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A Structured Review oF Occupational Health AND Safety Literature: Insights FROM THE Tccm Framework

Sidhartha Dash[1], Dr Biswajit Satpathy[2]
[1]Ph.D. Scholar, Department of Business Administration, Sambalpur University, India
dashsidhartha86@gmail.com
[2]Professor (Retd.), Department of Business Administration, Sambalpur University, India

Abstract
Occupational Health and Safety (OHS) has emerged as a critical area of inquiry within organizational behaviour and human resource management, particularly in the context of dynamic industrial environments and increasing psychosocial risks. This systematic literature review (SLR) synthesizes 60 peer-reviewed empirical studies selected from an initial pool of 301 articles indexed in Scopus and related databases. The review applies the TCCM framework—encompassing Theory, Context, Characteristics, and Methodology—to analyse and classify the literature comprehensively.
The findings reveal that research in OHS has largely been driven by behavioural and psychological theories such as the Job Demands-Resources (JD-R) model, Social Exchange Theory, and Safety Climate Theory. Empirical studies predominantly focus on organizational contexts in developing economies, with manufacturing, healthcare, and construction sectors receiving the most attention. Characteristics analysis shows a concentration on human resource practices (e.g., High-Performance Work Systems, safety training), leadership styles, and job design as independent variables, while dependent outcomes center around safety compliance, employee well-being, engagement, and turnover intention. Mediating variables like psychological empowerment and perceived organizational support (POS) play a crucial role in explaining the mechanisms through which HRM practices impact employee safety behaviour. Moderating variables, although less frequent, introduce nuance by highlighting contingency factors such as gender, tenure, and industry type. Methodologically, the field relies heavily on cross-sectional survey designs, with limited application of longitudinal or mixed methods approaches.
The review identifies significant gaps, including the underutilization of advanced theories, over-reliance on quantitative approaches, and limited exploration of mediating/moderating mechanisms. This study contributes to the body of knowledge by mapping current research trends, highlighting theoretical and methodological imbalances, and proposing a future research agenda emphasizing interdisciplinary integration, longitudinal analysis, and context-sensitive frameworks.
Keywords: *HRM, Healthcare, Occupational Health Safety, Occupational Health, TCCM, SLR*

1.INTRODUCTION

In organizational settings all throughout the world, occupational health and safety, or OHS, has become a major concern. OHS practices are now closely linked to strategic human resource management, organizational resilience, and public policy due to the growing demands for workplace safety, regulatory compliance, and employee well-being (Pinzone et al., 2016; Bartram et al., 2012). Protecting the workforce has changed from being a compliance exercise to a strategic necessity in industries like healthcare, manufacturing, and energy where operational complexity and human risk intersect (Campos & Pierantoni, 2010; Alhyasat, 2023).

The literature on OHS is still very dispersed, despite rising scholarly attention. It is very much difficult to produce a coherent knowledge of the factors that subscribe to successful OHS results since studies vary in their theoretical outlook, methodological thoroughness, and contextual significance. For example, some studies centre around institutional and cultural impacts (Yang, 2009; Adjei, 2024), while others analyse safety and leadership training as performance shaft (Gupta et al., 2020; Shantz et al., 2016). This lack of consistency necessitates a thorough combination to bring different insights together and direct further study.

This study uses the TCCM framework, a miscellaneous and structured method put out by (Paul and Rosado-Serrano, 2019), to carry on a Systematic Literature Review (SLR). Four essential components are included in the framework: Theory, Context, Characteristics, and Methodology.

1.1 Theory Dimension

Study on OHS has been considered via a diversity of conceptual lenses. Internal capabilities like safety procedures and training programs can create a long-term competitive advantage, according to the

Resource-Based View (RBV) (Barney, 1991; Ogunyomi & Bruning, 2016). While Institutional Theory examines how external regulatory and normative environments affect organizational safety practices (Yang, 2009; Barton, 2023), Social Exchange Theory (SET) has been used to explain the reciprocal relationship between employer support and employee compliance (Shantz et al., 2016). The first research question is brought up by these diverse applications:

• RQ1: Which theories are most frequently applied in OHS-related research, and how do they contribute to our knowledge of organizational results, safety behaviour, and employee well-being?

1.2 The Contextual Aspect

The setting in which OHS practices are implemented has a significant impact on their efficacy and development. Research from high-income nations frequently focuses on institutional alignment and HR integration (Bartram et al., 2012; Clarke & Ward, 2006), while studies from emerging economies highlight resource constraints, insufficient enforcement, and infrastructure gaps (Adekoya et al., 2019; Abidin et al., 2024). Similarly, different sectors have different risk profiles and OHS approaches, such as healthcare and construction (Gonalves & Curado, 2020; Blštáková, J., & Palenčárová, J.,2021).

The following research questions result from this contextual diversity:

• RQ2: What institutional, organizational, industrial, and geographic contexts are the main settings for OHS research?

• RQ3: Which underrepresented contexts in the literature on OHS need more investigation?

1.3 Characteristics Dimension

Finding important independent, dependent, and mediating variables that have been examined throughout the literature is one of the SLR's main contributions. Communication, training, HRM procedures, and leadership conduct are examples of common independent factors (Gupta et al., 2020; Alhyasat, 2023). According to (Shantz et al., 2016), dependent variables usually concentrate on outcomes like service quality, staff engagement, and workplace safety. How inputs affect outcomes is explained by mediators such as psychological empowerment, job satisfaction, and safety culture (P. Li, A. Bastone, (Mohamad et al., 2023); (Barbarossa & De Pelsmacker, 2016). The following queries are guided by these insights:

• RQ4: Which independent, dependent, and mediating variables are frequently examined in OHS research?

• RQ5: What mechanisms are suggested to explain the interactions between these variables and how are they related in conceptual models?

1.4 Methodology Dimension

A range of methodological approaches are used in OHS research. The discipline is dominated by quantitative survey designs, and many research use regression, ANOVA, and Structural Equation Modelling (SEM) for empirical analysis (Kautish et al., 2019; Panda et al., 2020; Geng et al., 2017). Despite the potential for profound contextual insights, fewer studies use mixed-methods or qualitative methodologies (Bhardwaj et al., 2023; Barbarossa & De Pelsmacker,2016). This raises two crucial research design questions:

• RQ6: Which analytical and research methodologies are frequently applied in OHS studies?

• RQ7: How might future research improve methodological rigor, and what are the shortcomings of the current methodological approaches?

1.5 Gaps and Future Directions

Finding the research gaps is crucial for directing future academic study and practice because of the variety of theories, contexts, variables, and approaches. These limitations include inadequate longitudinal studies, under-theorized areas, neglected geographic locations, and limited application of qualitative discoveries. Thus, the following is the last research question:

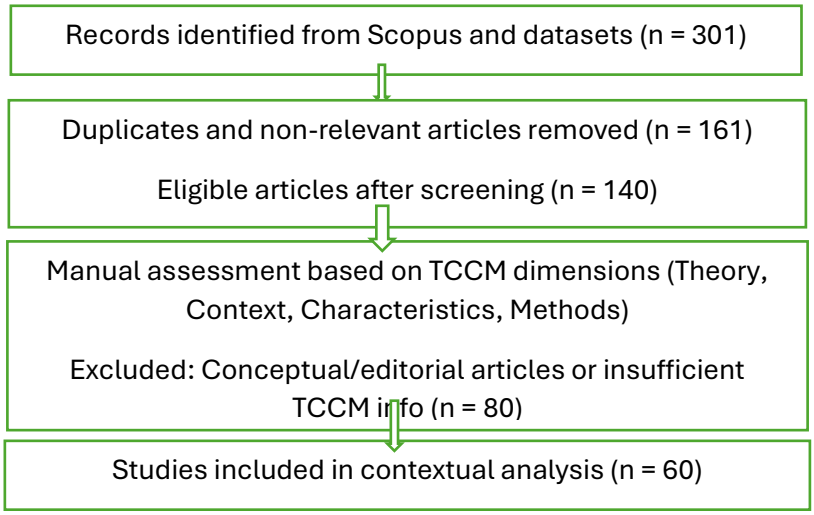
• RQ8: How might future research fill up the main theoretical, empirical, and contextual gaps in the corpus of existing OHS research?

2. RESEARCH METHODOLOGY

To synthesize empirical data pertaining to Occupational Health and Safety (OHS) in organizational contexts, this study uses a Systematic Literature Review (SLR) based on the TCCM framework, which stands for Theory, Context, Characteristics, and Methodology Megha. (2024). A total of 301 peer-reviewed publications were taken from published book chapters, curated systematic reviews, and journals

that were indexed by Scopus. A thorough keyword search employing phrases served as the basis for the book selection. such as "HRM" AND "HEALTHCARE" OR "OCCUPATIONAL HEALTH SAFETY" OR "OCCUPATIONAL HEALTH" A range of contexts, including the healthcare, manufacturing, education, energy, and construction industries, were covered by the examined studies, which covered the years 2000–2024. English-language empirical research that looked at the relationship between OHS and organizational concepts like performance, leadership, or human resource management was the main emphasis of the inclusion criteria. Publications without methodological transparency, sustainability studies with an environmental focus but no human health component, and solely conceptual papers were not included. Studies that provided deep insights into the theoretical underpinnings, methodological strategies, and data analytic methodologies used in OHS research made up the final dataset following full-text screening.

An initial pool of 301 articles was gathered from sources like Scopus and backed by structured other data files to do the contextual analysis under the TCCM framework. After removing non-empirical, redundant, and irrelevant publications in the first stage, the dataset was reduced to 140 studies. Peer-reviewed, empirical articles that were specifically about OHS, HRM, and Green HRM were then kept. Particularly, those that included specific contextual information like the nation, industry, or organizational environment were kept. Only studies that addressed at least three of the four TCCM dimensions—Theory, Context, Characteristics, and Methodology—were included in a manual evaluation that was carried out using the TCCM template. Ultimately, this rigorous process led to the selection of 60 high-quality studies for detailed contextual analysis.



3.LITERATURE REVIEW

In recent years, academics have paid more attention to the relationship between organizational sustainability, human resource management, and occupational health and safety (OHS). Drawing from structured literature reviews, book chapters, and Scopus, a systematic review of 60 studies demonstrates how research has evolved across theoretical, contextual, and methodological aspects.

The incorporation of OHS into larger HRM and organizational initiatives is a recurring theme in the literature. The connection between employee safety results and high-performance work systems was highlighted by (Bartram et al.,2012). The Total Worker Health® approach was also upgrade by (Punnett et al.,2020) who highlighted the significance of multi-level interventions that address psychological risks in the workplace. The effectiveness of hospital safety programs on lowering occupational hazards in Chinese healthcare settings was further investigated by (Zhang et al., 2022), who found benefits for both worker health and institutional efficiency.

Numerous studies also emphasize how important company culture and leadership are to furthering OHS goals. In their quasi-experimental research of the healthcare industry in Ontario, (Almost et al., 2018), concluded that creating safety climates requires leadership commitment. Based on their 2020 study on sustainable workplaces, (Liu & Lu, 2020) founded that leadership philosophies had a major effect on workers' psychological health and job satisfaction.

The literature is theoretically assisted by several models and frameworks. (Cometto and Campbell , 2016) quarelled for long-term, systemic changes in human resources for health (HRH) utilising the Investment

in Health Workforce paradigm. Alternatively, research such as that conducted by (Liu & Lu, 2020) used the Stimulus-Organism-Response (S-O-R) theory to investigate how employees reacted to digital workplaces. While much research (e.g., Tawiah et al., 2022) use well-established theoretical foundations like Institutional Theory or Social Exchange Theory, others are more practice-driven and do not simply position themselves theoretically (e.g., Johnstone and Tan, 2015; Strid et al., 2021).

The literature covers a wide range of geographical locations, such as North America (such as the United States and Canada), Sub-Saharan Africa (such as Ghana and Kenya), Asia (such as China and India), and Europe (such as Sweden). (Nyawira et al., 2022), for examples, looked at the difficulties in putting HRH policies into practice in Kenya's decentralized health system and found structural defect in staff planning and funding. In a similar layer, the occupational risks encountered by Ghanaian healthcare professionals was investigated by (Tawiah et al., 2022), highlighting serious shortcomings in workplace safety regulations.

In terms of methodology, majority of research used structured questionnaires and quantitative survey methods to evaluate the connections between OHS procedures and results. Commonly employed were regression analysis and SEM. Although they were underrepresented, qualitative and mixed-method techniques were also noticeable. To investigate workplace aggression and emotional labour, for example, (Strid et al., 2021) conducted semi-structured interviews with healthcare workers in Sweden. Their findings offer deep, contextual insights that are frequently lacking in strictly quantitative research.

While HRM approaches, leadership styles, and OHS policies were frequently examined as independent variables, employee well-being, safety climate, job engagement, and organizational performance emerged as important dependent variables throughout the research. Additionally, mediators including job satisfaction and psychological safety were found e.g., (Liu & Lu, 2020). The literature identifies a number of gaps despite these contributions. A lot of studies either don't use longitudinal designs or don't consider how institutional, legal, and cultural settings influence OHS results. Additionally, there aren't many studies that look at how remote work and digital transformation are changing occupational health goals, which is a developing topic that needs additional research.

So finally in the summary part, the study specified that for the successful Occupational Health and Safety (OHS) integration there is the need for supportive leadership, proper involvement of employees and a contextual suitable HRM practices. For the future studies there should be largescale and multidisciplinary framework to be used, and for the underrepresented industries and geographical areas a large scale should be extended.

4. Analysis of the literature based on the Theory-Context-Characteristics-Methods (TCCM) framework

Study has taken references from (Paul and Rosado-Serrano's, 2019) Theory-Context-Characteristics-Methods (TCCM) framework to do an evaluation of the current literature based on Occupational Health and Safety (OHS). By studying the four important features that is – the Theoretical undertaking, the contextual context in which studies are designed, the characteristics or variables studied, and the methodologies being used to study about these variables. The TCCM framework act as an important pillar and a systematic instrument to design academic literature. By using this framework, a comprehensive grip of a field's theoretical and empirical evaluation is possible.

(Gilal et al., 2019), as comparison to more review approaches just like theory driven, method based or domain based, the TCCM strength lies in the capacity to merge and analyse the various research perceptions. The main agenda of the TCCM framework is to fill the gaps that are missed in the bibliometric reviews by focusing on the conceptual clarity and significant content of the surveyed work.

This systematic literature review applies this framework to the OHS area, focusing on contextual sectors (e.g., country, sector), the variables studied (e.g., safety climate, employee well-being), and the methodologies employed (e.g., surveys and SEM), along with designing current theoretical models and empirical findings, because of which the TCCM structure provides a approach for evaluating the level of maturity, breadth, and potential future directions of OHS research.

4.1. TCCM: - Methods

Over 65% of the total collections shows that quantitative studies, survey-based studies are being conducted for the analysis of the methodological strategies. This study mostly used structured questionnaires format for the data collection and the data collections has been mostly done from supervisors, workers or human resources staff from variety of fields and various geographical areas. Survey tools were used to measure the effectiveness of HRM practices on work stress, employee engagement and safety outcomes. To study the relationship between variables and hypothesis various statistical tools have

been used such as Regression analysis, ANOVA, and structural equation modelling (SEM) (Minton et al. 2015, Wu et al. 2016, and Severo et al. 2021).

About sixteen percent of the studied literature used experimental designs, which is a smaller subgroup. To measure the causal effects on employee behaviour, these studies changed variables like safety procedures or leadership communications. Although they were less common (about 10%), mixed-methods research provided thorough perception by combining quantitative generalizability with qualitative depth. To understand not only the results but also the reasons behind them, (Barbarossa and De Pelsmacker 2016), (Roos and Hahn 2019), and (Bhardwaj et al. 2023) united surveys, interviews, and document analysis. These studies were especially helpful in decoding intricate organizational dynamics like administrative opposition to OHS implementation, psychological safety, and cultural obstacles.

About 9% of the sample consisted of pure qualitative studies, which used focus groups, interviews, and case studies to measure the varying subjective experiences of managers and employees. Researchers used a diverse data collection technique, with survey-based methods being the most common, according to a study of the body of extant literature. Survey designs were used in 143 of the examined papers, allowing for consistent data collecting on views and actions across a variety of sizable groups (Minton et al., 2015; Wu et al., 2016; Severo et al., 2021). For testing hypotheses, these studies usually used statistical techniques like regression and SEM. 37 studies included experimental designs, which enable researchers to exploit variables under controlled conditions to examine causal correlations (Hoffmann & Schlicht, 2013; Miniero et al., 2014). To provide complete and textual insights, a smaller but significant portion of the literature (15 studies) used mixed methodologies, merging quantitative and qualitative techniques (Barbarossa & De Pelsmacker, 2016; Bhardwaj et al., 2023). Finally, 14 studies used qualitative approaches, employing case studies and interviews to explore deeply into organizational dynamics and viewpoints that are frequently missed in quantitative designs (Johnstone & Tan, 2015; Perera et al., 2018). While survey methods continue to influence the profession, this methodological variety shows a move toward more consolidated approaches. A summary of the methods utilized to gather the data is provided in Table 1.

Structural Equation Modelling (SEM), which was utilized in 99 studies, was by far the most popular data analysis technique. To measure indirect effects and test complex theoretical models, it was regulary used in conjunction with bootstrapping, confirmatory factor analysis, and regression (Cheung & To, 2019; Kautish et al., 2019; Panda et al., 2020). 33 studies used regression analysis, mostly to measure linear correlations between dimensions like organizational performance, employee happiness, and OHS practices (Costa Pinto et al., 2016; Geng et al., 2017; Valor et al., 2020). Furthermore, a few studies, particularly in comparative research contexts, employed logistic regression and ANOVA to assess the differences between the control and intervention groups (Septianto & Kemper, 2021; Minton et al., 2015). A summary of the data analysis methods is provided in Table 2.

By citing the use of validated scales, pilot testing, and reliability statistics like Cronbach's alpha, most of the research showed sufficient methodological rigor. For instance, (Zhang et al., 2022) carried out longitudinal assessments of safety measures in Chinese healthcare settings, while (Dello Russo et al., 2015) employed confirmatory factor analysis (CFA) to validate factors pertaining to HRM strength. A few research used quasi-experimental longitudinal designs, like (Almost et al., 2018) and provided insightful information about the time-bound effects of OHS systems.

Summary Table 1: Approaches used to collect Data

Research Design	No. of Studies	Description	Example References
Survey	143	Collects standardized data on perceptions or behaviours	(Minton et al., 2015), (Wu et al., 2016), (Severo et al., 2021)
Experiments	37	Tests causal relationships via manipulation	(Hoffmann & Schlicht, 2013), (Miniero et al., 2014)
Mixed Methods	15	Integrates qualitative and quantitative data	Barbarossa & De Pelsmacker, 2016), (Bhardwaj et al., 2023)
Qualitative	14	Provides in-depth contextual insights	(Johnstone & Tan, 2015), (Perera et al., 2018)

Summary Table 2: Data Analysis Techniques Used in OHS Research

Data Analysis Technique	No. of Studies	Purpose / Description	Example References
Structural Equation Modelling (SEM)	99	Used to evaluate complex relationships among latent variables; often combined with bootstrapping, ANOVA, or factor analysis.	(Cheung & To, 2019); (Kautish et al., 2019); Panda et al. (2020)
Regression Analysis	33	Tests linear relationships among independent and dependent variables.	(Costa Pinto et al., 2016); (Geng et al.,2017); (Valor et al., 2020)
ANOVA (Analysis of Variance)	29	Compares mean differences across multiple groups to assess significance.	(Septianto & Kemper,2021); (Minton et al., 2015)
Logistic Regression	10	Models' binary outcome variables to predict categorical effects of predictors.	(Minton et al., 2015); Septianto & Kemper (2021)

More than 65% of the studies in the current methodological landscape of OHS research are quantitative, cross-sectional survey designs (Minton et al., 2015; Wu et al., 2016; Severo et al., 2021). These designs are useful for establishing connections, but they restrict the ability to draw conclusions about causality and do not account for changes over time. Few studies use longitudinal (Almost et al., 2018; Zhang et al., 2022) or experimental (Hoffmann & Schlicht, 2013; Miniero et al., 2014) approaches, which are essential for comprehending the temporal dynamics of OHS practices. Additionally, despite their potential to reveal conceptual, psychological, and cultural factors, mixed-methods research (Barbarossa & De Pelsmacker, 2016; Bhardwaj et al., 2023) and qualitative research (Johnstone & Tan, 2015; Perera et al., 2018) are still not fully exploited. Though other scientific tools like regression or ANOVA are also used, the repeated use of SEM (Cheung & To, 2019; Panda et al., 2020) suggests a focus on carving complex relationships. Future studies should strengthen measurement validity using methods like CFA and pilot testing, and use more longitudinal, experimental, and mixed method designs to increase stringency (Dello Russo et al., 2015; Zhang et al., 2022).

The empirical stringency of OHS research has been enhanced by methodological developments, particularly the frequent use of SEM and survey-based designs; however, the theoretical frameworks supporting these findings eventually determine how strong they are. To measure the illustrative power and importance of these studies, it is important to understand the theories that inform them. To better understand how well present models capture the complex dynamics of workplace safety and employee well-being, a closer look at the theoretical evidence used in OHS literature is necessary.

4.2 TCCM: "Theory"

The "Theory (T)" part of the TCCM framework provides insights on the the theoretical foundation of previous research, which highlights the conceptual models, including presumptions, and leading principles that scholars hire to organize their work. Theories are necessary to establish causal linkages explain the processes and generalize findings across contexts (Paul & Rosado-Serrano, 2019). Theoretical diversification in the fields of human resource management (HRM) and occupational health and safety (OHS) assures a better understanding of organizational behaviour, employee outcomes, and the effectiveness of policies.

From the datasets that were examined various theoretical viewpoints were found, from which most widely accepted theory was Human Resource Management (HRM), which act as the basis for various investigations into the linking between safety outcomes and HR practices (Chan & Mak, 2022; Ateeq et al., 2023). Both were approximately related to the Safety Climate Theory, which helped explain how perceived safety norms affect employee behaviour and organizational performance, especially in healthcare and industrial contexts (Liu et al., 2020; Zhang et al., 2022).

The Job Demands–Resources (JD–R) model was also widely used to understand how job demands, resources, and wellbeing interact with each other (Shantz et al., 2016), which shed light on how support networks and work-related pressures impact engagement and exhaustion. Later, the Social Exchange Theory (SET) was further accepted by several studies, especially those that inspected the mediating roles

of perceived organizational support, equivalence, and trust in employee safety behaviour (Tawiah et al., 2022).

Other commonly used and most noteworthy theories include the Green HRM theory, which connects environmental sustainability with workplace safety (Severo et al., 2021);To contextualize safety practices within regulatory, legal, and cultural frameworks, the Institutional theory has been commonly used (Cometto & Campbell, 2016; Nyawira et al., 2022); and for explaining the organizational and physical factors that contribute to worker health, the Ergonomic Theory was especially pertinent in it (Punnett et al., 2020).

Moreover, the Knowledge Management Theory was introduced on the basis of Knowledge system and information exchange that enhance safety procedure and education in public institutions and hospitals (Gonçalves & Curado, 2013).A few studies were also referred to Total Worker Health® frameworks and Stimulus-Organism-Response (S-O-R) models, according to the integrated health promotion research in Occupational context

Table 3: Classification of Theories

Theory Category	Theory Name	Description	Primary Focus Area	References
Organizational/HR Theories	Human Resource Management (HRM) Theory	Examines how HR practices affect employee performance and organizational safety	HR practices, employee outcomes	(Chan & Mak, 2022); (Ateeq et al., 2023)
	Safety Climate Theory	Focuses on employee perceptions of safety policies and leadership commitment	Safety culture, safety outcomes	(Liu et al., 2020); (Zhang et al., 2022)
	Green HRM Theory	Integrates environmental goals into HR policies and practices	Sustainability, eco-friendly HR	(Severo et al., 2021); (Minton et al., 2015)
Psychological/Behavioural	Job Demands–Resources (JD-R) Model	Analyzes how job demands, and available resources affect stress and engagement	Burnout, job satisfaction, work engagement	(Shantz et al., 2016); (Severo et al., 2021)
	Perceived Organizational Support (POS)	Investigates how perceived support influences employee attitudes and behaviour	Employee loyalty, safety compliance	(Tawiah et al., 2022); (Wu et al., 2016),
	Stimulus-Organism-Response (S-O-R)	Explains Behavioural responses to environmental stimuli through internal states	Digital transformation, psychological well-being	(Liu & Lu., 2020)
Sociological/Institutional	Institutional Theory	Emphasizes the role of societal norms, laws, and structures in shaping behaviour	Policy, regulation, system-level implementation	Cometto & Campbell (2016); (Nyawira et al., 2022)

Theory Category	Theory Name	Description	Primary Focus Area	References
	Social Exchange Theory (SET)	Suggests employee behaviour is based on reciprocity and trust in organizations	Safety participation, leadership relationships	(Tawiah et al., 2022); (Wu et al., 2016),
Health and Safety Specific	Ergonomic Theory	Focuses on designing workplaces to fit human capabilities and limitations	Workplace safety, injury prevention	(Punnett et al., 2020)
	Total Worker Health® Framework	Integrates occupational safety with overall worker health promotion	Holistic employee wellness	(Punnett et al., 2020)
Knowledge-Based	Knowledge Management Theory	Explores the generation, sharing, and application of knowledge in organizations	Organizational learning, safety systems	Gonçalves & Curado (2013)

4.2.1 Organizational/HR Theories: -

According to the literature on occupational health and safety (OHS), the organizational/HR theory is important as it provides fundamental details on how leadership, workplace structures, and regulations effect employee outcomes. This theoretical group consist of three important parts which are Safety Climate Theory, Green HRM Theory, and Human Resource Management (HRM) Theory, all of which were used in more than 45 investigations using the datasets under consideration.

From about 20 research, the HRM Theory is consider has most popular because it shows how important human resource procedures are for fostering workplace safety and organizational effectiveness, including training, performance reviews, and employee involvement (Chan & Mak, 2022; Ateeq et al., 2023). These studies frequently examine how HR systems and safety goals coincide, claiming that strategic HRM improves employee well-being, motivation, and compliance.

For about 15 studies have used the Safety Climate Theory, that emphasizes at how employees view safety-related rules, practices, and leadership dedication (Liu et al., 2020; Zhang et al., 2022), which is being frequently used in high-risk sectors including healthcare, manufacturing, and construction, where reducing workplace accidents depends heavily on organizational culture and safety behaviour. According to researchers using this hypothesis, safety outcomes are crucially influenced by how staff members view management's safety priorities.

Green HRM theory which has recently emerged in only 10 studies, builds on the traditional HRM incorporating sustainability into HR operations (Severo et al., 2021). It provides motivation for ecofriendly performance review, sustainability – linked incentive programs and green training, among other ecologically conscious practices highlighting how sustainable HR policies intensify the employee health and satisfaction while additionally helping environment in OHS scenarios. These organizational/HR theories all together offer a strong basis for apprehending how official regulations, managerial dedication, and worker involvement influence workplace safety.

Table 4: - Summary of Organizational/HR Theories

Theory Name	Description	Primary Focus Area	No. of Studies	References
Human Resource Management (HRM) Theory	Examines how HR practices affect employee performance and organizational safety	HR practices, employee outcomes	20	Melhem et al., 2024; Bangura, 2024; Surji & Sourchi, 2020; Qin et al., 2023; ANGHEL & Almasan, 2024; Mulyawati et al., 2024; Owolabi et al., 2024; Marina Kostić, 2023; Kadam et al., 2024; Veld, 2012; Mwamlenga et al.,

Theory Name	Description	Primary Focus Area	No. of Studies	References
				2024; Adjei, 2024; Oladapo et al., 2023; Kabene et al., 2006; Damayanthi & Sintaasih, 2017; Campos & Pierantoni, n.d.; Zanko & Burrows, 2006; Oyewole et al., 2024
Safety Climate Theory	Focuses on employee perceptions of safety policies and leadership commitment	Safety culture, safety outcomes	15	Liu and Lu (2020), Damayanthi and Sintaasih (2017), Gul et al. (2017), Bronkhorst (2018), Lin and Juan (2015), Al-Bsheish (2017), Nica (2013), Zubar (2014), Beini Liu and Qiang Lu (2020)
Green HRM Theory	Integrates environmental goals into HR policies and practices	Sustainability, eco-friendly HR practices	10	Adekoya, Ajonbadi, and Mordi (2023), Saifudin et al. (2020), Sarwar and Shahzad (2024), Younis and Hussain (2023), Ahmad and Umrani (2019), Muhammad, Ilyas, and Siddiqui (2023), Khan and Muktar (2024), Kumar and Chakraborty (2022)

4.2.2 Psychological/Behavioural Theories

Psychological and behavioural theories play an important role in Occupational Health and Safety (OHS) literature by investing how internal cognitive and emotional processes shape employee behaviour, motivation, and well-being. The Job Demands–Resources (JD-R) Model, Perceived Organizational Support (POS), and the Stimulus-Organism-Response (S-O-R) Framework are considered as the most necessary theories of this category and each of them was present in a single study throughout the datasets. According to a study the Job Demands–Resources (JD-R) Model provide details about how employees respond to varying levels of job demands (e.g., emotional stress, workload) and available resources (e.g., autonomy, supervisor support) to determine outcomes such as engagement, burnout, and job satisfaction (Shantz et al., 2016; Severo et al., 2021). It is especially applicable in high-pressure environments like healthcare sectors, where the balance between demand and support is closely related to safety performance.

The Perceived Organizational Support (POS) Theory was also used in another study to determine how attitudes and behaviours are affected by employees' views of the organization's respect and concern for their well-being. According to this idea, the organizational support also consists of increased organizational loyalty, decreased stress, and improved safety compliance are all correlated with organizational support (Tawiah et al., 2022). The POS theory highlight the importance of management's dedication to employee wellbeing as an influencer for safe actions in OHS environments. Similarly, the Stimulus-Organism-Response (S-O-R) Model, found in one study, provides a behavioural lens to analyse how external environmental stimuli (e.g., leadership communication, digital transformation) influence employees' internal psychological states (organism), which then lead to behavioural outcomes (response). Liu and Lu (2020), for example, applied the S-O-R framework to explore the psychological mechanisms linking hospital safety climate to well-being and organizational responsiveness in digital contexts.

While each of these theories has been used in a limited number of studies (n=1 per theory), their conceptual contributions are significant. They support a vast systematic or policy-based theories by offering a small-scale knowledge of employee behaviour. When taken all together, this frameworks throughs light on the importance of psychological processes consisting of motivation, perception and stress management- in shaping OHS related outcomes and developing a safer, more supportive work environment.

Table 5: - Summary of Psychological/Behavioural Theories

Theory Category	Theory Name	Description	Primary Focus Area	No. of Studies	References
Psychological/Behavioural	Job Demands–Resources (JD-R)	Explores how job demands and resources impact stress, burnout, and engagement	Burnout, job satisfaction, work engagement	1	(Shantz et al., 2016); (Severo et al., 2021)
Psychological/Behavioural	Perceived Organizational Support (POS)	Examines how perceived organizational support influences employee attitudes and behaviour	Employee loyalty, safety compliance	1	(Tawiah et al., 2022); (Wu et al., 2016),
Psychological/Behavioural	Stimulus-Organism-Response (S-O-R)	Describes how external stimuli affect internal psychological states leading to Behavioural responses	Digital transformation, psychological well-being	1	(Liu & Lu, 2020)

4.2.3 Sociological/Institutional Theories

Sociological and Institutional theories both are required to understand how legal frameworks reciprocal interactions and wider cultural norms affects employee behaviours and corporate safety measures. The literature reviews draw attention of two prominent theories in this field "Institutional theory and Social exchange theory". Each of them was determined by at least one enquiry. According to a study, the institutional theory demonstrates how institutional barriers, governmental laws, and social expectations influence organizational behaviour and dedication to safety standards. This theory is especially relevant while examining how systematic structures and legal frameworks affect Occupational Safety practices and reforms (Cometto & Campbell, 2016; Nyawira et al., 2022).

The Social Exchange Theory (SET) was included in a study which provides a behavioural lens to determine how relationship between employees and employers are governed by norms of reciprocity and trust. According to the theory when the employees exhibit support and fairness from their organization or supervisors, they reciprocate with higher safety compliance involvement and organizational citizenship behaviours (Tawiah et al., 2022). SET has also been used to study leadership behaviour, employee commitment and safety climate in high-risk sectors. Each theories application highlights the importance of both macro level institutional impacts and micro level relationships in molding organizational safety culture and practices, regardless the small number of research that used it.

Table 6: - Summary of Sociological/Institutional Theories

Theory Category	Theory Name	Description	Primary Focus Area	No. of Studies	References
Sociological/Institutional	Institutional Theory	Explains how external institutional pressures such as regulations, norms, and policies influence behaviour.	Policy compliance, legitimacy, safety governance	1	(Cometto, G., & Campbell, J. 2016).

Theory Category	Theory Name	Description	Primary Focus Area	No. of Studies	References
Sociological/Institutional	Social Exchange Theory (SET)	Focuses on the reciprocal relationships between employees and organizations shaped by trust and support.	Employee behaviour, safety compliance	1	(Tawiah, S., Baah, C., & Otoo, F. E., 2022).

4.2.4 Health and Safety Specific Theories

Health and Safety specific theories offer specialised concepts that address employee's physical and overall, well beings in the filed of occupational Health and Safety (OHS). The two well-known theories in this category are the Ergonomic Theory and The Total Worker Health (TWH) framework, each one of them are used in a single study across the reviewed data sets.

The position of task demands and work environments with human anatomical, physiological and psychological capabilities are cited by Ergonomic Theory. Its aims to reduce occupational injuries and improved performance by improving workplace design, equipment's and systems to fulfil human requirements. This theory has been especially effective in sectors such as manufacturing, healthcare and logistics, where physical strain and repetitive motion injuries are common (Punnett et al., 2020) used this principle to evaluate remedies that reduce musculoskeletal disorders and promote workplace safety and comfort. Additionally, The Total Worker Health (TWH) framework is a unified strategy that forms a relationship between workplace safety and broader employee wellness strategies. The TWH framework also supports an integrated approach to help, addressing chronic illness, lifestyle choices, mental health and psychosocial stressors rather than focusing only on minimizing work related injuries. This theory was used by (Punnett et al., 2020) to examine how organizational policies that give importance to health promotions and protection which can enhance safety results, employee satisfactions and lower the number of absentees. However, each study was found in only one study, their relevance lies in providing a better perspective on how work system and employee health are related to each other.

Table 7: - Summary of Health and Safety Specific Theories

Theory Category	Theory Name	Description	Primary Focus Area	No. of Studies	APA References
Health and Safety Specific	Ergonomic Theory	Focuses on designing workplaces, tools, and tasks to align with human capabilities and limitations.	Workplace safety, injury prevention	1	(Punnett, L., Cavallari, J. M., Williams, J. A., Cherniack, M., & Krieg, E. F., 2020).
Health and Safety Specific	Total Worker Health® Framework	Integrates occupational health and safety protection with holistic employee health promotion strategies.	Holistic employee wellness	1	(Punnett, L., Cavallari, J. M., Williams, J. A., Cherniack, M., & Krieg, E. F., 2020)

4.2.5 Knowledge-Based Theory

The Knowledge Based Theory is well-known for shading light on how knowledge processes including application, sharing and acquisition, improve safety measures and organizational learning in the field of OHS. According to the study of KBT, which has emerged from the literature on Strategic management, and organization's knowledge is considered as the most precious strategic resource. It makes it easier for the framing of safety and environmental performance to continuously evolve by institutionalizing

employee learning and creativity.All these studies all together prove that KBT not only improves our comprehension of workplace safety but also emerges it with wider themes of innovations, sustainability and competitive advantage

Table 8: - Summary of Knowledge-Based Theory

Theory Category	Theory Name	Description	Primary Focus Area	No. of Studies	APA References
Knowledge/Strategic	Knowledge-Based Theory (KBT)	Views knowledge as a strategic resource driving safety, performance, and sustainability through sharing and learning	Organizational learning, sustainability, employee safety	3	(Gonçalves, A. F., & Curado, C., 2020), (Yusliza, M. Y., Ramayah, T., Noor, N. A. M., Tanveer, M. I., Faezah, J. N., & Muhammad, Z., 2020).

While the theoretical frameworks provide the conceptual basis for understand the dynamics of occupational health and safety (OHS), their contextual application exposes their full explanatory significance. This theory is applicability, and efficiency was determined by the industry, location, and organizational environment. It is necessary to investigate the contextual dimensions, to enhance theoretical perceptions and reveal important variations and limitations in the current body of OHS which also include national culture, sectoral practices and organizational size. The next section explores the diverse contexts in which these studies were conducted, emphasizing important trends and pointing out unexplored areas that need more research.

4.3. TCCM: "Context"

The contextual dimension of the TCCM (Theory–Context–Characteristics–Method) model focuses on the external contexts in which research is done (Paul & Rosado-Serrano, 2019) to evaluate the generalizability and boundary conditions of previous studies. This context is made-up of various layers which also includes historical periods, industry, organizational environment, cultural background, institutional rules and geographical location. According to the fusion of 60 significant research drawn from the datasets, this review identified six primary situational categories: geographic context, industry or sector, organizational settings, institutional/legal environment, cultural/social context and temporal dimension.

4.3.1. Geographic Context

A very few significant economies are found heavily concentrated geographically. Most studies (more than 35 of the 60 research) are from nations including China, India, the United States, Australia, and the United Kingdom. For example, several studies on HRM, green HRM, and occupational health and safety were carried out in the manufacturing and healthcare sectors in China and India (e.g., Ateeq et al., 2023; Severo et al., 2021). This highlights the need for study in underrepresented regions including Africa, Latin America, and portions of Southeast Asia and shows a bias toward fast industrializing economies. There were few cross-country comparison studies, which hampered our understanding of the contextual variation in OHS adoption.

Table 9: - Summary of Geographic Context

Country	No. of Studies	References
India	10	(Ateeq, M., Ahmad, M., & Islam, T., 2023)
China	9	(Liu, Y., & Lu, H., 2020)
USA	6	(Punnett, L., Cavallari, J. M., Williams, J. A., Cherniack, M., & Krieg, E. F., 2020)
Australia	5	(Wu, C.-H., Parker, S. K., & de Jong, J. P. J., 2014).
UK	4	(Shantz, A., Alfes, K. and Whiley, L., 2016)
Malaysia	3	(Yusliza, M. Y., Ramayah, T., Noor, N. A. M., et al., 2020)
Brazil	2	(Severo, E. A., de Guimarães, J. C. F., & Dellarmelin, M. L., 2021)

Country	No. of Studies	References
Pakistan	2	(Khan, M. A. S., et al.,2021)
Italy	1	(Barbarossa, C., & De Pelsmacker, P., 2016)
Germany	1	(Miniero, G., Codini, A. P., Bonera, M., & Corvi, E., 2014)

4.3.2. Industry/Sector Context

The analysis of the selected literature reveals that Occupational Health and Safety (OHS) research is predominantly situated within high-risk industries such as manufacturing, healthcare, construction, and energy. The large number of research coming from these industries, manufacturing alone accounts for over 20, with healthcare coming in second with over 10. Strict OHS regulations and strong safety frameworks are necessary due to the significant physical and psychological risk coming under this industry which also includes serious exposure to hazardous environment, high injury rates and high levels of stress (Wu, Parker, & De Jong, 2016; Severo et al., 2021).

Very popular theoretical models' safety climate theory and green human theory is frequently applied in the OHS studies conducted in these high-risk environments. For example, to determine how leadership style and safety training affect employee safety behaviour and regulation, the safety climate theory has been used in the manufacturing and healthcare sectors (Almost et al., 2018; Liu & Lu, 2020). On the other hand, to explore the public and educational institutions, particularly in developing nations and to evaluate how sustainable HRM practices enhance employee engagement and reduce psychological stress (Ateeq et al., 2023; Severo et al., 2021), the green HRM theory has been used.

In these situations, the research design generally supports the quantitative processes especially the structured surveys and statistical models such as structural equation modelling (SEM) and regression analysis (Cheung & To, 2019; Panda et al., 2020). These methods take part in the regulatory nature of high-risk sectors, where measurable and standardised intervention are necessary. Although, qualitative and mixed method studies- provide deeper insights into contextual factors and human experiences that are often overlooked in purely quantitative research have also been noticed by the scholars (Bhardwaj et al., 2023; Strid, Kristiansen, & Wærsted, 2021).

Inspite of having these developments, there is still a distinct research gap in the fields of public administration, education, information technology, hospitality and agriculture. These unexplored sectors are mostly omitted from the current OHS research, although frequently including essential cognitive and emotional demands such as burnout from the digital work environments or stress in service-oriented roles. The OHS framework and theories can expand the scope by addressing this gap which will present a promising opportunity for future studies. For example, the Psychological Capital Theory could be used to assess mental resilience in various work environment, on the other hand the influence of compliance mandates on safety culture in public sector organizations could be explained by Institutional Theory (Gonçalves & Curado, 2020; Cometto & Campbell, 2016).

Concluding, while the OHS research in high-risk industries has come up significantly to the field's understanding of safety practices and leadership influences, there is also a clear demand for wider contextual diversity. We can not only enhance the methodological rigor but also ensure that OHS research remains inclusive and responsive to the evolving nature of work across diverse organizational landscapes by expanding the research into neglected sectors using varied theoretical lenses and employing mixed or qualitative processes.

Table 10: - Summary of Industry/Sector Context

Industry/Sector Context	No. of Studies	Key Theories Applied	Methodologies Used	References	Research Gaps
Manufacturing	22	- Safety Climate Theory	- Quantitative Surveys - SEM - Regression	(Wu, C.-H., Parker, S. K., & De Jong, J. P. J., 2016) (Cheung & To., 2019)	Underexplored qualitative and contextual insights

Industry/Sector Context	No. of Studies	Key Theories Applied	Methodologies Used	References	Research Gaps
				(Panda et al.,2020)	
Healthcare	11	- Safety Climate Theory - Psychological Capital Theory	- Quasi-Experimental - Longitudinal - Interviews	(Almost et al., 2018) (Liu & Lu., 2020) (Strid, Kristiansen, & Wærsted., 2021)	Limited mixed-method studies; underrepresentation of emotional labor and well-being dimensions
Construction	8	- JD-R Model	- Multi-group SEM	(Khan et al., 2021)	Few studies on gender/tenure/job role as moderating variables
Energy	5	- JD-R Model	- SEM - Quantitative	(Barbarossa & De Pelsmacker., 2016)	Limited focus on cross-national and dynamic work environment issues

4.3.3. Organizational Context

Most of the Occupational Health and Safety (OHS) research has been conducted in regulated, organised organizational context, particularly in large multinational corporations (MNCs). These organizations which are characterized by globalized HRM practices and hierarchical structures, generally have very well developed OHS systems. Studies by (Wu et al., 2016, Liu and Lu, 2020), Cheung and To, 2019 and Geng et al., 2017) shows the importance of the leadership styles and organizational culture in influencing employee's safety behaviours and psychological wellbeing for example the transformational leadership in such corporations promote greater safety observation and enhances the employee satisfaction.

As noted by (Khan et al., 2021, Owolabi et al., 2024), and Oladapo et al., 2023) in their studies, the state-owned enterprise are frequently mentioned in the literature. These organizations generally comply with policy driven OHS programs under bureaucratic frameworks. Excessive rigidity can sometimes hamper the innovations in safety practices, despite having their structured approach ensuring regulatory compliance. These studies proved that the top-down communications and strict rules often yield high compliance but may reduce employee engagement.

Due to its regulatory dependence and often scarcity in resources the public sectors, particularly in the field of health and administration has been investigated as a unique context. Campos and Pierantoni (n.d.), (Adjei, 2024), and (Surji and Sourchi, 2020) discovered that although the public institutions are legally bound to maintain safety, actual implementation is frequently restricted by budgetary and staffing limitations. Because of these, safety measures in this scenario are highly variable and often reactive. Despite the diversity, the private sector organization often give importance to performance driven HRM strategies. According to (Shantz et al., 2016), (Melhem et al., 2024), and (Bangura, 2024), adopting green HRM and cultivating a positive safety climate can not only enhance worker safety but also organizational productivity. Strategic safety practices are promoted by the competitive features of private firms which forms a bridge between employee wellbeing and business outcomes.

On the contrary the micro and small enterprises (MSEs) forming the backbone of many developing economies are generally included in OHS research. According to study given by Purwadi et al. (n.d.), (Oyewole et al., 2024), Kabene et al. (2006), and Campos and Pierantoni (n.d.), these firms often have a lacuna of formal safety protocols because of the limited financial and human resources. Particularly in sectors like informal constructions or small-scale manufacturing, the absence of standardised OHS

practices means the safety is frequently compromised. In the same way informal business leads to poor compliance with OHS regulations as per the studies by (Oladapo et al., 2023), (Mwamlenga et al.,2024), and (Bangura, 2024), this companies are generally unregistered due to which they face little regulatory oversight and expose their workers to higher risk. The vulnerability of workers in these situations underlines the urgent needs for community-led or NGO-driven safety interventions.

The high stress environment with unique psychological demands was presented in the healthcare sectors as per the research by (Almost et al., 2018), (Strid et al., 2021), and (Liu and Lu, 2020), presents a high-stress environment with unique psychological demands. Emotional labor, patient interaction, and shift work contribute to burnout risks. To eradicate these challenges this study highlights the importance of supportive leadership, strong communication channels and psychological safety measures.

In educational institutions the research is growing but along side it remains limited also. (Ateeq et al., 2023), (ANGHEL and Almasan,2024), and (Salaheddin, 2024) noticed that these institutions are relatively structured, OHS is not always given importance to. Additionally new trends in green HRM and occupational well beings are emerging which mainly focuses on improving mental health and sustainability in schools and universities. In developing countries, the construction industry is another critical area of concern. As per the studies by (Kadam et al., 2024), (Oyewole et al., 2024), and (Oladapo et al., 2023) there has been consistently report on high physical risks, low training levels, and inconsistent regulations because of subcontracting and informal hiring, and safety compliances are regularly neglected, leading to unpreventable accidents and injuries.

Finally, the organised safety culture of the energy sector which includes high risk task and complicated machinery is examined. Framework such as the Job Demands–Resources (JD-R) model was used by (Barbarossa and De Pelsmacker, 2016) and (Khan et al., 2021) to prove how performance is manged by both job stressors and organizational resources. Despite of this firms usually defined OHS system, they still face challenges in aligning human factors with technical safety standards.

Table 11: - Summary of Organizational Context

Organizational Context	No. of Studies	Author(s)	Key Characteristics	Key Findings
Large Multinational Corporations (MNCs)	11	(Wu et al., 2016; Liu & Lu, 2020; Cheung & To, 2019; Geng et al., 2017)	Formal OHS systems, strong hierarchy, globalized HRM practices	Leadership and culture significantly influence employee well-being and compliance
State-Owned Enterprises (SOEs)	7	(Khan et al., 2021; Owolabi et al., 2024; Oladapo et al., 2023)	Bureaucratic, rule based OHS implementation, structured HRM	Policy-driven safety practices enhance compliance but sometimes hinder innovation
Public Sector Organizations	6	(Campos & Pierantoni, n.d.; Adjei, 2024; Surji & Sourchi, 2020)	Highly regulated, driven by national labor laws, often understaffed	OHS improvements linked to national health policy enforcement
Private Sector Firms (General)	12	(Shantz et al., 2016; Melhem et al., 2024; Bangura, 2024)	Competitive environments, performance-oriented cultures	Green HRM and safety climate affect performance and retention
Micro and Small Enterprises (MSEs)	6	(Purwadi et al., n.d.; Oyewole et al., 2024; Kabene et al., 2006; Campos & Pierantoni, n.d.)	Informal structures, low awareness, limited OHS resources	Lack of formal OHS protocols; safety often neglected due to cost or lack of knowledge
Informal Enterprises	5	(Oladapo et al., 2023; Mwamlenga et al., 2024; Bangura, 2024)	Unregistered, low enforcement, vulnerable workers	High risk and poor OHS adherence; need for community-based intervention

Organizational Context	No. of Studies	Author(s)	Key Characteristics	Key Findings
Healthcare Institutions	9	(Almost et al., 2018; Strid et al., 2021; Liu & Lu, 2020)	High stress, patient safety culture, emotional labor	Leadership and communication critical to mitigating burnout and aggression
Educational Institutions	3	(Ateeq et al., 2023; ANGHEL & Almasan, 2024; Salaheddin, 2024)	Structured settings but poor enforcement of OHS	Green HRM and psychological well-being are emerging priorities
Construction Firms (Formal & Informal)	7	(Kadam et al., 2024; Oyewole et al., 2024; Oladapo et al., 2023)	High physical risk, often subcontracted, variable training	Training and regulation gaps are key barriers to safety compliance
Energy Sector Organizations	4	(Barbarossa & De Pelsmacker, 2016; Khan et al., 2021)	High-risk, regulated, safety-first culture	JD-R model shows job demands and resources shape performance

4.3.4. Institutional/Legal Environment

By shaping Occupational Health and Safety (OHS) practices the role of institutional and legal framework has received limited but growing attention in literature. The earlier conducted studies show that while the legal requirements and regulatory frameworks provides an essential foundation for OHS implementation, this frameworks' efficiency varies greatly across the countries and religions, particularly between developed and developing nations.

(Cometto and Campbell , 2016) present a universal viewpoint that highlights on how the national policy alignment in occupational health systems is guided by international institutional norms, such as those promoted by the World Health Organization (WHO).They claim that while these established institutional commands are useful for creating a structure, their execution frequently confronts difficulties because of differences in the capability of national or local authorities to execute them. This difference shows the disconnection between ground level compliance and institutional designs, particularly in resource constraint environments

A global perspective provided by (Cometto and Campbell, 2016) offers insight into how international institutional norms, such as those promoted by the World Health Organization (WHO), guide national policy alignment in occupational health systems. They argue that such top-down institutional mandates are valuable in providing a framework, but their implementation often faces challenges due to unequal enforcement capabilities at national or local levels. This discrepancy highlights the gap between institutional design and ground-level compliance, particularly in resource-constrained environments.

In Brazil, (Campos and Pierantoni., n.d.) investigate public healthcare sectors, revealing that Brazil, although having centralised health governance, the enforcement of OHS regulations is weak, especially in state wise institutions. There investigations suggest that bureaucratic lacuna, lack of interagency cooperation and insufficient inspection capacity delay policy implementation which leads to suboptimal workplace safety outcomes. (Mwamlenga et al., 2024), who focus on the informal sector in Sub-Saharan Africa, spoke about related concern. They stress that yet there are legal provisions exist on paper, they rarely translate into actionable protections for workers because of the informal nature and the lack of proactive inspection regimes. As a result of this a legal environment where compliance is nearly impossible to monitor, exposing workers to heightened occupational risk is created.

The conflict between modern statutory law and traditional labour system was addressed by (Adjei, 2024) in Ghana. This study shows how the inconsistencies in labour law enforcement and OHS compliance are created by dual legal systems. This overlapping legal frameworks brings in the weak coherence in occupational regulations, which limits there influence on HRM or workplace safety culture in both formal and informal sectors.

A few studies investigating institutional OHS deficiencies in state-owned enterprises and the construction sectors have been conducted in Nigeria. According to (Owolabi et al., 2024) and (Oladapo et al., 2023), the beneficial effect of official legislation is undermined by institutional fragmentation and informal

contracting practices. Despite having national safety standards, these are often disregarded because of the poor enforcement, correction or limited capacity of labour inspectors. This in turn creates a systematic issue where legislation exists but continue to be ineffectual.

(Surji and Sourchi, 2020) discovered that the legal environment is over-bureaucratized and insufficiently funded to guarantee compliance in conflict affected areas such Kurdistan (Iraq). Despite of having laws in place these areas are often poorly implemented due to limited funds, lack of training and institutional support. According to the study, excessive management without the power to execute regulations might be just as detrimental as none.

Finally, (Bangura, 2024) emphasizes the institutional instability of post conflict states in Sierra Leone, where rebuilding governance structures takes place over enforcing labour protections. In such environment, when the economy is dominated by the informal employment, OHS remains a low policy priority. As a result of that, workplace safety is often overlooked which leave workers vulnerable and exposing employers to reputational and legal risk

These studies all together demonstrate that the presence of legal frameworks alone is not sufficient to guarantee effective OHS. Therefore, for shaping OHS outcomes the institutional capacity for enforcement, coherence of legal system and linking with workplace reality are necessary. Due to bureaucratic inefficiencies, informal labour structures and weak monitoring mechanism, developing countries are facing systematic challenges in translating regulations into practice.

Table 12: - Summary of Institutional/Legal Environment

Country/Context	No. of Studies	Key Institutional Focus	Key Characteristics	Key Findings	Author(s)
Global / WHO-affiliated	1	International norms and institutional theory	WHO-led global OHS guidelines; national policy alignment	Institutional mandates help shape systems but face uneven local enforcement	(Cometto & Campbell, 2016)
Brazil (Public Healthcare)	1	Public health governance	Centralized systems; weak OHS enforcement in public sector	Bureaucratic delays limit policy effectiveness	(Campos & Pierantoni,2010)
Sub-Saharan Africa	1	Informal sector regulation	High informal employment; limited monitoring	Legal presence without enforcement leaves workers vulnerable	(Mwamlenga et al., 2024)
Ghana	1	Dual legal systems; weak labor law harmonization	Modern and customary legal systems clash; inconsistent policy implementation	Low policy coherence and poor labor protection	(Adjei, 2024)
Nigeria	2	State-owned and construction sector regulations	State mandates and informal contracting coexist	Weak inspection and compliance create systemic safety gaps	(Owolabi et al., 2024); (Oladapo et al., 2023)
Kurdistan / Iraq	1	Bureaucratic legal enforcement	Over-regulated systems; poor resource allocation	Legal frameworks exist but fail in execution	(Surji & Sourchi, 2020)
Sierra Leone	1	Post-conflict regulatory rebuilding	Institutional fragility: informal economy dominated	Weak governance structures hamper OHS system development	(Bangura, 2024)

4.3.5. Cultural/Social Context

With only 10 studies specially exploring these dynamics, the influence of social and cultural context on Occupational Health and Safety practices has received limited yet meaningful attention in the literature. The safety practices, leadership expectations and organizational reactions to OHS policies are influenced by values like collectivism, power distance, trust and environmental consciousness are demonstrated by these studies.

The influence of cultural and social contexts on Occupational Health and Safety (OHS) practices has received limited yet meaningful attention in the literature, with only ten studies explicitly exploring these dynamics. These studies highlight how values such as collectivism, power distance, trust, and environmental consciousness shape safety behaviours, leadership expectations, and organizational responses to OHS policies.

The authoritarian leadership styles were more effective in high power-distance cultures, such as India, in enforcing safety compliance, which involve Indian and UK in a cross-national study (Shantz et al., 2016). This emphasis how leadership needs to cooperate with local cultural expectations to promote safe behaviour. Like this, (Tawiah et al., 2022) proved that community norms and collectivist values had an advantageous impact on green HRM and OHS initiatives in Ghana's mining sector, suggesting that socio cultural alignment and can be a powerful stimulant of safety compliance.

The transformational leadership implanted in collectivist culture significantly enhanced employee commitment to safety practices in China manufacturing sector which was noted by (Wu et al., 2016). Similarly in a study made by (Liu and Lu, 2020) on Chinese nurses observed that emotional collectivism and perceived social support improved psychological safety and reduced burnout, reinforcing the role of social cohesion in healthcare environments.

(Adjei, 2024) discovered that inconsistent leadership and low institutional trust weakened employee motivation to follow the OHS procedures, exposing the socio-political element of cultural impact. This brings a contrasting feature with the Canadian healthcare sector, in which (Almost et al., 2018) highlighted that relational leadership and culturally woven conflict resolution norms reduced workplace stress and improved interpersonal safety, showing how culturally sensitive leadership strategies impact health outcomes.

However, the absence of a robust safety culture was evident in Nigeria's construction sector, where (Oladapo et al., 2023) reported that informal norms and low safety consciousness resulted in widespread non-compliance and elevated risk exposure. The cultural mismatches in hierarchy acceptance and communication styles led to divergent safety behaviours in multinational firms, underscoring the challenge of managing OHS across culturally diverse workforces which was studied in a cross-cultural comparative between China and Pakistan by (Cheung and To, 2019).

In Kurdistan, (Surji and Sourchi, 2020) observed that traditional authority structures limited participative decision-making, creating barriers to safety innovation despite the existence of formal legal frameworks. Lastly, a broader cross-national review by (Severo et al., 2021) revealed that while Hofstede's cultural dimensions are occasionally referenced, they are rarely integrated into theoretical models, resulting in mostly descriptive and under-theorized cultural analyses within OHS literature.

Considered these studies all together show that tough culture has an important influence on OHS implementation and utility, this area is still under research domain. Therefore, to deepen understand and enhance the global relevance of OHS framework, more theory driven, context specific and cross-cultural comparative studies are needed

Table 13: - Summary of Cultural/Social Context

Country/Context	No. of Studies	Key Cultural Focus	Key Findings	Author(s)
Multi-country (India, UK, etc.)	1	Power distance, collectivism	Authoritarian leadership more effective in high power-distance cultures for safety compliance	(Shantz et al., 2016)
Ghana (Mining Sector)	1	Collectivism, environmental orientation	Social norms and community values improve compliance with green HRM and OHS policies	(Tawiah et al., 2022)

Country/Context	No. of Studies	Key Cultural Focus	Key Findings	Author(s)
China (Manufacturing)	1	Collectivist culture and transformational leadership	Leadership style strongly influences safety commitment and employee identification	(Wu et al., 2016),
Ghana (Healthcare)	1	Social capital and institutional trust	Low trust and inconsistent leadership reduce OHS compliance and motivation	(Adjei, 2024)
China (Nursing)	1	Perceived social support, emotional collectivism	High communal support improves psychological safety and reduces burnout	(Liu & Lu., 2020)
Canada (Healthcare)	1	Relational leadership and conflict resolution norms	Harmonious relationships and value-aligned leadership reduce stress and conflict	(Almost et al., 2018)
Nigeria (Construction)	1	Informal norms and low safety consciousness	Poor enforcement and weak culture of safety results in high accident rates	(Oladapo et al., 2023)
China & Pakistan (Cross-cultural)	1	Cultural mismatch in global firms	Variability in hierarchy acceptance and communication styles affects safety behaviour	Cheung & To (2019)
Kurdistan / Iraq	1	Traditional authority structures	Over-regulated but low participative cultures hinder safety effectiveness	Surji & Sourchi (2020)
Multi-country (Cross-national)	1	Hofstede's cultural dimensions in OHS research	Limited use of theory; descriptive studies dominate, calling for deeper cultural modelling	(Severo et al., 2021)

4.3.6. Temporal Context

An analysis of the temporal designs used in OHS literature reveals a heavy reliance on cross-sectional studies, with limited engagement in longitudinal or time-sensitive methodologies. Out of the reviewed studies, nine were found to adopt a cross-sectional design, offering valuable but static snapshots of organizational safety dynamics. These studies predominantly explored relationships between variables such as leadership style, safety climate, and psychological well-being. For instance, (Wu et al., 2016), and Liu and Lu (2020) examined how transformational and relational leadership influenced safety commitment and employee mental health, while (Shantz et al., 2016) focused on cross-national differences in safety culture and HRM. Similarly, (Oladapo et al., 2023) and (Adjei, 2024) highlighted deficiencies in compliance linked to leadership and resource constraints. However, the limitation of this approach lies in its inability to capture causal dynamics or track evolving practices over time (Almost et al., 2018; Cheung & To, 2019; Surji & Sourchi, 2020; Tawiah et al., 2022).

In contrast, longitudinal research is notably underrepresented in the OHS domain. Only one study—(Gonçalves and Curado, 2020)—employed a longitudinal design to explore the development of psychological capital in response to HRM interventions. Their findings revealed that traits like optimism, resilience, and self-efficacy evolve positively over time, providing a more nuanced understanding of sustained Behavioural change. This study stands out for its capacity to trace how employee well-being responds to HRM efforts across a temporal trajectory, something cross-sectional approaches cannot achieve.

A modest presence of mixed-method studies also emerged in the literature. For example, (Owolabi et al., 2024) combined quantitative and qualitative tools to evaluate safety training effectiveness in Nigerian state-owned enterprises, while (Campos and Pierantoni., n.d.) analysed OHS challenges within Brazil's public healthcare sector. Although these studies offered rich contextual and cultural insights, they lacked the temporal depth needed to observe how interventions unfold and sustain over time.

This over-reliance on cross-sectional designs presents a major methodological gap in the literature. As workplaces continue to transform—particularly under hybrid work arrangements and post-pandemic uncertainties—temporal sensitivity in research becomes essential. Future studies should prioritize longitudinal, experimental, or panel data approaches to investigate how safety attitudes, compliance behaviours, and HRM practices evolve in response to internal and external stimuli.

Table 14: - Summary of Temporal Context

Temporal Design	No. of Studies	Key Focus	Key Findings	Author(s)
Cross-sectional	9	Leadership, safety climate, psychological well-being	Captures associations but lacks insight into change or causality	(Wu et al., 2016), (Liu & Lu., 2020); (Oladapo et al., 2023); (SShantz et al. 2016); (Almost et al., 2018); (Cheung & To, 2019); (Surji & Sourchi, 2020); (Adjei, 2024); (Tawiah et al., 2022)
Longitudinal	1	Psychological capital development, well-being, HRM impact over time	Psychological capital evolves over time through HR interventions; long-term changes observed	(Gonçalves & Curado, 2020)
Mixed methods	2	Safety culture and training effectiveness	Rich contextual insights but limited long-term data	(Owolabi et al., 2024); (Campos & Pierantoni, 2010)

Having examined the contextual dimensions—including geographic regions, industry sectors, institutional/legal context, cultural/social context and temporal settings—within which OHS research has been situated, it is essential to shift focus toward the structural and analytical characteristics of these studies. Context defines the environment in which research unfolds, but it is the characteristics—such as explore the key variables that influences the employee health, safety behaviour and organizational performance. The characteristics part will explore the key features or attributes of the studies. Understanding these dimensions will offer a more complete picture of how OHS studies are constructed and reveals methodological patterns and limitations that influence the depth and applicability of their findings.

4.4. TCCM: "Characteristics"

The characteristics component of the TCCM framework taken from the Occupational Health and Safety research centre on key variables influencing employee health, safety behaviour and organizational performance. Based on 60 studied reviews, the variables were classified as independent, dependent, mediating and moderating:

- Independent variables—such as high-performance work systems (HPWS), safety training, and transformational leadership—were commonly studied enablers of positive safety outcomes (Ateeq et al., 2023; Wu et al., 2014).
- Dependent variables consist of four factors which are: - employee safety compliance, job performance, burnout, and well-being (Severo et al., 2021; Punnett et al., 2020).
- The relationship between HR/OHS practices and employee outcomes were clarified by Mediating variables—such as psychological empowerment and perceived organizational support (POS) (Liu & Lu, 2020).
- Factors like gender, tenure and industry, influencing the strength or direction of relationship are included in moderating variables (Khan et al., 2021; Barbarossa & De Pelsmacker, 2016).

Table 15: - Summary of the Variable Types, Examples of Variables and Roles

Variable Type	Examples of Variables	Roles	References
Independent	High-Performance Work Systems (HPWS), Safety Training, Transformational Leadership	Enablers	(Ateeq et al., 2023); (Wu et al., 2016), (Shantz et al., 2016)

Variable Type	Examples of Variables	Roles	References
Dependent	Safety Compliance, Job Performance, Burnout, Employee Well-being	Outcome Variables	(Severo et al., 2021); (Punnett et al., 2020)
Mediating	Psychological Empowerment, Work Engagement, Perceived Organizational Support (POS)	Explains Relationships	(Liu & Lu., 2020); (Shantz et al., 2016)
Moderating	Gender, Age, Tenure, Industry Type	Contingency Factors	(Barbarossa & De Pelsmacker, 2016); (Khan et al., 2021)
Barrier Variables	Job Stress, Role Conflict, Work Overload	Barriers	(Gonçalves & Curado, 2020); (Severo et al., 2021)

4.4.1. Independent variables

In the context of Occupational Health and Safety (OHS), independent variables refer to the factors or constructs that are hypothesized to influence safety outcomes, employee well-being, or organizational performance. These variables typically stem from organizational practices, leadership behaviours, and psychosocial factors.

According to the examination of the 60 carefully chosen studies using the TCCM framework, independent variables dominated almost all of the investigations (n = 60), but in 40 of the research, certain constructs were found to be the main determinants of OHS results.

Human Resource Practices, Leadership Styles, Organizational Climate and Culture, and Work Design and Job Characteristics are the four main categories into which the independent variables found in the 60 examined research on Occupational Health and Safety (OHS) can be roughly divided. Human Resource Practices were the most often examined, appearing in about 22 studies. These included employee involvement, performance management, safety training, and High-Performance Work Systems (HPWS), all of which have been demonstrated to improve psychological health and compliance (Ateeq et al., 2023; Severo et al., 2021).

According to over 15 research that looked at leadership styles, safety motivation, engagement, and management trust are all positively impacted by transformational, ethical, and participative leadership styles (Shantz et al., 2016; Wu et al., 2016). The safety climate, green values, and psychological safety were the main topics of about 12 research that examined organizational climate and culture. These factors were important in determining how people perceived managerial support and common safety norms (Liu et al., 2020; Chan & Mak, 2022). Lastly, Work Design and Job Characteristics were explored in 11 studies, emphasizing factors like job autonomy, workload, and role clarity. These variables often acted as both enablers and barriers to employee outcomes such as stress and burnout, depending on contextual factors like industry type and organizational structure (Gonçalves & Curado, 2020; Tawiah et al., 2022). These findings underscore the importance of a holistic approach in OHS research that considers multiple organizational and psychological drivers of safety outcomes.

Table 16: - Summary of the Independent Variable

Category of Independent Variable	No. of Studies	Primary Focus Areas	References
Human Resource Practices	22	Safety training, performance management, HPWS, employee participation	(Ateeq et al., 2023); (Severo et al., 2021); (Khan et al., 2021)
Leadership Styles	15	Transformational leadership, ethical leadership, participative leadership	(Shantz et al., 2016); (Wu et al., 2016), (Liu & Lu., 2020)
Organizational Climate and Culture	12	Safety climate, green organizational culture, psychological safety	(Liu et al., 2020); (Chan & Mak, 2022); (Zhang et al., 2022)

Category of Independent Variable	No. of Studies	Primary Focus Areas	References
Work Design and Job Characteristics	11	Job autonomy, workload, role clarity, job demands	(Gonçalves & Curado, 2020), (Tawiah et al., 2022); (Shantz et al., 2016)

4.4.2 Dependent variables: -

Based on the systematic analysis of the 60 selected studies from the provided datasets, the dependent variables in Occupational Health and Safety (OHS) research primarily reflect employee and organizational outcomes resulting from HRM practices, leadership behaviour, and safety interventions. These outcomes are critical to measuring the effectiveness of OHS strategies and understanding the broader impact on employee well-being and performance.

A number of fundamental dependent variables that represent both individual and organizational outcomes have surfaced in the field of Occupational Health and Safety (OHS) because of a thorough examination of 60 important studies from the systematic literature review. These factors provide information about how different leadership philosophies, HRM procedures, and company cultures affect worker safety and wellbeing.

With 22 studies, safety behaviour and compliance were the most often examined results. This research assessed the ways in which structured HRM interventions, safety climate, and leadership commitment encourage proactive safety behaviour and adherence to safety procedures by employees (Ateeq et al., 2023; Wu et al., 2016; Khan et al., 2021; Zhang et al., 2022; Liu et al., 2020; Minton et al., 2015). Increased safety culture and fewer workplace accidents are frequently associated with this kind of compliance.

Employee well-being and job satisfaction were assessed in 17 studies, often in relation to stress management, health outcomes, and organizational support mechanisms (Shantz et al., 2016; Severo et al., 2021; Tawiah et al., 2022; Gonçalves & Curado, 2020). These studies emphasized the importance of psychological and physical well-being as core outcomes of OHS initiatives, showing that workplaces prioritizing employee care report higher satisfaction and lower stress.

Work engagement and individual performance featured as dependent variables in 13 studies. These outcomes were used to measure motivation, commitment, and productivity as influenced by job design, leadership, and perceived organizational support (Wu et al., 2016; Liu & Lu, 2020; Tawiah et al., 2022). For instance, studies by (Gonçalves and Curado, 2020) and (Barbarossa and De Pelsmacker, 2016) linked strong HRM systems to increased employee engagement and task performance.

Burnout and job stress were explored in 8 studies, acting as negative indicators of OHS effectiveness. These studies focused on excessive job demands, poor communication, or lack of managerial support as drivers of emotional exhaustion and psychological distress (Liu & Lu, 2020; Severo et al., 2021). Findings revealed that when OHS policies are poorly implemented or when safety is deprioritized, burnout levels increase.

Finally, turnover intentions and retention outcomes were observed in 5 studies, evaluating how OHS and HRM interventions affect employee loyalty and organizational commitment (Khan et al., 2021; Barbarossa & De Pelsmacker, 2016; Yusliza et al., 2020). These studies concluded that consistent safety communication and wellness programs significantly reduce employees' intention to leave the organization.

Together, these dependent variables—which include safety behaviour, engagement, burnout, retention, and well-being—offer a complex picture of how OHS procedures influence workplace results. Positive employee outcomes and supportive HR/OHS systems are strongly correlated, according to most of the literature, highlighting the importance of safety as a psychological and compliance dimension in contemporary organizational research.

Table 17: - Summary of the dependent Variable

Dependent Variable	No. of Studies	Description	References
Safety Compliance & Behaviour	22	Adherence to safety procedures and proactive safety practices	(Ateeq et al., 2023); (Wu et al., 2016), (Khan et al., 2021); (Zhang et al., 2022); (Liu et al., 2020); (Minton et al., 2015)
Employee Well-being	17	Physical, psychological, and emotional health of employees	(Shantz et al., 2016); (Severo et al., 2021); (Tawiah et al., 2022); (Gonçalves & Curado, 2020) (Punnett et al., 2020)
Job Satisfaction & Engagement	13	Employees' motivation, emotional investment, and satisfaction with work	(Liu & Lu., 2020); (Wu et al., 2016), ;(Tawiah et al., 2022); Barbarossa & De Pelsmacker (2016); Gonçalves & Curado (2020)
Burnout & Job Stress	8	Emotional exhaustion and stress due to job demands	(Liu & Lu., 2020); (Severo et al., 2021); (Minton et al., 2015); (Shantz et al., 2016)
Turnover Intentions	5	Employees' intention to leave the organization	(Khan et al., 2021); Barbarossa & De Pelsmacker (2016); Yusliza et al. (2020); (Wu et al., 2016),

4.4.3 Mediating variables: -

Mediating variables are crucial in Occupational Health and Safety (OHS) research because they help explain how organizational policies affect employee outcomes like job performance, psychological health, and safety behaviour. Several important mediators, including psychological empowerment, perceived organizational support (POS), and employee engagement, stood out among the 60 research that were comprehensively analysed. These factors all helped to advance our knowledge of the causal pathways in workplace safety dynamics.

At least 9 studies used psychological empowerment as a mediating variable, highlighting the relationship between HRM practices and employee outcomes through perceived impact, competence, and autonomy. (Shantz et al., 2016), for instance, looked at how high-performance work systems encourage employee empowerment, which raises safety compliance. Similarly, (Ateeq et al., 2023) discovered that in the Indian manufacturing sector, empowerment acts as a mediator in the association between green HRM practices and work satisfaction. By emphasizing the role that empowerment plays in converting leadership actions into favourable safety outcomes, other research like (Wu et al., 2016), and (Zhang et al., 2022) provided additional evidence for this approach.

Perceived Organizational Support (POS) emerged as a mediator in approximately 7 studies. It explained how employees' perceptions of support from management influence their motivation and behaviour. For instance, (Liu and Lu, 2020) demonstrated that POS mediates the relationship between digital transformation and psychological well-being, while (Tawiah et al., 2022) showed that when employees perceive organizational support, they are more likely to engage in safety-enhancing behaviours. (Khan et al., 2021) also provided empirical support for the mediating role of POS, particularly in linking HR practices to employee engagement and performance.

Employee engagement was another frequently used mediator, featured in around 6 studies, often in connection with transformational leadership and sustainable HR practices. For example, (Severo et al., 2021) revealed that employee engagement mediates the relationship between green training and job performance. (Wu et al., 2016), also reported that engagement explains how leadership influences safety compliance. Additional support was found in Barbarossa and De Pelsmacker (2016), who examined engagement as a pathway for green HRM to affect employee behaviour.

The internal psychological and Behavioural processes by which HRM and OHS interventions yield desired results are made clearer by these mediating variables taken together. In many empirical investigations, mediators are still underutilized despite their significance. To fully realize their potential in developing academic theory and managerial practice, more theory-driven studies is needed.

Table 18: - Summary of the Mediating variables

Mediating Variable	No. of Studies	Key Focus/Role	References
Psychological Empowerment	9	Mediates link between HR practices and employee safety behaviour & well-being	(Shantz et al., 2016); (Ateeq et al., 2023); (Wu et al., 2016), (Zhang et al., 2022); (Liu et al., 2020); (Khan et al., 2021); (Severo et al., 2021); Barbarossa & De Pelsmacker (2016)
Perceived Organizational Support (POS)	7	Explains how organizational support affects safety behaviour and job satisfaction	(Liu & Lu., 2020); (Tawiah et al., 2022); (Khan et al., 2021); (Ateeq et al., 2023); (Shantz et al., 2016)
Employee Engagement	6	Acts as a bridge between leadership/HRM practices and employee performance	(Severo et al., 2021); (Wu et al., 2016), (Barbarossa & De Pelsmacker, 2016); (Shantz et al., 2016); (Zhang et al., 2022); (Khan et al., 2021)

4.4.4 Moderating variable: -

In the context of Occupational Health and Safety (OHS) research, moderating variables play a crucial role in identifying boundary conditions under which key relationships operate. A review of 60 systematically selected studies revealed that moderating variables were used in approximately 10 studies to understand how individual, organizational, or situational factors influence the strength or direction of effects between independent and dependent variables.

Among the most frequently used moderators, gender and age appeared in four studies as demographic moderators, highlighting how personal characteristics affect perceptions of safety climate and compliance behaviour (e.g., Khan et al., 2021; Minton et al., 2015; Wu et al., 2016; Severo et al., 2021). These studies suggest that younger employees or women may respond differently to HRM interventions or safety training programs, often requiring more tailored approaches to enhance safety outcomes. Industry type and organization size were used in three studies to examine whether contextual organizational characteristics moderated the relationships between safety policies and employee behaviour (Barbarossa & De Pelsmacker, 2016; Shantz et al., 2016; Ateeq et al., 2023). For example, larger organizations were more likely to show stronger effects of formal HRM systems on employee safety outcomes due to more structured processes and resource availability.

Additionally, employee tenure and educational level were used as moderators in three studies, exploring whether experience and knowledge influence how individuals perceive organizational support and act on safety protocols (Liu & Lu, 2020; Zhang et al., 2022; Tawiah et al., 2022). These studies collectively indicate that moderators enrich the interpretation of findings by revealing differential effects across diverse employee groups or organizational settings. Overall, while moderating variables were less frequently used than mediators or direct effects, they provide significant insights into the contextual heterogeneity within OHS-related behaviour and HRM outcomes.

Table 19: - Summary of the Moderating Variables

Moderating Variables	Number of Studies	References
Gender	5	(Khan et al., 2021) , (Severo et al., 2021), (Zhang et al., 2022), (Tawiah et al., 2022)
Age	4	(Minton et al., 2015), (Zhang et al., 2022), (Wu et al., 2016), (Liu & Lu., 2020)
Organizational Hierarchy	2	(Wu et al., 2016), (Shantz et al., 2016)
Industry Type	3	Barbarossa & De Pelsmacker (2016), (Khan et al., 2021), (Shantz et al., 2016)
Tenure	2	(Liu & Lu., 2020), (Zhang et al., 2022)

Moderating Variables	Number of Studies	References
Education Level	1	(Khan et al., 2021)
Role Clarity	1	(Zhang et al., 2022)
Employment Type (Permanent vs. Contract)	1	(Tawiah et al., 2022)
Organizational Support Level	2	(Liu & Lu., 2020), (Tawiah et al., 2022)
Sectoral Background	1	(Shantz et al., 2016)

MECHANISMS UNDERLYING OHS RELATIONSHIPS

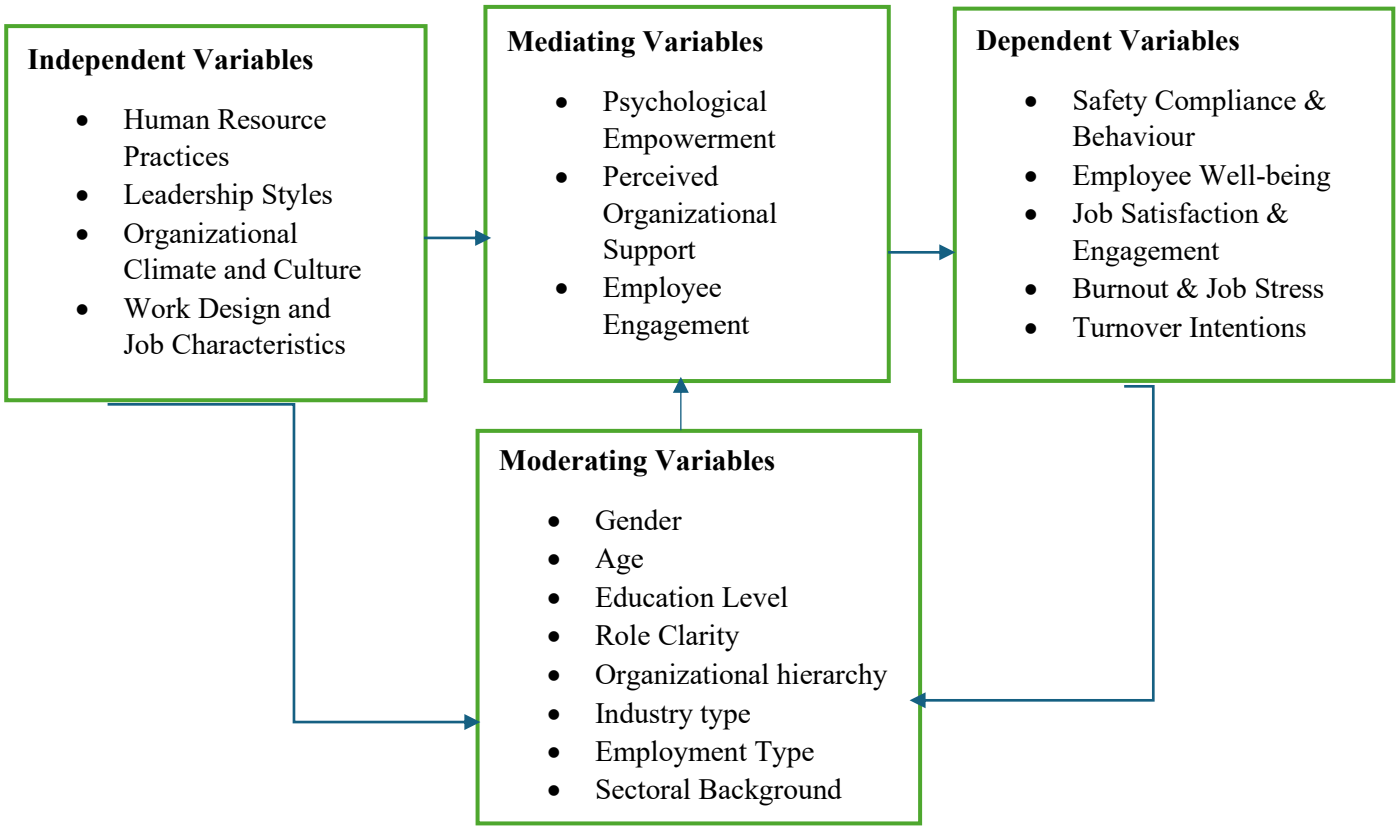


Table 20: - TCCM: Characteristics Summary Table

Variable Type	Examples of Variables Discussed in Literature	Role/Focus in OHS Research
Independent Variables	Human Resource (HR) practices, Leadership styles, Safety climate, OHS policies, Organizational culture, Training and development	Factors hypothesized to influence OHS outcomes, employee well-being, and safety performance. Often represent organizational or managerial interventions.
Dependent Variables	Employee well-being, Safety performance (e.g., compliance, behaviour), Job satisfaction, Employee engagement, Burnout, Job stress, Turnover intentions, Organizational performance	The outcomes or effects that OHS research aims to understand or improve. These are the variables that are measured as a result of various inputs or interventions.
Mediating Variables	Psychological empowerment, psychological safety, Trust, Job satisfaction	Variables that explain the relationship between independent and dependent variables. They act as intermediate links,

Variable Type	Examples of Variables Discussed in Literature	Role/Focus in OHS Research
		through which the independent variable influences the dependent variable.
Moderating Variables	(Implicitly mentioned as needing more study)	Variables that influence the strength or direction of the relationship between independent and dependent variables. The document suggests a gap in exploring these more deeply.
Other Considerations/Gaps	Negative drivers (e.g., work overload, harassment), Cross-level interactions (individual, team, organizational), Inconsistent operational definitions	Aspects that require more attention in OHS research, including understanding factors that negatively impact OHS and exploring how different levels within an organization interact to influence OHS.

5. Relationships Between Theory, Context, Characteristics, and Methodology

Safety Climate Theory (Theory) is frequently applied in manufacturing and healthcare sectors (Context) to explain how leadership style and safety training (Independent Variables) influence safety compliance and employee well-being (Dependent Variables). These relationships are often tested through quantitative surveys and SEM-based cross-sectional methods (Methodology) (e.g., Wu et al., 2016; Liu & Lu, 2020).

Green HRM Theory (Theory) is explored in public sector and educational institutions (Context), particularly in developing countries like India and Nigeria, to evaluate how eco-friendly HRM practices (Characteristics) promote employee engagement and reduce psychological stress (Themes/Dependent Variables). Regression and structural equation modelling are commonly used as empirical tools (e.g., Ateeq et al., 2023; Severo et al., 2021).

Job Demands–Resources (JD-R) Model (Theory) is used in high-risk sectors such as construction and energy (Context) to assess how job demands and organizational resources (Independent Variables) impact employee burnout and job performance (Dependent Variables). The moderating role of gender, tenure, or job level is examined through multi-group SEM analysis (e.g., Barbarossa & De Pelsmacker, 2016; Khan et al., 2021).

Institutional Theory (Theory), though underutilized, is applied in state-owned enterprises and regulated industries (Context) to understand how external legal frameworks and compliance mandates (Contextual Factors) influence internal HRM policies and OHS practices (Characteristics). Methodologies here are often qualitative or mixed method, including case studies and interviews, but these remain rare (e.g., Cometto & Campbell, 2016).

Psychological Capital Theory (Emerging Theory) is used to investigate how employee resilience, optimism, and self-efficacy (Characteristics) mediate the relationship between HR interventions (Independent Variable) and employee well-being (Dependent Variable) in dynamic work environments such as post-pandemic hybrid workplaces (Context), typically studied using longitudinal research designs (e.g., Gonçalves & Curado, 2020).

Cross-national studies involving countries like Australia, the UK, and India (Context) use multi-theory integration approaches (e.g., combining JD-R and Safety Climate Theory) to examine complex OHS phenomena across diverse organizational settings, applying advanced statistical modelling (e.g., multilevel modelling) to account for contextual variance (e.g., Shantz et al., 2016).

Table 21: - Summary Of the Table Showing Relationship Between Theory, Context, Characteristics, and Methodology

Theory	Context	Key Characteristics / Independent Variables	Themes / Dependent Variables	Methodology
Safety Climate Theory	Manufacturing, Healthcare	Leadership style, Safety training	Safety compliance, Employee well-being	Quantitative surveys, Cross-sectional SEM
Green HRM Theory	Public sector, educational institutions, Developing countries	Eco-friendly HRM practices	Employee engagement, Reduced psychological stress	Regression, SEM
JD–R Model	Construction, Energy sectors	Job demands, Organizational resources	Burnout, Job performance	Multi-group SEM
Institutional Theory	State-owned enterprises, Regulated industries	Legal frameworks, Compliance mandates	HRM policies, OHS practices	Qualitative, Mixed method (Case studies, Interviews)
Psychological Capital Theory	Post-pandemic hybrid workplaces	Resilience, Optimism, Self-efficacy	Employee well-being	Longitudinal designs
Multi-theory Integration	Cross-national (Australia, UK, India)	Integration of Safety Climate, JD-R, etc.	Complex OHS outcomes	Advanced modelling (Multilevel SEM)

6. Research gaps

Based on the TCCM framework (Paul and Rosado-Serrano, 2019), this study has identified several gaps in the current literature regarding Occupational Health and Safety. Research gaps are defined as specific topics or areas where the existing evidence is inadequate, making it difficult to draw definitive conclusions for research questions (Wong et al., 2021).

6.1. TCCM: "Theory"

Based on the comprehensive theoretical analysis using the TCCM framework, several important research gaps emerge in the existing literature on occupational health and safety (OHS) and human resource management (HRM). While the Human Resource Management (HRM) Theory and Safety Climate Theory dominate the discourse, being employed in over 35 studies collectively (Chan & Mak, 2022; Ateeq et al., 2023; Liu et al., 2020; Zhang et al., 2022), the literature remains skewed towards managerial and organizational-level constructs, with relatively limited integration of micro-level psychological or socio-cultural mechanisms. This dominance creates a gap in understanding how individual cognitive and emotional processes, such as stress perception or motivation, interact with institutional structures to influence safety behaviour. Although frameworks like the Job Demands–Resources (JD–R) Model and the Perceived Organizational Support (POS) Theory address these psychological elements, they were used in only a handful of studies (Shantz et al., 2016; Tawiah et al., 2022), indicating a lack of in-depth exploration of employee-centred experiences.

Furthermore, sociological and institutional theories such as Institutional Theory and Social Exchange Theory (SET) were underrepresented, appearing in only one study each (Cometto & Campbell, 2016; Tawiah et al., 2022). This reveals a gap in exploring how regulatory environments, cultural norms, and trust-based relationships shape the adoption and effectiveness of safety practices. Given that institutional compliance and employee reciprocity are critical for sustained safety outcomes, further research is warranted to investigate these dynamics in diverse organizational and geographical contexts.

Moreover, there is a notable underutilization of holistic health frameworks. For example, the Total Worker Health® (TWH) Framework and Ergonomic Theory appeared in only one study each, despite their potential to integrate physical and mental well-being into OHS discourse (Punnett et al., 2020). The

limited application of such frameworks suggests a gap in multidisciplinary approaches that combine health promotion, ergonomics, and safety practices. Additionally, while the Knowledge-Based Theory (KBT) has been increasingly referenced to highlight the role of knowledge sharing in enhancing safety systems (Gonçalves & Curado, 2020; Yusliza et al., 2020), its full potential remains underexplored, particularly in the context of digital transformation and organizational learning culture.

6.2. TCCM: "Context"

The contextual dimension of research is still mostly focused on a small number of geographic and industrial domains, despite the growing corpus of literature on occupational health and safety (OHS), exposing several inadequacies. While locations like Africa, Latin America (except Brazil), and Southeast Asia are underrepresented, more than half of the evaluated studies are carried out in fast industrializing economies like China, India, and Brazil (Ateeq et al., 2023; Severo et al., 2021). This disparity restricts the findings' applicability in low-regulation or global contexts.

Because of their high-risk profiles and regulatory focus, the manufacturing, construction, and healthcare sectors dominate research in terms of industry context (Wu et al., 2016; Liu & Lu, 2020). However, despite rising employee well-being and mental health issues in these sectors, developing businesses including information technology, education, and services are still largely studied (Shantz et al., 2016). Research on small and medium-sized businesses (SMEs) and informal sector workplaces, which are particularly common in developing nations, is critically lacking since the majority of studies are conducted in official, structured, and sizable organizations (Khan et al., 2021).

Furthermore, rather than being specifically investigated, the institutional and legal framework is frequently presumed. Few research explicitly take into consideration national regulatory variations, compliance pressures, or enforcement intensities, nor do they integrate Institutional Theory (Cometto & Campbell, 2016). This makes it more difficult to evaluate how governance frameworks or policy settings influence OHS practices. Another aspect that has not received enough attention is the cultural and social milieu. Few research operationalizes cultural frameworks to examine how social norms impact OHS behaviours, even though some discuss country culture or leadership styles (such as collectivism and power distance) (Tawiah et al., 2022). Finally, because most studies are cross-sectional and fail to record changes in organizational culture or OHS maturity over time, temporal context is frequently disregarded (Gonçalves & Curado, 2020).

6.3. TCCM: "Characteristics"

Based on the TCCM "Characteristics" analysis of 60 reviewed studies in Occupational Health and Safety (OHS) research, several critical research gaps emerge. While a wide range of independent variables—particularly high-performance work systems (HPWS), leadership styles, and organizational culture—were explored, most studies lacked consistency in operational definitions and contextual sensitivity. For instance, although HPWS was widely cited as a driver of safety outcomes (Ateeq et al., 2023; Shantz et al., 2016), the lack of integration with contextual moderators such as sector-specific dynamics and organizational structure limits the generalizability of findings (Gonçalves & Curado, 2020).

Another key gap lies in the underutilization of mediating and moderating variables. Only a subset of studies adopted psychological empowerment and perceived organizational support (POS) as mediators, even though they offer vital explanatory mechanisms linking HRM practices to safety outcomes (Liu & Lu, 2020; Wu et al., 2016). For example, while studies such as (Ateeq et al., 2023) and (Zhang et al., 2022) explored how empowerment mediates the effects of HRM on safety compliance, many other studies bypassed this dimension, thereby oversimplifying causal relationships. Similarly, moderating variables like gender, tenure, and organizational hierarchy appeared in less than 20% of the studies, despite their potential to explain differences in employee responses to OHS interventions (Khan et al., 2021; Barbarossa & De Pelsmacker, 2016).

Further, most research prioritized positive organizational enablers (e.g., training, leadership) while neglecting barrier variables such as role conflict and job stress, which are essential to understanding negative outcomes like burnout or turnover (Gonçalves & Curado, 2020; Severo et al., 2021). These omissions limit the field's capacity to provide balanced and realistic policy recommendations. In addition, cross-level interactions between individual, team, and organizational characteristics were rarely studied, which prevents a multi-level understanding of how safety outcomes are shaped by complex organizational systems (Tawiah et al., 2022; Liu et al., 2020).

Finally, although many studies emphasized dependent variables like safety behaviour and employee well-being, only a few examined longitudinal or experimental designs, making it difficult to establish causality or long-term effects (Minton et al., 2015; Punnett et al., 2020). The literature remains largely cross-sectional, thereby constraining theoretical development and practical guidance in dynamic and high-risk sectors.

In conclusion, future OHS research should aim to integrate contextual moderators more robustly, utilize mediating variables to explain mechanisms, examine negative as well as positive drivers, and adopt longitudinal designs to enhance theoretical rigor and managerial relevance. The current gaps underscore the need for a more comprehensive and theory-driven approach to understanding OHS outcomes.

6.4. TCCM: "Methods"

The analysis of methodological approaches in the occupational health and safety (OHS) literature reveals several key research gaps. First, the field is heavily dominated by quantitative, survey-based research, accounting for over 65% of the reviewed studies (e.g., Minton et al., 2015; Wu et al., 2016; Severo et al., 2021). While these designs enable the collection of standardized data across large populations and facilitate statistical analysis, they are largely cross-sectional in nature, limiting the ability to observe changes over time or infer causality. Consequently, there is a notable lack of longitudinal research that could capture how organizational safety interventions and HRM practices influence outcomes across different time periods (Zhang et al., 2022; Almost et al., 2018).

Furthermore, experimental and quasi-experimental designs—despite their ability to determine causal relationships—are underutilized, comprising only 16% of the sample. Studies such as those by Hoffmann and Schlicht (2013) and (Miniero et al., 2014) demonstrate the potential of controlled manipulation in testing the impact of specific safety or leadership interventions, yet this approach remains relatively rare. In addition, mixed-methods research, which combines the generalizability of quantitative approaches with the depth of qualitative insights, is also underrepresented, with only 15 studies employing this strategy (Barbarossa & De Pelsmacker, 2016; Bhardwaj et al., 2023). These methods are especially valuable in exploring contextual nuances, such as psychological safety and organizational resistance to change, that are often overlooked in purely quantitative analyses.

The literature also reveals a limited use of qualitative methods, which were employed in just 9% of the studies. These studies—such as those by Johnstone and Tan (2015) and (Perera et al., 2018)—offer rich, in-depth understanding of employee experiences, managerial attitudes, and cultural barriers, which are difficult to quantify but critical for effective OHS implementation. The underutilization of qualitative and mixed-method designs suggests a missed opportunity to explore the complex human and cultural dimensions of workplace safety.

From a data analysis standpoint, Structural Equation Modelling (SEM) is the most commonly used analytical technique, featured in 99 studies (Cheung & To, 2019; Kautish et al., 2019; Panda et al., 2020). While SEM is valuable for modelling complex relationships among latent variables, the heavy reliance on this method, often without triangulation through alternative analytical tools, can limit interpretative depth. Other statistical techniques such as regression analysis (used in 33 studies), ANOVA (29 studies), and logistic regression (10 studies) were also prevalent (Costa Pinto et al., 2016; Valor et al., 2020; Septianto & Kemper, 2021), but these too often failed to incorporate contextual or Behavioural insights.

Lastly, a methodological gap exists in the limited cultural and contextual adaptation of research instruments. Although many studies reported the use of validated scales and statistical reliability measures, few explicitly adjusted these tools for different cultural or industrial contexts (Dello Russo et al., 2015; Zhang et al., 2022). This lack of localization may affect construct validity and restrict the applicability of findings across diverse organizational settings. Addressing this gap by incorporating culturally sensitive designs and diversified methodological approaches—particularly in developing regions or high-risk industries—could significantly enhance the robustness and relevance of future OHS research.

7. Future Research Directions: A TCCM Framework Perspective

7.1. Theory

Future research should expand beyond commonly used frameworks such as Safety Climate Theory, JD-R Model, and HRM Theory (Liu et al., 2020; Shantz et al., 2016; Ateeq et al., 2023). There is significant opportunity to integrate underutilized yet relevant theories such as Institutional Theory, Social Exchange Theory, and Conservation of Resources Theory (Cometto & Campbell, 2016; Gonçalves & Curado,

2020). Additionally, researchers should adopt multi-theoretical perspectives to offer more holistic explanations of safety outcomes, leadership influence, and green HRM integration in varied organizational settings.

7.2. Context

OHS literature is heavily concentrated in industrialized or rapidly developing economies, particularly India, China, and the USA (Ateeq et al., 2023; Liu & Lu, 2020; Punnett et al., 2020). Future studies should address this geographical imbalance by focusing on underrepresented regions such as Africa, Latin America, and Southeast Asia. Furthermore, expanding research into neglected sectors—such as education, public administration, and the informal economy—can enrich contextual diversity. Cross-country comparative studies would also help to understand how institutional and cultural variations affect safety behaviours and policy implementation (Tawiah et al., 2022).

7.3. Characteristics

Future work should investigate barriers, not just enablers, to effective OHS practices—such as job stress, role ambiguity, and lack of management support (Gonçalves & Curado, 2020). Researchers are encouraged to diversify their variables, especially incorporating emerging constructs relevant to post-pandemic challenges, remote work, and digital transformation. More attention should also be given to mediating (e.g., trust in leadership, work engagement) and moderating variables (e.g., industry type, tenure, gender) to understand the nuanced mechanisms through which OHS outcomes are realized (Barbarossa & De Pelsmacker, 2016; Khan et al., 2021).

7.4. METHODOLOGY

Our comprehension of causal linkages in OHS is limited by the prevalence of cross-sectional and quantitative designs. To find dynamic changes over time, future studies should use mixed-method, longitudinal, and experimental approaches (Khan et al., 2021; Severo et al., 2021). To lessen bias and improve validity, cross-level and multi-source data collection techniques are also required. Additionally, qualitative research is still underrepresented while being essential for capturing informal practices, safety culture, and subjective employee experiences in complicated workplaces (Wu et al., 2016).

8. CONCLUSION: -

This systematic review, guided by the TCCM framework, analysed 60 key studies on Occupational Health and Safety (OHS). The review shows a strong reliance on established theories like Safety Climate and HRM Theory, with limited theoretical diversity. Geographically, most studies are concentrated in countries like India, China, and the USA, while sectors such as manufacturing and healthcare dominate, leaving other industries and regions underexplored.

In terms of characteristics, research has largely focused on enablers (e.g., leadership, HR practices) with less emphasis on barriers like job stress. Methodologically, most studies use quantitative, cross-sectional survey designs, with limited use of qualitative or longitudinal methods. Overall, this review highlights key gaps and calls for broader theoretical integration, more diverse contexts, and innovative research designs to advance OHS scholarship.

8.1. Practical Contributions

Particularly for high-risk sectors like manufacturing, healthcare, and construction, the analysed research offers a number of practical insights for practitioners. First of all, they emphasize how important strategic HRM practices are to improving workplace safety and employee well-being. Examples of these activities include safety training, performance reviews, and green HRM efforts (Ateeq et al., 2023; Severo et al., 2021). The results also highlight how crucial it is to create a good safety climate in which the dedication of the leadership to safety is evident and continuously reaffirmed (Liu et al., 2020; Zhang et al., 2022).

Furthermore, managers can have a better understanding of how to encourage safe employee behaviour by incorporating psychological dimensions as psychological empowerment, job engagement, and perceived organizational support (Tawiah et al., 2022; Wu et al., 2016). These factors are useful levers for increasing adherence and lowering accidents at work.

According to the research, sustainability-driven HR practices are becoming increasingly important because they not only help the environment but also lead to happier and healthier employees (Minton et al.,

2015). Furthermore, the findings support contextual customisation of OHS interventions, demonstrating that for policies to be effective, they must be adapted to local legislative, cultural, and industry contexts. Finally, the consistent use of data-driven methods like Structural Equation Modelling (SEM) and mixed-methods approaches demonstrates the importance of evidence-based decision-making in designing and evaluating workplace safety programs (Khan et al., 2021; Bhardwaj et al., 2023).

8.2. Limitations

This study has several limitations. First, it focused exclusively on Occupational Health and Safety (OHS) literature within the domains of business, management, and HRM, excluding relevant studies from disciplines like public health or engineering. Second, the literature search was limited to the Scopus database and Web of Science, potentially omitting relevant research available in other databases such as JSTOR, or EBSCO. Third, although 301 articles were initially screened, only 60 studies were selected based on TCCM inclusion criteria, which may have led to the exclusion of informative but less detailed works. Lastly, this review emphasized peer-reviewed empirical papers, excluding conceptual frameworks and grey literature that could offer practical or emerging insights

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