Conceptual Model for Institutionalizing Life-Preserving Safety Practices Across Project-Based Organizations

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Abstract

The high-risk nature of project-based organizations (PBOs) demands systematic approaches to safety that go beyond episodic interventions. Despite extensive safety programs, incidents and near-misses continue to occur due to fragmented implementation, inconsistent adherence, and weak organizational learning mechanisms. This study proposes a conceptual model for institutionalizing life-preserving safety practices across project-based organizations, aiming to embed proactive safety behaviors, processes, and governance into organizational structures. The model integrates human, technical, and organizational factors, emphasizing the interplay between individual competencies, team coordination, leadership engagement, and digital safety tools. Core components include safety leadership and governance, standardized procedures, hazard identification and risk assessment mechanisms, competency assurance, and communication systems. The model further identifies moderating variables such as safety culture and climate, and mediating mechanisms including real-time monitoring, incident reporting, and lessons learned repositories. Through a process-oriented framework, the

model outlines pathways for codifying best practices into organizational routines, reinforcing continuous learning, and establishing feedback loops that prevent recurrence of unsafe behaviors. The framework also emphasizes the strategic role of digital tools, predictive analytics, and real-time dashboards in enabling proactive interventions and enhancing situational awareness. By bridging individual, team, and organizational dimensions of safety, the model offers a systems-based approach to reduce accidents, improve project performance, and institutionalize a culture of life-preserving behaviors. Its adoption can enhance compliance, resilience, and operational efficiency across complex projects, providing a replicable template for high-hazard industries. This conceptual study contributes to the safety management and project governance literature by providing an integrative model that links organizational learning, leadership, and technology with sustained safety performance. Future research should empirically validate the framework across multiple industries and project types, evaluating its effectiveness in reducing incidents and embedding enduring safety practices.

1. Introduction

Safety management in project-based organizations (PBOs) is a critical determinant of operational success, particularly in high-risk industries such as construction, oil and gas, chemical processing, and heavy industrial manufacturing (NDUKA, 2020; Oshoba *et al*., 2020). PBOs are characterized by temporary organizational structures, complex coordination requirements, and dynamic project environments, which amplify the inherent risks associated with project execution (Odejobi *et al*., 2020; Ekechi, 2020). In such contexts, human error remains a leading contributor to accidents, near-misses, and operational disruptions. Studies consistently highlight that even minor lapses in judgment, fatigue, or procedural adherence can escalate into severe consequences when interacting with hazardous conditions or complex systems. The prevalence of human error, coupled with organizational and environmental vulnerabilities, underscores the pressing need for systematic and institutionalized safety practices that extend beyond isolated projects or episodic interventions (Aminu-Ibrahim *et al*., 2020; Nwankwo *et al*., 2020). Embedding safety as an enduring organizational attribute is therefore essential to mitigating risks, enhancing project performance, and protecting the

lives of personnel engaged in high-hazard activities (Okeke *et al*., 2020; Dako *et al*., 2020). Despite the recognized importance of safety, current practices within PBOs often remain fragmented and inconsistent across projects. Many organizations implement project-specific safety protocols that vary in scope, rigor, and enforcement, creating gaps in oversight and continuity (Ekechi and Fasasi, 2020; Omotayo *et al*., 2020). Furthermore, conventional approaches tend to prioritize reactive measures responding to incidents or near-misses after they occur rather than proactively embedding life-preserving behaviors into the organizational fabric. This reactive orientation limits the ability to anticipate risks, address latent conditions, or prevent recurrence of unsafe practices (Frempong *et al*., 2020; Farounbi *et al*., 2020). Compounding this challenge is the insufficient integration of organizational learning mechanisms and cultural reinforcement, which are necessary to transform individual and team behaviors into standardized, sustained safety practices (Yeboah and Ike, 2020; Onovo *et al*., 2020). Without formalized processes for codifying lessons learned and promoting a safety-centric culture, PBOs remain vulnerable to repeated incidents and diminished operational resilience.

In response to these challenges, the study aims to develop a conceptual model for institutionalizing safety practices across project-based organizations. The model seeks to provide a structured framework that identifies critical mechanisms for sustaining life-preserving behaviors, including leadership engagement, competency assurance, hazard identification, communication systems, and digital monitoring tools (Ekechi and Fasasi, 2020; NDUKA, 2020). By explicitly linking human, organizational, and technological dimensions, the framework endeavors to facilitate proactive safety interventions and ensure continuity of best practices across diverse projects and teams.

The significance of the study lies in its potential contribution to both theory and practice. From a scholarly perspective, the conceptual model advances the safety management literature by integrating organizational learning, governance, and behavioral safety into a unified framework. Practically, the model offers actionable guidance for managers, safety officers, and project stakeholders, highlighting pathways to improve compliance, enhance operational performance, and reduce risk exposure. By institutionalizing life-preserving practices, organizations can achieve not only safer project outcomes but also sustainable organizational resilience, positioning safety as a strategic enabler rather than a reactive constraint (Dako *et al*., 2020; Bayeroju, 2020).

2. Literature Review
The literature on safety management in high-risk, project-based organizations (PBOs) underscores the critical influence of organizational, human, and structural factors on safety performance. Safety culture and climate, human factors, the unique characteristics of PBOs, and existing safety frameworks collectively shape the implementation and effectiveness of life-preserving practices (NDUKA, 2020; Nwafor *et al*., 2020). A review of these domains provides a theoretical and empirical foundation for developing a conceptual model that institutionalizes safety across projects. Safety culture and climate have been widely recognized as pivotal determinants of workplace safety. Safety culture refers to the shared values, beliefs, and norms that prioritize safety as a core organizational objective, while safety climate

represents the employees' perceptions and attitudes toward the organization's safety policies and practices at a given point in time (Frempong *et al*., 2020; Aifuwa *et al*., 2020). Theoretical perspectives, including Reason's Swiss Cheese Model and Schein's organizational culture framework, suggest that a positive safety culture and supportive climate reinforce adherence to safety procedures, encourage proactive hazard reporting, and reduce tolerance for unsafe behaviors. Empirical studies indicate that robust safety cultures enhance individual safety compliance and foster collective vigilance among teams. High levels of trust in management and perceived organizational commitment to safety are associated with increased reporting of near-misses, adherence to standard operating procedures, and mutual monitoring of peers, thereby improving overall safety outcomes (Ugwu-Oju *et al*., 2018; Seyi-Lande *et al*., 2019). Conversely, weak or inconsistent safety climates can normalize risk-taking behaviors and exacerbate error propagation, particularly in complex project environments.

Human factors play a critical role in shaping safety performance and the recurrence of unsafe behaviors. Cognitive biases, such as overconfidence, confirmation bias, and risk underestimation, can lead workers to bypass procedures or make unsafe judgments under pressure. Fatigue and stress further impair attention, decision-making, and situational awareness, increasing susceptibility to errors. Organizational design factors, including workload distribution, supervision quality, and communication structures, also influence the likelihood and consequences of human error (Oshoba *et al*., 2020; Olatunde-Thorpe *et al*., 2020). In PBOs, where tasks are often novel, highly variable, and time-sensitive, the interaction between human cognitive limitations and environmental demands becomes especially pronounced. Studies in high-risk industries consistently demonstrate that interventions targeting human factors such as fatigue management, cognitive training, and behavioral monitoring can mitigate error probability and improve compliance with safety standards.

Project-based organizational contexts present unique challenges for safety implementation. PBOs are characterized by temporary, flexible structures with dynamic teams, short project lifecycles, and frequent turnover of personnel. These characteristics complicate the standardization of safety practices and the consistent reinforcement of organizational learning. Coordination among multi-disciplinary teams, subcontractors, and stakeholders is often fragmented, leading to information silos and inconsistent application of safety protocols. Furthermore, the temporary nature of project assignments may diminish employees' identification with the organization and reduce their motivation to adhere to safety norms, particularly when short-term productivity pressures compete with safety priorities (Anichukwueze *et al*., 2020; Pamela *et al*., 2020). Such contextual factors highlight the need for a structured approach to institutionalize safety practices that transcends individual projects and ensures continuity of standards across organizational boundaries.

Existing safety models and frameworks provide valuable insights but exhibit limitations in addressing the full complexity of institutionalizing safety practices across PBOs. Reactive approaches, including incident reporting, accident investigation, and compliance-based interventions, primarily focus on mitigating consequences rather than preventing unsafe behaviors. Proactive frameworks, such as behavior-based safety (BBS), safety management systems (SMS), and

high-reliability organization (HRO) principles, emphasize hazard anticipation, risk assessment, and continuous improvement. While these models advance safety management, they often fall short in ensuring consistent application across multiple projects or embedding practices into organizational culture (Odejobi and Ahmed, 2018; Ugwu-Oju *et al*., 2018). Challenges include variability in leadership commitment, inconsistent training, limited integration of digital safety tools, and insufficient mechanisms for cross-project knowledge transfer. Consequently, there remains a gap in conceptualizing an integrative framework that systematically aligns human, organizational, and technological dimensions to institutionalize life-preserving safety practices.

The literature highlights the intertwined roles of safety culture and climate, human factors, and project-based organizational characteristics in influencing safety outcomes. Existing frameworks provide valuable tools for reactive and proactive interventions but are insufficient for achieving sustained, organization-wide safety institutionalization (Onovo *et al*., 2020; Okonkwo *et al*., 2020). These insights establish the theoretical foundation for developing a conceptual model that incorporates leadership, competency assurance, hazard identification, communication mechanisms, and technology to support continuous, life-preserving safety practices across projects. By integrating these dimensions, the proposed model seeks to overcome the limitations of fragmented approaches and embed safety as a core organizational capability, ensuring consistent and proactive risk management in high-hazard PBO environments.

2.1. Methodology
The study employed a systematic review approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology to develop a conceptual model for institutionalizing life-preserving safety practices in project-based organizations. A comprehensive literature search was conducted across multiple electronic databases, including Scopus, Web of Science, PubMed, and Google Scholar, covering publications from 2000 to 2025. Keywords and Boolean operators were used to capture relevant studies, including "project-based organizations," "construction safety," "high-hazard operations," "safety culture," "human factors," "organizational learning," and "life-preserving practices." Additional sources were identified through reference tracking and citation analysis to ensure completeness.

The initial search yielded 1,562 records, which were screened for duplicates, resulting in 1,327 unique articles. Titles and abstracts were independently reviewed by two researchers to assess relevance, focusing on studies addressing safety practices, organizational learning, human factors, and governance in high-risk, project-based contexts. Studies that did not explicitly discuss safety interventions or organizational mechanisms were excluded, resulting in 247 full-text articles for eligibility assessment. Full-text screening applied inclusion criteria such as peer-reviewed publications, empirical studies, conceptual frameworks, and case studies pertinent to institutionalization of safety practices. Exclusion criteria included studies focusing solely on technical engineering solutions without organizational integration, non-English publications, and conference abstracts lacking sufficient methodological detail.

Following full-text assessment, 112 studies were retained for data extraction, capturing information on safety leadership, competency assurance, risk assessment practices, communication mechanisms, organizational learning processes, and technological interventions. The extracted data were synthesized to identify recurring themes, causal relationships, and moderating and mediating factors, forming the basis for the conceptual model. The PRISMA flow diagram was used to document the identification, screening, eligibility, and inclusion stages, ensuring transparency and replicability. This structured methodology allowed for a rigorous and evidence-based development of a model integrating human, organizational, and technological dimensions for institutionalizing life-preserving safety practices in project-based organizations.

2.2. Conceptual Framework
The conceptual framework for institutionalizing life-preserving safety practices in project-based organizations (PBOs) integrates human, organizational, and technological dimensions to provide a systematic approach to sustaining safety across diverse projects. At its core, the framework emphasizes safety leadership, standardized procedures, proactive risk management, competency development, and effective communication, while accounting for moderating and mediating variables that influence the translation of policies into consistent behaviors (Gado *et al*., 2020; Nwafor *et al*., 2020). The framework further incorporates structured processes for embedding safety practices into organizational routines, ensuring continuous improvement and learning.

Central to the framework is safety leadership and governance, which establishes the strategic direction and accountability for safety performance. Effective leadership provides clear commitment to life-preserving practices, allocates resources for safety initiatives, and fosters a culture in which safety is prioritized alongside productivity. Governance mechanisms define roles, responsibilities, and decision-making hierarchies that ensure adherence to safety protocols and enable timely escalation of hazards (Odejobi and Ahmed, 2018; Ugwu-Oju *et al*., 2018). Leaders serve as role models, influencing individual and team behaviors through visibility, engagement, and reinforcement of safety standards.

Complementing leadership, the framework emphasizes policies, protocols, and standard operating procedures (SOPs) that codify organizational expectations and provide structured guidance for task execution. SOPs ensure consistency across projects by specifying step-by-step processes for high-risk activities, detailing safety requirements, and delineating accountability mechanisms. These policies are designed to be adaptive, accommodating variations in project scope, site conditions, and operational complexity, while maintaining core safety principles.

Risk assessment and hazard identification mechanisms constitute another essential component, enabling proactive identification of potential threats before they result in incidents. Structured hazard analyses, including pre-task assessments and probabilistic risk evaluations, allow organizations to prioritize mitigation measures and allocate resources effectively. By integrating these mechanisms with real-time monitoring systems, the framework supports dynamic risk management that adjusts to evolving project conditions (Sanusi *et al*., 2020; Farounbi *et al*., 2020).

The framework further incorporates training, competency, and certification systems to ensure that personnel possess the

requisite knowledge and skills to perform tasks safely. Continuous training programs, including scenario-based exercises, simulations, and certification processes, reinforce proper behaviors and minimize errors associated with human limitations. Competency assurance ensures that both new and experienced personnel adhere to organizational safety standards.

Effective safety communication channels and coordination mechanisms facilitate the exchange of critical information within and across project teams. Reporting systems for near-misses, hazards, and deviations, combined with team briefings and coordination protocols, enable timely responses to emerging risks (Seyi-Lande *et al*., 2018; Badmus and Olamide, 2019). Communication tools also support knowledge transfer between projects, reducing redundancy and reinforcing lessons learned.

The framework recognizes several moderating and mediating variables that influence safety outcomes. Organizational culture and safety climate shape individual and team perceptions of risk, affecting adherence to procedures. Digital monitoring tools and real-time feedback systems enhance situational awareness, enabling prompt corrective action. Team cohesion, collaboration, and inter-project knowledge sharing promote collective vigilance and the diffusion of best practices, mitigating the impact of project turnover and temporary structures (Badmus and Olamide, 2018; Okeke *et al*., 2019).

Processes for institutionalization are embedded within the framework to ensure sustainability of safety practices. Codification of safety practices into organizational standards creates formal reference points that guide behavior across projects. Embedding safety into project lifecycle processes from planning to execution and closeout integrates hazard management into everyday operations rather than treating safety as an ancillary function (NDUKA, 2020; Farounbi *et al*., 2020). Continuous improvement loops, including systematic documentation of lessons learned and post-incident reviews, enable organizations to refine procedures, reinforce best practices, and prevent recurrence of unsafe behaviors.

The conceptual framework provides an integrative structure for institutionalizing life-preserving safety practices in project-based organizations. By combining leadership, standardized protocols, proactive risk management, competency development, and effective communication, and by accounting for moderating factors such as culture, technology, and team dynamics, the framework establishes a robust foundation for embedding safety into organizational routines. The inclusion of codification, lifecycle integration, and continuous improvement processes ensures that safety practices are not only implemented but sustained, fostering resilience, reducing incidents, and promoting a culture of life-preserving behaviors across multiple projects.

2.3. Mechanisms for Implementation

Effective implementation of life-preserving safety practices in project-based organizations (PBOs) requires structured mechanisms that integrate leadership, competency development, communication, and technology. These mechanisms translate the conceptual framework into actionable processes, ensuring that safety practices are consistently applied, monitored, and reinforced across diverse projects. By operationalizing leadership, training, communication, and digital tools, organizations can move beyond reactive safety measures toward a proactive, institutionalized approach that reduces incidents, enhances performance, and fosters a resilient safety culture (Ekechi and Fasasi, 2020; Sanusi *et al*., 2020).

Leadership and governance form the cornerstone of implementation by establishing authority, accountability, and strategic direction for safety initiatives. Project managers and executive leaders play critical roles in enforcing organizational safety policies, allocating resources, and modeling life-preserving behaviors. Their engagement signals the importance of safety to the workforce and reinforces compliance with established procedures. Clear decision-making authority and accountability structures ensure that responsibility for hazard identification, risk mitigation, and incident response is well-defined at every organizational level (Ugwu-Oju *et al*., 2018; Ekechi, 2019; Ayanbode *et al*., 2019

). Leaders are also responsible for establishing escalation protocols for critical safety decisions, allowing timely interventions in high-risk situations. Empirical studies demonstrate that visible leadership commitment enhances employee perception of safety priority, increases reporting of near-misses, and strengthens adherence to safety norms, thereby creating a foundation for sustained behavioral change.

Training and competency assurance are essential to equip personnel with the knowledge and skills required to perform tasks safely. Simulation-based and scenario-driven learning provides workers with realistic exposure to potential hazards, allowing them to practice responses in a controlled environment. Such experiential learning enhances cognitive preparedness, decision-making under stress, and procedural compliance. In addition, structured assessment, certification, and continuous skill development programs ensure that competency standards are maintained over time. Competency assurance is particularly important in PBOs, where workforce composition frequently changes and new personnel are integrated into complex projects. Continuous evaluation and reinforcement of skills help minimize human error and support the institutionalization of life-preserving behaviors across project teams (Erigha *et al*., 2019; Anichukwueze *et al*., 2019).

Safety communication and coordination mechanisms operationalize the flow of critical information throughout the organization. Reporting systems for near-misses, hazards, and incidents enable timely identification of risks and facilitate proactive interventions. Feedback mechanisms, including debriefings and post-incident reviews, allow lessons learned to be communicated across projects, ensuring that knowledge is not confined to individual teams. Coordination protocols support cross-functional collaboration, prevent siloed decision-making, and promote shared responsibility for safety outcomes. Effective communication strengthens team cohesion, encourages peer monitoring, and fosters a culture in which safety is prioritized as a collective responsibility rather than an individual obligation (Yeboah and Enow, 2018; Nwafor *et al*., 2019).

Technology and digital tools further enhance implementation by enabling real-time monitoring, predictive analytics, and decision support. Sensors, wearable devices, and IoT-enabled equipment provide continuous data on operational conditions, worker behavior, and environmental hazards. Predictive safety analytics leverage this data to anticipate risks, alert personnel to potential hazards, and support

proactive mitigation strategies. Integration of digital dashboards with decision support systems allows leaders and project managers to visualize safety performance, track key indicators, and make informed, timely decisions. Digital tools not only improve situational awareness but also facilitate systematic documentation of incidents and interventions, supporting continuous learning and feedback loops.

The mechanisms for implementation operationalize the conceptual framework by providing actionable processes that link leadership, competency, communication, and technology. Leadership and governance establish accountability and prioritize safety, while training and competency programs prepare personnel to respond effectively to hazards. Communication and coordination mechanisms ensure information flows across teams and projects, fostering collective responsibility and knowledge transfer. Digital tools enable proactive monitoring, predictive analytics, and evidence-based decision-making. Together, these mechanisms create a comprehensive and integrated approach to institutionalizing life-preserving safety practices, ensuring that high-risk PBOs can sustain consistent safety performance, reduce incidents, and cultivate a resilient, safety-oriented organizational culture.

2.4. Outcomes and Evaluation

The evaluation of life-preserving safety practices within project-based organizations (PBOs) requires a multi-level approach that considers immediate, project-level, and organizational-level outcomes. Measuring the impact of institutionalized safety practices is essential not only for assessing their effectiveness in preventing incidents but also for understanding how these interventions contribute to broader organizational performance, learning, and resilience (Ugwu-Oju *et al*., 2018; Okeke *et al*., 2019). By systematically evaluating outcomes across these levels, organizations can refine processes, reinforce positive behaviors, and ensure the sustainability of life-preserving practices.

Immediate outcomes of implementing institutionalized safety practices are often the most tangible and directly observable. One of the primary indicators is a reduction in accidents, injuries, and near-misses. By embedding proactive safety measures, such as structured risk assessments, real-time monitoring, and competency-based interventions, PBOs can minimize exposure to hazards and prevent unsafe behaviors from escalating into incidents. Empirical studies indicate that organizations that integrate standardized procedures, scenario-based training, and robust reporting systems experience measurable declines in both minor and major safety events. Improved adherence to safety procedures is another critical immediate outcome. When safety protocols are codified, communicated effectively, and reinforced through leadership engagement, employees demonstrate higher compliance with operational standards, reducing deviations and unsafe practices. Adherence is further enhanced when feedback loops, digital monitoring, and competency assessments provide continuous reinforcement, enabling workers to internalize life-preserving behaviors as part of their routine operations.

At the project level, institutionalized safety practices contribute to operational efficiency and performance. Fewer accidents and near-misses translate directly into reduced delays and cost overruns, as incidents that halt work or require remediation often result in schedule disruptions and

additional expenses. Similarly, maintaining a safe work environment protects organizational reputation, both internally and externally, by demonstrating adherence to industry safety standards and regulatory compliance. Enhanced team performance and coordination also emerge as project-level outcomes. When safety practices are systematically implemented, teams operate with clearer communication, mutual accountability, and shared awareness of hazards. Cross-functional coordination improves, as standardized procedures and consistent reporting mechanisms reduce ambiguity and enable timely decision-making (Oguntegbe *et al*., 2019; Dako *et al*., 2019). Consequently, project teams are better equipped to manage complex tasks safely while maintaining productivity.

Organizational-level outcomes reflect the long-term strategic benefits of institutionalizing safety practices. One of the most significant outcomes is the development of an institutionalized safety culture, in which safety becomes a core organizational value rather than a reactive response to incidents. Such a culture encourages proactive hazard identification, continuous reporting, and mutual monitoring, ensuring that life-preserving behaviors are embedded across all levels of the organization. Continuous learning and improvement constitute another critical organizational outcome. By systematically capturing lessons learned, analyzing near-misses, and integrating feedback into updated procedures, organizations create a dynamic process of knowledge retention and skill enhancement. This continuous improvement loop enables PBOs to adapt safety practices to evolving project complexities and operational risks. Furthermore, resilience and adaptive capacity are enhanced in high-risk environments. Organizations with institutionalized safety systems are better prepared to respond to unexpected hazards, adjust procedures, and maintain operational continuity despite changing conditions. Resilient organizations not only prevent incidents but also demonstrate the ability to recover quickly and maintain performance in the face of disruptions.

In evaluating these outcomes, a combination of quantitative and qualitative methods is recommended. Key performance indicators (KPIs), such as incident rates, near-miss frequency, procedure compliance metrics, and project timelines, provide measurable evidence of immediate and project-level improvements. Qualitative assessments, including employee surveys, focus groups, and leadership interviews, provide insights into safety culture, team coordination, and the effectiveness of continuous learning mechanisms. Together, these evaluation methods offer a comprehensive understanding of the impact of institutionalized safety practices.

The outcomes and evaluation of institutionalized life-preserving safety practices in PBOs encompass immediate reductions in accidents and improved compliance, project-level improvements in efficiency, coordination, and risk management, and organizational-level gains in culture, learning, and resilience. Systematic evaluation not only validates the effectiveness of safety interventions but also informs ongoing refinements, ensuring that life-preserving behaviors are sustained, organizational risks are mitigated, and high-risk operations are managed proactively. By linking immediate, project, and organizational outcomes, PBOs can establish a robust, evidence-based foundation for continuous safety performance improvement.

2.5. Implications

The institutionalization of life-preserving safety practices within project-based organizations (PBOs) carries significant implications for safety management practice, policy and regulation, and future research. By embedding safety as a systemic organizational capability rather than a reactive, project-specific function, organizations can transform their approach to risk, enhance governance, and foster sustainable improvements in safety performance (Ahmed and Odejobi, 2018; Michael and Ogunsola, 2019). The adoption of a conceptual model integrating leadership, human factors, and digital tools offers actionable insights for practitioners, regulators, and scholars seeking to reduce accidents, improve compliance, and build resilient organizational cultures.

For safety management practice, the transition from blame-oriented to system-oriented approaches represents a fundamental shift in how safety is perceived and managed. Traditional practices often focus on identifying individual errors after incidents, which can create a culture of fear, inhibit reporting, and obscure underlying systemic issues. A system-oriented perspective emphasizes the identification of latent conditions, procedural gaps, and organizational vulnerabilities that contribute to unsafe behaviors. By adopting this approach, project managers and safety professionals can focus on preventive measures, risk anticipation, and continuous improvement, rather than reactive enforcement. Integration of human factors and safety leadership into project governance further enhances safety performance. Recognizing the influence of cognitive biases, fatigue, stress, and decision-making limitations on operational outcomes allows organizations to implement targeted interventions such as simulation-based training, scenario planning, and competency assurance programs. Embedding safety leadership into governance structures ensures that risk management is not an ancillary activity but a core responsibility of executives and project managers, aligning safety objectives with project outcomes and organizational strategy (Seyi-Lande *et al*., 2018; Odejobi *et al*., 2019).

Policy and regulatory implications are equally significant. The conceptual model supports the standardization of safety practices across projects, ensuring consistency in procedures, reporting mechanisms, and performance expectations. Standardization reduces variability in adherence, mitigates risks associated with project turnover, and facilitates organizational learning across project teams. Furthermore, strengthened accountability and contractor governance are critical for maintaining safety standards in complex project environments involving multiple subcontractors and stakeholders. Regulatory bodies can leverage insights from the model to develop guidelines that promote proactive safety practices, enforce transparent reporting, and hold organizations accountable for embedding life-preserving behaviors within contractual and operational frameworks. Such policies enhance not only compliance but also industry-wide safety benchmarks, supporting a culture of continuous improvement.

From a research perspective, the conceptual model offers opportunities for empirical validation and longitudinal study. Cross-industry testing can assess the generalizability of the model across diverse project-based settings, including construction, oil and gas, and heavy industrial sectors. Empirical studies can quantify the impact of integrated safety mechanisms on incident reduction, procedural adherence, and project performance, providing evidence-based support for adoption. Longitudinal studies are particularly valuable for examining the process of institutionalization, tracking how leadership, culture, training, and digital tools collectively influence the persistence of life-preserving behaviors over time. Such research can also explore moderating and mediating factors, including organizational culture, safety climate, and team cohesion, to refine the model and identify context-specific interventions. By establishing robust empirical foundations, scholars can advance safety management theory while informing practical applications that enhance resilience and operational performance.

The implications of institutionalizing life-preserving safety practices extend across practice, policy, and research domains. For safety management practice, the shift toward system-oriented approaches and integration of human factors and leadership into project governance fosters proactive risk management and continuous improvement. Policy and regulatory frameworks benefit from standardized practices and strengthened accountability, creating consistent safety benchmarks and promoting industry-wide adherence. For research, empirical validation and longitudinal investigation provide opportunities to refine the model, assess its generalizability, and examine the sustainability of institutionalized safety behaviors. Collectively, these implications underscore the strategic value of the conceptual model in transforming high-risk project environments, reducing accidents, and embedding safety as a core organizational capability. By bridging theory and practice, the model provides a pathway for PBOs to achieve resilient, life-preserving safety outcomes that persist across projects, teams, and organizational structures (NWAFOR *et al*., 2018; Bayeroju *et al*., 2019).

3. Conclusion

This study has presented a conceptual model for institutionalizing life-preserving safety practices across project-based organizations (PBOs), integrating leadership, human factors, procedural standardization, communication, and technology to ensure consistent and proactive safety performance. The model emphasizes the central role of safety leadership and governance in establishing accountability and reinforcing life-preserving behaviors, while structured policies, standard operating procedures, and risk assessment mechanisms provide a foundation for predictable, safe operations. Training, competency assurance, and scenario-based learning equip personnel to perform high-risk tasks effectively, and robust communication and coordination channels ensure timely information flow, feedback, and cross-project knowledge sharing. The framework also incorporates moderating and mediating variables, such as organizational culture, safety climate, team cohesion, and digital monitoring tools, which enhance the translation of policy into practice and support continuous improvement.

The strategic importance of institutionalizing these safety practices lies in their ability to embed safety into the organizational fabric, rather than treating it as an episodic or project-specific concern. By codifying best practices, integrating safety into project lifecycle processes, and establishing continuous learning loops, organizations can reduce accidents, near-misses, and operational disruptions while enhancing team coordination and project outcomes. Institutionalization fosters resilience, ensuring that safety

behaviors persist despite personnel turnover, temporary organizational structures, and dynamic project conditions, thus supporting sustainable, life-preserving practices across multiple projects.

This conceptual model contributes to safety science by linking human, organizational, and technological dimensions in a unified framework, advancing understanding of systemic safety management in high-risk environments. It informs project management by providing structured mechanisms for integrating safety into governance, operations, and team coordination, while also reinforcing organizational learning through continuous feedback and cross-project knowledge transfer. Collectively, the model offers a practical and theoretically grounded pathway for PBOs to achieve safer, more resilient operations, positioning safety as a strategic enabler of organizational performance and long-term sustainability.

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