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Transforming Safety Culture through The Integration of Effective Communication and Safety Leadership in High-Risk Industries

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Abstract

Safety culture in high-risk industries is often managed through procedures, compliance systems, and visible leadership programs; however, these mechanisms do not automatically become shared workplace values. This study examined how effective safety communication and safety leadership could be integrated to transform safety culture and support operational excellence in an oleochemical manufacturing company. A sequential explanatory mixed-methods design was employed. Quantitative data from 421 respondents were analyzed using structural equation modeling (SEM) with LISREL, followed by in-depth interviews and focus group discussions analyzed using MAXQDA. The measurement model demonstrated satisfactory construct reliability and convergent validity. Safety communication had a strong and significant direct effect on safety culture ($\beta = 0.724$, $p < 0.001$), whereas the direct effect of safety leadership was not statistically significant ($\beta = 0.129$, $p = 0.058$). Safety culture significantly supported operational excellence ($\beta = 0.438$, $p < 0.001$), and the integrated model explained 87.2% of the variance in safety culture and 91.3% of the variance in operational excellence. Qualitative findings showed that leadership remained culturally central; however, its influence weakened when communication was formalistic, one-way, emotionally detached, or inconsistently implemented by second-line leaders. The study therefore positioned communication as the mechanism that transformed leadership intentions and role modeling into shared meaning, trust, feedback, and sustained safe behaviors. It proposed Personalized Safety Communication, consisting of direct personalized communication, escort communication, and direct impact communication, as a practical framework for integrating leadership visibility with dialogic, contextual, and empathetic safety communication.

INTRODUCTION

High-risk industries depend on more than technical controls to maintain safe and reliable operations (Aderamo et al., 2024; Akano et al., 2024; Meyer & Reniers, 2025; Nwulu et al., 2023). Their performance also relies on whether employees consistently interpret hazards, trust those who communicate safety expectations, and translate organizational priorities into daily decisions. In chemical and process manufacturing, communication failures may distort risk perceptions, weaken shift handovers, delay corrective actions, reduce safety awareness, or normalize unsafe adaptations. For this reason (1997), safety culture should not be treated as a separate compliance function. Instead, it represents a dimension of work culture through which

organizational values, assumptions, symbols, routines, and power relations shape how individuals understand and respond to risks (Guldenmund, 2000; Keyton, 2011). A mature safety culture therefore exists when safety is consistently integrated into production decisions, interpersonal interactions, decision-making processes, leadership practices, supervision, organizational learning, and operational improvement.

The established safety literature emphasizes the importance of both leadership and communication. Leaders influence safety through priority setting, resource allocation, role modeling, monitoring, and reinforcement (Cooper, 2001; O'Dea & Flin, 2001). Communication enables employees to understand hazards, clarify procedures, raise concerns, coordinate actions, and learn from incidents (Davis et al., 2014; Curcuruto & Griffin, 2023). These two domains are frequently discussed as parallel predictors. However, treating them as independent inputs may obscure the process through which leadership is transformed into cultural influence. A leader's commitment does not become culturally meaningful merely because it is expressed. It must be interpreted by employees through repeated communicative interactions, including what leaders communicate, how they listen, whether they respond to reported hazards, how they provide feedback and recognition, and whether their visible behaviors align with their stated commitments.

This distinction is particularly important because formal safety leadership can coexist with weak cultural internalization. Organizations may conduct Gemba walks, safety talks, inspections, and behavioral observations while employees still perceive these activities as ritualistic, metric-driven, or disconnected from operational realities. Similarly, a high volume of safety messages does not guarantee effective communication when the language is overly technical, communication channels are one-way, feedback is delayed, or the communicator lacks credibility. Communication problems may originate from the message, source, channel, or receiver and may be intensified by hierarchical structures, mistrust, and differences in educational or experiential backgrounds (Covello et al., 1988). Accordingly, cultural transformation requires more than message delivery; it requires the co-construction of meaning, psychological safety, and shared responsibility.

The empirical context of this study was an oleochemical manufacturer with high-risk operations involving hazardous chemicals, high temperatures and pressures, flammable materials, confined spaces, heavy equipment, and complex maintenance activities. The data identified a dominant contribution of unsafe acts while also indicating variations in leadership commitment and gaps in the delivery of safe work information. The company had established safety systems and communication routines; however, the central practical question remained unresolved: how could safety communication and safety leadership be integrated so that safety was experienced as a shared workplace value rather than merely a formal requirement?

This study addressed a research gap at the intersection of organizational communication and occupational safety. Previous studies have demonstrated that safety leadership, safety communication, and safe behaviors are associated with safety performance; however, fewer studies have explained how these elements operate simultaneously to construct safety culture and connect it with operational excellence. This study addressed this gap by combining structural equation modeling with qualitative analysis, enabling statistical patterns to be interpreted through employees' and leaders' experiences. This research design was particularly valuable when a variable was conceptually prominent but statistically weak because it revealed

the organizational conditions under which an expected influence was either enabled or constrained.

This article narrowed the broader research model to focus on the integration of effective communication and safety leadership. It examined how the integration of safety communication and safety leadership transformed safety culture in a high-risk industrial setting and identified the communicative practices that enabled leadership to become a credible cultural force. The article made three contributions. First, it reframed safety communication as a constitutive mechanism of safety culture rather than merely a supporting channel. Second, it explained why safety leadership could be culturally significant without producing a statistically significant direct effect when communication quality was weak or inconsistent. Third, it developed a practice-oriented architecture of Personalized Safety Communication that linked leadership presence, contextual dialogue, emotional engagement, and immediate behavioral impact.

Keyton (2011) conceptualized organizational culture as a phenomenon that is continuously produced and reproduced through communication. Culture is reflected in symbolic performances, narratives, texts, managerial practices, power relations, technologies, and responses to broader contexts. In safety management, daily briefings, toolbox meetings, incident narratives, signs, procedures, reporting systems, and leadership interactions are not merely neutral communication channels. They function as cultural performances that demonstrate what an organization truly values. Their influence depends on consistency and alignment. When leaders verbally prioritize safety but tolerate unresolved hazards or apply inconsistent sanctions, employees may perceive that production pressures hold greater practical authority than formal safety commitments.

This communicative perspective differs from an information-deficit model. Lasswell's formulation of the communicator, message, channel, audience, and effect remains useful for structuring safety messages, while Berlo (1960) emphasized that meaning depends on the capabilities and relationships of senders and receivers. However, culture formation requires an additional process: employees must actively participate in meaning-making. Purposeful, coherent, inclusive, symbolic, and responsive communication enables safety messages to become shared norms. Two-way interaction is therefore critical because it allows employees to compare formal requirements with field conditions, engage with safety practices, challenge ambiguous instructions, and contribute operational knowledge.

Cooper (2001) described safety culture through psychological, behavioral, and situational dimensions. Leadership connects these dimensions by shaping priorities, systems, resources, and observable behaviors. A safety leader is expected to demonstrate commitment, model safe behaviors, monitor work practices, provide feedback, involve employees, and sustain organizational learning. Social exchange research similarly suggests that employees respond positively to safety expectations when leadership behaviors signal organizational support and respect (Hofmann & Morgeson, 1999). Transformational safety leadership can encourage employee voice, particularly when it fosters trust (Conchie et al., 2012).

Leadership influence, however, is not automatic. Role modeling must be visible and interpreted as authentic. Monitoring must generate meaningful feedback rather than function solely as surveillance. Employee involvement must include opportunities for disagreement and

upward communication. Curcuruto and Griffin (2023) demonstrated that team leaders can encourage upward safety communication through empowering and monitoring supervision, although the effectiveness of these practices depends on their implementation. This suggests that communication quality is a condition of leadership effectiveness: leadership becomes culturally influential only when employees can understand, evaluate, and trust its meaning.

Bandura's (1986) Social Cognitive Theory explains behavior through reciprocal interactions among personal factors, behavior, and environmental influences. Employees learn from credible models, evaluate expected consequences, develop self-efficacy, and regulate their actions. In safety contexts, a leader's example can strengthen safe behaviors only when it is sufficiently visible, consistent, and reinforced. When supervisors communicate different standards or violations receive inadequate responses, observational learning may create ambiguity rather than behavioral alignment.

Heart Communication Theory adds an affective and ethical dimension to safety communication. Lestari (2023) argued that communication begins with thought and emotion and becomes effective when cognitive awareness is integrated with empathy, sincerity, moral responsibility, and emotional self-regulation. Applied to safety contexts, this perspective explains why technically accurate messages may fail to influence behavior. Employees must feel respected, psychologically safe, and personally connected to the purpose of safety communication. Communication that engages both cognition and emotion can transform safety from an external obligation into a moral commitment to protect oneself and others.

The DNA of safety culture consists of two fundamental elements: safety communication and safety leadership. Operational excellence represents an organizational outcome resulting from the effective integration of these elements. At the core of the proposed model is Personalized Safety Communication. Effective safety communication enhances employees' safety awareness by delivering clear, relevant, and contextualized messages through organizational leaders. Safety leadership provides direction, legitimacy, resources, role modeling, and reinforcement, while safety communication translates these leadership inputs into shared meaning and coordinated action. Communication therefore functions as the cultural mechanism through which leadership intentions are interpreted, understood, and enacted by employees.

The effective integration of safety leadership and safety communication is expected to generate four intermediate organizational conditions: message clarity, trust in the communicator, employee voice, and consistent feedback. These conditions facilitate the internalization of safety values and the development of a strong safety culture, which can subsequently contribute to reliable operations and operational excellence.

The proposed model does not assume that safety communication statistically mediates every effect of safety leadership. Instead, it draws on integrated mixed-methods evidence to explain the organizational processes through which safety leadership may become more or less influential in shaping safety culture and contributing to operational excellence.

Figure 1. DNA of Safety Culture

Note. The mechanism is synthesized from the dissertation's quantitative and qualitative findings (Zulkarnain, Arief, 2026).

METHOD

Research Design and Setting

The study adopted a post-positivist paradigm and a sequential explanatory mixed-methods design. The quantitative phase was conducted first to examine the relationships among safe behavior, safety leadership, safety communication, safety culture, and operational excellence. The qualitative phase was subsequently conducted to explore participants' interpretations of the quantitative findings and explain why theoretically important variables might not demonstrate significant direct effects. This approach followed the logic of explanatory mixed-methods research, in which qualitative evidence is integrated with quantitative findings to clarify underlying mechanisms and contextual conditions (Creswell, 2020).

The research was conducted in an oleochemical manufacturing company involving 687 employees and contractors across 17 workstations. The operational setting included production facilities, maintenance activities, warehousing, and outsourced operations. Respondents were selected from work areas with identified operational hazards to ensure alignment between the sampling frame and the study's focus on high-risk activities.

Quantitative Phase

A risk-modified stratified random sampling strategy was used. Slovin's formula produced an initial sample estimate of 253, while the rule of thumb for structural equation modeling suggested 215 to 430 observations for 43 indicators. The final quantitative sample consisted of 421 respondents. The sample was dominated by male employees (91.7%), field operators (79.8%), respondents with senior-high-school education (45.8%), employees aged 30-39 years (44.7%), and employees with one to five years of tenure (34.2%). Supply-chain management contributed the largest departmental group (18.1%), followed by outsourced workers (15.9%).

The instrument measured five latent constructs: safe behavior, safety leadership, safety communication, safety culture, and operational excellence. Forty-three indicators were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement model was evaluated through standardized loading factors, construct reliability, and average variance extracted. The structural model was analyzed with SEM-LISREL. Statistical significance was assessed using an absolute z-value of at least 1.96 and $p < 0.05$.

Model fit was interpreted using multiple indices rather than a single criterion, consistent with SEM practice (Ghozali & Fuad, 2005; Hair et al., 2010).

Qualitative Phase and Integration

The qualitative phase used in-depth interviews and one focus group discussion whose transcript contained 12 managerial and safety representatives from operational and support functions. Participants discussed barriers to safe behavior, leadership challenges, effective safety communication, the relationship between safety culture and productivity, and the synergy among behavior, leadership, and communication. Identifiers were reduced to initials in the dissertation transcripts.

Data were analyzed in MAXQDA using the six phases of thematic analysis: familiarization, initial coding, theme searching, theme review, theme definition and naming, and report production (Braun & Clarke, 2006). Word-cloud, code-matrix, network, and single-case model outputs were used as analytic supports. Integration occurred at interpretation: themes were examined against the SEM paths, especially the strong safety-communication effect and the non-significant direct safety-leadership effect. Qualitative evidence was not used to replace the statistical results; it was used to explain the conditions under which leadership and communication were experienced as credible, superficial, enabling, or obstructive.

RESULTS AND DISCUSSION

Measurement Quality and Model Fit

All retained indicators exceeded a standardized loading of 0.70, with the lowest loading at 0.705. Construct reliability ranged from 0.93 to 0.97, and average variance extracted ranged from 0.68 to 0.81. These values support convergent validity and internal consistency for the five constructs. The structural model showed strong absolute and parsimonious fit on RMSEA (0.0349), RMR (0.0127), SRMR (0.0376), and CMIN/DF (1.792). Comparative fit was mixed: CFI (0.830), IFI (0.866), and GFI (0.823) were marginal, while NFI, NNFI, RFI, and AGFI did not meet conventional thresholds. The model should therefore be interpreted as empirically useful but not uniformly optimal across all fit families.

Structural Relationships

Safety communication was the strongest direct predictor of safety culture ($\beta = 0.724$, $z = 9.566$, $p < 0.001$). By contrast, safety leadership had a positive but non-significant direct effect ($\beta = 0.129$, $z = 1.897$, $p = 0.058$). The result is close to, but remains outside, the pre-specified 0.05 significance threshold. Together, safe behavior, safety leadership, and safety communication explained 87.2% of the variance in safety culture.

Safety culture significantly predicted operational excellence ($\beta = 0.438$, $z = 5.656$, $p < 0.001$). Safety communication also had a significant direct effect on operational excellence ($\beta = 0.368$, $z = 4.233$, $p < 0.001$) and a significant indirect effect through safety culture $\beta = 0.317$, $z = 5.067$). The direct and indirect effects of safety leadership on operational excellence were not significant. The full model explained 91.3% of the variance in operational excellence. These results position safety communication as the most consistent empirical driver and safety culture as a critical link between safety-related practices and operational performance.

The structural equations were: Safety Culture = 0.106(Safe Behavior) + 0.129(Safety Leadership) + 0.724(Safety Communication), $R2 = 0.872$;

Qualitative Themes

Theme 1: Leadership was culturally central but unevenly enacted. Leadership appeared prominently in the MAXQDA word cloud and was repeatedly described as essential to safety culture. Participants expected leaders to model safe behavior, integrate safety into daily operations, act on findings, communicate standards, and provide feedback. Yet they also described weak second-layer initiative, inconsistent enforcement, and a reluctance to confront unsafe behavior. HA summarized the challenge as 'ineffective leadership communication, lack of second-layer leadership initiative, insufficient enforcement of safety programs, and minimal impactful reinforcement.' The problem was therefore not the absence of formal leadership roles, but the gap between formal authority and lived communicative presence.

Theme 2: Communication functioned as the bridge between policy and field practice. Participants consistently identified briefings, safety talks, toolbox meetings, Safety Moments, CSMS engagement, Behavior-Based Safety observations, and Gemba walks as effective communication forms. Their preferred practices were interactive, timely, concrete, and related to current hazards. MK emphasized the use of 'straightforward, field-friendly language' and immediate personal feedback. SKD similarly argued that safety communication should be prioritized because behavioral change begins with clear communication from leaders and shift supervisors. These accounts support the statistical finding that communication is the strongest predictor of safety culture.

Theme 3: Effective communication required personalization and emotional credibility. Participants did not describe effective communication solely in technical terms. HTM stated that leaders must understand their teams personally and use tailored, intensive communication to influence behavior. Another FGD response noted that two-way communication combined with respectful physical engagement could build emotional closeness and trust. STK explicitly linked personalized communication and respectful gestures with safe behavior, while AUG stressed that leadership must listen rather than only command and that 'safety comes from the heart.' These narratives connect the communication process with empathy, trust, and psychological safety.

Theme 4: Communication and leadership had to be integrated rather than sequenced as separate programs. Participants used complementary metaphors and statements: leadership and communication were described as catalysts, communication as the pillar, and leadership as the guide for field implementation. The dominant view was not that one element could replace the other. Rather, leaders had to model and communicate simultaneously. Communication without leadership follow-through would lack authority, while leadership without open and contextual communication would be experienced as command, surveillance, or formalism.

Theme 5: Safety culture connected integration with operational continuity. Participants associated a strong safety culture with fewer interruptions, orderly work areas, safe permits, equipment reliability, and sustained productivity. ACH explained that workers who understand safe standards contribute to uninterrupted operations. SKD described how poor housekeeping and neglected safety-critical equipment could lead to major incidents and plant shutdowns. Safety culture thus operated as an organizing logic that aligned protection, reliability, and productivity rather than treating safety and production as competing objectives.

Table 1. Integrated qualitative explanation of the structural results

Empirical analysis	Qualitative analysis	Cultural implication
Safety communication strongly predicts safety culture.	Interactive, field-relevant, repeated, and personalized messages create shared understanding and trust.	Communication is a constitutive mechanism of culture, not merely a channel.
Safety leadership is positive but not directly significant.	Leadership practices were uneven, formalistic, inconsistent in feedback, and weak at second-layer implementation.	Leadership influence depends on communicative enactment and credibility.
Safety culture predicts operational excellence.	Shared safety values support uninterrupted work, hazard control, reliable equipment, and coordinated decisions.	Safety becomes an operational value rather than a separate compliance target.
Communication has direct and indirect operational effects.	Messages coordinate immediate work and also build the cultural conditions that sustain safe routines.	Communication operates at both task and cultural levels.

Source: Integrated interpretation of SEM-LISREL and MAXQDA findings.

Personalized Safety Communication

The Personalized Safety Communication. It is designed for mixed leadership levels and hazardous operations and consists of three interconnected practices. Direct Personalized Communication (DPC) involves respectful verbal and nonverbal engagement between leaders and employees. Escort Communication (EC) requires leaders to accompany employees in the field, guide them with care, and discuss hazards openly rather than merely observe compliance. Direct Impact Communication (DIC) links the safety message to consequences that employees can immediately understand, thereby strengthening procedural adherence and personal relevance.

These practices should not be interpreted as informal substitutes for procedures. Their function is to make procedures cognitively accessible, emotionally credible, and operationally actionable. DPC creates relational access, EC connects leadership with field reality, and DIC clarifies why the message matters. Together they transform leadership visibility from symbolic presence into a sustained cycle of listening, explanation, feedback, modeling, and reinforcement.

Communication as the Mechanism of Cultural Transformation

The central finding is not simply that communication matters. It is that communication appears to be the process through which safety culture is made real. The strong path from safety communication to safety culture supports Keyton's (2011) view that culture is constituted through recurring interactions, symbols, narratives, and texts. Safety talks, briefings, signs, Gemba walks, and incident stories become culturally meaningful only when they form a coherent pattern. When a message is repeated but not supported by leader behavior or corrective action, repetition may reproduce cynicism rather than commitment.

The finding also refines conventional behavior-change approaches. DeJoy (2005) distinguishes behavior change from culture change, and the present study shows why the two cannot be collapsed. A procedure can alter an immediate action, but culture requires shared interpretation and sustained reinforcement. Communication links individual actions to collective values. It enables employees to explain hazards, challenge inconsistencies, narrate

lessons, and recognize safety as an organizational expectation. This is particularly important in high-risk operations, where local adaptations and time pressure can gradually normalize deviation.

Why Leadership Was Salient but Not Statistically Significant

The non-significant direct effect of safety leadership should not be interpreted as evidence that leadership is unimportant. The qualitative data clearly position leaders as central actors. Instead, the result indicates that formal or perceived leadership activities did not translate consistently into a direct cultural effect under the conditions observed. Three explanations are supported by the data. First, implementation varied across leadership layers. Top-management commitment could be diluted when area supervisors and shift leaders did not provide consistent feedback or enforcement. Second, activities such as observations and Gemba walks sometimes emphasized quantity rather than conversational quality. Third, communication could be one-way, mechanical, or emotionally detached, reducing trust and internalization.

This interpretation is consistent with the literature on trust, social exchange, and safety voice. Leadership behavior influences employees when it signals support, fairness, and credibility (Hofmann & Morgeson, 1999; Conchie et al., 2012). Employees are more likely to speak up when leaders empower them and respond to information rather than merely monitor them (Curcuruto & Griffin, 2023). The present study adds that leadership must be understood as communicative performance. A leader models safety not only by wearing personal protective equipment or stopping unsafe work, but also by how the leader explains the decision, listens to concerns, acknowledges uncertainty, and closes the feedback loop.

The path coefficient for leadership to safety culture was positive and close to significance ($p = 0.058$). This pattern may indicate a potentially meaningful influence that was weakened by inconsistent enactment. However, the study does not test communication as a formal mediator between leadership and culture. The appropriate conclusion is therefore conditional: the mixed-method evidence suggests that leadership becomes more culturally effective when embedded in authentic, contextual, and participatory communication.

Integrating Cognitive, Emotional, and Operational Dimensions

The integration of leadership and communication must address cognition, emotion, and action. Cognitive clarity concerns hazard information, procedural expectations, and decision criteria. Emotional credibility concerns empathy, respect, and the employee's sense that safety messages reflect genuine care rather than organizational self-protection. Operational action concerns timely correction, resource allocation, and visible follow-through. If one dimension is absent, the cultural effect is incomplete. Clear messages without care may produce minimal compliance; empathy without standards may produce ambiguity; and strong standards without follow-through may produce distrust. Bandura's (1986) framework helps explain how the integrated process changes behavior. Leaders provide models, communication clarifies expected consequences, feedback reinforces learning, and participation develops self-efficacy. Heart Communication Theory complements this mechanism by explaining how sincerity and emotional intelligence affect receptivity (Lestari, 2023). In practical terms, a leader who enters the field, asks workers to describe a hazard, listens without immediate blame, explains the risk in accessible language, models the correct response, and follows up on corrective action is simultaneously performing leadership, communication, learning, and cultural reinforcement.

Safety Culture as an Enabler of Operational Excellence

The significant relationship between safety culture and operational excellence supports the view that reliable performance depends on the quality of organizational attention. High-reliability organizations cultivate sensitivity to operations, learning, and early warning signals (Weick & Sutcliffe, 2007). A strong safety culture supports these capacities by making it legitimate to report weak signals, pause work, question assumptions, and resolve hazards before they become failures. Safety is therefore not a cost external to production; it is part of the infrastructure of continuity, quality, and resilience.

The operational excellence construct captures responsiveness, continuous improvement, safety integration, and operational continuity. Communication affects these outcomes directly by coordinating work and indirectly by strengthening culture. This dual effect is important. A shift briefing may prevent an immediate error, while repeated high-quality briefings can also establish a norm of openness and disciplined handover. The first effect is transactional; the second is cultural. Sustainable operational excellence requires both.

An Implementation Architecture for High-Risk Industries

Based on the integrated findings, organizations can operationalize communication-leadership integration through a five-stage cycle. The cycle is not a new statistical model; it is a managerial translation of the dissertation's leadership principles and Personalized Safety Communication.

Table 2. Communication-leadership integration cycle

Stage	Leadership responsibility	Communication practice	Expected cultural effect
1. Align values	Clarify that safety and production are mutually enabling priorities.	Translate policies into field-relevant expectations and examples.	Shared interpretation of safety as a work value.
2. Present	Conduct purposeful field engagement and model safe conduct.	Use DPC and ask open questions about current hazards.	Credibility, accessibility, and trust.
3. Diagnose the risk	Invite operational knowledge and acknowledge uncertainty.	Use two-way dialogue, field-friendly language, and EC.	Employee voice and a shared mental model of risk.
4. Act and reinforce	Remove barriers, allocate resources, and respond consistently.	Give immediate feedback, explain consequences, and use DIC.	Learning, accountability, and behavioral consistency.
5. Review	Review actions, recognize contributions, and communicate lessons.	Report what changed, why it changed, and what remains unresolved.	Institutional memory and sustained cultural reinforcement.

Note. DPC = Direct Personalized Communication; EC = Escort Communication; DIC = Direct Impact Communication.

CONCLUSION

Transforming safety culture in a high-risk industry requires the integration of leadership and communication rather than the expansion of either as an isolated program. The quantitative evidence identified safety communication as the strongest direct predictor of safety culture and a significant contributor to operational excellence. Although safety leadership was central in qualitative accounts, it did not demonstrate a significant direct effect. The qualitative findings

explained this result: leadership influence weakened when engagement was formalistic, one-way, inconsistent, or emotionally detached.

The study therefore positioned communication as the mechanism that transformed leadership visibility, authority, and role modeling into shared meaning, trust, feedback, and sustained action. Personalized Safety Communication provided a practical approach for this integration through direct personalized engagement, field accompaniment, and messages that clarified immediate consequences. When leaders communicated with clarity, empathy, consistency, and operational follow-through, safety could shift from procedural compliance to an internalized workplace culture. In turn, this culture supported operational continuity, organizational learning, reliability, and operational excellence.

REFERENCES

Aderamo, A. T., Olisakwe, H. C., Adebayo, Y. A., & Esiri, A. E. (2024). Behavioral safety programs in high-risk industries: A conceptual approach to incident reduction. *Comprehensive Research and Reviews in Engineering and Technology*, *2*(1), 64–82.

Akano, O. A., Hanson, E., Nwakile, C., & Esiri, A. E. (2024). Integrating sustainability and safety in high-risk industries: A framework for balancing operational efficiency and environmental responsibility. *Global Journal of Research in Multidisciplinary Studies, 2*(2), 27–37.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.

Berlo, D. K. (1960). *The process of communication: An introduction to theory and practice*. Holt, Rinehart & Winston.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Clarke, S. (2006). The relationship between safety climate and safety performance: A meta-analytic review. *Journal of Occupational Health Psychology, 11*(4), 315–327. https://doi.org/10.1037/1076-8998.11.4.315

Conchie, S. M., Taylor, P. J., & Donald, I. J. (2012). Promoting safety voice with safety-specific transformational leadership: The mediating role of two dimensions of trust. *Journal of Occupational Health Psychology, 17*(1), 105–115. https://doi.org/10.1037/a0025101

Cooper, D. (2001). *Improving safety culture: A practical guide*. Applied Behavioural Science.

Covello, V. T., von Winterfeldt, D., & Slovic, P. (1988). Risk communication. In C. C. Travis (Ed.), *Carcinogen risk assessment* (Contemporary Issues in Risk Analysis, Vol. 3). Springer. https://doi.org/10.1007/978-1-4684-5484-0_15

Creswell, J. W. (2020). *Pengantar penelitian mixed methods*. Pustaka Pelajar.

Curcuruto, M., & Griffin, M. A. (2023). Upward safety communication in the workplace: How team leaders stimulate employees' voice through empowering and monitoring supervision. *Safety Science, 157*, 105947. https://doi.org/10.1016/j.ssci.2022.105947

Davis, R., Stephenson, C. M., & Gantner, J. L. (2014). The impact of safety communication on workplace incident rates. *Safety Science, 65*, 45–52. https://doi.org/10.1016/j.ssci.2014.01.003

DeJoy, D. M. (2005). Behavior change versus culture change: Divergent approaches to managing workplace safety. *Safety Science, 43*(2), 105–129. https://doi.org/10.1016/j.ssci.2005.02.001

Ghozali, I., & Fuad. (2005). *Structural equation modeling: Teori, konsep, dan aplikasi dengan program LISREL 8.54*. Badan Penerbit Universitas Diponegoro.

Guldenmund, F. W. (2000). The nature of safety culture: A review of theory and research. *Safety Science*, *34*(1–3), 215–257.
Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson Prentice Hall.
Hofmann, D. A., & Morgeson, F. P. (1999). Safety-related behavior as a social exchange: The role of perceived organizational support and leader-member exchange. *Journal of Applied Psychology*, *84*(2), 286–296. https://doi.org/10.1037/0021-9010.84.2.286
Keyton, J. (2011). *Communication and organizational culture: A key to understanding work experiences* (2nd ed.). SAGE.
Lasswell, H. D. (1948). The structure and function of communication in society. In L. Bryson (Ed.), *The communication of ideas* (pp. 37–51). Harper & Brothers.
Lestari, P. (2023). *Teori komunikasi hati: Analisis dan implementasi dalam kehidupan*. LPPM UPN Veteran Yogyakarta.
Meyer, T., & Reniers, G. (2025). *Engineering risk management: Optimizing operational risk decision-making, safety and reliability, risk assessment*. Walter de Gruyter GmbH & Co. KG.
Nwulu, E. O., Elete, T. Y., Aderamo, A. T., Esiri, A. E., & Erhueh, O. V. (2023). Promoting plant reliability and safety through effective process automation and control engineering practices. *World Journal of Advanced Science and Technology, 4*(1), 62–75.
O'Dea, A., & Flin, R. (2001). Site managers and safety leadership in the offshore oil and gas industry. *Safety Science*, *37*(1), 39–57. https://doi.org/10.1016/S0925-7535(00)00049-7
Reason, J. (1997). *Managing the risks of organizational accidents*. Routledge.
Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty*. Wiley.