SAFETY CLIMATE AND SAFETY PERFORMANCE IN MALAYSIA'S CONSTRUCTION INDUSTRY

By

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Thesis Submitted to

Collage of Business

Universiti Utara Malayisa

In Partial Fulfilment of the Requirement for the Master of Sciences
(Occupational Safety and Health Management)

Pusat Pengajian Pengurusan Perniagaan
SCHOOL OF BUSINESS MANAGEMENT
Universiti Utara Malaysia

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ABSTRACT

Malaysia's construction sector plays a noteworthy role in the economic expansion and advancement of the nation. Nonetheless, due to its high accident and fatality rate, the construction sector is among the riskiest in the world. This sector is among the riskiest in the world. This study aims to identify the relationship between safety climate and safety performance in Malaysia's construction industry which include of management commitment and employees' involvement in health and safety, safety enforcement and promotion, applicability of safety rules and safe work practices and safety consciousness and responsibility. Construction personnel across Malaysia were given a series of questionnaires to complete in order to collect data for this study. The study employed the Statistical Package for the Social Sciences (SPSS) version 28.0 software to assess the acceptability of the hypotheses that were specifically designed for the investigation. The findings resulted in there is a positive relationship between management commitment and employees' involvement in health and safety and safety compliance, management commitment and employees' involvement in health and safety and safety participation, safety enforcement and promotion and safety compliance, safety enforcement and promotion and safety participation, applicability of safety rules and safe work practices and safety compliance, applicability of safety rules and safe work practices and safety participation, safety consciousness and responsibility and safety compliance and safety consciousness and responsibility and safety participation. All the independent variables influence the dependent variables (safety compliance and safety participation).

Keywords: accident, construction industry, occupational safety and health, safety, safety climate, safety performance

ABSTRAK

Sektor pembinaan Malaysia memainkan peranan penting dalam pengembangan dan kemajuan ekonomi negara. Namun begitu, disebabkan kadar kemalangan dan kematian yang tinggi, sektor pembinaan adalah antara yang paling berisiko di dunia. Sektor ini adalah antara yang paling berisiko di dunia Kajian ini bertujuan untuk mengenal pasti hubungan antara iklim keselamatan dan prestasi keselamatan dalam industri pembinaan Malaysia yang merangkumi komitmen pengurusan dan penglibatan pekerja dalam kesihatan dan keselamatan, penguatkuasaan dan promosi keselamatan, kebolehgunaan peraturan keselamatan dan amalan kerja selamat serta kesedaran dan tanggungjawab keselamatan. Kakitangan pembinaan di seluruh Malaysia telah diberikan satu siri soal selidik untuk dilengkapkan bagi mengumpul data untuk kajian ini. Kajian itu menggunakan perisian Statistical Package for the Social Sciences (SPSS) versi 28.0 untuk menilai kebolehterimaan hipotesis yang direka khusus untuk penyiasatan. Penemuan menghasilkan terdapat hubungan positif antara komitmen pengurusan dan penglibatan pekerja dalam pematuhan kesihatan dan keselamatan dan keselamatan, komitmen pengurusan dan penglibatan pekerja dalam penyertaan kesihatan dan keselamatan dan keselamatan, penguatkuasaan dan promosi keselamatan dan pematuhan keselamatan, penguatkuasaan dan promosi keselamatan. dan penyertaan keselamatan, kebolehgunaan peraturan keselamatan dan amalan kerja selamat dan pematuhan keselamatan, kebolehgunaan peraturan keselamatan dan amalan kerja selamat dan penyertaan keselamatan, kesedaran keselamatan dan tanggungjawab dan pematuhan keselamatan dan kesedaran keselamatan dan tanggungjawab dan penyertaan keselamatan. Semua pembolehubah bebas mempengaruhi pembolehubah bersandar (pematuhan keselamatan dan penyertaan keselamatan).

Kata kunci: industry pembinaan, kemalangan, keselamatan dan kesihatan pekerjaan, keselamatan, iklim keselamatan, prestasi keselamatan

ACKNOWLEDGEMENTS

‘In the name of Allah, The Most Gracious and The Most Merciful, and peace be upon our Greatest Prophet Muhammad S.A.W’

Alhamdulillah, thanks to Allah's grace and strength, I was able to finish my dissertation. My sincere gratitude is extended to my parents, relatives, and my cherished spouse, Muhammad Azuddin Rosli; to my mother, Siti Zabidah binti Ngaliman; and to my children, Muhammad Hud bin Muhamad Azuddin and Siti Khadijah binti Muhammad Azuddin, for their unending prayers, love, support, and inspiration that have enabled me to successfully finish this project from start to finish.

I would especially like to thank my project supervisor, Ts. Dr. Syazwan Syah bin Zulkifly, for his excellent guidance and unwavering support as I completed this paper. His invaluable assistance with the data collection and report writing, along with his insightful criticism and suggestions, made this project a success.

Not to be overlooked is my gratitude to my colleagues for their insightful advice, recommendations, and information on my research. We appreciate the participation of each and every respondent in this study.

Finally, but just as importantly, I want to say how much I appreciate your kindness to my friends who helped with this research in an indirect way. I am so grateful.

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LIST OF ABBREVIATION

Abbreviation	Definition
DOSH	Department of Occupational Safety and Health
DOSM	Department of Statistics Malaysia
DV	Dependent Variable
GDP	Gross Domestic Product
HSR	High Speed Rail
IV	Independent Variable
MRT	Mass Rapid Transit
NPD	Non-Permanent Disability
PD	Permanent Disability
SC	Safety Climate
MC&EI	Management Commitment and Employee's Involvement in Health and Safety
SE&P	Safety Enforcement and Promotion
SR&WP	Applicability of Safety Rules and Safe Work Practices
SC&R	Safety Consciousness and Responsibility
SP	Safety Performance
SCOMP	Safety Compliance
SPART	Safety Participation

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will explain the background of study, problem statement, research question, research objective, scope of study, significance of study and definition of key terms.

1.2 Background of Study

The construction industry is considered a high-risk industry globally, with a high incidence of accidents and injuries (Sousa V, 2014). According to ILO (2021), almost 108,000 fatal accidents occur on a construction site annually. The construction industry in Malaysia plays a pivotal role in driving the nation's economic growth and development. The activity in question plays a substantial role in augmenting the Gross Domestic Product (GDP) of the nation and acts as a pivotal driver for fostering economic expansion. The government of Malaysia has made substantial investments in the development of infrastructure, encompassing various sectors such as highways, railways, airports, ports, and public transport systems. The MRT and HSR Kuala Lumpur-Singapore are notable illustrations of the nation's emphasis on infrastructure development. In addition to infrastructure, there is a robust market for residential, commercial, and industrial construction projects. The property development sector is

active, with a mix of high-rise condominiums, landed properties, and commercial complexes.

The construction industry is inherently hazardous, characterized by numerous potential risks and safety hazards. Accidents, injuries, and even fatalities are not uncommon in this sector. This industry is considered to be one of the most hazardous sectors globally, primarily due to its elevated incidence of accidents and fatalities. Numerous investigations have been carried out to look into the causes and consequences of mishaps in the construction sector. Numerous factors, such as inadequate safety measures, poor communication, human error, and a lack of training, have been linked to accidents, according to these studies.

The primary factors leading to accidents can be attributed to substandard safety performance exhibited by workers, resulting from a confluence of various contributing factors. (Nawi et. al. 2016). The construction industry places significant importance on safety performance as a fundamental outcome, as it directly correlates with the well-being of workers, project efficiency, and overall project success. Researching safety performance is essential for understanding the efficacy of safety measures and practices. Safety performance is considered a crucial outcome in the construction industry. (Neal et. al., 2000). The safety climate and safety performance relationship in the construction industry is a critical and well-studied topic. This industry experiences a significant number of accidents due to its poor safety performance. In addition to the inherent human toll associated with experiencing an accident, the economic ramifications can be profoundly detrimental. For every unit of accident cost

that an insurance company is obligated to cover, the contractor may incur indirect costs ranging from £5 to £50.

Safety climate is a construct that encompasses the collective perceptions, attitudes, and behaviors exhibited within an organizational setting, which subsequently exert an impact on the overall safety performance. The creation of a favorable safety climate is imperative in cultivating a safety-oriented culture, wherein employees experience a sense of backing and encouragement to prioritize safety in their work practices. According to Zohar (2003), safety climate can be defined as the collective perceptions held by employees regarding the safety practices and procedures within their work environment. According to Abdul et al. (2023), it was determined the level of management commitment exhibited the greatest impact on the overall efficacy of the safety and health committee. In addition, Ratih et al. (2022) discovered a noteworthy correlation between safety communication and safety performance. The influence of safety rules and safe work practices on safety performance has been found to be significant (Iskandar et al., 2022). This finding is supported by Muthusamay and Malarvizhy (2013), who identified there exists a robust correlation between the adherence to safety rules and procedures and the subsequent safety performance outcomes. According to Farida et al. (2022), the cultivation of safety consciousness and responsibility has been found to exert a beneficial influence on safety performance.

1.3 Problem Statement

Despite ongoing efforts to improve safety procedures, accidents persist, indicating the need for further research to ascertain the underlying causes of these incidents. Hence, the main research investigation objective is to investigate the variety of safety climate. The lack of managerial dedication, employee engagement in safety and health initiatives, enforcement and promotion of safety policies, adherence to safety regulations and best practises, and individual responsibility and awareness for safety collectively contribute to an unsafe climate.

Table 1.1
Number of Occupational Accidents (Reported to DOSH) for 2018- 2022

Year	Number of Accident
2018	5031
2019	7984
2020	6933
2021	6686
2022	6719

Source: Department of Occupational Safety and Health Malaysia (2023)

Number of occupational accidents reported to DOSH between year 2021 and year 2022 shown in Table 1.1. its records the aggregate number of reported accident cases. increased from 6686 cases in year 2021 to 6719 cases in year 2022 which equal to 0.49% increases.

The construction sector is widely recognized as a high-risk industry characterised by a multitude of hazards and perils that possess the capacity to result in numerous injuries and fatalities (Williams et. Al., 2017). Construction industry is a highly dangerous

worksite as its ranked in first for fatality rate in National Occupational Accident and Disease 2021.

Figure 2.1 Number of Occupational Fatalities for Construction and All Sectors for the 1999 to 2020

Source: Department of Occupational Safety and Health (DOSH)

Figure 1 displays the data pertaining to occupational fatalities in the construction sector and across all sectors from the years 1999 to 2020. From the figure above, all sectors show a decrease from 1004 cases in 1999 to 312 cases in 2020 while for the construction industry, the number of death cases shows a decrease but not much, from 146 cases in 1999 to 81 cases in 2020. This shows that in the field of construction, there has not been much change in the decrease in death cases over the course of 22 years compared to all sector. A notable factor contributing to accidents case in the construction sector is the frequent modification of the environment of the work, which exposes workers to new and potentially unnoticed hazards. According to Hinze and Teizer (2011),

Table 1.2
Occupational Accidents Statistics by Sector 2022 (Investigated)

Sector	NPD	PD	Death	Total
Hotel and Restaurant	118	1	0	119
Utilities (Electricity, Gas, Water and Sanitary Service)	178	2	9	189
Finance, Insurance, Real Estate and Business Services	345	4	24	373
Construction	87	2	59	148
Transport, Storage and Communication	234	4	10	248
Manufacturing	4273	183	58	4514
Wholesale and Retail Trade	114	3	2	119
Public Services and Statutory Authorities	74	3	0	77
Mining and Quarrying	27	2	8	37
Agriculture, Forestry and Fishery	856	23	16	895
TOTAL	6306	227	186	6719

Legend: -
NPD - Non- Permanent Disability
PD - Permanent Disability

Source: Department of Occupational Safety and Health Malaysia (2023)

The data presented in Table 1.2 illustrates the aggregate figures pertaining to occupational accidents across various sectors in the year 2022, as investigated by the DOSH. Based on the data provided in the table, it is evident that the manufacturing sector demonstrates the highest prevalence of occupational accidents, totaling 4514 cases. Subsequently, the agriculture, forestry, and fishery sector documented a total of 895 cases, while the finance, insurance, real estate, and business services sector reported 373 cases. The construction sector has the highest number of death cases, totaling 59, followed closely by the manufacturing sector with 58 cases. The finance, insurance, real estate, and business services sector reported 24 death cases.

Table 1.3
Occupational Accidents Statistics by State January to November 2022 (Reported to DOSH only)

State	NPD	PD	Death	Total
Johor	1082	59	24	1165
Kedah	396	3	7	406
Kelantan	115	4	5	124
Melaka	362	7	2	371
Negeri Sembilan	382	13	6	401
Pahang	366	9	19	394
Perak	747	26	20	793
Perlis	12	0	2	14
Pulau Pinang	695	15	13	723
Sabah	227	22	9	258
Sarawak	290	26	20	336
Selangor	1301	38	29	1368
Terengganu	135	3	11	149
WPKL	188	1	19	208
WP Labuan	8	1	0	9
TOTAL	6306	227	186	6719

Legend: -
NPD - Non- Permanent Disability
PD - Permanent Disability

Source: Department of Occupational Safety and Health Malaysia (2023)

The data presented in Table 1.3 illustrates the aggregated figures pertaining to occupational accidents reported exclusively by the DOSH for the period spanning from January to November in the year 2022. According to the data provided in the table, it is evident that Selangor exhibits the highest prevalence of occupational accidents, as indicated by a cumulative count of 1368 occurrences. This is followed by Johor, which recorded 1165 cases, and Kedah, with 406 cases.

The primary factor contributing to the elevated incidence of accidents within the construction industry is attributed to substandard safety performance (Othman, 2020). The primary objective of this study is to examine the relationship between safety climate and safety performance in the construction sector of Malaysia, which has experienced a significant number of accidents. There are several factors that contribute to the concept of safety climate. Karim et al. (2022) have identified management support and commitment as the primary influential factors in enhancing safety performance within the construction industry. Eshagh et al. (2022) have reported that the adoption of safety programmes has been shown to improve safety outcomes. The absence of stringent safety enforcement within laws and regulations pertaining to health and safety practises contributes to an elevated likelihood of accidents and injuries (Abubakar, 2020). According to Zitong et al. (2022), the systematic implementation of safety regulations plays a crucial role in optimising safety performance. Farida et al. (2022) posit that safety consciousness and responsible leadership exert a favourable influence on safety performance. In the preceding study, it was discovered that there exist four primary predictors that exert influence on safety performance. These predictors include management commitment and employees' engagement in health and safety, safety enforcement and promotion, the relevance of safety regulations and adherence to safe work practises, as well as safety consciousness and responsibility. Therefore, this study has selected all four of these independent variables.

The findings derived from this study suggest that the proposed measures can be potentially implemented within the construction sector to enhance safety performance. From contributing to the existing body of knowledge on accident prevention in

construction sites, but also facilitate evidence-based decision-making for safety management. Consequently, the overall safety performance of construction projects could be significantly improved.

This study distinguishes itself from previous research by examining the relationship between safety climate and safety performance in the construction industry in Malaysia. The study considers four safety climate factors (SC) as independent variables (IV): management commitment and employees' involvement in health and safety (MC&EI), safety enforcement and promotion (SE&P), applicability of safety rules and safe work practises (SR&WP), and safety consciousness and responsibility (SC&R). The dependent variables (IV) are safety compliance (SCOMP) and safety participation (SPART), which reflect different aspects of safety performance (SP).

1.4 Research Questions

The research questions of this research are:

1.4.1 Is there any relationship between MC&EI and SCOMP?

1.4.2 Is there any relationship between MC&EI and SPART?

1.4.3 Is there any relationship between SE&P and SCOMP?

1.4.4 Is there any relationship between SE&P and SPART?

1.4.5 Is there any relationship between SR&WP and SCOMP?

1.4.6 Is there any relationship between SR&WP and SPART?

1.4.7 Is there any relationship between SC&R and SCOMP

1.4.8 Is there any relationship between SC&R and SPART

1.4.9 Do all the independent variables (MC&EI, SE&P, SR&WP, SC&R) influence the SCOMP in construction industry in Malaysia?

1.4.10 Do all the independent variables (MC&EI, SE&P, SR&WP, SC&R) influence the SPART in construction industry in Malaysia?

1.5 Research Objective

The objectives of this research are:

i) To determine the relationship between SC (MC&EI, SE&P, SR&WP, SC&R) and SCOMP.

ii) To determine the relationship between SC (MC&EI, SE&P, SR&WP SC&R and SPART

iii) To investigate whether the SC (MC&EI, SE&P, SR&WP, SC&R) influence SCOMP.

iv) To investigate whether the SC (MC&EI, SE&P, SR&WP, SC&R) influence SPART.

1.6 Significance of the Study

The construction industry is renowned for its distinctive array of safety-related challenges. The research aims to provide valuable insights into the unique challenges encountered by the construction industry in Malaysia by examining safety climate and safety performance. The development of targeted interventions and strategies to enhance safety outcomes can be of utmost importance. In addition to this, the research findings hold potential implications for policy formulation and the establishment of regulatory frameworks pertaining to safety within the construction sector. Gaining

comprehension of the safety climate and its influence on safety performance can facilitate the development of more efficient and customised regulations, thereby enhancing the provision of secure working environments. In addition, this study aims to identify the various factors that exert an influence on safety climate and performance within construction companies. The provided information possesses significant value for organisations aiming to improve their safety protocols and establish a more secure working environment. A comprehensive understanding of organisational culture, leadership, and communication can inform strategic interventions at the organisational level.

The results of the research can offer valuable perspectives for the development The outcomes of the research can offer valuable insights for creating and executing specialized training programs designed to improve the skills and knowledge of construction workers. This may encompass initiatives that prioritise the enhancement of safety attitudes, risk awareness, and communication skills, thereby leading to enhanced safety performance. The study enhances the scholarly comprehension of SC and SP, specifically within the construction sector in Malaysia. This research adds to the current body of literature by presenting empirical evidence and valuable perspectives on the relationship between safety climate and performance. These findings can serve as a basis for future research endeavours in this field. Incorporating a comparative analysis of safety practises in other countries or industries within the research can provide significant benchmarks and insights. The inclusion of a comparative perspective can enhance the comprehension of safety dynamics on a larger scale and promote the dissemination of optimal strategies across various contexts. Through the prioritisation of safety climate, this research has the potential to

make a significant contribution towards fostering a culture that places a strong focus on ensuring safety in the construction sector. The implementation of this cultural transformation is imperative in order to achieve long-term enhancements in safety outcomes.

In brief, the study holds promise for making substantial advancements in enhancing safety outcomes within the construction sector of Malaysia. It also has the potential to provide valuable insights for shaping policies and organisational strategies, as well as furthering the theoretical comprehension of SC and SP within a particular context.

1.7 Scope of Study

The scope of study will primarily concentrate on construction sector within the context of Malaysia. The responder will be chosen from practitioner at all level of the construction industry in Malaysia. The variables under investigation consist of safety climate (SC) as IV and the DV will be the safety performance (SP). The SC divided to four factor which MC&EI, SE&P, SR&WP and SC&R meanwhile SP has two dimension which are SCOMP and SPART.

1.8 Definitions of Key Terms

Accident- An unforeseen incident that leads to injury to individuals, destruction of assets, or disruption to operations. (IAPA, 2007).

Construction industry- The industrial sector encompassing manufacturing and trade activities associated with the construction, repair, renovation, and maintenance of infrastructural assets (Chaudery et. al., 2022).

Incident- An unplanned event resulting from a non-injurious or non-damaging behaviour (Krause and Russell, 1994)

Occupational safety and health- the field of study and practise focused with the work-related injuries and diseases prevention, as well as the safeguarding and enhancement of workers' health. The objective of this initiative is to enhance both the working conditions and the overall environment. Various professionals from diverse fields, such as engineers, physicians, hygienists, psychologists, and nurses, actively contribute to the enhancement of occupational safety, occupational health, occupational hygiene, well-being at work, and the amelioration of the working environment. (ILO, 1998)

Safety- Freedom from (unacceptable) risk of harm to or danger; the state of not being dangerous or harmful; a place that is free from harm or danger (Merrian Webster, 2015).

Safety climate- Collective beliefs, values, and perceptions regarding safety that are commonly held within a particular group (Zohar, 1980 and Cooper, 2004) during a specific period.

Safety performance- The measurable results concerning an organization's management of its OHS risks (BS4:1800, 2008)

1.9 Organization of the Study

Chapter one elaborates a comprehensive examination of the significance of safety performance within an organisational context. It outlines the research inquiries, objectives, and the overall importance and scope of the study.

Chapter two provides an exposition of the theoretical framework underpinning the research, as well as a thorough examination of pertinent literature. The components encompassed within this framework consist of theoretical underpinnings, safety performance, management dedication, safety regulations and protocols, safety education, and safety communication and feedback.

In Chapter three, the methodological aspects of the research are elucidated. These aspects encompass the research design, sampling procedure, population and sample characteristics, development of the survey instrument, specification of variables, questionnaire development, the pilot study and expert judgements, administration of survey instruments, data analysis, and approval of the organisation.

Chapter four offers a detailed description of the data analysis procedures, which is undertaken to evaluate the findings of the study. The presentation should begin with the descriptive statistic, followed by the administration of the reliability test, validity test, correlation test, and multiple regression tests. Furthermore, this chapter also elucidated the fundamental findings of the study.

The fifth chapter of the dissertation provided an in-depth analysis of the study's outcomes. Furthermore, the implications of the findings and discusses the theoretical and managerial contributions within the defined scope will be examines in this chapter. Finally, the concluding section of this chapter will address the conclusions drawn from the preceding discussion and provide suggestions for prospective research.

1.10 Summary

This chapter encompasses the background of the study, the statement of the problem, research questions, research objectives, the study's scope concerning safety performance, and a summary of the thesis organization

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will examine the concept, analyse the findings of previous studies, and explore the relevant theories that are applicable to the present study. The provided information offers a precise elucidation of the chosen dependent and independent variables.

2.2 Accident

Accidents are events that occur without intention, desire, or expectation, and are not necessarily under control. They can result in harm to both humans and property, resulting in harm and loss (Ali et. Al., 2010). According to the ISO 45001 standard, an accident is a specific category of incident that leads to physical injury or adverse health effects. An incident can be defined as an occurrence that takes place within the context of work and possesses the capacity to result in or indeed leads to physical harm and adverse health consequences, as defined by the ISO 45001:2018 standard.

According to the data provided by the DOSM (2022), the National Occupational Accident and Disease Statistics for the year 2021 reported a total of 21,534 cases of occupational injuries. Among these cases, 301 were classified as fatal. The primary

sector responsible for occupational accidents is the Manufacturing industry, which is subsequently followed by the Services and Construction industries. The construction industry, despite ranking third in terms of injury rates, exhibits the regrettable distinction of having the highest fatality count, with a reported total of 73 cases. This finding substantiates the assertion that the Malaysia's construction industry is characterised by a higher level of occupational hazards compared to other industries.

2.2.1 Causes of Accident

Typically, the primary factors contributing to accidents encompass both unsafe acts and unsafe conditions. The heightened incidence of injuries and fatalities can be attributed to several key factors, namely the prevalent utilisation of subcontracting, inadequate allocation of resources for safety training, insufficient emphasis on safety awareness, ineffective regulatory and legislative measures pertaining to safety, and a dearth of support from upper-level management. (Awwad et al., 2016)

Derived from research carried out by Nur et al. (2019), the primary factors contributing to fatal accidents can be categorised into three main elements factor: human, worksite, and management. Furthermore, the absence of a culture focused on safety within an organization is recognised as a contributing factor to accidents.

2.3 Safety Climate (SC)

2.3.1 Management commitment and employees' involvement to safety and health (MC&EI)

Management commitment and employees' involvement are crucial to guarantee the preservation of safety and well-being within the construction sector. The literature suggests that the lack of safety and health policies, inadequate training programmes, and a shortage of safety specialists present notable obstacles in the efficient OSH management in construction sites. (P., N., & Nemade, 2023). Furthermore, it has been acknowledged that the existence of managerial support and dedication plays a pivotal role in augmenting safety performance within the construction sector (Karim et al., 2022). The dedication of managers to improving the quality of management practices of safety and health is of great significance in cultivating employee retention and advancing overall safety and health within the industry (Udaya et al., 2021).

2.3.2 Safety enforcement and promotion (SE&P)

Safety enforcement and promotion are crucial for enhancing safety performance in the construction industry. Empirical research performed by Eshagh et al. on 2022, has demonstrated that the dedication of senior management to safety, the implementation of safety programmes, and the emphasis placed on control measures are significant determinants in the improvement of safety. Safety training programmes have a substantial impact on the enhancement of safety performance. Several factors, including project and company-related, demographic, practical, motivational, organizational, and human-related aspects, collectively impact the efficacy of safety training (Algan et al., 2021). Nevertheless, it is worth noting that the construction

industry in developing nations such as Nigeria continues to face a deficiency in comprehensive legislation and regulatory frameworks pertaining to health and safety protocols. Consequently, this deficiency contributes to an elevated susceptibility to accidents and injuries within the industry (Abubakar, 2020).

2.3.3 Applicability of safety rules and safe work practices (SR&WP)

The implementation of safety regulations and compliance with safety procedures are of paramount importance in enhancing safety outcomes within the construction sector. The construction sector demonstrates a notable occurrence of fatalities and injuries, emphasising the necessity for scholarly inquiry focused on reducing work-related accidents. According to Q. et al. (2023). The utilisation of safety management tools and the implementation of construction safe techniques are pivotal in meeting the industry's objectives of minimising accidents (Kai & Chen, 2022). The systematic and synergistic implementation of safety regulations is crucial for optimising safety performance and reducing the occurrence of accidents (Zitong, Jia., 2022). To improve safety outcomes in construction, it is crucial to have a deep understanding of how collaborative processes impact safety in construction (Shabbab, A, Alhammadi, 2022). The amalgamation of insights from team science and construction safety science has the potential to formulate a specialized approach aimed at enhancing safety in the construction sector. The primary objective of this framework is to enhance safety performance and reduce the incidence of injuries and fatalities within the construction industry.

2.3.4 Safety consciousness and responsibility (SC&R)

The study conducted by Farida et al. (2022) has confirmed the beneficial impact of safety consciousness and responsible leadership on safety performance. Nusrat et al. (2018) discovered the relationship between an ethical leadership style and organizational safety performance is, to some extent, shaped by safety awareness. The study conducted by Ferit et. al. (2018) found that safety consciousness has a positive influence on safety behavior. This suggests that individuals who have elevated levels of safety consciousness are more prone to exhibit responsible safety conduct. A recent study conducted by H. Jak (2022) revealed a beneficial impact between the mindset of safety responsibility and both job performance and safety behavior. The research conducted by Wael et al. (2018) discovered a significant correlation between an individual's accountability for their own health and safety and the frequency of injuries. The implication is that the degree of accountability individuals assume for their personal health and safety directly influences the overall level of safety performance.

2.4 Safety Performance (SP)

The concept of performance of safety e can be viewed as a component of the overall performance of an organisation, as discussed by Wu et al. (2008). Safety performance indicators can be broadly categorised into two main dimensions: safety participation and safety compliance (Neal & Gryphon, 2002; Zahoor et al., 2002).

2.4.1 Safety Compliance (SCOMP)

According to Griffin and Neal (2000), safety compliance can be defined as the act of adhering to established rules and regulations, which is evidently associated with the concept of safety climate. According to Cooper and Phillips (2004), safety compliance refers to the actions undertaken by employees to adhere to safety practises and activities in accordance with industrial safety and health requirements, with the aim of reducing workplace accidents. Gryphon and Neal (2000) elucidated the concept that safety compliance encompasses more than mere adherence to an organization's established safety rules and procedures, despite its potential lack of direct impact on workplace safety outcomes. Nevertheless, implementing a constructive strategy is crucial for cultivating and maintaining a secure work environment, wherein the active involvement and compliance of employees with safety protocols are imperative. Mearns et al. (2003) have established a noteworthy association between the frequency of workplace or individual-level incidents and the lack of adherence to safety regulations and protocols implemented by the organisation.

2.4.2 Safety Participation (SPART)

Safety participation, as defined by Khairiah (2018), refers to the voluntary engagement of employees in various safety and health-related activities within the workplace. These activities encompass workplace safety inspections, safety meetings, reviews, accident and incident investigations, safety audits, and safety discussions. Employees who actively partake in these activities are considered to be actively participating in safety. Safety participation is a crucial factor that significantly influences the effective

implementation of safety management within an organisation (Biggs et al., 2005). Geldart et al. (2010) posit that the safety committee meeting can effectively enhance and sustain a safer and healthier workplace environment for the organisation through improved collaboration between employees and management. Safety participation refers to the voluntary actions undertaken by employees in order to establish a safe working environment, without any external force or demand (Gryphon & Neal, 2000). According to Vredenburgh (2002), the occurrence of safety participation is contingent upon effective inter-communication between management and employees within the organisation, specifically in the context of managing safety in the workplace.

2.5 Conclusion

This chapter focuses on the literature pertaining to factors that influence safety performance. This study examines four distinct dimensions of safety climate that have been extensively discussed in previous research. These dimensions include management commitment and employee involvement in health and safety (Karim et al., 2022), safety enforcement and promotions (Eshagh et al., 2022), adherence to safety rules and safe work practises (Kai, Chen, 2022), and safety consciousness and responsibility (Farida et al., 2022). These factors are believed to possess the potential to mitigate the occurrence of injuries and accidents within the workplace. A better understanding of these factors will assist other organizations in achieving similar results in the management of occupational safety and health issues. The data gathered from this study will significantly contribute to the current body of literature., which predominantly relies on anecdotal evidence from individual firms.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter outlines the research methods employed by the researcher for conducting the study. These methods encompass the research framework, research design, operational definitions, research population and sample size, sampling technique, research instruments/measurements, data collection procedure, and data analysis technique.

3.2 Research Framework

Research framework is a structured and systematic outline for conducting a research project. Figure 3.1 shows the (IV) and (DV) of this research. The IV are safety climate (SC) which divided into four; MC&EI, SE&P, SR&WP and SC&R. The DV of this research are safety performance (SP) which divided into two; SCOMP and SPART

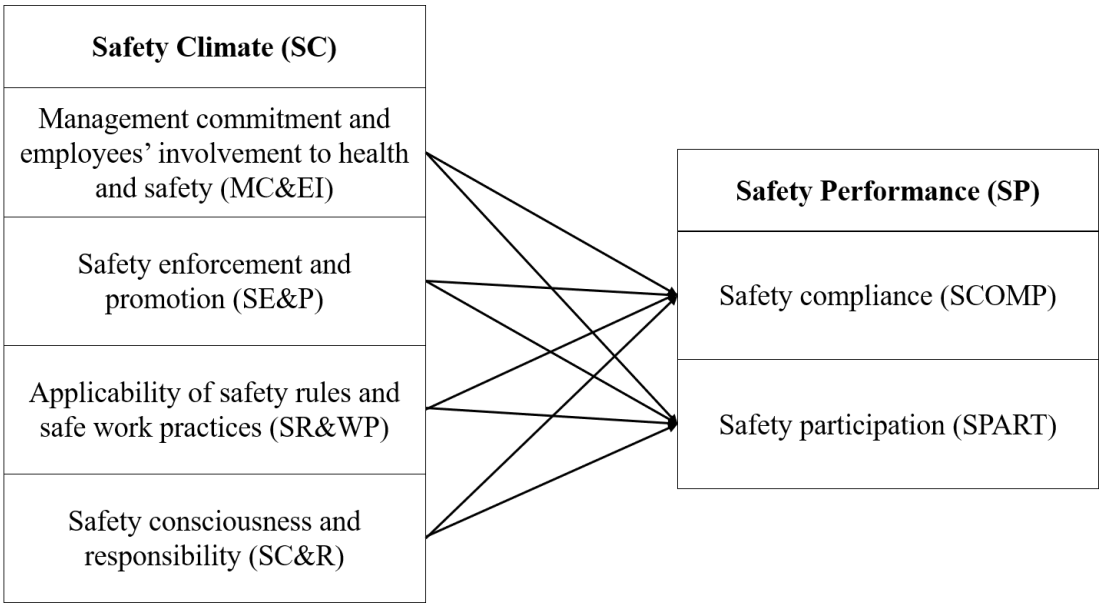

Figure 3.1 Research Framework

3.3 Research Hypotheses

The main aim of this research is to determine the influence of the IV on the DV. A total of ten research hypotheses have been developed in accordance with the previously mentioned framework, which are presented in the following manner.

i. MC&EI and SCOMP

Management commitment and employee involvement are essential for maintaining a strong safety and health management system. (James et. al., 2019). A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety compliance. The findings form a study conducted by Alden et al. in 2021 found it was determined

that there exists a noteworthy beneficial impact of management commitment on the OSH performance. There was a positive correlation observed between the commitment of management and the employee's involvement of in safety training, compliance to procedures and rules, and the promotion of safety policies. This correlation was found to be associated with increased levels of safety compliance and participation. According to Kaliannan and Maran (2016),

Based on the findings of relationship between MC&EI and SCOMP from various literatures, Hypothesis 1 was postulated.

H1: There is a relationship between MC&EI and SCOMP in construction industry in Malaysia.

ii. MC&EI and SPART

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety participation. The commitment of leadership to safety has a positive impact on the participation behaviour of miners in terms of safety, and this impact is partially influenced by the psychological safety of miners. According to Lixia et al. (2022), the

relationship between leadership safety commitment and safety participation behaviour is influenced by the perceived attitudes towards safety of both supervisors and coworkers. There was a positive correlation observed between the commitment of management and the involvement of employees in safety training, adherence to rules and procedures, and the promotion of safety policies. This correlation was found to be associated with increased levels of safety compliance and participation. According to the study conducted by Kaliannan and Maran in 2016, In their study, Metin et al. (2019) discovered a statistically significant and positive correlation between employee involvement and safety performance. The implementation of occupational safety and health regulations may be impeded by a lack of commitment from management and insufficient employee participation. Consequently, it is crucial for organisations to prioritise these elements in order to enhance workplace safety (Patrick, 2019).

Based on the findings of relationship between MC&EI and SPART from various literatures, Hypothesis 2 was postulated.

H2: There is a relationship between MC&EI and SPART in construction industry in Malaysia.

,

iii. SE&P and SCOMP

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety compliance. The implementation of safety enforcement practises has been found to exert a notable influence on safety performance across diverse industries (Rina et al., 2023).

Based on the findings of relationship between SE&P and SCOMP from various literatures, Hypothesis 3 was postulated.

H3: There is a relationship between SE&P and SCOMP in construction industry in Malaysia

iv. SE&P and SPART

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety participation. Munir et al. (2017) established a positive correlation between safety promotion policies and safety participation.

Based on the findings of relationship between SE&P and SPART from various literatures, Hypothesis 4 was postulated.

H4: There is a relationship between SE&P and SPART in construction industry in Malaysia.

v. SR&WP and SCOMP

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety compliance. Safety rules and safe work practises are essential for ensuring compliance with safety standards in the workplace (Muhammad et. al., 2022). Research has demonstrated that safety-management practises, including safety training, workers' participation, safety communication and feedback, management dedication to safety, safety-promotion policies, and safety rules and procedures, are strongly linked to occupational accidents through safety compliance (Zuraida et al., 2016).

Based on the findings of relationship between SR&WP and SCOMP from various literatures, Hypothesis 5 was postulated.

H5: There is a relationship between SR&WP and SCOMP in construction industry in Malaysia.

vi. SR&WP and SPART

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety participation. Metin et al. (2021) have found through empirical research that implementing safety management practises (SMPs) and perceiving a strong emphasis on safety from management can positively influence safety participation. The authors Noor Hanatasia et al. (2018) have acknowledged the importance of safety training, safety rules, and procedures in promoting adherence to safety measures and stimulating active engagement.

Based on the findings of relationship between management commitment and safety SR&WP and SPART from various literatures, Hypothesis 6 was postulated.

H6: There is a relationship between SR&WP and SPART in construction industry in Malaysia.

vii. SC&R and SCOMP

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety compliance. The promotion of safety compliance in the workplace is heavily influenced by the presence of safety consciousness and responsible leadership (Farida et al., 2022). According to a recent study conducted by Michael et al. (2022), there exists a positive correlation between safety consciousness and responsible leadership with regards to safety compliance among employees. Furthermore, safety management practises, including safety training, adherence to safety rules and procedures, and effective safety communication, are also significant factors in ensuring safety compliance (Xiaowen et al., 2020).

Based on the findings of relationship between SC&R and SCOMP from various literatures, Hypothesis 7 was postulated.

H7: There is a relationship between SC&R and SCOMP in construction industry in Malaysia.

viii. SC&R and SPART

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices) significantly positive towards safety participation. According to Farida et al. (2022), the presence of safety consciousness and responsibility plays a crucial role in fostering active engagement in safety measures. According to the study conducted by Hanatasia et al. (2018), there exists a positive correlation between safety consciousness and both safety compliance and safety participation.

ix. Based on the findings of relationship between SC&R and SPART from various literatures, Hypothesis 8 was postulated.

H8: There is a relationship between SC&R and SPART in construction industry in Malaysia.

x. MC&EI, SE&P, SR&WP and SC&R influence SCOMP

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices)

significantly positive towards safety compliance. Iskandar et al. (2022) have identified several factors that have been observed to impact safety compliance, namely management commitment and employees' involvement, safety enforcement and promotion, applicability of safety rules and safe work practises, and safety consciousness and responsibility. According to the study conducted by Farida et al. (2022), several factors were identified as influential in promoting safety compliance within an organisation. These factors include management commitment, employee involvement, safety enforcement, safety promotion, applicability of safety rules, safe work practises, safety consciousness, and responsibility.

Based on the findings of relationship between MC&EI, SE&P, SR&WP and SC&R influence SCOMP from various literatures, Hypothesis 9 was postulated.

H9: There is influence between MC&EI, SE&P, SR&WP and SC&R influence SCOMP

xi. MC&EI, SE&P, SR&WP and SC&R influence SPART

A study conducted by Zahoor et. al (2017) found that safety climate (management commitment and employee involvement, safety enforcement and promotion, applicability of safety rules and safe work practices)

significantly positive towards safety participation. Iskandar et al. (2022) have identified several factors that influence safety participation, including management commitment and employees' involvement, safety enforcement and promotion, applicability of safety rules and safe work practises, and safety consciousness and responsibility. The study conducted by Farida et al. (2022) revealed that various factors, including management commitment, employee involvement, safety enforcement, safety promotion, applicability of safety rules, safe work practises, safety consciousness, and responsibility, significantly impact safety participation.

Based on the findings of relationship between MC&EI, SE&P, SR&WP and SC&R influence SPART from various literatures, Hypothesis 10 was postulated.

H10: There is influence between MC&EI, SE&P, SR&WP and SC&R influence SPART.

3.4 Research Design

The objective of this study was to investigate the impact of SC (MC&EI, SE&P, SR&WP and SC&R) to SP (SCOMP and SPART) within the construction industry of Malaysia.

Initially, the problem was articulated. Subsequently, the process entailed the identification of a research subject matter and a comprehensive examination of existing scholarly works. The deployment of a survey instrument was carried out, followed by the implementation of a pilot study to establish its validity. After the process of verification, data was gathered. Upon conducting an analysis of the data, a comprehensive conclusion was drawn and a set of recommendations were formulated. The researcher employed a non-experimental research design, which resulted in a lack of control over the variables under investigation. The IV examined in the study include MC&EI, SE&P, SR&WP and SC&R. The DV in this study is SCOMP and SPART.

The study will employ a quantitative research design in order to gather and analyse data. The research methodology utilised in this study involves the implementation of a survey method, employing questionnaires as the primary research tool. Questionnaires will be distributed to respondents with the purpose of identifying the factors that contribute to construction accidents. The utilisation of questionnaires will be employed in this study due to their capacity to effectively gather targeted data.

3.5 Operational Definition

The operational definition is a crucial element in this study as it offers a precise and tangible description of the variable. The definitions are as follows:

3.5.1 Safety Performance (SP)

According to Neal and Gryphon (2002), safety performance encompasses two key aspects: safety involvement and safety specific performance. Safety specific performance pertains to an individual's direct performance in relation to safety matters. The concept of safety performance is characterised, at the organisational level, as a complex task involving the assessment of safety within an organisation (Hofeman et al., 2003). To elaborate, safety performance indicators can be classified into two distinct categories, namely safety participation and safety compliance (Neal & Gryphon, 2002). According to Gryphon and Neal (2000), safety performance serves as a metric for assessing individual accountability within the work environment. In their proposed safety performance dimensions, Gryphon and Neal (2000) selected safety participation and safety compliance as the two dimensions to be examined.

3.5.2 Safety Compliance (SCOMP)

According to Gryphon and Neal (2000), safety compliance can be defined as the act of adhering to rules and regulations, which is closely associated with the overall safety climate. Cooper and Phillips (2004) provided a definition for safety compliance, which encompasses employee actions aligned with safety practises and activities. These

actions are expected to adhere to work-related safety and health requirements, aiming to mitigate the frequency of workplace accidents.

3.5.3 Safety Participation (SPART)

Safety participation can be succinctly characterised as the act of actively attending, engaging, participating, and contributing to various safety and health-related endeavours, including but not limited to workplace safety inspections, safety meetings, accident and incident investigations, safety audits, and safety discussions (Khairiah, 2008). Safety participation can be defined as the proactive engagement of employees in activities aimed at establishing a secure working environment, independent of any external influence or requirement (Gryphon & Neal, 2000).

3.5.4 Management Commitment and employees' involvement to health and safety (MC&EI)

Management commitment in health and safety pertains to the extent of dedication and support exhibited by organisational leadership in upholding the utmost levels of occupational safety and health within the workplace. The concept pertains to the measures and strategies enacted by organisational leadership to establish a work environment that prioritises the well-being and safety of employees (Patrick et al., 2019). The concept of employee involvement in health and safety pertains to the proactive and enthusiastic participation of workers in the process of recognising, evaluating, and managing potential workplace hazards and risks. According to Siew Lee et al. (2018), the factors encompassed in this category consist of the active

participation of workers in safety initiatives, the timely reporting of incidents and near misses, and the consistent adherence to established safety protocols and procedures.

3.5.5 Safety enforcement and promotion (SE&P)

Safety enforcement and promotion entails the execution and advancement of efficacious safety net initiatives aimed at safeguarding marginalised populations (Margeret et al., 2008).

3.5.6 Applicability of safety rules and safe work practices (SR&WP)

The applicability of safety rules and safe work practises refers to the process of establishing the procedure for identifying or creating the definition, as well as ensuring a high level of reliability for said definition (Gene, I., Rochlin, 1999). The implementation of safe work practises is based on a collection of formally established safety systems and is influenced by various factors such as organisational structure, prevailing conditions, and ongoing change initiatives (Mark et al., 2014).

3.5.7 Safety consciousness and responsibility (SC&R)

Safety consciousness can be conceptualised as an individual's cognitive state characterised by a heightened sense of awareness and perception regarding personal safety, which subsequently motivates them to engage in safety-oriented behaviours. The concept encompasses the acknowledgment of the significance of safety and the readiness to assume accountability for guaranteeing safety (Gene, I., Rochlin., 1999). The concept of safety responsibility can be characterised as a continuous and mutually

understood construct that extends beyond the mere handling or prevention of risks or errors. The subject matter pertains to the interactive dynamics that occur between operators and managers, along with their active involvement in operational and organisational circumstances (Gene, I., Rochlin., 1999).

3.6 Measurement of Variables/ Instrumentation

3.6.1 Questionnaire Design

A set of questionnaire serves as the main instrument to the quantitative data of this study. A validated questionnaire with some modification was adopted from Zahoor et al. (2017) for this study to collect and analyse the independent variable (IV) and dependent variable (DV). It was presented in English.

3.6.2 Operationalization of Survey Instrument

The questionnaire used as research survey tools. The questionnaire was derived based on following journal shown in Table 3.1:

Table 3.1
Survey Instrument

Variables	Item	Source	Scale	Alpha Values
MC&EI	9	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.96
SE&P	7	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.96
SR&WP	5	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.91
SC&R	3	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.78
SCOMP	3	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.82
SPART	3	Zahoor et. al., (2017)	1= Strong Disagree 5= StronglyAgree	0.92

The questionnaire consisted of three sections; personal attributes (seven questions), safety climate (four indicator with total of 24 statements) and safety performance (two indicator with total of 6 statements).

In the Section 1: Personal Attribute, respondent was requested for the information of their age, state, education level, working level, types of employer/ organization, service with current employer and work experience in the construction industry.

In the Section 2: Safety Climate (SC), there are 24 statements that clustered into 4 factors; MC&EI, SE&P, SR&WP and SC&R. Respondent were requested for their agreement using 5-point Likert scale, with 1 as “Strongly Disagree”, 2 as “Disagree”, 3 as “Neutral”, 4 as “Agree” and 5 as “Strongly Agree”.

In Section 3: Safety Performance (SP), there are 6 statements that clustered into 2 factors; SCOMP and SPART. All of the statement asked using 5-point Likert scale, with 1 as “Strongly Disagree”, 2 as “Disagree”, 3 as “Neutral”, 4 as “Agree” and 5 as “Strongly Agree”.

3.7 Research Population and Sample Size

3.7.1 Population

The target group for this research was construction personnel in construction industry in Malaysia. Thus, the population size is limited to the respondent in construction personnel in construction industry in Malaysia.

3.7.2 Sampling Size

According to DOSM (2022), total number of construction personnel in Malaysia is 1.38 million. By using Krejie Morgan (1970) method for sampling size of known population, with 95% of confidence level, the minimum sample size is 385. The population of this study consisting of personnel that work in the construction industry including workers, supervisors, engineer, manager and safety personnel in Malaysia.

3.7.3 Sampling Technique

The study will employ a random sampling technique by distributing the Google Form questionnaire link to the participants. The respondent will click the link and answer the questionnaire. A direct and easy instruction are detailed in the questionnaire. The

data of the questionnaire will be sent automatically after they finished answering the questionnaire. When data was accomplished collected, will be analysed for further elaborated for discussion.

3.8 Data Collection Procedures

The data collection method employed in this quantitative study involves the use of a questionnaire. In order to conduct this study, it is necessary to adhere to a series of sequential steps. The questionnaires were distributed to a total of 500 respondents located throughout Malaysia. According to Gall et al. (2003), the term "population" refers to the comprehensive group that a researcher intends to study.

3.9 Pilot Study

The purpose of conducting a pilot study was to assess the reliability of the instrument employed in this research. The pilot test was utilised for this evaluation. According to Leon et al. (2010), pilot studies are commonly employed in large-scale research endeavours to assess the viability of a proposed approach. The questionnaire utilised in this study was modified to be in the English language.

According to the Institute for Digital Research and Education, Cronbach's alpha is employed to assess the internal consistency of a set of items, which pertains to the extent of their interrelatedness as a cohesive group. The internal consistency for Cronbach's alpha and the pilot test results will be presented in Table 3.2 below.

Table 3.2
Internal Consistency of the Cronbach's Alpha

Cronbach's Alpha	N of Items
$\alpha \geq 0.9$	Excellent (High-Stakes Testing)
$0.7 \leq \alpha < 0.9$	Good (Low-Stakes Testing)
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

To assess the dependability of this study, a pilot test was administered to the initial 30 participants' questionnaires. The purpose of this study is to assess the degree of positive correlation among the items in a questionnaire set, utilising the reliability coefficient known as Cronbach's Alpha (Sekaran & Bougie, 2013).

Table 3.3
Reliability Coefficient of Questionnaire of Variables

Variables	N of Items	Cronbach's Alpha
MC&EI	9	0.96
SE&P	7	0.96
SR&WP	5	0.91
SC&R	3	0.78
SCOMP	3	0.82
SPART	3	0.92

According to the findings presented in Table 3.3, the study employed various instruments to assess both the DV, namely SP, (SCOMP and SPART) as well as the IV, the SC including MC&EI, SE&P, SR&WP and SC&R. These instruments were subjected to a reliability test to ensure their consistency and accuracy. The findings from the reliability test indicate that the Cronbach Alpha coefficients for various dimensions of health and safety, namely MC&EI, SE&P, SR&WP and SC&R, SCOMP and SPART, were 0.960, 0.958, 0.911, 0.779, 0.821, and 0.923, respectively. The aforementioned values suggest that the questionnaire exhibited a satisfactory level of reliability. It is widely accepted that a coefficient of 0.70 or higher indicates good

reliability for a scale (Selim & Kilic, 2016). Consequently, no modifications were made to any of the questions, as all participants expressed no issues or challenges in comprehending and responding to them.

3.10 Technique of Data Analysis

The data obtained from the questionnaires was analysed using SPSS version 28.0. Descriptive statistics, Pearson correlation analysis, and multi regression analysis are commonly employed statistical analysis techniques to investigate the associations between independent variables and the dependent variable.

3.10.1 Data Screening

After the collection and input of data into SPSS, it is imperative to address the necessity of performing advanced multivariate statistical analysis, without explicitly or critically evaluating the quality of the collected data.

3.10.2 Normality test

There exist two distinct approaches for assessing normality: graphical techniques, including Histogram, Boxplot, Stem and Leaf Plot, Normal Probability Plot, and others, as well as non-graphical methods, such as Kurtosis, Skewness, and others. The data from this survey was analysed utilising a non-graphical methodology. A statistical analysis was conducted to assess the skewness and kurtosis.

3.10.3 Hypothesis Test

The data obtained from respondents was computed and analysed using version 28.0 of the Statistical Package for Social Science (SPSS) software. Descriptive statistics were employed to ascertain the sample, as indicated in the respondent information questionnaire sheet.

Correlation tests and multiple regressions were conducted to assess the statistical significance of the correlation coefficient and to examine the relationship between the IV and the DV. Correlation analysis is employed in these studies to ascertain the nature and strength of the association between DV and IV. The utilisation of Pearson's correlation coefficient (r) is imperative for the analysis of this particular dataset. Hair et al. (2010) assert that the utilisation of correlation enables the examination and quantification of the magnitude of a connection between variables. Cohen (1988) posits that the magnitude of the association is ascertained through the utilisation of r values, which serve to indicate whether the relationship is positive or negative.

Table 3.4
Strength of the Relationship

Correlation (r)	Strength
r= 0.10 to 0.29 or r=-0.10 to -0.29	Weak
r= 0.30 to 0.49 or r=-0.30 to -0.49	Medium
r= 0.50 to 1.0 or r=-0.50 to -1.0	Strong

A regression value with a p-value greater than 0.05 is considered to be statistically significant. In the realm of non-parametric statistics, data scaling can be broadly categorised into four types: nominal or categorical scale, interval scale, ordinal or ranking scale, and ratio scale. The study utilised an ordinal or ranking scale

measurement method to collect the majority of the variables relevant to the research (Sekaran & Bougie, 2010).

3.11 Summary

This chapter provides a description of the research model's development for the current study. The research process was comprehensively elucidated, providing a detailed account of each step from initiation to completion. This chapter provides an overview of the sampling methodology employed, the process of questionnaire development, and the data collection methodology utilised. Additionally, the methodology for administering the questionnaire is comprehensive, including a thorough description of the testing process, as well as clear guidelines for monitoring procedures to ensure optimal outcomes. Lastly, the instrument employed for the collection, observation, and analysis of data is emphasised.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the data findings obtained from the questionnaire conducted to assess the safety climate and safety performance in Malaysia's construction industry. Additionally, it aims to identify the most influential factors that contribute to the safety performance of organisations. The data analysed in this study underwent processing using the Statistical Package for the Social Sciences (SPSS) Version 28. The analysis of frequency and percentages was conducted to ascertain the demographic profiles of the respondents, including their age, state, education level, working level, types of employer/organization, service with current employer, and work experience in the construction industry.

This chapter also presents the findings of descriptive analysis, correlation coefficient analysis, and multiple regression analysis. The statistical method of Pearson correlation has been used to determine the presence of any relationships between SC (MC&EI, SE&P, SR&WP and SC&R) and SP (SCOMP and SPART). Furthermore, the utilisation of multiple regression analysis serves the purpose of validating the hypotheses that have been delineated in Chapter 3.

4.2 Rate of response

According to DOSM (2022), total number of construction personnel in Malaysia is 1.2 million and it makes the population is 1.2 million. By using Krejie Morgan method for sampling size of known population this study only required at least 385 respondents.

A survey consisting of 500 questionnaires was administered to construction personnel in Malaysia. The feedback received was highly positive, with a total of 385 responses (77.0%) to the distributed questionnaire. The summary of responses from the questionnaire survey is presented in Table 4.1.

Table 4.1
Rate of Response

Description	N	Percentage
Total Questionnaire Distributed	500	100%
Total Questionnaire Distributed	385	77.0%

From 500 sets of questionnaires distributed during data collection for this study, only 115 sets were not returned which contributed 23% from the total sets.

4.3 Personal attribute of respondents

Descriptive analysis is employed to collect comprehensive background information pertaining to the entirety of the respondent's profile, as outlined in section A of the questionnaire. The aforementioned approach was employed to comprehensively depict the entirety of the data obtained from the questionnaire, encompassing the percentages and frequencies of all specific details.

4.3.1 Age

The demographic data analysis reveals that individuals aged 20 years old and below constitute 0.0 percent or 0 respondents. Those falling within the age range of 21 to 30 years old account for 26.0 percent or 100 respondents. Similarly, individuals aged between 31 and 40 years old represent 36.6 percent or 141 respondents. The group aged between 41 and 50 years old comprises 24.7 percent or 95 respondents, while those aged between 51 and 60 years old make up 11.7 percent or 45 respondents. Lastly, individuals aged 61 years old and above constitute 1.0 percent or 4 respondents. These figures are based on the responses of the 385 participants who took part in the survey. Table 4.2 presents a comprehensive categorization of participants based on their age.

Table 4.2
Age of Respondents

Age	Frequency	Percentage
20 and below	0	0.0%
21-30	100	26.0%
31-40	141	36.6%
41-50	95	24.7%
51-60	45	11.7%
61 and above	4	1.0%
Total	385	100.0%

4.3.2 State

The analysis of demographic data for the respondents indicates that individuals from various states are represented as follows: Johor comprises 6.8 percent, equivalent to 26 respondents; Kedah comprises 6.5 percent, or 25 respondents; Kelantan comprises 4.9 percent, or 19 respondents; Melaka comprises 2.9 percent, or 11 respondents;

Negeri Sembilan comprises 5.5 percent, or 21 respondents; Pahang comprises 6.8 percent, or 26 respondents; Perak comprises 3.9 percent, or 15 respondents; Perlis comprises 0.8 percent, or 3 respondents; Pulau Pinang comprises 11.9 percent, or 46 respondents; Sabah and Sarawak each have 0.0 percent, with no respondents; Selangor comprises 26.5 percent, or 102 respondents; Terengganu comprises 3.6 percent, or 14 respondents; Wilayah Persekutuan Kuala Lumpur comprises 20.0 percent, or 77 respondents; and Wilayah Persekutuan Labuan has 0.0 percent, with no respondents. Table 4.3 provides a detailed breakdown of participants based on their respective states.

Table 4.3
State of Respondents

State	Frequency	Percentage
Johor	26	6.8%
Kedah	25	6.5%
Kelantan	19	4.9%
Melaka	11	2.9%
Negeri Sembilan	21	5.5%
Pahang	26	6.8%
Perak	15	3.9%
Perlis	3	0.8%
Pulau Pinang	46	11.9%
Sabah	0	0.0%
Sarawak	0	0.0%
Selangor	102	26.5%
Terengganu	14	3.6%
Wilayah Persekutuan Kuala Lumpur	77	20.0%
Wilayah Persekutuan Labuan	0	0.0%
Total	385	100.0%

4.3.3 Education Level

The descriptive analysis of the demographic data reveals that individuals below the primary education level constitute 0.0 percent or 0 respondents. Those with a primary education level make up 6.0 percent or 23 respondents. Individuals with a middle level education represent 4.7 percent or 18 respondents. Respondents with a secondary education level account for 14.8 percent or 57 respondents. Those with a diploma level of education comprise 16.9 percent or 65 respondents. Finally, individuals with a degree or higher level of education constitute 57.7 percent or 222 respondents out of the total 385 respondents who participated in the survey. Table 4.3 presents a comprehensive analysis of the participants categorised based on their educational attainment.

Table 4.4
Education Level of Respondents

Education Level	Frequency	Percentage
Below primary	0	0.0%
Primary	23	6.0%
Middle	18	4.7%
Secondary	57	14.8%
Diploma	65	16.9%
Degree or higher	222	57.7%
Total	385	100.0%

4.3.4 Working Level

The demographic analysis of the respondents reveals that frontline workers constitute 15.1% or 58 individuals, foremen constitute 3.1% or 12 individuals, supervisors constitute 23.6% or 91 individuals, site engineers constitute 21.3% or 82 individuals, construction managers constitute 11.2% or 43 individuals, and safety officials constitute 25.7% or 99 individuals out of the total 385 respondents who participated in

the survey. Table 4.5 presents a comprehensive categorization of participants based on their respective employment levels.

Table 4.5
Working Level of Respondents

Working Level	Frequency	Percentage
Frontline Worker	58	15.1%
Foreman	12	3.1%
Supervisor	91	23.6%
Site Engineer	82	21.3%
Construction Manager	43	11.2%
Safety Official	99	25.7%
Total	385	100.0%

4.3.5 Types of Employer/ Organization

The analysis of demographic data from the respondents reveals that 39 individuals, constituting 10.1 percent of the total respondents, are employed as client/owners. Additionally, 239 respondents, accounting for 62.1 percent, work as main contractors, while 83 respondents, representing 21.6 percent, are engaged as subcontractors. Furthermore, 24 respondents, equivalent to 6.2 percent, are employed as consultants. Table 4.6 presents a comprehensive categorization of survey participants based on their respective employers or organisations.

Table 4.6
Types of Employer/ Organization of Respondents

Types of Employer/ Organization	Frequency	Percentage
Client/ Owner	39	10.1%
Main Contractor	239	62.1%
Subcontractor	83	21.6%
Consultant	24	6.2%
Total	385	100.0%

4.3.6 Service with Current Employer

The analysis of demographic data from the respondents reveals that 78 individuals, constituting 20.3 percent of the total respondents, reported working for less than 1 year. Additionally, 132 respondents, accounting for 34.3 percent, reported working for a duration of 1-5 years. Furthermore, 107 respondents, representing 27.8 percent, reported working for a period of 6-10 years. Similarly, 107 respondents, comprising 27.8 percent, reported working for a span of 11-15 years. Lastly, 24 respondents, equivalent to 6.2 percent, reported working for more than 15 years. Table 4.7 presents a comprehensive categorization of survey participants based on their tenure with their present employer.

Table 4.7
Service with Current Employer of Respondents

Service with Current Employer	Frequency	Percentage
Less than 1 year	78	20.3%
1-5 years	132	34.3%
6-10 years	107	27.8%
11-15 years	44	11.4%
More than 15 years	24	6.2%
Total	385	100.0%

4.3.7 Work Experience in the Construction Industry

The analysis of demographic data pertaining to the working experience of the respondents in the construction industry reveals that 74 individuals, constituting 19.2 percent of the total respondents, possess less than 5 years of experience. Additionally, 117 respondents, accounting for 30.4 percent, possess 6-10 years of experience. Furthermore, 61 respondents, comprising 15.8 percent, have 11-15 years of experience. Moreover, 91 respondents, representing 23.6 percent, possess 16-20 years

of experience, while 42 respondents, constituting 10.9 percent, possess more than 15 years of experience. Table 4.8 presents a comprehensive breakdown of the survey participants based on their respective levels of work experience within the construction sector.

Table 4.8
Work Experience in the Construction Industry of Respondents

Work Experience in the Construction Industry	Frequency	Percentage
Less than 5 years	74	19.2%
6-10 years	117	30.4%
11-15 years	61	15.8%
16-20 years	91	23.6%
More than 20 years	42	10.9%
Total	385	100.0%

4.4 Reliability Analysis

Table 4.9
Reliability Coefficient of Questionnaire of Variables

Variables	N of Items	Cronbach's Alpha
MC&EI	9	0.92
SE&P	7	0.94
SR&WP	5	0.74
SC&R	3	0.75
SCOMP	3	0.81
SPART	3	0.85

According to the data presented in Table 4.9, the instruments employed for the assessment of the DV (SP; SCOMP and SPART) and IV (SC; MC&EI, SE&P, SR&WP and SC&R) identified using the reliability test. The results of reliability test show that the Cronbach Alpha of MC&EI was 0.92, SE&P was 0.94, SR&WP was 0.74, SC&R was 0.75, SCOMP was 0.8 and SPART was 0.85. The aforementioned

values suggest that the questionnaire's reliability was satisfactory, as a coefficient equal to or greater than 0.70 is generally considered indicative of good reliability (Selim & Kilic, 2016). Consequently, no modifications were made to any of the questions, as all participants expressed no issues or challenges in comprehending and responding to them.

4.5 Normality Test

The normality of the data was assessed by conducting a normality test, specifically utilising the skewness and kurtosis test. Skewness is a statistical measure that quantifies the degree of symmetry or asymmetry present in a given data distribution. On the other hand, kurtosis is a statistical measure that assesses the extent to which data exhibits heavy-tailedness or light-tailedness within a distribution. According to George and Marley (2010), the extrapolation of the skewness value can be utilised to determine whether the data can be regarded as conforming to a normal distribution. Specifically, if the obtained asymmetry value falls within the range of -2 to 2, it suggests that the data can be considered normally distributed. According to Hair et al. (2010), a kurtosis value within the range of -7 to 7 indicates that the data can be considered to follow a normal distribution.

Table 4.10
Skewness and Kurtosis Values

Variables	Skewness	Kurtosis
MC&EI	-1.30	2.95
SE&P	-1.05	1.74
SR&WP	0.09	0.54
SC&R	0.35	1.99
SCOMP	-0.17	-0.23
SPART	0.02	-0.71

Table 4.10 shows the skewness and kurtosis of the data. The range of skewness were between -1.30 and 0.35. The range of kurtosis were between -0.71 and 2.95. It shows that the skewness and kurtosis values is considered normal.

4.6 Descriptive Statistics

The IV and DV were assessed using a 5-point Likert scale. Table 4.11 presents a summary of the mean and standard deviation values for all variables. The range of means for all variables falls between 3.8151 and 4.1091. The highest mean was observed for SPART, while the lowest mean was found for the SR&WP. The range of standard deviations for all variables was observed to be between 0.45148 and 0.83762. The SE&P category exhibited the highest standard deviation, while the SR&WP category demonstrated the lowest standard deviation.

Table 4.11
Descriptive Statistics (Means and Standard Deviation)

Variables	Mean	Standard Deviation
MC&EI	3.90	0.71
SE&P	3.90	0.84
SR&WP	3.82	0.45
SC&R	3.57	0.62
SCOMP	4.09	0.57
SPART	4.11	0.60

4.7 Hypothesis Testing

4.7.1 Correlation

Correlation analysis is used to determine the type and magnitude of the relationship between dependent and independent variables in research studies. The study utilised the Pearson correlation coefficient to examine the relationship between pairs of variables.

According to Shivam and Pandey (2020), correlation analysis is a statistical method used to measure the degree of relationship between two variables of a quantitative nature. Cohen (1988) posited that the magnitude of the association is contingent upon the r values, which indicate the directionality (positive or negative) of the relationship between variables. The Pearson correlation coefficient (r) is a statistical measure that quantifies the degree of linear association between two variables, with values ranging from -1 to +1 (David et al., 2020). Pallant (2007) provides a classification of statistical significance based on the magnitude of correlation coefficients. Specifically, weak statistical significance is indicated by correlation coefficients ranging from r = 0.10 to 0.29 or r = -0.10 to -0.29. Medium statistical significance is represented by correlation

coefficients ranging from r = 0.30 to 0.49 or r = -0.30 to -0.49. Finally, strong statistical significance is denoted by correlation coefficients ranging from r = 0.50 to 1.0 or r = -0.50 to -1.0. The information will be presented in Table 4.12.

Table 4.12
Correlation r Values

Correlation (r)	Strength
r= 0.10 to 0.29 or r=-0.10 to -0.29	Weak
r= 0.30 to 0.49 or r=-0.30 to -0.49	Medium
r= 0.50 to 1.0 or r=-0.50 to -1.0	Strong

Source: Pallant (2007)

In this study, there are four (8) hypotheses were test for correlation:

H1 : There is a relationship between MC&EI and SCOMP in construction industry in Malaysia.

H2 : There is a relationship between MC&EI and SPART in construction industry in Malaysia.

H3 : There is a relationship between SE&P and SCOMP in construction industry in Malaysia

H4 : There is a relationship between SE&P and SPART in construction industry in Malaysia

H5 : There is a relationship between SR&WP and SCOMP in construction industry in Malaysia.

H6 : There is a relationship between SR&WP and SPART in construction industry in Malaysia.

H7 : There is a relationship between SC&R and SCOMP in construction industry in Malaysia.

H8 : There is a relationship between SC&R and SPART in construction industry in Malaysia.

Table 4.13
Correlation Analysis
**Correlation is significant at the 0.01 level (2-tailed)

		Safety compliance	Safety participation
Management commitment and employees' involvement to health and safety	Pearson Correlation	.374**	.280**
	Sig. (2-tailed)	<0.01	<0.01
	N	385	385
Safety enforcement and promotion	Pearson Correlation	.399**	.404**
	Sig. (2-tailed)	<0.01	<0.01
	N	385	385
Applicability of safety rules and safe work practices	Pearson Correlation	.156**	.274**
	Sig. (2-tailed)	.002	<0.01
	N	385	385
Safety consciousness and responsibility	Pearson Correlation	.317**	.406**
	Sig. (2-tailed)	<0.01	<0.01
	N	385	385

i) Hypothesis 1

H1: There is a relationship between MC&EI and SCOMP in construction industry in Malaysia.

A positive correlation between SCOMP and MC&EI shown in Table 4.13, where r = 0.374, n = 385, p <0.01. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

ii) Hypothesis 2

H2: There is a relationship between MC&EI and SPART in construction industry in Malaysia.

A positive correlation between SPART and MC&EI shown in Table 4.13, where r = 0.280, n = 385, p <0.01. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

iii) Hypothesis 3

H3: There is a relationship between SE&P and SCOMP in construction industry in Malaysia.

A positive correlation between SCOMP and SE&P shown in Table 4.13, where r = 0.399, n = 385, p <0.01. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

iv) Hypothesis 4

H4: There is a relationship between SE&P and SPART in construction industry in Malaysia.

A positive correlation between SPART and SE&P shown in Table 4.13, where r = 0.404, n = 385, p <0.01. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

v) Hypothesis 5

H5: There is a relationship between SR&WP and SCOMP in construction industry in Malaysia.

A positive between SCOMP and SR&WP shown in Table 4.13, where r = 0.156, n = 385, p= 0.002. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

vi) Hypothesis 6

H6: There is a relationship between SR&WP and SPART in construction industry in Malaysia.

A positive between SPART and SR&WP shown in Table 4.13, where r = 0.274, n = 385, p= 0.002. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted.

vii) Hypothesis 7

H7: There is a relationship between SC&R and SCOMP in construction industry in Malaysia.

A positive correlation between SCOMP and SC&Rsown in Table 4.13, where r = 0.317, n = 385, p <0.01. Thus, the null hypothesis was accepted and the alternative hypothesis was rejected.

viii) Hypothesis 8

H8: There is a relationship between SC&R and SPART in construction industry in Malaysia.

A positive correlation between SPART and SC&Rshown in Table 4.13, where r = 0.406, n = 385, p <0.01. Thus, the null hypothesis was accepted and the alternative hypothesis was rejected.

4.7.2 Regression

Hypotheses 7 and 8 were formulated to investigate the relationships between the IV and the DV. A regression analysis was conducted to determine the IV that exhibit a positive influence on the DV, namely SCOMP and SPART. Regression modelling is a commonly employed technique in the field of statistical analysis for the purpose of investigating and leveraging the association between DV, which are the variables being studied, and IV, which are the variables used to predict the outcome (Srikanta, Mishra., Akhil, Datta-Gupta, 2018). Multiple regression is a statistical technique used to analyse the relationship between a single dependent variable (DV) and multiple independent variables (IV) (Moore, et al., 2006). The aim of multiple regression analysis is to use known values for the independent variables (IV) to forecast the value of the dependent variable (DV).

Table 4.14
Model Summary

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	0.442a	0.195	0.187	0.51570

a. Predictors: (Constant), MC&EI, SE&P, SR&WP, SC&R

Table 4.14 shows R is 0.442 which indicates a fairly strong relationship between the predictors (MC&EI, SE&P, SR&WP and SC&R) with the response variable (SCOMP). The R square is 0.195 which indicates that 19.5% of the variance in the SCOMP can be explained by the IV (MC&EI, SE&P, SR&WP and SC&R). The adjusted R square is 0.187

Table 4.15
ANOVA

Model	R	Sum of square	df	Mean square	F	Sig.
1	Regression	24.552	4	6.138	23.079	<.001b
	Residual	101.060	380	0.266		
	Total	125.612	384			

a. Dependent Variable: SCOMP
b. Predictors: (Constant), MC&EI, SE&P, SR&WP, SC&R

The statistical significance of the F statistic, as indicated by the p-value, is 0.01. In comparison to the predetermined significance level of 0.05, the calculated p-value is found to be lower than the significance level. Based on the extant evidence, it can be inferred that the regression model exhibits a more robust conformity to the data in comparison to the model devoid of any predictor variables. This finding suggests that the regression model, taken as a whole, exhibits statistical significance.

Table 4.16
Coefficient a

Model	R	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.134	.274		7.790	<.001
	MC&EI	.113	.065	.140	1.745	.032
	SE&P	.141	.055	.206	2.535	.012
	SR&WP	.131	.060	.103	2.199	.028
	SC&R	.131	.049	.141	2.666	.008

a. Dependent Variable: SCOMP

The multiple regression analysis results are presented in Table 4.16, which displays the standard coefficient, t value, and significance value. In this study, hypothesis testing shows that MC&EI, SE&P, SR&WP and SC&R have positive influence towards SCOMP as signified by p-value (sig < 0.05).

Table 4.17
Model Summary

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	0.521	0.272	0.264	0.51856

a. Predictors: (Constant), MC&EI, SE&P, SR&WP, SC&R

Table 4.17 shows R is 0.521 which indicates a fairly strong relationship between the predictors (MC&EI, SE&P, SR&WP and SC&R) with the response variable (SPART). The R square is 0.272 which indicates that 27.2% of the variance in the SPART can be explained by the IV (MC&EI, SE&P, SR&WP and SC&R). The adjusted R square is 0.264

Table 4.18
ANOVA

Model	R	Sum of square	df	Mean square	F	Sig.
1	Regression	38.124	4	9.531	35.444	<.001b
	Residual	102.183	380	0.269		
	Total	140.07	384			

a. Dependent Variable: SCOMP
b. Predictors: (Constant), MC&EI, SE&P, SR&WP, SC&R

Table 4.18 presents the statistical significance of the F-test, as indicated by a p-value of 0.01. In comparison to the predetermined significance level of 0.05, the p-value is found to be lower than the significance level. Based on the available evidence, it can be determined that the regression model demonstrates a superior fit to the data compared to the model lacking predictor variables. This finding suggests that the regression model, taken as a whole, exhibits statistical significance.

Table 4.19
Coefficient a

Model	R	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.649	.275		5.992	<.001
	MC&EI	-.135	.065	.158	-2.075	.039
	SE&P	.276	.056	.382	4.939	.012
	SR&WP	.256	.060	.191	4.269	.028
	SC&R	.263	.049	.269	5.333	.008

a. Dependent Variable: SPART

The multiple regression analysis results shown in Table 4.19, which displays the standard coefficient, t value, and significance value. In this study, hypothesis testing shows that MC&EI, SE&P, SR&WP and SC&R have positive influence towards SPART as signified by p-value (sig < 0.05).

4.8 Multicollinearity

Collinearity refers to the occurrence when two or more predictor variables in a statistical model exhibit a linear relationship, which is also known as multicollinearity (Alin, 2010).

Table 4.20
Multicollinearity (SCOMP)

Model	R	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Tolerance	Statistics VIF
1	(Constant)	2.134	.274		7.790	<.001		
	MC&EI	.113	.065	.140	1.745	.082	.330	3.034
	SE&P	.141	.055	.206	2.535	.012	.321	3.118
	SR&WP	.131	.060	.103	2.199	.028	.957	1.045
	SR&R	.131	.049	.141	2.666	.008	.753	1.327

Table 4.20
Multicollinearity (SPART)

Model	R	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Tolerance	Statistics VIF
1	(Constant)	1.649	.275		5.992	<.001		
	MC&EI	-.135	.065	-.158	-2.075	.039	.330	3.034
	SE&P	.276	.056	.382	4.939	.012	.321	3.118
	SR&WP	.256	.060	.191	4.269	.028	.957	1.045
	SR&R	.263	.049	.269	5.333	.008	.753	1.327

Table 4.20 and 4.21 shows the statistics VIF of IV (MC&EI, SE&P, SR&WP and SC&R) to DV (SCOMP and SPART) respectively. Hair et al. (1999) established that a VIF value of 10 is considered the upper threshold for acceptability. A Variance Inflation Factor (VIF) value exceeding 10 indicates a pronounced indication of multicollinearity. From the Table 4.20 and Table 4.21, the value of statistics VIF is between 1.045 and 3.118 which is less than 10. That mean there is no collinearity and is acceptable.

4.9 Summary result hypothesis testing

The comprehensive hypothesis's summary under investigation was presented in Table 4.22. Based on the findings of the analysis conducted in this study, it can be concluded that all of the formulated hypotheses are deemed acceptable when the 'p' value is below 0.05.

Table 4.22
Summary of Hypothesis Testing

Hypothesis	Description	Results
H1	There is a relationship between MC&EI and SCOMP in construction industry in Malaysia.	**Accepted**
H2	There is a relationship between MC&EI and SPART in construction industry in Malaysia.	**Accepted**
H3	There is a relationship between SE&P and SCOMP in construction industry in Malaysia	**Accepted**
H4	There is a relationship between SE&P and SPART in construction industry in Malaysia	**Accepted**
H5	There is a relationship between applicability of SR&WP and SCOMP in construction industry in Malaysia.	**Accepted**
H6	There is a relationship between applicability of SR&WP and SPART in construction industry in Malaysia.	**Accepted**
H7	There is a relationship between SC&R and SCOMP in construction industry in Malaysia.	**Accepted**
H8	There is a relationship between SC&R and SPART in construction industry in Malaysia.	**Accepted**
H9	There is influence between (MC&EI, SE&P, SR&WP and SC&R) and SCOMP.	**Accepted**
H10	There is influence between (MC&EI, SE&P, SR&WP and SC&R) and SPART.	**Accepted**

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

Chapter 5 provides a comprehensive summary and conclusive analysis of the hypothesis that was examined in the present study. This chapter outlines closely resembles that of Chapter Four. The implications of the findings for different industries are also examined. The final section of this chapter presents recommendations for future research endeavours. The concluding section of this chapter additionally addresses certain constraints inherent in the present study.

5.2 Summary of findings

The objective of this study has been to investigate the correlation between all the independent variables (IV) and dependent variable (DV). The specific objectives of this research involve examining the correlation between MC&EI, SE&P, SR&WP, SC&R, SCOMP, and SPART. Additionally, the study aims to determine if the independent variables (MC&EI, SE&P, SR&WP, and SC&R) have an impact on the dependent variables (SCOMP and SPART).

Based on the stated objectives, it can be concluded that all the objectives have been successfully accomplished. There is a positive relationship between MC&EI and SCOMP; MC&EI and SPART; SE&P and SCOMP; SE&P and SPART; SR&WP and SCOMP, SR&WP and SPART; SC&R and SCOMP; and SC&R and SPART.

All the IV (MC&EI, SE&P, SR&WP and SC&R) found influence the DV (SCOMP and SPART).

5.3 Discussion

5.3.1 MC&EI and SCOMP

The study's findings indicate that there is a widespread implementation of MC&EI practises across the organisation, with the aim of enhancing SCOMP. The individuals in management and the workforce who exhibit a commitment to establishing and upholding a workplace environment that prioritises the safety and security of employees, alongside the pursuit of their other organisational objectives and goals. According to the study conducted by Kaliannan and Maran in 2016, there was a positive correlation observed between management commitment, employees' involvement in safety training, adherence to safety rules and procedures, and the implementation of safety promotion policies. This correlation was found to be associated with increased levels of safety compliance and active participation in safety-related activities. The consistent implementation of safety measures will enhance their overall capacity to effectively manage safety.

5.3.2 MC&EI and SPART

Leadership safety commitment has a positive effect on miners' safety participation behavior, and this effect is partially mediated by miners' psychological safety. The relationship between leadership safety commitment

and safety participation behaviour is influenced by the perceived attitudes towards safety of both supervisors and coworkers (Lixia et al., 2022).

According to the findings of this study, MC&EI are being given throughout the organisation in order to improve their SPART. The management and employees who demonstrate an interest in establishing and maintaining a safe and secure working environment for their employees while achieving their other objectives and goals. Consistent efforts to maintain safety performance will improve their ability to manage safety as a whole and completely.

5.3.3 SE&P and SCOMP

Safety enforcement and promotion have different effects on safety performance. Research by Berliana et al. found that safety communications have a positive influence on safety performance among nurses (Beliana et. al., 2022)

Based on the findings of this study, SE&P must be prioritised in order to improve SCOMP. Good safety enforcement and safety promotion will help organisation to achieve their safety compliance target

5.3.4 SE&P and SPART

According to Munir et. al., safety promotion policies positively relate to safety participation (Munir et. al., 2017).

Based on the findings of this study, SE&P must be prioritised in order to improve SCOMP. Good safety enforcement and safety promotion will encourage everyone in safety participation

5.3.5 SR&WP and SCOMP

The implementation of safety rules and safe work practices are of paramount importance in fostering compliance with safety standards within the workplace (Muhammad et al., 2022). The study's findings indicate a positive correlation between the SR&WP, and SCOMP. Employers ought to give precedence to the adherence of safety regulations and the implementation of safe work protocols in order to guarantee compliance with safety standards.

5.3.6 SR&WP and SPART

Studies have shown that the implementation of safety management practices (SMPs) and the perception of management's safety priority can positively influence safety participation (Metin et. al., 2021). According to the findings of this study, SR&WP have positive correlation with SPART. Good work practices and safety rules issued by employers can increase the safety participation among employees in construction industry in Malaysia.

5.3.7 SC&R and SCOMP

Responsible leadership also moderates this relationship, enhancing safety performance when safety consciousness is low or the safety climate is weak Siao-Yun (2023). According to Farida et. al., (2022), safety consciousness mediates the relationship between safety management practices and safety compliance.

Based on the findings of this study, SC&R have positive correlation with SCOMP. Employer can put specific safety responsibility to all employees' job description so they clearly realize that they also responsible in ensuring the safety compliance and performance in the workplace.

5.3.8 SC&R and SPART

Responsible leadership plays a crucial role in moderating this relationship, thereby enhancing safety performance in situations where there is a lack of safety consciousness or a weak safety climate. Siao-Yun (2023) is the author of the cited work. Farida et al. (2022) study shows that the relationship between safety management practises and safety participation is facilitated by safety consciousness.

Based on the findings of this study, SC&R have positive correlation with SPART. Employer can put specific safety responsibility to all employees' job

description so they clearly realize that they also responsible in ensuring the safety participation and performance in the workplace.

5.3.9 MC&EI, SE&P, SR&WP and SC&R influence SCOMP

According to the result, it shows that MC&EI, SE&P, SR&WP and SC&R influence SCOMP. Employers need to prioritize these four-safety climate factor to improve the safety performance especially in safety compliance.

5.3.10 MC&EI, SE&P, SR&WP and SC&R influence SPART.

According to the result, it shows that MC&EI, SE&P, SR&WP and SC&R influence SPART. Employers need to prioritize these four-safety climate factor to improve the safety performance especially in safety participation.

5.4 Implication of study

The construction industry is known for its unique set of challenges related to safety. By focusing on safety climate and safety performance in Malaysia, the research can provide insights into the specific issues faced by the construction sector in the country. This can be crucial for developing targeted interventions and strategies to improve safety outcomes. Other than that, this research findings can have implications for policy-making and regulatory frameworks related to safety in the construction industry. Understanding the safety climate and its impact on safety performance can

help in the formulation of more effective and tailored regulations, contributing to safer working conditions. Apart of that, this study may identify factors that influence safety climate and performance within construction companies. This information can be valuable for organizations seeking to enhance their safety practices and create a safer work environment. Insights into organizational culture, leadership, and communication can guide interventions at the company level.

Findings from the research can inform the development of targeted training programs for construction workers. This could include programs that focus on improving safety attitudes, risk awareness, and communication skills, ultimately contributing to better safety performance. The research contributes to the academic understanding of safety climate and performance, particularly in the context of the construction industry in Malaysia. It adds to the existing body of knowledge by providing empirical evidence and insights into the relationship between safety climate and performance, which can be used as a foundation for future studies. If the research includes a comparative analysis with safety practices in other countries or industries, it can offer valuable benchmarks and lessons learned. This comparative perspective can contribute to a broader understanding of safety dynamics and facilitate the transfer of best practices across different contexts. By emphasizing the importance of safety climate, the research can contribute to the promotion of a safety-oriented culture within the construction industry. This cultural shift is essential for sustained improvements in safety performance.

In summary, the research has the potential to make significant contributions to improving safety outcomes in the Malaysian construction industry, informing policy

and organizational practices, and advancing the theoretical understanding of safety climate and performance in a specific context.

5.5 Limitation and Future Research Directions

This study, despite benefiting from previous research on safety performance, does have certain limitations; time and language of the questionnaire. As the questionnaire is disseminated via Google Form, the response from the respondent needs some time as researcher not meet the respondent face to face. Some of the respondent especially from frontline worker level, researcher need to meet them and explain each of the item in the questionnaire as the questionnaire is in English.

The regression analysis in this research shows that only 19.5% of the safety climates predictors tested has influenced the SCOMP and 27.2% of the safety climates predictors tested has influenced the SPART on construction employee in construction industry in Malaysia has been identified through the four independent variable which are MC&EI, SE&P, SR&WP and SC&R. There is still remaining of 80.5% for SCOMP and 72.8% for SPART of the other predictors that need to be identified by the future researchers. This is because there many safety climate predictors that can contribute to safety performance.

Future research may conduct this research focusing on other predictors, different industry, or other population. It is suggested to further study on the other safety climate predictor that possibly give high impact on the safety performance.

5.6 Recommendations

This study exclusively concentrates on the construction sector within the geographical boundaries of Malaysia. Their methodologies and criteria may vary from those of other sectors. Hence, it is advisable to limit the discussion to construction firms operating in Malaysia. Safety encompasses the overall practises of an organisation, specifically in regard to its strengths and weaknesses. Despite the fact that most researchers demonstrate a positive correlation between safety and health, certain organisations tend to neglect this relationship.

Based on this study, it is recommended to consider on the improvement below:

a. Top management should demonstrate their unwavering commitment to safety. Leaders should actively participate in safety initiatives and set an example for all employees.

b. Develop a clear and comprehensive safety policy that outlines the organization's commitment to health and safety. Ensure that all employees are aware of and understand this policy.

c. Create safety committees consisting of both management and employees to jointly identify, assess, and address safety issues hold regular meetings to discuss safety concerns and initiatives, allowing employees to voice their opinions and concerns.

d. Provide ongoing safety training for all employees, from new hires to experienced workers. This training should cover not only regulations and procedures but also the importance of safety in their daily work.

e. Encourage employees to stay informed about the latest safety practices, technologies, and regulations through workshops, seminars, and online resources.

f. Promote a culture of reporting near-misses and incidents without fear of repercussions. Encourage employees to report hazards and unsafe conditions.

g. Investigate all incidents and near-misses thoroughly to identify root causes and implement corrective actions.

h. Employer can implement safety recognition programs and incentive system to acknowledge and reward employees and teams for their safety performance and achievements.

i. Establish open channels of communication where employees can express safety concerns or suggestions. Encourage two-way communication.

j. Conduct regular safety audits and inspections to ensure compliance with safety regulations and identify potential hazards and involve employees in safety audits to gain their insights and perspectives on safety issues.

k. Give employees the authority to stop work if they identify unsafe conditions. This empowers them to take immediate action when necessary and involve employees in the decision-making process related to safety procedures and equipment purchases.

l. Establish a feedback mechanism for employees to provide suggestions for safety improvements, and ensure that their input is considered.

Implementing these recommendations can help create a safety-focused culture where both management and employees actively contribute to safety and health in the construction industry.

5.7 Conclusion

The purpose of this study was to identify the factors contributing to accidents in the construction industry in Malaysia by examining the relationship between safety climate factors and safety performance in Malaysia's construction industry. The four major components of main predictors which influencing SP inclusive MC&EI, SE&P, SR&WP and SC&R. The result in this study shows that MC&EI, SE&P, SR&WP and SC&R found to have significant relationship with the SP; SCOMP and SPART in Malaysia’s construction industry in Malaysia.

This study has been proposed in order to establish an organised framework for understanding safety performance in the construction industry in Malaysia. By doing

so, organisations can become more aware of the contributing factors that significantly impact their safety performance, based on previous research findings. In summary, this study has effectively achieved its research objectives by identifying the factors that contribute to accidents in the construction industry in Malaysia.

REFERENCES

(2023). Health Hazards and Safety Management in Construction Industry Using Linear Regression Model. International Journal for Science Technology and Engineering.

Abubakar, Sadiq, Mahmoud., Mohd, Hamdan, Ahmad., Yahya, Mohd, Yatim. (2020). Overview of safety performance in the construction industry.

Abukhashabah, E., Summan, A., & Balkhyour, M. (2020, August). Occupational accidents and injuries in construction industry in Jeddah city. Saudi Journal of Biological Sciences, 27(8), 1993–1998.

Ahmed, S. (2019, January 1). Causes of Accident at Construction Sites in Bangladesh. Organization, Technology and Management in Construction: An International Journal, 11(1), 1933–1951.

Al-Bayati, A. J., Hadikusumo, B. H. W., Rowlinson, S., & Susilawati, C. (2020). Assessing the effects of construction site environment on occupational accidents in the Kingdom of Saudi Arabia. Safety Science, 122, 104532.

Alden, Nelson., Yedin, Arianto, Zega. (2021). Influence of occupational health safety (ohs) culture, commitment management, ohs training on ohs performance in oil & gas contractors' company in Batam island.

Algan, Tezel., Esra, Dobrucali., Sevilay, Demirkesen., Isik, Ates, Kiral. (2021). Critical Success Factors for Safety Training in the Construction Industry. Buildings.

Ali,A., Kamaruzzaman, S., & Sing, G. (2010). A Study on causes of accident and prevention in Malaysian construction industry.

Asanka, W., & Ranasinghe, M. (2016). STUDY ON THE IMPACT OF ACCIDENTS ON CONSTRUCTION PROJECTS.

Awwad, R., El Souki, O., & Jabbour, M. (2016). Construction safety practices and challenges in a Middle Eastern developingcountry. Safety science, 83, 1-11.

Choi, J. W., Park, J., & Cho, Y. (2019). The influence of organizational climate on construction accidents: Mediating role of safety behavior. International Journal of Environmental Research and Public Health, 16(12), 2186.

David, Weisburd., Chester, Britt., David, B., Wilson., Alese, Wooditch. (2020). Measuring Association for Scaled Data: Pearson's Correlation Coefficient.

Department of Occupational Safety and Health Malaysia (DOSH), Occupational Accidents Statistics by Sector 2022 (investigated).

Dörnyei, Z. (2007). Research methods in applied linguistics. New York: Oxford University Press.

Eshagh, Arianmehr., Zahra, Sabzi., Faezeh, Abbasgohari., Mohsen, Asgari. (2022). Investigating Safety Promotion Guidelines in Railway Construction Projects.

Farida, Saleem., Muhammad, Imran, Malik. (2022). Safety Management and Safety Performance Nexus: Role of Safety Consciousness, Safety Climate, and Responsible Leadership. International Journal of Environmental Research and Public Health,

Fei, S., Xiangdong, L., & Yali, F. (2018). Safety Evaluation for Bridge Crane Based on FTA and AHP. [online] MATEC Web of Conferences.

Gene, I., Rochlin. (1999). Safe operation as a social construct. Ergonomics,

H., Jak. (2022). A study on the effect of job stress on safety responsibility mindset, job performance, and safety behavior of urban train drivers.

Hair, J. F. Jr., Anderson, R. E., Tatham, R. L. & Black, W. C. (1995). Multivariate Data Analysis (3rd ed). New York: Macmillan.

Hinze, J. W., & Teizer, J. (2011). Visibilityrelated fatalities related to construction equipment. Safety science, 49(5), 709-718.

Hinze, J., & Glick, W. H. (2002). Safety climate factors, group differences, and safety behavior in the construction industry. Journal of Construction Engineering and Management, 128(5), 375-384.

I., Othman., A., Azman. (2020). Safety Misbehaviour and Its Effect Towards Safety Performance of Construction Projects. doi: 10.1007/978-981-15-1193-6_22

Institute of Labour Market Information and Analysis (ILMIA), Department of Statistics (2022). National Occupational Accident and Disease Statistics 2021

Iskandar, Abdullah., S., Mat, Zin., Rosfatihah, Che, Mat. (2022). Role of Health and Safety Management Practices in Safety Performance of Malaysian Bumiputera SMEs. International journal of academic research in business & social sciences.

ISO 45001:2018 Occupational health and safety management systems — Requirements with guidance for use

James, Roughton., Nathan, Crutchfield., Michael, Waite. (2019). Getting Employee Involvement in the Safety Management System.

Kai, Chen. (2022). Safety Issues In The Construction Industry.

Kaliannan, Maran. (2016). Safety management practices and safety behaviour among employees in steel fabrication construction company.

Karim, El-Dash., Mohamed, A., S., Abdel, Monem., Rasha, Mohammed, Salih. (2022). An intensive review on health and safely factors affecting construction projects' productivity. Journal of Al-Azhar University Engineering Sector,

Khushbu, Kumari., Suniti, Yadav. (2018). Linear regression analysis study. Journal of the Practice of Cardiovascular Sciences.

Kines, P., Andersen, L. P., Spangenberg, S., & Mikkelsen, K. L. (2010). Improving construction site

Kong S.K, Ku Z.F (2022). Causes and Solutions of Construction Crane Accidents in Malaysian Construction Industry. INTI Journal

Lee, J. Y., Yoon, Y. G., Oh, T. K., Park, S., & Ryu, S. I. (2020, November 9). A Study on Data Pre-Processing and Accident Prediction Modelling for Occupational Accident Analysis in the Construction Industry. Applied Sciences; Multidisciplinary Digital Publishing Institute.

Lingard, H., Cooke, T., & Blismas, N. (2018). Safety education and its impact on construction worker safety performance: A socio-cultural perspective. Safety Science, 109, 94-103.

Lingard, H., Cooke, T., & Blismas, N. (2018). The effects of safety climate, safety rules, and procedural justice on safety outcomes for construction workers in Hong Kong: The role of supervisor safety support. Safety Science, 103, 36-43.

Lixia, Niu., Yong, Liu. (2022). The Relationship Between Leadership Safety Commitment and Resilience Safety Participation Behavior. Psychology Research and Behavior Management

Margaret, Grosh., Carlo, del, Ninno., Emil, Tesliuc., Azedine, Ouerghi. (2008). For Protection and Promotion: The Design and Implementation of Effective Safety Nets.

Mark, Pagell., Clay, Dibrell., Anthony, Veltri., Elisabeth, D., Maxwell. (2014). Is an Efficacious Operation a Safe Operation: The Role of Operational Practices in Worker Safety Outcomes. IEEE Transactions on Engineering Management,

Metin, Bayram. (2019). Safety Training and Competence, Employee Participation and Involvement, Employee Satisfaction, and Safety Performance: An Empirical Study on Occupational Health and Safety Management System Implementing Manufacturing Firms.

Metin, Bayram., Bülent, Arpat., Yilmaz, Ozkan. (2021). Safety priority, safety rules, safety participation and safety behaviour: the mediating role of safety training. International Journal of Occupational Safety and Ergonomics.

Michael, King., Peter, Carruthers. (2022). Responsibility and Consciousness.

Mohammed, Azman., Aziz, Mohammed. (2015). The influence of safety management practices towards safety performance among insured person in commuting accident.

Muhammad, Muneeb, Ajmal., Ahmad, Shahrul, Nizam, Isha., Shahrina, Md, Nordin., Al-Baraa, Abdulrahman, Al-Mekhlafi. (2022). Safety-Management Practices and the Occurrence of Occupational Accidents: Assessing the Mediating Role of Safety Compliance. Sustainability

Munir, Shehu, Mashi., Chandrakantan, Subramaniam., Johanim, Johari. (2017). The Effect of Management Commitment, Safety Rules and Procedure and Safety

Promotion Policies on Nurses Safety Performance: The Moderating Role of Consideration of Future Safety Consequences.

Muthusamay, Malarvizhy. (2013). Safety management practices towards safety performance: A case study in A.P.S Medical Sdn. Bhd.

Nawi, M. N. M. , Ibrahim, S. H. , Affandi, R. , Rosli, N. A. & Basri, F. M. (2016). Factor Affecting Safety Performance Construction Industry. International Review of Management and Marketing, 6 (8) , 280-285 .

Neal, A.; Griffin, M.A.; Hart, P.M. The impact of organizational climate on safety climate and individual behavior. Saf. Sci. 2000, 34, 99–109.

Noor, Hanatasia., Mohd, Foudzy. (2018). Safety management practices, safety consciousness and safety behaviour among SME employees.

Nur Qistinna Israrr Ahmad, & Muhammad Shafiq Harun. (2022, September 13). CONSTRUCTION SECTOR: A REVIEW OF THE LABOUR MARKET SITUATION.

Nusrat, Khan., Ifzal, Ahmad., Muhammad, Ilyas. (2018). Impact of Ethical Leadership on Organizational Safety Performance: The Mediating Role of Safety Culture and Safety Consciousness. Ethics & Behavior,

P., N., Nemade. (2023). Analysis of health hazards and safety management in construction industry. Indian journal of applied research.

Patrick, Kinyanjui, Njogu., Charles, Mburu., Benson, Karanja. (2019). Effects of Management Commitment and Workers' Participation on Occupational Safety and Health Performance in Public Health Facilities.

Patrick, Kinyanjui, Njogu., Charles, Mburu., Benson, Karanja. (2019). Effects of Management Commitment and Workers' Participation on Occupational Safety and Health Performance in Public Health Facilities.

Q., Yin., Esther, Obonyo., Somayeh, Asadi. (2023). Towards a Multilevel Framework of Teamwork Processes Affecting Construction Safety Outcomes. Buildings.

Ratih, Berliana., Noeroel, Widajati., Nurhayati, Saridewi., Endang, Dwiyanti. (2022). The Influence of Safety Communications and Safety Promotion Policies on Safety Performance among Nurses in The Emergency Department at a Tertiary Hospital in Surabaya, Indonesia. Folia Medica Indonesiana

Rina, Sandora., Dewi, Kurniasih., Gilang, Armanda, Putri. (2023). Influence of Safety Management Practices on Safety Performance with Safety Knowledge as Intervening Variable in Safety Representative. Tibuana

Sawacha, Edwin & Naoum, Shamil & Fong, Daniel. (1999). Factors affecting safety performance on construction sites. International Journal of Project Management. 309-315. 10.1016/S0263-7863(98)00042-8.

Selim, Kilic. (2016). Cronbach's alpha reliability coefficient -. Journal of Mood Disorders, 6(1):47-48.

Shabbab, A, Alhammadi. (2022). Identification and Categorisation of Safety Improvement Practices in the Construction Industry: Review Study. International Review of Civil Engineering.

Shivam, Pandey. (2020). Principles of correlation and regression analysis. Journal of the Practice of Cardiovascular Sciences.

Siew, Lee, Cheng., Florianna, Lendai, Michael., Hana, Hamidi., Siti, Mariam, Abdullah. (2018). The Relationship between Management Practices and Safety.

Sousa V, Almeida NM, Dias LA. Risk-based management of occupational safety and health in the construction industry – part 1: background knowledge. Saf Sci. 2014;66:75-86.

Srikanta, Mishra., Akhil, Datta-Gupta. (2018). Regression Modeling and Analysis

Teo, E. A., Ling, F. Y. Y., Chong, A. F. W., & Chew, M. Y. L. (2015). The relationship between safety training and safety performance: A study among Singapore construction firms. International Journal of Occupational Safety and Ergonomics, 21(3), 301-309.

Udaya, Mohan, Devadas., M., A., L., S., Wijesooriya. (2021). Impact of the Management of Work Environmental Hazards on the Perceived Quality of Occupational Health and Safety among Operational Employees in Construction Industry.

Wasilkiewicz, K., Albrechtsen, E., & Antonsen, S. (2016). Occupational safety in a globalized construction industry: a study on Polish workers in Norway. Policy and Practice

Wu, T.C., Chen, C.H., Li C.C., (2008). A correlation among safety leadership, safety culture and safety performance. Journal of loss prevention in the process industries. Vol. 21, pp. 307-318.

Xiaowen, Hu., Gillian, Yeo., Mark, A., Griffin. (2020). More to safety compliance than meets the eye: Differentiating deep compliance from surface compliance. Safety Science

Zahoor, H., Chan, A., Utama, W., Gao, R., & Zafar, I. (2017, March 28). Modeling the Relationship between Safety Climate and Safety Performance in a Developing Construction Industry: A Cross-Cultural Validation Study. International Journal of Environmental Research and Public Health, 14(4), 351.

Zhang, X., Liu, H., & Skitmore, M. (2018). Safety climate and safety performance in the construction industry: A multilevel mediation model. Journal of Construction Engineering and Management, 144(3), 04018004.

Zitong, Jia. (2022). Development and Advanced Technologies of Construction Safety Management. Highlights in Science, Engineering and Technology.

Zohar, D. (2003). Safety climate: Conceptual and measurement issues. In J. C. Quick & L. E. Tetrick (Eds.), Handbook of occupational health psychology (pp. 123–142). American Psychological Association.

Zuraida, Hassan., Subramaniam, Sri, Ramalu., Md., Lazim, Mohd, Zin., Faridahwati, Mohd, Shamsudin., Chandrakantan, Subramaniam. (2016). Safety Management Practices and Safety Compliance: A Model for SMEs in Malaysia. doi: 10.15405/EPSBS.2016.08.120

Appendix

SURVEY QUESTIONNAIRE FOR THE MASTER OF SCIENCE IN OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT (MOSHM) / SOAL SELIDIK TINJAUAN UNTUK YANG SARJANA SAINS DALAM PENGURUSAN KESELAMATAN DAN KESIHATAN (MOSHM)

Title of Research : Safety Climate and Safety Performance in Malaysia's Construction Industry

Tajuk Penyelidikan : Iklim Keselamatan dan Prestasi Keselamatan dalam Industri Pembinaan Malaysia

Dear Sir / Madam / Miss, Tuan/ Puan / Cik,

Thank you for agreeing to participate in this research.

I'm currently conducting a study on the "*Safety Climate and Safety Performance in Malaysia's Construction Industry"*. Therefore, I would appreciate if you could answer all of the questions in the survey as the information you provide will influence the accuracy and success of this research. It will take less than 15 minutes to complete the questionnaire. Please note that response gathered will be treated in the strictest confidence and will be used for academic purpose only.

If you have any question regarding this research, you may forward them to me at the contact below.

Researcher:

Laili binti Sengut
Master student of Occupational Safety and Health Management
Universiti Utara Malaysia, Kuala Lumpur (lailysengut@gmail.com)

Thank you for your time and cooperation in answering this questionnaire.

Terima kasih kerana bersetuju untuk mengambil bahagian di dalam soal selidik ini.

Saya sedang menjalankan kajian tentang "Iklim Keselamatan dan Prestasi Keselamatan dalam Industri Pembinaan Malaysia". Oleh yang demikian, saya amat berbesar hati sekiranya anda boleh menjawab semua soalan di dalam kajian ini kerana setiap informasi yang anda beri akan mempengaruhi ketepatan serta kejayaan kajian ini. Soal selidik ini akan mengambil masa kurang dari 15 minit untuk menjawab kesemua soalan. Sila ambil perhatian bahawa maklumat yang diberi dianggap sebagai sulit dan akan digunakan untuk tujuan penyelidikan sahaja.

Sekiranya anda mempunyai sebarang pertanyaan berkaitan kajian ini, sila hubungi saya seperti maklumat yang tertera dibawah.

Penyelidik:

Laili binti Sengut
Sarjana Sains Dalam Pengurusan Keselamatan Dan Kesihatan
Universiti Utara Malaysia, Kuala Lumpur (lailysengut@gmail.com)

Terima kasih untuk masa dan kerjasama anda untuk menjawab kajiselidik ini

QUESTIONNAIRE: SAFETY CLIMATE AND SAFETY PERFORMANCE IN MALAYSIA'S CONSTRUCTION INDUSTRY

SECTION 1: PERSONAL ATTRIBUTE		
Age (years)	20 and below	
	21-30	
	31-40	
	41-50	
	51-60	
	61 and above	
State	Johor	
	Kedah	
	Kelantan	
	Melaka	
	Negeri Sembilan	
	Pahang	
	Perak	
	Perlis	
	Pulau Pinang	
	Sabah	
	Sarawak	
	Selangor	
	Terengganu	
	WPKL	
	WP Labuan	
Education level	Below primary	
	Primary	
	Middle	
	Secondary	
	Diploma	
	Degree or higher	
Working level	Frontline worker	
	Foreman	
	Supervisor	
	Site Engineer	
	Construction manager	
	Safety Official	
Types of Employer/ Organization	Client/ Owner	
	Main contractor	
	Subcontractor	
	Consultant	
Service with current employer	Less than 1 year	
	1-5 years	
	6-10 years	
	11-15 years	
	More than 15 years	
Work experience in the Construction Industry	Less than 5 years	
	6-10 years	
	11-15 years	

	16-20 years	
	More than 20 years	

SECTION 2: SAFETY CLIMATE					
Please rate the following factors using a scale of 1 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."					
	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
Management commitment and employees' involvement to health and safety					
Company really cares about the health & safety of the people who work here.					
Adequate health & safety training is given by the company to perform the job safely.					
People here always wear their personal protective equipment when they are supposed to.					
All the people who work in my team are fully committed to health & safety					
There is always good communication here between management and workers about health & safety issues.					
Sufficient resources are available for health and safety here.					
Time pressures for completing the jobs are reasonable.					
My workmates would react strongly against people who break health & safety procedures.					
Working with defective equipment is not at all allowed.					
Safety enforcement and promotion					
The company/management encourages suggestions/feedback from the employees, on how to improve health & safety					
There is always good preparedness for emergency here.					
Accidents which happen here are always reported.					
Management always motivates and praises the employees for working safely.					
Safety posters and publications are effectively used for safety awareness					

Necessary precautions are taken against fall protection.					
Supervisors carry out the job hazard analysis before start of each activity					
Applicability of safety rules and safe work practices					
Some health & safety rules/procedures do not reflect how the job is to be done.					
Some health & safety rules or procedures are difficult to follow as they are either too complex or not practical.					
Sometimes it is necessary to take risks to get the job done within given time.					
Some health & safety procedures are too stringent in relation to the associated risks.					
Some jobs here are difficult to do safely due to physical conditions on site.					
Safety consciousness and responsibility					
I am very clear about my responsibilities for health & safety.					
Work Health & safety is my concern—it is my responsibility					
Regular safety inspections are very helpful to improve the health & safety of workers.					

SECTION 3: SAFETY PERFORMANCE					
Please rate the following factors using a scale of 0 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."					
	1 Strongly disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly agree
SCOMP- Safety compliance					
You follow all of the safety procedures for the jobs that you perform					
Your co-workers (working in your team) follow all the safety procedures for the jobs that they perform.					
All the workers in your company follow the safety procedures for the jobs that they perform.					
SPART- Safety participation					
You always promote safety programmes at your workplace. (e.g., always convincing the co-workers about the importance of safety compliance for our well-being)					

You always put in extra effort to improve safety of the workplace? (e.g., reminding the co-workers about safety procedures, reporting all incidents, looking for hazards)					
You always voluntarily carry out tasks or activities that help to improve workplace safety? (e.g., attending safety meetings, giving suggestions for improvements, receiving safety training voluntarily, and assisting the co-workers in safety compliance)					
Thank you for taking the time to complete this questionnaire! Your contribution is greatly appreciated.					