

A Casual Model to Understand Psychological Safety Affecting Employee Creativity: Role of Knowledge Sharing, Knowledge Hiding and Organizational Safety Climate

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Abstract

This study aims to investigate the impact of psychological safety on employee creativity, focusing on the mediating roles of knowledge sharing and knowledge hiding and the moderating effect of organizational safety climate. Utilizing a sample of 757 skilled workers from large Chinese manufacturing enterprises, we collect data through a structured questionnaire via stratified random sampling across four key sectors: light textiles, resource processing, machinery and electronics, and other manufacturing. Data analysis used structural equation modelling (SEM) to validate the hypothesized relationships. The results confirm that psychological safety significantly enhances employee creativity, with knowledge sharing positively mediating and knowledge hiding negatively mediating this relationship. Furthermore, the organizational safety climate aims to amplify the positive impact of psychological safety on knowledge sharing and mitigate knowledge hiding. This study contributes to the literature by elucidating how psychological safety influences creativity and providing practical insights for fostering an innovative organizational environment.

Keywords: *Psychological Safety, Employee Creativity, Organizational Support, Knowledge Sharing, Organizational Development, Structural Equation Model.*

INTRODUCTION

Employee creativity is the capacity of individuals to generate novel and valuable ideas, solutions, products, or processes within their roles at work. It extends beyond artistic innovation or design reform and includes finding new methods and improving processes in routine work tasks (Bhaskara et al., 2023). Creativity is the foundation of innovation, enabling organizations to respond adeptly to changes in the market and technology, develop new products and services, and enhance their overall innovation performance (Qu & Mardani, 2023). The importance of employee creativity in the modern business environment cannot be overstated. In a landscape characterized by intense competition and rapid technological advancements, creative employees help organizations sustain competitive advantages by fostering innovation (Memon & Ooi, 2023). This capability is crucial for problem-solving, driving efficiency, and facilitating organizational adaptability and growth in uncertain and dynamic market conditions.

Despite recognizing creativity as a cornerstone of innovation and competitive advantage, several prevalent issues in the organizational environment significantly hinder employees' creative capacities. A fundamental challenge is the lack of psychological safety in many workplaces (Alami et al., 2023). When employees fear ridicule or repercussions from expressing novel ideas or making mistakes, they are less likely to engage in creative risk-taking or share innovative thoughts. This fear can stifle the open exchange of ideas essential for creativity and innovation.

Knowledge hiding is another significant issue that curtails creativity in organizations (Chhabra & Pandey, 2023). When employees withhold information—whether to protect their status, out of fear of losing their competitive advantage, or due to a lack of trust in their colleagues—it impedes the flow of ideas and collaboration critical for creative processes. The motives behind knowledge hiding, such as insecurity and competition, must be addressed to foster a more collaborative and transparent environment. The variability in organizational safety

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climates across different levels (individual, team, and organizational) can create uneven conditions for creativity (Harvey et al., 2023). In environments with a weak safety climate, employees might perceive their workplace as unsupportive or unsafe in expressing creative ideas, especially if they challenge the status quo or propose radical changes. This inconsistency can lead to isolated pockets of creativity rather than being a pervasive culture across the organization.

The fast pace of technological advancements and market changes requires continuous innovation. However, organizations often struggle to keep up due to rigid structures, slow decision-making processes, and resistance to change (Ayamga et al., 2024). This misalignment between the need for quick adaptation and the organization's capability to support creative endeavours can leave potentially groundbreaking ideas unexplored. While some organizations proclaim the importance of creativity, their support systems—such as resources, time, and recognition—are often lacking. Employees may not feel motivated to invest in creative activities without tangible support, knowing their innovative work might not be implemented or valued.

These challenges underscore the importance of researching employee creativity more comprehensively. Organizations can develop targeted interventions to foster a supportive environment by understanding and addressing the factors that hinder creativity (Ciriello et al., 2024). This involves enhancing psychological safety, reducing barriers to knowledge sharing and ensuring consistent support from the organizational climate that actively encourages and nurtures creative endeavours (Devi, 2024).

Exploring these dynamics will provide vital insights into how organizations can cultivate a culture where creativity flourishes, leading to sustained innovation and success in the competitive global market. This research could thus have profound implications for organizational practices, contributing to a robust framework for effectively nurturing and harnessing employee creativity.

The pivotal role of psychological safety in fostering employee creativity is well-acknowledged in organizational psychology literature (Islam & Chaudhary, 2024). However, the existing research often provides a simplistic linkage between psychological safety and creativity, overlooking the nuanced interactions that involve mediating mechanisms like knowledge sharing and knowledge hiding and potential moderating factors such as the organizational safety climate. This gap presents a significant oversight, as the interplay of these factors could critically influence the effectiveness of organizational strategies aimed at enhancing creativity.

Empirical studies suggest that psychological safety enhances creativity by fostering an environment where employees feel secure enough to share information and ideas openly (Xu et al., 2023). However, the converse process—knowledge hiding—where employees intentionally withhold information can stifle creativity and innovation and harm organizational performance (Chavali et al., 2024). While establishing the negative implications of knowledge hiding, the existing literature often fails to adequately explore how psychological safety can simultaneously influence knowledge sharing and hiding and, through these opposing processes, impact employee creativity. This study seeks to delve deeper into this dual-pathway mediation, offering a more comprehensive understanding of how psychological safety translates into creative output.

Moreover, the role of the organizational safety climate as a moderator between psychological safety and knowledge behaviours (sharing and hiding) remains underexplored (Zhang & Min, 2024). While research acknowledges that a supportive safety climate can enhance psychological safety, the nuances of how such a climate influences the dynamics of knowledge behaviours and employee creativity are not well documented (Alami et al., 2023). This oversight is critical as the organizational safety climate could amplify or buffer psychological safety's effects on creativity via knowledge mechanisms. By investigating this moderating role, the research could provide valuable insights into tailoring organizational policies that foster a conducive climate for creativity (Farrukh et al., 2024).

Hence, this study aims (1) to understand the direct impact of psychological safety and employee creativity. (2) to examine the mediating effect of Knowledge sharing on the relationship between psychological safety and employee creativity and the mediating effect of knowledge hiding in the relationship between psychological safety and employee creativity. (3) to assess the moderating effect of organizational safety climate on the relationship between psychological safety and knowledge sharing. Assess the moderating effect of

organizational security climate on the relationship between psychological safety and knowledge hiding. (4) to develop a causal model to examine the influence of knowledge sharing and knowledge hiding on employees' psychological safety and creativity.

LITERATURE REVIEW

Theoretical Approach

This study draws upon the principles of organizational support theory, which posits that employees' perceptions of organizational support significantly influence their behaviour and attitudes towards their work environment (Bahadir et al., 2024). Central to this theory is the concept of perceived organizational support (POS), which assesses how employees believe their contributions are valued and their organization prioritizes their well-being (Hong et al., 2024). The foundational variables of this theory include perceived organizational support, organizational justice, interactional fairness, and organizational rewards and working conditions (Park & Kim, 2023). These elements collectively suggest that higher levels of organizational support can enhance employee loyalty and commitment, fostering psychological safety and creativity in the workplace (Azila-Gbettor et al.).

In parallel, this research incorporates insights from organizational learning theory, which focuses on how organizations adapt and evolve through the collective knowledge of their members (Rass et al., 2023). This theory emphasizes the strategic role of learning in achieving organizational success, highlighting aspects such as the continuity of learning across the organization's timeline, the alignment of learning objectives with current operations, and the need for learning strategies to adapt dynamically to external changes (Junaid et al., 2023). This approach underlines the importance of fostering an organizational culture that promotes knowledge creation, transfer, and retention, essential for developing a safe climate conducive to innovation (Berraies & Chouiref, 2023).

By integrating organizational support theory and learning theory, we aim to comprehensively explore the structural and behavioral factors within organizations that support or impede creative workforce development. This dual-theoretical approach facilitates a nuanced exploration of how organizational practices and learning environments interact with psychological safety to influence employee creativity significantly (Talwar et al., 2023). This synthesis deepens our understanding of organizational dynamics and provides practical insights for enhancing creativity through strategic organizational support and learning initiatives.

Hypothesis Development and Conceptual Framework

Psychological safety is a significant predictor of innovative behaviour in employees. For example, Zhao et al. (2023) found a positive relationship between employees' psychological security and innovative behaviour, suggesting that employees are more likely to engage in creative and innovative activities when they feel secure. Similarly, Ahmad et al. (2023) provided empirical evidence from a sample of 441 respondents in China, showing that psychological safety positively influences innovative behaviour. This is further supported by Edmondson (1999), who observed that psychological safety facilitates team learning and innovation by creating an environment where team members feel safe to voice their opinions and ask questions. These findings suggest that psychological safety enables employees to take risks and engage in creative processes without fear of negative consequences. Therefore, we propose:

H1: Employees' psychological Safety has a positive impact on personal creativity.

Psychological Safety is vital to facilitate knowledge sharing among employees. Luqman et al. (2023) argued that psychological safety is a critical prerequisite for knowledge sharing in organizations, positively affecting this behaviour. Verwijs and Russo (2024) also discussed how psychological safety reduces employees' apprehensions about time commitments and ownership, which could hinder knowledge sharing. These studies indicate that when employees feel psychologically safe, they are more likely to share knowledge, leading to enhanced collaboration and innovation within the team. Thus, we propose:

H2: Employees' psychological safety has a positive effect on their knowledge sharing behaviour.

Further, the relationship between knowledge sharing and creativity is well established in the literature. Knowledge sharing enables employees to access a broader range of information and ideas, which can stimulate creative thinking and innovation. For instance, Nguyen et al. (2024) have shown that knowledge sharing significantly enhances team and organizational performance by fostering an environment where creative ideas can flourish. This effect is believed to be due to the dynamic interaction and exchange of ideas that knowledge-sharing promotes, which stimulates creativity. Therefore, based on these studies, we can infer:

H3: Employees' knowledge-sharing behaviour positively impacts personal creativity.

The mediating role of knowledge sharing between psychological safety and creativity has been well-documented in recent studies. For instance, Islam and Asad (2024) observed that psychological safety facilitates knowledge sharing, which in turn enhances creativity. This relationship underscores the importance of an open environment where employees feel secure enough to share knowledge, which provides the necessary resources and stimuli for creative thinking. When employees share their insights and experiences, it enriches the collective knowledge base and fosters an atmosphere ripe for innovation. Therefore, the following hypothesis is proposed:

H4: Knowledge sharing mediates the relationship between employees' psychological safety and creativity.

Knowledge hiding, where employees intentionally withhold knowledge, can have detrimental effects on creativity and innovation (Fauzi, 2023). Empirical evidence suggests that a lack of psychological safety may lead to increased knowledge hiding as employees fear potential negative repercussions for sharing information (Bhatti et al., 2023). For example, Guo et al. (2024) discussed how psychological safety can diminish knowledge-hiding behaviours by creating a trusting environment. When employees feel secure, they are less likely to hide knowledge, facilitating open communication and collaboration essential for creative outcomes. Therefore, we propose:

H5: Employees' psychological Safety has a robust negative effect on knowledge hiding.

The negative impact of knowledge hiding on creativity has been extensively supported by empirical research (Liao et al., 2024). For instance, Zhang et al. (2023) have shown that Knowledge hiding reduces the individual's ability to be creative and impairs the team's overall innovative capabilities. When knowledge is withheld, it restricts the flow of ideas and limits the diversity of perspectives available for creative problem-solving. Thus, increased knowledge hiding can significantly dampen creative processes within organizations. Based on these findings, the following hypothesis is suggested

H6: Knowledge hiding by employees harms their creativity.

Knowledge hiding can mediate the relationship between psychological safety and creativity (Bhatti et al., 2023). This implies that knowledge hiding decreases when psychological safety is high, enhancing the potential for creative outcomes. For example, Jeong et al. (2023) highlighted that employees are less likely to hide knowledge in a psychologically safe environment because they do not fear negative consequences. This reduction in knowledge hiding promotes a more open exchange of ideas, which is crucial for creative thinking and innovation. Thus, we propose the following hypothesis

H7: Knowledge hiding mediates the relationship between employees' psychological safety and creativity.

The role of the organizational safety climate as a moderating factor between psychological safety and knowledge sharing suggests that a supportive organizational climate can enhance the positive effects of psychological safety (Yasin et al., 2023). Research by Xu et al. (2023) indicates that a strong safety climate fosters trust and openness, which are conducive to knowledge sharing. Therefore, when the organizational safety climate is robust, the influence of psychological safety on knowledge sharing is likely to be stronger. This leads us to hypothesize:

H8: Organizational Safety Climate moderates the relationship between employees' psychological safety and knowledge sharing. Specifically, a more robust organizational safety climate enhances the positive effect of

psychological safety on knowledge sharing.

Similarly, the organizational safety climate can moderate the relationship between psychological safety and knowledge hiding. Employees are more likely to feel secure and less inclined to engage in protective behaviors such as knowledge hiding when the organizational climate is perceived as supportive and safe. This assumption is supported by findings from Zhang and Min (2024), who observed that a lack of psychological safety could enhance knowledge-hiding behaviours, which negatively affect organizational innovation. Thus, we posit:

H9: Organizational Safety Climate moderates the relationship between employees' psychological safety and knowledge hiding. A more robust organizational safety climate reduces knowledge-hiding behaviours among employees.

Figure 1 illustrates the proposed relationships between psychological safety, knowledge sharing, knowledge hiding, organizational safety climate, and creativity within an organizational context. Psychological Safety serves as the independent variable, posited to influence creativity (H1) directly and to mediate knowledge sharing (H2) and knowledge hiding (H5) behaviours among employees. Knowledge sharing and hiding are hypothesized to act as mediators in this model, directly and indirectly influencing creativity. Specifically, knowledge sharing is hypothesized to positively influence creativity (H3) and mediate the relationship between psychological Safety and creativity (H4). Conversely, knowledge hiding is expected to negatively affect creativity (H6) and mediate the relationship between psychological Safety and creativity (H7). Organizational safety climate is introduced as a moderating variable, influencing how psychological safety affects knowledge sharing (H8) and hiding (H9). The model identifies creativity as the dependent variable, influenced by domain-relevant skills, creativity-relevant skills, and intrinsic task motivation, essential components fostering creative output in the workplace. This comprehensive framework seeks to delineate the complex interplay of safety, knowledge dynamics, and creativity, highlighting the pivotal roles of mediating behaviours and the moderating impact of organizational climate on these processes.

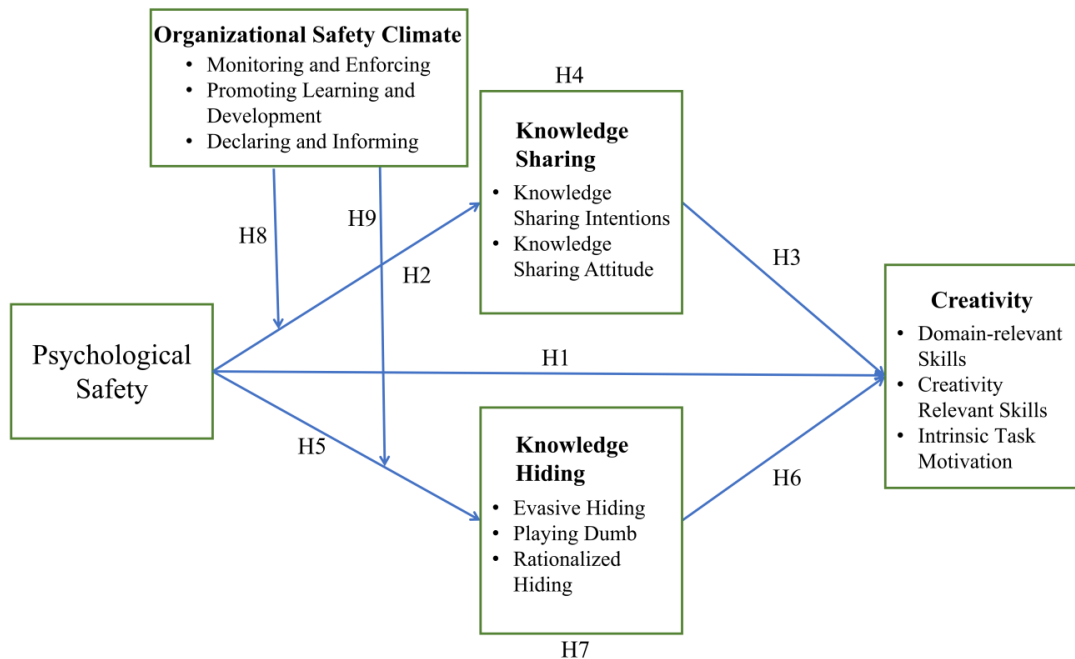


Figure1. Conceptual Framework of the Study (H = Hypothesis)

Method

Data Administration

This research focused on a stratified random sample of large manufacturing enterprises legally registered with the General Administration for Industry and Commerce of China as of December 31, 2022. The sample included 757 employees, classified according to the "Measures for the Division of Statistically Large, Small, Medium, and Micro Enterprises (2017)" and "National Economic Industry Classification." These categories were used to identify organizations across four sectors: the light and textile industry, the resource processing industry, the machinery and electronic manufacturing industry, and other manufacturing industries. The study used mailed surveys to the companies for data collection, with the projected response rate set at 60%. This method was chosen to efficiently reach many respondents across various geographical locations within the manufacturing sector. The final sampling covered a diverse range of manufacturing sub-sectors, providing a representative cross-section of China's giant manufacturing industry and capturing insights from skilled workers who play critical roles in innovation and production processes. This setup was designed to gather comprehensive data reflecting the innovative capabilities and creative contributions of skilled workers in large-scale manufacturing in China.

Instrument

This research utilizes a comprehensive questionnaire comprising several sections, each tailored to measure specific constructs related to employee behaviour and organizational climate in the context of creativity and knowledge management. The questionnaire is structured around crucial variables such as Psychological Safety, Employee Creativity, Domain-relevant Skills, Creativity Relevant Skills, Intrinsic Task Motivation, Knowledge Sharing, Knowledge Hiding, and Organizational Safety Climate. Each variable is assessed through carefully selected scales from prior validated research, ensuring the reliability and relevance of the measurements.

For measuring Psychological Safety, Carmeli and Shteigman (2010)'s 5-item scale is employed to assess employees' comfort in being themselves at work without fear of negative consequences. Employee Creativity is gauged using Tierney (1999)'s 9-item scale that captures the generation of novel and valuable ideas. Knowledge sharing is evaluated through Bock et al. (2005)'s 10-item scale, which examines making knowledge accessible to others within the organization. Knowledge Hiding, which involves deliberate attempts to conceal knowledge, is measured using Connelly et al. (2012)'s 12-item scale. The Organizational Safety Climate is quantified using Zohar and Luria (2005)'s 16-item scale that captures the shared perceptions of safety within the organization. These scales are selected based on their extensive use in the literature and proven effectiveness in capturing the nuances of each construct. All items are measured on an interval scale, allowing for precise quantification of subjective data and facilitating sophisticated statistical analysis such as Structural Equation Modeling to uncover the intricate relationships between the variables.

RESULTS

Demographic Information

Table 1 summarises the sample across various categories, including gender, age, qualifications, working experience, and enterprise type. The gender distribution among the participants shows a predominance of males (528 respondents, 69.749%) compared to females (229 respondents, 30.251%). Most of the participants are concentrated in the middle age groups, with 286 (37.781%) between 26-35 years and 264 (34.875%) between 36-45 years, highlighting a relatively young but experienced workforce. Educational qualifications of the respondents vary, with a significant number holding high school diplomas or below (423 respondents, 55.878%), followed by those with vocational secondary school education (213 respondents, 28.137%). The distribution of working experience indicates a seasoned workforce, where a notable proportion of the respondents (336, 44.386%) have more than ten years of experience, suggesting a high level of industry knowledge and expertise. Regarding the type of enterprise, a vast majority of the respondents are employed in private businesses (600 respondents, 79.260%), with fewer in nationalized (122 respondents, 16.116%) and joint venture firms (35 respondents, 4.624%). These demographic insights provide a comprehensive overview of the workforce involved in the study, reflecting a diverse yet predominantly mature and experienced group of

employees from various manufacturing enterprises.

Table 1 Statistics on demographic characteristics

Designation	Categories	Frequency	Valid Percent	Per cent
Gender	Male	528	69.749	69.749
	Female	229	30.251	100.000
Age	18-25 years	45	5.945	5.945
	26-35 years	286	37.781	43.725
	36-45 years	264	34.875	78.600
	Over 46	162	21.400	100.000
Qualifications	High school and below	423	55.878	55.878
	Vocational secondary School	213	28.137	84.016
	Three-year college	86	11.361	95.376
	Undergraduate	35	4.624	100.000
Working Experience	Less than one year	56	7.398	7.398
	1 to 3 years	86	11.361	18.758
	3 to 6 years	101	13.342	32.100
	6 to 10 years	178	23.514	55.614
	More than ten years	336	44.386	100.000
	More than ten years	336	44.386	100.000
Enterprise Type	Nationalized business	122	16.116	16.116
	Private business	600	79.260	95.376
	Joint venture	35	4.624	100.000

Table 2 evaluates the internal consistency of various constructs within the questionnaire, using Cronbach (1951)'s Alpha as a measure of reliability and corrected item-total correlations. The analysis encompasses several key psychological and organizational dimensions, namely Psychological Safety, Domain Relevant Skills, Creativity Relevant Skills, Intrinsic Task Motivation, Knowledge Sharing Attitude, Knowledge Sharing Intentions, Evasive Hiding, Playing Dumb, Rationalized Hiding, Monitoring and Enforcing, Promoting Learning and Development, and Declaring and Informing.

For Psychological Safety, a high Cronbach (1951)'s Alpha of 0.884 indicates excellent internal consistency, supported by strong item-total correlations ranging from 0.684 to 0.744. The Domain Relevant Skills dimension shows a satisfactory alpha of 0.822, suggesting a reliable measure, although the corrected item-total correlation for one item (0.657) suggests potential room for improvement. Creativity Relevant Skills and Intrinsic Task Motivation are also robust, with alphas of 0.830 and 0.821, respectively, showing internal solid consistencies across their items.

Knowledge Sharing Attitudes and Intentions are very reliable, with alphas of 0.842 and 0.900, respectively. The Knowledge Sharing Intentions, in particular, display notably high item-total correlations, indicating a very cohesive set. The constructs measuring Knowledge-hiding behaviours – Evasive Hiding, Playing Dumb, and Rationalized Hiding – all demonstrate high reliability (alphas from 0.858 to 0.890), ensuring that these scales are suitable for assessing these complex behaviours.

The scales measuring aspects of the Organizational Safety Climate – Monitoring and Enforcing, Promoting Learning and Development, and Declaring and Informing – report the highest reliability scores, with Cronbach (1951)'s Alphas ranging from 0.909 to 0.939. These results suggest that these scales are exceptionally reliable in measuring the perceived safety climate within organizations. Overall, the reliability of the total variables in the study is very high, with an alpha of 0.876, indicating that the scales used adequately capture the intended constructs and are suitable for further analysis in the study.

Reliability Analysis

Table 2 Results of confidence analyses

Dimension	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Psychological Safety	A1	0.717	0.860	0.884
	A2	0.731	0.857	
	A3	0.728	0.857	
	A4	0.684	0.868	
	A5	0.744	0.853	
Domain Relevant Skills	BA1	0.657	0.776	0.822
	BA2	0.656	0.775	
	BA3	0.720	0.713	
Creativity Relevant Skills	BB1	0.709	0.745	0.830
	BB2	0.669	0.785	
	BB3	0.688	0.764	
Intrinsic Motivation Task	BC1	0.688	0.741	0.821
	BC2	0.652	0.777	
	BC3	0.686	0.742	
Knowledge Sharing Attitude	CA1	0.733	0.789	0.842
	CA2	0.607	0.821	
	CA3	0.642	0.812	
	CA4	0.662	0.807	
Knowledge Sharing Intentions	CA5	0.604	0.823	0.900
	CB1	0.773	0.873	
	CB2	0.733	0.882	
	CB3	0.745	0.879	
	CB4	0.768	0.874	
Evasive Hiding	CB5	0.735	0.881	0.890
	DA1	0.726	0.870	
	DA2	0.802	0.842	
	DA3	0.723	0.871	
Playing Dumb	DA4	0.781	0.849	0.886
	DB1	0.759	0.850	
	DB2	0.735	0.859	
	DB3	0.771	0.845	
Rationalized Hiding	DB4	0.737	0.858	0.858
	DC1	0.750	0.800	
	DC2	0.686	0.825	
	DC3	0.674	0.831	
Monitoring and Enforcing	DC4	0.700	0.820	0.935
	EA1	0.817	0.922	
	EA2	0.781	0.927	
	EA3	0.822	0.922	
	EA4	0.831	0.921	
Promoting Learning and Development	EA5	0.776	0.928	0.939
	EA6	0.824	0.921	
	EB1	0.815	0.928	
	EB2	0.810	0.929	
	EB3	0.815	0.928	
	EB4	0.823	0.928	

Declaring and Informing	EB5	0.816	0.928	0.909
	EB6	0.829	0.927	
	EC1	0.783	0.886	
	EC2	0.792	0.883	
	EC3	0.808	0.877	
	EC4	0.791	0.883	
Reliability of total variables				0.876

Confirmatory Factor Analysis

Table 3 reveals a nuanced fit across the measured dimensions. For Psychological Safety (PS), the results indicate a CMIN/DF=4.279, which, while above the ideal, remains within acceptable limits. The GFI for PS is high at 0.989, suggesting a good fit, and the RMSEA at 0.066 is within the acceptable range, complemented by high CFI, NFI, and IFI values, all at 0.991. Employee Creativity (EC) demonstrates a robust model fit with a lower CMIN/DF of 1.71, indicating a robust fit. The GFI for EC stands at 0.988, with an excellent RMSEA of 0.031, and the CFI, NFI, and IFI indices are all well within the ideal range at 0.994 and 0.986, respectively. Knowledge Sharing (KS) shows a CMIN/DF of 1.566, GFI at 0.986, and an exceptionally low RMSEA of 0.027, suggesting an excellent fit. The CFI, NFI, and IFI for KS are at 0.995 and 0.986, reflecting strong unity with the hypothesized model. In the case of Knowledge Hiding (KH), the fit metrics are similarly strong, with a CMIN/DF of 1.191, GFI at 0.987, and an RMSEA of 0.016, among the lowest, pointing to a perfect fit. The CFI and IFI stand at 0.998, and NFI at 0.988, indicating high reliability and validity. Organizational Safety Climate (OSC) displays the best fit among all constructs with a CMIN/DF of 1.131, GFI at 0.982, and the lowest RMSEA at 0.013. The CFI, NFI, and IFI are exceedingly high at 0.999 and 0.989, respectively, underscoring a model that excellently captures the construct's nuances.

Overall, these results validate the factor model's adequacy in accurately representing the constructs within the organizational context, providing strong evidence of the model's reliability and the suitability of its application in understanding organizational dynamics and employee behaviours in large manufacturing settings.

Table 3. Fit metrics for the validated factor model

Norm	CMIN	DF	CMIN/DF	GFI	RMSEA	CFI	NFI	IFI
Ideal Value	-	-	<3	>0.9	<0.08	>0.9	>0.9	>0.9
Standard Value	-	-	<5	>0.8	<0.10	>0.8	>0.8	>0.8
Fitted Value								
PS	21.396	5	4.279	0.989	0.066	0.991	0.989	0.991
EC	41.034	24	1.71	0.988	0.031	0.994	0.986	0.994
KS	53.234	34	1.566	0.986	0.027	0.995	0.986	0.995
KH	60.763	51	1.191	0.987	0.016	0.998	0.988	0.998
OSC	114.229	101	1.131	0.982	0.013	0.999	0.989	0.999

Table 4 demonstrates the factor loadings of observed variables on their respective latent constructs. Each latent variable, such as Psychological Safety, Domain Relevant Skills, Creativity Relevant Skills, and others, is evaluated through non-standardized and standardized loading coefficients, signifying the strength and significance of each observed variable's contribution to the latent constructs.

For instance, the Psychological Safety construct shows strong standardized loadings ranging from 0.734 to 0.804, with all observed variables (A1 through A5) displaying significant z-values (CR), all exceeding the critical value, indicating statistically significant contributions to the construct. Similarly, Knowledge Intentions exhibit high standardized loadings from 0.783 to 0.823, with corresponding z-values indicating high statistical significance. The Evasive Hiding, Monitoring, and Enforcing constructs illustrate equally robust loadings and significance, supporting their respective construct definitions and the hypothesized relationships within the model. This quantitative analysis confirms the model's structural integrity and the relevance of each variable in explaining the underlying constructs, providing a solid foundation for further inference and discussion on the constructs' implications in organizational settings.

Table 4 Standardized factor load tables

Latent Variable	Observed Variables	Non-Standardized Loading Coefficients	Standardized Loading Coefficients	Standard Error	Z (CR.)	P
Psychological_Safety	A1	1.0	0.775			
	A2	0.968	0.789	0.044	22.116	***
	A3	0.998	0.786	0.045	22.016	***
	A4	0.972	0.734	0.048	20.408	***
	A5	1.02	0.804	0.045	22.568	***
Domain Relevant Skills	BA1	1.0	0.749			
	BA2	0.952	0.748	0.05	19.012	***
	BA3	1.042	0.846	0.051	20.294	***
Creativity Relevant Skills	BB1	1.0	0.803			
	BB2	1.02	0.769	0.05	20.587	***
	BB3	1.024	0.792	0.049	21.062	***
Intrinsic Task Motivation	BC1	1.0	0.791			
	BC2	0.934	0.738	0.049	19.226	***
	BC3	1.057	0.804	0.052	20.371	***
Knowledge Attitude Sharing	CA1	1.0	0.81			
	CA2	0.886	0.672	0.048	18.485	***
	CA3	0.957	0.722	0.048	20.044	***
	CA4	0.934	0.733	0.046	20.386	***
	CA5	0.946	0.679	0.051	18.709	***
Knowledge Intentions Sharing	CB1	1.0	0.823			
	CB2	0.994	0.783	0.041	24.132	***
	CB3	0.983	0.795	0.04	24.669	***
	CB4	1.004	0.822	0.039	25.813	***
	CB5	0.978	0.784	0.04	24.209	***
Evasive hiding	DA1	1.0	0.785			
	DA2	1.082	0.871	0.042	25.721	***
	DA3	0.996	0.777	0.044	22.553	***
	DA4	1.081	0.843	0.044	24.84	***
Playing dumb	DB1	1.0	0.818			
	DB2	1.008	0.791	0.042	23.869	***
	DB3	1.08	0.842	0.042	25.787	***
	DB4	1.02	0.799	0.042	24.179	***
Rationalized hiding	DC1	1.0	0.837			
	DC2	0.951	0.756	0.043	22.118	***
	DC3	0.962	0.753	0.044	22.035	***
	DC4	0.955	0.76	0.043	22.267	***
Monitoring and Enforcing	EA1	1.0	0.851			
	EA2	0.978	0.811	0.035	27.795	***
	EA3	1.016	0.855	0.033	30.379	***
	EA4	0.999	0.866	0.032	31.056	***
	EA5	0.948	0.806	0.034	27.512	***
	EA6	1.018	0.857	0.033	30.502	***
Promoting Learning and Development	EB1	1.0	0.849			
	EB2	0.977	0.839	0.033	29.385	***
	EB3	0.996	0.844	0.034	29.687	***
	EB4	1.026	0.856	0.034	30.451	***
	EB5	1.02	0.849	0.034	30.016	***
	EB6	1.017	0.858	0.033	30.575	***
Declaring and Informing	EC1	1.0	0.831			
	EC2	0.994	0.837	0.036	27.509	***
	EC3	1.017	0.866	0.035	28.938	***
	EC4	1.031	0.845	0.037	27.869	***

Note: *** p < 0.001 **p < 0.01 *p < 0.05

Table 5 provides quantitative results for the Average Variance Extracted (AVE) and Composite Reliability (CR) for various latent variables, crucial for assessing the measurement model's validity and reliability in the study context. These metrics underscore the adequacy of the constructs within the theoretical framework, demonstrating both the convergent validity and internal consistency of the scales used. For instance, the latent variable 'Monitoring and Enforcing' exhibits the highest levels of both AVE and CR, at 0.708 and 0.936, respectively, indicating excellent reliability and a substantial amount of variance explained by the construct relative to the measurement error. Similarly, 'Promoting Learning and Development' and 'Declaring and Informing' show strong validity and reliability with AVEs over 0.7 and CRs nearing or exceeding 0.9.

Conversely, 'Knowledge Sharing Attitude' reports the lowest AVE at 0.525 but maintains an acceptable CR of 0.846, suggesting adequate reliability but slightly lower explained variance. These results affirm the constructs' robustness, supporting their inclusion and utilization in further analyses to explore the dynamics within organizational settings.

Table 5 Variable AVE and CR Index Results

Latent Variable	Average Variance Extracted	Composite Reliability
Psychological_Safety	0.605	0.885
Domain Relevant Skills	0.612	0.825
Creativity Relevant Skills	0.621	0.831
Intrinsic Task Motivation	0.606	0.821
Knowledge_Sharing_Attitude	0.525	0.846
Knowledge_Sharing_Intentions	0.643	0.900
Evasive_hiding	0.672	0.891
Playing_dumb	0.661	0.886
Rationalized_hiding	0.604	0.859
Monitoring and enforcing	0.708	0.936
Promoting Learning and Development	0.721	0.939
Declaring and informing	0.714	0.909

Table 6 quantitatively assesses the relationships between the latent variables: Psychological Safety (PS), Employee Creativity (EC), Knowledge Sharing (KS), knowledge Hiding (KH), and Organizational Safety Climate (OSC). The analysis reveals statistically significant correlations between these constructs, indicating interconnected dynamics within the organizational framework. Psychological Safety (PS) shows a positive correlation with Employee Creativity (EC) and Knowledge Sharing (KS), with coefficients of .370 and .392, respectively, both significant at the 0.01 level, suggesting that higher psychological safety is associated with increased creativity and knowledge sharing within the organization. Conversely, PS is negatively correlated with Knowledge Hiding (KH) at -.415, indicating that the tendency to hide knowledge decreases as psychological safety increases. The relationship between PS and Organizational Safety Climate (OSC) is positive but weaker at .137, also significant at the 0.01 level. Additionally, Knowledge Sharing (KS) and knowledge Hiding (KH) show a strong negative correlation of -.472, reinforcing the idea that environments promoting knowledge sharing tend to discourage knowledge hiding. These correlations provide insights into how these variables interact within organizational settings, underscoring the complexity of their relationships and the potential implications for organizational behaviour and culture.

Table 6 Correlation analyses of variable

	PS	EC	KS	KH	OSC
PS	1.000				
EC	.370**	1.000			
KS	.392**	.310**	1.000		
KH	-.415**	-.308**	-.472**	1.000	
OSC	.137**	.118**	.143**	-.320**	1.000

Note: *** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$

Figure 2 depicted in the diagram provides a detailed analysis of the relationships among several key organizational constructs, illustrating both the direct and indirect effects of Psychological Safety (PS) on Employee Creativity (EC) through the mediators Knowledge Sharing (KS) and knowledge Hiding (KH). Standardized path coefficients quantify the strength of these relationships, adding depth to the understanding of how these constructs interact within an organizational context. Psychological safety is positively linked to knowledge sharing, with a path coefficient = 0.53, indicating a strong influence, and it has a negative association with knowledge hiding, as evidenced by a coefficient = -0.54. These results suggest that higher levels of psychological safety in the workplace enhance knowledge-sharing behaviours while reducing the propensity for knowledge hiding. Knowledge Sharing further positively impacts Employee Creativity, as shown by a path coefficient = 0.24, while Knowledge Hiding has a comparatively more minor negative effect on creativity with a coefficient = -0.18. Knowledge Sharing is influenced by two observed variables: Knowledge Sharing Intention (KSI) and Knowledge Sharing Attitude (KSA), with respective path coefficients of 0.66 and 0.70, demonstrating

significant contributions to the latent construct. Similarly, Knowledge Hiding is decomposed into three forms: Evasive Hiding (EH), Playing Dumb (PD), and Rationalized Hiding (RH), with coefficients of 0.73, 0.68, and 0.63, respectively, indicating strong influences on the Knowledge Hiding construct. Employee Creativity is also depicted as being influenced by Domain Relevant Skills (DRS), Creativity Relevant Skills (CRS), and Intrinsic Task Motivation (ITM), with path coefficients of 0.62, 0.67, and 0.71, respectively, highlighting the substantial roles these factors play in fostering employee creativity.

Tables 7, 8, and 9 provide further quantitative support for these findings. The model fit indicators in Table 4.8 demonstrate a good fit, with a CMIN/DF ratio of 3.403, a GFI of 0.961, an RMSEA of 0.056, and a CFI of 0.959, all within acceptable ranges. Table 4.9 details significant standardized path coefficients, such as the direct effect of Psychological Safety on Employee Creativity (0.252, $p < 0.001$) and Knowledge Sharing (0.532, $p < 0.001$). Knowledge Sharing positively impacts Employee Creativity (0.24, $p < 0.001$), while Knowledge Hiding negatively affects it (-0.177, $p = 0.003$).

Table 9 summarizes the effects of mediation, showing that the indirect effect of psychological safety on employee creativity through knowledge sharing accounts for 34% of the total effect. In comparison, the indirect effect through Knowledge Hiding accounts for 27%. These indirect effects are significant, with p -values of 0.005 and 0.006, respectively. These results underscore the critical pathways through which psychological safety influences organizational behaviours and creativity, highlighting the importance of fostering a supportive and open work environment to enhance employee creativity.

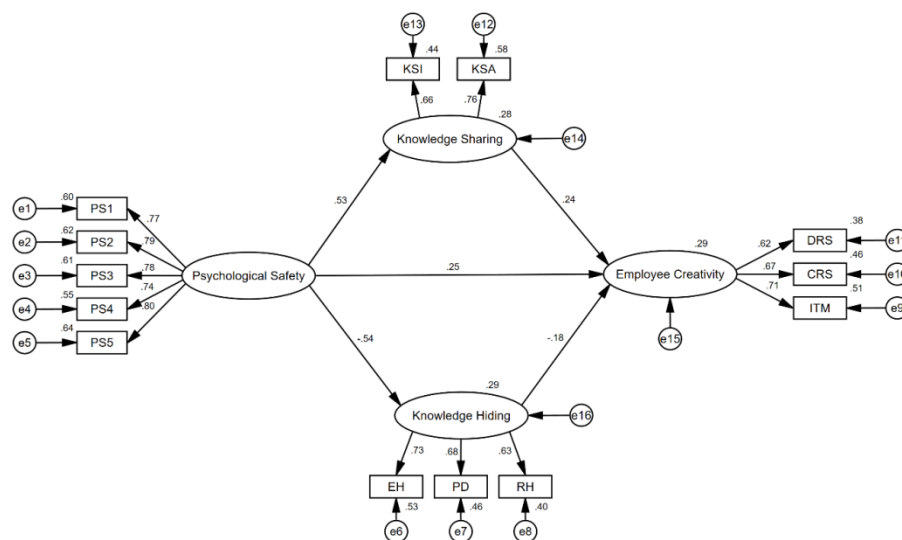


Figure 2 Structural equation modelling diagram

Table 7 Indicators of model fit

NORM	CMIN	DF	CMIN/DF	GFI	RMSEA	CFI	NFI	IFI
Ideal Value	-	-	<3	>0.9	<0.08	>0.9	>0.9	>0.9
Compliance Value	-	-	<5	>0.8	<0.10	>0.8	>0.8	>0.8
Fitted Value	204.191	60	3.403	0.961	0.056	0.959	0.943	0.959

Table 8 Summary of model coefficients

Independent Variable	Implicit Variable	Unstandardized Coefficients	Path	Standardized Coefficient	Path	Standard Error	z (CR.)	P
PS	EC	0.268		0.252		0.07	3.837	***
PS	KS	0.471		0.532		0.044	10.816	***
KS	EC	0.288		0.24		0.077	3.767	***
PS	KH	-0.735		-0.537		0.066	-11.147	***
KH	EC	-0.137		-0.177		0.046	-2.982	0.003

Note: ***P < 0.001 **P < 0.01 *P < 0.05

Table 9 Results of the test for mediation effects

Path Relationships	Direct Effect	Indirect Effect	Proportion of Indirect Effect	Bias-Corrected (95%)		P
				Lower Bounds	Upper Bounds	
PS --> KS --> EC	0.268(***)	0.136	34%	0.044	0.244	0.005
PS --> KH--> EC	0.268(***)	0.101	27%	0.031	0.173	0.006

Note: ***P < 0.001 **P < 0.01 *P < 0.05

Table 10 examines the moderating effect of Organizational Safety Climate (OSC) on the relationship between Psychological Safety (PS) and Knowledge Sharing (KS). The results across three models reveal significant findings. In Model 1, PS significantly predicts KS with a coefficient of 0.383 ($t = 11.186$, $p < 0.01$), explaining 16.1% of the variance in KS ($R^2 = 0.161$, Adjusted $R^2 = 0.155$). Model 2 introduces OSC as an independent variable, which is also a significant predictor of KS with a coefficient of 0.066 ($t = 2.619$, $p < 0.01$), slightly increasing the explained variance to 16.9% ($R^2 = 0.169$, Adjusted $R^2 = 0.162$). The interaction term PS×OSC is added to test the moderating effect, which is significant with a coefficient of 0.093 ($t = 3.291$, $p < 0.01$). This interaction further increases the explained variance to 18.0% ($R^2 = 0.180$, Adjusted $R^2 = 0.173$). The F-statistics for all models are significant ($p = 0.000$), indicating that the models are well-fitted. These results demonstrate that OSC not only directly influences KS but also enhances the positive effect of PS on KS, highlighting the importance of a supportive organizational climate in fostering knowledge-sharing behaviours.

Table 10 The moderating effect of knowledge sharing

Independent Variable	Dependent Variable (Knowledge Sharing)		
	Model 1	Model 2	Model 3
P.S.	0.383**(11.186)	0.371**(10.794)	0.387**(11.212)
OSC		0.066**(2.619)	0.058*(2.304)
PS×OSC			0.093**(3.291)
R ²	0.161	0.169	0.180
Adjusted R ²	0.155	0.162	0.173
F	F=28.801 p=0.000	F=25.331 p=0.000	F=23.544 p=0.000

Note: ***P < 0.001 **P < 0.01 *P < 0.05, Inside the parentheses is the value of t

Figure 3 illustrates the moderating effect of Organizational Safety Climate (OSC) on the relationship between Psychological Safety (PS) and Knowledge Sharing (KS). The graph shows two lines representing low and high levels of OSC. Both lines indicate a positive relationship between PS and KS; however, the slope for high OSC is steeper than that for low OSC. This suggests that when OSC is high, the positive effect of PS on KS is more substantial. In other words, in environments with a high OSC, increases in psychological safety lead to more significant improvements in knowledge sharing compared to environments with a low OSC. This underscores the importance of fostering a supportive and safe organizational climate to maximize the benefits of psychological safety on knowledge sharing among employees.

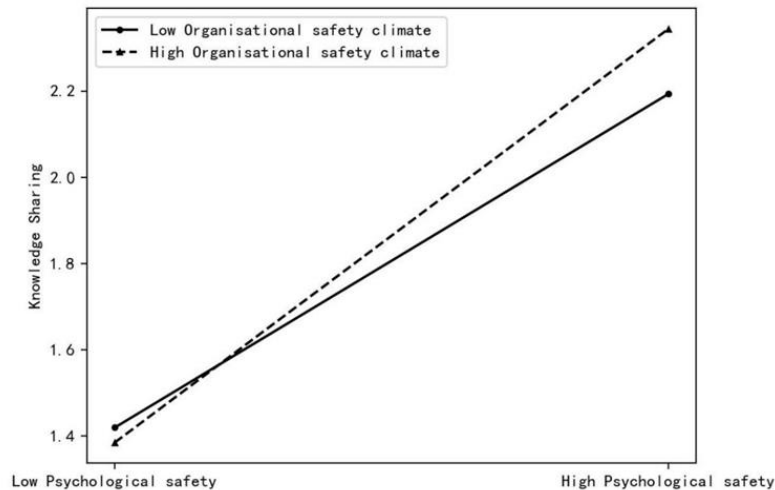


Figure 3 Map of moderating effects of knowledge sharing

Table 11 examines the moderating effect of Organizational Safety Climate (OSC) on the relationship between Psychological Safety (PS) and Knowledge Hiding (KH). In Model 1, PS significantly predicts KH with a negative coefficient of -0.577 ($t = -12.310, p < 0.01$), explaining 17.6% of the variance in KH ($R^2 = 0.176$, Adjusted $R^2 = 0.171$). Model 2 introduces OSC as an independent variable, which also significantly predicts KH with a negative coefficient of -0.277 ($t = -8.326, p < 0.01$), increasing the explained variance to 24.6% ($R^2 = 0.246$, Adjusted $R^2 = 0.240$). Model 3 includes the interaction term PS×OSC, which is significant with a positive coefficient of 0.099 ($t = 2.650, p < 0.01$). This inclusion slightly increases the explained variance to 25.3% ($R^2 = 0.253$, Adjusted $R^2 = 0.246$). The F-statistics for all models are significant ($p = 0.000$), indicating that the models are well-fitted. These results suggest that while both PS and OSC individually reduce knowledge-hiding behaviours, the positive interaction term indicates that the effect of PS on reducing KH is less pronounced at higher levels of OSC. This interaction effect highlights the complexity of the dynamics between psychological safety and organizational safety climate in influencing Knowledge-hiding behaviors within organizations.

Table 11 The moderating effect of knowledge hiding

Independent Variable	Dependent Variable (Knowledge Hiding)		
	Model 1	Model 2	Model 3
P.S.	-0.577**(-12.310)	-0.528**(-11.667)	-0.512**(-11.242)
OSC		-0.277**(-8.326)	-0.285**(-8.577)
PS×OSC			0.099**(2.650)
R ²	0.176	0.246	0.253
Adjusted R ²	0.171	0.240	0.246
F	F=32.138 p=0.000	F=40.772 p=0.000	F=36.231 p=0.000

Figure 4 illustrates the moderating effect of Organizational Safety Climate (OSC) on the relationship between Psychological Safety (PS) and Knowledge Hiding (KH). The graph shows two lines representing low and high levels of OSC. Both lines indicate a negative relationship between PS and KH; however, the slope of the line for high OSC is less steep than that for low OSC. This suggests that higher psychological safety consistently reduces knowledge hiding, but the effect is more pronounced in environments with low OSC. In contrast, although knowledge hiding still decreases with increased psychological safety, the reduction is less significant in environments with high OSC. This indicates that high OSC already provides a context that reduces knowledge hiding, thereby lessening the additional impact of psychological safety. This interaction highlights the complex interplay between organizational safety climate and psychological safety in influencing knowledge-hiding behaviours.

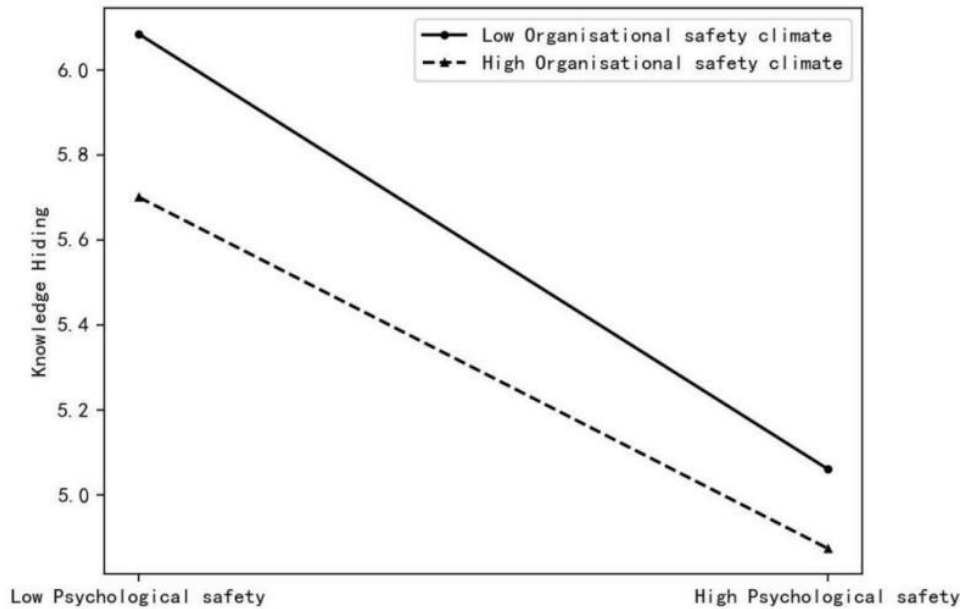


Figure 4 Map of modulating effects of knowledge hiding

The study's results are summarised as follows in Table 12.

Table 12 The Results of the Research Hypothesis Test

Hypotheses	Result
H1: Psychological Safety directly affected employee creativity	passed
H2: Psychological Safety directly affected knowledge sharing	passed
H3: Knowledge sharing directly affected creativity	passed
H4: Psychological Safety indirectly affected employee creativity via knowledge sharing	passed
H5: Psychological Safety directly affected knowledge hiding	passed
H6: Knowledge hiding directly affected employee creativity	passed
H7: Psychological Safety indirectly affected employee creativity via knowledge hiding	passed
H8: The Relationship Between Psychological Safety and Knowledge the organizational safety climate moderates sharing	passed
H9: The organizational safety climate moderates the relationship between psychological safety and knowledge-hiding	passed

DISCUSSION AND CONCLUSION

Theoretical Contributions

This study contributes to the theoretical understanding of how psychological safety influences employee creativity, introducing novel insights into the mechanisms at play. By incorporating knowledge sharing and knowledge hiding as mediating variables, the research elucidates the pathways through which psychological safety affects employee creative performance. This dual-pathway approach clarifies the direct effects and highlights the indirect effects mediated by distinct knowledge management behaviours.

Integrating knowledge sharing and hiding as mediators provides a deeper understanding of the dynamics within organizations. This approach aligns with organizational learning theory, which posits that knowledge is a critical driver of innovation. This study offers a nuanced perspective that enriches existing literature on organizational behaviour and innovation by demonstrating how psychological safety fosters an environment conducive to

knowledge sharing and simultaneously mitigates knowledge hiding.

The study also emphasizes the moderating effect of organizational safety climate on the relationship between psychological safety, knowledge sharing, and knowledge hiding. This finding supports organizational support theory, which suggests that a supportive work environment enhances positive employee behaviours. The results indicate that a robust organizational safety climate amplifies the beneficial effects of psychological safety on knowledge sharing and mitigates knowledge hiding, thereby fostering a more innovative organizational culture. This theoretical contribution provides a new lens for the interplay between organizational climate and individual behaviours.

By contrasting the bidirectional effects of psychological safety on knowledge sharing and knowledge hiding, the study adds depth to the understanding of psychological safety's role within organizations. This comparative analysis is relatively underexplored in previous research, offering a fresh perspective on how organizations can simultaneously promote positive behaviours and curb negative ones.

Practical Implications

The findings of this study provide valuable insights for organizational managers aiming to enhance innovation and optimize knowledge management.

Cultivating Psychological Safety: To enhance employee creativity, managers should build an organizational culture fostering psychological safety. This involves creating a supportive environment where employees feel safe to express their ideas without fear of negative repercussions. These strategies include promoting open communication, encouraging risk-taking, and demonstrating supportive leadership. This aligns with Fenner et al. (2023) assertion that psychological safety is critical for fostering innovation.

Promoting Knowledge Sharing: Given the positive impact of knowledge sharing on creativity, managers should implement policies and practices that encourage knowledge dissemination. This can be achieved through creating platforms for knowledge exchange, providing incentives for knowledge sharing, and fostering a collaborative work environment. Training programs highlighting the benefits of knowledge sharing and building trust among employees can further enhance these efforts. Alami et al. (2023) support that psychological safety is essential for effective knowledge sharing within teams.

Reducing Knowledge Hiding: Managers should also focus on reducing Knowledge-hiding behaviours, which negatively impact creativity. This can be addressed by creating a transparent and trustful work environment where employees feel valued and supported. Developing clear policies against knowledge hiding and mechanisms for anonymous feedback can help mitigate this behaviour. The study by Zhang et al. (2023) corroborates the finding that psychological safety reduces knowledge hiding.

Enhancing Organizational Safety Climate: Strengthening the organizational safety climate is crucial for amplifying the positive effects of psychological safety on knowledge sharing and reducing knowledge hiding (Luqman et al., 2023). Managers can achieve this by developing clear organizational values, improving communication skills, optimizing organizational structures, and fostering an open culture (Assoratgoon & Kantabutra, 2023). This enhances psychological safety and promotes a more innovative and collaborative work environment.

Continuous Monitoring and Adjustment: Organizational culture and safety climate are dynamic and require ongoing attention. Managers should regularly review and adapt their strategies to ensure they continue to support psychological safety, knowledge sharing, and innovation (Rabiul et al., 2023). This involves staying attuned to employees' needs and concerns and making adjustments as necessary to maintain a positive and supportive work environment.

In conclusion, this study underscores the critical role of psychological safety in fostering employee creativity through the mediating effects of knowledge sharing and knowledge hiding. The moderating role of organizational safety climate further enhances these relationships, highlighting the importance of a supportive organizational environment. These theoretical and practical insights provide a comprehensive framework for organizational leaders to foster innovation, optimize knowledge management, and create a dynamic and

supportive workplace. By implementing these strategies, organizations can better harness the creative potential of their employees and drive sustainable innovation.

Limitations and Future Study

This study primarily focuses on skilled workers in sizeable Chinese manufacturing enterprises, which limits the generalizability of its findings to other industries and regions. The reliance on quantitative methods, mainly self-reported data, introduces potential biases and may overlook qualitative factors that are difficult to quantify. Additionally, the study's industry-specific focus means its findings may not directly apply to sectors like services or technology. The study's cross-sectional nature restricts the ability to establish causality, necessitating longitudinal or experimental designs for more precise causal inference. Furthermore, the study does not account for other potential factors, such as individual differences, leadership styles, and organizational culture, that could influence psychological safety, knowledge sharing, and creativity.

Future research should expand on these findings by delving deeper into the mechanisms and conditions under which psychological safety affects creative performance, including the influence of different cultural contexts and leadership styles. Longitudinal studies are needed to explore the long-term effects of psychological safety, knowledge sharing, and knowledge hiding on employee creativity. Qualitative approaches such as in-depth interviews and case studies can provide a more nuanced understanding of employees' experiences in psychologically safe environments. Additionally, introducing variables like job satisfaction and employee engagement can offer a more comprehensive view of the complex relationships between organizational culture, psychological safety, and employee creativity, aiding in developing more effective organizational strategies.

CONCLUSION

This study comprehensively examines the impact of psychological safety on employee creativity, exploring the mediating roles of knowledge sharing and knowledge hiding and the moderating influence of organizational safety climate. The findings affirm that psychological safety significantly enhances employee creativity, primarily by fostering an environment conducive to open communication and idea sharing while reducing knowledge concealment. The study's results underscore the critical role of organizational safety climate in amplifying the positive effects of psychological safety on knowledge sharing and mitigating knowledge-hiding behaviours. By integrating organizational support and learning theories, this research provides valuable insights into the mechanisms that drive organizational innovation. The practical implications suggest that managers should focus on creating a supportive and safe work environment, promoting knowledge sharing, and reducing knowledge hiding to harness the creative potential of their employees. Despite its limitations, including sample specificity and reliance on quantitative methods, this study lays a robust foundation for future research to further explore these dynamics across diverse contexts and over time, ultimately enhancing organizational innovation and performance.

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A Casual Model to Understand Psychological Safety Affecting Employee Creativity: Role of Knowledge Sharing, Knowledge Hiding and Organizational Safety Climate

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