

ESG-ALIGNED RISK MANAGEMENT FRAMEWORKS FOR OCCUPATIONAL HEALTH & SAFETY (OHS) IN NCR COMMERCIAL/RETAIL BUILDINGS: POLICY, ENGAGEMENT & RESILIENCE

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ABSTRACT:

Occupational Health and Safety (OHS) risk management in commercial and retail buildings is becoming increasingly complex due to multi-stakeholder operations, high occupancy, outsourced services, regulatory requirements, and the need for organizational resilience. This study examines an Environmental, Social and Governance (ESG)-aligned approach to OHS risk management in commercial and retail buildings across the National Capital Region (NCR), India. The study aims to assess ESG–OHS integration, OHS risk management practices, stakeholder engagement, policy and governance alignment, and their relationships with resilience and perceived ESG–OHS outcomes. An empirical, quantitative, cross-sectional, survey-based design was adopted. Primary data were collected through a structured five-point Likert-scale questionnaire from professionals associated with commercial, retail, mixed-use, facility management, safety, engineering, ESG/compliance, and related functions in NCR buildings. Of 50 responses received, 47 valid responses were retained after screening. Descriptive statistics, reliability analysis, correlation and regression analyses were employed, supplemented by thematic analysis of open-ended responses. The findings indicate generally favourable levels of ESG–OHS integration, OHS risk management, stakeholder engagement, resilience preparedness, and perceived ESG–OHS outcomes. ESG–OHS integration and stakeholder engagement significantly influenced OHS risk management practices, while OHS risk management practices demonstrated significant contributions to resilience and perceived ESG–OHS outcomes. Policy and governance alignment, however, did not show a statistically significant independent effect on OHS practices, indicating a gap between formal governance mechanisms and their operational implementation. Qualitative findings further highlighted the importance of policy enforcement, audits, training, resource availability, stakeholder coordination, and emergency preparedness. Based on these findings, an integrated ESG-aligned OHS risk management framework is proposed for NCR commercial and retail buildings, emphasizing the alignment of ESG principles, stakeholder participation, governance, operational safety practices, resilience, and continuous improvement.

KEYWORDS: Occupational Health and Safety; ESG; OHS Risk Management; Commercial Buildings; Retail Buildings; Stakeholder Engagement; Governance; Organizational Resilience; NCR; Safety Management

INTRODUCTION

Occupational Health and Safety (OHS) risk management has become a critical managerial concern in commercial and retail buildings, particularly in high-density urban regions where built environments function through multi-stakeholder interaction. Shopping malls, commercial complexes, mixed-use developments and corporate retail spaces involve employees, tenants, contractors, customers, vendors, facility management teams, maintenance workers, security personnel and regulatory agencies operating within shared infrastructure. In such settings, risks related to fire safety, electrical systems, crowd movement, housekeeping, maintenance work, contractor operations, emergency evacuation and infrastructure failure require systematic identification, assessment, control and monitoring. Therefore, OHS in commercial and retail buildings cannot be limited to routine compliance; it requires an integrated and preventive risk management approach.

The National Capital Region (NCR), India, provides a relevant context for examining this issue because of its dense concentration of commercial buildings, shopping malls, office complexes, retail spaces and facility-managed properties. These buildings operate under conditions of high public footfall, multi-tenant occupancy, outsourced services and continuous technical maintenance. International OHS frameworks such as ISO 45001 emphasize leadership commitment, worker participation, risk-based thinking, hazard identification, preventive controls and continual improvement as core elements of safety management systems (International Organization for Standardization [ISO], 2018). Similarly, the International Labour Organization highlights the need for prevention-oriented workplace safety systems rather than reactive compliance practices (International Labour Organization [ILO], 2019).

In recent years, Environmental, Social and Governance (ESG) principles have expanded the understanding of

organizational risk, responsibility and sustainability. OHS is closely linked with the social and governance dimensions of ESG because workplace safety, employee well-being, contractor protection, compliance, emergency preparedness and transparent reporting reflect responsible organizational conduct. Prior research suggests that sustainability-oriented organizations tend to develop stronger internal processes, accountability mechanisms and long-term performance capabilities (Eccles, Ioannou, & Serafeim, 2014). In this context, ESG-aligned OHS risk management can help organizations treat workplace safety not only as a statutory obligation but also as a strategic sustainability and governance priority.

Stakeholder engagement and governance are equally important in commercial and retail buildings because safety outcomes depend on coordinated action among several actors. Stakeholder theory suggests that organizational outcomes are shaped by the participation and responsibilities of multiple stakeholders rather than management action alone (Freeman, 1984). Similarly, risk governance requires clear policies, responsibility allocation, monitoring, audit systems and corrective actions (Hopkin, 2018). When these mechanisms are weak, OHS practices may remain fragmented and procedural. Organizational resilience further strengthens this framework because resilient organizations are better able to anticipate risks, prepare for disruptions, respond effectively and recover while maintaining continuity (Duchek, 2020).

In this background, the present study examines ESG-aligned OHS risk management frameworks for NCR commercial and retail buildings, with particular focus on policy alignment, stakeholder engagement and resilience. The study is empirical in nature and uses primary survey data collected from professionals associated with commercial and retail building operations, facility management, safety, engineering, administration and related managerial functions.

1.1 Research Gap

Existing literature on OHS risk management, ESG integration, stakeholder engagement, governance and organizational resilience provides useful insights, but these areas are often examined separately. OHS studies generally focus on hazard identification, compliance, training and accident prevention, while ESG studies emphasize sustainability, transparency and governance performance. Similarly, resilience research focuses on preparedness and recovery, whereas stakeholder engagement literature emphasizes participation and communication. Limited empirical attention has been given to integrating these dimensions into a single ESG-aligned OHS risk management framework.

Another important gap relates to the research context. Much of the available OHS literature focuses on industrial, construction, manufacturing, healthcare and other high-risk sectors, while commercial and retail buildings remain comparatively underexplored. This is significant because commercial and retail buildings have distinctive safety challenges arising from public footfall, multi-tenant occupancy, outsourced services, shared infrastructure and fragmented responsibilities. Therefore, this study addresses the gap by empirically examining ESG-aligned OHS risk management in NCR commercial and retail buildings and by proposing a framework integrating ESG principles, OHS practices, policy governance, stakeholder engagement and resilience.

1.2 Research Objectives

The primary objective of this study is to develop and empirically examine an ESG-aligned OHS risk management framework for commercial and retail buildings in NCR, India, with specific focus on policy alignment, stakeholder engagement and organizational resilience.

The specific objectives are:

- To examine the extent of ESG–OHS integration in NCR commercial and retail buildings.
- To assess the status of OHS risk management practices in commercial and retail building operations.
- To analyse the role of stakeholder engagement in strengthening OHS implementation.
- To evaluate the contribution of policy and governance alignment to OHS risk management.
- To examine the relationship between OHS risk management practices, resilience and perceived ESG–OHS outcomes.
- To propose an integrated ESG-aligned OHS risk management framework suitable for NCR commercial and retail buildings.

2. Conceptual Framework and Hypotheses

2.1 Theoretical Foundation

The conceptual foundation of this study is based on the integration of ESG principles, OHS risk management, stakeholder theory, governance-based risk control and organizational resilience. OHS risk management involves systematic hazard identification, risk assessment, preventive control, monitoring and improvement. In commercial and retail buildings, this process becomes complex because safety outcomes depend on coordinated action among employees, tenants, contractors, service providers, facility teams and regulatory authorities.

The ESG perspective positions OHS within the broader social and governance responsibilities of organizations. When workplace safety is treated as part of ESG responsibility, organizations are more likely to strengthen safety policies, reporting systems, training practices, audits and preventive controls. Stakeholder theory supports this approach by emphasizing that effective safety performance depends on the participation of multiple actors (Freeman, 1984). Governance further provides the structure for responsibility allocation, policy implementation, monitoring and accountability (Hopkin, 2018). Organizational resilience represents the outcome dimension because effective OHS systems improve preparedness, emergency response, adaptability and continuity (Duchek, 2020).

2.2 Conceptual Framework of the Study

The study proposes that ESG–OHS integration, stakeholder engagement and policy/governance alignment act as key enabling factors influencing OHS risk management practices. These OHS practices further contribute to resilience, emergency preparedness and perceived ESG–OHS outcomes. The framework follows the logic that strategic ESG alignment, participatory engagement and governance support strengthen operational safety practices, while strong OHS practices improve preparedness and safety-related outcomes.

The conceptual flow of the study is as follows:

ESG–OHS Integration, Stakeholder Engagement and Policy/Governance Alignment → OHS Risk Management Practices → Resilience and Emergency Preparedness → Perceived ESG–OHS Outcomes

2.3 Variable Classification

Table 1 presents the classification of variables used in the study according to the questionnaire structure and their role in the proposed framework.

Table 1. Variable Classification According to Questionnaire Structure

Questionnaire Section	Construct	Role in the Framework
Section A	ESG–OHS Integration	Strategic driver
Section B	OHS Risk Management Practices	Core operational variable
Section C	Stakeholder Engagement	Participatory driver
Section D	Policy and Governance Alignment	Governance driver
Section E	Resilience and Emergency Preparedness	Resilience outcome
Section F	Perceived ESG–OHS Outcomes	Final perceived outcome

Table 1 shows that ESG–OHS integration, stakeholder engagement and policy/governance alignment are treated as explanatory variables, while OHS risk management practices represent the operational mechanism. Resilience and perceived ESG–OHS outcomes represent the outcome dimensions of the framework.

2.4 Hypotheses

Based on the conceptual framework, the following null and alternative hypotheses are formulated:

Hypothesis 1: ESG–OHS Integration and OHS Risk Management Practices

H01: ESG–OHS integration has no significant influence on OHS risk management practices in NCR commercial and retail buildings.

Ha1: ESG–OHS integration has a significant positive influence on OHS risk management practices in NCR commercial and retail buildings.

Hypothesis 2: Stakeholder Engagement and OHS Risk Management Practices

H02: Stakeholder engagement has no significant influence on OHS risk management practices in NCR commercial and retail buildings.

Ha2: Stakeholder engagement has a significant positive influence on OHS risk management practices in NCR commercial and retail buildings.

Hypothesis 3: Policy and Governance Alignment and OHS Risk Management Practices

H03: Policy and governance alignment has no significant influence on OHS risk management practices in NCR commercial and retail buildings.

Ha3: Policy and governance alignment has a significant positive influence on OHS risk management practices in NCR commercial and retail buildings.

Hypothesis 4: OHS Risk Management Practices and Resilience/ESG–OHS Outcomes

H04: OHS risk management practices have no significant influence on resilience and perceived ESG–OHS outcomes in NCR commercial and retail buildings.

Ha4: OHS risk management practices have a significant positive influence on resilience and perceived ESG–OHS outcomes in NCR commercial and retail buildings.

3. RESEARCH METHODOLOGY

3.1 Research Design and Study Area

The study adopts an empirical, quantitative, cross-sectional and survey-based research design. This design is suitable because the study examines respondents' perceptions regarding ESG–OHS integration, OHS risk management practices, stakeholder engagement, policy/governance alignment, resilience and perceived ESG–OHS outcomes. The study is cross-sectional because data were collected at one point in time from professionals associated with commercial, retail, mixed-use and facility-managed buildings.

The study area is the National Capital Region (NCR), India. NCR was selected because it includes major commercial and retail hubs with dense building operations, high footfall, multi-tenant occupancy, outsourced services and complex safety requirements. The valid responses mainly represent Delhi/New Delhi, Gurugram/Gurgaon, Noida/Greater Noida, Ghaziabad, Faridabad and other NCR-linked commercial locations.

3.2 Population, Sampling and Sample Size

The target population consisted of professionals involved in commercial and retail building operations, facility management, safety, engineering, administration, property management, ESG/compliance and related managerial functions. These respondents were considered suitable because the study required informed responses from individuals familiar with building operations, OHS implementation, stakeholder coordination and policy practices.

The study used non-probability purposive sampling supported by convenience-based access. Purposive sampling was appropriate because respondents were selected based on their relevance to OHS, ESG, facility operations or commercial/retail building management (Etikan, Musa, & Alkassim, 2016). A total of 50 responses were received. After screening, one response was excluded due to non-confirmation of participation and two responses were excluded due to non-eligibility for the NCR commercial/retail/mixed-use building context. Therefore, 47 valid responses were retained for final analysis.

3.3 Research Instrument and Measurement

Primary data were collected through a structured questionnaire. The instrument included screening questions, demographic/professional details, construct-based scale items and open-ended questions. The questionnaire measured six constructs: ESG–OHS Integration, OHS Risk Management Practices, Stakeholder Engagement, Policy and Governance Alignment, Resilience and Emergency Preparedness, and Perceived ESG–OHS Outcomes. Most construct-based items were measured using a five-point Likert-type agreement scale. Responses were coded from 1 to 5, where higher values indicated more favourable perceptions. Negatively worded items were reverse-coded before analysis so that higher scores consistently represented stronger ESG–OHS alignment, better OHS practices, stronger engagement, better governance, higher resilience and more positive perceived outcomes. Duplicate item labels identified in the response sheet were reviewed and handled before construct-wise scoring to avoid double counting.

3.4 Data Preparation and Analysis Techniques

The dataset was cleaned before analysis. The process included consent and eligibility screening, standardization of demographic entries, verification of NCR relevance, treatment of duplicate item labels, reverse coding of negatively worded items and calculation of construct-wise composite scores. Composite scores were calculated by averaging the coded items under each construct.

The final dataset of 47 valid responses was analysed using frequency and percentage analysis, descriptive statistics, reliability analysis using Cronbach’s alpha, composite score analysis, Pearson correlation analysis, regression analysis and thematic interpretation of open-ended responses. The sample size was suitable for descriptive analysis, reliability assessment, correlation and limited regression-based hypothesis testing. Advanced techniques such as EFA, CFA and SEM were not used because the valid sample size was not sufficient for robust application of these methods.

3.5 Ethical Considerations and Methodological Scope

Participation in the survey was voluntary, and the questionnaire included a participation confirmation and eligibility question. Optional personal identifiers such as name, organization and contact details were not used as analytical variables. The analysis was conducted at an aggregate level, and no individual respondent or organization was identified.

The study has certain methodological limitations. It is based on a small but specialized valid sample of 47 respondents, uses non-probability purposive sampling, and relies on self-reported perception-based data. Therefore, the findings should be interpreted as context-specific empirical insights rather than statistically generalizable conclusions for all commercial and retail buildings in NCR.

4. Data Analysis and Results

4.1 Response Screening and Sample Profile

Before conducting the final analysis, the collected responses were screened on the basis of participation confirmation and eligibility criteria. Table 2 presents the response screening status and the final valid sample used for analysis.

Table 2. Response Screening and Final Valid Sample

Response Screening Criterion	Number of Responses
Total responses received	50
Response excluded due to non-confirmation of participation statement	1
Responses excluded due to non-eligibility for NCR commercial/retail/mixed-use building context	2
Final valid responses retained for analysis	47

Table 2 shows that 50 responses were initially received, out of which 47 were retained for final analysis after applying screening criteria. The exclusion of invalid responses was necessary to ensure that the final sample represented only those respondents who confirmed participation and were associated with operations, management, health and safety, facility, engineering, ESG/compliance, or related functions in NCR commercial, retail, or mixed-use buildings.

The professional and operational background of the valid respondents was then examined to assess the relevance of the sample. Table 3 presents the respondent and building profile.

Table 3. Respondent and Building Profile

Profile Variable	Category	Frequency	Percentage
Organization Type	Commercial	21	44.7%
	Facility Management / Service Provider	8	17.0%
	Retail	8	17.0%

Location	Mixed-use	7	14.9%
	Other service/contractor/consultancy	3	6.4%
	Gurugram/Gurgaon region	25	53.2%
	Delhi/New Delhi	15	31.9%
	Noida/Greater Noida	2	4.3%
	NCR/mixed location	2	4.3%
	Ghaziabad	1	2.1%
	Faridabad	1	2.1%
Years of Experience	NCR-adjacent/other NCR-linked	1	2.1%
	<2 years	2	4.3%
	2–5 years	4	8.5%
	6–10 years	18	38.3%
	>10 years	23	48.9%
Number of Employees/Occupants	<50	2	4.3%
	50–200	16	34.0%
	201–500	10	21.3%
	>500	19	40.4%

Table 3 indicates that the sample is contextually appropriate for the study. Most respondents were associated with commercial, retail, mixed-use, and facility management/service provider organizations, which directly aligns with the scope of the paper. Location-wise, Gurugram/Gurgaon and Delhi/New Delhi form the largest share of the sample, reflecting major NCR commercial hubs. The experience profile also strengthens the relevance of the data, as 87.2% of respondents had more than six years of professional experience. The occupant profile further shows that a large share of responses came from buildings with substantial occupancy, making the sample suitable for examining OHS risk management, stakeholder coordination, and emergency preparedness.

4.2 Descriptive Statistics and Reliability of Constructs

Descriptive statistics were calculated to assess respondents' perceptions of the major constructs. Reliability analysis was also conducted using Cronbach's alpha to examine the internal consistency of each construct. Table 4 presents the mean, standard deviation, and Cronbach's alpha values for the six constructs.

Table 4. Descriptive Statistics and Reliability of Major Constructs

Construct	Items Used	Mean	Standard Deviation	Cronbach's Alpha	Interpretation
ESG–OHS Integration	20	4.17	0.62	0.932	High and reliable
OHS Risk Management Practices	22	4.21	0.69	0.957	High and reliable
Stakeholder Engagement	20	4.01	0.72	0.949	High and reliable
Policy and Governance Alignment	20	3.91	0.89	0.965	Moderately high and reliable
Resilience and Emergency Preparedness	20	4.12	0.68	0.946	High and reliable
Perceived ESG–OHS Outcomes	20	4.08	0.73	0.955	High and reliable

Table 4 shows that all constructs have mean scores above the neutral midpoint of 3.00, indicating generally favourable perceptions of ESG-aligned OHS practices among the respondents. OHS Risk Management Practices recorded the highest mean score, followed by ESG–OHS Integration and Resilience and Emergency Preparedness. Policy and Governance Alignment recorded the lowest mean among the constructs, although it remained above the neutral level. This suggests that governance mechanisms are present but may require stronger operational implementation and monitoring. The Cronbach's alpha values for all constructs are above 0.70, indicating strong internal consistency. However, because the values are very high, the results should be interpreted as reliable construct-level perception scores rather than as evidence of advanced scale validation.

Figure 1 presents the construct-wise mean scores of ESG-aligned OHS risk management dimensions. The graph visually compares the relative strength of ESG–OHS integration, OHS risk management practices, stakeholder engagement, policy and governance alignment, resilience preparedness, and perceived ESG–OHS outcomes.

Figure 1 Construct-wise Mean Scores of ESG-Aligned OHS Risk Management Dimensions

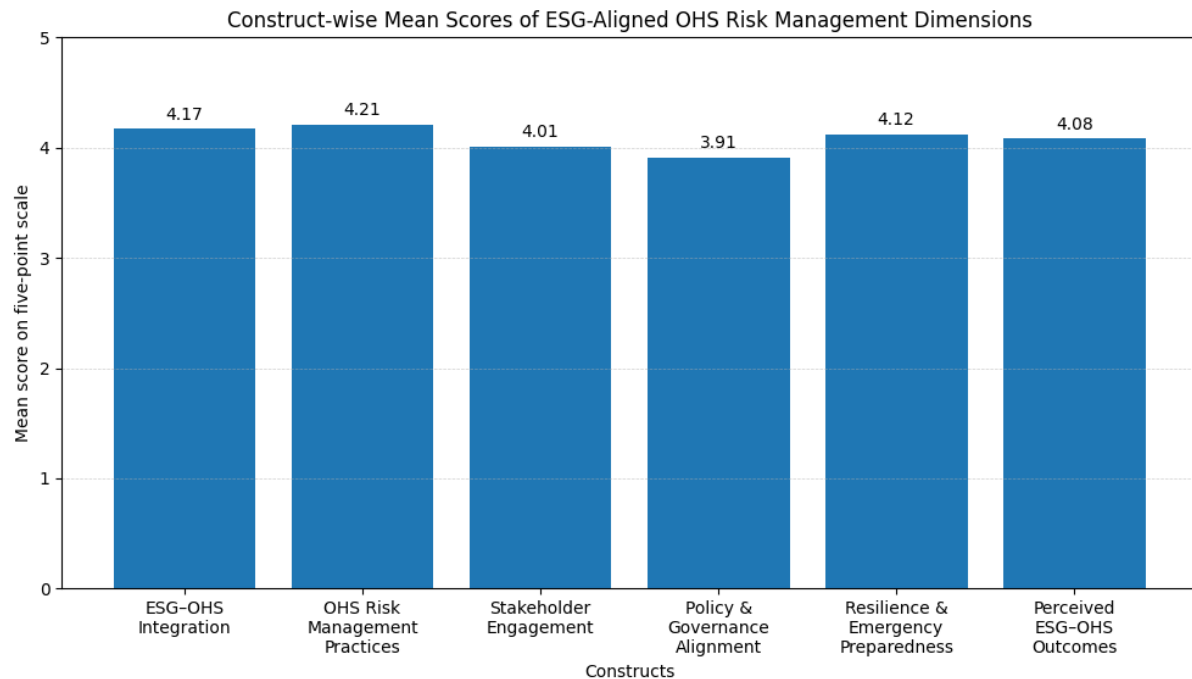


Figure 1 shows that all constructs recorded mean scores above the neutral midpoint of 3.00, indicating generally favourable perceptions among respondents. OHS Risk Management Practices recorded the highest mean score, followed by ESG–OHS Integration and Resilience and Emergency Preparedness. Policy and Governance Alignment recorded the lowest mean score among the six constructs, although it remained above the neutral level. This visual pattern supports the study’s finding that while operational OHS practices and ESG linkage are comparatively strong, governance mechanisms require stronger operational implementation and monitoring.

4.3 Correlation Analysis

Pearson correlation analysis was conducted to examine the strength and direction of relationships among the major constructs. Table 5 presents the correlation matrix.

Table 5. Correlation Matrix of Major Constructs

Construct	ESG	OHS	SE	PG	REP	OUT
ESG–OHS Integration (ESG)	1.000	-	-	-	-	-
OHS Risk Management Practices (OHS)	0.926**	1.000	-	-	-	-
Stakeholder Engagement (SE)	0.795**	0.853**	1.000	-	-	-
Policy and Governance Alignment (PG)	0.102	0.187	0.098	1.000	-	-
Resilience and Emergency Preparedness (REP)	0.897**	0.913**	0.856**	0.145	1.000	-
Perceived ESG–OHS Outcomes (OUT)	0.418**	0.527**	0.442**	0.351*	0.487**	1.000

Note: **p < 0.01; *p < 0.05.

Table 5 indicates that ESG–OHS Integration, OHS Risk Management Practices, Stakeholder Engagement, and Resilience and Emergency Preparedness are strongly and significantly associated with one another. The strongest relationship is observed between ESG–OHS Integration and OHS Risk Management Practices, followed by OHS Risk Management Practices and Resilience and Emergency Preparedness. This suggests that stronger ESG alignment is closely linked with stronger operational OHS systems, and stronger OHS systems are closely associated with preparedness and resilience. Policy and Governance Alignment shows weaker correlations with OHS practices and resilience, but it has a modest significant association with perceived ESG–OHS outcomes. This indicates that policy structures may exist but may not yet be consistently translated into operational safety practices.

4.4 Regression Analysis and Hypothesis Testing

Regression analysis was conducted to test the hypotheses. Considering the valid sample size of 47, the analysis was limited to focused regression models rather than advanced techniques such as CFA or SEM. Table 6 presents the regression results.

Table 6. Regression Results for Hypothesis Testing

Model	Dependent Variable	Predictor Variable(s)	Standardized Beta	R ²	Adjusted R ²	p-value	Result
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Model 1	OHS Management Practices	Risk	ESG–OHS Integration	0.667	0.902	0.895	<0.001	Significant
			Stakeholder Engagement Policy and Governance Alignment	0.314			<0.001	Significant
				0.088			0.075	Not significant
Model 2	Resilience and Emergency Preparedness	and	OHS Risk Management Practices	0.913	0.834	0.830	<0.001	Significant
Model 3	Perceived OHS Outcomes	ESG–	OHS Risk Management Practices	0.527	0.277	0.261	<0.001	Significant

Table 6 shows that ESG–OHS Integration and Stakeholder Engagement significantly predict OHS Risk Management Practices. The first model explains 90.2% of the variance in OHS Risk Management Practices, indicating that ESG alignment and stakeholder participation are important predictors of operational safety practices in the surveyed buildings. Policy and Governance Alignment shows a positive but statistically non-significant effect in the combined model. This does not mean governance is irrelevant; rather, it suggests that governance may not independently explain OHS practices when ESG integration and stakeholder engagement are considered together.

The second model shows that OHS Risk Management Practices have a strong and significant influence on Resilience and Emergency Preparedness. This indicates that buildings with stronger hazard identification, risk assessment, training, audit, incident reporting, and emergency planning systems are more likely to demonstrate preparedness and adaptive capacity. The third model shows that OHS Risk Management Practices also significantly influence Perceived ESG–OHS Outcomes, although the explanatory power is moderate. This suggests that perceived outcomes may also depend on other factors such as ESG reporting, certification, leadership communication, tenant confidence, and long-term sustainability initiatives.

Table 7 summarizes the hypothesis-testing decisions based on the regression results.

Table 7. Summary of Hypothesis Testing

Hypothesis	Null Hypothesis	Statistical Result	Decision
H01	ESG–OHS integration has no significant influence on OHS risk management practices.	Significant positive influence found	Rejected
H02	Stakeholder engagement has no significant influence on OHS risk management practices.	Significant positive influence found	Rejected
H03	Policy and governance alignment has no significant influence on OHS risk management practices.	Positive but not significant in the combined model	Failed to reject
H04	OHS risk management practices have no significant influence on resilience and perceived ESG–OHS outcomes.	Significant positive influence found	Rejected

Table 7 shows that three null hypotheses were rejected, while one null hypothesis failed to be rejected. The results support the positive role of ESG–OHS Integration and Stakeholder Engagement in strengthening OHS Risk Management Practices. The results also confirm that OHS Risk Management Practices significantly contribute to resilience and perceived ESG–OHS outcomes. However, the non-significant result for Policy and Governance Alignment suggests a practical gap between policy existence and policy operationalization in the surveyed commercial and retail buildings.

4.5 Qualitative Insights from Open-Ended Responses

The questionnaire also included open-ended questions to capture practical views on OHS challenges, ESG-driven initiatives, and governance improvements. Table 8 presents the major themes identified from the qualitative responses.

Table 8. Thematic Summary of Open-Ended Responses

Major Theme	Key Issues Reflected in Responses
Policy enforcement and audit systems	Need for stricter monitoring, third-party audits, regular OHS audits, stronger compliance review, and ESG-linked reporting
Environmental and ESG-linked safety concerns	Indoor air quality, pollution, waste management, energy efficiency, water conservation, and green building practices
Training and safety culture	Safety awareness, regular training, orientation, leadership involvement, and competency-building
Manpower and resource constraints	Shortage of trained manpower, staffing pressure, budget limitations, and need for dedicated OHS resources

Stakeholder and contractor coordination	Contractor compliance, tenant participation, stakeholder communication, and shared responsibility
Fire, electrical and emergency preparedness	Fire safety, electrical hazards, evacuation drills, emergency readiness, flooding, and disaster preparedness

Table 8 shows that respondents viewed OHS risk management as a practical governance and coordination challenge rather than only a technical safety issue. Policy enforcement, audits, environmental conditions, training, manpower availability, contractor coordination, and emergency preparedness emerged as recurring concerns. These qualitative insights support the quantitative findings by showing that ESG–OHS integration and stakeholder engagement are important in practice, while governance requires stronger operational follow-through.

4.6 Overall Interpretation of Results

The results indicate that NCR commercial and retail buildings represented in the sample show generally favourable levels of ESG–OHS integration, OHS risk management practices, stakeholder engagement, resilience preparedness, and perceived ESG–OHS outcomes. The descriptive results show high construct-level mean scores, and the reliability results confirm that the construct measures are internally consistent.

The correlation and regression results show that ESG–OHS Integration and Stakeholder Engagement are significant drivers of OHS Risk Management Practices. OHS Risk Management Practices further contribute strongly to Resilience and Emergency Preparedness and moderately to Perceived ESG–OHS Outcomes. However, Policy and Governance Alignment does not show a statistically significant independent effect on OHS practices in the combined regression model. This finding suggests that governance systems may exist formally but require stronger implementation, monitoring, accountability, and integration with daily safety practices.

Overall, the results support the need for an ESG-aligned OHS risk management framework for NCR commercial and retail buildings. The evidence suggests that ESG integration and stakeholder engagement can strengthen OHS practices, while strong OHS practices improve resilience and perceived safety-related outcomes. At the same time, the findings highlight the need to convert policy and governance mechanisms into more active operational systems.

5. Proposed ESG-Aligned OHS Risk Management Framework

5.1 Basis of Framework Development

The proposed ESG-aligned OHS risk management framework has been developed on the basis of three interconnected sources: the conceptual understanding of ESG and OHS integration, the questionnaire constructs used in the study, and the empirical findings obtained from the primary data. The framework reflects the major dimensions examined in the study, namely ESG–OHS integration, stakeholder engagement, policy and governance alignment, OHS risk management practices, resilience and emergency preparedness, and perceived ESG–OHS outcomes.

The empirical results indicate that ESG–OHS integration and stakeholder engagement significantly influence OHS risk management practices, while OHS practices strongly contribute to resilience and emergency preparedness. However, policy and governance alignment showed a weaker independent influence in the regression model, suggesting that formal governance mechanisms need stronger operational translation. Therefore, the framework is designed not only to show the relationship among these dimensions but also to highlight the need for converting policy commitments into practical safety action.

5.2 Components of the Framework

The framework consists of six major components. The first component is **ESG–OHS Integration**, which represents the strategic alignment of workplace safety with sustainability, social responsibility, governance, compliance, and long-term risk management. It positions OHS as a part of ESG responsibility rather than a separate operational function.

The second component is **Stakeholder Engagement**, which includes the involvement of employees, tenants, contractors, service providers, facility teams, safety officers, and management in safety communication, training, reporting, audits, and emergency preparedness. In commercial and retail buildings, stakeholder participation is essential because safety responsibilities are shared across multiple actors.

The third component is **Policy and Governance Alignment**, which refers to the presence of clear safety policies, accountability structures, compliance mechanisms, audit systems, reporting channels, and periodic review processes. Although the empirical results show that this construct requires stronger implementation, it remains an important foundation for institutionalizing OHS practices.

The fourth component is **OHS Risk Management Practices**, which forms the operational core of the framework. It includes hazard identification, risk assessment, preventive controls, incident reporting, safety training, emergency drills, documentation, monitoring, and corrective actions. This component translates ESG, stakeholder, and governance inputs into practical safety management.

The fifth component is **Resilience and Emergency Preparedness**, which reflects the ability of commercial and retail buildings to anticipate, respond to, and recover from disruptions. This includes preparedness for fire incidents, electrical hazards, crowd-related risks, health emergencies, evacuation challenges, technical failures, and other operational disruptions.

The sixth component is **Perceived ESG–OHS Outcomes**, which represents the broader results of effective ESG-aligned OHS practices. These outcomes include improved safety culture, better compliance, enhanced accountability, reduced risk exposure, stronger stakeholder confidence, and improved alignment between safety performance and ESG responsibility.

5.3 Framework Explanation

The proposed framework follows a sequential and integrated logic. ESG–OHS integration provides the strategic direction for treating workplace safety as part of organizational sustainability and governance. Stakeholder engagement strengthens participation, communication, and shared responsibility, while policy and governance alignment provides the structural basis for compliance, accountability, and monitoring. Together, these three dimensions influence the quality of OHS risk management practices.

OHS risk management practices act as the central operational mechanism of the framework. When organizations implement systematic hazard identification, risk assessment, training, audits, incident reporting, emergency drills, and preventive controls, they become better prepared to manage safety risks. These practices further strengthen resilience and emergency preparedness by improving the organization’s capacity to respond to disruptions and maintain continuity.

The final outcome of the framework is reflected in perceived ESG–OHS outcomes. When commercial and retail buildings demonstrate stronger OHS practices and preparedness systems, they are more likely to be perceived as safe, responsible, compliant, and ESG-aligned. Thus, the framework can be understood through the following flow:

ESG–OHS Integration + Stakeholder Engagement + Policy and Governance Alignment → OHS Risk Management Practices → Resilience and Emergency Preparedness → Perceived ESG–OHS Outcomes

This framework also highlights an important practical insight from the study: policy and governance should not remain limited to documentation or compliance statements. They must be actively connected with audits, training, monitoring, accountability, reporting, and corrective action mechanisms.

Figure 2 illustrates the proposed ESG-aligned OHS risk management framework developed from the literature base, questionnaire constructs, and empirical findings of the study.

Figure 2 Proposed ESG-Aligned OHS Risk Management Framework for NCR Commercial/Retail Buildings

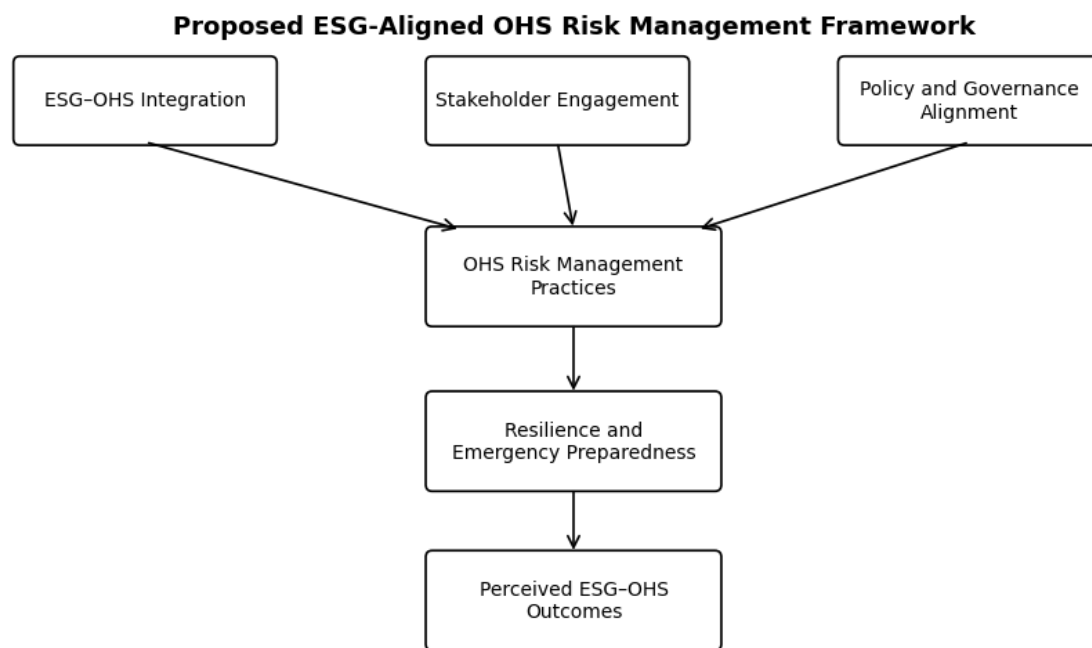


Figure 2 shows the proposed flow of the framework. ESG–OHS Integration, Stakeholder Engagement, and Policy and Governance Alignment act as enabling dimensions that influence OHS Risk Management Practices. These practices form the operational core of the framework and support Resilience and Emergency Preparedness. Improved resilience then contributes to Perceived ESG–OHS Outcomes, including stronger safety culture, better compliance, accountability, stakeholder confidence, and operational continuity.

5.4 Practical Application in NCR Commercial/Retail Buildings

The framework can be applied by facility managers, safety officers, mall management teams, property managers, ESG/compliance teams, contractors, and tenant organizations working in NCR commercial and retail buildings. Facility managers can use the framework to integrate ESG indicators into routine OHS audits, risk assessments, maintenance schedules, contractor evaluations, and emergency preparedness reviews. Safety officers can apply it to strengthen hazard reporting, training programmes, incident documentation, mock drills, and corrective action systems.

Mall and commercial building management teams can use the framework to improve coordination between tenants, service providers, housekeeping teams, security personnel, maintenance staff, and external agencies. Since commercial and retail buildings operate through shared infrastructure, the framework encourages joint responsibility rather than isolated safety management. ESG and compliance teams can also use the framework to

align safety practices with sustainability reporting, governance review, and stakeholder accountability.

The framework is especially useful in NCR because commercial and retail buildings in this region often experience high footfall, multi-tenant operations, outsourced service arrangements, and complex emergency preparedness requirements. By applying the framework, organizations can move from a reactive and compliance-based safety approach toward a more integrated, preventive, and resilience-oriented OHS system.

5.5 Strategic Value of the Framework

The strategic value of the proposed framework lies in its ability to connect OHS risk management with ESG responsibility, stakeholder accountability, governance systems, and organizational resilience. It supports compliance by encouraging structured policies, monitoring systems, audits, and corrective actions. It strengthens safety culture by promoting stakeholder participation, training, communication, and shared responsibility.

The framework also supports emergency preparedness by linking OHS practices with resilience planning, mock drills, incident learning, and continuity measures. From an ESG perspective, it helps organizations demonstrate that workplace safety, contractor protection, employee well-being, emergency readiness, and governance accountability are part of their broader sustainability commitments.

For NCR commercial and retail buildings, the framework provides a practical and context-specific approach to managing safety risks in complex operational environments. It enables organizations to align strategic ESG goals with day-to-day OHS practices, thereby improving compliance, preparedness, stakeholder confidence, and long-term operational continuity.

6. DISCUSSION

The findings of the study indicate that ESG-aligned OHS risk management in NCR commercial and retail buildings is shaped by the combined role of ESG integration, stakeholder engagement, operational safety practices, governance alignment, and resilience preparedness. The descriptive results show generally favourable perceptions across the major constructs, suggesting that respondents recognize OHS as an important part of responsible and sustainable building operations. This supports the broader ESG view that employee safety, contractor protection, emergency preparedness, compliance, and accountability form part of responsible organizational conduct (Eccles, Ioannou, & Serafeim, 2014).

The significant influence of ESG–OHS Integration on OHS Risk Management Practices confirms the central argument of the study that safety systems become stronger when they are connected with sustainability and governance priorities. In commercial and retail buildings, OHS cannot remain limited to statutory compliance because safety risks are distributed across employees, tenants, contractors, service providers, customers, and facility teams. ESG alignment helps organizations view OHS as a strategic risk management function rather than a routine operational activity. This finding is consistent with prevention-oriented OHS approaches emphasized by ISO 45001 and ILO guidelines, where leadership commitment, worker participation, hazard identification, preventive controls, and continual improvement are central to safety performance (ISO, 2018; ILO, 2019).

Stakeholder engagement also emerged as a significant predictor of OHS Risk Management Practices. This finding is important because commercial and retail buildings operate through shared infrastructure and shared responsibility. Facility managers and safety officers alone cannot ensure effective safety outcomes unless tenants, contractors, employees, housekeeping staff, security teams, maintenance personnel, and service providers participate in training, communication, hazard reporting, and emergency drills. This supports stakeholder theory, which argues that organizational outcomes are shaped by the participation and responsibilities of multiple actors rather than by management action alone (Freeman, 1984).

A notable finding is that Policy and Governance Alignment showed a positive but statistically non-significant effect on OHS Risk Management Practices in the combined regression model. This does not mean that governance is irrelevant. Rather, it suggests that formal policies may exist but may not always be translated effectively into daily safety practices. The finding indicates a possible gap between policy documentation and operational implementation. Risk governance requires not only written policies but also accountability, monitoring, audits, corrective actions, and periodic review (Hopkin, 2018). Therefore, NCR commercial and retail buildings need to strengthen the operational side of governance through regular audits, responsibility allocation, compliance monitoring, and follow-up mechanisms.

The study further found that OHS Risk Management Practices strongly influence Resilience and Emergency Preparedness. This confirms the framework logic that operational safety practices serve as the central mechanism through which ESG alignment, stakeholder engagement, and governance structures translate into preparedness and resilience. Buildings with stronger hazard identification, risk assessment, training, audits, incident reporting, preventive controls, and emergency drills are better prepared to respond to disruptions. This finding aligns with the organizational resilience perspective, which views resilience as the ability to anticipate, respond to, recover from, and adapt to uncertain conditions (Duchek, 2020).

The positive influence of OHS Risk Management Practices on Perceived ESG–OHS Outcomes shows that safety practices contribute to improved safety culture, compliance, accountability, and stakeholder confidence. However, the moderate explanatory power of this relationship suggests that ESG–OHS outcomes may also depend on other factors such as ESG reporting, certification, leadership communication, tenant confidence, and long-term sustainability investments. Therefore, OHS practices should be supported by visible governance systems and transparent reporting mechanisms.

The qualitative responses further support the statistical findings. Respondents emphasized policy enforcement,

audits, air quality, environmental concerns, training gaps, manpower shortages, contractor coordination, and emergency preparedness. These themes show that OHS risk management in commercial and retail buildings is not only a technical safety issue but also a governance, resource, communication, and coordination challenge. This strengthens the practical relevance of the proposed framework because it reflects the operational realities of NCR commercial and retail buildings.

Overall, the discussion supports the proposed ESG-aligned OHS risk management framework. The study contributes theoretically by integrating ESG, OHS risk management, stakeholder engagement, governance, and resilience into a single framework. It contributes empirically by providing primary-data-based evidence from NCR commercial and retail buildings, a context that remains less examined than industrial, construction, and manufacturing sectors. Practically, the findings suggest that commercial and retail buildings should move from documentation-based compliance toward an integrated model based on ESG alignment, stakeholder participation, operational safety discipline, governance implementation, and resilience preparedness.

7. CONCLUSION

This study examined ESG-aligned Occupational Health and Safety (OHS) risk management in NCR commercial and retail buildings with specific focus on policy alignment, stakeholder engagement, and organizational resilience. Based on primary survey data collected from 47 valid respondents, the study found that ESG–OHS integration and stakeholder engagement significantly contribute to stronger OHS risk management practices. The findings indicate that when safety is linked with ESG priorities and supported by active participation of stakeholders, commercial and retail buildings are better positioned to manage operational safety risks.

The results further show that OHS risk management practices have a strong positive influence on resilience and emergency preparedness. This confirms that systematic practices such as hazard identification, risk assessment, safety training, audits, incident reporting, preventive controls, and emergency drills are essential for improving preparedness in high-footfall, multi-stakeholder commercial environments. The study also found that OHS practices positively influence perceived ESG–OHS outcomes, suggesting that effective safety systems contribute to better compliance, accountability, safety culture, and stakeholder confidence.

An important finding of the study is that policy and governance alignment, although positively associated with OHS practices, did not show a statistically significant independent effect in the combined regression model. This suggests a practical gap between policy existence and policy implementation. In other words, commercial and retail buildings may have safety policies and compliance structures, but these mechanisms need stronger operational translation through regular monitoring, accountability, audits, corrective actions, and stakeholder-level enforcement.

The proposed ESG-aligned OHS risk management framework therefore provides a structured approach for integrating ESG priorities, stakeholder participation, governance systems, OHS practices, and resilience outcomes. The framework is particularly relevant for NCR commercial and retail buildings because these spaces involve shared infrastructure, high public movement, tenant diversity, outsourced services, and complex emergency preparedness requirements. By applying this framework, facility managers, safety officers, mall management teams, property managers, ESG professionals, and service providers can strengthen safety governance and move from documentation-based compliance toward a more integrated and preventive safety system.

The study contributes to the existing literature by connecting ESG, OHS risk management, stakeholder engagement, policy governance, and resilience within one empirical framework. It also adds context-specific evidence from NCR commercial and retail buildings, which remain less examined compared to industrial, construction, and manufacturing sectors. However, the study is limited by its relatively small valid sample size, purposive sampling approach, NCR-specific scope, and reliance on self-reported perception-based data. Future studies may expand the sample size, include multiple regions, compare different types of commercial properties, and incorporate objective safety performance indicators to strengthen the generalizability and practical application of the framework.

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