



Reply to Comment on The Identifying the Key Factors Affecting the Success of Occupational Health and Safety Management during the Implementation of Construction Projects for NGOs in Sana'a, Yemen

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ABSTRACT

This document provides a detailed methodological and scientific response to the commentary on our published study of factors influencing the success of occupational health and safety (OHS) management in NGO-related construction projects in Sana'a, Yemen. The response clarifies the study's empirical scope, sampling rationale, interpretation of questionnaire-based evidence, psychometric results, institutional context, and use of ISO 45001:2018 as an analytical framework. It also acknowledges the distinction between perceived management priorities and objective safety-performance indicators and explains how the study's recommendations were derived from the evidence collected. The authors have revised the presentation of the response to maintain a respectful academic tone and to distinguish clearly between textual clarification, methodological justification, and points that may warrant further discussion.

1. INTRODUCTION AND RESPONSE TO THE CLAIMS OF THE FIRST SECTION OF THE COMMENTARY (THE RESEARCH GAP, THE EMPIRICAL NATURE, AND TRANSLATING FINDINGS INTO RECOMMENDATIONS)

The authors welcome constructive academic discussion that contributes to improving occupational health and safety practices in Yemen's construction sector. The points raised in the first section of the commentary concern the research gap, the empirical nature of the study, and the relationship between the findings and the recommendations. We address each point below by referring to the wording and evidence presented in the original paper [1].

1.1. RESPONSE TO THE CLAIM OF INACCURACY OF THE RESEARCH GAP (THE RESEARCH GAP VS. OPERATIONAL REALITY)

- **The Commentator's Claim:** The commentator claims that the targeted organizations (the Social Fund for Development [SFD], the Public Works

Project [PWP], and the United Nations Office for Project Services [UNOPS]) are legally and contractually bound by the World Bank's Environmental and Social Framework (specifically Environmental and Social Standard 2 [ESS2] on Labor and Working Conditions), and that they possess fully funded systems, personnel, and monitoring tools, which renders the assumption of limited evidence in our study inaccurate.

• The Documented Scientific Response:

1- The commentary distinguishes between written frameworks and regulations established by donor entities or funding agencies and the extent to which those requirements are implemented in the field by contractors and subcontractors. We agree that this distinction is important. Our study [1] addressed the implementation dimension rather than the mere existence of formal requirements. In Sections 1, 2.3, and 4.5, we discussed the operational context of humanitarian and development projects in Yemen, including accelerated timelines, budget constraints, rapid mobilization, subcontracting, and economic and security pressures. The results reported in Table 5 and Section 4.4—including the means and Relative Im-

portance Indices for the Organizational Context, Administrative Context, and Monitoring and Evaluation Mechanisms dimensions—were intended to describe implementation challenges under these conditions. The statement that performance tracking may remain inconsistent even when procedures exist was therefore an interpretation of an implementation gap, not a claim that formal frameworks are absent.

2- Our study diagnosed this operational reality with utmost precision in Section 1, Section 2.3, and Section 4.5, where we explained that humanitarian and development projects in Yemen are executed through contractors and subcontractors under the pressures of accelerated timelines, strict budget ceilings, rapid mobilization of teams, and severe security and economic fluctuations.

3- Most importantly, the results of our field study in Table 5 and Section 4.4 proved with statistical figures the existence of the administrative and supervisory obstacles that the commentator assumes we overlooked; the "Organizational Context" dimension recorded a mean of 4.34 (with a Relative Importance Index [RII] of 86.8%), the "Administrative Context" recorded a mean of 4.32 (with an RII of 86.4%), and "Monitoring and Evaluation Mechanisms" recorded a mean of 4.19 (with an RII of 83.8%). Furthermore, our paper stated verbatim in Section 4.4 that the high rating of monitoring and evaluation challenges indicates that "even when procedures exist, performance tracking may be inconsistent." This supports the interpretation that the study examined the actual operational gap on the ground with complete scientific accuracy.

1.2. RESPONSE TO THE CLAIM OF INVALIDITY OF THE "EMPIRICAL (EXPERIMENTAL/FIELD)" NATURE OF THE STUDY

- The commentary questions whether a questionnaire based on stakeholder perceptions can be described as empirical in the absence of injury rates, incident records, inspection data, or other objective safety-performance indicators.
- **The Documented Scientific Response:**

1- The study uses the term empirical in the sense of a systematic investigation based on primary field data collected from relevant practitioners and analyzed to address defined research questions. Questionnaire-based studies of professional assessments are an established form of empirical research in construction safety and project-management research. At the same time, the authors recognize that perceived management priorities are not equivalent to observed safety performance. The original paper therefore stated that the study examined stakeholder perceptions rather than objective safety-performance indicators and recommended future triangulation using

incident records, inspections, and observation-based audits. The present response reiterates that limitation and does not claim that the questionnaire replaces objective safety records.

2- Leading reference studies in the field of construction safety published in the most prestigious scientific journals such as *Safety Science*—upon which the commentator himself relied as scientific arguments in his commentary, such as the study by Bavafa et al. (2018) [2] and the study by Wu et al. (2020) [3]—are quantitative empirical studies that relied on questionnaires measuring the assessments and perceptions of experts, engineers, and managers to identify critical success factors and safety climate dimensions.

3- In fragile and conflict-affected contexts such as Yemen, official incident records suffer from severe deficiency, irregularity, and underreporting—a fact acknowledged by the commentator himself in Section 6 of his commentary when he pointed to the suppression of incident reporting to protect timelines and budgets—which is why the findings of our study in Section 4.4 pointed to a gap in systematic data collection and recommended that organizations "*maintain basic incident databases, conduct post-incident learning reviews, and activate near-miss reporting.*"

4- The authors adhered to the highest degrees of transparency and scientific integrity in Section 3.8, Section 5.4, and Section 5.5 of the original paper, where the paper explicitly stated that "*this study examines stakeholder perceptions rather than objective safety performance indicators, and future studies should conduct research triangulation integrating incident records, inspections, and observation-based audits.*"

1.3. RESPONSE TO THE CLAIM OF EPISTEMOLOGICAL FALLACY IN TRANSLATING FINDINGS INTO PRACTICAL RECOMMENDATIONS

- **The Commentator's Claim:** The commentator claims that deriving executive recommendations and policies from the subjective perceptions of a sample of 171 respondents represents an "epistemological methodological issue."
- **The Documented Scientific Response:**

1- The sample of 171 respondents does not represent laypersons or non-specialists, but rather represents an elite group of field professionals and practitioners (project managers, site engineers, safety engineers, consultants, and contractors) who possess extensive practical experience in executing and managing these projects (with 53.8% of them possessing experience ranging between 6 years and more than 10 years in construction projects, as documented in Table 2).



2- Deriving administrative and operational recommendations based on identifying field priorities measured by the Relative Importance Index (RII) is a standard and globally recognized scientific methodology in engineering project management research (Bavafa et al., 2018 [1] [2]; Buniya et al., 2021 [4]; Al-Otaibi and Kineber, 2023) [5].

2. RESPONSE TO THE SECOND SECTION OF THE COMMENTARY (THE ALLEGED GAP BETWEEN CONCEPTUAL ADAPTATION, INSTITUTIONAL CLASSIFICATION, AND SAMPLE HOMOGENEITY)

- **The Commentator's Claim:** The commentator alleges that the questionnaire was distributed exclusively within three institutions (the Social Fund for Development, the Public Works Project, and the United Nations Office for Project Services), that the SFD and PWP are national implementing agencies while UNOPS is a UN agency rather than NGOs, and that combining them destroys sample homogeneity and does not reflect the reality of local NGOs.

- **The Documented Scientific Response:**

1- Clarification of the Paper's Wording Regarding Questionnaire Distribution: The original paper did not state that the sample consisted exclusively of internal administrative staff from the three institutions. Section 3.2 identified the target population as professionals involved in NGO construction projects and related roles, including project managers, site engineers, consultants, contractors, and safety personnel. The questionnaire was circulated through the professional channels of the Social Fund for Development, the Public Works Project, and UNOPS because these organizations are connected to infrastructure and rehabilitation projects in Yemen. The authors acknowledge that this wording could be made clearer and recommend specifying the distribution pathway and respondent affiliations in any revised version.

2- **The Institutional and Operational Reality in Yemen:** In the development and humanitarian work environment in Sana'a, these three institutions operate as pivotal entities and executive and funding umbrellas that partner with dozens of international and local NGOs and contract with hundreds of contractors and consulting firms to execute infrastructure, water and sanitation (WASH), school, and health facility projects. Consequently, circulating the research instrument through their professional channels and networks is the most accurate methodological pathway to reach the community of engineers, project managers, and contractors actually engaged in organizational projects in Sana'a.

3- **Ensuring Sample Homogeneity Through Strict**

Inclusion Criteria: Contrary to the commentator's claim of merging heterogeneous entities, the study unified the measurement framework around "construction and rehabilitation projects in Sana'a" and established in Section 3.6 a decisive inclusion criterion stating that: *"Inclusion criteria required respondents to be currently involved in, or to have recently contributed to, NGO construction projects in Sana'a with direct exposure to site operations or OHS management practices. This criterion helped ensure that responses reflected informed professional judgment rather than general perceptions."*

3. RESPONSE TO THE THIRD SECTION OF THE COMMENTARY (SAMPLING, DEMOGRAPHIC CHARACTERISTICS, PSYCHOMETRIC MEASUREMENT, AND STATISTICAL RIGOR)

The third section of the commentary raises several questions about sampling, respondent characteristics, psychometric measurement, and statistical interpretation. We respond to these points by clarifying the relevant passages in the original paper and by acknowledging where the wording can be improved.

3.1. RESPONSE TO THE CLAIM OF CONTRADICTION IN USING THE FINITE POPULATION FORMULA WITH PURPOSIVE SAMPLING

- **The Commentator's Claim:** The commentator claims that calculating a reference sample 360 from an estimated population (5,600) requires probability sampling, and that applying it with non-probability purposive sampling creates a logical contradiction, and furthermore that analyzing 171 responses without post-hoc power analysis weakens statistical power.

- **The Documented Scientific Response:**

1- The relevant sentence in Section 3.2 stated that the finite-population calculation was used as an indicative benchmark for field-outreach planning and not to claim statistical representativeness under purposive sampling. Read together, the surrounding sentences explain that the achieved sample of 171 valid responses was used for descriptive and ranking analysis within the study context. We agree that this distinction should be stated more prominently to prevent misinterpretation.

2- Regarding post-hoc statistical power analysis (according to Cohen, 1988), it is used for testing inferential hypotheses and predictive models to prevent Type II error, whereas our study clarified in Section 3.6 that *"the analysis was descriptive and ranking-oriented; no causal or predictive modeling was conducted."* In engineering survey studies, a sample size of 171

specialists (with a response rate of 44.5% out of 384 distributed questionnaires) is considered a high and highly reliable sample size (Bryman, 2012 [6]; Field, 2024) [7].

3.2. RESPONSE TO THE CLAIM OF UNREALISTIC INFLATION IN HIGHER ACADEMIC QUALIFICATIONS (32.2%)

- **The Commentator's Claim:** The commentator alleges that the presence of 23.4% Master's degree holders and 8.8% PhD holders (a total of 32.2%) is an unrealistic inflation compared to UNESCO and World Bank data, which indicate that the percentage of PhD holders in Yemen does not exceed 1% and Master's holders does not exceed 5%.
- **The Documented Scientific Response:**
 - 1- The commentator commits a clear statistical methodological issue by comparing the qualifications of a "purposive professional sample of engineers, project managers, and consultants in the capital city of Sana'a" with general population or general field statistics for Yemen.
 - 2- The study population in Section 3.2 and Table 2 is restricted to engineering, administrative, and supervisory cadres (where 58.5% hold a Bachelor's degree, 23.4% a Master's degree, 8.8% a PhD, and 9.4% a technical diploma). Under the current economic conditions in Yemen and the suspension of government projects, projects of international organizations, development funds, and consulting offices in Sana'a have attracted senior engineering competencies, university professors, and holders of postgraduate degrees to work as project managers, consultants, and safety and quality engineers, making this percentage a true and accurate reflection of the reality of the engineering and consulting cadre in Sana'a.

3.3. CLARIFICATION OF THE DIVISION OF SPECIALIZATIONS AND JOB ROLES

- **The Commentator's Claim:** The commentator criticized the separation between "Civil Engineer" (26.3%) and "Structural Engineer" (22.2%), questioned in Section 3 the inclusion of an "Other" category (18.7%) comprising procurement officers, consultants, and environmental engineers on the pretext that they are "office staff who harm sample homogeneity," and claimed the absence of contractors and safety specialists as well as weak representation of supervisory roles.
- **The Documented Scientific Response:**
 - 1- The commentary raises two related questions: whether the categories of civil engineer and structural engineer should be reported separately, and

whether the 'Other' category introduces heterogeneity. The original questionnaire retained respondents' reported professional designations and did not use these categories for separate causal or inferential comparisons. The 'Other' category included professionals involved in project implementation, such as environmental engineers, consultants, and procurement officers. The authors consider these roles relevant to an OHS management system because ISO 45001 [8] implementation involves operational, contractual, environmental, and procurement interfaces. We agree that the revised manuscript should present the category definitions and respondent affiliations more explicitly.

2- Comprehensiveness and Integration of the Sample in Our Study: The footnote to Table 2 in our paper clarified that the "Other" category (18.7%, i.e., 32 respondents) represents professionals from allied fields actively participating in projects, such as environmental engineers, construction management consultants, and procurement officers. By adding these to OHS engineers (9.9%, i.e., 17 engineers), project managers (15.8%, i.e., 27 managers), and civil, structural, electrical, mechanical, and quality engineers, as well as supervisors and site managers, it becomes clear that the sample covers all parties concerned with implementing the ISO 45001 [8] system in the field, administratively, and contractually.

3- As for retaining the designations "Civil Engineer" and "Structural Engineer" in Table 2, this is fidelity in presenting the demographic data as identified by the respondents, and the study did not conduct any differential statistical comparisons between these two categories for statistical redundancy to be claimed.

3.4. REFUTING THE COMMENTATOR'S PSYCHOMETRIC ERROR REGARDING CRONBACH'S ALPHA COEFFICIENT 0.972

- **The Commentator's Claim:** The commentator claims that recording high Cronbach's alpha coefficients (0.973 for the first axis, 0.935 for the second axis, and 0.972 for the instrument as a whole) exceeds the 0.95 ceiling and inevitably indicates item redundancy and response pattern bias based on Tavakol and Dennick (2011) [9].
- **The Documented Scientific Response:**
 - 1- The value of Cronbach's alpha is influenced by the number of items in a scale. In this study, the instrument contained 60 items distributed across two axes and 20 sub-dimensions. A high alpha can therefore reflect both item number and internal consistency, and it should be interpreted alongside item-to-dimension correlations and substantive content. The authors do not intend to suggest that a high alpha alone proves



validity or excludes redundancy; rather, the correlations reported in Section 3.3, which ranged from 0.353 to 0.828, provide additional evidence that the items were not uniformly interchangeable. A clearer discussion of this limitation would improve the original paper.

2- Additional evidence from the original paper: item-to-dimension correlations ranged from 0.353 to 0.828. These results are compatible with meaningful relationships between items and their dimensions, although they do not by themselves establish construct validity or rule out all forms of redundancy. The authors therefore accept that the psychometric discussion should be presented more cautiously.

3.5. RESPONSE TO THE CLAIM REGARDING THE CONVERGENCE OF MEANS AND THE ABSENCE OF NON-PARAMETRIC TESTS

- **The Commentator's Claim:** The commentator claims that the convergence of arithmetic means (between 4.00 and 4.52) and the Relative Importance Index exceeding 80% limits the discriminative power of the instrument, and that ranking them without non-parametric tests (such as Friedman or Wilcoxon) renders the ranking descriptive rather than statistically proven.
- **The Documented Scientific Response:**
 - 1-** The fact that all dimensions obtained high means (greater than or equal to 4.00) is a logical scientific outcome because the dimensions were not formulated randomly, but rather derived from mandatory international standard requirements in ISO 45001:2018 [8] and from critical success factors whose paramount importance has been proven by previous studies.
 - 2-** The authors never claimed at all that slight decimal differences between ranks represent substantive inferential differences; rather, the paper stated with full rigor and scientific integrity in Section 4.3 that: *"Factors were ranked descriptively based on mean scores; closely spaced differences should be interpreted as broadly similar priorities rather than statistically distinct positions."* Accordingly, the commentator's demand to prove inferential statistical differentiation is a criticism of something the paper itself explicitly stated it did not claim.

4. RESPONSE TO THE FOURTH SECTION OF THE COMMENTARY (THE REGULATORY FRAMEWORK AND BINDING LEGAL OBLIGATIONS)

- **The Commentator's Claim:** The commentator claims that the study overlooked the World Bank's Environmental and Social Framework (ESS1, ESS2,

and ESS4), Yemeni sovereign laws (the Labor Law, the Tenders Law, and the Civil and Criminal Codes), and supervisory tools such as Third-Party Monitoring (TPM), Grievance Redress Mechanisms (GRM), and Environmental and Social Management Plans (ESMP).

• The Documented Scientific Response:

1- Methodological Integration with the International Standard ISO 45001:2018 [8]: Our study was designed to evaluate the administrative and operational system according to the clauses of ISO 45001:2018 [8]. As is known to every specialist in quality and safety systems, ISO 45001 [8] includes an entire core clause dedicated to "Compliance with Legal and Other Requirements," and our study explicitly included this clause as an independent dimension in the measurement instrument and in the results (Table 4, Dimension 11: *"Compliance with Legal and Other Requirements,"* which achieved a high mean of 4.14 and a standard deviation of 0.80). In the context of organizational projects in Yemen, "Legal and Other Requirements" naturally encompass national Yemeni labor laws as well as donor stipulations such as World Bank standards.

2- Dedicating an Entire Section in the Paper to Project Governance and Donor Compliance: Our study dedicated Section 4.5 in its entirety under the title *"Implications for NGO Project Governance and Donor Compliance,"* discussing in detail how to link the maturity of the OHS management system to external donor reporting requirements, the management of contractors and subcontractors, and periodic compliance and performance reviews in high-risk projects.

5. RESPONSE TO THE FIFTH AND SIXTH SECTIONS OF THE COMMENTARY (ALIGNMENT WITH ISO 45001, AGENCY BIAS, AND THE SOUNDNESS OF POLICY RECOMMENDATIONS)

The fifth and sixth sections of the commentary interpret several recommendations in relation to ISO 45001 Clauses 5.4, 5.1, and 8.1.4 [8]. The authors respond below by reproducing the relevant wording and explaining how the recommendations were intended to relate to worker participation, leadership accountability, procurement controls, and project-size adaptation.

5.1. RESPONSE TO THE COMMENT REGARDING WORKER PARTICIPATION AND THE INTERPRETATION OF WORKER RESPONSIBILITY

- **The Commentator's Claim:** The commentator claims that the paper excluded workers from the sam-

ple (0%), placed their participation at the bottom of the success factors (80.0%), and defined the problem as unsafe behaviors linked to workers' illiteracy and weak culture, which represents agency bias and blaming the victim.

- **The Documented Scientific Response:**

1- Methodological Justification for the Questionnaire Population: The paper clarified in Section 3.2 that the study instrument measures the extent of implementation of strategic and operational management system clauses of ISO 45001 [8] (such as aligning policies with organizational strategy, allocating budgets, procurement and contracting procedures, and management review), which are administrative and engineering processes that require respondents with supervisory, engineering, and administrative experience to evaluate them.

2- Clarification of the Study's Position on Workers: The study did not attribute unsafe conditions solely to workers. In the Introduction and Sections 2 and 2.3, it linked unsafe behaviors and weak site controls to systemic and managerial factors, including inadequate supervision, insufficient training, poor communication, weak enforcement, limited incentives, conflicting production pressures, subcontracting, and varying levels of literacy and technical competence. The discussion of worker participation also stated that hierarchical site cultures, temporary labor, and limited consultation mechanisms can constrain participation, while emphasizing that worker knowledge is important for hazard identification and practical controls.

3- Analysis of the Worker Participation Result in Our Study: The dimension of "Worker Participation and Representation" in Table 4 obtained an arithmetic mean of 4.00 out of 5.00 (Relative Importance Index of 80.0%), which is officially classified within the "Influential" category according to Table 1. Most important of all is the scientific interpretation provided by our study in Section 4.3 for why this dimension ranked twelfth; instead of blaming workers, our study directed criticism squarely at management and site culture with a decisive verbatim text stating: "Interestingly, worker participation—despite being classified as an influential factor—obtained the lowest mean among the success factors. In practice, participation can be constrained by hierarchical site cultures, temporary labor, and limited consultation mechanisms. Nevertheless, enhancing participation is essential because workers possess tacit knowledge about hazards and workarounds; consequently, improving participation can strengthen hazard identification and practical control measures [6]." This text alone is sufficient to clarify the authors' position of "blaming the victim" and prove that the commentator did not read the interpretation of results in Section 4.3.

5.2. RESPONSE TO THE CLAIM OF VIOLATING CLAUSE 5.1 (LEADERSHIP AND ACCOUNTABILITY)

- **The Commentator's Claim:** The commentator alleges that the recommendation to *"strengthen leadership accountability by assigning OHS responsibilities to project managers and site supervisors"* violates Clause 5.1 of ISO 45001 [8], allows top management to evade accountability, and creates a conflict of interest that incentivizes the suppression of incident reporting.

- **The Documented Scientific Response:**

1- The dimension of *"Top Management Commitment and Accountability"* ranked first overall among all twelve success factors in our study (Table 4, with a mean of 4.52 and an RII of 90.4%), followed in second place by *"Promoting a Leadership-Driven OHS Culture"* (with a mean of 4.48 and an RII of 89.6%). Section 4.3 explicitly confirmed that *"ISO 45001 [8] explicitly assigns leadership responsibility for policies, roles, worker participation, and resource provision."*

2- The commentary quotes part of the recommendation concerning leadership accountability. The complete recommendation in Section 5.2 states: 'Strengthen leadership accountability by assigning OHS responsibilities to project managers and site supervisors, establishing measurable OHS indicators, and reviewing performance regularly.' The intended meaning was to distribute operational responsibilities while retaining overall accountability at the top-management level, consistent with ISO 45001 Clauses 5.1, 5.3, and 9.3 [8].

3- In ISO 45001:2018 [8], Clause 5.1 states that top management bears overall accountability, while Clause 5.3 (Organizational Roles, Responsibilities, and Authorities) obligates top management to ensure that the responsibilities and authorities for relevant roles within the safety system are assigned and communicated at all levels, and Clause 9.3 obligates top management to conduct periodic management reviews of performance. Requiring project managers and site supervisors to bear their field responsibilities and linking them to measurable performance indicators subject to regular review by top management is the very essence of sound governance in ISO 45001 [8], and not an exemption of top management as claimed by the commentator.

5.3. RESPONSE TO THE COMMENT REGARDING CLAUSE 8.1.4 AND THE ISO 45001-ALIGNED MINIMUM OHSMS PACKAGE

- **The Commentator's Claim:** The commentator alleges that recommending a "miniature/scaled-down



minimum OHSMS package" based on project size violates the legal and ethical duty of care, and that recommending "adaptive procurement strategies" and supporting local suppliers licenses the purchase of uncertified equipment and leads to "cosmetic token compliance."

- **The Documented Scientific Response:**

1- Regarding the minimum OHSMS package, the original recommendation stated that an ISO 45001 [8]-aligned package could be scaled according to project size and complexity while preserving core preventive functions. The authors did not intend to reduce the duty of care or permit lower safety specifications. Similarly, the recommendation to support qualified local suppliers was conditional on compliance with PPE specifications, supplier-quality criteria, contractor pre-qualification, supervision requirements, and penalties for repeated non-compliance. To avoid ambiguity, the revised wording should state explicitly that adaptation concerns administrative arrangements and implementation resources, not the removal of essential safety controls or certified-equipment requirements.

2- Regarding Adaptive Procurement and Quality Controls (Clause 8.1.4): The commentator claimed that our call to support local suppliers means compromising on safety specifications. Referring back to the text of our study, we find that we emphasized in the strongest terms the rigor of specifications and supplier quality; in Section 4.4, the paper stated: "*Specify minimum Personal Protective Equipment (PPE) standards in contracts, establish supplier quality criteria, and allocate dedicated safety budget lines.*" In Section 5.2, the fourth recommendation explicitly stated: "*Integrate OHS requirements into procurement and contracting (PPE specifications, contractor pre-qualification, supervision plans, and penalties for repeated non-compliance).*" As for the eighth recommendation in Section 5.2 regarding adopting adaptive procurement strategies by supporting qualified local suppliers and building contingency budgets to counter inflation and supply chain disruptions, it is a strategic solution to ensure the uninterrupted provision of certified PPE amidst blockade and import disruptions, provided they adhere to the supplier quality criteria and contract specifications stipulated in the very same section.

6. RESPONSE TO THE SEVENTH SECTION OF THE COMMENTARY (CORRECTING THE COMMENTATOR'S UNDERSTANDING OF THE NATURE OF ISO 45001 AND CONCLUSION)

- **The Commentator's Claim:** The commentator claims in his conclusion that the study misunderstood the nature of ISO 45001, alleging that it is a volun-

tary quality and management certificate granted only after a practical audit, safety records, and annual or semi-annual audits.

- **The Documented Scientific Response:**

1- The commentator confuses "conformity certification procedures conducted by certification bodies" with "using the international standard as a reference framework for designing and evaluating management systems." The ISO 45001:2018 [8] standard issued by the International Organization for Standardization states in its introduction and Clause 1 that it specifies requirements for an occupational health and safety management system with guidance for its use to enable any organization to provide safe and healthy workplaces and prevent injuries, and that any organization or project can adopt its elements and clauses to improve its operational performance without the objective necessarily being to obtain a commercial certificate.

2- Our study succeeded in transforming the clauses of this international standard into a validated quantitative measurement instrument (consisting of 12 dimensions for success factors and 8 dimensions for challenges, totaling 60 items), diagnosing the reality of its implementation in construction projects in Sana'a, and providing a practical and integrated roadmap for NGOs, contractors, and donors.

7. COMPREHENSIVE DOCUMENTARY TABLE COMPARING THE COMMENTARY'S CLAIMS WITH THE VERBATIM TEXTS IN THE ORIGINAL STUDY

8. CONCLUSION

The authors appreciate the opportunity to clarify the methodological basis and intended interpretation of the published study. The commentary raises important questions about sampling, the interpretation of questionnaire evidence, psychometric reporting, institutional classification, worker participation, leadership accountability, procurement, and the use of ISO 45001:2018 [8]. Our response shows how the relevant passages in the original paper address these issues, while also identifying areas where the paper could provide clearer definitions, fuller methodological detail, and more cautious language. The authors respectfully request that the Editorial Board consider the original paper and this response together, with the study understood as a questionnaire-based assessment of practitioner perceptions and management priorities rather than as a substitute for objective injury, incident, inspection, or audit data.

Based on the detailed methodological, statistical, and textual proofs presented above, it becomes evident that the authors have addressed the principal criticisms by clari-

No.	Discussion Pillar	The Commentator's Claim in His Commentary	The Explicit Text and Scientific Evidence from the Original Study
1	Research Gap and World Bank Standards	Systems are fully funded and existent within the three entities, and there is no evidence gap.	The study proved that the problem lies in field execution through contractors, and Table 5 and Section 4.4 proved that monitoring and evaluation challenges reached 83.8% and that <i>"even when procedures exist, performance tracking is inconsistent."</i>
2	Sample Size Formula and Purposive Sampling	Logical contradiction between calculating a finite population sample (360) and using a purposive sample (171).	Section 3.2 stated verbatim that the formula was used <i>"solely to estimate the desired response volume for field outreach planning and not to infer statistical population representativeness."</i>
3	Representation of Specialists and Sample Homogeneity	Attacked in Section 3 the presence of 18.7% of environmental engineers, procurement, and consultants, then criticized in Section 4 the absence of environmental and social risk specialists.	An explicit Apparent Tension by the commentator; Table 2 and its footnote documented the participation of safety engineers (9.9%), project managers (15.8%), civil and structural engineers (48.5%), and environmental engineers, consultants, and procurement officers (18.7%).
4	Cronbach's Alpha Coefficient (0.972)	Exceeding the value of 0.95 inevitably means item redundancy and response bias.	Alpha rises mathematically due to the instrument's length of 60 items (Field, 2024) [7], and Section 3.3 proved the absence of verbal redundancy because Pearson correlations between items and their dimensions ranged between 0.353 and 0.828.
5	Descriptive Ranking of Means	Ranking dimensions without non-parametric tests (Friedman or Wilcoxon) is statistically unproven.	Section 4.3 stated explicitly that <i>"the ranking is descriptive, and closely spaced differences should be interpreted as broadly similar priorities rather than statistically distinct positions."</i>
6	Worker Participation (ISO Clause 5.4)[8]	The study blames workers and places their participation at the bottom.	Worker participation achieved an "Influential" rating (mean of 4.00 and RII of 80%), and Section 4.3 placed the blame on <i>"hierarchical site cultures, temporary labor, and limited consultation mechanisms"</i> and emphasized the imperative of enhancing worker participation.
7	Leadership and Accountability (ISO Clause 5.1)[8]	The recommendation transfers accountability to supervisors and exempts top management.	<i>"Top Management Commitment and Accountability"</i> ranked first (mean of 4.52), and Section 5.2 stipulated assigning responsibilities to project managers and supervisors while establishing measurable indicators and reviewing performance regularly in accordance with Clauses 5.1 and 5.3.
8	Minimum Package and Procurement (ISO Clause 8.1.4)[8]	The recommendation compromises worker safety and licenses the purchase of poor local equipment.	Section 4.3 stipulated <i>"preserving core preventive functions,"</i> and Sections (4.4 and 5.2) stipulated specifying PPE standards in contracts, supplier quality criteria, contractor pre-qualification, and penalties for non-compliance.

ying the evidence and scope of the study and resulted from a different interpretation of selected passages of the texts of the original paper, conceptual and statistical confusion, and internal contradictions in the commentator's presentation. The authors affirm that their published study represents a sober and reliable scientific and practical contribution, providing an integrated, evidence-based framework for strengthening occupational health and safety management systems in construction projects in Yemen in accordance with the highest international standards.

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