cost of occupational health and safety, particularly to equip all workers and staff with personal protective equipment (Alaloul, Ismail, Ammad, & Saad, 2020). TIPs may involves hundreds to thousands workers with different social and cultural background including believe or religion. This attributes influence to different understanding of health and safety resulting of human interaction and different work habits.

Adversity of conducting safety supervision on TIP's sites ranked as the third most important difficulty to implement safety practice, according to the experts. This difficulty could not be separated from the characteristic of TIPs. A thousands-kilometre toll road or railway project for instance, creates a site situation which is fully uncontrolled. The surveillance system on the safety compliance is also difficult to be conducted in project such TIPs due to the paucity of safety officer personnel. The project management has limitation to provide sufficient number of safety officer for each spot of scattered site operation. Generally speaking, instead of safety, the management more focuses on time and productivity performance. In the context of supervision, supervisors are the people who directly interact with workers most profoundly and intensely among all the management in the project (Fang, Wu, & Wu, 2015). Many studies affirmed that the supervisors can emphasize the safety in the context of group norm within the construction workers (Shen, Ju, Koh, Rowlinson, & Bridge, 2017). Supervisors play the most important role to prevent accident, and enable to influence workers' safety performance (Liang & Zhang, 2019). However, they have less respect for safety and frequently compromise on the procedure to meet productivity demands onsite (Garrett & Teizer, 2009; L. Wong, Wang, Law, & Lo, 2016). Such situation are normally found in construction

projects in developing countries. Additionally, safety supervision is not merely regular inspection and the safety condition evaluation of the construction sites. It is also about safety standards in safety supervision (Su, Gao, Jiang, & Li, 2021) which is overlooked by project's stakeholders. The role of safety standards in supervision In Indonesia, is still not comprehensive, mostly for building works and insufficiently implemented for other projects such as road projects. This situation almost happens in all industries, construction sector in particular. In result, safety supervision has been not maximally conducted at site.

Lack of safety awareness of workers (ignorance and disobey) ranked in the fourth as the fundamental difficulty of implementation safety practice in TIPs. Safety awareness constitutes person's behave to hazards and possibility of injury when working (Hwang, Shan, & Phuah, 2018). According to Kouabenan, (2009) fully aware of safety and health at work constitutes a complex occurrence of multi-dimensional factors influenced by emotional, physical, social, political, and cultural factors. There are several indications showing that poor safety awareness of parties involved in TIPs sites exists. For instance, only few workers are sufficiently equipped with complete personal protective stuff when undertaking hot asphalt overlaying. In fact, all parties take apart in ignoring their responsibilities for safety. On one side, workers never prosecute when they are not protected properly. On the other side, the contractors and project management intentionally neglect to provide such stuffs. Similar to the fact found by Zou and Zhang (2009) that most of construction workers in developing countries are not aware of their rights and necessity of safety. In addition, the government as the project owner fails to empower safety regulation. Indeed, the responsibility of safety is bear with all stakeholders, therefore a multi-stakeholder rather than separate parties (Musonda & Smallwood, 2008), and a multi-dimensional rather than solely single approach (Qazi, Ye, & Choudhry, 2006) are advocated to increase safety awareness in construction projects. Each worker has different degree of safety awareness and the management has responsibility to improve it throughout their organization. Safety training and structured promotion program such as posters and displays can significantly raise the safety awareness of workers (Choudhry et al., 2008).

Difficulty to enforce national standard and regulation related occupational health and safety was the top fifth difficulty the of implementation safety practice in TIPs. Enforcing standard and regulation of health and safety at work can be challenging across different countries and jurisdictions. In Nigeria for instance, the effectiveness of standard and regulation of occupational health and safety was obstructed by corruption, bad politicians and lack of governmental commitment (Umeokafor, Isaac, Jones, & Umeadi, 2014). Meanwhile, there was inconsistent standard and jurisdiction issues in governing occupational health and safety in Atlantic Canada due to federal-provincial boundaries (Shan, 2022). In Indonesia, there are various factors influencing national standards and regulations enforcement of occupational health and safety. A major problem is the lack of adequate resources and infrastructure to monitor and enforce compliance with these standards. Inadequate funding, limited manpower, and outdated technology can affect governments' ability to effectively monitor workplace safety practices. Additionally, the size and diversity of Indonesia's workforce and industry makes it difficult to ensure consistent enforcement across different regions and sectors. Differences in cultural norms, education levels and economic development can also affect the implementation of and compliance with safety regulations. Similar to problem in Nigeria, corruption and a lack of transparency in regulatory enforcement also reduce the effectiveness of efforts to comply with occupational health and safety standards. Companies that prioritize profits over the well-being of their employees may find themselves violating regulations, further complicating enforcement efforts. These challenges highlight the complexity of enforcing national OHS standards and regulations in TIPs.

5. Conclusion

The acceleration of economic growth through the development of infrastructure projects recorded a number of fatal accidents befalling the workers on site even though the projects regularly promoted and administered health and safety management systems. This study aims to investigate the difficulties of implementing safety practices in Indonesian, specifically in the field of transportation infrastructure projects (TIPs). The findings indicate that the main difficulties hampering safety practice implementation in TIPs include difficulty in changing the workers' mindset and unsafe outward demeanour, the uniqueness of TIPs (complexity, massive heavy equipment and adverse site condition), adversity of conducting safety supervision on TIP's sites, lack of safety awareness of workers (ignorance and disobey) and difficulty to enforce national standard and regulation related occupational health and safety.
Reducing these difficulties will require significant effort and time, but may also provide insight into future safety strategies: if successfully addressed, they may elevate the implementation of safety practice and directly improve safety performance. Changing workers' mindsets and unsafe behaviours which is greatly pivotal to improve safety implementation at workplace could be addressed by providing enough knowledge through education and technical safety training. Complex operation, using massive heavy equipment and adverse site condition of TIPs present significant challenging in implementation of safety practice. The use of information and communication technology (ICT) for instance Building Information Modeling (BIM) in assisting visualization of identify and recognize safety risks during project operation, workers and equipment tracking, and safety warning system becomes a strategic solution. Adversity of conducting safety supervision on TIP's sites could be resolved by increasing regular inspections, collaboration among parties on site and better enforcement of regulations. On supervisors' side, they have to improve their communication skill and utilize modern communication technology. In terms of lack of safety awareness among workers which is the major contributing factor of fatality in construction sites, could be catered by safety developing plans involving safety experts, occupational health and safety institutions and also training programs. Meanwhile, the difficulty to enforce national standard and regulation associated with occupational safety could be tackled by

reforming employment law in this context and enhancing coordination among enforcement bodies. Indeed, there are still many strategies and methods that can be applied to make safety practices could be implemented facilely and safety performance become better. Addressing these difficulties is not only essential to improve implementation of safety practice in TIPs in Indonesia but also indicates possible safety strategies which are override in this research.

The generalisability of these results is subject to the type of industry or project and the number of expert involved. Thus, it would be interesting to compare the difficulties to implement safety practice among type of infrastructure projects such as TIPs and energy infrastructure projects. It is also recommended that further research be undertaken by involving homogeneous sample to view the experts' opinions from a point of view to strengthen the result validity. Finally, this study suggests further research on safety strategies for alleviating the difficulties of safety practice implementation particularly in strategic infrastructure projects. Finding the right strategies for each difficulty will continually improve the safety implementation.

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