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Internal Factors Influencing the Compliance with Health and Safety Regulations among Medium Manufacturing Enterprises (MEs) in Tanzania

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Abstract

This study investigated the compliance with health and safety regulations in the Medium manufacturing Enterprises (MEs) in Tanzania, focusing on internal factors. In particular, the study focused on the impact of financial capability, leadership commitment, organizational safety culture, and employee training on the level of regulatory compliance. The study was based on Systems Theory and used a quantitative research method with Partial Least Squares Structural Equation Modelling (PLS-SEM) to analyse data gathered from 120 respondents who were randomly selected in Temeke Municipality, Dar es Salaam. The findings show that leadership commitment, organizational safety culture and employee training positively and significantly influence the compliance with health and safety regulations. Financial capability, on the other hand, had a positive, although not significant, effect. The findings indicate that financial resources are important, but should not be prioritized. This study adds to the current debate regarding factors that affect compliance with health and safety regulations with empirical evidence from the Tanzanian Medium manufacturing Enterprise context. This paper recommends that senior managers and owners of Tanzanian MEs should prioritize enhancing leadership commitment, building a strong organizational safety culture, investing in targeted employee training, and aligning financial resources with institutional support to guarantee health and safety compliance.

Keywords: Leadership commitment, organizational safety culture, employee training, financial capability, compliance with health and safety regulations

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SDG alignment

SDG 3 (Good Health and Well-being): safer workplace practices and occupational health.

SDG 8 (Decent Work): safer manufacturing jobs.

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Introduction

Health and safety regulations are important for Medium Enterprises (MEs) to comply with. Complying the health and regulations standards has a marked impact on minimising workplace accidents and improving productivity (Njoroge et al., 2025). Developed countries such as Germany, Portugal and France have stringent occupational safety laws and proactive safety cultures. In Germany, one study reported that in 2021, 13.9% of companies did not comply with legally mandated occupational safety measures, suggesting that approximately 86.1% complied with the assessed requirements (Molares Zambrano & Mendoza, 2021). The study carried out in 2025 in Portugal showed that 88% of companies carried out some of the most important OSH activities, such as risk identification and accident analysis (Zulkifly et al., 2018). The compliance levels are responsible for the relatively low fatality rates in the workplace in countries such as France, which has an average fatality rate of 2.55 per 100,000 workers (Zulkifly et al., 2018). Compliance boosts productivity, minimizes accident costs, strengthens corporate image and promotes sustainable business operations. These are some of the advantages of robust compliance systems, but in many African countries, the picture is different.

The constructs of the current study, namely leadership commitment, organizational safety culture, employee training and financial capability, are related to the Safety Culture Theory, which describes the influence of internal organizational factors on compliance (Langford, 2021). Leadership commitment influences attitudes and sets an example for safety behaviours, while organizational safety culture is established by shared values that encourage compliance. Moreover, employee training instils knowledge and understanding of safety rules, whereas financial capability ensures that resources are available to effectively implement safety measures. These constructs indicate that is related to the organizational context and the resources that are available to ensure safe practices (Crawford, 2020).

In Africa, manufacturing companies have poor compliance with health and safety standards, which has serious negative impacts. The human toll of poor health and safety practices is evident in Africa, where about 11.8% of all work-related deaths occur (Njoroge et al., 2025). For instance, Kenya's compliance rate is estimated at 76.5%, which is lower than the compliance rate of Uganda, estimated at 79.2% (Abanga et al., 2023). Noncompliance with these practices is associated with increased work injury and occupational disease rates, workplace deaths, and reduced worker welfare and productivity. The impacts are not limited to health, but also affect operational efficiency and legal liability, hindering overall economic and social growth (Khassim & Costapius, 2025). As part of Africa, Tanzania faces many of these compliance issues in the manufacturing industry.

The health and safety problems in Tanzania's manufacturing industry are a representation of the situation in African manufacturing industries. Even with the current regulations, the compliance rate in Tanzania industries like the food manufacturing industry is still below 80% (Khassim & Costapius, 2025).

Nevertheless, in the fiscal year 2023/2024, OSHA Tanzania conducted more than 23,700 general inspections and more than 330,000 specific inspections, resulting in significant improvements in health and safety practices such as fire preparedness, chemical handling, and the use of Personal Protective Equipment (PPE) (Mrema et al., 2015). However, injuries at work and work-related diseases in Tanzania remain at high levels. Interestingly, the accident rate is much higher in Tanzania's manufacturing companies than in larger companies (Bonaga et al., 2024). This has led to a need to identify the factors that may be affecting compliance rates in these enterprises.

Research Issue

Earlier research examined the determinants of compliance with health and safety rules in manufacturing Medium Enterprises. The results, however, are mixed. Some researchers suggest that financial capability is a key factor in the ability of firms to invest in safety measures and training (Sousa et al., 2021; Murugiah et al., 2025), while others believe that financial resources are not enough without the support of leadership and training structures (Mayson et al., 2014; Wilson et al., 2023). Likewise, leadership commitment has had mixed impacts. While Won et al. (2024) identified its positive effects, it is noted that leadership commitment does not necessarily translate to compliance without the appropriate support systems and resources (Timbang et al., 2023; Yamoah & Nsowah, 2024). There are also contradictions in organizational safety culture. While a positive safety culture can enhance compliance (Amirah et al., 2024), the internal resistance and challenges of each sector can reduce the effect of a positive safety culture (Kabiesz, 2024; Murugiah et al., 2025). While employee training is known to be a major compliance factor (Obong et al., 2021), it can be ineffective if not integrated into a broader safety management system or if it is not well executed (Bayram, 2019; Bogdanov et al., 2024). This resulted in an inconclusive debate because of conflicting results from the same subject.

The question that remained unanswered was how the internal factors like financial capability, leadership commitment, organizational safety culture and employee training affect compliance with health and safety regulations among Medium manufacturing Enterprises in Tanzania. These factors had been investigated in other countries, but the results were inconsistent and were not directly applicable to the specific economic, cultural and regulatory context in Tanzania. Hence, it was crucial to examine the internal factors that influence compliance with health and safety regulations in manufacturing MEs in Tanzania.

Theoretical Background

Three theoretical perspectives explain organizational compliance with health and safety regulations: Human Factors Theory, Safety Culture Theory and Systems Theory. Human Factors Theory emphasizes the relationship between human capabilities, workplace conditions and safe behaviour (Carayon et al., 2014). Safety Culture Theory explains how shared organizational values, attitudes and practices influence safety compliance (Zulkifly et al., 2018). Systems Theory considers organizations as interconnected components whose interactions influence organizational outcomes (Njoroge et al., 2025).

Although Human Factors Theory emphasizes individual behaviour and ergonomics, it gives comparatively limited attention to broader organizational interactions. Similarly, Safety Culture Theory primarily emphasizes shared safety values and practices (Carayon et al., 2014; Vosper et al., 2018). Systems Theory provides a broader perspective because it considers how leadership, financial resources, organizational culture and employee training operate together to influence compliance. Consequently, Systems Theory guided the present study.

Systems Theory

Systems Theory, developed by Ludwig von Bertalanffy, explains organizations as open systems comprising interdependent components that collectively influence organizational performance (Leighninger, 1978). The theory maintains that organizational outcomes depend on interactions among resources, leadership, employees and operational processes rather than isolated activities (Langford, 2021; Crawford, 2020). This perspective is particularly relevant to health and safety compliance, which requires coordination among several organizational functions (Small et al., 2022).

In manufacturing enterprises, financial capability facilitates investment in safety equipment, infrastructure and training (Mrema et al., 2015). Leadership commitment supports resource allocation, policy implementation and accountability, while organizational safety culture encourages employees to observe safety procedures. Employee training strengthens the knowledge and skills required to implement workplace safety measures (Amirah et al., 2024; Yamoah & Nsowah, 2024). These factors represent interconnected organizational components that may individually and collectively influence regulatory compliance.

Systems Theory was therefore considered appropriate for examining how financial capability, leadership commitment, organizational safety culture and employee training influence compliance with health and safety regulations among medium manufacturing enterprises in Tanzania. Its application also extended the examination of organizational safety systems to a developing-country context, where resources and regulatory enforcement conditions may differ from those investigated in earlier studies (Benson et al., 2024; Pandey, 2025).

Empirical Review

Financial capability and compliance with health and safety regulations

Financial capability is one of the important resources that help different parts of the organization to work together in the compliance system, according to Systems Theory. Firms need sufficient financial resources to invest in safety infrastructure, equipment, and training programmes, which are essential in complying with health and safety regulations (Crawford, 2020; Langford, 2021; Leighninger, 1978; Small et al., 2022). Empirical research indicates that companies with good financial resources make adequate safety investments, resulting in better compliance results. According to Sousa et al. (2021) and Murugiah et al. (2025), financial resources are essential for continued investments in safety equipment and training. Financial constraints can restrict the ability of SMEs to invest adequately in safety measures and sustain occupational health and safety practices (Kabiesz, 2024). Likewise, Okon et al. (2024) found that financial constraints can also impact the implementation of comprehensive safety systems, thereby influencing overall compliance. Furthermore, Molares Zambrano and Mendoza (2021) have found evidence in Germany that shows that the higher the financial investment, the higher the level of compliance for manufacturing companies, with approximately 86.1% of companies complying. Therefore, in this study, it was hypothesized that:

H1: *Financial capability has a positive effect on the compliance with health and safety regulations among Medium manufacturing Enterprises.*

Leadership commitment and the compliance with health and safety

For Systems Theory, leadership commitment serves as a key control mechanism that brings together resources, culture and processes to ensure compliance goals are met in an integrated system. Leadership has an impact on policy implementation, resource allocation and accountability, which in turn affects organizational behaviour in relation to health and safety standards (Bayram, 2019; Mrema et al., 2015; Molares Zambrano & Mendoza, 2021). Empirical studies provide evidence for the role of leadership commitment in compliance and safety. Won et al. (2024) highlight leadership's positive impacts on compliance outcomes, showing that committed leaders promote safer practices and a culture of compliance. Leadership, however, is not enough without other factors such as adequate funding and training, as some research has indicated (Timbang et al. 2023; Yamoah & Nsowah, 2024). Thus, leadership should be considered as part of a systemic interplay that increases compliance in manufacturing MEs. Thus, this research posited that:

H2: *Leadership commitment has a positive effect on the compliance with health and safety regulations among Medium manufacturing Enterprises.*

Organizational safety culture and the compliance with health and safety regulations

Systems Theory highlights the importance of organizational safety culture as a shared set of values, beliefs and norms that influence employee behaviours and attitudes towards compliance. This culture is a critical subsystem that is interdependent with leadership, finances and training. A good safety culture encourages proactive risk management and a shared responsibility for safety outcomes (Yamoah & Nsowah, 2024; Kabiesz, 2024). Amirah et al. (2024) demonstrate that companies with high safety cultures have more compliance and fewer accidents. Kabiesz (2024) emphasizes that a positive safety culture enhances communication and proactive safety management, which in turn lowers the chances of non-compliance with regulations. Murugiah et al. (2025) found that safety culture contributes to employee engagement in safety practices. Bayram (2019) also found a correlation between safety culture and the number of incidents in manufacturing SMEs. Finally, a French study by Zulkifly et al. (2018) shows that high safety cultures are associated with reduced fatality rates in the workplace, highlighting the importance of culture beyond compliance to improving safety. In light of this, it was suggested in the study that:

H3: *Organizational safety culture has a positive effect on the compliance with health and safety regulations among Medium manufacturing Enterprises.*

Employee training and the compliance with health and safety regulations

In the context of the Systems Theory, employee training is an important subsystem that provides employees with the knowledge and skills they need to work safely, alongside leadership, culture and financial factors, thereby creating a comprehensive compliance system. Together, these factors improve safety outcomes as a result of effective training, which helps to minimise human error and ensure compliance with regulations (Crawford, 2020; Langford, 2021; Leighninger, 1978; Small et al., 2022). The study by Obong et al. (2021) showed that compliance is significantly enhanced by regular and targeted training, which increases awareness and minimizes human error. Well-designed training programmes are essential for establishing safety norms, as Bayram (2019) points out. Bogdanov et al. (2024) reported that training in complete safety management systems results in improved compliance with regulations. Murugiah et al. (2025) found that employee training is directly related to the reduction of injuries in the workplace in SMEs. Lastly, Mrema et al. (2015) revealed that safety training is systemically linked to the use of personal protective equipment and better safety practices among manufacturing firms in Tanzania. Therefore, it was proposed that:

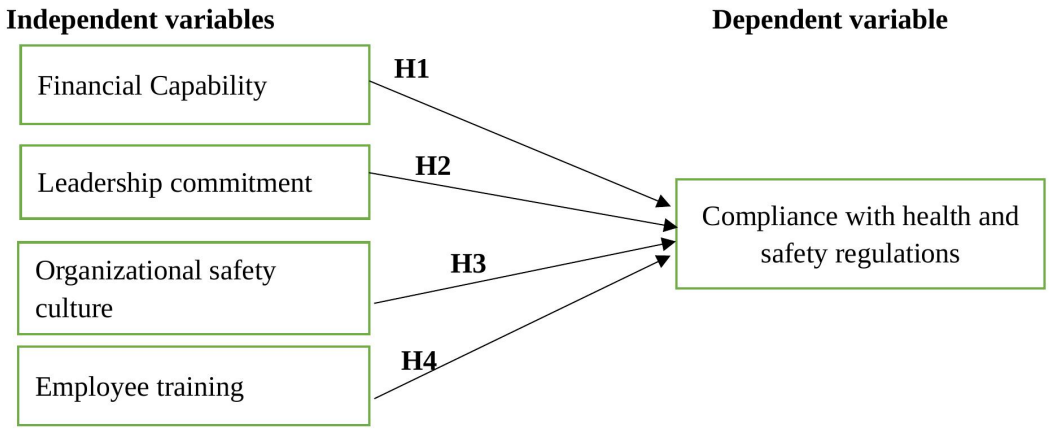
H4: *Employee training has a positive effect on the compliance with health and safety regulations among*

Medium manufacturing Enterprises.

Conceptual framework

Figure 1 presents the study's conceptual framework, which proposed that financial capability, leadership commitment, organizational safety culture and employee training influence compliance with health and safety regulations among Medium manufacturing enterprises. The four proposed relationships were represented by hypotheses H1 to H4.

Figure 1: Conceptual framework



Source: Developed from the literature

Methodology

Research Philosophy, Design and Approach

The study adopted a quantitative, deductive approach within the positivist paradigm. The aim was to identify relationships between internal organizational factors (financial capability, leadership commitment, organizational safety culture, employee training) and compliance with health and safety regulations. The study was conducted using an explanatory research design. This design assisted in testing the research hypotheses and determining whether the identified internal organizational factors were associated with and predicted compliance with health and safety regulations among medium manufacturing enterprises.

Study Area and Population

The study area was Temeke Municipality in the city of Dar es Salaam. This municipality is known as the main industrial area in the city (NBS, 2023). There are many medium-sized manufacturing businesses in the area, making it an ideal place to study workplace safety and regulatory compliance. The target population comprised medium sized manufacturing companies in Temeke Municipality. The Temeke Municipality Internal Database (2026) indicated that the number of medium manufacturing enterprises in the Municipality was around 240.

Sampling Design

This study sampled all the medium manufacturing businesses in Temeke Municipality of Dar es Salaam. Specifically, the focus was on the firm owners and senior managers responsible for workplace health and safety in these firms. A short pre-survey was carried out before the main data collection to estimate the number of potential and willing participants.

The study used the guidelines for structural equation modelling (SEM), which are generally accepted to be 100 to 200 cases based on the complexity of the model, number of variables, number of factors, and the magnitude of the factor loadings. The sampling method used in SEM is generally probability sampling (Movahedi et al., 2023). This study used the same sampling method, specifically simple random sampling. The sample size was determined using Yamane's formula: $n = N/(1 + N(e)^2)$ (Yamane, 1967). In this way, the calculated study sample was 150.

One hundred and fifty (150) copies of the questionnaires were sent directly to selected firms. A contact person was identified in each enterprise to assist in identifying suitable respondents, including owners and senior managers who are responsible for workplace health and safety. Of all copies of the questionnaire, 132 copies were returned (88.0% response rate). Of the 132 returned questionnaires, 120 passed the completeness screening and met the inclusion criteria and were therefore retained. This final sample size was considered adequate for partial least squares structural equation modelling (PLS-SEM) in Smart-PLS 4. Additionally, the size satisfied Hair et al. (2021) guideline of having a minimum sample size of over 10 times the number of structural paths leading to a construct in the model. The unit of analysis in this study was the individual firm owners and senior managers from Medium manufacturing Enterprises who play a key role in implementing and ensuring compliance with workplace health and safety regulations.

Measurement of Variables

The study measured financial capability, leadership commitment, organizational safety culture, employee training and compliance with health and safety regulations using structured questionnaire items.

Responses were recorded on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5), which provides a manageable range of response options (Kothari, 2004; Koo & Yang, 2025). Table 1 presents the measurement indicators and their respective sources.

Table 1: Measurement and Operationalization of Variables

Variables	Indicators	Sources
Financial Capability	1 Budget allocation 2 Availability of funds 3 Access to external financial resources 4 Timeliness of fund disbursement for safety activities	Halaj et al. (2018); Naji et al. (2021); Tappura et al. (2022)
Leadership Commitment	1 Top management's involvement 2 Recognition and rewards 3 Communication of safety policies 4 Communication of safety goals	Halaj et al. (2018); Naji et al. (2021); Tappura et al. (2022)
Organizational Safety Culture	1. Employees perceived importance of safety 2. Reporting culture 3. Consistency in applying safety rules 4. Employee participation in safety decision-making	Halaj et al. (2018); Naji et al. (2021); Tappura et al. (2022)
Employee Training	1. Frequency of health and safety training 2. Percentage of employees trained 3. Quality and relevance of training materials 4. Availability of refresher training programs	Halaj et al. (2018); Naji et al. (2021); Tappura et al. (2022)
Compliance with Health and Safety Regulations	1. Frequency of internal safety audits 2. Adherence to OHS standards 3. Documentation and recordkeeping of safety incidents 4. Timely implementation of corrective actions after inspections	Halaj et al. (2018); Naji et al. (2021); Tappura et al. (2022)

Ethical Considerations

Participation was voluntary, and informed consent was obtained after respondents received information about the study's purpose and their rights. Participants could withdraw without consequences. Confidentiality and anonymity were maintained, and collected information was used exclusively for academic research purposes.

Analysis and Results

The data presented in Table 2 give information about the demographic characteristics of the respondents, which is important for the reliability and contextual relevance of the data collected. The age distribution reveals that the majority of the respondents, 55 (45.8%), were aged 26-40 years, followed by 30 (25.0%) aged 18-25 years, 25 (20.8%) aged 41-55 years and 10 (8.4%) above 55 years, which shows a youthful workforce. In terms of gender, 80 (66.7%) were male and 40 (33.3%) were female, which is the usual gender ratio in the sector. Educationally, 55 (45.8%) had a Bachelor's degree, 50 (41.7%) a Diploma/Certificate, 12 (10.0%) a Master's degree and 3 (2.5%) a PhD, indicating a relatively low level of advanced education within the workforce.

The professional background of the respondents showed that 40 (33.3%) were owners of the firm and 80 (66.7%) were senior managers. Thus, the study was targeted at the key decision makers who are responsible for health and safety compliance. In terms of work experience, 15 (12.5%) had less than one year, 40 (33.3%) had 1–4 years, 35 (29.2%) had 5–8 years, and 30 (25.0%) had 9 years or more, indicating a significant level of exposure to organizational operations. As regards the on-the-job safety training, 85 (70.8%) of the respondents had received this training. Sixty-nine (57.5%) and 51 (42.5%) of respondents' organizations were certified to ISO 45001 and OSHA, respectively. Also, 36 (30.0%) indicated that they had a dedicated health and safety department, and 84 (70.0%) indicated they did not. Periodic workshops/seminars and certified safety programmes were the most common safety training types, with 20 (16.7%) and 10 (8.3%) respondents, respectively, reporting on them. The findings suggest that the respondents had appropriate experience, authority and practical exposure to give informed and reliable inputs for the study.

Table 2: Distribution of Demographic Characteristics of Respondents (n = 120)

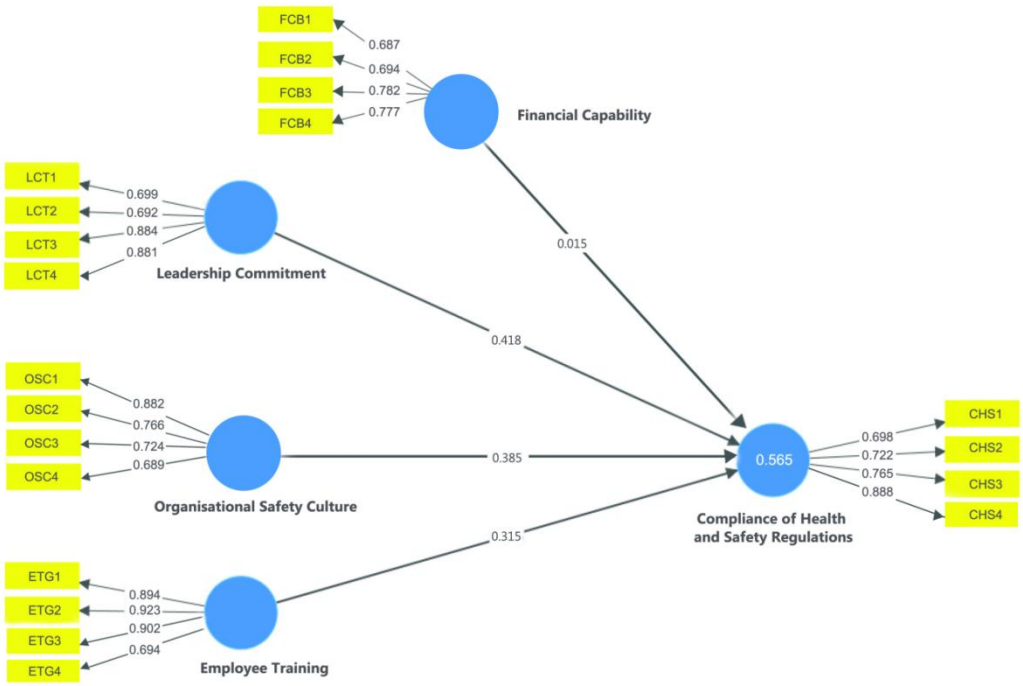
Variables	Categories	Frequency	Percent (%)
Age	18-25 years	30	25.0
	26-40 years	55	45.8
	41-55 years	25	20.8
	Above 55 years	10	8.4
Gender	Female	40	33.3
	Male	80	66.7
Education level	Diploma /Certificate	50	41.7
	Bachelor's Degree	55	45.8
	Master's Degree	12	10.0
	PHD	3	2.5
Years of experience	Less than 1	15	12.5
	1–4	40	33.3
	5–8	35	29.2
	9 and above	30	25.0
Position in the organization	Firm Owners	40	33.3
	Senior Manager	80	66.7
Dedicated Health and Safety Department	Yes	36	30.0
	No	84	70.0
Health and Safety certifications held by the organization	None	0	0.0
	ISO 45001	69	57.5
	OSHA	51	42.5
Type of employee safety training received	None	5	4.2
	On-the-job training only	85	70.8
	Periodic workshops/seminars	20	16.7
	Certified safety training programmes	10	8.3

Source: Field Data (2026)

Hypotheses Testing

Partial Least Squares Structural Equation Modelling (PLS-SEM) was performed using Smart PLS 4 to examine the proposed relationships (Hair et al., 2021). The analysis involved assessing the measurement model for reliability and validity, followed by evaluating the structural model for collinearity, explanatory power and hypothesis testing. The structural model (inner model) was used to examine the direct relationships between the latent variables, thereby answering the research questions by predicting relationships and the theoretical framework of the study (Hair et al., 2021). Furthermore, PLS-SEM was used to overcome the potential distribution issues like non-normality of data and small sample size, which guaranteed the validity of the results. In order to ensure the methodological rigor of the study, analyses were performed to assess the reliability, internal consistency, and validity of the constructs and indicators, such as collinearity assessment, path coefficient evaluation, predictive relevance (Q^2), and f^2 effect size assessment.

Figure 2: Measurement Model



Source: Output from Smart Pls 4

Validity and Reliability

The validity and reliability of the variables have to be evaluated so that all indicators are taken into consideration. In PLS-SEM, the researcher is able to ascertain the validity and reliability of variables through the evaluation of the measurement model (Hair et al., 2021). One of the objectives of evaluating the measurement model is to determine the quality of each indicator loaded in a construct. According to Rasoolimanesh (2022) and Hair et al. (2021), the loading of a minimum recommended indicator is 0.708, but the lenient one is 0.400. The values less than 0.708 are acceptable. Figure 2 shows a measurement model with the loadings of the indicators above 0.4. This designates that the indicators of the constructs were acceptable to be used in the data analysis.

Composite reliability (CR) was used to determine construct reliability. Table 3 shows that the CR values are above the minimum value of 0.700 of CR (Hair et al., 2021). These findings show that there is a good internal consistency of observed variables in the measurement of each construct.

Table 3: Composite Reliability and AVE

Construct	Composite reliability (CR)	Average Variance Extracted (AVE)
Compliance with Health and Safety Regulations (CHS)	0.858	0.510
Financial Capability (FCB)	0.831	0.505
Leadership Commitment (LCT)	0.874	0.549
Organizational Safety Culture (OSC)	0.898	0.511
Employee Training (ETG)	0.892	0.552

Source: Field Data (2026)

Convergent and discriminant validity were assessed to evaluate the validity of the study constructs. Convergent validity was examined using the Average Variance Extracted (AVE). As shown in Table 3, the AVE values for all constructs ranged from 0.510 to 0.552, exceeding the recommended minimum threshold of 0.500 (Smith & Smith, 2018). This indicates that the indicators effectively represented the underlying constructs.

Discriminant validity was evaluated using the heterotrait–monotrait ratio of correlations. During the revision of the analysis, the measurement model was re-estimated in SmartPLS 4 using the final screened dataset. This re-estimation produced an HTMT value of 0.835 between Organizational Safety Culture (OSC) and Employee Training (ETG), replacing the value of 0.875 reported in the earlier version of the

manuscript. The revised value therefore resulted from re-estimation of the measurement model and was not a manual adjustment made to satisfy the discriminant validity threshold. Following Henseler et al. (2015), an HTMT value below 0.85 provides evidence of discriminant validity under the more conservative criterion. As shown in Table 4, the HTMT values ranged from 0.435 to 0.835, with all values remaining below the 0.85 threshold. The results therefore confirmed that the constructs were empirically distinct from one another and that discriminant validity was established.

Table 4: Heterotrait-Monotrait Ratio

	CHS	FCB	LCT	OSC	ETG
CHS					
FCB	0.572				
LCT	0.514	0.435			
OSC	0.635	0.589	0.726		
ETG	0.489	0.643	0.745	0.835	

Source: Field Data (2026)

Common Method Variance

The consequences of common method bias can be damaging to a study's validity. As such, common method variance was checked. Variable Inflation Factor (VIFs) lower than or equal to 3.3 in the inner model (see Table 5) resulting from a full collinearity test can be considered free of common method bias (Vinkoczi et al., 2024). This means that common method bias has no impact on the study.

Structural Model

The structural model was assessed to estimate the nature and strength of the relationships between the variables in the study. This was preceded by ascertaining the prevalence of the multicollinearity problem. High multicollinearity can undermine the statistical significance of the independent variable(s). Multicollinearity is a problem when the indicators' Variance Inflation Factor (VIF) values are above 5.0 (Hair et al., 2021). As shown in Table 5, all VIF values in this study were well below the critical threshold, with Compliance with Health and Safety Regulations at 1.558, Financial Capability at 2.795, Leadership Commitment at 1.652, Organizational Safety Culture at 2.221, and Employee Training at 2.665. These results confirmed that multicollinearity was not an issue in the model. Thus, the relationships among the constructs could be interpreted with confidence.

Table 5: Variance Inflation Factor Values

Construct	Model VIF
Compliance with Health and Safety Regulations (CHS)	1.558
Financial Capability (FCB)	2.795
Leadership Commitment (LCT)	1.652
Organizational Safety Culture (OSC)	2.221
Employee Training (ETG)	2.665

Source: Field Data (2026)

Table 6 presents the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity, which were used to assess the suitability of the data for factor analysis. The KMO value was 0.922, exceeding the minimum acceptable value of 0.70. This indicated that the sample was adequate for factor analysis. Bartlett's Test of Sphericity was also statistically significant ($\chi^2 = 2854.316$, $df = 190$, $p < 0.001$), confirming that the correlation matrix was significantly different from an identity matrix and that sufficient correlations existed among the indicators to support factor analysis. Therefore, the KMO and Bartlett's Test results provided evidence of the appropriateness of the dataset for factor analysis. These statistics were not interpreted as tests of common method bias.

Table 6: Exploratory Factor Analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.922
Bartlett's Test of Sphericity	Approx. Chi-Square	2854.316
	df	190
	Sig.	0.000

Source: Field Data (2026)

The structural model was then evaluated to ascertain its ability to predict target constructs as another way to measure the goodness of fit (Hair et al., 2021). The ability of the model is measured in terms of the coefficients of determination (R^2) which determines the accuracy of the model to predict the dependent variable. As shown in Table 7, the model accounts for a significant amount of the variance in compliance with health and safety regulations (CHS) (R-square = 0.565). This means that approximately 56.5% of the variation in CHS can be accounted for by the predictor variables included in the model, such as financial capability, leadership commitment, organizational safety culture, and employee training. The adjusted R-square value of 0.545, adjusted for the number of predictors and sample size, indicates that the model is still strong and reliable after adjustment.

Table 7: Model Capability Assessment

	R-square	R-square adjusted
Compliance with Health and Safety Regulations (CHS)	0.565	0.545

Hypotheses Testing Results

The results of the hypothesis testing in Table 8 show that the path coefficient of Financial Capability (H1) on Compliance with Health and Safety Regulations (CHS) is very low (0.015), the effect size is very small (f^2 = 0.076), and the p-value is very high (0.578), which is greater than the conventional significance level of 0.05 (Hair et al., 2021). The other three factors, namely Leadership Commitment (H2), Organizational Safety Culture (H3), and Employee Training (H4) have positive significant relationships with CHS, with substantial path coefficients (0.418, 0.385, and 0.315, respectively), moderate effect sizes, and very low p-values (all below 0.05). Thus, these relationships are confirmed as critical drivers of compliance in the studied medium enterprises.

Table 8: Hypotheses Testing Result

Hypotheses paths	Path coefficients	F^2	P values	Hypothesis status
H1: Financial Capability -> CHS	0.015	0.076	0.578	Insignificant
H2: Leadership Commitment -> CHS	0.418	0.566	0.000	Significant
H3: Organizational Safety Culture -> CHS	0.385	0.349	0.001	Significant
H4: Employee Training -> CHS	0.315	0.236	0.002	Significant

Source: Field Data (2026)

Discussion of findings

The hypothesis testing results revealed that Leadership Commitment (H2), Organizational Safety Culture (H3), and Employee Training (H4) had a positive and significant influence on compliance with health and safety regulations (CHS). This means that these factors promote compliance with health and safety regulations in medium enterprises in Tanzania. Financial Capability (H1) had a positive but insignificant effect on CHS compliance. This indicates that resources may be available but not necessarily being used to implement safety measures without strategic direction, leadership commitment, or institutional support. The discussion starts with the positive and significant results.

Leadership commitment and compliance with health and safety regulations

The hypothesis testing results indicated that Leadership Commitment (H2) had a significant positive influence on CHS. This proves that the Systems Theory is correct in that leadership is an important control subsystem in the organization that guides organizational behaviour. Thus, the finding of the current study indicates that commitment to leadership positively affects the CHS in Tanzanian manufacturing medium enterprises. This finding is consistent with the findings of Won et al. (2024), who found that leadership commitment is a significant factor in the implementation of industrial safety policies in the electronics industry in South Korea. This similar outcome suggests that leadership behaviour can shape a safety-oriented culture that promotes compliance in industrial environments.

In the same way, Timbang et al. (2023) in India showed that leadership and managerial commitment improved process safety management, indicating that leadership dedication creates a tone for expectations of compliance and accountability structures, as in the current Tanzanian context. But other empirical observations yield different results. In Ghana, Yamoah and Nsowah (2024) found that leadership commitment is a significant factor but can be ineffective in achieving results without the support of appropriate systems and institutional resources. This brings in a cautionary note that commitment is not enough; it depends on the enabling environment.

Organizational safety culture and compliance with health and safety regulations

Moreover, the results of the hypothesis testing indicated that Organizational Safety Culture (H3) had a significant positive relationship with CHS. This further confirms the Systems Theory by highlighting the importance of culture as one of the subsystems that affect the processes and results of an organization. The present study's finding aligns with the study conducted by Amirah et al. (2024), which revealed that a robust safety culture in manufacturing in India encouraged safety behaviours and compliance with regulations. This means that in various industries, built-in safety values have a positive impact on compliance results. This indicates that if the organizations emphasize and embed safety norms, employees are more likely to conform to expected norms. In contrast, however, Kabiesz (2024) in Poland, and Murugiah et al. (2025) in Malaysia found that the impact of safety culture can be undermined by internal resistance, informal work practices, and low enforcement levels. These differences suggest that safety culture is an important element but that it is highly dependent on the characteristics of the sector, the maturity of the institutions and the presence of supportive systems which reinforce safety culture actions.

Employee training and compliance with health and safety regulations

The hypothesis testing results showed that Employee Training (H4) had a significant positive influence on CHS. This is in line with the Systems Theory that good knowledge and skill development in the human resources subsystem will improve safety compliance. This study's result of employee training having a significant effect on compliance with health and safety regulation (CHS) is consistent with the result of Obong et al. (2021), which showed that structured safety training of employees in manufacturing firms in Nigeria led to improved employee efficiency and compliance with health and safety regulations. This means that in both Tanzania and Nigeria, effective training creates knowledge, awareness and alignment of behaviour with expectations of safety. But, as in Indonesia by Bayram (2019) and India by Bogdanov et al. (2024), training can be ineffective without a wider safety management system, or if it is not engaging and relevant. The differences suggest that Tanzania's medium enterprises can benefit from training, but that a relatively coordinated institutional structure or specific training content could help them do so. However, the constraints found in Indonesia and India could be due to fragmented systems, employee resistance to the training or generic training methods.

Financial capability and compliance with health and safety regulations

The results of hypothesis testing showed that Financial Capability (H1) did not have a significant influence on CHS. This discovery contradicts the Systems Theory view that sufficient resources are necessary for the proper operation of organizational subsystems, such as compliance mechanisms. Several interrelated factors in the context of Tanzanian medium enterprises may be responsible for the insignificant finding. Funds might be available but not directed towards compliance because of other operational priorities like production, staffing or market expansion. Also, companies might not be aware of the need to invest in safety measures or might not consider compliance as a crucial part of their financial planning. In addition, 30% of the businesses surveyed indicated that they had a health and safety department. This could indicate that the institutional capacity of many medium manufacturing enterprises is inadequate to effectively convert available financial resources into health and safety programmes. This interpretation, however, should be regarded as a possible explanation that should be explored in future research.

This result is contrary to Sousa et al. (2021) and Murugiah et al. (2025), who highlighted that financial resources help companies invest in safety infrastructure and training. Thus, these scholars suggested that sufficient funding is directly linked to compliance. The difference implies that financial strength might help to facilitate compliance in global and Malaysian SMEs but not in medium enterprises in Tanzania unless it is accompanied by strategic direction or leadership commitment. This is in line with Mayson et al. (2014) in Australia and Wilson et al. (2023) in the UK, who state that financial resources are not enough without systems like leadership, awareness or regulatory pressure.

Conclusions, Recommendations and Implications

Conclusions

This study adds to the current debate on factors affecting compliance with health and safety regulations in the Tanzanian Medium manufacturing Enterprises context, which has been under-researched. Previous studies in different countries had yielded mixed results on the roles of financial capability, leadership commitment, organizational safety culture and employee training. The current study provides clarity by placing these internal factors in the context of Tanzania's specific economic, cultural and regulatory context.

Recommendations

Senior managers and owners of manufacturing MEs in Tanzania should focus on enhancing leadership commitment and building a strong organizational safety culture. This is because these are key factors that contribute to compliance with health and safety regulations. Investing in targeted employee training programmes is also crucial to enhance staff knowledge and adherence to safety standards. It is important, however, for senior managers and owners to understand that financial capability is not necessarily sufficient to ensure compliance unless it is purposefully applied, effectively led and institutionalized.

Implications

This study reveals that internal organizational factors such as leadership commitment, organizational safety culture, employee training, etc., are key factors that influence compliance with health and safety regulations in medium manufacturing companies in Tanzania. These variables have significant positive effects, suggesting that effective leadership, a positive safety culture, and structured training programmes all contribute to better compliance with regulatory requirements and to employees' safety behaviours. However, the positive but insignificant influence of financial capability suggests that resources are not enough to ensure compliance if they are not allocated, led and supported strategically. The findings suggest that compliance is a function of synergy, organizational priorities and supportive structures in firms.

Delimitations

The study was delimited to medium manufacturing enterprises operating in Dar es Salaam, Tanzania, to examine compliance with health and safety regulations within a defined industrial and geographical context. Enterprises in other regions and businesses outside the medium manufacturing category were excluded because they fell beyond the established scope of the investigation. The study also adopted a quantitative approach and collected data through structured questionnaires administered to one owner or senior manager from each participating enterprise. These respondents were selected because their managerial responsibilities provided relevant knowledge of organizational operations and regulatory compliance practices. Consequently, the investigation focused on managerial assessments rather than the perspectives of employees, regulatory officers or multiple informants within individual enterprises. Although these choices established clear boundaries for the study, reliance on one respondent and self-reported information could introduce response and social desirability biases and may not fully capture actual compliance practices. To reduce these risks, respondents were assured of confidentiality and anonymity, questionnaire items were written clearly and neutrally, and participants were encouraged to report actual organizational practices. The full collinearity VIF assessment did not indicate substantial common method bias, although it could not eliminate all possible reporting biases.

Areas for Further Research

The study accounted for 56.5% of the variance in compliance with health and safety regulations. So, further studies are needed to explore the other factors affecting compliance for medium manufacturing enterprises. Future research could apply mixed methods, using quantitative surveys and qualitative interviews or workplace observations to gain a deeper understanding of organizational and contextual factors that influence compliance. Further research is needed to gather information from several respondents in each enterprise, including owners, managers, supervisors and employees, or to triangulate survey results with objective compliance records and inspection reports to get a more holistic picture of enterprise compliance practices.

Furthermore, further research should be extended to other medium enterprises in other regions of Tanzania, particularly in rural areas, to assess whether there are regional variations in the factors that affect compliance. Lastly, financial capability was found to have little impact on compliance with health and safety regulations. This suggests that future research should explore the circumstances under which financial capability is associated with compliance, and the potential moderating or mediating effects of organizational characteristics, management practices and regulatory enforcement.

References

Abanga, C., Moturi, W., & Makindi, S. (2023). Determinants of compliance with occupational and safety regulations in the vehicle body manufacturing industry in Kenya. *Open Access Library Journal, 10*, 1–13. https://doi.org/10.4236/oalib.1109912

Amirah, N. A., Nik Him, N. F., Rashid, A., Rasheed, R., Zaliha, T. N., & Afthanorhan, A. (2024). Fostering a safety culture in manufacturing through safety behavior: A structural equation modelling approach. *Journal of Safety and Sustainability, 1*(2), 108–116. https://doi.org/10.1016/j.jsasus.2024.03.001

Bayram, M. (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. *Alphanumeric Journal, 7*(2), 301–318. https://doi.org/10.17093/alphanumeric.555154

Benson, C., Obasi, I. C., Akinwande, D. V., & Ile, C. (2024). The impact of interventions on health, safety and environment in the process industry. *Heliyon, 10*(1), 1-18. https://doi.org/10.1016/j.heliyon.2023.e23604

Bogdanov, M., Kuručev, D. V., Poštin, J., & Nikolić, S. S. M. (2024). The impact of training and education on sustainable water resource management. *International Water and Irrigation, 43*(1), 31–33.

Bonaga, S. S., Rovira, M., & Lwaho, S. (2024). P-071 Enhancing occupational health and safety training in Tanzania: Trends, challenges, and opportunities for a safer workforce. *Occupational Medicine, 74*(Supplement_1), 1-5. https://doi.org/10.1093/occmed/kqae023.0540

Carayon, P., Wetterneck, T. B., Rivera-Rodriguez, A. J., Hundt, A. S., Hoonakker, P., Holden, R., & Gurses, A. P. (2014). Human factors systems approach to healthcare quality and patient safety. *Applied Ergonomics, 45*(1), 14–25. https://doi.org/10.1016/j.apergo.2013.04.023

Crawford, M. (2020). Ecological systems theory: Exploring the development of the theoretical framework as conceived by Bronfenbrenner. *Journal of Public Health Issues and Practices, 4*(2), 170. https://doi.org/10.33790/jphip1100170

Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer. https://doi.org/10.1007/978-3-030-80519-7

Halaj, M., Kutaj, M., & Boroš, M. (2018). The organization's safety culture, its indicators and its measurement capabilities. *CBU International Conference Proceedings, 6*, 595–600. https://doi.org/10.12955/cbup.v6.1219

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Kabiesz, P. (2024). Safety culture in SMEs of the food industry: A case study and best practices. *Sustainability, 16*(24), 11185. https://doi.org/10.3390/su162411185

Khassim, S. S., & Costapius, E. (2025). Assessment of adherence to and compliance with occupational health and safety standards in public organizations in Tanzania: A case of regional administration and local government. *African Journal of Empirical Research, 6*(2), 445–455. https://doi.org/10.51867/ajernet.6.2.37

Köhler, C., & Hartig, J. (2020). Reliability and validity. In A. Kobayashi (Ed.), *International encyclopedia of human geography* (2nd ed., Vol. 11, pp. 393–396). Elsevier. https://doi.org/10.1016/B978-0-08-102295-5.10421-4

Koo, M., & Yang, S.-W. (2025). Likert-type scale. *Encyclopedia, 5*(1), 18. https://doi.org/10.3390/encyclopedia5010018

Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd rev. ed.). New Age International.

Langford, M. (2021). The three worlds of systems theory. *Elements of Physical Biology, 1*(7), 1–21.

Leighninger, R. D., Jr. (1978). Systems theory. *The Journal of Sociology & Social Welfare, 5*(4), 446–466. https://doi.org/10.15453/0191-5096.1294

Mayson, S., Barrett, R., & Bahn, S. (2014, December 3–5). Competitive advantage through safety compliance: Smaller firm responses to changes in the Australian occupational health and safety regulatory context. *28th Australian and New Zealand Academy of Management Conference: Reshaping Management for Impact*, University of Technology Sydney, Sydney, Australia.

Morales Zambrano, C. M., & Mendoza, D. J. (2021). Analysis of the implementation of occupational safety and health standards at manufacturing companies in the city of Valledupar. *Revista Brasileira de Medicina do Trabalho, 19*(3), 290–298. https://doi.org/10.47626/1679-4435-2021-601

Movahedi, M., Nehrir, B., Moayed, M. S., & Sirati Nir, M. (2023). Structural equation modeling of treatment adherence based on general health and demographic characteristics in patients undergoing hemodialysis. *Nephro-Urology Monthly, 15*(4), 1-8. https://doi.org/10.5812/numonthly-140108

Mrema, E. J., Ngowi, A. V., & Mamuya, S. H. D. (2015). Status of occupational health and safety and related challenges in expanding economy of Tanzania. *Annals of Global Health, 81*(4), 538–547. https://doi.org/10.1016/j.aogh.2015.08.021

Murugiah, P., Kuppusamy, M., & Rao, A. (2025). Determinants of occupational health and safety compliance by Malaysian SMEs. *International Journal of Advanced Business Studies, 3*(3), 94–118. https://doi.org/10.59857/IJABS3019

Naji, G. M. A., Isha, A. S. N., Mohyaldinn, M. E., Leka, S., Saleem, M. S., Rahman, S. M. N. B. S. A., & Alzoraiki, M. (2021). Impact of safety culture on safety performance; mediating role of psychosocial hazard: An integrated modelling approach. *International Journal of Environmental Research and Public Health, 18*(16), 8568. https://doi.org/10.3390/ijerph18168568

NBS. (2023). *Statistical business register report*. Ministry of Finance and Planning.

Njoroge, T. W., Odongo, A. O., & Muchiri, J. M. (2025). Determinants of compliance to occupational safety and health standards in food manufacturing industries, Thika Sub-County, Kiambu County,

Kenya. *International Journal of Community Medicine and Public Health, 12*(4), 1617–1624. https://doi.org/10.18203/2394-6040.ijcmph20250905

Obong, M. M., Amadi, C., Ekpenyong, O. E., Harry, E. W., & Edodi, H. U. (2021). Influence of health and safety training, safety monitoring and enforcement of compliance on employee efficiency in manufacturing firms. *Research in World Economy, 12*(2), 86–96. https://doi.org/10.5430/rwe.v12n2p86

Okon, R., Zouo, S. J. C., & Sobowale, A. (2024). Operational oversight in high-stakes turnarounds: Key insights for C-suite leaders. *World Journal of Advanced Research and Reviews, 24*(2), 2391–2408. https://doi.org/10.30574/wjarr.2024.24.2.3591

Pandey, B. R. (2025). Rethinking occupational health and safety principles—A systems perspective. *Journal of the Royal Society of New Zealand, 55*(6), 1362–1383. https://doi.org/10.1080/03036758.2024.2333555

Rasoolimanesh, S. M. (2022). Discriminant validity assessment in PLS-SEM: A comprehensive composite-based approach. *Data Analysis Perspectives Journal, 3*(2), 1–8.

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.

Small, A., Owen, A., & Paavola, J. (2022). Organizational use of ecosystem service approaches: A critique from a systems theory perspective. *Business Strategy and the Environment, 31*(1), 284–296. https://doi.org/10.1002/bse.2887

Smith, T., & Smith, S. (2018). Reliability and validity of the Research Methods Skills Assessment. *International Journal of Teaching and Learning in Higher Education, 30*(1), 80–90.

Sousa, S. R. de O., Melchior, C., Da Silva, W. V., Zanini, R. R., Su, Z., & da Veiga, C. P. (2021). Show you the money—Firms investing in worker safety have better financial performance: Insights from a mapping review. *International Journal of Workplace Health Management, 14*(3), 310–331. https://doi.org/10.1108/IJWHM-11-2020-0200

Tappura, S., Jääskeläinen, A., & Pirhonen, J. (2022). Creation of satisfactory safety culture by developing its key dimensions. *Safety Science, 154*, 1-14. https://doi.org/10.1016/j.ssci.2022.105849

Temeke Municipality Internal Database. (2026). *Temeke Municipal Council: Council strategic plan 2021/22 to 2024/25* (pp. 1–158).

Timbang, A., Prasad, D. M. R., & Azri, M. H. (2023). The perspective of leadership and management commitment in process safety management. *Indian Chemical Engineer, 65*(4), 381–394. https://doi.org/10.1080/00194506.2023.2165459

Vinkóczi, T., Heimné Rácz, É., & Koltai, J. P. (2024). Exploratory analysis of zero waste theory to examine consumer perceptions of sustainability: A covariance-based structural equation modeling (CB-SEM). *Cleaner Waste Systems, 8*, 1-11. https://doi.org/10.1016/j.clwas.2024.100146

Vosper, H., Lim, R., Knight, C., Bowie, P., Edwards, B., & Hignett, S. (2018). Considering human factors and developing systems-thinking behaviours to ensure patient safety. *Clinical Pharmacist, 10*(2). 1-6. https://doi.org/10.1211/CP.2018.20204352

Wilson, C., Williams, I. D., & Kemp, S. (2023). Compliance with producer responsibility legislation: Experiences from UK small and medium-sized enterprises. *Business Strategy and the Environment, 20*(5), 310–330. https://doi.org/10.1002/bse.698

Won, S., Choi, J., & Kim, K. (2024). Development of sustainable industrial safety and health policy for electronic industry in Korea: A study on the relationship between safety leadership of managers, safety climate, and safety behavior. *Sustainability, 16*(23), 10308. https://doi.org/10.3390/su162310308

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.

Yamoah, E. E., & Nsowah, I. (2024). Safety, commitment, and performance: A study of manufacturing firms. *Prosperitas, 11*(3), 1–15. https://doi.org/10.31570/prosp_2024_0116

Zulkifly, S. S., Zain, I. M., Hasan, N. H., & Baharudin, M. R. (2018). Workplace safety improvement in SME manufacturing: A government intervention. *MATTER: International Journal of Science and Technology, 4*(2), 27–39. https://doi.org/10.20319/mijst.2018.42.2739