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Guidance to critical realism mixed-methods research framework: A must-adopt approach to explore the relationship of social realities

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Abstract

This study examines the fundamentals of adopting a Critical Realist Mixed-Methods Research Framework to investigate the complex interplay of social realities. Rooted in Roy Bhaskar's philosophical foundations, particularly his stratified ontology and commitment to epistemological Realism, this framework offers a structured lens through which researchers can move beyond surface-level observations to examine the deeper causal mechanisms at work. Drawing on Margaret Archer's morphogenetic approach and Tony Lawson's theory of social positioning, it facilitates a nuanced analysis of how structural, cultural, and individual (agential) factors interact to shape related behaviors and their outcomes.

By integrating the methodological insights of Zachariadis et al. (2013) and Douglas (2010), the research design employs both quantitative and qualitative strands in a retroductive logic of inquiry, allowing for an iterative movement between empirical data and theoretical abstraction. The study further operationalizes realist evaluation principles (Pawson and Tilley, 1997; Allana and Clark, 2018) and realist explanatory case study methods (Eastwood et al., 2016) to investigate how mechanisms such as power dynamics, organizational routines, leadership practices, and cultural equity influence occupational health and safety (OHS) performance under specific contextual conditions.

The framework also incorporates applied insights from recent realist-informed research in safety, public health, and organizational development (Muselela et al., 2022a, 2022b, 2023; Chebrolu et al., 2024), ensuring methodological coherence and practical relevance. This approach ultimately aims to inform more reflexive, context-sensitive management strategies within globalized industrial environments.

Keywords: Critical Realism; Mixed Methods; Organizational Culture; Cultural Relativism; Human Agency; Thematic Analysis

1. Introduction

The philosophical foundation of this study was grounded in Critical Realism (CR), a paradigm first articulated by Bhaskar (1975), which posited a stratified ontology of social reality. This ontology distinguishes among the empirical, the actual, and the real (underlying causal mechanisms).

Sayer (1992), Archer (1995), and Lawson (1997) further advanced the ontological foundations by significantly deepening the understanding of the interaction between human agency, social structures, and causal powers within complex systems.

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Drawing on postpositivist and interpretive-descriptive traditions, researchers such as Creswell (1998), Saunders et al. (2007), and Cochran-Smith (2009) emphasized the value of integrating qualitative and quantitative strategies. The researcher's work supported the development of research frameworks capable of addressing multifaceted phenomena through both breadth and depth. In addition, it is within this tradition that the CR framework facilitated the blending of interpretive-descriptive phenomenology with realist inquiry, offering a powerful means to engage with causal complexity and contextual variability.

The application of this framework has been demonstrated in recent empirical studies, notably by Muselela et al. (2022a, 2022b, 2023), which have provided practical insights into its implementation within organizational contexts. The researchers employed a convergent parallel mixed-methods design (Creswell and Plano Clark, 2017), which combined both qualitative and quantitative data through simultaneous collection and analysis.

The research methods included self-administered surveys, focus group interviews, and document analysis. This multi-method approach enabled triangulation across the empirical, actual, and real domains, aligning with the principles of the Critical Realism (CR) framework and informed by the Theory of Reasoned Action. The analysis performed in this research highlighted tensions between individual ethical judgments and the collective norms embedded in the broader safety culture.

These contributions aligned with and extended contemporary realist-informed research in public health, development, and information and communication technology (ICT) (Allana and Clark, 2018; Eastwood et al., 2016; Bogna et al., 2020; Heeks, 2018; Davies et al., 2021; Mercier et al., 2023; Imran, 2024; Chebrolu et al., 2024).

2. Problem Statement: Framework Guide to Identifying the Research Problem

2.1. Theoretical Foundation: Generative Mechanisms and Stratified Ontology

The research inquiry begins with the identification of a complex real-world problem embedded in a multilayered social structure. In the tradition of Critical Realism, this phase was underpinned by the ontological and epistemological work of Bhaskar (1975) and Sayer (1992), who assert that observable phenomena in the empirical world are merely expressions of deeper generative mechanisms operating within the 'real' domain of social structures. Bhaskar (1975) argues that researchers should move beyond accepting empirical patterns at face value, instead seeking explanatory depth that reveals the layered structures underlying observable events.

Building on this, Archer's (1995) morphogenetic approach highlights the role of temporality and the dynamic interaction between structure and agency in shaping social outcomes over time. Guided by these theoretical perspectives, the present study aimed to go beyond surface-level correlations and investigate the causal powers and structural conditions influencing occupational health and safety (OHS) performance within multinational organizational contexts. The approach aligns with Lawson's (1997) call for economists and, by extension, social researchers to prioritize ontological Realism over empirical regularity, thus facilitating transformative insight into systemic problems or dysfunctions.

2.2. Applied Context: Culture and Organizational Risk

In applied terms, the study builds on the critical realist evaluations conducted by Muselela et al. (2022a, 2022b, 2023), who explored the influence of cultural equity and safety values on occupational safety outcomes. Their research highlighted how perceived cultural preferences and prioritization of safety vary significantly across organizational hierarchies. Drawing from these findings, the current study recontextualizes the issue as one of deeper cultural and systemic disjuncture rather than isolated behavioral noncompliance or technical failure.

Similar applications of realist inquiry appear in the work of Eastwood et al. (2016), who examined postnatal depression within socio-ecological systems using realist explanatory theory-building methods. These studies reinforce the importance of theorizing how structural enablers and constraints, mediated by individual perception and agency, produce tangible health and safety outcomes.

2.3. Empirical Phenomenon: Cultural Disparities

The need to identify and explain these generative mechanisms is further supported by the work of Douglas (2010) and Ackroyd and Fleetwood (2000), who illustrate how management theories, when guided by critical Realism, uncover often-ignored structural explanations for organizational dysfunction. Muselela et al.'s (2022a) mixed-methods research

framework, grounded in Critical Realism, enables the examination of both the observable symptoms of safety failure and their underlying structural causes.

2.4. Interpretive Phenomenological Focus: Perception, Prioritization, and Ethics

As noted by Markham (2017), phenomenological inquiry in digital and organizational contexts reveals not only how individuals perceive social structures but also how they internalize and resist them.

The present study thus addresses a dual imperative: it seeks both to expose the deep causal structures undermining OHS performance and to interpret how these structures are experienced, normalized, or contested by workers and managers. This fusion of Realism and interpretivism, as suggested by Zachariadis et al. (2013), aligns with a convergent mixed-methods logic that seeks both explanation and understanding.

3. Purpose of the study: Framework Guide to Identifying the Purpose

The primary purpose of this study was to demonstrate the value and applicability of the Critical Realism Mixed-Methods Research Framework as a methodological approach for exploring complex social phenomena, particularly within organizational and safety-related contexts.

The research aims to demonstrate how Critical Realism offers a philosophically informed approach to uncovering deeper. These generative mechanisms underlie social realities rather than focusing on incidents or behaviors at a superficial level. The study argued that such an approach was especially vital in organizational settings where multilayered interactions between structural conditions, cultural dynamics, and individual agency influence outcomes such as organizational performance.

The alarming Culture and Organizational Risk acted as a practical catalyst for deeper methodological reflection. However, the central aim of the study remained firmly rooted in promoting Critical Realism as both a methodological and epistemological framework, one that challenges reductionist thinking and moves beyond purely empirical accounts of complex social issues.

The researcher employed a convergent parallel mixed-methods design, informed by the philosophical foundations laid out by Bhaskar (1975), Archer (1995), Sayer (1992), and Lawson (1997). The framework allowed for the triangulation of data across the empirical, actual, and real domains, thereby facilitating a comprehensive analysis of how culture and OHS performance are shaped. This included integrating interpretive-descriptive phenomenology to understand subjective meaning-making processes while also employing realist explanatory strategies to reveal systemic mechanisms.

Furthermore, the study drew upon the applied work of scholars such as Muselela et al. (2022a; 2022b; 2023), whose research demonstrated the practical utility of Critical Realism in workplace safety analysis. It also reflected broader methodological insights from Eastwood et al. (2016), Bogna et al. (2020), Chebrolu et al. (2024), and others who employed Critical Realism in diverse health and development settings.

This study emphasized the framework's relevance for developing ethically informed, context-sensitive strategies for change. Sought to establish Critical Realism as an essential methodological paradigm for mixed-methods researchers seeking to move beyond empirical description toward deeper, causal explanations of social phenomena.

In alignment with the overarching purpose of the study to illustrate the methodological strength of Critical Realism in examining complex social realities, the researchers under this framework are guided by the following specific objectives:

- To investigate the underlying generative mechanisms contributing to problems or failures.
- To examine how individual perceptions, cultural norms, and organizational structures interact to shape safety behaviors and influence outcomes.
- To apply the Critical Realism Mixed-Methods Research Framework as a methodological lens that integrates both qualitative and quantitative approaches for analyzing complex social phenomena.
- To demonstrate how interpretive-descriptive phenomenology, when embedded within a critical realist paradigm, can enhance understanding of subjective experiences within structurally conditioned environments.

- To contribute to awareness of the development of practical, context-sensitive strategies that focus on improving workplace safety through insights derived from in-depth causal analysis rather than surface-level correlations.

4. Significance of the study: A guide to establishing the Purpose

First, the research provided a rigorously tested application of the Critical Realism Mixed-Methods Research Framework, showcasing its relevance for exploring socially embedded, causally layered problems. By drawing on the ontological stratification of reality and a generative understanding of causality, the study addressed epistemic limitations found in both traditional positivist and purely interpretivist approaches.

Second, the study generated contextually grounded insights into the dynamics of culture within an organizational setting, which is often underrepresented in critical realist literature. The findings provided valuable, real-world guidance for developing culturally sensitive interventions and risk mitigation strategies that consider both individual perspectives and broader systemic limitations.

In addition, the study added to the growing body of work shaping the evolution of critical realist research methodology. The results of the study help in formulating Culture-sensitive Prevention strategies that take into account both personal perspectives and societal limitations.

Finally, the research added to the developing body of work on critical realist methodology. This has been demonstrated by advancing a synthesized model that integrates ethical subjectivism, cultural relativism, and morphogenetic theory. This approach foregrounded the interaction between human agency and structural conditioning, which reinforced the argument for ethically informed and ontologically grounded research in organizational contexts.

5. Theoretical framework

5.1. Philosophical Foundations: Critical Realism

The philosophical foundation of this study was grounded in Critical Realism (CR), as initially proposed by Bhaskar (1975, 1979) in a study called the Realist Theory of Science. Bhaskar's framework outlines a stratified ontology consisting of three domains: the real (underlying structures and mechanisms), the actual, and the empirical (events that are experienced or observed). This ontological Realism was paired with epistemic relativism and judgmental rationality, which together assert that while reality exists independently of our knowledge, our understanding of it is always partial, situated, and open to critique and refinement. Ontological Realism, accompanied by epistemic relativism, recognizes that all knowledge is fallible and socially constructed, and judgmental rationality asserts that rational decisions can still be made among competing explanations (Bhaskar, 1975; Sayer, 1992).

Archer, (1995). Lawson (1997) demonstrated that CR provides a philosophical bridge that reconciles structure and agency, making it particularly suitable for mixed-methods research that investigates the relationships between individual perceptions, cultural values, and institutional arrangements (Archer, 1995; Lawson, 1997). Archer's morphogenetic approach explains how social structures and human agency interact over time, thus informing this study's interest in how safety culture evolves within organizational systems.

5.2. Interpretive-Descriptive Phenomenology: Understanding Lived Experience

Complementing Critical Realism, this study incorporated interpretive-descriptive phenomenology to understand the lived experiences and subjective meanings of organizational actors. Drawing from van Manen (1990) and Charmaz (2006), this approach emphasized how individuals make sense of their cultural and organizational contexts, particularly how safety values and priorities are internalized and enacted.

This methodological stance provided a bridge between structural causality (as identified through CR) and lived experience (as illuminated through phenomenology).

5.3. Framing Initial Theories and Causal Hypotheses

In line with Sayer's (1992) call for methodological pluralism within Critical Realism (CR), the study employed middle-range theories to formulate initial hypotheses about the causal mechanisms linking cultural values and Occupational

Health and Safety (OHS) performance. This theoretical framing allowed the researchers to conceptualize safety culture as a generative mechanism influenced by both institutional structures and individual agency.

Other applied CR researchers further illustrate this approach: Brown (2021) explored identity and reflexivity in education, Hastings (2021) analyzed structural causes of homelessness, and Cabote et al. (2024) examined caregiving burdens among Aboriginal communities by linking individual experiences to systemic inequities. These examples support the notion that CR-based frameworks, as applied by Muselela et al. (ibid.), can be used not only for explanation but also for actionable transformation.

5.4. Initial Theoretical Framing and Conceptual Development

Muselela et al. (2022b, 2023) hypothesized that organizational culture mediated by local and expatriate value systems acted as a generative mechanism influencing OHS performance. The notion that perceptions of fairness, prioritization, and cultural preferences impact safety behaviors formed the cornerstone of this hypothesis.

This theoretical stance aligns with the work of Bogna et al. (2020), who designed CR-based models for hazard identification, and Brown (2021), who integrated embodiment theory with CR to explore identity and reflexivity in education. Hastings (2021) and Cabote et al. (2024) similarly demonstrated how CR can reveal hidden structural constraints that shape homelessness and caregiving experiences, respectively.

5.5. Integration with Mixed Methods

As emphasized by Zachariadis et al. (2013), CR supports mixed methods designs through its commitment to causal explanation and its flexibility across epistemologies. This framework allowed the integration of qualitative thematic analysis with quantitative performance metrics and document review, providing a triangulated, multilayered understanding of the problem domain. Onwuegbuzie and Leech (2010) further validated the use of CR in such designs, supporting the methodological compatibility between realist ontology and interpretive inquiry.

5.6. Integration with Interpretive-Descriptive Phenomenology

While Critical Realism provides a robust ontological and epistemological foundation, this study also integrated interpretive-descriptive phenomenology to capture lived experiences and individual sense-making processes. This methodological complementarity is grounded in the belief that subjective interpretations are essential for understanding how individuals navigate and internalize institutional safety norms and practices (van Manen, 1990; Charmaz, 2006).

Phenomenology, particularly in its descriptive form, enables the researcher to interpret the meanings that individuals assign to their social and cultural realities. In this study, phenomenological insights were crucial in understanding how employees' perceptions of safety culture were shaped by personal values, cultural norms, and social conditioning, which in turn influenced their behavior and attitudes toward occupational safety.

5.7. Application of Multilayers: Bridging Philosophy and Practice

The theoretical foundations of CR were not merely philosophical abstractions but served as the basis for applied research examining stratified realities. Muselela et al. (2022a, 2022b, 2023) employed CR to investigate how cultural values, safety perceptions, and institutional arrangements influenced occupational safety outcomes. By integrating Bhaskar's ontological stratification with Archer's morphogenetic sequences, their research revealed how individual perceptions and organizational culture co-evolve to shape performance, with the practical application echoed in related realist studies.

For example, Eastwood et al. (2016) employed a realist explanatory theory-building method to explore postnatal depression, while Bogna et al. (2020) applied Critical Realism (CR) to enhance hazard identification in occupational health settings.

Similarly, Chebrolu et al. (2024) employed realist evaluation in healthcare improvement projects, and Davies et al. (2021) demonstrated the utility of CR in participatory budgeting within public sector governance.

5.8. Application in Health and Organisational Research

The application of Critical Realism has been extended and operationalized in various applied research contexts. Allana and Clark (2018) conducted a scoping review of realist evaluations in public health, arguing for the necessity of understanding context–mechanism–outcome (CMO) configurations to enhance the effectiveness of health interventions. Similarly, Heeks (2018) employed CR in the field of ICT for Development (ICT4D), utilizing a philosophical framework to address the complex interplay between technological systems, institutional structures, and user behavior.

In occupational health and safety (OHS), Bogna et al. (2020) developed a pilot CR framework for improving hazard identification. Their work aligns with this study's premise that unsafe workplace events are products of deeper, often hidden mechanisms shaped by organizational culture, policy, and employee perceptions. Furthermore, Muselela et al. (2022a, 2022b, 2023) applied Critical Realism (CR) to explore how cultural norms and perceptions shape safety culture and performance, offering critical insights into the role of cultural equity, individual agency, and social structures in workplace safety outcomes.

6. Methodological approach

6.1. Philosophical Foundations

This study was grounded in Critical Realism (CR), a philosophical orientation that offered a stratified ontology distinguishing between the empirical (experiences), the actual (events), and the real (underlying mechanisms) (Bhaskar, 1975; Archer, 1995; Sayer, 1992). CR recognized the layered, emergent, and causally complex nature of social phenomena, making it well-suited to investigating the interrelations among individual agencies, cultural logics, and institutional structures within occupational health and safety (OHS) contexts. This ontological depth enabled the identification of generative mechanisms beneath observable patterns (Lawson, 1997; Eastwood et al., 2016).

6.2. Mixed-Methods Design Logic

Consistent with CR's principle of methodological pluralism, a convergent parallel mixed-methods design was adopted (Creswell and Plano Clark, 2017). This design facilitated the simultaneous collection and integration of qualitative and quantitative data within a coherent philosophical framework. Data were triangulated across Bhaskar's (1975) three ontological domains, thereby allowing empirical patterns to be contextualized within deeper explanatory structures (Zachariadis et al., 2013; Onwuegbuzie and Leech, 2006).

6.3. Research Design: Qualitative Core, Quantitative Complement

In Muselela et al. (2022b, 2023), the research design was anchored in a qualitative core with a complementary quantitative strand. Lawson (1997) argued that explanatory depth was best achieved through methods capable of interrogating the layered nature of reality. Qualitative inquiry explored the organizational, cultural, and normative dynamics underpinning safety culture, while Muselela et al. (2022b, 2023) used quantitative data to measure patterns and test working hypotheses. This integrated approach mirrored applications of CR in similar domains by Douglas (2010), Muselela et al. (2022a), and Imran (2024) and was operationalized through abductive and retroductive logics consistent with CR and the iterative RADaR technique (Watkins, 2017; Zachariadis et al., 2013).

6.4. Qualitative Data Collection

In Muselela et al. (2022b, 2023), the researchers gathered qualitative data through in-depth focus group interviews, reflexive memoing, and documentary analysis. These methods were selected to capture lived experiences and perceptions of safety culture. The design followed Archer's (1995) morphogenetic approach, which analytically separates structure and agency to examine their interplay over time. Methodological alignment with the researcher's work was established through the works of Padgett (2012), Mercier et al. (2023), and Muselela et al. (2023). Additionally, arts-based and embodied approaches were considered to access practical and non-verbal dimensions of safety experiences (Brown, 2021).

6.5. Qualitative Data Analysis

Thematic analysis was employed during data analysis (Braun and Clarke, 2006), supported by abductive and retroductive reasoning. These inferential strategies are central to CR, facilitating the identification of causal mechanisms and theorizing underlying structures from surface-level patterns (Bhaskar, 1975; Chebrolu et al., 2024; Markham, 2017). This analytical logic enabled the study to move from descriptive codes to explanatory narratives grounded in empirical data (Muselela et al., 2022b).

6.6. Hypothesis Development and Theorisation

Emergent qualitative findings were abstracted into working hypotheses through abductive theorizing, informed by Archer's (1995) morphogenetic sequence. These hypotheses aimed to capture the recursive interactions between institutional conditions, cultural logic, and individual practices over time. This approach was similar to those adopted by Allana and Clark (2018), Mukumbang (2023), and Fletcher (2017), who developed mid-range theories in complex programmatic and organizational settings.

6.7. Quantitative Data Collection

This methodological choice aligned with Muselela et al. (2022a) and Imran (2024), who used CR logic to guide tool development in safety and cybersecurity domains.

6.8. Quantitative Data Analysis

The quantitative data are analyzed using descriptive and inferential statistics, including multilevel modeling, to detect patterns and demi-regularities (Sayer, 1992). Rather than testing causality in a positivist sense, the analysis sought to establish the plausibility of hypothesized generative mechanisms. This strategy reflected the work of Eastwood et al. (2016), Hastings (2021), and Zachariadis et al. (2013), who interpreted statistical findings within CR's layered explanatory framework. Muselela et al. (2023) similarly quantified the relationship between cultural misalignment and safety outcomes in multicultural organizational settings.

6.9. Methodological and Philosophical Justification for CR Mixed-Methods

The rationale for employing a CR mixed-methods framework was both philosophical and practical. Traditional mono-method designs were insufficient for interrogating the interplay of agency, culture, and structure in high-risk organizational environments. CR, as articulated by Bhaskar (1975), Archer (1995), Sayer (1992), and Lawson (1997) offered a coherent ontological and epistemological basis for exploring these complexities.

The convergent design supported the alignment of data types across CR's stratified ontology: self-reported survey data captured behavioral regularities in the actual domain, focus groups revealed lived experiences in the empirical domain, and documentary analysis illuminated institutional logics in the real domain (Creswell and Plano Clark, 2017; Zachariadis et al., 2013). The study's epistemic relativism and commitment to judgmental rationality enabled iterative knowledge-building through the integration of qualitative and quantitative findings (Onwuegbuzie and Leech, 2006; van Manen, 1990; Charmaz, 2006).

The CR logic of inquiry was validated through applied research in related fields: Muselela et al. (2022a; 2022b; 2023) in occupational safety, Eastwood et al. (2016) in public health, and Chebrolu et al. (2024) in healthcare quality improvement. These studies demonstrated CR's power in uncovering causal mechanisms masked by surface-level data.

7. Presentation of Findings

It contextualizes the integration of qualitative and quantitative findings within the logic of Critical Realism and presents the research process in a coherent narrative using Harvard referencing:

7.1. Integration and Triangulation of Findings

The final stage of the research involved integrating and triangulating qualitative and quantitative findings to construct a comprehensive, explanatory account of how safety culture influenced occupational health and safety (OHS) performance. This process adhered to the critical realist principle of inference to the best explanation (Bhaskar, 1975; Sayer, 2000), wherein data from distinct ontological levels were synthesized to uncover the generative mechanisms behind observed patterns.

The integration process was grounded in Archer's (1995) morphogenetic framework, which provided a conceptual structure for examining the recursive interplay between structural conditions, cultural logic, and individual agency. By juxtaposing narrative accounts from focus groups with quantified survey data and archival metrics, the study moved beyond descriptive convergence to develop deeper causal explanations, a hallmark of critical realist research (Smith and Elger, 2014; Zachariadis et al., 2013).

This approach was reflected in the present study, where thematic patterns (e.g., perceptions of safety responsibility and trust in leadership) were mapped against statistical regularities (e.g., safety climate scores and incident frequency) to explore causal interconnections.

Similar triangulation strategies have been employed across applied CR studies. Brannen (2005) was among the first to operationalize CR-informed triangulation across life domains, using it to enrich the understanding of social and work identities. Douglas et al. (2010) used CR logic to integrate qualitative and quantitative data in a study on smoking cessation, while Mercier et al. (2023) triangulated perspectives from staff and youth participants to evaluate developmental program outcomes. Muselela et al. (2023) merged interview and survey data in their examination of safety performance across culturally diverse organizational settings, demonstrating the capacity of CR to uncover latent tensions and structural contradictions.

In the present study, triangulation also involved the development of joint displays (Onwuegbuzie and Leech, 2006) and narrative matrices, which juxtaposed emergent themes with quantitative indicators to identify demi-regularities and context-mechanism-outcome (CMO) patterns (Mamabolo and Myres, 2019).

8. Discussion of Findings

8.1. A Critical Realist Interpretation

This study employed a Critical Realist Mixed-Methods Research Framework to investigate how safety culture influences occupational health and safety (OHS) performance in a multinational organizational setting. The integration of Archer's (1995) morphogenetic approach and Sayer's (2000) realist methodology facilitated an iterative movement between theory and data, enabling the identification and explanation of generative mechanisms.

8.2. Causal Explanation and Theoretical Refinement through Retroduction

Rather than seeking merely empirical regularities, the study employed retroduction, a core epistemic strategy in Critical Realism, to hypothesize the causal mechanisms underlying observed safety performance outcomes. Initial analysis identified empirical patterns (demi-regularities) such as variation in safety compliance, discrepancies in risk perception, and differential engagement with safety procedures across cultural groups.

Through abductive re-description and retroductive reasoning, these patterns were theorized as the effects of deeper, stratified mechanisms, including.

- Leadership Legitimacy: Trust in safety leadership emerged as a generative mechanism shaping employee engagement with OHS procedures. This aligns with Archer's (1995) concept of cultural system conditioning and empirical work by Muselela et al. (2022a, 2023).
- Cultural Congruence: The alignment (or misalignment) between localized safety norms and institutionalized safety protocols influenced employee perceptions of procedural relevance.
- Agential Mediation: Actor reflexivity, particularly among mid-level managers and frontline staff, mediated the effects of institutional mechanisms consistent with Archer's morphogenetic sequences.

These mechanisms were not directly observable but were inferred through a realist logic of inquiry, consistent with Danermark et al. (2002) and Lawson (1997). The refinement of explanatory models thus centered on uncovering how multiple mechanisms interacted contingently under open-system conditions to produce specific OHS outcomes.

8.3. Integration and Triangulation in Open Systems

The integration of quantitative and qualitative data followed the Critical Realist principle of judgmental rationality, which involves the rational evaluation of competing explanations based on their explanatory power (Bhaskar, 1986). Through triangulation, the study did not seek convergence of findings but instead employed the logic of explanatory depth (Sayer, 2000; Watkins, 2017). This approach acknowledged the complexity and partiality of each method, allowing the synthesis to yield a richer causal narrative.

Following Brannen's (2005) framework for CR-informed triangulation and Douglas et al. (2010), the integration phase produced a multilayered explanatory account rather than a singular 'truth.' For example, survey data highlighted differences in perceived safety climate. At the same time, interviews revealed that these perceptions were shaped by

informal hierarchies, expatriate-local dynamics, and tacit workplace norms—mechanisms that are only visible through qualitative engagement.

8.4. Implications

8.4.1. The Emancipatory and Transformative Potential of CR Inquiry

A foundational tenet of Critical Realism is its emancipatory intent—to generate knowledge that is not only explanatory but also transformative (Bhaskar, 1998; Markham, 2017). This study's findings carry direct implications for both organizational intervention and policy formation in multinational contexts:

- Culturally Responsive Safety Leadership Interventions should be attuned to the cultural and structural dynamics that shape perceptions of safety authority and legitimacy. This requires reflexive leadership development that recognizes diversity in values and communication norms.
- Embedded Reflexivity: Safety systems should institutionalize reflexive spaces such as participatory feedback mechanisms that enable employees to contest, interpret, and revise safety norms based on their lived experiences.

These recommendations align with the CR commitment to bridging explanation and praxis, a dual agenda articulated in applied studies by Muselela et al. (2022b, 2023), Imran (2024), and Peter and Park (2018). Through its focus on structure-agency interaction, this research highlights the contingent, transformable nature of OHS systems and the role of reflexivity in fostering more inclusive and effective safety cultures.

8.4.2. Reflexivity and Researcher Positionality in CR Praxis

Critical Realism asserts that knowledge is socially produced and epistemically mediated. As such, this study incorporated methodological reflexivity to critically examine how the researchers' ontological assumptions, positionality, and methodological choices shaped knowledge production (Peter and Park, 2018; Brown, 2021).

By acknowledging a partial standpoint, external researchers engage in what Watkins (2022) terms "ontological reflexivity": a reflexive dialogue with the reality being studied rather than mere introspective subjectivity. This enabled ethical engagement with participants and a deeper awareness of how power, language, and institutional positioning influence both access and interpretation.

8.5. Limitations in Critical Realist Context

Although the Critical Realist framework provides profound, explanatory insights, several limitations remain.

- Contextual Contingency: As CR emphasizes, generative mechanisms operate differently across contexts. The explanatory model developed here reflects the contingent interaction of specific cultural, structural, and institutional factors, which necessitates caution and contextual reinterpretation for transferability.
- Temporal Constraints: CR views social change as emergent over time. The cross-sectional design limited the study's ability to track morphogenetic cycles longitudinally.
- Access to Deep Causal Layers: Although the study aimed to access deeper mechanisms, some, particularly at the institutional or macroeconomic level, remained partially opaque, constrained by methodological and organizational boundaries.

9. Conclusion

This study demonstrates the unique value of Critical Realism in occupational health and safety research by moving beyond surface-level correlations to explore the generative mechanisms underlying safety culture and performance outcomes. Through stratified ontology, retroductive inference, and epistemic reflexivity, the research uncovered how safety practices emerge from dynamic interactions between institutional structures, cultural beliefs, and agential responses.

The theoretical contributions lie in refining a context-sensitive model of safety culture grounded in CR principles. The practical implications emphasize the need for culturally embedded and reflexively developed safety systems in globalized organizational settings. Most importantly, this research affirms the emancipatory power of Critical Realism not merely to understand the world but to transform it under real and complex conditions.

Contribution to Theory and Practice

This study contributes to both theoretical development and practical application through the systematic application of a Critical Realist Mixed-Methods Research Framework. Theoretically, it advances the integration of Critical Realism with interpretive-descriptive phenomenology, demonstrating how retroductive reasoning, depth ontology, and methodological triangulation can be effectively employed to uncover the generative mechanisms underlying safety culture and occupational health and safety (OHS) performance. By linking Bhaskar's (1975, 1998) stratified ontology with Archer's (1995) morphogenetic approach, the study refines existing models of safety behavior and organizational culture, highlighting the causal pathways through which contextual and cultural mechanisms shape health and safety outcomes.

Methodologically, this research illustrates how Critical Realism can be applied across all phases of a research project—from conceptual framing and data collection to integration, explanation, and theoretical refinement. This methodological versatility reinforces the explanatory power of Critical Realism as it has the capability of addressing complex social phenomena within organizational systems.

Practically, the study provides actionable insights for enhancing occupational health and safety (OHS) performance in multicultural organizational settings. Key contributions include the development of culturally tailored safety interventions, improved communication strategies between management and employees, and the empowerment of individual agencies through participatory safety programs.

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