Perceived organizational support and the occupational health and safety–organizational citizenship behaviour nexus: A multigroup analysis across high-risk sectors in the manufacturing, mining, and power sub-sectors of Ghana

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ABSTRACT

This paper examined the role of Occupational Health and Safety Climate (OHS) and Perceived Organizational Support on Organizational Citizenship Behavior (OCB) in the manufacturing, mining and power sub-sectors of Ghana. The Structural Equation Modeling (PLS-SEM) was used to analyze the primary data collected from 384 frontline employees selected through purposive and stratified sampling techniques. Drawing from social exchange theory, the findings reveal that safety dimensions such as communication and feedback, safety compliance and safety participation predicted organizational citizenship behavior. Consistent with established frameworks, safety participation emerged as the most significant driver of extra-role behaviors. Perceived organizational support significantly predict OCB across all three sectors but did not moderate most of the OHS-OCB relationships. POS moderated only the Safety Training-OCB relationship especially in the power sub-sector. The multigroup permutation analysis revealed no significant differences across the sectors although effect size analysis revealed contextual differences where safety communication had more effect in the power sector and management commitment having the most impact in the mining sector. This study has extended safety science literature by highlighting the combined role of safety climate and organizational support in encouraging positive discretionary behaviors. However, since the cross-sectional research design limits causal inferences, it is important that future research use longitudinal approaches to confirm these link. Besides, sector-specific focus constrains the generalizability of the findings to other industries and national contexts. In practice, organizations could consider safety engagement, improve perceptions of organizational support and conduct safety programs according to industry-related risks to encourage citizenship behavior.

Keywords: Organizational Citizenship Behaviour, Occupational Health and Safety, Perceived Organizational Support, PLS-SEM Multigroup Analysis, Sectoral Dynamics

I. INTRODUCTION

Occupational Health and Safety (OHS) has received growing attention among scholars in recent years. Such interest emerges from the fact that the hazards related to work become apparent in industrial occupations like construction, healthcare, mining, manufacturing, and oil and gas industries. (Amponsah-Tawiah & Mensah, 2016; Baidoo et al., 2025). Investment in OHS can encourage Organizational Citizenship Behavior (OCB) through social exchange mechanisms, which implies that employees will respond positively to OHS by engaging in discretionary behavior (Reader et al., 2017; Laurent et al., 2021; Ateeq et al., 2024; Maryam, 2023; Kart & Miser, 2025).

Recent academic discussions reveal the notion that OHS has strategic significance and becomes beneficial for organizations, showing how companies are concerned about workers, demonstrating trust and dedication toward them. It affects their perceptions because employees spend a considerable part of their lives working at organizations. Employees who realize that their company cares about their safety and well-being tend to engage in discretionary behavior and show positive attitudes towards their work and fellow employees. This includes helping them, reporting safety issues, and abiding by the regulations beyond their job requirements (Amponsah-Tawiah et al., 2020; Shafait et al., 2021).

The connection between OHS and OCB has immense significance since it reveals how organizational investment into employee health and safety is not just aimed at preventing injuries but also encourages discretionary behavior that promotes organizational performance, especially in risky environments. Thus, an OHS policy not only reduces the incidents of occupational injuries and diseases but also shows organizational priorities regarding employee health and safety. Employee awareness and perception play a key role here. Numerous empirical studies conducted in different spheres provide consistent evidence of this pattern.

Safety climate an important concept linked to organizational OHS strategies is found to correlate with citizenship behavior in aerospace manufacturing industry (Maryam, 2023). Similarly, the impact of safety leadership and safety knowledge on safety attitudes and OCB has been explored in rail transport sector (Gyekye & Salminen,

2005). Finally, the implementation of initiatives to ensure safety and worker welfare in the fish processing sector serves as a precursor to OCB though producing mixed results related to which particular dimension encourages discretionary behavior (Hossain, 2024).In addition, employee welfare, where workplace safety represents a vital aspect, has been identified as one of the factors that influence citizenship behavior in relation to both the individual and the organization (Hossain, 2024).

However, the increasingly robust literature on this subject, although inherently relevant, has exposed a significant deficiency regarding contextual under-specified (Sridadi et al., 2023). The current research paradigm has primarily viewed high-risk sectors as one homogeneous entity, implicitly assuming that the psychological processes underlying the relationship between investment in safety and voluntary citizenship behaviors are constant throughout all types of organizations. This assumption, the author argues, is not only theoretically unsound but also practically inappropriate because the disciplines involved in occupational safety differ greatly in their ability to deal with the complexity of comprehension (Horan et al., 2021).

High-risk industries manifest substantial structural variances that significantly affect the interplay between occupational health and safety (OHS) practices and organizational citizenship behavior (OCB) (Bęś & Strzałkowski, 2024). The attributes of occupational risk exhibit considerable variability across diverse sectors. For example, in the mining sector, the predominant risks are chronic and insidious, encompassing prolonged exposure to dust, mercury contamination, and the cumulative repercussions of repetitive manual labor (Yavan, 2017; Nguembi et al., 2023; Morcinek-Słota, 2019; Lee et al., 2023; Gao et al., 2024).

Conversely, the power sector is characterized by acute high-energy hazards such as electrocution and dangers associated with confined-space operations thereby presenting a qualitatively distinct threat profile. In chemical manufacturing, processes akin to smelting present safety challenges associated with the management of toxic substances and intricate system interdependencies, thereby introducing yet another configuration of hazards. These varying hazard profiles mold collective risk perception, impact the OHS interventions that employees prioritize, and consequently condition the intensity of the reciprocity signal that OHS practices convey (Lee et al., 2023). These heterogeneous hazard profiles shape collective risk perceptions, influence employees' valuation of specific OHS interventions and consequently modulate the perceived robustness and credibility of the reciprocity signal communicated by organizational safety initiatives (Adikwu et al., 2024; Singh, 2026).

Furthermore, psychosocial elements can substantially influence safety outcomes in high-risk industries (Adikwu et al., 2024; Singh, 2026). Employees' encounters with safety threats may elicit adverse emotional responses and withdrawal behaviors from work (Derdowski & Mathisen, 2023).Variations in perceptions, attitudes, and beliefs regarding OHS between management and employees can engender compliance discrepancies, as evidenced in the manufacturing sector (Adikwu et al., 2024; Singh, 2026). Consequently, understanding the distinctive occupational risk profiles across various high-risk industries is imperative for the formulation of OHS interventions that are not only effective but also resonate with the specific needs and perceptions of employees within those sectors. The overarching objective is to transition from a reactive accident response to a proactive approach that systematically identifies and mitigates risks prior to the occurrence of harm (Adikwu et al., 2024; Singh, 2026).

In high-risk work environments, formal safety regulations and protocols alone are inadequate to comprehensively prevent occupational accidents. Organizations consequently depend heavily on employees' discretionary behaviors, such as assisting colleagues, voluntarily complying with safety protocols, reporting hazards, and actively engaging in safety initiatives to enhance safety outcomes (Christian et al., 2009; Hofmann et al., 2017). Empirical evidence suggests that such behaviors are pivotal for accident prevention, fostering resilient safety systems, and enhancing organizational resilience (Fiore et al., 2023). Thus, understanding how occupational health and safety (OHS) practices engender Organizational Citizenship Behavior (OCB) is essential for both safety performance and sustainable organizational efficacy.

The second, interrelated gap pertains to the mechanistic function of Perceived Organizational Support (POS) within the OHS–OCB pathway. POS, which is the collective perceptions of employees regarding the extent to which their organization acknowledges their contributions and prioritizes their well-being, is a well-established construct within the domain of organizational behavior. Existing literature has shown its relationship with employees' turnover intentions among repatriates in multinational enterprises, wherein POS was used as a mediating variable between employees' qualifications and their turnover intentions (Kraimer &Wayne, 2004). In terms of knowledge safety training knowledge transfer, POS was found to also influence in-house trainers' orientation in facilitating training outcome when mediated by perceived responsibility (Freitas et al., 2017). Employee commitment has similarly been associated with OHS practices, with organizational support proposed as a potential mediating factor (Amponsah-Tawiah & Mensah, 2016).

Nonetheless, the function of POS within the OHS–OCB pathway remains under-specified and theoretically understudied as a moderator rather than merely a mediator. The critical question our study seeks to answer is not simply whether employees who feel supported are more likely to engage in OCB as this is well established but whether a strong

sense of POS heightens the positive effect of OHS practices on OCB and whether this amplification is itself contingent on sectoral context and this is the focus of this study.

Moreover, while Perceived Organizational Support (POS) is a well-documented predictor of job satisfaction, commitment, and performance (Andriani et al., 2023; Kirsten, 2025), its influence on shaping employees' discretionary reactions to organizational safety initiatives has yet to be thoroughly investigated. In response to the call for sector-specific research (Ali et al., 2018; Hair et al., 2022), this study examines the sectoral dynamics of the OHS–OCB relationship and the moderating influence of POS across Ghana's mining, manufacturing, and power sectors. By concentrating on high-risk industrial contexts, the study contributes both theoretically and offers practical insights for designing safety interventions that promote sector-specific employee citizenship behaviors.

1.1 Research Hypotheses

Ho_1: Occupational Health and Safety (OHS) dimensions (safety compliance, safety communication and feedback, safety training, safety participation and management commitment to safety) have significant influence on Organizational Citizenship Behavior (OCB).

Ho_2: The strength of the relationship between OHS and OCB differ significantly among the various sectors.

Ho_3: Perceived Organizational Support (POS) moderates the relationship between OHS dimensions and OCB.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Social Exchange Theory

The occupational health psychology literature strongly establishes a theoretical linkage between Organizational Health and Safety (OHS) practices and Organizational Citizenship Behavior (OCB) best explained through the lens of Social Exchange Theory (SET). According to SET, life within an organization is predicated on a network of reciprocal interdependent transactions which engender moral obligations independent of the contractual terms of employment (Blau, 1964). As organizations commit to beneficial actions towards employees, a moral obligation is cultivated on the part of employees to reciprocate by exhibiting attitudes and extra-role behaviors that are favorable towards the organization (Cropanzano et al., 2017). In this conceptual framework, effective OHS practices represent a key organizational resource which acts as an antecedent of OCB. Instead of solely being viewed as regulatory mandates, OHS refers to how workers interpret the policies, procedures and practices that an organization has implemented pertaining to safety, thus having significant effects on the employee's actions and perceptions at the workplace (Baidoo et al., 2025; Clarke, 2006). It is essentially the perception of the employees concerning the value the organization places on the importance of safety and how the safety processes are deeply integrated into operations; thus serving as a complex multidimensional concept for a safety culture (Amponsah-Tawiah & Dartey-Baah, 2016; Obuobisa-Darko, 2022).

The presence of an organization's OHS, such as ensuring the physical and psychological security of its employees and their protection, reflects the organization's value for its workforce and triggers the underlying psychological mechanism of reciprocity to motivate discretionary OCB (Obuobisa-Darko, 2022). This effect really stands out in high-risk jobs. When safety measures make dangerous work less stressful or less hazardous, employees do not only appreciate it. They often step up in ways that help the entire organization. Safety practices like thorough risk training, active efforts to control hazards and honest communication serve as proof that the company cares and supports its employees' well-being (Obuobisa-Darko, 2022). This makes employees want to reciprocate with positive behaviour. Building on this assumption, this research argues that perceived organizational support (POS) makes the connection between safety practices and OCB even stronger. When employees truly feel supported, safety efforts pack more of a punch. They inspire employees to be proactive and helpful well beyond what's required (Cropanzano et al., 2017).

2.2 Empirical Review

2.2.1 Effect of Occupational Health and Safety Dimensions on OCB

OHS has been perceived as the perceptions of the employees on the safety policies, processes, and practices of an organization which greatly influence the behaviour of workers and the work process (Clarke, 2006; Baidoo et al., 2025). It indicates how much importance has been accorded to the issue of safety, the extent of prioritization of safety in the operations of the organization, and is recognized as a multi-dimensional construct forming the basis of organizational safety climate. OHS does not operate as one homogenous concept but operates through a number of dimensions related to different aspects of the work environment. Based on safety climate and performance perspectives found in academic literature, the dimensions of OHS include; management commitment to safety, safety communication and feedback, safety training, safety participation, and safety compliance (Ajmal et al., 2021).Under the umbrella of organizational leadership, these dimensions together act as tangible measures of organizational care (Obuobisa-Darko, 2022). In situations of high risk, the resource allocation helps reduce the intrinsic demands of the job (Morin et al., 2023).

Management commitment to safety is widely acknowledged as the fundamental component of a safety culture. This type of commitment is represented by managerial decisions concerning safety resource provision and safety procedures prioritization. The existence of high management commitment contributes to increased psychological safety and builds employees' belief in the firm's commitment to take care of their well-being (Bayram et al., 2021). Employees start seeing safety as a valid organizational concern rather than a cosmetic move, thus, triggering the social exchange process. They become more likely to engage in voluntary extra-role behaviors like helping co-workers, hazard detection, and safety improvement collaboration (Griffin & Curcuruto, 2016; Ajmal et al., 2021). In case the managerial commitment does not exist, and the issue of safety is not managed, safety-related efforts are seen as cosmetic activities.

Safety Communication and Feedback (SCF): Safety communication and feedback have a very important role to play in terms of enhancing safety awareness and implementing safety policy in practical operations. Effective SCF includes a timely reaction to the reports about incidents or risks given by employees as well as the consistent two-way transmission of safety-related information (Vinodkumar & Bhasi, 2010; Ismail, 2015). An effective SCF mechanism strengthens the workers' perception of the importance of their welfare from the perspective of management (Fiore et al., 2023). SCF enhances the role clarity and reduces operational ambiguity and sends a strong signal of institutional support. It can be stated that, therefore, based on empirical evidence, safety communication is a very effective intermediary and moderating factor of the interaction of safety leadership, safety climate, and safety-based organizational citizenship behaviors (Griffin & Neal, 2000; Jiang & Probst, 2016).

Safety Training (ST): Through safety training, the employees are provided with the appropriate knowledge, skills, and awareness that can enable them to recognize potential hazards and follow the safety procedures. Effective training programs help in enhancing competence, confidence and capacity of employees to work together in maintaining a safe work environment (Sharma & Mishra, 2020; Ajmal et al., 2021; Vinodkumar & Bhasi, 2010). Past research has shown that there exists a strong association between a good occupational health and safety climate, safety training, and proactive safety behavior including safety citizenship behaviors (Amponsah-Tawiah et al., 2020; Curcuruto et al., 2023). But the effectiveness of training in triggering OCBs depends on the sustainability and consistency of safety training programs along with the appropriateness of training and its fit with organizational culture (Bęś & Strzałkowski, 2024).

Safety Participation (SP): Safety participation includes employee participation in safety decision making, problem solving, and safety improvement activities. While there is a variation in the empirical evidence concerning its influence on safety behavior directly, studies have found that safety participation increases organizational citizenship behavior by raising affective commitment and perceived organizational support (Maryam, 2023). Nevertheless, it is noted that participation alone does not produce OCB if some other factors are missing, like perceived leadership support (Joe-Akunne et al., 2022; Bayram et al., 2021). Under the widely accepted theory of social exchange, if participation is viewed as an effective collaboration rather than just management activity, it provides exactly the right climate for citizenship behavior.

Safety Compliance (SC): Safety compliance, which is described as conformity with organizational safety regulations and protocols, continues to be essential for accident prevention and regulation compliance (Neal & Griffin, 2006). Although compliance contributes to the reduction of workplace accidents through obligatory compliance, a focus on compliance might have an adverse effect on engaging in safe behaviors because compliance involves following rules without being proactive (Clarke, 2006). On the other hand, the existing literature states that safety compliance is positively related to OCB in conditions of supportive leadership styles and participative safety culture (Reader et al., 2017). Viewing safety compliance as a shared effort to protect each other rather than organizational coercion makes the base of citizenship behavior.

In conclusion, the literature reveals that these five OHS dimensions do not only impact the safety outcomes directly but also the discretionary behavior of employees (Tokay & Akin, 2023). When there is structural support for safety initiatives provided by organizational leadership, along with communication and training, this will create a situation in which both the safety performance and the organizational citizenship behavior complement each other. Therefore, based on these interrelated variables, the research hypotheses are proposed as follows:

Ho1: The Occupational Health and Safety (OHS) dimensions (safety compliance, safety communication and feedback, safety training, safety participation, and management commitment to safety) significantly impact Organizational Citizenship

2.2.2 OHS-OCB Dynamics in High-Risk Work Environments

In hazardous industries like power, manufacturing and mining, proactive risk management is vital to survival. In these cases, strong OHS programs have a greater relationship with prosocial OCB which is mainly because of the increase in the sense of safety interdependence and responsibility within the group. In this case, the concern for physical injuries is the main issue; therefore, it becomes important that employees follow safety procedures and indulge in OCB related to safety (such as helping colleagues in recognizing the potential hazards) (Curcuruto et al., 2019). This research specifically targets heavy industrial settings where data is collected from the energy sector (power transmission, power

distribution and power generation), the extraction sector (mining) and the manufacturing sector (food processing and smelting). The literature places much emphasis on the obvious spatial, environmental, and structural risks associated with these particular industries. In the power production, transmission, and distribution industry, there are highly automated workplaces, spatially spread out field networks, and unseen local risks, such as high-voltage electric arcs, electromagnetic waves, and thermal stress. Since workers work remotely in an autonomous field workplace, the transformation of OHS into OCB requires self-regulation and safety communication among colleagues (Lomotey, 2025). Empirical studies in the Ghanaian power industry have found that the adoption of OHS strategies greatly reduces worker turnover intentions in a way that is moderated by organizational commitment.

Contrastingly, mining is characterized by a heavily concentrated, dynamic and physically dangerous working environment that is characterized by underground tunneling, rock bursts, structural collapses and machinery operations. Research reveals that mining is associated with a very high global rate of fatalities and acute injuries than any other industrial sectors. Since risk environments keep on changing with each blast or cycle of mining, one gets phenomena such as 'risk normalization' within groups. Thus, OHS inputs are seen by miners as lifesaving means, making a more basic level of safety oriented OCB (such as checking on fellow workers and mandatory coaching) necessary for survival (Milošević et al., 2025; Komljenovic et al., 2017). The manufacturing industry is interested in developing safety culture through safety behavior and uses structural equation modeling methods to understand these issues. In this particular study sample, smelting works share the characteristics of mining environment, which include being very rigid and hot with high risk environment, where safety training failure causes catastrophic injuries.

Contrary to that, food processing plants have a very well-standardized, clean and repetitive line assembly type of operation whereby the risks involved are more of a mechanical nature. Studies have shown that in certain manufacturing sectors like fish processing, OHS practices have been found to be directly related to OCB among employees (Hossain, 2024). The successful adoption of OHS practices in industries that pose significant risks depends largely on the decision-making processes adopted by organizations, and also new technological paradigms such as Virtual Design and Construction (VDC) techniques have been examined as a way of adopting such practices in occupational safety and health (Shen et al., 2023).

More importantly, the research evidence from mining shows that safety leadership and the provision of specific safety training are two key performance measures in improving the ability to retain the workers and foster a safety climate (Amponsah-Tawiah et al., 2016). Particularly, linking learning to operation is seen as an important link between the provided training and the proactive safety stewardship by workers. Learning-oriented leadership not only minimizes risks associated with the extractive processes but also facilitates the contribution of employees in maintaining the safety of the working environment beyond their formal job responsibilities (Derdowski & Mathisen, 2023). Importantly, the empirical evidence shows that providing tangible resource allocation towards the health of the workforce in the form of specific welfare management and training practices is responsible for a considerable share in the increased safety citizenship behaviors of employees through the social exchange mechanism (Hossain, 2024). This implies that human resources and workforce relations play an important role in the process of safety management (Reader et al., 2016). Besides addressing the problems related to workplace hazards, such integrated efforts within the organization serve as an important tool for increasing the performance of employees (Milošević et al., 2024).

On the other hand, in cases of knowledge-based or low-hazard domains, like IT, finance, hospitality, or education industries, OHS-OCB relationships can be more determined by psychological safety, high quality of leadership, and organization's support (Singh et al., 2023). In the case of hospitality industry, OCB has gained great attention, because of its service-oriented characteristics, and there has been a number of studies examining the peculiarities of its antecedents and consequences (Griffin & Neal, 2000; Memon et al., 2024). In low hazard environment, Green Human Resource Management in hotels affects hospitality workers' organizational citizenship behavior from organizational, interpersonal and customer perspective. Moreover, the role of organizational support in non-technical aspects of safety has been studied in various domains, like automotive industry, concentrating on an interaction of personal and organizational approaches to work (Mohamed et al., 2024). In these cases, psychological safety that helps individuals to engage in interpersonal activities and do not worry about any negative consequences becomes a primary driver of team performance and discretion (Sridadi et al., 2023). In this sphere, Citizenship Behavior appears in form of proactive involvement and voluntary altruistic behavior going far beyond simple regulatory compliance and becoming the stewardship of collective well-being. (Curcuruto & Griffin, 2018; Kart & Miser, 2025).

Because the baseline risk profiles, regulatory stringencies, team dependencies and situational cues differ fundamentally between automated power infrastructure, physically volatile extraction sites and service-oriented sectors, employees value and interpret institutional OHS practices differently. Therefore, the strength of the social exchange loop fluctuates depending on the sector, dictating the volume of cognitive and physical bandwidth employees dedicate to extra-role workplace behaviors. Consequently, the capacity of OHS dimensions to inspire OCB is fundamentally bound by the sector-specific context. This study therefore proposes the following:

Ho_2: The strength of the relationship between OHS and OCB differs significantly among the various sectors.

2.2.3 Perceived Organizational Support (POS) in OHS-OCB link

Perceived Organizational Support (POS) reflects the extent to which workers believe that their organization values their contributions and cares about their well-being (Eisenberger *et al*., 1986; Singh *et al*., 2023). The nexus between POS, OCB and OHS is fundamentally grounded in the social exchange theory where employees reciprocate their organizational case with discretionary behaviours (Reader *et al*., 2017; Eisenberger et al., 2020; Laurent et al., 2021). Numerous empirical studies have illustrated that POS exerts a significant influence on prosocial safety behavior, frequently mediated by intrinsic motivation and affective commitment, thereby further affirming its role as a critical moderator in safety-related outcomes (Moserle et al., 2024; Sudiyani & Rihayana, 2025; Singh et al., 2023). For example, when organizations extend robust support for safety, it enhances employee satisfaction and engagement at work, which subsequently drives their levels of OCB (Sudiyani & Rihayana, 2025; Singh et al., 2023). In high-risk sectors such as construction and healthcare, the presence of POS has been correlated with diminished unsafe behaviors and heightened proactive safety participation, indicating that the moderating effect of POS is particularly pronounced in contexts where physical hazards are prevalent. In instances where the POS is high, employees interpret organizational safety practices as genuine care for their well-being, thereby strengthening the positive effect of the OHS initiatives on their organizational citizenship behaviours (Tariq et al., 2021; Moserle et al., 2024).

On the contrary, in organizations where POS is perceived to be low, employees could interpret even well-structured OHS programs with skepticism which significantly diminishes the potential to promote voluntary safety participation and enhance OCB (Laurent et al., 2021; Reader et al., 2016). The mechanism by which POS moderates the OHS–OCB relationship encompasses the psychological interpretation of safety climate and the motivations underlying organizational intentions. Safety climate, conceptualized as the collective perceptions of employees regarding the significance of safety within the organization, functions as a vital contextual factor that interacts with POS (Shen et al., 2023; Podsakoff et al., 2000). In safety-sensitive industries, such as the offshore oil and gas sector Reader et al., 2026 found that organizational support acts as a critical antecedent to safety citizenship behaviors establishing a reciprocal social exchange that mitigates risk through enhanced employee participation. This dynamic is particularly relevant in high-risk settings such as mining and power generation where discretionary behaviors are essential for robust risk management.

In manufacturing contexts, Lee et al. (2007) investigated frontline operators and supervisors in 118 facilities in Taiwan and found that organizational support system encourage workers to exceed minimum safety requirements. Consequently, POS serves as a vital moderator, ensuring that OHS dimensions effectively translate into sustained OCB across diverse industrial sectors by validating employee contributions and fostering a secure, supportive work environment. Empirical evidence suggests that a positive psychosocial safety climate cultivates OCB, particularly under conditions where employees perceive a substantial level of organizational support (Tariq et al., 2021). In this interplay, POS operates as a framework through which safety policies are assessed; elevated POS augments the credibility of safety leadership and protocols, prompting employees to internalize safety as a collective value rather than perceiving it as an enforced limitation. This process of internalization engenders a sense of felt obligation, a fundamental aspect of SET, which incites employees to engage in prosocial safety behaviors and extra-role activities that are beneficial to the organization as a whole (Laurent et al., 2021).

This study therefore proposes that:

Ho_3: Perceived Organizational Support (POS) moderates the relationship between OHS dimensions and OCB.

III. METHODOLOGY

3.1 Study Design

This study adopts a quantitative, cross-sectional survey design to empirically test the relationships between POS, OHS practices and OCB. This methodology is adopted to capture snapshot data from a large diverse population across high-risk industries (Reader et al., 2016) as a robust approach. The cross-sectional design has also been used widely in prior studies to test complex theoretical models in SET and POS (Hofmann& Morgeson, 1999). Besides, it is considered as a robust approach for examining the theoretical frameworks such as the moderating role of POS in OHS-OCB relationship.

3.2 Study Area

The research is conducted within three distinct high-risk industrial sectors comprising manufacturing, mining and power generation. These sectors were purposively selected due their high exposure to occupational hazards and the critical importance of discretionary safety behaviors in accident prevention (Reader et al., 2016). In such safety-sensitive environments, the interplay between organizational support and employee safety outcomes is paramount as frontline workers often face complex risk scenarios that require proactive rather than merely compliant responses Adekanmbi et al., 2022).

3.3 Target Population

The target population comprises technical and frontline workers directly exposed to health hazard within the selected high-risk sectors. This demographic was specifically chosen due to their frequent exposure to occupational hazards and the main recipients of OHS initiatives making their safety perceptions and behaviors central to effective risk management (Reader et al., 2016). Managers and supervisors were excluded from the sample to minimize role and perspective-related biases because their daily exposure to operational risks differs significantly from those of frontline employees (Addo & Dartey-Baah, 2019).

3.4 Sampling and Sample Size

A multistage sampling procedure was employed to ensure adequate representation and rigorous data collection. The purposive sampling technique was used to select sectors and specific workers who are exposed to occupational hazards (Bęś & Strzałkowski, 2024). This was followed by stratified random sampling to ensure proportional representation across the sectors. The sample size was determined using Miller and Brewer's formula, resulting in a minimum required sample of 384 participants from a total population of 10,695 frontline workers. To account for potential non-response and incomplete surveys, 400 questionnaires were distributed. This method aligns well with survey research ensuring adequate statistical power for SEM analysis which typically requires larger samples to test complex relationships among latent variables (Memon et al., 2024).

3.5 Data Collection Tools and Procedures

Data were collected using a structured questionnaire comprising validated scales for OHS, POS and OCB. OHS was measured with scales covering safety communication and feedback, safety participation, safety training, safety compliance, management commitment to safety (Neal et al., 2000). OCB and POS were assessed using validated scales (Podsakoff et al., 2000; Eisenberger et al., 1986) with items exhibiting poor factor loadings (like sportsmanship dimension and two items from POS) removed during the analysis to ensure construct validity and model fit. POS was measured using Eisenberger's standardized scale which captures employees' perceptions of organizational valuing and care (Eisenberger et al, 2020). OCB was measured with measured using Podsakoff's multidimensional scale. The instrument was administered personally by the researchers and four trained research assistants to enhance the response rate.

3.6 Data Analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) SmartPLS 3.0 was employed for data analysis. PLS-SEM is considered appropriate for this study due to its ability to handle complex models with multiple dependent and independent variables as well as its robustness in dealing with non-normal data distributions common in social science research and simultaneously examining the measurement model as well as structural model to provide accurate results on path co-efficient and effect sizes. The analysis was carried out in two stages with the first stage assessing the measurement model for reliability and validity. The second stage which involves the structural model assessment was carried out to test the hypothesized relationships.

3.7 Ethical Consideration

Ethical standards were strictly upheld throughout this research process by complying with guidelines on human subject research to foster trust and encourage honest responses on sensitive issues such as employees' perceptions of safety violation and organizational support. For instance, we obtained informed consent from all participants and emphasized voluntary employees' involvement and their right to withdraw at any time they wish. Anonymity and confidentiality were also guaranteed by excluding all items likely to reveal the identity of respondents. Besides, access to the final data was restricted to the research team only ensuring that individual responses could not be traced back to specific employees.

IV. FINDING & DISCUSSION

4.1 Finding

The descriptive analysis showed a relatively balanced gender distribution among respondents with majority possessing secondary-level education. Ages were concentrated in 18-45 range suggesting a predominantly youthful-to-middle-aged workforce. Tenure data showed that most employees had 1 to 5 years of service with few long serving staff reflecting a stable, moderately experienced workforce dominated by early-to-mid-career employees. The analysis also employed a reflective SmartPLS-SEM measurement model which was evaluated based on established criteria for reflective constructs; discriminant validity, convergent validity, internal consistency reliability, and indicator reliability (Hair *et al.*, 2017). The results on these tests are presented in Tables 1, 2 and 3. As indicated in Table 4, all indicators

loaded strongly onto their respective latent constructs with factor loadings greater than the recommended threshold of 0.70 (Hair *et al.*, 2017; Cheah *et al.*,2023) thereby indicating adequate indicator reliability.

Table 1

Factor Loading and Convergent Validity Metrics

Items	Factor Loading	Cronbach's Alpha	CR	AVE
ALT	0.77	0.846	0.897	0.687
CIV	0.895			
CONSC	0.885			
COURT	0.753			
MCS2	0.765	0.81	0.875	0.638
MCS3	0.858			
MCS4	0.849			
MCS5	0.711			
OSP1	0.799	0.89	0.92	0.69
OSP2	0.869			
OSP3	0.832			
OSP4	0.818			
OSP5	0.835			
SC1	0.836	0.871	0.907	0.66
SC2	0.842			
SC3	0.807			
SC4	0.805			
SC5	0.771			
SFC1	0.746	0.876	0.906	0.617
SFC2	0.796			
SFC3	0.791			
SFC4	0.782			
SFC5	0.799			
SFC6	0.797			
SP1	0.824	0.881	0.913	0.677
SP2	0.840			
SP3	0.853			
SP4	0.788			
SP5	0.809			
ST1	0.741	0.82	0.874	0.583
ST2	0.788			
ST3	0.757			
ST4	0.686			
ST5	0.837			

The evaluation of the measurement model was conducted with respect to indicator reliability, internal consistency reliability, and convergent validity, adhering to the established guidelines of PLS-SEM as delineated by Hair et al. (2022). As presented Table 1, the internal consistency reliability was affirmed for all constructs, evidenced by Cronbach`s alpha values and composite reliability (CR) values exceeding the recommended cut-off of 0.70, factor loadings greater than 0.60 and AVE values exceeding 0.5. This implies that the measurement model presents adequate indicator reliability, robust internal consistency, and sufficient convergent validity, thereby establishing a solid foundation for the ensuing structural model analysis.

Table 2

Heterotrait-Monotrait Ratio (HTMT)

	MCS_	OCB	POS	SC	SCF	SP	ST
MCS_							
OCB	0.70						
POS	0.56	0.74					
SC	0.85	0.77	0.57				
SCF	0.81	0.84	0.66	0.91			
SP	0.67	0.78	0.62	0.71	0.78		
ST	0.89	0.72	0.54	0.85	0.8	0.76	

Discriminant validity was also assessed using HTMT and Fornell-Larker criterion in line with PLS-SEM best practices. The results shows that all pairs of constructs present values that fall below the widely acceptable threshold of 0.90 (Henseler *et al.*, 2015) thereby indicating discriminant validity among all latent variables. Despite the fact that certain construct pairs, SCF and OCB at 0.839, and Safety Training (ST) and SCF at 0.790, which is close to the stringent threshold of 0.85, they remain within acceptable parameters (Hair *et al.*, 2022). Consequently, the constructs were considered empirically distinct and appropriate for subsequent analysis.

Table 3

Fornell and Lacker Criterion

	MCS_	**OCB**	**POS**	**SC**	**SCF**	**SP**	**ST**
MCS_							
OCB	0.7						
POS	0.56	0.74					
SC	0.85	0.77	0.57				
SCF	0.81	0.84	0.66	0.91			
SP	0.67	0.78	0.62	0.71	0.78		
ST	0.89	0.72	0.54	0.85	0.8	0.76	

Again, the Fornell-Larcker results in Table 3 further confirmed discriminant validity according to Hair *et al.* (2017) as the values squared root of AVE for each construct exceeded their corresponding inter-construct correlations suggesting that all the constructs measuring the OHS dimensions, POS and OCB are empirically distinct and suitable for further structural model analysis.

4.2 The Goodness of Fit

The goodness of fit evaluates whether the model's predicted values match the actual observed values (Hair *et al.*, 2017). It serves as a key metric to quantify the explanatory power of the model. In this study, the coefficient of determination (R^2) for OCB is calculated at 0.66. This finding illustrates the notable explanatory capacity of the variables that are integrated within the model including the dimensions of OHS and POS. The adjusted R^2 value of 0.65 corroborates the model's robustness and shows a strong model fit (Chin, 1998) by mitigating the risk of overfitting associated with the number of predictors utilized (Hair *et al.*, 2017).

4.3 Structural Model

The second phase of the results present the empirical examination of the proposed hypotheses through the application of PLS-SEM. Following validation of the measurement model assessed to evaluate the hypothesized relationships amongst the constructs (Hair *et al.*, 2022).

Table 4

Relationship between OHS dimensions and OCB

Pathways	**Manufacturing Sector**			**Mining Sector**			**Power Sector**			**Complete Model**		
	β (value)	T (value)	P (value)	β (value)	T (value)	P (value)	β (value)	T (value)	P (value)	β (value)	T (value)	P (value)
MCS_ -> OCB	-0.040	0.290	0.780	0.080	0.630	0.530	0.000	0.050	0.960	0.020	0.360	0.720
POS -> OCB	0.340	2.250	**0.020**	0.390	3.400	**0.000**	0.180	3.320	**0.000**	0.260	5.580	**0.000**
SC-> OCB	0.070	0.510	0.610	0.250	1.590	0.110	0.090	1.420	0.160	0.130	2.270	**0.020**
SCF -> OCB	0.380	3.230	**0.000**	0.120	0.580	0.560	0.340	4.600	**0.000**	0.280	4.180	**0.000**
SP -> OCB	0.200	1.730	0.080	0.240	1.430	0.150	0.260	3.250	**0.000**	0.240	4.010	**0.000**
ST -> OCB	0.030	0.290	0.770	-0.160	0.930	0.350	0.090	1.260	0.210	0.040	0.680	0.500

Note: MCS Management Commitment to safety, POS [Perceived Organizational Support], SC (Safety Compliance), SFC (Safety communication and Feedback; SP (Safety Participation); ST (Safety Training)

From the analysis in Table 4, OCB is strongly influenced by safety compliance indicating that workers who follow safety rules are more inclined to go above and beyond the call of duty. Workers` involvement in safety decision-making enhances their sense of voluntary behavior as evidenced by the significant predictor of OCB. The results showed three out of the five predictors tested (SC, SCF and SP) showed statistically significant and positive relationships with OCB. By implication, safety training and management commitment to safety alone do not sufficiently motivate workers to engage in voluntary work practices beyond their formal job roles unless accompanied by other supportive practices. Based on these outcome, the hypothesis H_1 is rejected because not all the OHS practices tested significantly predicted OCB in this model. The next hypothesis tests whether or not there is any significant difference in the strength of relationships across the three sectors studied. To do this, the SEM-MGA analysis was performed and the results are summarized in Table 5.

Ho_2: The strength of the relationship between OHS dimensions and OCB differs significantly among the various sectors.

Table 5

Multigroup Permutation Analysis

Relationships	β (Mining)	β (Power)	Original Difference (Mining - Power)	Permutation Mean Difference (Mining - Power)	Permutation p-Values	Decision
SCF -> OCB	0.231	0.415	-0.185	0.014	0.169	not supported
SP -> OCB	0.262	0.319	-0.056	-0.004	0.37	not supported
SC -> OCB	0.22	0.082	0.138	-0.008	0.184	not supported
ST -> OCB	-0.151	0.057	-0.209	-0.011	0.134	not supported
MCS_ -> OCB	0.213	0.029	0.184	0.015	0.116	not supported

The Multigroup analysis (MGA) was performed to assess whether the structural pathways between the safety dimensions and OCB differ significantly in the mining, manufacturing and power sectors using the permutation-based test. From the analysis, there was no statistically significant differences for the five pathways tested (SCF → OCB, SP → OCB, SC → OCB, ST → OCB and MCS → OCB) in these sectors as depicted in Table 5. Again, while safety communication and feedback predicted OCB in both manufacturing and power sectors ($P<0.01$), the MGA permutation test proved that the difference is not statistically significant across the groups.

Ho_3: Perceived Organizational Support (POS) moderates the relationship between OHS dimensions and OCB.

The hypothesis 3 explores the moderating role of POS in the OHS –OCB relationship and the outcome of this is presented in Figure 1 below.

4.3.1 Summary of Moderating Effect of Perceived Organizational Support (POS) on the Relationship between OHS Climate Dimensions and Organizational Citizenship Behaviour (OCB)

Table 6

Moderating Effect of Perceived Organizational Support (POS) on the Relationship between OHS Climate Dimensions and Organizational Citizenship Behaviour (OCB)

Sector/Model	Moderating Effect of POS	Significant Interaction(s)	Interpretation
Mining	Positive but not statistically significant	None	POS strengthened the relationship between OHS climate dimensions and OCB, but the moderation effects were not statistically significant.
Manufacturing	Positive but not statistically significant	None	POS enhanced the relationship between OHS climate dimensions and OCB; however, none of the interaction effects reached statistical significance.
Power	Positive and strongest among sectors	POS × Safety Training (ST) → OCB ($p < .05$)	POS significantly strengthened the effect of Safety Training on OCB, while other interaction effects were not statistically significant.
Overall (Combined Model)	Positive but limited	POS × Safety Training (ST) → OCB ($p < .05$)	Across all sectors, POS significantly moderated only the relationship between Safety Training and OCB, providing limited support for the moderating role of POS.

From the moderation analysis, a limited support was found for the moderating role of POS in the link between OHS climate dimensions and OCB. From the analysis, POS positively influenced OCB across all the sectors with the strongest effect in the power and mining sectors where safety risks are inherently high. Although POS consistently

strengthens the relationship between safety climate dimensions and OCB across the sectors, most of the paths were not statistically significant. For instance, in the mining and manufacturing sectors, no significant moderating effect was found. Even in the power sector, only the POS × ST → OCB was statistically significant ($p<0.05$). Similarly in the complete model, POS significantly moderated only the Safety Training–OCB relationship ($p<0.05$).

4.4 Discussion

The empirical investigation of the interplay between OHS dimensions, POS and OCB yields critical insights that validates and substantiates existing theoretical frameworks underpinned by the social exchange theory. Our model found a partial support for Hypothesis 1 as safety compliance, safety communication and Feedback and safety participation significantly predicted OCB except management commitment to safety, and safety training which did not and this explains the nuanced nature of employee reciprocity. The significant effect of the SCF and SP suggests that when employees are granted voice in safety decision-making, they perceive that as fair and supportive which triggers the norm of reciprocity inherent in SET (Laurent et al., 2021). The sectoral differences in specific pathways like SP→OCB in the power sector but not in mining and manufacturing are explicable through the participation and employee voice. Recent studies by Akomah and Ramani (2024) also show that safety participation and voice are multidimensional. Some of these are relational and discretionary and are likely to elicit OCB whilst others are compliance-based and less likely to relate to OCB. Therefore, where participation is experienced as a genuine voice and collective responsibility usually in highly structured settings, its relation to OCB strengthens (Amoadu et al., 2023). Conversely, the non-significant impact of ST and MCS suggests that standardized training and symbolic managerial declarations may be viewed as procedural obligations or "hygiene factors" rather than relational investments thereby failing to generate the affective commitment necessary for discretionary citizenship behaviors (Eisenberger et al., 2020).

In contrast to our hypothesis 1, Safety Training (ST) did not significantly predict Organizational Citizenship Behavior (OCB) within the Manufacturing, Mining and Power sectors, nor was it evident in the pooled model. This outcome diverges from existing literature that has established affirmative correlations between safety training, safety engagement, and discretionary behaviors (Mohamed et al., 2024). Although it is well-documented that safety training contributes to the enhancement of safety knowledge and adherence (Quaigrain et al., 2022; Ordysiński, 2024), the absence of a significant effect on OCB in this investigation indicate the generic and compliance-focused characteristics of training programs within these industries. Homogenized “one-size-fits-all” training methodologies may exhibit a deficiency in contextual relevance, thereby constraining their motivational efficacy (Saks, 2022). In contrast, training modalities that are contextually specific and participatory such as hazard simulations and peer learning have demonstrated efficacy in eliciting proactive safety behaviors and extra-role performance (Bęś & Strzałkowski, 2024).

The Multigroup analysis found sector-specific variations in the relative impact of OHS dimensions on OCB although none achieved statistical significance. Notably, safety communication and participation were more prominent within the Power sector highlighting the critical role of structured systems and employee engagement in promoting discretionary efforts. Based on these findings, the Hypothesis 2 which proposed significant sectorial variations in the relationships across the three sectors is also rejected. The outcome reveals a robust universality of psychological mechanism in these high-risk work settings. Despite the varying levels of hazard profiles in these settings, the structural pathways linking OHS practices to OCB remained statistically consistent suggesting that the fundamental drivers of OCB in high risk contexts are rooted in human psychological responses to support rather than contextual risk levels (Curcuruto et al., 2019). This universality reinforces the premise that POS acts as critical lens through which safety initiatives are interpreted irrespective of industry-specific hazards (Hofmann & Morgeson, 1999). The absence of sectorial variation here implies that organizations in high-risk contexts ought to prioritize interactive and supportive practices rather than mere regulatory compliance to foster proactive safety cultures (Shen et al., 2023). The mining and power sectors are typically classified as high-risk industries due to the inherent dangers associated with their operational environments (Ismail, 2015). Workers in these sectors are often more aware of the consequences of safety lapses and thus actively participating in safety-related activities becomes not just a voluntary self-protection but collective responsibility. As a result, their participation in safety behaviours like helping colleagues, following safety procedures or reporting hazards are more likely to be aligned with OCB (Kim & Lee; 2024; Amoadu *et al.*, 2023).

Again we examined the moderating role of POS in the OHS-OCB link. The path analysis shows that POS exerts a direct effect on OCB across all the three sectors indicating that when POS is high, employees interpret safety initiatives as genuine care, thereby strengthening the link between safety practices and citizenship behaviors (Sudiyani & Rihayana, 2025; Singh et al., 2023). Integrating with existing literature, these findings suggests that the effectiveness of OHS management systems is heavily dependent on the quality of the social exchange relationship between employees and the organization. While hierarchical controls and regulatory adherence establish baseline safety, it is the discretionary efforts driven by POS that create a resilient safety culture (Lee et al., 2007). This shows that organizations must move beyond symbolic commitments to implement tangible, consistent actions that validate employee contributions which foster the trust and mutual obligation required for sustained citizenship (Meira et al., 2021). This approach does not only enhance compliance but also encourages workers to exceed minimum safety requirements,

contributing to a proactive safety culture that mitigates risk through enhanced employee participation (Reader et al., 2016). Therefore, the strategic alignment of OHS practices with POS initiatives emerges as a critical imperative for organizations seeking to optimize safety performance and reduce accidents in high-risk industries (Ye et al., 2017) and when POS is low, these same initiatives may be perceived as coercive weakening their impact (Moserle et al., 2024).

However, contrary to the hypothesized model, POS did not significantly moderate the majority of OHS–OCB relationships (Figure 1). This observation implies that POS may function in an indirect capacity or as part of a more expansive safety climate rather than serving as a direct interaction mechanism in this pathway. The significant negative moderation observed between ST and POS suggests the presence of a potential ceiling effect, where additional training is perceived as routine rather than a discretionary investment when levels of support are already elevated (Eisenberger *et al.*, 2001; Saks, 2022). Consequently, given this theoretical and empirical reasoning, our study finds no support for the assertion in hypothesis 3 which proposed that POS would moderate the link between OHS dimensions and OCB.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study looked into whether the connection between Occupational Health and Safety (OHS) practices and Organizational Citizenship Behavior (OCB) is affected by certain factors in the manufacturing, mining, and power industries in Ghana. These sectors have special features when it comes to how much risk they involve, the way they operate, and the safety measures they use. This allows for a comparison of how occupational health and safety conditions influence the choices employees make in these high-risk work environments. Using multiple group analysis inside the Partial Least Squares Structural Equation Modeling approach.

OHS practices play a big role in predicting the voluntary actions people take, which help improve the well-being of their coworkers and the organization as a whole in this model. However, the effect of different aspects of OHS varied between the three sectors. In the manufacturing and power industries, safety communication, feedback, and employee involvement had a much stronger effect. However, management's support for safety and safety training had little impact in all the industries studied. These findings suggest that there might be a difference between the official safety rules and the benefits that workers actually feel. These differences show that even though rules and systems set up the basic way to reduce dangers, they might not really make people feel safe inside if people don't think the actions are real and sincere.

5.2 Recommendations

The lack of sector-level differences indicates the importance of using interactive and collaborative activities within each organization rather than compliance alone to facilitate a culture of proactive safety that will promote OCB behaviors. Despite the valuable theoretical implications, it is clear that the findings presented in the current paper are not entirely generalizable due to the focus on high-risk sectors in an emerging economy and use of cross-sectional design to conduct the empirical analysis. To address this issue in the future, it would be necessary to use longitudinal studies. In addition, organizations consider safety engagement, improve perceptions of organizational support and conduct safety programs according to industry-related risks to encourage citizenship behavior.

Declaration of Interest

The author declares that she does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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