International Research Journal of Multidisciplinary Scope (IRJMS), 2024; 5(4):1095-1103 IRJMS

Original Article | ISSN (O): 2582-631X DOI: 10.47857/irjms.2024.v05i04.01689

From Stress to Success: The Role of Safety Climate in It Employee Psychological Well-Being

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Abstract

The present study explores the impact of safety climate on the psychological well-being of employees within the IT sector. Recognizing the vital role of a positive safety culture in reducing stress and enhancing job satisfaction, the research aims to elucidate the relationship between organizational safety practices and employee mental health. Utilizing a descriptive research design, data were collected through an online survey from 286 IT professionals in Chennai, analysed using Smart PLS 3.0 for Partial Least Squares Structural Equation Modeling. The results indicate a significant positive correlation between safety climate and psychological well-being, with a high explanatory power demonstrated by the model. A robust safety climate, characterized by proactive risk management, supportive leadership, and transparent communication, was found to significantly enhance employees' mental health, reduce stress, and improve job satisfaction. Conversely, a negative safety climate exacerbates stress, diminishes job satisfaction, and increases turnover rates. These findings underscore the importance of fostering a supportive and transparent safety culture in the IT industry to enhance overall well-being and organizational performance. This study contributes to the understanding of safety climate's role in employee mental health, offering valuable insights for developing strategies to create healthier and more productive workplaces.

Keywords: Employee Mental Health, IT Sector, Organizational Safety Culture, Psychological Well-Being, Safety Climate.

Introduction

Encouraging a strong safety culture is crucial in the fast-paced Information Technology (IT) industry, where productivity and creativity are rife. The workplace culture and environment that people in this sector work in have a significant impact on their psychological health. A culture of positive safety, defined by proactive risk management, supportive leadership, and open communication, is essential for promoting the mental health and general wellbeing of employees (1). On the other hand, its absence can lead to tension, worry, and disengagement, which can eventually hinder the success of both individuals and organizations.

A supportive and safe work atmosphere helps employees feel less stressed and anxious in a setting where creativity, deadlines, and performance expectations are common. Clear communication channels, transparent policies, and proactive safety measures contribute to a culture where employees feel valued and empowered to voice concerns without fear of reprisal (2).

One complex and significant part of workplace dynamics is the effect that safety atmosphere has on the mental health of IT workers (3). Safety climate refers to the shared perceptions of employees regarding the importance their organization places on safety at a given point in time. It encompasses the organization's commitment to safety practices, procedures, and policies designed to safeguard employees' physical and psychological health. This concept reflects not only the direct measures taken to ensure workplace safety but also the attitudes, behaviors, and priorities exhibited by both management and staff toward maintaining a secure working environment. In the context of the IT industry, 'safety climate' refers to employees' shared perceptions of the organization's commitment to ensuring their psychological and physical safety in a high-stress, deadline-driven environment. A positive safety climate in IT involves not only safeguarding employees from burnout and stress but also fostering a culture that promotes mental health, innovation, and trust through transparent communication and proactive risk management (3).

(Received 19th July 2024; Accepted 25th October 2024; Published 30th October 2024)

A positive safety climate fosters a sense of security and trust among employees (4). People are more likely to feel less stressed and anxious when they believe that their company values their safety and well-being. On the other hand, a workplace environment that prioritizes safety over the well-being of its workers may lead to increased stress and psychological strain associated with the job. Burnout, a decline in job satisfaction, and even mental health conditions like anxiety and depression might be signs of this (4). How safe a workplace is seen affects how engaged and dedicated individuals are to their jobs. Employee engagement with the aims and objectives of the company is higher in an atmosphere that values and promotes safety. Because they are aware that their company places a high priority on safety, they are also more likely to follow safety procedures and take part in safety activities (5). On the other hand, in an environment where safety concerns are disregarded or downplayed, employees may become disengaged and disenchanted with their work, leading to decreased productivity and morale. The quality of interpersonal connections in the workplace is significantly influenced by the safety climate (6). Colleague cooperation, open communication, and mutual support are all encouraged in a healthy safety climate. Transparency and trust are promoted when workers feel free to voice concerns or report risks without fear of retaliation (7). Given the nature of IT work, the safety climate must be redefined to account for the specific stressors and risks associated with mental health, as opposed to merely focusing on physical safety protocols. This is particularly relevant in fast-paced tech companies where innovation is constant, and employees may feel pressured to meet stringent deadlines without adequate mental health support (8, 9).

The concept of safety climate has historically been associated with high-risk industries like construction, manufacturing, and healthcare, where physical safety hazards are prevalent. However, in recent years, the scope of safety climate has evolved to encompass psychological and emotional safety, especially in sectors like Information Technology (IT), where employees face unique challenges such as high job demands, extended working hours, and the constant pressure to innovate under tight deadlines (10). Studies have shown that IT professionals are particularly susceptible to stress, burnout, and work-life imbalances due to the rapid pace of technological advancement and the high expectations for productivity and creativity. A supportive safety climate in this context involves leadership actively addressing these stressors by fostering a culture of transparent communication, providing mental health resources, and establishing clear boundaries to prevent overwork (11). This proactive approach not only safeguards employees but also augments organizational performance, reputation, and talent retention. Embracing a supportive safety atmosphere not only nurtures innovation and creativity but also establishes a foundation for sustained success in a field defined by rapid change and high-pressure environments. Prioritizing safety in the IT sector is not just a strategic move but a fundamental commitment to nurturing a healthy, engaged, and resilient workforce.

Psychological Well-Being (PWB) refers to an individual's mental health and emotional functioning, encompassing aspects such as emotional balance, life satisfaction, self-actualization, and the quality of social relationships (12). It plays a critical role in an employee's overall health and productivity, influencing their ability to manage stress and cope with challenges. In the context of the Information Technology (IT) sector, where professionals often face high job demands, tight deadlines, and rapid technological changes, the importance of PWB becomes even more pronounced. Factors like emotional balance and life satisfaction can significantly affect how IT employees engage with their work, innovate, and collaborate with colleagues

Determining the impact of safety climate on the psychological well-being of employees in the IT sector offers a multitude of benefits. By understanding this relationship, organizations can proactively create a work environment that prioritizes employee mental health, leading to reduced stress, improved job satisfaction, and enhanced overall well-being. This knowledge empowers companies to foster a culture of trust, support, and open communication, increasing employee engagement, productivity, and retention (13, 14). Addressing safety climate's influence can positively impact organizational performance,

reputation, and innovation within the fast-paced and competitive IT industry, ultimately contributing to a healthier, more resilient workforce and sustainable success. Thus, determining the current state of the psychological wellbeing of employees has become the foundation to carry out our research by analysing the impact of safety and climate.

Enhancing the safety climate offers substantial advantages to businesses by promoting a safer and more supportive workplace. A strong safety climate boosts employees' safety knowledge and motivation, resulting in safer behaviors and a reduction in workplace accidents. This proactive approach to safety fosters greater adoption of safety policies and programs, leading to better compliance and consistent safety practices across the organization (15). Furthermore, employees perceive greater support from management, which boosts morale and trust, reducing turnover rates. A robust safety climate also diminishes employees' perceptions of hazardous exposure, alleviating stress and fostering a more focused and productive workforce. Consequently, businesses experience increased production, and lower compensation and insurance costs, contributing to overall operational efficiency and profitability.

Safety climate can be assessed in various ways depending on an organization's needs and resources. It can be formally evaluated using survey tools that gauge individual responses to key aspects of safety climate. The results can then be applied across the organization, with many free online tools available for this purpose. In smaller organizations, safety climate may be assessed through staff focus groups, management interviews, and observing routine operations. A best practice approach would involve a combination of these methods to obtain a comprehensive understanding (16).

Over the past four decades, safety climate research has extended across various industries, with numerous systematic reviews focusing on research trends and measurement scales. Despite these efforts, a comprehensive understanding of how safety climate affects performance remains elusive. Research indicates that a positive safety climate significantly enhances employee productivity and well-being, particularly through effective leadership. A study in Turkey found that management attitudes were more influential on productivity than peer interactions or training. A literature review highlights the critical link between transformational leadership and improved health and safety outcomes, suggesting that strong leadership fosters a supportive environment. While safety climate consistently predicts safety performance across various industries, there is a need for more rigorous research methods to establish clear causal relationships (17-19).

Hypothesis Development

Safety climate can significantly influence the psychological well-being of IT employees. A positive safety climate, characterized by feelings of security, trust, and support, can lead to reduced stress, increased job satisfaction, and overall improved mental health among IT professionals. Conversely, a negative safety climate, marked by poor communication, lack of support, and unsafe working conditions, can heighten stress and anxiety, diminishing employees' well-being. Research has shown that a strong commitment to safety from management correlates with lower stress levels and enhanced mental health (20). In healthcare settings, better safety climates are associated with reduced stress-related conditions, a principle applicable to the IT sector where high job demands prevail (21). Additionally, effective safety climate mediated by leadership can significantly improve mental health and job satisfaction (22). Critical dimensions like management commitment and effective communication play a pivotal role in reducing stress and promoting a healthy work environment in the IT sector (23). Based on this understanding, the hypothesis is proposed that safety climate significantly impacts the psychological well-being of IT employees (see Figure 1).

Hypothesis (H1) Safety climate has a significant impact on psychological well-being of IT employees.

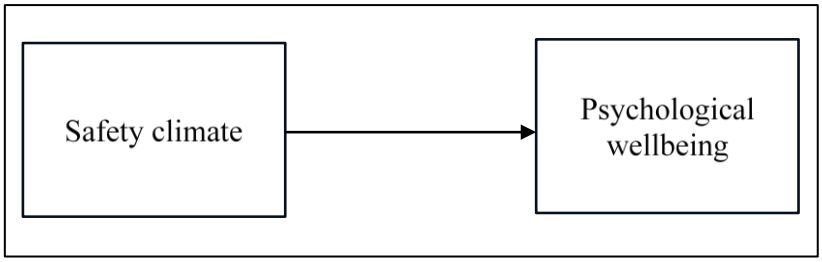

Figure 1: Research Model

Methodology

This study utilised a descriptive research design to evaluate the effect of safety climate on the psychological well-being of IT employees in Chennai. The research focuses on IT professionals in Chennai, specifically chosen for their diverse representation in the IT sector. Chennai serves as a significant hub for the information technology industry in India, housing numerous global and local IT firms. The selection of this geographic region is justified by its vibrant IT ecosystem, characterized by varying organizational sizes, operational frameworks, and safety practices. This diversity allows for a nuanced exploration of the relationship between safety climate and psychological well-being, making it a suitable context for this study.

The research centers on 286 IT professionals in Chennai, with participants selected through social media platforms. This approach facilitated the recruitment of a diverse range of IT professionals while ensuring representation from various companies in the region. Filter questions regarding organizational safety measures were employed to ensure that participants had relevant experiences, enhancing the study's focus on safety climate and psychological well-being.

The sample size adhered to the "10 times rule" for Partial Least Squares Structural Equation Modeling (PLS-SEM), providing sufficient statistical power for the analysis. Data were analysed using Smart PLS 3.0, a specialized tool for PLS-SEM, prioritizing the validation of the measurement model by assessing reliability and construct validity. Ethical considerations involved securing informed consent, ensuring the anonymity of respondents, and safeguarding the confidentiality of the data considered.

Results and Discussion

Partial Least Squares (PLS) analysis was conducted using Smart PLS 3.0 software to evaluate the model. In performing structural equation modeling (SEM), a two-stage analytical process is generally recommended: first, testing the measurement model, followed by examining the structural model to interpret the results. Smart PLS 3.0 offers robust capabilities for handling non-normal data and small to medium sample sizes, making it ideal for the study's dataset. The research utilised two primary statistical techniques: the measurement model and the structural model. The outer model evaluates the validity, reliability of the variables, ensuring that the survey items precisely capture the intended theoretical concepts. Conversely, the structural model analyses the relationships between the constructs, testing the hypothesized effect of safety climate on psychological well-being. The analysis included assessing the model's predictive relevance, typically done through the Q^2 test, which measures how well the model predicts data points not used in model estimation, thereby ensuring its practical applicability and robustness.

Measurement Model

The outer model is first evaluated for convergent validity when assessing the validity and reliability of all reflective constructs. Convergent validity is determined by analysing factor loadings, Composite Reliability (CR), and Average Variance Extracted (AVE).

Table 1 displays the reliability and validity metrics for two constructs: Psychological Well-Being (PWB) and Safety Climate. The Cronbach's Alpha values for PWB (0.97) and Safety Climate (0.969) demonstrate excellent internal consistency, indicating that the items within each construct consistently measure the same underlying concept. The rho_A values, which are also high for both PWB (0.972) and Safety Climate (0.972), further confirm the reliability of these constructs. Composite Reliability values for PWB (0.973) and Safety Climate (0.972) are similarly high, indicating that the constructs have good overall reliability when considering the different loadings of the items. The AVE values for PWB (0.75) and

Safety Climate (0.685) demonstrate that a substantial portion of the variance in the observed variables is accounted for by the latent constructs, signifying good convergent validity. Overall, these metrics suggest that both PWB and Safety Climate are measured reliably and validly in this study.

Table 1: Reliability and Validity for Constructs

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
PWB	0.97	0.972	0.973	0.75
Safety climate	0.969	0.972	0.972	0.685

Discriminant validity confirms that a variable is distinct from other constructs by showing stronger correlations with its own indicators than with those of other constructs. This is assessed using the Fornell-Larcker criterion (refer to Table 2), which compares the square root of the Average Variance Extracted (AVE) for each construct against the correlations among constructs. In Table 2, the diagonal values indicate the square roots of the AVE for Psychological Well-Being (PWB) and Safety Climate, which are 0.866 and 0.828, respectively. The off-diagonal value, 0.839, represents the correlation between PWB and Safety Climate. To establish discriminant validity, the diagonal values should exceed the corresponding off-diagonal values. Here, the square root of the AVE for Safety Climate (0.828) is slightly lower than its correlation with PWB (0.839), indicating potential overlap and suggesting that discriminant validity is not fully established. The reliability and validity metrics for Psychological Well-Being (PWB) and Safety Climate demonstrate high internal consistency and strong convergent validity. The constructs show Cronbach's Alpha values of 0.97 and 0.969, rho_A values of 0.972 for both, composite reliability values of 0.973 and 0.972, and AVE values of 0.75 and 0.685, respectively.

The Heterotrait-Monotrait (HTMT) ratio is used to evaluate discriminant validity by comparing average correlations between different constructs with the correlations within the same construct. In this study, the HTMT value between Psychological Well-Being (PWB) and Safety Climate is 0.85 (refer Table 3). This value meets the general threshold for discriminant validity, indicating that the two constructs are sufficiently distinct. This complements the reliability and validity metrics, which show high internal consistency and convergent validity for both PWB and Safety Climate. Despite the slight overlap suggested by the Fornell-Larcker criterion, the HTMT ratio supports the conclusion that PWB and Safety Climate are distinct constructs, measured reliably and validly in this study.

Table 2: Fornell-Larcker Criterion

	PWB	Safety climate
PWB	0.866	
Safety climate	0.839	0.828

Table 3: HTMT Ratio

	PWB	Safety climate
PWB		
Safety climate	0.85	

Structural Model

Once the outer model is validated, the inner model, also known as the structural model, is analysed to map the relationships between the constructs being studied.

The structural model (refer Figure 2) in the image maps the relationships between two constructs: "Safety Climate" and "Psychological Well-Being (PWB)."

The analysis reveals a strong, positive relationship between Safety Climate and Psychological Well-Being (PWB), as indicated by a significant path coefficient of 0.839. The high R-squared value of 0.703 shows that Safety Climate explains 70.3% of the variance in PWB (refer Figure 2), demonstrating substantial explanatory power.

Additionally, the high indicator loadings for both constructs (ranging from 0.700 to 0.902 for Safety Climate and 0.787 to 0.918 for PWB) suggest that the individual items are reliable measures of their respective constructs. These findings underscore the critical role of Safety Climate in enhancing Psychological Well-Being.

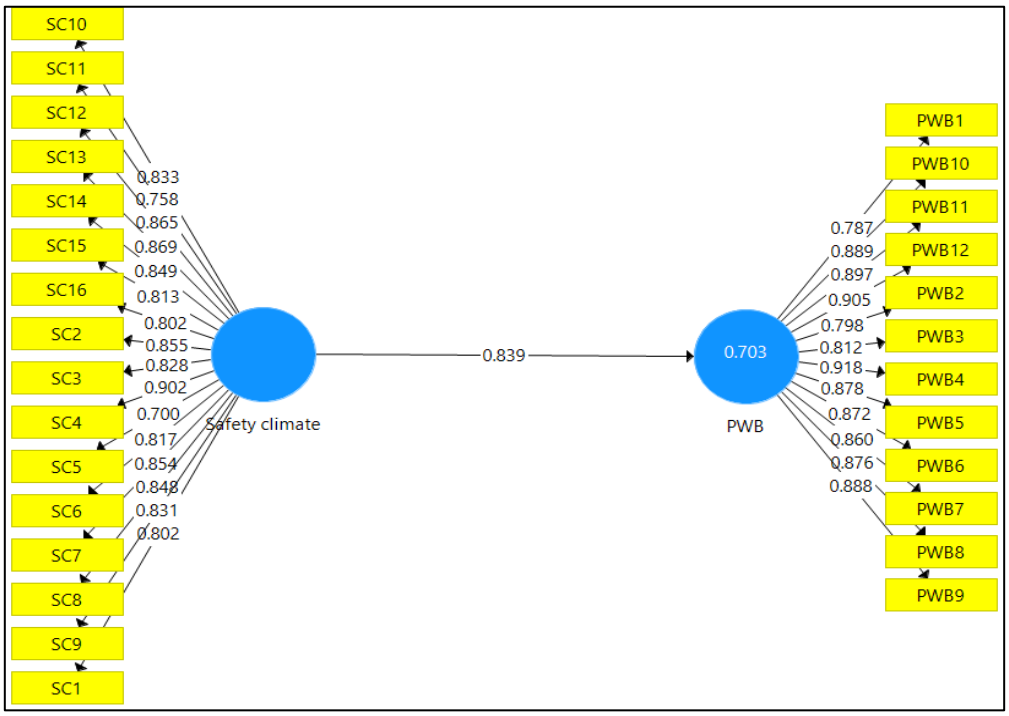

Figure 2: Path Model

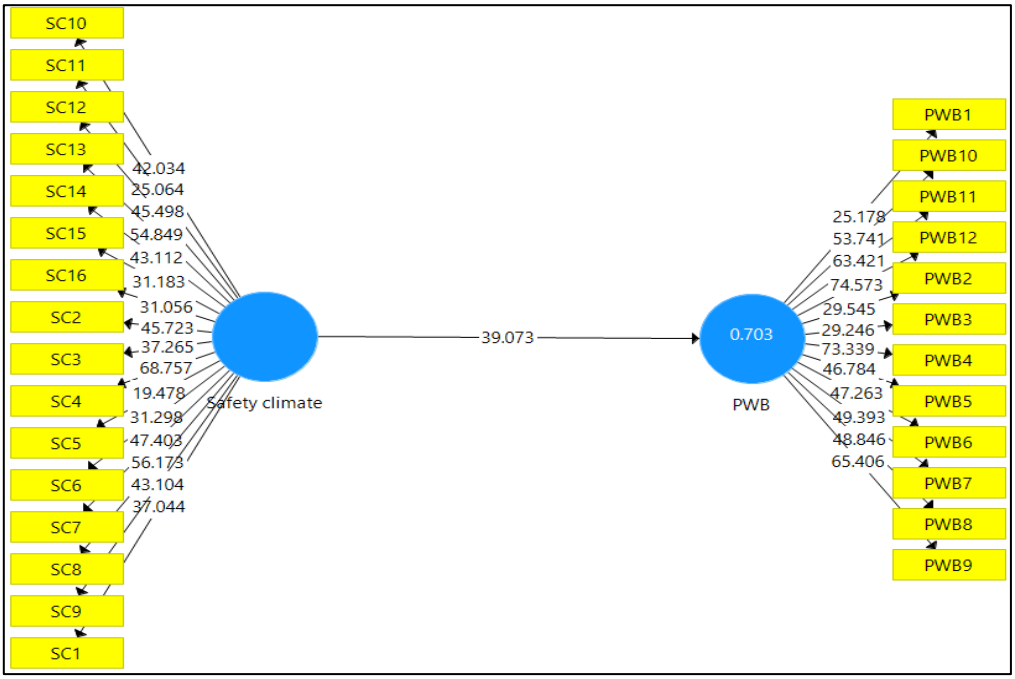

Figure 3: Bootstrapped Model

The bootstrapped model depicted in the image is a structural equation model (SEM) that appears to be analyzing the relationship between "Safety Climate" and "PWB" (likely standing for Psychological Well-Being). Here's a detailed interpretation:

The indicators for Safety Climate (SC1 to SC16) and Psychological Well-Being (PWB1 to PWB12) show varying contributions, with SC1 and PWB3 having

relatively stronger influences within their constructs. The path coefficient of 39.073 (refer Figure 3) indicates a significant positive relationship between Safety Climate and PWB, suggesting that improvements in Safety Climate are associated with higher PWB. The high R-squared value of 0.703 for PWB demonstrates that the model fits well, with Safety Climate explaining a substantial portion of the variance in PWB.

Predictive Relevance (Q^2)

This statistic is employed to evaluate the quality of the PLS path model and is calculated using blindfolding procedures and cross-validated redundancy.

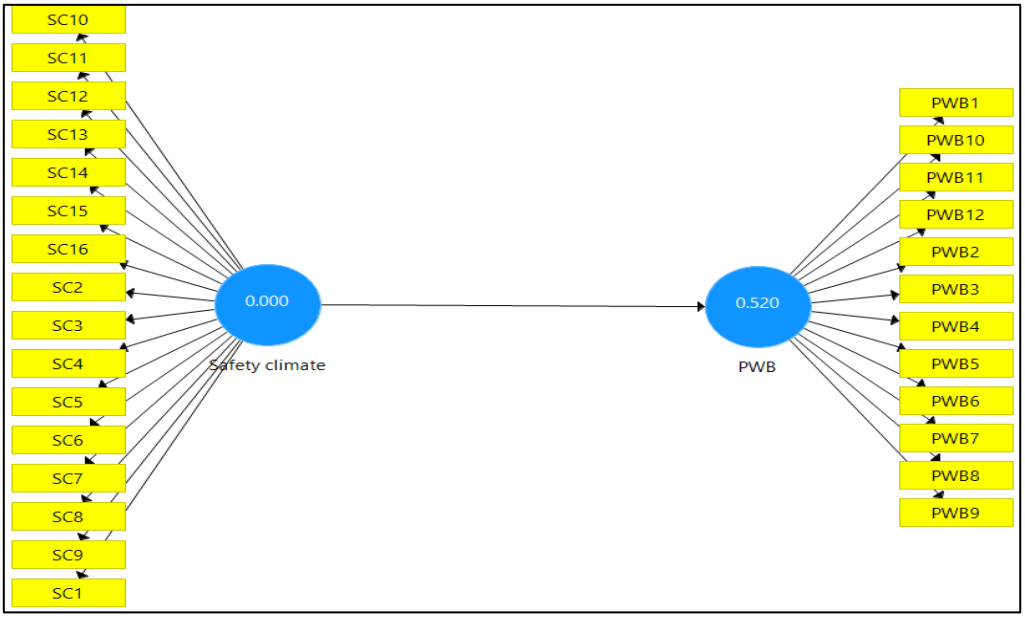

Figure 4: Predictive Relevance

The Predictive Relevance of the Model (Q^2) is a metric used in structural equation modeling, particularly in the context of Partial Least Squares Structural Equation Modeling (PLS-SEM). It assesses the model's predictive accuracy by determining how well the dependent constructs can be predicted by the independent constructs (24).

The Q^2 value of 0.000 for Safety Climate indicates that the model lacks predictive relevance for this construct, suggesting the need for additional or different predictors. In contrast, the Q^2 value of 0.520 for Psychological Well-Being (PWB) (refer Figure 4) demonstrates strong predictive relevance, confirming that the model effectively explains the variance in PWB. This indicates that the constructs within the model, particularly those related to Safety Climate, significantly contribute to predicting PWB, highlighting the model's robustness and practical applicability in organizational settings for enhancing employee well-being.

Conclusion

The findings of this study significantly contribute to the understanding of safety climate in the IT sector, revealing a strong, positive relationship between safety climate and psychological well-being (PWB). While safety climate is often associated with high-risk industries, this research expands its definition to include aspects such as workload management, job security, and interpersonal relationships, highlighting the necessity of fostering a psychologically safe environment. A robust safety climate enhances employee PWB, leading to increased job satisfaction, productivity, and organizational commitment. As organizations prioritize mental health, implementing training for managers focused on emotional intelligence and effective communication can strengthen the safety climate. Regular feedback mechanisms can also identify issues early, reinforcing a culture of safety that drives innovation. Ultimately, this study emphasizes that organizations prioritizing a positive safety climate not only safeguard employee well-being but also enhance overall performance, making it a strategic imperative for success in the competitive IT landscape. The implications of these findings are significant for IT organizations. Employers should prioritize

creating a positive safety climate through transparent communication, regular feedback mechanisms, and supportive leadership practices. By fostering an environment where employees feel safe to express concerns and share ideas, organizations can enhance employee engagement and loyalty. Furthermore, investing in training programs that focus on building a safety-oriented culture can lead to improved job satisfaction and retention rates.

Limitations and Future Scope

This study is subject to several limitations that may impact the interpretation and generalizability of the findings. The cross-sectional design restricts our ability to draw causal inferences, as it does not account for potential bidirectional relationships or changes over time. While our purposive sampling aimed to ensure a diverse representation of IT professionals, the sample may not fully reflect the broader IT workforce in other regions, potentially limiting the applicability of our findings. This study primarily focused on examining the direct relationship between safety climate and psychological well-being, which limited our exploration of alternative interpretations of the data. Future research could benefit from a broader approach that considers additional variables and contextual factors influencing this relationship, allowing for a more comprehensive understanding of the dynamics at play.

Future research should adopt a longitudinal design to better establish causal relationships between safety climate and psychological well-being, allowing for the exploration of how these constructs evolve over time. Incorporating multiple data sources, such as manager assessments or observational data, would provide a more comprehensive view and mitigate biases associated with self-reported measures. Expanding the sample to include a more diverse range of IT professionals across different regions and organizational contexts would enhance the generalizability of the findings. Future studies could also investigate the influence of unmeasured variables, such as organizational culture, employee resilience, and personal coping strategies, to uncover a more nuanced understanding of the factors contributing to the relationship between safety climate and psychological well-being. These directions will deepen our understanding of how to foster a positive safety climate and promote employee well-being in the IT sector.

Abbreviations

PWB: Psychological Well-Being, SC: Safety Climate, PLS-SEM: Partial Least Squares Structural Equation Modeling, CR: Composite Reliability, AVE: Average Variance Extracted, HTMT: Heterotrait-Monotrait ratio, Q^2: Predictive Relevance.

Acknowledgements

We express our gratitude to our colleagues and mentors for their invaluable support and feedback. Special thanks to the IT professionals who participated in our survey.

Author Contributions

The preparation and completion of the manuscript were equally contributed to by all authors.

Conflicts of Interest

There are no conflicts of interest to disclose.

Ethics Approval

Data for this study were collected with the informed consent of all respondents, ensuring their voluntary participation and understanding of the research purpose. Ethical guidelines were followed to maintain the confidentiality and anonymity of the participants throughout the study.

Funding

There is no funding provided to conduct this study.

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