Proceedings of the 2026 International Conference on Global Science and Business (ICGSB 2026)
ISSN : ...
Jakarta, 16 – 18 April, 2026, pp. 137-146

Human Factors in Fire Emergency Response in the Hospitality Sector: Rethinking Preparedness in High-Risk Service Environments

Ja'far Amiruddin[1]

[1] Department of Fire Safety Engineering, Universitas Negeri Jakarta, Indonesia

[2]DBA Programme, The Philippine Women's University, Philippines

Abstract. Fire emergency preparedness in the hospitality sector is often evaluated through technical infrastructure and regulatory compliance, overlooking the human factors that influence emergency response. This conceptual paper examines how cognitive, behavioral, and organizational factors shape fire preparedness in hotel environments. Drawing on literature from safety science, human reliability, and organizational behavior, the study synthesizes the roles of risk perception, situational awareness, stress, leadership, and safety climate in emergency decision-making. The analysis suggests that service demands, hierarchical expectations, and competing operational priorities may delay protective actions despite established safety procedures. It proposes a human-centered conceptual model that understands preparedness as a dynamic capability emerging from interactions between individual cognition and organizational conditions.

1 Introduction

Fire incidents remain a persistent threat to the hospitality industry worldwide. Hotels operate as complex socio-technical environments characterized by high occupancy rates, continuous operations, and diverse human interactions, conditions that increase organizational vulnerability during emergency situations. Although significant advances

[1] Corresponding author: jafar_amiruddin@unj.ac.id

have been made in fire detection systems, suppression technologies, and regulatory compliance frameworks, research in safety science and evacuation behavior consistently shows that the presence of technical safeguards does not automatically translate into effective emergency response outcomes (Kinateder et al., 2015; Lovreglio, 2022).

In practice, evacuation performance and emergency effectiveness are strongly influenced by how individuals perceive risks, interpret warning cues, and make decisions under time pressure (Lin, 2023). Within the hospitality sector, this human dimension becomes even more salient, as employees frequently operate under high workload, service pressure, and emotional labor demands that may shape attention, vigilance, and response behavior in critical situations (Saito et al., 2025; Xie et al., 2020).

Empirical studies on hotel disaster preparedness further indicate that procedural compliance and safety literacy alone are insufficient without behavioral readiness and organizational reinforcement mechanisms (Tsai et al., 2020; Noumeur et al., 2024). From a global business perspective, the consequences of inadequate emergency response extend beyond safety outcomes to include business continuity disruption, reputational damage, and erosion of stakeholder trust, thereby underscoring the need to reconceptualize fire preparedness as a behavioral capability embedded within organizational systems rather than merely a technical condition (Brown et al., 2021; Yu et al., 2022).

2 Fire Risk in the Hospitality Industy

Hotels have a unique fire risk profile compared to other building types. They operate continuously, accommodate large numbers of guests who are often unfamiliar with the building layout, and involve a wide range of fire-triggering activities, including cooking operations, laundry processes, extensive electrical use, and maintenance work. Such characteristics create a complex socio-technical environment in which interactions between infrastructure, human behavior, and service demands may amplify vulnerabilities, allowing minor errors or delayed responses to escalate into major incidents (Kinateder et al., 2015; Lovreglio, 2022). The presence of guests with limited situational awareness further complicates evacuation dynamics, as decision-making during emergencies is frequently shaped by uncertainty, information processing under stress, and social influence processes (Lin, 2023).

Beyond physical and operational hazards, organizational characteristics also contribute significantly to fire vulnerability in the hospitality sector. High employee turnover, shift-based scheduling systems, and culturally diverse workforces may result in uneven safety knowledge, inconsistent training retention, and variability in emergency preparedness levels across departments (Xie et al., 2020; Tsai et al., 2020). At the same time, the strong customer-service orientation inherent in hotel operations may unintentionally reinforce risk-taking behaviors, as employees prioritize guest comfort, service continuity, or managerial approval before initiating protective actions. Such role conflict between safety compliance and service delivery can delay emergency responses and weaken the effectiveness of established procedures.

Research on human behavior during fire emergencies consistently demonstrates that individuals rarely respond instantly to alarms. Instead, they often seek confirmation,

interpret social cues, try to gather belongings, or underestimate the threat before deciding to evacuate (Kuligowski et al., 2017; Kinateder et al., 2015). In hotel settings, these behavioral tendencies may be further shaped by professional identity and perceived responsibility, leading employees to manage incidents independently, assist guests prior to self-evacuation, or wait for explicit managerial instructions (Noumeur et al., 2024). While such actions may reflect commitment and service ethics, they can inadvertently increase exposure to danger and prolong pre-evacuation time.

Taken together, these patterns underscore that fire preparedness in hotels cannot be understood solely in terms of structural adequacy or regulatory compliance. Rather, preparedness must be conceptualized as a behavioral and organizational phenomenon in which cognition, social norms, leadership signals, and role expectations interact with technical systems to shape emergency outcomes. Viewing preparedness through this integrated lens allows for a more comprehensive understanding of vulnerability and provides a stronger foundation for enhancing resilience in the hospitality industry (Brown et al., 2021; Lovreglio, 2022).

3 Human Factors in Emergency Response

Human factors play a crucial role in determining how individuals respond during a fire emergency. These factors encompass risk perception, situational awareness, decision-making under time pressure, stress regulation, and prior experience, all of which interact dynamically in high-uncertainty environments. In emergencies, individuals must rapidly interpret environmental cues, assess the credibility of warning signals, and choose appropriate actions despite incomplete information. Empirical research in evacuation science demonstrates that perception and interpretation processes strongly influence pre-evacuation time and the initiation of protective actions, often determining whether individuals act immediately or delay their response (Kinateder et al., 2014; Lovreglio, 2022). When cognitive appraisal fails (through underestimating risk, ambiguity in alarm interpretation, or diffusion of responsibility) response delays can significantly increase exposure to danger.

Safety science literature consistently emphasizes that accidents and emergency failures rarely stem from technical breakdowns alone; rather, they emerge from the interaction between human cognition, organizational conditions, and system design (Dekker, 2014; Leveson, 2016). In complex service environments such as hotels, employees may ignore weak signals, normalize deviant conditions, misinterpret alarm cues as false alerts, or hesitate to act due to uncertainty and perceived role expectations. These tendencies are not merely individual shortcomings but reflect how organizational norms, workload, and communication structures shape risk interpretation and action thresholds. Understanding these cognitive-behavioral processes is therefore central to evaluating the true effectiveness of emergency response systems.

Situational awareness remains a foundational construct in explaining emergency performance. It involves perceiving environmental elements, understanding their meaning, and projecting their future status over a short time horizon. In fire contexts, this means recognizing abnormal cues (e.g., smell of smoke, unusual heat, alarm

activation), understanding the potential escalation trajectory, and anticipating necessary protective actions. Recent research in high-risk environments suggests that situational awareness is highly sensitive to task saturation, divided attention, and competing role demands (Salmon, 2016; Lin, 2023). In hotel operations, where employees are continuously engaged in guest-facing activities, maintaining vigilance for safety can be particularly challenging, especially when service priorities compete with risk-monitoring responsibilities.

Stress further complicates emergency response behavior. Acute stress reactions trigger physiological and psychological responses that may impair working memory, narrow attentional focus, and disrupt coordination among team members. Studies in Safety Science indicate that under high stress, individuals often revert to habitual routines, delay decisions while seeking confirmation, or experience temporary response paralysis rather than engage in adaptive problem-solving (Kinateder et al., 2014; McLennan et al., 2012). In hospitality settings, where employees are socialized to maintain composure and prioritize guest comfort, stress-induced cognitive narrowing may unintentionally delay protective action. These findings underscore that preparedness should not be confined to procedural instruction alone but must also strengthen cognitive readiness, stress-management capacity, and adaptive decision-making under uncertainty.

4 Organizational Influence on Preparedness Behavior

Organizations play a critical role in shaping how employees perceive and respond to safety risks. Leadership commitment, communication transparency, supervisory practices, and the prevailing safety climate collectively influence employees' safety-related attitudes and behavioral intentions. Empirical research consistently demonstrates that when leaders visibly prioritize safety, allocate resources to risk management, and reinforce safety norms through daily interactions, employees are more likely to remain vigilant and engage in proactive safety behaviors (Clarke, 2013; Neal & Griffin, 2002). Conversely, inconsistent leadership signals or weak communication structures may create ambiguity about risk tolerance and response expectations, particularly during emergencies.

Safety climate research further suggests that employees interpret organizational priorities not only through formal policy statements but also through routine managerial decisions and operational trade-offs (Zohar & Polachek, 2014). In service-oriented industries such as hospitality, where productivity metrics, guest satisfaction scores, and efficiency targets are highly visible performance indicators, employees may implicitly perceive safety as secondary if it is not consistently reinforced at the operational level. Such perceptions can shape cognitive schemas regarding acceptable risk and influence response thresholds during emergencies, thereby weakening preparedness and delaying protective actions (Neal & Griffin, 2002; Christian et al., 2009).

Training constitutes another pivotal organizational mechanism. Although technical instruction enhances procedural knowledge and compliance capability, knowledge acquisition does not automatically translate into adaptive behavior under stress. Research in Safety Science indicates that scenario-based simulations, immersive drills,

and experiential learning approaches are significantly more effective than traditional lecture-based training in improving decision-making speed, situational awareness, and confidence during emergencies (Kinateder et al., 2014; Stanton, 2016). Experiential training allows employees to rehearse cognitive processing under time pressure, reducing uncertainty and strengthening behavioral automaticity during real incidents.

The organizational reliability literature further underscores the importance of collective mindfulness and sustained attention to operational anomalies. Studies on high-reliability organizing emphasize preoccupation with failure, reluctance to simplify interpretations, and sensitivity to frontline operations as core attributes of resilient systems (Sutcliffe et al.,2016; Vogus & Sutcliffe, 2012). Within such environments, employees are encouraged to detect weak signals, report near misses, and respond proactively before minor irregularities escalate into major events. In the hospitality context, this perspective suggests that cultivating vigilance, psychological safety for reporting concerns, and continuous risk awareness may significantly enhance preparedness behavior. Rather than viewing fire readiness as a compliance obligation, organizations should embed it within everyday operational mindfulness, thereby aligning safety performance with organizational resilience.

5 Discussion

This article reviews fire preparedness in the hospitality sector by shifting the analytical focus from technical readiness to human-centered behavioral capabilities. Although modern hotels increasingly use advanced detection technologies, suppression systems, and compliance-based safety management frameworks, empirical research consistently shows that emergency effectiveness ultimately depends on individuals' risk perceptions, interpretations of environmental cues, and actions under stress (Kinateder et al., 2014; Lovreglio, 2022). Contemporary safety science further emphasizes that accidents and emergency response failures rarely stem from isolated technical breakdowns; instead, they emerge from complex interactions among human cognition, system design, and organizational conditions (Dekker, 2014; Leveson, 2016). This systems perspective suggests that preparedness should be understood not as a static technical condition, but as an adaptive behavioral capability embedded within organizational processes.

Within the hotel environment, these human–system interactions are intensified by the nature of service work. Employees operate in fast-paced, customer-centered settings where attention is continuously divided between operational efficiency and guest satisfaction. This divided attention creates a cognitive landscape in which employees may overlook or deprioritize weak safety signals. Occupational safety research indicates that when performance demands compete, employees often allocate cognitive resources to productivity-related tasks, potentially reducing vigilance toward emerging risks (Christian et al., 2009; Neal & Griffin, 2016). In hospitality operations, this dynamic can delay fire response, particularly when safety cues conflict with service expectations.

Another key insight concerns how risk perception and situational awareness shape emergency behavior. Fire incidents often unfold amid ambiguity and time pressure,

requiring people to interpret incomplete or changing information. Research on evacuation behavior consistently finds that individuals often seek confirmation, observe others' reactions, or reinterpret alarms before taking protective action, thereby prolonging pre-evacuation time (Kinateder et al., 2015; Lovreglio, 2022). In hotel contexts, employees may hesitate while awaiting managerial direction, attempt to manage incidents informally, or prioritize assisting guests before initiating formal emergency protocols. These behavioral tendencies illustrate how professional norms and hierarchical structures can shape response thresholds.

This discussion also reinforces the central role of organizational context in shaping preparedness behavior. Safety climate research shows that employees infer organizational priorities from leadership behavior, communication practices, and resource allocation decisions; these perceptions significantly influence their risk awareness and willingness to intervene (Clarke, 2013; Zohar & Polachek, 2014). When safety is consistently embedded within daily operations, reinforced by supervisors, and integrated into performance expectations, employees are more likely to maintain vigilance and act decisively during emergencies.

From a human reliability and high-reliability organizing perspective, organizations that successfully manage operational risk cultivate continuous sensitivity to anomalies and encourage proactive reporting of weak signals. Empirical studies on mindful organizing indicate that sustained attention to potential failure, rather than relying solely on periodic compliance training, strengthens adaptive capacity in complex systems (Sutcliffe et al., 2016; Vogus & Sutcliffe, 2012). Applying this lens to the hospitality sector suggests that effective fire preparedness requires ongoing cognitive engagement and organizational reinforcement, not merely adherence to procedural checklists.

Overall, this review underscores the need to move beyond compliance-oriented safety management toward a holistic framework that integrates behavioral, cognitive, and organizational dimensions. By reframing fire preparedness as a dynamic capability shaped by leadership, climate, cognition, and mindfulness, the hospitality industry can enhance resilience and reduce vulnerability to high-impact emergencies.

6 Explanation of the conceptual model

Drawing on a synthesis of the literature and insights from contemporary safety research, this article proposes a conceptual understanding of fire preparedness as a human-centered process shaped by multiple interacting factors, rather than a purely technical condition. Safety science increasingly recognizes preparedness as an emergent property of socio-technical systems, arising from the dynamic interaction between individual cognition, organizational structures, and operational environments (Dekker, 2014; Leveson, 2016). Within this perspective, preparedness is not reducible to procedure compliance or equipment availability, but reflects individuals' adaptive capacity within structured organizational contexts.

At the individual level, human factors such as safety awareness, risk perception, prior experience, stress regulation, and decision-making under time pressure influence how employees interpret emergency signals and determine appropriate actions. Research on

evacuation behavior and human factors shows that perception and cognitive appraisal significantly shape response latency and the choice of protective action (Kinateder et al., 2015; Lovreglio, 2022). Individuals do not simply react to alarms; they interpret cues through cognitive schemas shaped by training, experience, and social expectations. Under stress, these interpretations may accelerate, distort, or delay, influencing the effectiveness of emergency response behavior (Lin, 2023).

However, these human factors do not operate in isolation. They are strongly shaped by organizational influences, including leadership commitment, communication practices, supervisory reinforcement, training design, and the prevailing safety climate. Empirical research consistently shows that when leaders visibly prioritize safety and embed it into daily operational routines, employees demonstrate higher levels of vigilance and proactive safety behavior (Clarke, 2013; Neal & Griffin, 2016). Safety climate, in particular, acts as a perceptual filter through which employees interpret organizational priorities, influencing whether they take safety signals seriously or deprioritize them under performance pressure (Zohar & Polachek, 2014). Training approaches further moderate this relationship; experiential and scenario-based learning methods have been found to strengthen situational awareness and behavioral readiness more effectively than purely technical instruction (Kinateder et al., 2014).

In the hotel context, this interaction between individual cognition and organizational influence is especially critical. Hotel employees often serve as first responders in fire emergencies, guiding evacuations, assisting guests with limited situational awareness, and initiating internal safety procedures before external responders arrive. Their preparedness, therefore, cannot be understood solely as a personal competency; it results from organizational priorities, resource allocation, and cultural reinforcement. Studies on resilience in the hospitality sector suggest that organizational preparedness significantly shapes frontline behavior during crises, influencing both safety outcomes and operational continuity (Brown et al., 2021).

The conceptual model advanced in this article thus emphasizes that preparedness is not a static condition achieved solely through infrastructure. Instead, it should be conceptualized as a dynamic behavioral capacity that develops through continuous interaction between individuals and the organizational environment. Drawing on high-reliability organizing research, preparedness is sustained through ongoing mindfulness, attention to weak signals, and reinforcement of safety-oriented norms, not episodic compliance checks (Sutcliffe, 2018; Vogus & Sutcliffe, 2012). By framing fire preparedness as an evolving capability embedded within socio-organizational systems, this perspective provides a more comprehensive foundation for strengthening resilience in the hospitality industry

7 Managerial Implications for Global Business

From a global business perspective, strengthening fire preparedness in the hospitality sector carries implications that extend well beyond immediate safety outcomes. Fire incidents can disrupt operations, interrupt revenue streams, damage brand reputation, and erode customer trust, particularly in an industry where perceptions of safety and reliability are central to competitive positioning. Research in

tourism and hospitality management consistently shows that crisis events significantly influence customer satisfaction, loyalty intentions, and long-term brand equity (Yu et al., 2022). Moreover, studies on organizational resilience in the hotel sector demonstrate that inadequate preparedness can prolong operational downtime and weaken recovery capacity, thereby affecting financial performance and stakeholder confidence (Brown et al., 2021). In a globally connected market where information spreads rapidly through digital media, even a single major fire incident can generate reputational consequences that extend far beyond the event's location.

In this context, leadership plays a pivotal role in promoting safety awareness as a core organizational priority rather than a compliance requirement. Empirical research indicates that visible leadership commitment, consistent safety communication, and alignment between words and actions significantly influence employees' safety behaviors and risk sensitivity (Clarke, 2013; Neal & Griffin, 2002). When leaders model safety-oriented decision-making and allocate sufficient resources to preparedness initiatives, employees are more likely to see safety as an integral part of performance. In contrast, ambiguous or inconsistent leadership signals may undermine vigilance, particularly in high-pressure service environments.

Training practices likewise require strategic reconsideration. While traditional instruction provides foundational procedural knowledge, research in safety and human factors suggests that simulation-based training, immersive drills, and experiential learning approaches more effectively enhance cognitive readiness, stress regulation, and adaptive decision-making under uncertainty (Kinateder et al., 2014; Stanton, 2016). These approaches let employees rehearse responses in realistic scenarios, strengthening situational awareness and reducing hesitation during actual emergencies. In hospitality, where employees may serve as immediate responders before external emergency services arrive, strengthening these cognitive and behavioral competencies is especially critical.

Ultimately, integrating safety into organizational culture represents a strategic investment in long-term resilience and global business continuity. Studies on high-reliability organizing emphasize that sustained attention to operational risk, proactive reporting of anomalies, and reinforcement of safety norms enhance adaptive capacity in complex systems (Sutcliffe et al, 2016; Vogus & Sutcliffe, 2012). For hospitality organizations operating across international markets, balancing investment in physical infrastructure with parallel investment in human capability development is essential. Infrastructure provides the technical foundation for protection, but human awareness, leadership reinforcement, and organizational culture determine whether those systems function effectively during crises. By embedding safety in strategic management priorities, hotels can strengthen resilience, safeguard stakeholder trust, and build a sustainable competitive advantage in the global marketplace.

8 Conclusion

This paper concludes that effective fire emergency preparedness in the hospitality sector extends beyond technical infrastructure and regulatory compliance. By synthesizing safety science and organizational research, it conceptualizes preparedness

as a dynamic capability shaped by risk perception, situational awareness, decision-making under stress, leadership, and organizational safety climate. In hotel environments, competing service priorities and hierarchical expectations may undermine timely protective actions despite established safety procedures.

The proposed human-centered perspective emphasizes integrating behavioral readiness into organizational safety management through scenario-based training, consistent leadership reinforcement, and ongoing risk awareness. For hospitality organizations, this approach provides a conceptual foundation for strengthening emergency responsiveness, organizational resilience, and business continuity. As a conceptual study, the proposed relationships require empirical validation across different hospitality settings to establish their practical applicability.

References

Brown, N. A., Rovins, J. E., Feldmann-Jensen, S., Orchiston, C., & Johnston, D. (2021). Exploring disaster resilience within the hotel sector: A case study. International Journal of Disaster Risk Reduction, 56, 102139. https://doi.org/10.1016/j.ijdrr.2021.102080

Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. Journal of Occupational and Organizational Psychology, 86(1), 22–49. https://doi.org/10.1111/j.2044-8325.2012.02064.x

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety: A meta-analysis of the roles of person and situation factors. Journal of Applied Psychology, 94(5), 1103–1127. https://doi.org/10.1037/a0016172

Dekker, S. (2014). The bureaucratization of safety. Safety Science, 70, 348–357. https://doi.org/10.1016/j.ssci.2014.07.015

Kinateder, M. T., Kuligowski, E. D., Reneke, P. A., & Peacock, R. D. (2015). Risk perception in fire evacuation behavior revisited: Definitions, related concepts, and empirical evidence. Fire Science Reviews, 4(1). https://doi.org/10.1186/s40038-014-0005-z

Kinateder, M., Ronchi, E., Nilsson, D., Kobes, M., Müller, M., Pauli, P., & Mülberger, A. (2014). Virtual Reality for Fire Evacuation Research. In A. Krasuski & G. Rein (Eds.), Federated Conference on Computer Science and Information Systems (Vol. 2, pp. 313–321). IEEE - Institute of Electrical and Electronics Engineers Inc.

Leveson, N. (2012). Engineering a safer world: Systems thinking applied to safety. MIT Press. https://doi.org/10.7551/mitpress/8179.001.0001

Lin, J., Li, N., Rao, L.-L., & Lovreglio, R. (2023). Individual wayfinding decisions under stress in indoor emergency situations: A theoretical framework and meta-analysis. Safety Science, 160, 1–19. https://doi.org/10.1016/j.ssci.2023.106063

Lovreglio, R. (2022). A pre-evacuation study using data from evacuation drills and false alarm evacuations in a university library. Fire Safety Journal, 131, 103595. https://doi.org/10.1016/j.firesaf.2022.103595

McLennan, J., Elliott, G., & Omodei, M. (2012). Householder decision-making under imminent wildfire threat: stay and defend or leave? International journal of wildland fire, 21(7), 915–925. https://doi.org/10.1071/WF11061

Neal, A., & Griffin, M. A. (2002). Safety Climate and Safety Behaviour. Australian Journal of Management, 27(1_suppl), 67–75. https://doi.org/10.1177/031289620202701S08 (Original work published 2002)

Noumeur, A., Mohd Tohir, M. Z., Lovreglio, R., Md Said, M. S., Baharudin, M. R., & Mohamed Yusoff, H. (2024). A study of staff pre-evacuation behaviors in a Malaysian hotel. Fire and Materials. https://doi.org/10.1002/fam.3250

Saito, H., Kim, H., & Park, J. (2025). Well-being of hospitality employees: A systematic literature review. International Journal of Hospitality Management, 116, 103563. https://doi.org/10.1016/j.ijhm.2024.103563

Stanton, N. A. (2016). Distributed situation awareness. Theoretical Issues in Ergonomics Science, 17(1), 1–7. https://doi.org/10.1080/1463922X.2015.1106615

Sutcliffe, Kathleen M., Vogus, Timothy J., and Dane, Erik. Mindfulness in Organizations: A Cross-Level Review (March 2016). Annual Review of Organizational Psychology and Organizational Behavior, Vol. 3, Issue 1, pp. 55–81, 2016, Available at SSRN: https://ssrn.com/abstract=2754551 or http://dx.doi.org/10.1146/annurev-orgpsych-041015-062531

Tsai, C.-H., Linliu, S.-C., Chang, R. C. Y., & Mak, A. H. N. (2020). Disaster prevention management in the hotel industry: Hotel disaster prevention literacy. Journal of Hospitality and Tourism Management, 45, 444–455. https://doi.org/10.1016/j.jhtm.2020.09.008

Vogus, T. J., & Sutcliffe, K. M. (2012). Organizational mindfulness and mindful organizing: A reconciliation and path forward. Academy of Management Learning & Education, 11(4), 722–735. https://doi.org/10.5465/amle.2011.0002C

Xie, C., Zhang, J., Chen, Y., Morrison, A., & Lin, Z. (2020). Measuring hotel employee perceived job risk: Dimensions and scale development. International Journal of Contemporary HospitalityManagement, 32(2), 730–748. https://doi.org/10.1108/ijchm-01-2019-0022

Yu, M., Cheng, M., Yang, L., & Yu, Z. (2022). Hotel guest satisfaction during COVID-19 outbreak: The moderating role of crisis response strategy. Tourism Management, 93, 104618. https://doi.org/10.1016/j.tourman.2022.104618

Zohar, D., & Polachek, T. (2014). Discourse-based intervention for modifying supervisory communication as leverage for safety climate and performance improvement: A randomized field study. Journal of Applied Psychology, 99(1), 113–124. https://doi.org/10.1037/a0034096