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Integrating Safety Climate and Safety Performance through Internal Ties Strength, Risk Perception and Job Burnout: Proactive Approaches in Organizational Safety Management

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Abstract

Purpose: This study explores the integration of safety climate and safety performance within organizations, emphasizing the roles of internal ties strength, risk perception, and job burnout. Strong internal ties among employees are found to foster a cohesive and positive safety climate, leading to improved safety performance as employees are more likely to adhere to safety protocols and engage in safe behaviors when supported and connected. Risk perception is identified as crucial in shaping safety behaviors and outcomes. The research underscores the importance of effective communication about risks to foster a shared understanding of safety priorities among employees. Additionally, job burnout is addressed as a significant factor that negatively impacts safety performance, leading to decreased vigilance and reduced compliance with safety procedures. Addressing job burnout through supportive work environments and stress management initiatives is deemed essential for maintaining high safety standards. This study proposes a comprehensive framework for enhancing safety climate and performance by integrating these elements: internal ties strengths, risk perception, and job burnout.

Design/methodology/approach: This study employs a quantitative, cross-sectional design to examine the relationships between safety climate, safety performance, internal ties, risk perception, and job burnout within organizations, specifically focusing on the Malaysian petrochemical industry. Data is collected via surveys distributed to employees, using standardized and validated scales to measure key constructs: internal ties strength, risk perception, job burnout, safety climate, and safety performance. The analysis uses structural equation modeling (SEM) to test the proposed conceptual framework, exploring direct and

indirect relationships among variables. Descriptive statistics, correlation analysis, and mediation analysis are conducted to understand the interactions between internal ties, risk perception, burnout, and safety outcomes. Reliability is ensured through Cronbach's alpha, while confirmatory factor analysis (CFA) validates the measurement tools. The study is grounded in safety climate theory and conservation of resources (COR) theory, offering a robust theoretical foundation. Based on the results, practical interventions are proposed to strengthen internal ties, improve risk perception management, and mitigate job burnout. These interventions aim to foster a proactive safety climate and enhance overall safety performance within organizations by focusing on strategic relationship-building, communication, and employee well-being.

Findings: By strengthening internal relationships, managing risk perceptions, and mitigating job burnout, organizations can achieve more effective and proactive safety management, ultimately leading to enhanced safety outcomes. Strengthening Internal Relationships refers to improving communication, collaboration, and trust between employees, supervisors, and management. Stronger internal relationships foster a positive safety climate where individuals feel supported and are more likely to follow safety protocols. When employees trust that their concerns will be heard and addressed, they become more engaged in maintaining a safe work environment. Employees' perception of risk is closely tied to their behavior regarding safety. If they underestimate risks, they might take shortcuts or neglect safety procedures, leading to potential accidents. On the other hand, an overestimation of risk might cause undue stress or overly cautious behavior that could hamper productivity. Managing risk perception involves educating workers about real risks, ensuring that they have a balanced understanding of potential hazards, and equipping them with the knowledge and tools to handle those risks confidently. Job burnout can diminish an employee's ability to focus on safety. When workers are mentally or physically exhausted, they are more prone to making mistakes or neglecting safety measures. Mitigating job burnout involves addressing workload, providing adequate rest periods, and promoting mental well-being. Reducing burnout not only improves safety but also boosts overall job performance and satisfaction.

Research limitations/implications: By concentrating on internal ties, risk perception, and job burnout, the study might neglect other critical variables that could influence safety performance. For instance, leadership behavior, organizational safety culture, regulatory compliance, technological safety measures, or training programs could be equally important in shaping safety outcomes but may not be fully addressed in the study's framework. This creates a limitation because safety performance is often multi-faceted, and interventions that are too narrowly focused might miss opportunities for more holistic safety improvements.

Practical implications: Organizations should prioritize fostering strong interpersonal relationships and communication within teams. By encouraging social cohesion, mutual support, and a sense of belonging, companies can enhance the safety climate, making employees more likely to adhere to safety protocols and engage in safe behaviors. The study highlights the importance of clear and effective communication about risks. Organizations need to implement structured and ongoing communication strategies that ensure employees have a shared understanding of safety priorities, enabling better risk perception and more informed safety-related decisions. Recognizing the negative impact of job burnout on safety performance, organizations should implement supportive work environments and stress management programs. These initiatives can reduce burnout, thereby improving employee vigilance, adherence to safety protocols, and overall compliance with safety standards. The proposed comprehensive framework offers a guide for organizations to integrate internal ties, risk perception, and burnout management into their safety practices. By doing so, organizations can achieve more proactive safety management and enhanced safety outcomes.

Originality/value: The originality and value of this study lie in its comprehensive approach to integrating multiple factors—internal ties strength, risk perception, and job burnout—into the understanding of safety climate and safety performance within organizations. Unlike previous research that often examines these factors in isolation, this study introduces a holistic framework that emphasizes the interconnectedness of these variables and their collective impact on safety outcomes. The study is particularly valuable for advancing safety management practices by highlighting the often-overlooked role of internal ties in fostering a positive safety climate. Additionally, it addresses the critical yet underexplored influence of job burnout on safety performance, offering actionable insights into how organizations can mitigate burnout through supportive environments and stress management initiatives. By integrating these elements, the study provides practical, evidence-based recommendations for organizations to create safer and more proactive work environments. The value of the research is further enhanced by its focus on high-risk industries like petrochemicals, offering targeted strategies for improving safety performance in these settings while contributing to broader safety management literature.

Keywords: Safety Climate, Safety Performance, Internal Ties, Risk Perception, Job Burnout

Introduction

In order to improve safety in the workplace, the concept of safety climate has been widely recognized as a crucial approach for over 30 years across diverse industries (Han et al., 2021; Cheng, 2021; Omidi et al., 2021; Lin & Lou, 2022; Wahyuni et al., 2023). This perspective reflects the findings of Shea et al. (2021), who highlighted that a significant portion of workplace safety research focuses on safety climate. The ongoing expansion of safety climate research is fueled by the varied nature of different industries. Heffernan et al. (2018), Birowo & Putra (2023) and Dursun & Şengül (2023) noted an increasing awareness of safety climate, particularly its effectiveness in predicting organizational safety performance. Researchers such as Alruqi et al. (2018) have started to investigate the predictive capabilities of safety climate, emphasizing its critical role in averting hazardous incidents and enhancing overall safety management.

Hon & Liu (2016) noted that safety climate research originated within the domain of industrial and organizational psychology before expanding into various industrial sectors. Initially grounded in social psychology, safety climate is predicated on the understanding that behavior results from the interaction between individuals and their psychological environments. This framework provides an explanation of safety behavior by examining safety climate (Yuan et al., 2022; Prinsloo & Hofmeyer, 2022; Obolewicz et al., 2023). Over the past 40 years, researchers have refined safety climate constructs and measures, recognizing their importance in enhancing occupational safety (Lagerstrom et al., 2019).

Research consistently shows that the connection between safety climate and management is evident, as the perceptions of employees regarding their leaders' engagement in safety greatly impact the overall safety results. This relationship underscores the critical role of human factors and the work environment in enhancing safety performance. Merely enhancing working conditions or innovating equipment is insufficient; the development of a robust safety climate is crucial (Salajegheh & Maazallahi, 2021). In industries such as manufacturing and chemical processing, studies by Al-Bayati (2021), and Hertanto et al. (2023) have established that safety climate is an essential approach to augmenting the overall safety conditions in the workplace.

This study is designed to explore how safety climate correlates with safety performance, which comprises safety compliance and safety participation, which are also known as safety behavior. Based on the organizational behavior model, the relationships are mediated by internal tie, an

independent variable at the group level, and risk perception, which is an independent variable at the individual level. Safety climate is an independent variable at the organizational level, and safety performance is the human output.

Literature Review

Safety Climate Serves as a Reliable Measure of Safety

Harrison et al. (2018) emphasized that the safety characteristics of employees' immediate work environments and their organization's overall safety capabilities are often evaluated based on the employees' collective perceptions. The primary goal of occupational safety is to minimize or eliminate adverse safety outcomes, which manifest in various forms such as incidents, accidents, and injuries (Xue et al., 2021; Gümüş et al., 2022). Payne et al. (2009) reviewed different research methodologies that have been employed to investigate the correlation between safety climate and safety outcomes, identifying two main types: prospective and retrospective.

Prospective designs involve measuring safety climate first and then tracking safety outcomes, positioning safety climate as a prospective indicator. On the other hand, in retrospective designs, safety events are recorded before evaluating the safety climate, making the safety climate an indicator that follows. Retrospective indicators usually consist of information regarding occurrences, such as the quantity of injuries, rates of accident occurrence, levels of accident severity, near-miss incidents, and damages linked to subpar safety performance. This approach, commonly referred to as the conventional method of evaluating safety performance, centers on the measurement and analysis of data related to incidents (Hinze et al., 2013; Pera et al., 2023).

Lagging indicators commonly pertain to measurements like rates of injury and fatality, whereas leading indicators assess particular elements within the system for safety management, such as safety audit readiness and regularity (Pera et al., 2023). Floyd (2022) noted that effective indicators should capture both normal and abnormal system functions. Swuste et al. (2016) illustrated how leading indicators can be distinguished from lagging indicators by using a bowtie metaphor, which visually differentiates proactive measures from reactive outcomes.

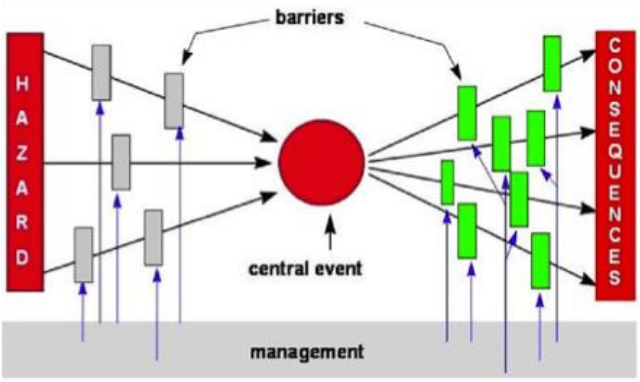

Figure 1: Bowtie metaphor according to Swuste et al. (2016) that explains the distinction between leading and lagging indicators.

In order to enhance clarity in safety management, a bowtie diagram was utilized to elucidate the roles of both leading and lagging indicators (Swuste et al., 2016). In this model, the central event is the focal point. Indicators that lead the way, acting as stand-ins for risks, obstacles,

situations, and factors related to management, offer insights into the left side of the bowtie diagram. These indicators offer insights that can prevent system instability and potential incidents by addressing risks proactively. On the right side, lagging indicators convey insights about the central events and their consequences, reflecting the effects of interventions. These indicators typically include metrics such as injury rates and incident frequencies, highlighting outcomes after an event has occurred.

There are terminological distinctions that distinguish leading indicators from lagging indicators (Pera et al., 2023; Hinze et al., 2013). Terms like upstream, predictive, proactive, and positive are often used to describe leading indicators, emphasizing their forward-looking and preventative nature. In contrast, lagging indicators are referred to as downstream, historical, reactive, and negative, as they provide data based on past events and highlight areas needing improvement post-incident. They further clarified that the primary distinction between the indicators lies in the type of response that would have been elicited following undesirable performance. Leading indicators prompt proactive, preventive actions aimed at mitigating risks before incidents occur. In contrast, lagging indicators trigger reactive responses, addressing issues only after injuries or accidents have already taken place.

The concepts of *leading* and *lagging*, which originated in the fields of economics and finance, describe how indicators behave relative to business cycles. Leading indicators tend to change direction ahead of the broader economy, while lagging indicators adjust direction after changes have occurred in coincident indicators, such as employment and production metrics (Skikiewicz, 2021; Rangvid, 2021; Hull, 2022). When evaluating safety performance, it is essential to consider both leading and lagging indicators in the context of safety climate, as these indicators provide valuable insights into the overall safety of an organization. Leading indicators provide early warnings and help in implementing preventive measures, while lagging indicators reflect outcomes after safety incidents have occurred. Zakaria et al. (2020) and Floyd (2022) all highlight the utility of both types of indicators in measuring and improving safety performance. This has been indicated by the findings of Pera et al. (2023), who assert that these indicators have the potential to function as indirect gauges of overall effectiveness, offering critical insights for enhancing workplace safety.

Figure 2: Safety climate as a leading indicator for safety performance (Kongsvik et al., 2011).

Figure 3: Safety climate as a lagging indicator for safety performance (Kongsvik et al., 2011).

In the past few years, there has been a noticeable change in approach, moving away from relying exclusively on reactive safety measures or backward-looking indicators such as fatalities, accident rates, and incidents towards a greater emphasis on using proactive leading indicators like safety audits and evaluations of safety climate (Heffernan et al., 2018;

Lagerstrom et al., 2019; Sarabekova et al., 2021). Advancements in technology have facilitated real-time data collection, narrowing the gap between leading and lagging indicators.

This shift is driven by findings that factors pertaining to humans and organizations are the primary contributors to workplace accidents. These findings also suggested that it is not solely technical errors that lead to these accidents. Hull (2022) highlighted that with modern capabilities in data collection, analysis, and sharing, traditional safety metrics or lagging indicators are becoming outdated. Today, industry stakeholders can leverage technology to gather real-time information, moving away from post-accident analyses. Hinze et al. (2013) and Pera et al. (2023) observed that while lagging indicators provide valuable data about past incidents, their usefulness as future predictors of workplace safety is questionable. In contrast, leading indicators can effectively predict future safety performance levels. This suggests that for preventing future accidents and injuries, leading indicators are more effective than lagging indicators.

Sarabekova (2021) and Awolusi et al. (2022) highlighted that leading indicators serve as proactive and predictive tools for safety monitoring. These indicators provide valuable insights into the safety performance of an automobile and can assist in pinpointing areas for enhancement before any accidents take place. Heffernan et al. (2018) and Štumbauer & Lališ (2022) emphasized that leading indicators enable continuous monitoring of safety conditions, allowing organizations to address safety weaknesses without waiting for incidents to happen. This proactive approach helps to overcome the restrictions imposed by conventional safety measures, such as the rate at which accidents occur (Zhu et al., 2023).

Consequently, to monitor safety performance more efficiently, leading indicators have been identified as the right tools (Tong et al., 2020; Umeokafor et al., 2023). Harrison et al. (2018) and Zhu et al. (2023) determined safety climate to be a vital leading indicator of organizational safety. It has demonstrated predictive validity regarding safety behaviors and incidents across various contexts, reinforcing its utility in improving safety outcomes.

Annisa & Lestari (2021), Lin & Lou (2022), and Alamoudi (2022) observed that employees' attitudes and opinions regarding safety are captured by the safety climate, which aims to pinpoint system flaws and areas for improvement. As it reflects the collective perception of safety among employees during a given period, safety climate can be seen as a temporary state that may shift over time. For instance, safety climate might improve following an incident or the implementation of a new safety policy. Culture shifts and improved safety performance can result from long-term improvements in safety climate.

Safety climate is considered to be a fragment of organizational climate, akin to safety performance, that is considered to be an integral aspect of overall organizational performance. This association implies that safety climate serves as a dependable gauge of safety performance (Lindahl et al., 2022; Dursun & Şengül, 2023). Consequently, safety climate significantly influences safe behavior, accident rates, and injury levels (Lim et al., 2021; Septian & Haryanto, 2023).

Indicators, as emphasized by Xu et al. (2021), Schmitz et al. (2021), and Zhu et al. (2023), play a vital part in preventing accidents. They provide early warnings and time to detect and address potential incidents, thereby enabling preventive measures. This proactive approach to safety management underscores the importance of continuous monitoring and improvement of safety climate within organizations.

Safety climate, which is a part of organizational climate, offers an all-encompassing approach to the management of safety in addition to the conventional engineering-focused methods (Omidi et al., 2021). It serves as an alternative indicator of an entity's safety performance, aiding in mitigating the drawbacks of traditional metrics such as accident frequency rates and their analyses (Lefsrud et al., 2021). Unlike conventional methods that rely on retrospective

data from earlier occurrences, safety climate functions as a leading indicator, offering a more proactive and predictive approach to preventing occupational accidents (Caldarescu et al., 2021; Obolewicz et al., 2023). When employees have favorable perceptions of safety, the likelihood of accidents decreases, as does the prevalence of unsafe behavior.

Harrison et al. (2018), Lim et al. (2021), and Dursun & Şengül (2023) highlighted several advantages of measuring safety climate. The capacity to identify potential incidents of safety before their occurrence, increased measurement accuracy and precision, and the method's cost-effectiveness in comparison to more conventional, non-psychological metrics like lost-time accident rates or total recordable injury frequency rates are some of these advantages. These analyses effectively reduce accident occurrence by providing data that serves as a leading indicators. As an important instrument for the monitoring of safety, safety climate provides the authority with valuable insights into areas that need improvement (Kvalheim et al., 2016; Xue et al., 2020; Lindahl et al., 2022; Umar & Umeokafor, 2022). This proactive monitoring enables organizations to implement timely interventions, fostering a safer work environment and enhancing overall safety performance. Additionally, safety perception analyses are cost-effective, making them an attractive option for organizations. Furthermore, involving all employees in providing information fosters a collaborative approach to improving safety management systems, ensuring that the insights and experiences of employees at all levels contribute to the development and enhancement of safety protocols.

Safety Performance

Enhancing safety performance is attainable proactively through safety climate evaluation (Sanni-Anibire et al., 2020; Lim et al., 2021; Umar & Umeokafor, 2022; Dursun & Şengül, 2023; Lestari et al., 2023). Researchers such as Probst et al. (2019) and Putra et al. (2022) have underscored the connection concerning safety climate and the ensuing safety outcomes. Studies by Kvalheim et al. (2016), Khoshakhlagh et al. (2021), Dehaghi et al. (2022), and Dursun & Şengül (2023) further support the idea that safety performance in a variety of industries can be determined by examining the safety climate. This emphasizes how safety climate has a proactive role in deciding on organizational safety outcomes.

The relationship between safety climate and organizational safety performance has received more attention in recent years (Heffernan et al., 2018; Omidi et al., 2021). This increased focus is likely owing to the predictive and proactive quality of safety climate, which allows the authority to develop more effective safety strategies without waiting for serious incidents to occur. By leveraging safety climate as a predictive tool, organizations can better plan and implement safety management practices, ultimately reducing the likelihood of costly and devastating incidents.

Lou (2022) and Peate (2023) argue that an environment that is favorable and encouraging naturally leads to a sense of safety among employees, which makes sense and serves as a realistic foundation for effective safety performance. Fitzgerald (2005), Çakıt et al. (2020), and Gümüş et al. (2022) further highlight that a crucial first step in improving overall safety performance is creating a safe climate. Hence, in the studies about occupational safety and health, this emphasis highlights the importance of safety climate as a prerequisite to safety performance.

Kim et al. (2021) and Omidi et al. (2021) have concluded that, because safety performance is viewed as a subsystem of organizational performance and safety climate is an element of the climate of an organization, the two have a substantial impact on each other. Wu (2011) created a safety climate scale as well as a safety performance scale. Both of these constructs were found to be significantly positively correlated using standard correlation analysis and product-moment correlation.

Additionally, Kongsvik et al. (2010), Barbaranelli et al. (2015), and Lestari et al. (2023) observed that the connection between safety performance and safety climate had been demonstrated in various studies. These findings suggest that assessing the safety climate may also be a useful tool for averting mishaps. Extending this research to various settings, such as the petrochemical industry, could potentially produce fresh perspectives and add to the corpus of information already available on the management of safety.
Overall, the evidence supports the notion that an improved safety performance is fostered by a favorable safety climate, reinforcing the importance of cultivating a supportive and proactive safety culture within organizations.

Internal Tie

In their review, Coppe et al. (2022), and Vorobeva & Guzhavina (2022) explored the intersection of ties and social capital to create a framework that includes four quadrants: individual social capital with internal ties, collective social capital with internal ties, personal social capital with external ties, and mutual social capital with external ties. Given that this discussion focuses on internal ties, the emphasis is on bonding social capital within the organization.
Xie et al. (2021) and Mishchuk et al. (2022) describe this type of social capital as characterized by non-rivalry and collectivity. Non-rivalry signifies an organization's inclusiveness that promotes an idea of community and cooperation among all of its members, fostering a spirit of belonging and collaboration. Collectivity refers to the shared benefits among members, ensuring that the advantages gained from collective efforts are distributed equitably. This inclusive approach allows all team members to work together harmoniously and share in the success of their collaborative endeavors.
The strength of a tie within an organization can be categorized as strong, weak, or nonexistent (Hu et al., 2021). Tie strength reflects the level of intimacy and influence individuals have within a team, where members can significantly impact each other. The nature of relationships among all parties in an organization determines the internal tie strengths (Jiang et al., 2020; Irma et al., 2023).
Strong internal ties indicate robust relationships between organization members, fostering better cohesion among employees. The stronger the ties, the greater the unity and cooperation within the team. To fully leverage the skills and knowledge of their employees, organizations should promote cooperation and solidarity, which in turn enhances cohesion. As a result, strong and appropriate internal ties will develop among employees.
Such strong internal ties encourage members to maximize their potential and effectively engage with the external environment (Zeng et al., 2022). This collaborative environment enables organizations to harness the full capabilities of their workforce, ultimately contributing to improved organizational performance and external outreach.

Risk Perception

Research on risk perception is critical as it examines how individuals perceive and evaluate risks, which is particularly vital in workplaces with potential hazards. Maguire & Looi (2022) highlighted that at its core, risk perception is a mental activity that enables individuals to identify and understand the risks inherent in a situation. This involves an accurate assessment of both the external environment and one's abilities. According to Rana et al. (2020) and Scovell et al. (2021), risk perception is the standard approach for evaluating the way individuals view potential hazards and react to them. Hence, it encompasses not just the perception of risk but also the decision-making process regarding the appropriate actions to take in response to identified risks.

Rana et al. (2020) and Green & Dikmen (2022) highlight two primary approaches in risk perception research: the rationalist approach, exemplified by the psychometric paradigm, and the constructivist approach, which focuses on cultural factors. The rationalist perspective views risk perception as a mental construct used for cost-benefit analysis in decision-making processes. In contrast, the constructivist approach interprets risk perception from a sociological standpoint (Rana et al., 2020). The reason why the rationalist method has influenced risk perception studies over the past few decades is that perceived risk is multidimensional and can be measured using scales that reflect the features of the risk origin. Employees typically rely on cognitive and rational assessments when estimating the likelihood of accidents or health injuries, while the perceptions of being safe and secure are more significantly influenced by emotional responses. These perspectives provide four dimensions of risk perception: the likelihood that a risk would materialize, the impact of that risk being severe, the projected utility of that risk, and direct risk perception (Walpole & Wilson, 2021). Ultimately, understanding these dimensions can lead to improved workplace safety performance.

It is commonly believed that heightened risk perception leads to increased protective actions. However, Danso et al. (2023) have identified that this is not always the case, a phenomenon known as the "risk perception paradox." This paradox can be attributed to factors such as employees' complacent attitudes, self-doubt, and lack of competence. Xia et al. (2020), Langseth-Eide & Vittersø (2021), Vanharanta et al. (2022), and Henenstrosa et al. (2023) contextualize job demand as either a hindrance or a challenge. Thus, perceived risk can be viewed similarly: as a hindrance that impedes safety behavior or as a challenge that motivates employees to adopt safe practices to meet objectives. The key to understanding this dynamic is recognizing that the motivation for safety behavior stems from a shift in employees' risk perception from negative to positive. When employees reinterpret a job hindrance as a challenge, their safety behavior improves. Therefore, the risk perception – safety behavior link is strongly dependent on context.

Job Burnout

Maslach & Goldberg (1998), along with more recent studies by Salminen et al. (2021), Gabriel & Aguinis (2021), Shankar (2023), and Alhuwaydi et al. (2023), describe burnout as a chronic psychological condition marked by diminished individual achievements, depersonalization, and feeling weariness. This definition stems from three core dimensions: emotional fatigue, cynicism, and a feeling of ineffectiveness or lack of accomplishment.

Burnout is recognized as a work-related stress disorder prevalent in industrialized countries (Salminen et al., 2021; Shankar, 2023), and it significantly impacts both professional and personal life. According to Dobrokhotova & Voronkova (2023), burnout often results from a prolonged mismatch between an employee’s abilities and the demands of their job. This persistent imbalance leads to chronic stress, eventually manifesting as burnout.

Călin et al. (2022) and Belay et al. (2023) affirmed that emotional exhaustion, depersonalization, and reduced personal accomplishment are intricately linked to workplace demands, resources, and organizational attitudes. When individual achievement is low and emotional weariness and depersonalization are high, employees develop burnout. These components collectively undermine a person's dignity, spirit, values, and aspirations.

Zborowska et al. (2021) and Shumilov et al. (2023) observed that such employees often have lower self-esteem and feel dissatisfied with their achievements, even if they continue to persevere. Hasanah et al. (2022) noted that employees facing daily job burnout also experience a lack of energy to accomplish other tasks. This state of burnout affects all aspects of their professional and personal lives, including work-related activities, personal and professional

attributes such as personality, effectiveness, workload, and job pressure, as well as overall mental and physical health.

Safety Climate Relationship with Safety Performance

Neal et al. (2000) and Bülbül et al. (2022) emphasized that safety climate has shown to have a major impact on safety results, since both the general organizational climate and the safety climate are important predictors of safety performance. Omidi et al. (2021) noted that under conditions of a weaker safety climate, employees tend to deprioritize safety performance. Conversely, favorable employees' perceptions of the safety climate are indicative of an efficient safety program. Shea et al. (2021) emphasized that as early as the 1980s, safety climate was identified as an indication of the successful implementation of safety programs.

Further research by Putra et al. (2022) has shown that safety performance and safety climate are directly correlated. This correlation has been the subject of numerous studies across various industries to more fully comprehend and improve safety in the workplace. In emerging industrial contexts, establishing safety climate evaluation instruments requires an understanding of the connection between safe work performance and safety climate characteristics (Razali et al., 2022). Birowo & Putra (2023) highlighted that a robust safety climate is vital for strengthening the overall safety efficiency of an organization.

Dursun & Şengül (2023) and Dollard & Loh (2023) emphasize that fostering and maintaining a strong safety climate is crucial for enhancing safety performance. This safety outcome is composed of key components, namely participation and compliance. Safety participation and safety compliance represent two distinct types of safety behaviors (Zhang et al., 2021). The former encompasses voluntary safety-related behaviors that go beyond formal job requirements, while the latter refers to adherence to safety rules and regulations as part of an individual's job role, as highlighted by Mazzetti et al. (2020).

Research by Saedi et al. (2020) and AlShemeili et al. (2022) shows that there is a direct and positive correlation between safety engagement and adherence, as well as a robust safety climate. These findings suggest that a positive safety climate promotes practices that enhance overall safety performance. Many studies have confirmed this favorable correlation, including those by Maneechaeye et al. (2021) and Bakidamteh et al. (2022).

Hypothesized by Dursun & Şengül (2023), a robust safety climate bears beneficial impacts on safety outcomes. Their research confirms this hypothesis, reinforcing the notion that improving the safety climate within an organization can result in notable gains in safety compliance and participation, thereby enhancing overall safety performance.

Internal Tie Relationship with Safety Performance

Perikos & Michael (2022) explain that the number of people connected inside a network is referred to as network density, while tie strength pertains to the closeness of these connections. They discovered a correlation between the strength of ties and organizational performance. Lee et al. (2021) and Kim & Fernandez (2023) noted that dense, strong ties facilitate social control and ease of collaboration, whereas weak ties are beneficial for uncovering new information.

Internal and external ties represent forms of social capital, enabling effective communication, information sharing, and learning within an organization. This connectivity fosters work engagement among employees, which subsequently enhances their behavioral engagement. Studies by Handi et al. (2020) and Gümüş et al. (2022) suggest that increased behavioral engagement among employees ultimately leads to improved performance.

In summary, dense networks with strong ties promote collaboration and control, while weak ties introduce novel information. Both types of ties, as elements of social capital, are crucial

for communication and learning within organizations. Enhanced engagement resulting from these ties drives better performance outcomes.

Risk Perception Relationship with Safety Performance

Numerous findings have demonstrated how safety behavior is directly linked to risk perception. For instance, Vosoughi et al. (2021), Roshanshad et al. (2021), and Khaday et al. (2021) observed that compared to employees with lower risk perception, individuals with higher risk awareness typically demonstrate superior safety habits. Additionally, Xia et al. (2020) and Handoko et al. (2022) established that risk perception as a work obstacle may have a detrimental effect on participation in and adherence to safety procedures. They also discovered that a favorable safety climate might change individuals' perceptions of risk from one of impediment to one of challenge, which in turn improves safety behavior.

Scovell et al. (2021), and Maartensson & Loi (2021) asserted a favorable correlation between risk perception and behavior, highlighting the need for more in-depth studies to fully understand these dynamics. However, Zhao et al. (2021), Handoko et al. (2022), and Cheng et al. (2022) suggested that the measurement of risk perception might lead to ambiguous relationships between both variables. According to Wang & Xu (2022), risk perception directly influences the elements of safety performance, with emotional risk perception playing a more significant role than rational risk perception. Rational risk perception, defined as the product of the risk's likelihood and severity, does not seem to have a substantial impact on safety performance (Man et al., 2019).

It is suggested that risk-taking activities are less common among employees who perceive risk highly, thereby positively influencing safety performance. This implies that fostering a strong risk perception among employees is crucial for enhancing overall safety in the workplace.

Job Burnout as a Moderator in the Relationship between Risk Perception and Safety Performance

In exploring the link between safety outcomes and perceived risk, several studies have identified potential moderating factors that can influence this dynamic. Bae & Park (2021), and Handoko et al. (2022) have suggested that pressures, among other factors, might moderate this relationship. Moderating variables, as emphasized by Amemiya & Sakairi (2020), are qualitative or quantitative variables that influence how strongly or in which direction an independent variable and a dependent variable are related.

Lemonaki et al. (2021), and Karnia (2023) found that burnout can lead to significant behavioral deficits, such as reduced productivity. Peasley et al. (2020) and Corbeanu et al. (2023) further supported this by establishing that burnout negatively impacts performance. Su et al. (2022) differentiated performance into two types: in-role performance, which aligns with compliance, and extra-role performance, which corresponds to participation. Burke et al. (2002) suggested that safety behaviors co-vary significantly in a similar manner to job performance.

This study adopts the same performance notion, with safety performance paralleling job performance. It is postulated that job burnout moderates the correlation between perceived risks and safety performance, given the direct association between job performance and safety performance. In other words, the presence of burnout may weaken or alter the way risk perception influences safety performance. Understanding this moderating effect is crucial for developing strategies to enhance safety performance, especially in high-pressure environments where burnout is prevalent.

Theoretical Framework

The theoretical framework utilized in this research is based on several studies, namely:

- a study on safety outcome and safety climate within the context of general organisational atmosphere by Andrew Neal, Mark A. Griffin and Peter M. Hart (2000),
- an investigation into the safety attitude and conformance in the oil and gas sector by Sverre A. Kvalheim and Oyvind Dahl (2016),
- a study on the connections between unsafe behavior, job fatigue, safety engagement and adherence in Chinese oil industry by Ruipeng Tong, Xiaoyi Yang, Trent Parker, Boling Zhang and Qingsheng Wang (2020),
- a study on employees' perception towards safety climate factors in a Malaysian chemical industry by Junaidah Zakaria, Che Rosmani Che Hassan, Mahar Diana Hamid and Ezrin Hani Sukadarin (2020),
- a study on tie strengths and experiential knowledge management by Zhenyu Jiang, Zongjun Wang and Chengxiao Feng (2020), and
- a study on job burnout among Scandinavian managers by Katariina Salmela-Aro, Johanna Rantanen, Katriina Hyvönen, Kati Tilleman and Taru Feldt (2011).

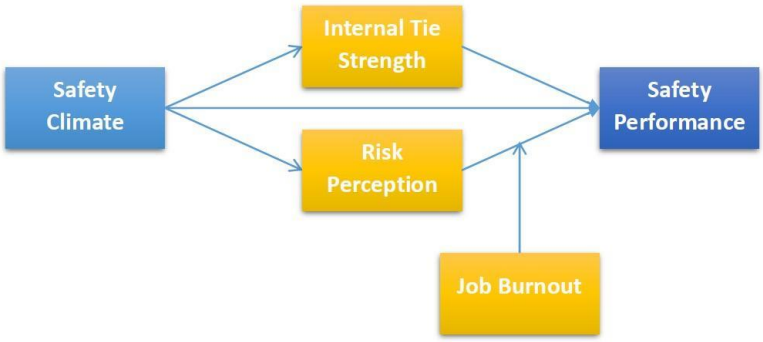

Figure 4: Theoretical Framework

Discussion and Conclusion

The study on integrating safety climate and safety performance through internal ties strength, risk perception, and job burnout provides valuable insights with significant implications for organizational safety management. According to Arooj et al. (2022), the effectiveness of workplace safety policy implementation and execution is reflected in the safety climate. This study offers a holistic understanding of how safety climate and safety performance are interconnected, highlighting the importance of both social and psychological factors in shaping safety outcomes, as concurred by Zadow et al. (2023). By demonstrating the critical roles of internal ties, risk perception, and job burnout, the research underscores the multifaceted nature of workplace safety and the need for comprehensive approaches to enhance safety outcomes. Furthermore, Lim et al. (2021) and Lindahl et al. (2022) observed that a prevalent predictor of safety-related accomplishments is the safety climate. Kadir et al. (2022) illustrated that the correlation between safety climate and safety outcomes is determined by the industrial context, and it varies depending on the setting. The findings provide evidence-based strategies for organizations to improve safety performance by fostering strong internal relationships, addressing risk perceptions, and mitigating job burnout.

The practical recommendations derived from this research are applicable across various industries, making it a valuable resource for safety managers and organizational leaders seeking to develop effective safety interventions. Thus, analyzing safety climate is essential for

generating data-driven evidence on the professional relationship between employees and its implications for safety performance, particularly concerning safety policies, procedures, and practices. Moreover, Xia et al. (2020) and Neto et al. (2021) suggested that a supportive workplace culture for safety can lower employees' perceptions of risk. The findings can also inform regulatory bodies in developing comprehensive safety standards that incorporate psychological and social dimensions of workplace safety. In conclusion, this study underscores the intricate interplay between safety climate, performance, internal ties strength, risk perception, and job burnout. By adopting a holistic and proactive approach to safety management, organizations can achieve significant improvements in safety outcomes, employee well-being, and overall organizational effectiveness. The practical and policy implications of this research make it a valuable asset for advancing safety practices and fostering a culture of continuous improvement in organizational safety management.

References

Alamoudi, M. (2022). The Integration of NOSACQ-50 with Importance-Performance Analysis Technique to Evaluate and Analyze Safety Climate Dimensions in the Construction Sector in Saudi Arabia. *Buildings*. https://doi.org/10.3390/buildings12111855.

Al-Bayati, A. (2021). Impact of Construction Safety Culture and Construction Safety Climate on Safety Behavior and Safety Motivation. *Safety*, 7, 41. https://doi.org/10.3390/SAFETY7020041.

Alhuwaydi, A., Alayshan, M., Alghutayghit, A., & Alsabilah, M. (2023). Burnout Syndrome in Emergency Department Healthcare Providers In Aljouf Region. *International Journal of Medicine in Developing Countries*. https://doi.org/10.24911/ijmdc.51-1675707927.

Alruqi, W. M., Halowell. M. R. & Techera, U. (2018). Safety climate dimensions and their relationship to construction safety performance. *Safety Science*, 109, 165-173

AlShemeili, H., Davidson, R., & Khalid, K. (2022). Impact of empowering leadership on safety behavior and safety climate: mediating and moderating role of safety monitoring. *Journal of Engineering, Design and Technology*. https://doi.org/10.1108/jedt-08-2021-0407.

Amemiya, R. & Sakari, Y. (2020). The role of self-compassion in athlete mindfulness and burnout: Examination of the effects of gender differences. *Personality and Individual Differences*, 166, 110167

Annisa, L., & Lestari, F. (2021). Safety Climate Survey Among Employees in a Feminine Care Products Manufacturing Company. *Jurnal Ilmu Kesehatan Masyarakat*. https://doi.org/10.26553/jikm.2021.12.1.164-180.

Arooj, A., Majid, M., Alam, A., & Bilal, M. (2022). Assessment of workplace safety climate among power sector employees: A comparative study of cross-culture employers in Pakistan. *PLoS ONE*, 17. https://doi.org/10.1371/journal.pone.0272976.

Awolusi, I., Marks, E., Hainen, A., & Alzarrad, A. (2022). Incident Analysis and Prediction of Safety Performance on Construction Sites. *CivilEng*. https://doi.org/10.3390/civileng3030039.

Bae, J., & Park, J. (2021). Research into Individual Factors Affecting Safety within Airport Subsidiaries. *Sustainability*, 13, 5219. https://doi.org/10.3390/SU13095219.

Bakidamteh, S., Teye-Kwadjo, E., & Abdul-Nasiru, I. (2022). Understanding the Role of Proactive Personality in Occupational Health and Safety at Oil and Gas Service Stations in Accra. *SAGE Open*, 12. https://doi.org/10.1177/21582440221089949.

Barbaranelli, C., Petitta, L. & Probst, T. M. (2015). Does safety climate predict safety

performance in Italy and the USA? Cross-cultural validation of a theoretical model of safety climate. *Accident Analysis and Prevention*, 77, 35-44

Belay, A., Gasheya, K., Engdaw, G., Kabito, G., & Tesfaye, A. (2023). Work-related burnout among public secondary school teachers is significantly influenced by the psychosocial work factors: a cross-sectional study from Ethiopia. *Frontiers in Psychology*, 14. https://doi.org/10.3389/fpsyg.2023.1215421.

Birowo, Y., & Putra, T. (2023). Safety First, Performance Next: Exploring the Interplay between Perceived Safety Climate and Employee Performance. *KINERJA*. https://doi.org/10.24002/kinerja.v27i2.7737.

Bülbül, S., Işiaçik, S., & Aytac, S. (2022). Measurement of Perceived Psychological Safety: Integration, Review and Evidences for the Scale in the Context of Turkey. *Journal of Economy Culture and Society*. https://doi.org/10.26650/jecs2021-974757.

Burke, M. J., Sarpy, S. A., Tesluk, P. E. & Smith-Crowe, K. (2002). General safety performance: A test of a grounded theoretical model. *Personnel Psychology*, 55, 429-457

Çakıt, E., Olak, A. J., Karwowski, W., Marek, T., Hejduk, I. & Taiar, R. (2020). Assessing safety at work using an adaptive neuro-fuzzy inference system (ANFIS) approach aided by partial least squares structural equation modeling (PLS-SEM). *International Journal of Industrial Ergonomics*, 76, 102925

Caldarescu, G., Florea, L., Nagîț, G., & Bernevig, M. (2021). The importance of performance indicators in occupational safety and health management - a review. *MATEC Web of Conferences*. https://doi.org/10.1051/matecconf/202134310016.

Călin, M., Tasențe, T., & Seucea, A. (2022). The effects of burnout on the professional activity of teachers. *Technium Social Sciences Journal*. https://doi.org/10.47577/tssj.v34i1.7156.

Cheng, H. (2021). Research on the Influence of Safety Climate on Safety Behavior: A Review. *Scientific and Social Research*. https://doi.org/10.36922/ssr.v3i2.1116.

Cheng, H., Ye, Q., & Liang, J. (2022). A Review: The Safety Risk Perception of the Workplace. *Economics & Management Information*. https://doi.org/10.58195/emi.v1i1.19.

Coppe, T., Thomas, L., Pantić, N., Froehlich, D., Sarazin, M., & Raemdonck, I. (2022). The Use of Social Capital in Teacher Research: A Necessary Clarification. *Frontiers in Psychology*, 13. https://doi.org/10.3389/fpsyg.2022.866571.

Corbeanu, A., Iliescu, D., Ion, A., & Spinu, R. (2023). The link between burnout and job performance: a meta-analysis. *European Journal of Work and Organizational Psychology*, 32, 599 - 616. https://doi.org/10.1080/1359432X.2023.2209320.

Danso, F., Agyekum, K., Manu, P., Adinyira, E., Ahadzie, D., & Badu, E. (2023). Examining the perception of site workers of their risk-taking behaviours on construction sites in Ghana. *Engineering, Construction and Architectural Management*. https://doi.org/10.1108/ecam-02-2022-0113.

Dehaghi, B., Teimori-Boghsani, G., Rahmani, D., Ghavamabadi, L., & Zare, S. (2022). Survey of the health, safety and environment climate and its effects on occupational accidents.. *Work*. https://doi.org/10.3233/wor-205320.

Dobrokhotova, E., & Voronkova, S. (2023). Professional burnout as a legal category. *Russian Journal of Labour & Law*. https://doi.org/10.21638/spbu32.2023.109.

Dollard, M., & Loh, M. (2023). Psychosocial safety climate in Japanese workplaces. *Journal of Occupational Health*, 65. https://doi.org/10.1002/1348-9585.12430.

Dursun, S., & Şengül, B. (2023). The Relationship Between Safety Climate and Safety

Performance Indicators: A Field Study. Sosyoekonomi, 31(55), 37-48. https://doi.org/10.17233/sosyoekonomi.2023.01.02

Fitzgerald, M. K. (2005). Safety performance improvement through culture change. *Process Safety Environmental Protection*, 83, 324-330

Floyd, H. (2022). Considerations for a Balanced Scorecard of Leading and Lagging Indicators for Your Electrical Safety Program: Leading and Lagging Indicators. *IEEE Industry Applications Magazine*, 28, 16-20. https://doi.org/10.1109/mias.2021.3114640.

Gabriel, K., & Aguinis, H. (2021). How to Prevent and Combat Employee Burnout and Create Healthier Workplaces During Crises and Beyond. *Business Horizons*. https://doi.org/10.1016/J.BUSHOR.2021.02.037.

Green, S., & Dikmen, I. (2022). Narratives of Project Risk Management: From Scientific Rationality to the Discursive Nature of Identity Work. *Project Management Journal*, 53, 608 - 624. https://doi.org/10.1177/87569728221124496.

Gümüş, R., Ayhan, M., & Gümüş, B. (2022). Safety climate in marble industry and its influence on safety performance and occupational accidents. *Archives of Environmental & Occupational Health*, 78, 48 - 59. https://doi.org/10.1080/19338244.2022.2061892.

Han, B., Son, S., & Kim, S. (2021). Measuring Safety Climate in the Construction Industry: A Systematic Literature Review. *Sustainability*. https://doi.org/10.3390/su131910603.

Handi, C., Duodu, B. & Rowlinson, S. Project social capital, work engagement and safety performance of workers: A conceptual model. *18th Annual Engineering Project Organization Conference Proceedings*, October 2020

Handoko, L., Martiana, T., & Partiwi, S. (2022). Occupational health and safety risk perception. *International journal of health sciences*. https://doi.org/10.53730/ijhs.v6ns3.6971.

Harrison, H. F., Griffin, M. A., Gagne, M. & Andrei, D. (2018). Assessing shortened safety climate measures: Simulating a planned missing data design in a field setting. *Safety Science*, 104, 189-201

Hasanah, H., Widajati, N., Paskarini, I., Martiana, T., & Rahmania, A. (2022). The influence of Self-efficacy and job stress toward job burnout at a packaging company in surabaya. *Journal of Vocational Health Studies*. https://doi.org/10.20473/jvhs.v6.i2.2022.118-126.

Heffernan, C., Harries, J. & Kirby, N. (2018). Theoretical components of workplace safety climate and their implications for practice. Book chapter, *Applied Psychology Readings*. Singapore: Springer Nature Singapore Pte Ltd

Henestrosa, M., Sischka, P., & Steffgen, G. (2023). Examining the challenge-hindrance-threat distinction of job demands alongside job resources. *Frontiers in Psychology*, 14. https://doi.org/10.3389/fpsyg.2023.1011815.

Hertanto, A., Erwandi, D., Widanarko, B., & Tejamaya, M. (2023). Relationship between Safety Climate and Safety Behavior in Company X in Indonesia. *Safety*. https://doi.org/10.3390/safety9040089.

Hinze, J., Thurman, S. & Wehle, A. (2013). Leading indicators of construction safety performance. *Safety Science*, 51, 23-28

Hon, C. K. H. & Liu, Y. (2016). Exploring typical and atypical safety climate perceptions of practitioners in the repair, maintenance, minor alteration and addition (RMAA) sector in Hong Kong. *International Journal of Environmental Research and Public Health*, 13, 935

Hu, Z., Wu, G., Zhao, X., Zuo, J., & Wen, S. (2021). How does the strength of ties influence relationship quality in Chinese megaprojects? The mediating role of contractual flexibility. *Baltic Journal of Management*. https://doi.org/10.1108/BJM-09-2020-0347.

Hull, M. (2022). Lagging and leading genres of the new economy. *Journal of Cultural Economy*, 15, 834 - 837. https://doi.org/10.1080/17530350.2022.2087722.

Irma, A., Negara, S., Helmi, M., Wijaya, A., & Madistriyatno, H. (2023). How Important Psychological Safety is in Supporting Strategic Management to Achieve Success: A Narrative Literature Review. *Open Access Indonesia Journal of Social Sciences*. https://doi.org/10.37275/oaijss.v6i5.175.

Jiang, Z., Wang, Z. & Feng, C. (2020). Balancing the strength of external and internal ties for tacit knowledge management. *Technology Analysis & Strategic Management*, 32, 7, 785-800

Kadir, A., Lestari, F., Sunindijo, R., Erwandi, D., Kusminanti, Y., Modjo, R., Widanarko, B., & Ramadhan, N. (2022). Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses and Influential Demographic Characteristics. *Buildings*. https://doi.org/10.3390/buildings12050639.

Karnia, R. (2023). An Evaluation of Stress and Burnout in Education and Its Impact on Job Performance and Work Life Quality. *International Journal of Psychological Studies*. https://doi.org/10.5539/ijps.v15n4p13.

Khaday, S., Li, K., Man, S., & Chan, A. (2021). Risky scenario identification in a risk perception scale for construction workers in Thailand.. *Journal of Safety Research*, 78, 105-114 . https://doi.org/10.1016/J.JSR.2021.05.007.

Khoshakhlagh, A., Yazdanirad, S., Hatamnejad, Y., Khatooni, E., Kabir, S., & Tajpoor, A. (2021). The relations of job stress dimensions to safety climate and accidents occurrence among the workers. *Heliyon*, 7. https://doi.org/10.1016/j.heliyon.2021.e08082.

Kim, M., & Fernandez, R. (2023). What Makes Weak Ties Strong?. *Annual Review of Sociology*. https://doi.org/10.1146/annurev-soc-030921-034152.

Kim, S., Song, S., Lee, D., Kim, D., Lee, S., & Irizarry, J. (2021). A Conceptual Model of Multi-Spectra Perceptions for Enhancing the Safety Climate in Construction Workplaces. *Buildings*. https://doi.org/10.3390/buildings11080347.

Kongsvik, T., Almklov, P. & Fenstad, J. (2010). Organisational safety indicators: Some conceptual considerations and a supplementary qualitative approach. *Safety Science*, 48, 1402-1411

Kongsvik, T., Johnsen, S. V. & Sklet, S. (2011). Safety climate and hydrocarbon leaks: An empirical contribution to the leading-lagging indicator discussion. *Journal of Loss Prevention in the Process Industries*, 24, 405-411

Kvalheim, S. A. & Dahl, Ø. (2016). Safety compliance and safety climate: A repeated cross-sectional study in the oil and gas industry. *Journal of Safety Research*, 59, 33-41

Kvalheim, S. A., Antonsen, S. & Haugen, S. (2016). Safety climate as an indicator for major accident risk: Can we use safety climate as an indicator on the plant level? *International Journal of Disaster Risk Reduction*, 18, 23-31

Lagerstrom, E., Magzamen, S., Kines, P., Brazile, W. & Rosecrance, J. (2019). Determinants of safety climate in the professional logging industry. *Safety*, 5, 35 doi: 10.3390/safety5020035

Langseth-Eide, B., & Vittersø, J. (2021). Here, There, and Everywhere: Applying Vignettes to Investigate Appraisals of Job Demands. *Sustainability*. https://doi.org/10.3390/su132111662.

Lee, D., Fu, Y., Wang, L., & Nie, T. (2021). Network Ties, Social Capital, and Knowledge Management. *European Journal of Business and Management Research*. https://doi.org/10.24018/ejbmr.2021.6.5.1090.

Lefsrud, L., McLarnon, M., & Gellatly, I. (2021). A pattern-oriented approach to safety

climate: An empirical example. *Safety Science*, 142, 105385. https://doi.org/10.1016/J.SSCI.2021.105385.

Lemonaki, R., Xanthopoulou, D., Bardos, A., Karademas, E., & Simos, P. (2021). Burnout and job performance: a two-wave study on the mediating role of employee cognitive functioning. *European Journal of Work and Organizational Psychology*, 30, 692 - 704. https://doi.org/10.1080/1359432X.2021.1892818.

Lestari, F., Modjo, R., Wibowo, A., & Sunindijo, R. (2023). Influence of Safety Climate on Safety Performance in Gas Stations in Indonesia. *Safety*. https://doi.org/10.3390/safety9030044.

Lim, H., Kim, S., Kim, Y., & Son, S. (2021). Relative Importance Analysis of Safety Climate Evaluation Factors Using Analytical Hierarchical Process (AHP). *Sustainability*, 13, 4212. https://doi.org/10.3390/SU13084212.

Lin, Y., & Lou, M. (2022). [Hospital Safety Climate: Concept and Measurement Tools].. *Hu li za zhi The journal of nursing*, 69 5, 27-33 . https://doi.org/10.6224/JN.202210_69(5).05.

Lindahl, C., Bruhn, Å., & Andersson, I. (2022). Occupational Safety Climate in the Swedish Equine Sector. *Animals: an Open Access Journal from MDPI*, 12. https://doi.org/10.3390/ani12040438.

Lou, M. (2022). [Safe Working Environments: The Foundation of Patient Safety].. *Hu li za zhi The journal of nursing*, 69 5, 4-6. https://doi.org/10.6224/JN.202210_69(5).01.

Maartensson, H., & Loi, N. (2021). Exploring the relationships between risk perception, behavioural willingness, and constructive hope in pro-environmental behaviour. *Environmental Education Research*, 28, 600 - 613. https://doi.org/10.1080/13504622.2021.2015295.

Maguire, P., & Looi, J. (2022). Grasping the nettle of danger: a commentary on how people perceive their health risks, impacting on their health behaviours. *Australasian Psychiatry*, 30, 608 - 611. https://doi.org/10.1177/10398562221104001.

Man, S. S., Chan, A. H. S. & Alabdulkarim, S. (2019). Quantification of risk perception: Development and validation of the construction worker risk perception (CoWoRP) scale. *Journal of Safety Research*, 71, 25-39

Maneechaeye, P., Chanmab, N., & Thaveeratc, U. (2021). Factors affecting safety behavior in front-line workers of a construction company. *Kasetsart Journal of Social Sciences*. https://doi.org/10.34044/j.kjss.2021.42.4.19.

Maslach, C. & Goldberg, J. (1998). Prevention of burnout: New perspectives. *Applied & Preventive Psychology*, 7, 63-74

Mazzetti, G., Valente, E., Guglielmi, D. & Vignoli, M. (2020). Safety doesn't happen by accident: A longitudinal investigation on the antecedents of safety behavior. *International Journal of Environmental Research and Public Health*, 17, 4332, doi: 10.3390/ijerph17124332

Mishchuk, H., Štofková, J., Krol, V., Joshi, O., & Vasa, L. (2022). Social Capital Factors Fostering the Sustainable Competitiveness of Enterprises. *Sustainability*. https://doi.org/10.3390/su141911905.

Neal, A., Griffin, M. A. & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, 34, 99-109

Neto, H., Arezes, P., & Junior, B. (2021). Safety values, attitudes and behaviours in workers of a waste collection and sanitation company. *Safety Science*. https://doi.org/10.1016/j.ssci.2021.105471.

Obolewicz, J., Baryłka, A., & Szota, M. (2023). Shaping the climate of construction work

safety. *Journal of Achievements in Materials and Manufacturing Engineering*. https://doi.org/10.5604/01.3001.0053.7667.

Omidi, L., Salehi, V., Zakerian, S., & Saraji, J. (2021). Assessing the influence of safety climate-related factors on safety performance using an Integrated Entropy-TOPSIS Approach. *Journal of Industrial and Production Engineering*, 39, 73 - 82. https://doi.org/10.1080/21681015.2021.1958937.

Payne, S. C., Bergman, M. E., Beus, J. M., Rodriguez, J. M. & Henning, J. B. (2009). Safety climate: Leading or lagging indicator of safety outcomes? *Journal of Loss Prevention in the Process Industries*, 22, 735-739

Peasley, M. C., Hochstein, B., Britton, B. P., Srivastava, R. V. & Stewart, G. T. (2020). Can't leave it at home? The effects of personal stress on burnout and salesperson performance. *Journal of Business Research*, 117, 58-70

Peate, I. (2023). Keeping safe at work. *British Journal of Healthcare Assistants*. https://doi.org/10.12968/bjha.2023.17.4.160.

Pera, F., Madonna, M., Fioretti, P., & Prete, E. (2023). How to Measure Organizational Resilience through Leading and Lagging Indicators of the Safety Management System Performance. *Proceedings of the 33rd European Safety and Reliability Conference*. https://doi.org/10.3850/978-981-18-8071-1_p265-cd.

Perikos, I., & Michael, L. (2022). A Survey on Tie Strength Estimation Methods in Online Social Networks. , 484-491. https://doi.org/10.5220/0010845100003116.

Prinsloo, H., & Hofmeyr, K. (2022). Organisational culture, frontline supervisory engagement and accountability, as drivers of safety behaviour in a platinum mining organisation. *SA Journal of Human Resource Management*. https://doi.org/10.4102/sajhrm.v20i0.1705.

Probst, T. M., Goldenhar, L. M., Byrd, J. L. & Betit, E. (2019). The Safety Climate Assessment Tool (S-CAT): A rubric-based approach to measuring construction safety climate. *Journal of Safety Research*, 69, 43-51

Putra, P., Wijayanti, R., & Hadiwidjojo, D. (2022). The effect of safety knowledge and workplace safety climate on safety performance with safety behavior as a mediator. *International Journal of Research in Business and Social Science (2147-4478)*. https://doi.org/10.20525/ijrbs.v11i3.1705.

Rana, I. A., Jamshed, A., Younas, Z. I. & Bhatti, S. S. (2020). Characterizing flood risk perception in urban communities of Pakistan. *International Journal of Disaster Risk Reduction*, 46, 101624

Rangvid, J. (2021). Judging the stance of the business cycle. , 222-240. https://doi.org/10.1093/OSO/9780198866404.003.0015.

Razali, A., Zin, R., & Ali, Q. (2022). Perceptual attitudes towards safety climate among employees of a manufacturing firm: A qualitative approach. *Problems and Perspectives in Management*. https://doi.org/10.21511/ppm.20(2).2022.10.

Roshanshad, R., Roshanshad, A., Vardanjani, H., Mashhadiagha, A., Mobarakabadi, M., Hoveidaei, A., & Hoveidaei, A. (2021). Risk perception, attitude, and practice related to COVID-19: A cross-sectional study among 1085 Iranian healthcare workers. *Annals of Medicine and Surgery*, 70. https://doi.org/10.1016/j.amsu.2021.102865.

Rowlinson, S., Shen, Y. & Koh, T. Y. A review of safety climate and risk-taking propensity in occupational health, safety and well-being in the construction industry. *The CIOB 5th World Construction Symposium*, Colombo, Sri Lanka, 29-31 July 2016, pp. 23-33

Saedi, A. M., Majid, A. A. & Isa, Z. (2020). Relationships between safety climate and safety participation in the petroleum industry: A structural equation modeling approach. *Safety Science*, 121, 240-248

Salajegheh, S., & Maazallahi, A. (2021). Creation of an appropriate safety climate in steel plant

construction projects. *International journal of health sciences*. https://doi.org/10.53730/ijhs.v5ns2.13885.

Salmela-Aro, K., Rantanen, J., Hyvönen, K., Feldt, T. & Tilleman, K. (2011). Bergen Burnout Inventory: Reliability and validity among Finnish and Estonian managers. *International Archives of Occupational and Environmental Health*, 84, 635-645

Salminen, S., Mäkikangas, A., Kykyri, V., Saari, E., & Pekkonen, M. (2021). Spouses' Experiences of Rehabilitees' Burnout and Recovery . https://doi.org/10.16993/sjwop.139.

Sanni-Anibire, M. O., Mahmoud, A. S., Hassanain, M. A. & Salami, B. A. (2020). A risk assessment approach for enhancing construction safety performance. *Safety Science*, 121, 15-29

Sarabekova, U., Asanova, G., Nurzhanova, D., Sakitzhanov, M., & Zhienbekova, Z. (2021). Improvement of methods for analysis of injuries in agricultural works. *Bulletin of Korkyt Ata Kyzylorda University*. https://doi.org/10.52081/bkaku.2021.v57.i2.039.

Schmitz, P., Swuste, P., Reniers, G., & Nunen, K. (2021). Predicting major accidents in the process industry based on the barrier status at scenario level: A practical approach. *Journal of Loss Prevention in the Process Industries*. https://doi.org/10.1016/J.JLP.2021.104519.

Scovell, M., McShane, C., Swinbourne, A., & Smith, D. (2021). Rethinking Risk Perception and its Importance for Explaining Natural Hazard Preparedness Behavior. *Risk Analysis*, 42, 1 - 20. https://doi.org/10.1111/risa.13780.

Septian, F., & Haryanto, B. (2023). The Effect of Safety Climate on Safety Behaviour: the Mediating Role of Safety Motivation and Safety Knowledge. *International Journal of Economics, Business and Management Research*. https://doi.org/10.51505/ijebmr.2023.71005.

Shankar, P. (2023). Burnout Syndrome. *RGUHS Journal of Medical Sciences*. https://doi.org/10.26463/rjms.13_3_10.

Shea, T., Cieri, H., Vu, T., & Pettit, T. (2021). How is safety climate measured? A review and evaluation. *Safety Science*, 143, 105413. https://doi.org/10.1016/J.SSCI.2021.105413.

Shumilov, S., Shumilova, E., Studnitskii, V., Smishnaya, O., & Lipatnikova, L. (2023). Emotional burnout syndrome in healthcare workers. *Severny region: nauka, obrazovanie, cultura*. https://doi.org/10.35266/2312-377x-2023-1-61-73.

Skikiewicz, R. (2021). Relationship Between Economic Climate and the Level of Barriers to Doing Business in the Services Sector in the EU Countries. *Studies in Business and Economics*, 16, 240 - 248. https://doi.org/10.2478/sbe-2021-0037.

Štumbauer, O., & Lališ, A. (2022). Progressing the aerospace performance factor toward nonlinear interactions. *Risk Analysis*, 42, 2243 - 2252. https://doi.org/10.1111/risa.13877.

Su, W., Yuan, S., & Qi, Q. (2022). Different Effects of Supervisor Positive and Negative Feedback on Subordinate In-Role and Extra-Role Performance: The Moderating Role of Regulatory Focus. *Frontiers in Psychology*, 12. https://doi.org/10.3389/fpsyg.2021.757687.

Swuste, P., Theunissen, J., Schmitz, P., Reniers, G. & Blokland, P. (2016). Process safety indicators, a review of literature. *Journal of Loss Prevention in the Process Industries*, 40, 162-173

Tong, R., Yang, X., Parker, T., Zhang, B. & Wang, Q. (2020). Exploration of relationships between safety performance and unsafe behavior in the Chinese oil industry. *Journal of Loss Prevention in the Process Industries*, 66, 104167

Umar, T., & Umeokafor, N. (2022). Developing a Safety Climate Assessment Tool for Omani

Construction Industry. *International Journal of Service Science, Management, Engineering, and Technology*. https://doi.org/10.4018/ijssmet.296265.

Umeokafor, N., Windapo, A., & Olatunji, O. (2023). The relationship between labour-only procurement and health and safety performance of construction projects. *International Journal of Productivity and Performance Management*. https://doi.org/10.1108/ijppm-09-2022-0490.

Vanharanta, O., Vartiainen, M., & Polvinen, K. (2022). Job challenges are hindrances, too: examining experiences of managers and employees in Finnish SMEs. *Journal of Small Business and Enterprise Development*. https://doi.org/10.1108/jsbed-07-2021-0274.

Vorobeva, I., & Guzhavina, T. (2022). Social Capital as a Factor of Social Participation: The Case of the Vologda Region. *Sociological Journal*. https://doi.org/10.19181/socjour.2022.28.4.9316.

Vosoughi, S., Alimohammadi, I., Hosseini, A., & Noushabadi, Z. (2021). Relationship between risk perception toward hearing conservation and using hearing protection devices among offset printing workers in Tehran province, Iran. *Archives of Environmental & Occupational Health*, 77, 338 - 344. https://doi.org/10.1080/19338244.2021.1893630.

Wahyuni, I., Amir, A., Rahayuningsih, T., Armalita, R., & Pratama, W. (2023). The relationship between safety climate with occupational safety and health (OSH) in employees of the mine department and raw material management of PT. Xyz. *Psychosophia: Journal of Psychology, Religion, and Humanity*. https://doi.org/10.32923/psc.v5i2.3579.

Walpole, H., & Wilson, R. (2021). A Yardstick for Danger: Developing a Flexible and Sensitive Measure of Risk Perception. *Risk Analysis*, 41. https://doi.org/10.1111/risa.13704.

Wang, Y., & Xu, J. (2022). Effect of Risk Perception on Safety Behavior among Chinese Frontline Construction Workers: The Roles of Social Support and Job Satisfaction. *Journal of Psychiatry & Mental Disorders*. https://doi.org/10.26420/jpsychiatrymentaldisord.2021.1056.

Wu, T.-C., Chang, S.-H., Shu, C.-M., Chen, C.-T. & Wang, C.-P. (2011). Safety leadership and Safety performance in petrochemical industries: The mediating role of safety climate. *Journal of Loss Prevention in the Process Industries*, 24, 716-721

Xia, N., Xie, Q., Hu, X., Wang, X. & Meng, H. (2020). A dual perspective on risk perception and its effect on safety behaviour: A moderated mediation model of safety motivation, and supervisor's and coworkers' safety climate. *Accident Analysis and Prevention*, 132, 105350

Xie, G., Wang, L., & Lee, B. (2021). Understanding the Impact of Social Capital on Entrepreneurship Performance: The Moderation Effects of Opportunity Recognition and Operational Competency. *Frontiers in Psychology*, 12. https://doi.org/10.3389/fpsyg.2021.687205.

Xu, J., Cheung, C., Manu, P., & Ejohwomu, O. (2021). Safety leading indicators in construction: A systematic review. *Safety Science*. https://doi.org/10.1016/J.SSCI.2021.105250.

Xue, M., Al-turjman, F., & Saravanan, V. (2021). A labor safety performance and involvement of workers in accident reduction and prevention. *Aggression and Violent Behavior*, 101560 https://doi.org/10.1016/J.AVB.2021.101560.

Xue, Y., Fan, Y. & Xie, X. (2020). Relation between senior managers' safety leadership and safety behavior in the Chinese petrochemical industry. *Journal of Loss Prevention in the Process Industries*, 65, 104142

Yuan, R., Zhang, Z., Deng, X., & Li, X. (2022). SEIR model and simulation research on unsafe

psychological state propagation of construction workers considering safety climate and intimate relationships. *Frontiers in Public Health*, 10. https://doi.org/10.3389/fpubh.2022.1031440.

Zadow, A., Loh, M., Dollard, M., Mathisen, G., & Yantcheva, B. (2023). Psychosocial safety climate as a predictor of work engagement, creativity, innovation, and work performance: A case study of software engineers. *Frontiers in Psychology*, 14. https://doi.org/10.3389/fpsyg.2023.1082283.

Zakaria, J., Che Hassan, C. R., Hamid, M. D. & Sukandarin, E. H. (2020). Safety climate actors at selected chemical manufacturing plant in Malaysia. *Process Safety Progress*, 2020;39:e12096. https://doi.org/10.1002/prs.12096

Zborowska, A., Gurowiec, P., Młynarska, A., & Uchmanowicz, I. (2021). Factors Affecting Occupational Burnout Among Nurses Including Job Satisfaction, Life Satisfaction, and Life Orientation: A Cross-Sectional Study. *Psychology Research and Behavior Management*, 14, 1761 - 1777. https://doi.org/10.2147/PRBM.S325325.

Zeng, H., Cao, J., & Fu, Q. (2022). Unpacking the "Black Box": Understanding the Effect of Strength of Ties on Inter-Team Conflict and Project Success in Megaprojects. *Buildings*. https://doi.org/10.3390/buildings12111906.

Zhang, X., Sun, Z., Niu, Z., Sun, Y., & Wang, D. (2021). The Effect of Abusive Supervision on Safety Behaviour: A Moderated Mediation Model. *International Journal of Environmental Research and Public Health*, 18. https://doi.org/10.3390/ijerph182212124.

Zhao, Y., Zhang, M., Liu, T., & Mebarki, A. (2021). Impact of safety attitude, safety knowledge and safety leadership on chemical industry workers' risk perception based on Structural Equation Modelling and System Dynamics. *Journal of Loss Prevention in The Process Industries*, 72, 104542. https://doi.org/10.1016/J.JLP.2021.104542.

Zhu, W., Curtis, R., Curry, J., McSweeney, K., Craig, B., & Wari, E. (2023). Identifying Safety Leading Indicators for the Offshore Industry. *Day 1 Wed, March 08, 2023*. https://doi.org/10.5957/tos-2023-019.