Advances in Consumer Research
ISSN (Print): 0098-9258
ISSN(Online): 3079-1766

Vol. 2, Issue 3 (2025) *https://acr-journal.com/*

Leading to Safety: How Empowering Leadership Impacts Safety Culture and Performance

Md Aqeel Nasim*[1], Sanket Sunand Dash[2],

[1*]Department of OB/HR, Indian Institute of Management Rohtak, PIN Code-124010, India
Email ID: efpm01.003@iimrohtak.ac.in , aqeel.prince@gmail.com
[2]Sanket Sunand Dash, Department of OB/HR, Indian Institute of Management Rohtak, PIN Code-124010, India
Email ID: sanket.dash@iimrohtak.ac.in
***Corresponding Author:**
Md Aqeel Nasim,
Department of OB/HR, Indian Institute of Management Rohtak, PIN Code-124010, India
Email ID: efpm01.003@iimrohtak.ac.in

Cite this paper as: Md Aqeel Nasim, Sanket Sunand Dash, (2025) Leading to Safety: How Empowering Leadership Impacts Safety Culture and Performance. *Advances in Consumer Research*, 2 (3), 666-683.

KEYWORDS

Empowering Leadership (EL), Safety Culture, Safety Performance, Organizational Commitment, High-risk Industry.

ABSTRACT

This study looks at how empowering leadership (EL) can improve safety performance and shape safety culture in the high-risk oil and gas industry. The study examines how EL affects safety culture and performance using social learning theory (SLT) and social exchange theory (SET), proposing organizational commitment as the mediator. Data from 203 employees support the hypotheses, demonstrating that EL positively impacts safety culture, and subsequently, safety performance. The findings validate that organizational commitment mediates EL's impact on safety culture, while safety culture positively influences safety performance. Unique to the Indian context, this study emphasizes EL's critical role in fostering a safety-oriented culture amidst industry-specific safety challenges. These findings provide important insights for management practices in high-risk industries and highlight the need for enabling leadership strategies to improve safety performance. The theoretical ramifications, useful suggestions, and directions for further study are covered in the paper's conclusion

1. INTRODUCTION

Safety is a paramount concern for organizations across various industries, as inadequate safety performance can lead to significant financial and reputational losses (Khan, et al., 2018). This issue is critical in high-risk industries like oil and gas, where accidents can have devastating consequences (Ojuola, et al., 2020). Studies highlight the crucial role of a robust safety culture in preventing accidents and minimizing workplace risks (Cooper, 2000) (Naji, et al., 2021). Leadership is central to shaping organizational safety outcomes and improving safety culture (Flin, et al., 2002) (Khan, et al., 2018) (Stough, 2012). Among the different leadership styles, meta-analysis has identified empowering leadership as the most effective (Nasim, et al., 2023). Despite the documented effect of empowering leadership (EL) on safety culture, researchers are still determining how leadership impacts safety culture. Research shows that national culture can impact the adoption of a safety culture (Noort, et al., 2016) (Yorio, et al., 2019). Industry-specific factors also shape how leadership practices affect safety culture (Kalteh, et al., 2022) (Zohar, 2002), making it most effective to study the impact of EL on safety culture within a specific industry. It is also necessary to do empirical research on how safety culture affects safety performance. Consequently, the study's research questions are:

RQ1: What is the mechanism through which empowering leadership impacts safety culture?

RQ2: Does safety culture enhance safety performance?

The study's foundation in social exchange theory (Blau, 1964) identifies organizational commitment as a mediator between EL and safety culture. Empowering leadership shapes safety-oriented behaviors through observational learning, showing how social learning theory (Bandura, 1977) works. The study's data comes from 203 employees in the gas and in oil sector. The hypothesis was validated by the study's findings. This study indicates a positive correlation between safety culture and safety performance and justifies the mediating function of organizational commitment in the EL-safety culture link. The study is the first to confirm that EL has a good effect on safety culture in the Indian gas and oil sector, which has particular safety issues such as a high accident rate, poor enforcement of safety laws, and low employee safety knowledge (Bhattacharya & Tang, 2013) (Kumar & Kumar, 2014)**.**

The rest of the paper follows this structure: First, it presents the literature review and elaborates on the hypothesis development sections. Second, the paper presents the data collection, methodology choice, and results of the data analysis. The paper concludes with a discussion of the results and their theoretical and practical implications, followed by identifying the study's shortcomings and the area that needs more investigation

2. REVIEW OF THE LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 The study's theoretical framework

Bandura's SLT forms the theoretical underpinning of the study. SLT suggests that individuals learn by imitating others, especially their role models (Bandura, 1977). SLT has been used to explain the cascading effect of leadership styles, including empowering leadership, on individual-level behavior (Sharma & Kirkman, 2015). Autonomy is a basic human need (Deci & Ryan, 2000). Individuals will likely view empowering leaders as role models and imitate their values and behaviors. The sustained imitation of the values and behaviors of leaders by subordinates is likely to lead to the creation of an appropriate culture, defined as shared values and shared ways of thinking and doing. In the context of this study, extending this argument, the study hypothesizes that role modeling of empowering leaders' values and behaviors will lead to improved perceptions of safety culture. These shared perceptions of safety culture will, in turn, lead to improved shared performance. SLT has been utilized in previous research to explain how empowered leadership affects better task performance (Byun, et al., 2020). With supporting hypotheses, SLT has also been used to hypothesize collaborative culture's role in mediating servant leadership's impact on team performance (Nauman, et al., 2022).

2.2 Building Safety Culture and Leadership

Empowering leadership refers to sharing power and responsibilities, allowing for independent decisions, and promoting proactive behavior (Flin, et al., 2002). Empowering leadership helps to promote autonomy to employees, persuading them further to become actively involved in their work (Amundsen & Martinsen, 2014) (Tuckey, et al., 2012). This autonomy is vital in extreme or hazardous scenarios where leaders may not be immediately available. Hence, empowering leaders is likely to improve a firm's safety culture.

Critical elements of a strong safety culture include a questioning attitude, open communication, and collaborative learning (Insag, 1991). Promoting open communication and teamwork among leaders can significantly improve safety culture (Martínez-Córcoles, et al., 2012). In situations where standard procedures or checklists are not helpful, the capability to make immediate decisions becomes crucial. The successful emergency landing of US Airways Flight 1549 in the Hudson River, for example, serves as evidence of this (Eisen & Savel, 2009). On the other hand, the 2011 Fukushima nuclear disaster warns of the risks associated with restricted autonomy.

The suggested beneficial effect of empowering leadership on safety culture is also supported by existing research. Empowering leadership reduces unsafe behaviors in high-risk environments, such as mining, underscoring the importance of empowerment in such organizations (Chen, et al., 2023). In critical healthcare settings, empowering leadership has been found to bolster patient safety culture by enhancing decision-making and patient care (Armellino, et al., 2010). However, despite the strong conceptual and empirical support for a positive impact of empowering leadership on safety culture, no studies testing the same have been done in an Indian context. Hence, the study proposes the following hypothesis:

Hypothesis 1: There is a favourable correlation between safety culture and empowering leadership.

2.3 Empowering Leadership and Organizational Commitment

Organizational commitment refers to how strongly an individual identifies with and is involved in an organization (Meyer, et al., 1993) (Porter & Smith, 1970). Committed employees are more satisfied, engaged, and compliant with organizational norms (Van Steenbergen & Ellemers, 2009). Empowering leadership has increased employee commitment levels by instilling a sense of responsibility and engagement in team members (Kim & Beehr, 2020). Social exchange theory (SET) (Blau, 1964) provides a theoretical framework for understanding this relationship by suggesting that employees reciprocate the empowerment they receive from their leaders by increasing their commitment to the organization (Johnson, et al., 2010) (Kim & Beehr, 2020). The positive relationship between empowering leadership and the organizational commitment has been validated in multiple settings, such as healthcare (Laschinger, 2008) (Raziq, et al., 2024) (Al Otaibi, et al., 2023) Rand mining (Maré, 2007). Hence, in line with existing research, the study proposes that:

Hypothesis 2: Organizational commitment is favorably correlated with empowered leadership. 2.4 Organizational Commitment and Safety Culture

Employees who feel connected to their organization are more likely to prioritize safety and follow safety regulations because they care about the organization's welfare and the people they work with (Mearns & Reader, 2008) (Vredenburgh, 2002). This deep sense of commitment encourages participation in work tasks and a willingness to put in effort to contribute to the organization's prosperity by promoting a strong safety culture (Meyer & Allen, 1991) (Mowday, et al., 1979) (Reichers, 1985). Besides, deeply committed employees are more inclined to observe and communicate unsafe conditions and events (Einolander, et al., 2018) (Michael, et al., 2005). This finding emphasizes that safety is essential for the organization's long-term prosperity and performance. Hence, organizational commitment is a critical factor influencing an organization's safety culture (Horwitz & Horwitz, 2017) (Wiegmann, et al., 2004).

Empirical research also supports the positive impact of organizational commitment on safety climate, a precursor to safety culture (Zohar, 2011). Various research has identified a positive relationship between organizational commitment and safety culture (Horwitz & Horwitz, 2017) (Noh & Kim, 2021) (Im & Park, 2018). In contrast, strong employee-management relationships enhance organizational commitment (Novak, et al., 2017), fostering a proactive maintenance culture and better safety outcomes.

Hence, based on both conceptual and empirical grounds, the study proposes the following hypothesis:

Hypothesis 3: Organizational commitment will be positively related to safety culture.

2.5 Mediating impact of organizational commitment

According to SET, social behavior arises from a process of exchange in which individuals evaluate the potential advantages and disadvantages of the social exchange (Blau, 1964). In an organizational context, when employees perceive that their leaders are empowering them—through delegating authority, fostering self-determination, and encouraging participation—they are likely to reciprocate by increasing their commitment to the organization (Hendryadi, et al., 2019) (Al Otaibi, et al., 2023); (Stander & Rothmann, 2008). Thus, SET suggests that empowering leadership will lead to organizational commitment.

Empowered leaders are more likely to develop a safety culture by encouraging essential characteristics of a safety culture, such as questioning, open communication, and collaborative learning (Insag, 1991). Dedicated personnel, motivated by loyalty and a sense of belonging to the firm, are more likely to take activities to support and improve safety standards (Horwitz & Horwitz, 2017) (Trinchero, et al., 2019). They understand the value of a strong safety culture for the organization's long-term viability and success, and they are more inclined to report harmful circumstances or actions, resulting in a safer working environment (Wiegmann, et al., 2004). As a result, organizational commitment may mediate between empowering leadership and the safety culture. Therefore, the study proposes that:

Hypothesis 4: Safety Culture, Empowering Leadership, and Organizational Commitment: A Mediated Relationship.

2.6 Safety culture and Safety performance

Fostering a strong safety culture encourages behaviors related to safety, such as reporting hazards, following safety protocols, and actively engaging in safety initiatives, all of which contribute to improving an organization's overall safety performance (Clarke, 1999) (Fernández-Muñiz, et al., 2017) (Martínez-Córcoles, et al., 2014) (Vinodkumar & Bhasi, 2010). A strong safety culture ensures that employees comply with safety regulations, policies, and procedures and encourages active participation in safety-related activities, such as training, safety awareness programs, and competitions (Griffin & Neal, 2000) (Khasanah, et al., 2019). Active involvement is essential because it directly impacts safety performance measures such as near misses and injury rates (Hon, et al., 2014). Thus, a robust safety culture is probably linked to enhanced safety performance.

Empirical research also supports the positive linkage between safety culture and safety performance. A large-scale study conducted by the Institution of Occupational Safety and Health (IOSH) 2009 found that higher safety culture levels, particularly in hazardous environments, correlate with greater safety awareness and better safety performance (Wadsworth & Smith, 2009). Similarly, research in high-reliability organizations has shown that a strong safety culture leads to higher safety participation and compliance levels while reducing risky behaviors (De Castro Urra, 2017). Based on these discussions, this study proposes the following hypothesis:

Hypothesis 5: Safety culture will be positively related to safety performance.

2.7 Empowering leadership and safety performance

Leadership empowerment leads to greater trust among leaders and subordinates and helps develop a sense of responsibility and accountability among subordinates. When employees perceive that their leaders trust and support them, their motivation to comply with safety protocols and engage in proactive safety behaviors increases (Gill & Nazim, 2024) (Kong, et al., 2018) (Muchiri, et al., 2019). This trust also enhances the flow of safety-related information and communication, enabling more

effective hazard identification and reporting and contributing to a robust safety management system and improved safety performance (Hechanova-Alampay & Beehr, 2001) (Martínez-Córcoles, et al., 2013). Empowering leadership encourages people to proactively identify and address safety issues by instilling a sense of duty and accountability (Gracia, et al., 2020). Existing research highlights the positive impact of safety leadership on safety compliance, safety participation, and reductions in injury rates and risky behaviors across various high-risk industries (Kim & Gausdal, 2017) (Mattson Molnar, et al., 2019) (Ta, et al., 2022) (Zhao, et al., 2022). Research has indicated a favorable correlation between safety performance and leadership styles (Khan, et al., 2018) (Khasanah, et al., 2019) (Maharani, et al., 2019) (Yang, et al., 2009).

Although a large body of evidence shows the favorable impacts of empowering leadership on safety performance, little research addresses the impact of empowering leadership on safety performance in high-risk industries. By defining responsibilities and following protocols, empowered leadership can enhance safety performance in high-risk environments (Martínez-Córcoles, et al., 2014). This study tries to verify these theories by building on prior studies and proposes the following:

Hypothesis 6: Safety performance will be positively correlated with empowered leadership.

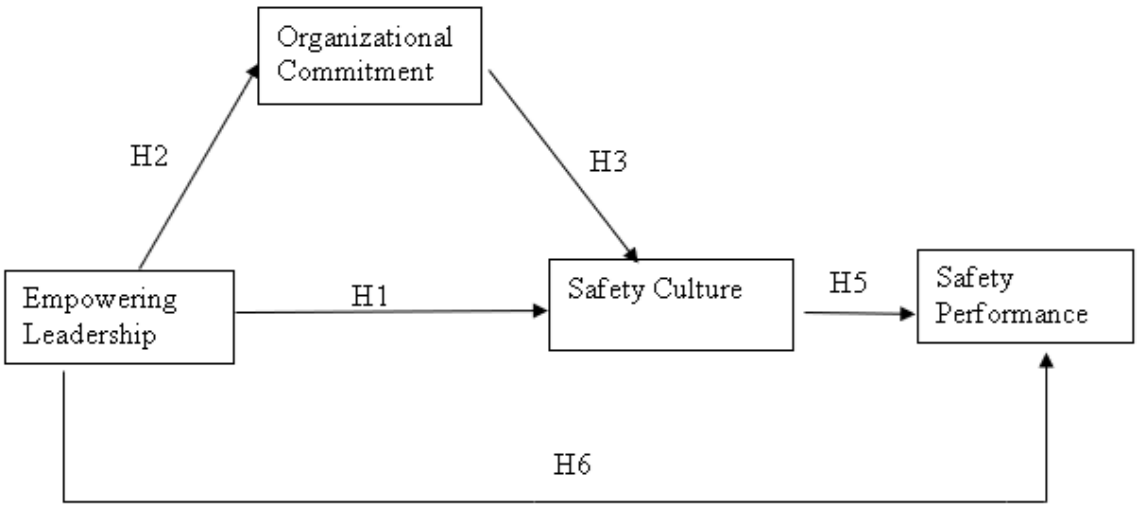

Figure I, Theoretical Model for the Study

3. RESEARCH METHOD

3.1 Sample Selection

This study focuses on the oil and gas sector, a high-risk industry known for its hazardous processes and significant accident rates (Mihailidou, et al., 2012). Hence, the study surveyed respondents from oil and gas organizations. The study collected data from 203 respondents. The sample size was significantly higher than the minimum sample size of 155, estimated using the inverse square root method, a scientifically validated method for sample size calculation (Kock & Hadaya, 2018). The study collected data online through a third-party firm and conducted periodic checks to ensure its integrity. Table I below displays the respondents' demographic characteristics.

Table-I Respondents Demographic Table

Variable	Characteristic	Number	Percent
Gender	Male	155	76
	Female	48	24
Qualification	Undergraduate	19	9
	Graduate	82	41
	Postgraduate	102	50

Function	Maintenance	74	37
	Operation	106	52
	Technical	23	11
Age	20-30	109	53.69
	31-40	87	42.87
	41-50	7	3.5
Work experience	<5	80	39.40
	6-10	102	50.24
	11-15	19	9.35
	16-20	2	0.1

3.2 Measures

The study utilized previously validated scales for data collection. All data was collected using a 5-point Likert scale. The study includes the questionnaire in Appendix 1

Empowering Leadership: The study used Ahearne et al. (Ahearne, et al., 2005) four-dimensional, 12-item questionnaire. (a) Enhancing the significance of work, (b) encouraging participation in decision-making, (c) expressing confidence in good performance, and (d) granting autonomy from bureaucratic limitations are the dimensions. Researchers have previously used this scale in various studies (Clack, 2017) (Dash & Vohra, 2018) (Zhang & Bartol, 2010) (Zhang & Zhou, 2014).

Organizational Commitment*:* The study measured organizational commitment using a nine-item, unidimensional scale (Mowday et al., 1982). The nine-item scale is an abbreviated version of Mowday et al.'s (1979) 15-item scale, that was formed by removing negatively worded items (Mowday, et al., 1982). Extensive prior research supports its use (Eisenberger, et al., 1990) (Horwitz & Horwitz, 2017) (Mete, et al., 2016).

Safety Culture: This study used the safety culture measurement scale developed by Antonsen (2017), which is widely utilized across various industries. The scale encompasses four dimensions: (a) Managers' prioritization of safety, (b) Safety communication, (c) Individual risk assessment, and (d) Supportive environment and safety procedures.

Safety Performance: Safety performance was measured using a two-dimensional scale developed by Neal and Griffin (2006) (Neal & Griffin, 2006). The two dimensions are Safety compliance and Safety participation.

3.3 Control Variables

Drawing upon earlier studies (Gorzin & Sadeghi, 2021) (Mat Isa, et al., 2021), this study used age, gender, qualification, work experience, and functional area as control variables. The coding schema was: gender (male coded as 1 and female 2); age brackets (20-30 coded as 1, 31-40 as 2, 41-50 as 3, and >50 as 4); work experience (<5 years coded as 1, 6-10 years as 2, 11-15 years as 3, 16-20 years as 4, >20 years as 5); and qualifications (doctorate coded as 1, postgraduate as 2, graduate as 3, and undergraduate as 4).

3.4 Common Method Variance

The researcher collected responses via self-reported questionnaires, which can introduce common method variance (CMV) due to measurement errors when the same participant rates all items (Chang, et al., 2020) (Lindell & Whitney, 2001)) (Podsakoff, et al., 2003). Common method bias (CMV) could result in systematic measurement inaccuracies, impact scale reliability, and generate inaccurate correlation estimates (Jakobsen & Jensen, 2015) (Malhotra, et al., 2006) (Podsakoff, et al., 2003) (Williams, et al., 1989). The study effectively handled the CMV by applying ex-ante and ex-post strategies to mitigate its impact. The study clearly defined its objectives, ensured anonymity, maintained the integrity of the original questions, and strategically intermixed the measures to foster a sense of psychological detachment to counteract any biases in the research design and execution process. Furthermore, the analysis using Harman's single-factor test indicated that 46. 2 % of the variance could be attributed to a factor, suggesting that the influence of common method variance (CMV) was not substantial enough to surpass the critical 50 % threshold specified by prior research (Kock, 2021). The study used the unmeasured latent variable and correlation-based VIF (Kock, 2015) technique. The differences in R-square values with and without the marker were below the 10% threshold, indicating a limited impact of CMV. The study found that VIF values of the random variable with each latent variable lie between 1 and 1.1, well below the threshold of 3.3, indicating no CMV.

4. RESULTS

4.1 Normality Check

With skewness values less than -1 and kurtosis values more than 1 for every construct, the data were not normally distributed, according to the skewness and kurtosis values (Hair, et al., 2017). Hence, PLS-SEM was used to analyze results as it is a distribution-free technique of analysis that is robust to deviations from normality (Hair, et al., 2017).

4.2 Model test

The study tested the path model in two steps (Hair, et al., 2019). First, the measurement model's validity and reliability are verified. The structural model then put the proposed connections between the components to the test.

4.2.1 Measurement Model

The study evaluated the internal consistency of the scales using Composite Reliability (CR) and Cronbach's alpha. All constructs demonstrated high internal consistency with Cronbach's alpha and composite reliability values exceeding the threshold of 0.70 (Table II) (Bagozzi & Yi, 1988) (Hair, et al., 2014). Similarly, all indicators had outer loadings above 0.70 (Table III), suggesting good indicator reliability (Wong, 2013). Convergent validity was assessed using AVE values and was higher than the threshold value 0.50 (Table II) for all constructs (Bagozzi & Yi, 1988) (Hair, et al., 2014) (Fornell & Larcker, 1981).

Table-II Composite reliability table

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	The average variance extracted (AVE)
EL	0.953	0.954	0.959	0.662
EL_A	0.846	0.849	0.907	0.765
EL_DM	0.896	0.899	0.935	0.827
EL_HP	0.873	0.873	0.922	0.798
EL_M	0.916	0.919	0.947	0.857
OC	0.948	0.949	0.957	0.734
SC	0.962	0.963	0.966	0.688
SC_COM	0.883	0.884	0.928	0.811
SC_MP	0.868	0.869	0.919	0.791
SC_RA	0.835	0.840	0.901	0.753
SC_SE	0.913	0.914	0.939	0.793
SP	0.923	0.924	0.940	0.722
SP_SC	0.844	0.848	0.906	0.762
SP_SP	0.896	0.896	0.935	0.828

Table-III Outer Loading matrix

	EL_A	EL_DM	EL_HP	EL_M	OC	SC_COM	SC_MP	SC_RA	SC_SE	SP_SC	SP_SP
EL_A1	0.858										
EL_A2	0.893										
EL_A3	0.873										

EL_DM1	0.923								
EL_DM2	0.918								
EL_DM3	0.887								
EL_HP1		0.860							
EL_HP2		0.902							
EL_HP3		0.916							
EL_M1			0.913						
EL_M2			0.932						
EL_M3			0.932						
OC1				0.864					
OC2				0.857					
OC3				0.887					
OC4				0.858					
OC5				0.870					
OC7				0.835					
OC8				0.846					
OC9				0.835					
SC_COM1					0.880				
SC_COM2					0.895				
SC_COM3					0.925				
SC_MP1						0.880			
SC_MP2						0.872			
SC_MP3						0.915			
SC_RA1							0.823		
SC_RA2							0.908		
SC_RA3							0.871		
SC_SE1								0.906	
SC_SE2								0.878	

SC_SE3	0.885		
SC_SE4	0.892		
SP_SC1		0.907	
SP_SC2		0.845	
SP_SC3		0.866	
SP_SP1			0.928
SP_SP2			0.891
SP_SP3			0.910

The study assessed discriminant validity (DV) using a CFA-based correlation technique, which compares construct correlations against intervals (Rönkkö & Cho, 2022). Correlations above 0.90 but below 1 suggest a moderate issue with discriminant validity. All lower-order construct pairs had CFA-based correlations below the 0.90 thresholds, although a few pairs had marginal issues with DV with a correlation between 0.80-0.90 (Table IV). The study analyzed cross-loadings and removed indicators with higher loadings on other constructs than on their hypothesized constructs to resolve high correlation issues (Chin, 1998) (Farrell, 2010). Based on this analysis, the study excluded OC6.

Table-IV CFA based Correlation matrix

	EL_A	EL_DM	EL_HP	EL_M	OC	SC_COM	SC_MP	SC_RA	SC_SE	SP_SC	SP_SP
EL_A	0.875										
EL_DM	0.748	0.910									
EL_HP	0.798	0.811	0.893								
EL_M	0.718	0.661	0.795	0.926							
OC	0.850	0.831	0.881	0.765	0.857						
SC_COM	0.757	0.780	0.840	0.752	0.837	0.900					
SC_MP	0.805	0.793	0.824	0.776	0.858	0.827	0.889				
SC_RA	0.737	0.833	0.802	0.709	0.840	0.859	0.815	0.868			
SC_SE	0.765	0.756	0.790	0.697	0.821	0.828	0.784	0.876	0.891		
SP_SC	0.762	0.784	0.808	0.757	0.868	0.867	0.838	0.815	0.753	0.873	
SP_SP	0.733	0.803	0.811	0.770	0.808	0.880	0.805	0.878	0.876	0.819	0.910

4.2.2 Higher order measurement model

The study used composite reliability and Cronbach's alpha, AVE, and CFA-based correlation, respectively, to evaluate the higher-order constructs' internal consistency, convergent validity, and divergent validity. AVE values were over 0.50, while Cronbach alpha and composite reliability for all components were higher than the cutoff value of 0.70 (Table V).

Table -V Composite reliability table, higher order

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EL	0.925	0.927	0.947	0.817
OC	0.948	0.949	0.957	0.734

SC	0.952	0.952	0.965	0.874
SP	0.900	0.900	0.952	0.909

Table VI presents the CFA-based correlations between various constructs. A moderate discriminant validity issue exists with three pairs of higher-order constructs as the CFA-based correlation exceeds the 0.9 limit. Based on the arguments of Ronkko and Cho (2022) (Rönkkö & Cho, 2022), who argued that a high correlation of 0.99 between two constructs (e.g., biological sex and gender identity) does not indicate redundancy, we decided to retain all the constructs and be prudent and careful while interpreting results.

Table-VI CFA based Correlation matrix

	EL	OC	SC	SP
OC	**0.921**			
SC	**0.920**	0.898		
SP	0.904	0.879	**0.942**	

4.2.3 Structural Model Test

The connections between latent variables are depicted in the structural model. The evaluation of the structural model enables the assessment of the significance of path coefficients and explanatory power through R^2 (Sarstedt & Cheah, 2019). The structural model is tested in PLS-SEM by bootstrapping the initial model (Hair, et al., 2014) (Hair Jr, et al., 2021) (Wong, 2013). The study used SmartPLS4 to test the structural model. **Table VII** summarizes the data on all statistically significant path coefficients, while **Table VIII** presents the data on the R-square explained. The mediation effect was assessed based on the magnitude of indirect effects. (Table VII). The study found that all hypotheses were supported, as summarized in Table IX. Figure II below displays the path model. Path Coefficients and Loadings with p-values for Inner and Outer Model.

Figure II, Structural Model with path coefficients

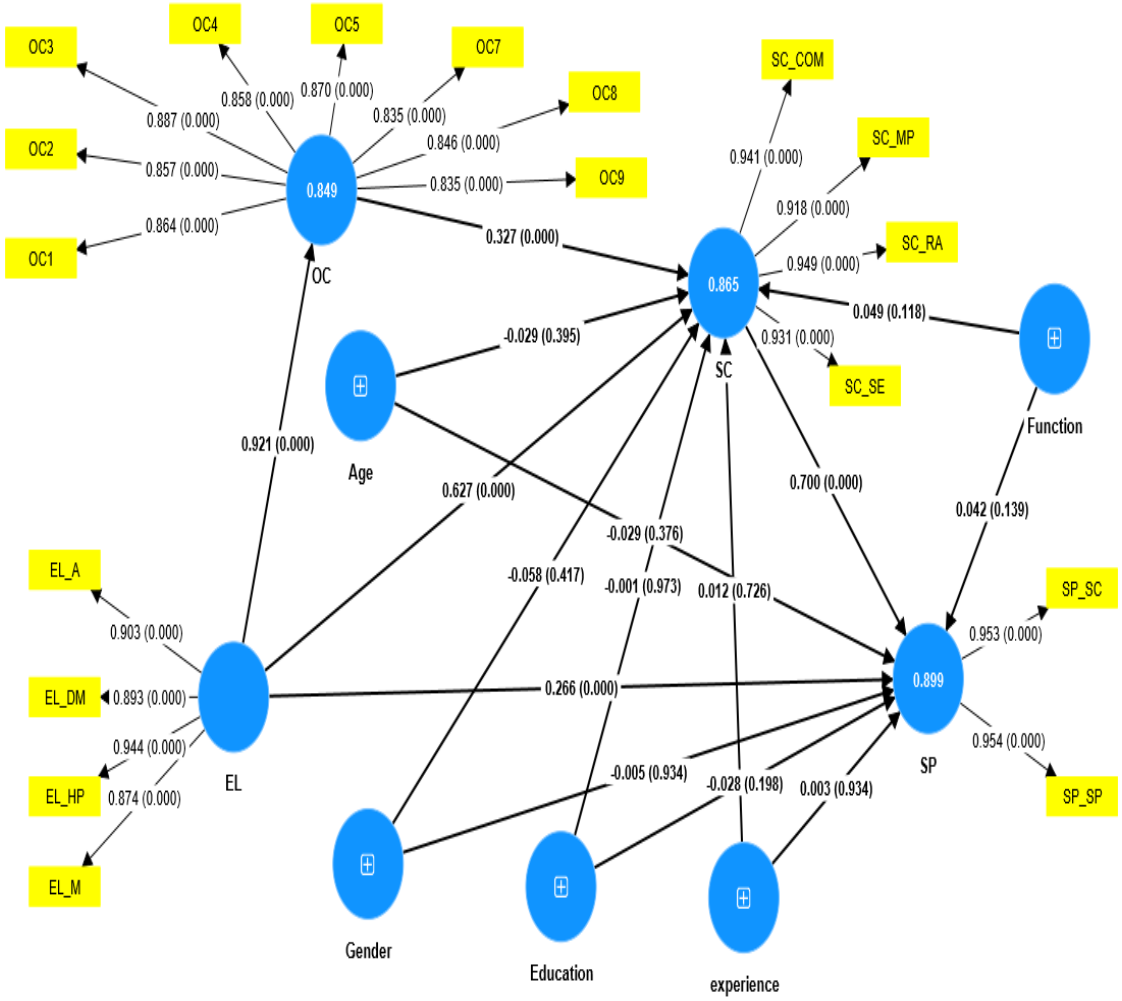

Table-VII Magnitude and significance of path coefficients and various effects

	Path coefficients		**Total indirect effects**		**Specific Indirect Effects**		**Total Effects**	
	Original sample (O)	P values	Original sample (O)	P values	Original sample (O)	P values	Original sample (O)	P values
EL -> OC	0.921	0.000	-	-			0.921	0.000
EL -> SC	0.627	0.000	0.301	0.000			0.928	0.000
EL -> SP	0.266	0.000	0.650	0.000			0.916	0.000
OC -> SC	0.327	0.000	-	-			0.327	0.000
SC -> SP	0.700	0.000	-	-			0.700	0.000
OC -> SP	-	-	0.229	0.000			0.229	0.000
EL -> SC -> SP					0.439	0.000		

EL -> OC -> SC	0.301	0.000
EL -> OC -> SC -> SP	0.211	0.000
OC -> SC -> SP	0.229	0.000

All the R square values between the constructs range from 0.8 to 0.9. The path coefficients indicate that all hypothesized relationships were supported. Table IX summarizes the results**.** The mediation effects (ratio of indirect effect to total effect) were 32.4% for OC in the EL-OC-SC relationship, 47.9% for SC in the EL-SC-SP relationship, and 23.0% for SC in the OC-SC-SP

relationship. The model fit indices – SRMR (0.042) and NFI (0.841) –were within acceptable thresholds, indicating acceptable model fit. The analysis of control variables (age, gender, education, work experience, and functional area) revealed that none had a significant effect on Safety Culture or Safety Performance, as indicated by non-significant p-values and T-statistics below 1.96.

Table-VIII R square

	R-square	**R-square adjusted**
OC	0.849	0.848
SC	0.865	0.861
SP	0.899	0.896

Table- IX Hypotheses test result summary

Hypotheses		**Results**				
		Path coefficient	Mediation	T statistic	P value	Support
Hypothesis 1:	EL-SC	0.627	-	8.629	0.000	Supported
Hypothesis2:	EL-OC	0.921	-	52.482	0.000	Supported
Hypothesis 3:	OC-SC	0.327	-	4.549	0.000	Supported
Hypothesis 4:	EL-OC-SC	0.301	(32.4%) *	4.48	0.000	Supported
Hypothesis 5:	SC-SP	0.70	-	10.937	0.000	Supported
Hypothesis 6:	EL-SP	0.266	-	3.834	0.000	Supported

(*) Represents mediation effect

5. DISCUSSION

According to the research, encouraging empowering leadership enhances safety performance and creates a safety culture. Furthermore, it suggested that the connection between safety culture and empowering leadership is mediated by organizational commitment. The hypothesis was supported by the analysis. Furthermore, the results show a mediating influence of safety culture in the link between empowering leadership and safety performance as well as a serial mediating function of organizational commitment and safety culture between empowering leadership and safety performance.

The study contributes to the literature by identifying how empowering leadership influences safety culture. This finding is important because empowering leadership is crucial to a safety culture (Lundell & Marcham, 2018) (Grinerud, et al., 2021) (Nasim, et al., 2023). Additional contributions to the literature include validating the empowering leadership-safety culture relationship in the Indian oil and gas industry context and verifying the positive relationship between safety culture and safety performance.

The mediating effect of organizational commitment adds to existing literature that has identified it as a critical mechanism through which empowering leadership exerts its influence on organizational behaviors (Alfaris & Zakiy, 2021) (Limon,

2022). Given that leadership styles share a common core (Banks et al., 2018), exploring whether organizational commitment similarly mediates the effects of other positive leadership styles, such as servant or transformational leadership, on safety culture and performance would be valuable. The correlation coefficient (0.91) between empowering leadership and safety culture is higher than in prior studies. This evidence suggests that industry setting (Kalteh, et al., 2022) and national culture (Yorio, et al., 2019) influence the relationship between empowering leadership and safety culture. Future studies may investigate the same topic. The study results also help expand the explanatory scope of SET beyond job satisfaction and performance (Huang, et al., 2016). The study provides evidence for the effectiveness of SLT and highlights how leadership behaviors are emulated and acquired in various organizational settings. It also discusses how training programs rooted in SLT principles can be improved to bolster safety culture and overall performance.

The study found a strong correlation between safety culture and safety performance, reinforcing previous studies' conclusions that consistently linked these constructs (Kalteh, et al., 2022) (Martínez-Córcoles, et al., 2012) (Supardi & Chandrarin, 2021). The strong correlation emphasizes the significant role of developing a strong safety culture for achieving excellent safety performance. The findings contribute to existing research on leadership styles and safety performance by highlighting the beneficial influence of empowering leadership on safety performance. Although not hypothesized, the study found supporting evidence for this relationship's sequential mediating roles of safety culture and organizational commitment. These findings contribute to the growing body of literature on the mediating mechanisms between leadership styles and safety outcomes, which has previously identified factors like mindful organizing (Gracia, et al., 2020) and role clarity (Martínez-Córcoles, et al., 2014) as essential mediators. The study also finds support for two additional mediation mechanisms: a) how empowering leadership influences safety performance through the mediation of safety culture and b) how organizational commitment influences safety performance through safety culture. These findings open a new wing for future research.

Implication for practice

Poor safety performance not only disrupts operations and incurs financial costs but also attracts significant regulatory penalties and reputational damage, as seen in high-profile incidents like the Fukushima nuclear disaster (Hayashi & Hughes, 2013) (Anon., 2021). The findings of this study offer critical guidance for organizations, particularly those in high-risk sectors such as oil and gas, where effective safety management is vital. First, organizations can help managers develop empowering leaders through structured leadership training focusing on conflict resolution, effective communication, and employee empowerment (Kirkman, et al., 2020). Organizations can also create a culture of empowerment by designing roles with increased task variety, which has been shown to enhance the impact of empowering leadership on safety behaviors (Hao, et al., 2018).

Second, fostering organizational commitment is crucial for strengthening safety culture. Organizations can aim to increase employee commitment by ensuring job security and designing challenging job roles that offer a sense of purpose. Reducing role ambiguity and conflict also increases organizational commitment (Mathieu & Zajac, 1990)). Third, organizations can improve safety performance by enhancing safety culture components such as improving psychosocial work conditions, strengthening safety communication, demonstrating management commitment, and enhancing safety motivation and knowledge (Michael, et al., 2005) (Naji, et al., 2021). Psychosocial work conditions can be improved by disseminating safety information, encouraging employees to participate in safety issues and initiatives, and recognizing the safety contribution of individuals and groups. Safety communication can be strengthened by sharing safety goals, policies, good practices, instructions, operating experiences, and safety-related information through various media such as local area networks, meetings, banners, or posters. Management can demonstrate safety commitment by self-demonstration, allocation of resources, and creating a climate of zero tolerance for safety deviation. Safety motivation can be enhanced by implementing safety rewards, linking financial incentives to safety performance, and benchmarking safety performance across various organizational units and groups (Godwin, 2017). Knowledge can be enhanced by providing safety training and assessment.

6. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The present study employs a self-reported cross-sectional design, which is cost-effective and easy to execute (Setia, 2016). However, this design limits the ability to infer causality and interpret associations clearly, and it is vulnerable to non-response bias (Solem, 2015) (Wang & Cheng, 2020). As it assesses leadership's impact on safety culture and performance at a single point in time, it cannot capture long-term effects or dynamic changes in the variables. While efficient and financially viable, using self-reported responses (Demetriou, et al., 2015) is prone to social desirability, response bias, and clarity issues (Northrup, 1997) (Spector, 1994). Also, self-reported, cross-sectional studies are more prone to CMB. Future studies can adopt longitudinal or experimental designs using multi-source data to reduce CMB, better establish causality, and track changes over time.

Another limitation of the study is the unexpectedly high correlations among variables, leading to concerns about discriminant validity. The correlations could be due to CMB arising from the single-source cross-sectional design. Subjective safety performance measures might have been conflated with safety culture, which could explain the high correlation. Collecting objective data, such as accident reports or safety compliance records, could enhance the robustness of future findings. Thirdly, this study conceptualizes leadership as an individual-level construct due to limited access to respondents. Future

studies can treat empowering leadership as an individual-level construct rather than a multilevel one in line with existing studies (Ahearne, et al., 2005) (Gracia, et al., 2020) (Khasanah, et al., 2019). Fourthly, the study was conducted only for employees in the oil and gas industry, leading to issues of generalizability. Future studies can use respondents from multiple industries while controlling for the industry-specific effects. The relationship between the variables holds under certain boundary conditions (Gonzalez-Mulé & Aguinis, 2018). Specific boundary conditions, such as personality traits (e.g., agreeableness, conscientiousness), can clarify employee compliance and adherence to safety rules that may be explored in future studies.

7. CONCLUSION

This study looked at how employee views of safety culture and safety performance in the high-risk oil and gas industry are influenced by empowered leadership. Based on social exchange theory, the study suggested that organizational commitment mediates the relationship between safety culture and empowering leadership. Based on analysis of data collected from 203 employees, the findings supported a partial mediation hypothesis. Furthermore, the study found that safety culture and empowering leadership influence safety performance positively. Additional mediation mechanisms involving a) safety culture and organizational commitment for empowering leadership-safety performance, b) safety culture for empowering leadership-safety performance, and c) safety culture for organizational commitment-safety performance relationships were found supported.

These results offer important practical implications for high-risk industries, where improving safety performance is critical to operational success and regulatory compliance. Empowering leadership by fostering a strong safety culture can enhance employee commitment and safety performance, ultimately benefiting the organization's overall performance and reputation. The use of single-source, self-reported, cross-sectional data collected from a single industry (oil and gas) limits the generalizability of the study findings. Future studies can use more sophisticated data collection techniques to resolve these issues.

Declaration

Funding Statement

This research received no specific grant from any funding agency.

REFERENCES

[1] Ahearne, M., Mathieu, J. & Rapp, . A., 2005. To empower or not to empower your sales force? An empirical examination of the influence of leadership empowerment behavior on customer satisfaction and performance. The Journal of Applied Psychology, 90(5), p. 945–955.

[2] Al Otaibi, . S. M. et al., 2023. The role of empowering leadership and psychological empowerment on nurses' work engagement and affective commitment. International Journal of Organizational Analysis, 31(6), p. 2536–2560.

[3] Alfaris, B. & Zakiy, M., 2021. Affective commitment as a mediation variables effect of empowering leadership on employee creativity. Jurnal Ekonomi Dan Bisnis Islam (Journal of Islamic Economics and Business), 7(2), p. 250.

[4] Amundsen, S. & Martinsen, . Ø. L., 2014. Empowering leadership: Construct clarification, conceptualization, and validation of a new scale. The Leadership Quarterly, 25(3), p. 487–511.

[5] Anon., 2021. IEA. [Online] Available at: from https://www.iea.org/reports/global-energy-review-2021

[6] Armellino, D., Quinn Griffin, M. T. & Fitzpatrick, . J. J., 2010. Structural empowerment and patient safety culture among registered nurses working in adult critical care units: RNs working in adult critical care units. Journal of Nursing Management, 18(7), p. 796–803.

[7] Bagozzi, R. P. & Yi, . Y., 1988. On the evaluation of structuANTOral equation models. Journal of the Academy of Marketing Science, 16(1), p. 74–94.

[8] Bandura, A., 1977. Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), p. 191–215.

[9] Bhattacharya, . S. & Tang, . L., 2013. Middle managers' role in safeguarding OHS: The case of the shipping industry. Safety Science, 51(1), p. 63–68.

[10] Blau, P. M., 1964. Social Forces. a Scientific Medium of Social Study and Interpretation, 44(1), p. 128–128.

[11] Byun, . G., Lee, S., Karau, S. J. & Dai, . Y., 2020. The trickle-down effect of empowering leadership: a boundary condition of performance pressure. Leadership & Organization Development Journal, 41(3), p. 399–414.

[12] Chang, S.-J., van Witteloostuijn, A. & Eden, . L., 2020. Common method variance in international business research. In Research Methods in International Business . Springer International Publishing, p. 385–398.

[13] Chen, . T., Hu, W. & Li, . H., 2023. The effect of empowering leadership on miners' unsafe behavior: a cross-level chain mediation model. International Journal of Occupational Safety and Ergonomics: JOSE, 29(4), p. 1345–1357.

[14] Chin, W. W., 1998. The partial least squares approach to structural equation modeling. Modern Methods for Business Research, 295(2), p. 295–336.

[15] Clack, . K., 2017. Empowering leadership and safety behavior in extreme work environments. (Doctoral dissertation).

[16] Clarke, . S., 1999. Perceptions of organizational safety: implications for the development of safety culture. Journal of Organizational Behavior, 20(2), p. 185–198.

[17] Cooper, . P. D., 2000. Towards a model of safety culture. Safety Science, 36(2), p. 111–136.

[18] Dash, . S. S. & Vohra, N., 2018. The leadership of the school principal: Impact on teachers' job crafting, alienation, and commitment. Management Research Review.

[19] De Castro Urra, . F. B. L., 2017. Safety culture assessment in high-reliability organizations: the use of questionnaires in the nuclear industry.

[20] Deci, . E. L. & Ryan, . R. M., 2000. The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), p. 227–268.

[21] Demetriou, . C., Ozer, B. U. & Essau, C. A., 2015. Self-report questionnaires. In The Encyclopedia of Clinical Psychology. Wiley, p. 1–6).

[22] Einolander, J., Kantola, . J., Vanharanta, H. & Markopoulos, E., 2018. Safety culture and collective commitment in organizational context.. In Advances in Intelligent Systems and Computing. Springer International Publishing, p. 148–159.

[23] Eisenberger, R., Fasolo, P. & Davis-LaMastro, . V., 1990. Perceived organizational support and employee diligence, commitment, and innovation. The Journal of Applied Psychology, 75(1), p. 51–59.

[24] Eisen, L. A. & Savel, R. H., 2009. What went right: lessons for the intensivist from the crew of US Airways Flight 1549. Chest, 136(3), p. 910–917.

[25] Farrell, A. M., 2010. Insufficient discriminant validity: A comment on Bove, Pervan, Beatty, and Shiu (2009). Journal of Business Research, 63(3), p. 324–327.

[26] Fernández-Muñiz, B., Montes-Peón, . J. M. & Vázquez-Ordás, C. J., 2017. The role of safety leadership and working conditions in safety performance in process industries. Journal of Loss Prevention in the Process Industries, Volume 50, p. 403–415.

[27] Flin, R., O'Dea, A. & Yule, . S., 2002. Leadership Behaviours for Maximising Safety. SPE International Conference and Exhibition on Health, Safety, Environment, and Sustainability?, pp. SPE-73939.

[28] Flin, R., O'Dea, A. & Yule, . S., 2002. Leadership Behaviours for Maximising Safety. SPE International Conference and Exhibition on Health, Safety, Environment, and Sustainability?, pp. SPE-73939.

[29] Fornell, C. & Larcker, D. F., 1981. Evaluating structural equation models with unobservable variables and measurement error. JMR, Journal of Marketing Research, Volume 39.

[30] Gill, . S. H. & Nazim, M., 2024. The impact of interpersonal value facets on safety culture: The mediating role of safety caring. Bulletin of Business and Economics (BBE), Volume 2, p. 270–281.

[31] Godwin, S. R., 2017. Offshore Oil and Gas Industry Safety Culture: Implications for Commercial Transportation Safety Regulation. TR News, Volume 308).

[32] Gonzalez-Mulé, . E. & Aguinis, H., 2018. Advancing theory by assessing boundary conditions with metaregression: A critical review and best-practice recommendations. Journal of Management, 44(6), pp. 2246-2273.

[33] Gorzin, A. & Sadeghi, M., 2021. The relationship between safety culture and some demographic variables of Aboureihan Pharmaceutical Company staff in Tehran. Occupational Hygiene and Health Promotion.

[34] Gracia, . F. J., Tomás, I., Martínez-Córcoles, M. & Peiró, . J. M., 2020. Empowering leadership, mindful organizing and safety performance in a nuclear power plant: A multilevel structural equation model. Safety Science, Volume 123, p. 104542).

[35] Griffin, M. A. & Neal, A., 2000. Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. Journal of Occupational Health Psychology, 5(3), p. 347–358.

[36] Grinerud, K., Aarseth, . W. K. & Robertsen , R., 2021. Leadership strategies, management decisions and safety culture in road transport organizations. Research in Transportation Business & Management, Volume 41.

[37] Hair, et al., 2019. When to use and how to report the results of PLS-SEM. European Business Review, 31(1), p. 2–24.

[38] Hair Jr, . J. et al., 2021. Partial least squares structural equation modeling (PLS-SEM) using R: A workbook (p. 197). Springer Nature..

[39] Hair, . J. F., Hult, G. T. M., Ringle, . C. M. & Sarstedt, M., 2017. Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).. Sage Publications Inc..

[40] Hair, . J., Hult, T., Ringle, C. & Sarstedt, M., 2014. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).. Sage Publications, Inc..

[41] Hao, . P., He, W. & Long, L.-R., 2018. Why and when empowering leadership has different effects on employee work performance: The pivotal roles of passion for work and role breadth self-efficacy. Journal of Leadership & Organizational Studies, 25(1), p. 85–100.

[42] Hayashi, M. & Hughes, L., 2013. The Fukushima nuclear accident and its effect on global energy security. Energy Policy, Volume 59, p. 102–111.

[43] Hechanova-Alampay, . R. & Beehr, T. A., 2001. Empowerment, span of control, and safety performance in work teams after workforce reduction. Journal of Occupational Health Psychology, 6(4), p. 275–282.

[44] Hendryadi, Suratna, Suryani & Purwanto, B., 2019. Bureaucratic culture, empowering leadership, affective commitment, and knowledge sharing behavior in Indonesian government public services. Cogent Business & Management, 6(1), p. 1680099.

[45] Hon, C. K. H., Chan, . A. P. C. & Yam, M. C. H., 2014. Relationships between safety climate and safety performance of building repair, maintenance, minor alteration, and addition (RMAA) works. Safety Science, Volume 65, p. 10–19.

[46] Horwitz, S. K. & Horwitz, . I. B., 2017. The effects of organizational commitment and structural empowerment on patient safety culture: An analysis of a physician cohort. Journal of Health Organization and Management, 31(1), p. 10–27.

[47] Horwitz, S. K. & Horwitz, . I. B., 2017. The effects of organizational commitment and structural empowerment on patient safety culture: An analysis of a physician cohort. Journal of Health Organization and Management, 31(1), p. 10–27.

[48] Huang, Y.-H.et al., 2016. Beyond safety outcomes: An investigation of the impact of safety climate on job satisfaction, employee engagement and turnover using social exchange theory as the theoretical framework. Applied Ergonomics, Volume 55, p. 248–257.

[49] Im, S. & Park, . M. J., 2018. The effects of patient safety culture perception and organizational commitment on patient safety management activities in general hospital nurses. Journal of Digital Convergence, 16(6), p. 259–270.

[50] Insag, . S. C., 1991. Safety Series No. 75-INSAG. 4..

[51] Jakobsen, M. & Jensen, . R., 2015. Common method bias in public management studies. International Public Management Journal : IPMJ, 18(1), p. 3–30.

[52] Johnson, R. E., Chang, C.-H. (. & Yang, L.-Q., 2010. Commitment and motivation at work: The relevance of employee identity and regulatory focus. Academy of Management Review, 35(2), p. 226–245.

[53] Kalteh, . H. O., Salesi, M. & Mokarami, H., 2022. The mediator role of safety motivation and knowledge between safety culture and safety performance: The results of a sociotechnical and macro ergonomics approach. Work, p. 1–11.

[54] Khan, N., Ahmad, I. & Ilyas, M., 2018. Impact of ethical leadership on organizational safety performance: The mediating role of safety culture and safety consciousness. Ethics & Behavior, 28(8), p. 628–643.

[55] Khasanah, . N., Kholil & Sugiarto, 2019. Analysis the effect of leadership to safety climate, safety culture and safety performance. Asian Journal of Advanced Research and Reports, p. 1–12.

[56] Kim, M. & Beehr, . T. A., 2020. Empowering leadership: leading people to be present through affective organizational commitment?. The International Journal of Human Resource Management, 31(16), p. 2017–2044.

[57] Kim, . T.-E. & Gausdal, A. H., 2017. Leading for safety: A weighted safety leadership model in shipping. Reliability Engineering & System Safety, Volume 165, p. 458–466.

[58] Kirkman, B., Chen, . G. & Mathieu, J., 2020. Improving employee performance by developing empowering leaders & companies. Behavioral Science & Policy, 6(1), p. 23–36.

[59] Kock, . N. & Hadaya, P., 2018. Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods: Sample size in PLS-based SEM. Information Systems Journal, 28(1), p. 227–261.

[60] Kock, . N., 2015. Common method bias in PLS-SEM: A full collinearity assessment approach. International Journal of e-Collaboration (ijec), 11(4), pp. 1-10.

[61] Kock, N., 2021. Harman's single factor test in PLS-SEM: Checking for common method bias. Data Analysis Perspectives Journal, Volume 2, p. 1–6.

[62] Kong, . M., Park, J., Shin, . Y. & Sohn, . Y. W., 2018. The relationship between empowering leadership, directive leadership, safety communication, and safety behavior for Air Force combat pilots: The moderated mediating effect of safety motivation. Journal of The Korean Society for Aviation and Aeronautics, 26(2), pp. 8-30.

[63] Kumar, . S. & Kumar, . P., 2014. Safety culture and its impact on safety performance in oil and gas industry: An empirical investigation in Indian context. Journal of Loss Prevention in the Process Industries, Volume 54, p. 14–24.

[64] Laschinger, . H. K. S., 2008. Effect of empowerment on professional practice environments, work satisfaction, and patient care quality: Further testing the nursing worklife model. Journal of Nursing Care Quality, 23(4), p. 322–330.

[65] Limon, . I., 2022. Relationship between empowering leadership and teachers' job performance: organizational commitment as mediator. Journal of Theoretical Educational Science, 15(1), p. 16–41.

[66] Lindell, M. K. & Whitney, . D. J., 2001). Accounting for common method variance in cross-sectional research designs. The Journal of Applied Psychology, 86(1), p. 114–121.

[67] Lundell, M. A. & Marcham, . C. L., 2018. Leadership's Effect on Safety Culture. Prof. Safety, Volume 63, p. 36–43.

[68] Maharani, D. W. S., Setiawan, . M., Irawanto, D. W. & Rahayu, . M., 2019. Analysis of patient safety culture and work team in educating the effect of leadership style on patients safety performance. Indian Journal of Public Health Research and Development, 10(9), p. 982.

[69] Malhotra, N. K., Kim, S. S. & Patil, A., 2006. Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. Management Science, 52(12), p. 1865–1883.

[70] Maré, . Z., 2007. Leader empowering behaviour, organisational commitment and turnover intention within the gold mining industry (Doctoral dissertation).

[71] Martínez-Córcoles, et al., 2013. Empowering team leadership and safety performance in nuclear power plants: A multilevel approach. Safety Science, 51(1), p. 293–301.

[72] Martínez-Córcoles, et al., 2012. Linking empowering leadership to safety participation in nuclear power plants: a structural equation model. Journal of Safety Research, 43(3), p. 215–221.

[73] Martínez-Córcoles, . M., Gracia, F. J., Tomás, . I. & Peiró, . J. M., 2014. Strengthening safety compliance in nuclear power operations: a role-based approach: Strengthening safety compliance in nuclear power operations. Risk Analysis: An Official Publication of the Society for Risk Analysis, Volume 34, p. 1257–1269..

[74] Mat Isa, A. A. et al., 2021. Impact of employee age and work experience on safety culture at workplace. E3S Web of Conferences, Volume 325, p. 06007.

[75] Mathieu, . J. E. & Zajac, D. M., 1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. Psychological Bulletin, 108(2), p. 171–194..

[76] Mattson Molnar, . M. et al., 2019. Leading for safety: A question of leadership focus. Safety and Health at Work, 10(2), p. 180–187.

[77] Mearns, K. J. & Reader, T., 2008. Organizational support and safety outcomes: An un-investigated relationship?. Safety Science, 46(3), p. 388–397.

[78] Mete, . E. S., Sökmen, . A. & Biyik, Y., 2016. The relationship between organizational commitment, organizational identification, person-organization fit and job satisfaction: A research on IT employees. International Review of Management and Business Research, 5(3).

[79] Meyer, J. P. & Allen, N. J., 1991. A three-component conceptualization of organizational commitment. Human Resource Management Review, 1(1), p. 61–89.

[80] Meyer, . J. P., Allen, N. J. & Smith, C. A., 1993. Commitment to organizations and occupations: Extension and test of a three-component conceptualization. The Journal of Applied Psychology, 78(4), p. 538–551.

[81] Michael, . J. H., Evans, D. D., Jansen, . K. J. & Haight, . J. M., 2005. Management commitment to safety as organizational support: relationships with non-safety outcomes in wood manufacturing employees. Journal of Safety Research, 36(2), p. 171–179.

[82] Mihailidou, . E., Antoniadis, . K. & Assael, M., 2012. The 319 major industrial accidents since 1917. International Review of Chemical Engineering, 4(6), p. 529–540.

[83] Mowday, R. T., Steers, . R. M. & Porter, . L. W., 1979. The measurement of organizational commitment. Journal of Vocational Behavior, 14(2), p. 224–247.

[84] Mowday, R. T., Porter, L. W. & Steers, R. M., 1982. Employee Organization Linkages. Academic Press.

[85] Muchiri, M. K., Mcmurray, A. J., Nkhoma, . M. & Pham, . H. C., 2019. How transformational and empowering leader behaviors enhance workplace safety: A review and research agenda. The Journal of Developing Areas, Volume 1, p. 257–265.

[86] Naji, G. M. A. et al., 2021. Impact of safety culture on safety performance; Mediating role of psychosocial hazard: An integrated modeling approach. International Journal of Environmental Research and Public Health, 18(6).

[87] Nasim, . M. A., Yadav, . R. S., Dash, . S. S. & Bamel, U., 2023. Leadership styles and safety culture-a meta-analytic study. International Journal of Organizational Analysis, 31(7), p. 3233–3250.

[88] Nauman, S., Bhatti, S. H., Imam, . H. & Khan, M. S., 2022. How servant leadership drives project team performance through collaborative culture and knowledge sharing. Project Management Journal, 53(1), p. 17–32.

[89] Neal, A. & Griffin, M. A., 2006. A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels.

[90] Noh, S. & Kim, T. I., 2021. The effects of organizational commitment and perceived patient safety culture on patient safety nursing activities among nurses in comprehensive nursing care units. Journal of Korean Clinical Nursing Research, 27(1), p. 12–22.

[91] Noort, M. C., Reader, . T. W., Shorrock, . S. & Kirwan, . B., 2016. The relationship between national culture and safety culture: Implications for international safety culture assessments. Journal of occupational and organizational psychology, 89(3), pp. 515-538.

[92] Northrup, . D. A., 1997. The problem of the self-report in survey research.

[93] Novak, . J. et al., 2017. Do effective workplace relationships with management and an effective maintenance culture affect organizational safety outcomes?. Reliability Engineering and System Safety Journal.

[94] Ojuola, J., Mostafa, . S. & Mohamed, S., 2020. Investigating the role of leadership in safety outcomes within oil and gas organisations. Safety and Reliability, 39(2), p. 121–133.

[95] Podsakoff, P. M., MacKenzie, . S. B., Lee, J.-Y. & Podsakoff, . N. P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. The Journal of Applied Psychology, 88(5), p. 879–903.

[96] Porter, . L. & Smith, . F. J., 1970. The Etiology of Organizational Commitment. Unpublished Manuscript.

[97] Raziq, M. M. et al., 2024. Empowering leadership, employee organizational commitment and organizational citizenship behavior: the roles of leader authenticity and trust. International Journal of Productivity Management.

[98] Reichers, . A. E., 1985. A review and reconceptualization of organizational commitment. Academy of Management Review, 10(3), p. 465.

[99] Rönkkö, . M. & Cho, E., 2022. An updated guideline for assessing discriminant validity. Organizational Research Methods, 25(1), p. 6–14.

[100] Sarstedt, M. & Cheah, J.-H., 2019. Partial least squares structural equation modeling using SmartPLS: a software review. Journal of Marketing Analytics, 7(3), p. 196–202.

[101] Setia, M. S., 2016. Methodology series module 3: Cross-sectional studies. Indian Journal of Dermatology, 61(3), p. 261–264.

[102] Sharma, P. N. & Kirkman, . B. L., 2015. Leveraging leaders: A literature review and future lines of inquiry for empowering leadership research. Group & Organization Management, 40(2), p. 193–237.

[103] Solem, R. C., 2015. Limitation of a cross-sectional study. American Journal of Orthodontics and Dentofacial Orthopedics: Official Publication of the American Association of Orthodontists, Its Constituent Societies,

and the American Board of Orthodontics. 148(2), p. 205.

[104] Spector, P. E., 1994. Using self-report questionnaires in OB research: A comment on the use of a controversial method. Journal of Organizational Behavior, 15(5), p. 385–392.

[105] Stander, M. W. & Rothmann, S., 2008. The relationship between leadership, job satisfaction and organisational commitment: empirical research. SA Journal of Human Resource Management, 6(3), p. 7–13.

[106] Stough, . J., 2012. Strong Reporting Culture as Stepping Stone to continuously drive Safety performance improvement. SPE Middle East Health, Safety, Security, and Environment Conference and Exhibition, pp. SPE-152566.

[107] Supardi, S. & Chandrarin, G., 2021. Improving Safety Performance through Safety Leadership and Safety Behaviors. ITALIENISCH, 11(2), p. 447–454.

[108] Ta, M. T. D., Kim, . T.-E. & Gausdal, . A. H., 2022. Leadership styles and safety performance in high-risk industries: a systematic review. Safety and Reliability, 41(1), p. 10–44.

[109] Trinchero, . E., Farr-Wharton, . B. & Brunetto, Y., 2019. A social exchange perspective for achieving safety culture in healthcare organizations. International Journal of Public Sector Management, 32(2), p. 142–156.

[110] Tuckey, M. R., Bakker, A. B. & Dollard, M. F., 2012. Empowering leaders optimize working conditions for engagement: a multilevel study. Journal of Occupational Health Psychology, 17(1), p. 15–27.

[111] Van Steenbergen, . E. F. & Ellemers, N., 2009. Feeling committed to work: How specific forms of work-commitment predict work behavior and performance over time. Human Performance, 22(5), p. 410–431.

[112] Vinodkumar, . M. N. & Bhasi, M., 2010. Safety management practices and safety behaviour: assessing the mediating role of safety knowledge and motivation. Accident; Analysis and Prevention, 42(6), p. 2082–2093.

[113] Vredenburgh, A. G., 2002. Organizational safety: Which management practices are most effective in reducing employee injury rates?. Journal of Safety Research, 33(2), p. 259–276.

[114] Wadsworth, E. & Smith, . A., 2009. Safety Culture, Advice and Performance. Policy and Practice in Health and Safety, Volume 1, p. 5–31.

[115] Wang, . X. & Cheng, Z., 2020. Cross-sectional studies: Strengths, weaknesses, and recommendations. Chest, 158(15), p. S65–S71.

[116] Wiegmann, D. A. et al., 2004. Safety culture: An integrative review. The International Journal of Aviation Psychology, 14(2), p. 117–134.

[117] Williams, . L. J., Cote, . J. A. & Buckley, M. R., 1989. Lack of method variance in self-reported affect and perceptions at work: Reality or artifact?. The Journal of Applied Psychology, 74(3), p. 462–468.

[118] Wong, . K. K. K., 2013. Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. Marketing Bulletin, 24(1), p. 1–32.

[119] Yang, . C. C. et al., 2009. A study on the leadership behavior, safety culture, and safety performance of the healthcare industry. International Journal of Humanities and Social Sciences, 3(5), p. 546–553.

[120] Yorio, . P. L., Edwards, . J. & Hoeneveld, . D., 2019. Safety culture across cultures. Safety science, Volume 120, pp. 402-410.

[121] Zhang, . X. & Bartol, K. M., 2010. Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. Academy of Management Journal, 53(1), p. 107–128.

[122] Zhang, . X. & Zhou, J., 2014. Empowering leadership, uncertainty avoidance, trust, and employee creativity: Interaction effects and a mediating mechanism. . Organizational Behavior and Human Decision Processes, 124(2), p. 150–164.

[123] Zhao, . L., Yang, D., Liu, S. & Nkrumah, E. N. K., 2022. The effect of safety leadership on safety participation of employee: A meta-analysis. Frontiers in Psychology, Volume 13, p. 827694.

[124] Zohar, D., 2002. The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. Journal of Organizational Behavior, 23(1), p. 75–92.

[125] Zohar, D., 2011. Safety climate: Conceptualization, measurement, and improvement (L. Quick & J. C. T. Ed, Eds.). American Psychological Association.

❖❖❖❖❖