

Psychological and Organisational Predictors of Risk and Safety Management: Evidence from Public Institutions¹

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Abstract:

Effective risk and safety management in contemporary organisations depends on complex interactions among human, organisational, and environmental factors. This study examines the psychological determinants of safety management in Romanian public institutions by analysing the interrelationships among executor (worker), means of production, work environment, and workload. Data from 512 managers were analysed using Spearman's rho correlation coefficients. Results reveal strong positive associations among all components, particularly between worker characteristics and workload ($p = 0.92$, $p < .001$) and between work environment and workload ($p = 0.95$, $p < .001$). These findings support a systems-based psychological model of organisational safety, emphasising the importance of integrated managerial strategies for accident prevention, safety culture development, and sustainable organisational performance.

Keywords: risk perception; safety climate; work system; accident prevention; organizational psychology.

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Introduction

Risk and safety management represent fundamental dimensions of organizational functioning, particularly in institutional environments characterized by high operational complexity and responsibility. In contemporary society, marked by accelerated technological development and increasing system interdependence, organizations are confronted with diversified and unpredictable risks that challenge traditional safety paradigms. While classical approaches to risk management have primarily emphasized technical controls, regulatory compliance, and procedural standardization, contemporary research increasingly highlights the decisive role of psychological and organizational factors, such as risk perception, cognitive appraisal, leadership behaviour, and safety culture, in shaping accident prevention and organizational resilience (Syed-Yahya et al., 2022; García-Mainar & Montuenga, 2024).

From a psychological perspective, risk perception is not merely a rational evaluation of objective hazards, but a cognitive–emotional process influenced by individual experience, beliefs, values, and organizational context. Decision-makers' interpretations of uncertainty, threat, and responsibility significantly affect how safety policies are implemented and how preventive strategies are prioritized. Consequently, understanding managerial risk perception becomes essential for explaining differences in safety performance across organizations, even when formal safety procedures appear similar. Undesirable events generate not only material and financial losses but also profound psychological consequences, including stress, anxiety, emotional exhaustion, and diminished trust in organizational protection mechanisms, thereby directly affecting employee well-being and institutional climate.

Organizational psychology further emphasizes that safety emerges from the dynamic interaction between human factors, work environment, task demands, and organizational structures. The work system approach conceptualizes safety as the product of interdependent components, including the worker (executor), means of production, work environment, and workload. Disruptions or misalignments among these components increase the likelihood of accidents, while their coherent integration fosters safety, efficiency, and employee well-being. Thus, accident prevention cannot be reduced to isolated interventions but requires a systemic understanding of psychological, technical, and organizational interactions. Empirical studies consistently demonstrate that safety performance improves when preventive strategies integrate technological safeguards with behavioural awareness, leadership engagement, and organizational learning mechanisms (Syed-Yahya et al., 2022).

In public institutions, these challenges are amplified by bureaucratic constraints, regulatory complexity, and limited managerial flexibility, which can affect both risk awareness and preventive decision-making. Moreover, public-sector organizations often operate under conditions of limited resources, high accountability, and increased public scrutiny, intensifying managerial responsibility for employee safety and institutional integrity. Despite the growing international literature on organizational safety and risk management, empirical research examining how managerial risk perception shapes safety practices within public-sector organizations remains limited, particularly in Eastern European contexts. Most existing studies concentrate on private enterprises or high-risk industrial sectors, leaving a significant gap in understanding the psychological mechanisms underlying safety management in public institutional environments.

Despite extensive research on risk management, limited empirical evidence exists regarding how managerial risk perception influences organizational safety culture in public institutions, particularly in Eastern European contexts. Addressing this gap is important, given the increasing demands placed on public organizations to enhance service quality, ensure employee well-being, and maintain operational safety under conditions of institutional reform and administrative modernization.

The present study seeks to contribute to this emerging field by investigating the psychological and organizational determinants of risk and safety management in Romanian public institutions. Specifically, it examines the relationships among key components of the work system, worker, means of production, work environment, and workload, and their perceived role in accident prevention. Using survey data collected from 512 managers and applying non-parametric statistical techniques, the study aims to clarify how managerial perceptions of risk and safety are structured and how these perceptions shape preventive practices. By integrating perspectives from organizational psychology, risk perception research, and work system theory, this study offers both theoretical and practical contributions. The findings are expected to inform the design of psychologically grounded prevention strategies, support leadership development in safety management, and enhance organizational policies aimed at strengthening safety culture and organizational resilience in public-sector institutions.

1. Literature Review

Risk management is widely conceptualized as a structured and continuous process involving the identification, analysis, evaluation, monitoring, and communication of risks, closely linked to how individuals and organizations cognitively and emotionally process uncertainty and threat (Singh et al., 2022). From a psychological perspective, risk management unfolds within a dynamic and iterative framework, in which the assessment of existing risks simultaneously generates awareness of emerging vulnerabilities, and mitigation strategies may themselves introduce new forms of uncertainty. This recursive nature reflects the complexity of human cognition, particularly the processes of anticipation, evaluation, emotional regulation, and adaptive decision-making.

Contemporary research emphasizes that risk management is embedded within organizational decision-making systems, requiring continuous reinterpretation of information and recalibration of action strategies (Arefin et al., 2022). Effective risk management extends beyond technical procedures and regulatory compliance, relying fundamentally on organizational communication, shared responsibility, and psychological safety. Open communication climates facilitate collective learning, encourage proactive reporting of hazards, and support collaborative problem-solving, thereby fostering a psychologically conducive environment for prevention-oriented behaviour (Jääskeläinen et al., 2022; Ali et al., 2022).

The systematic application of risk identification, analysis, planning, and control generates significant cognitive and organizational benefits. One of the most salient psychological outcomes is the reduction of cognitive surprise, as continuous situational monitoring enhances anticipatory awareness and preparedness. This anticipatory orientation improves judgment and decision quality by clarifying the relationship between probability and impact, thereby reducing ambiguity and emotional strain in high-stakes contexts (Turner et al., 2022). Moreover, structured risk management contributes to greater emotional regulation and

decision confidence, allowing individuals to operate with enhanced clarity under conditions of uncertainty.

A further critical contribution of effective risk management lies in the shift from reactive crisis response toward proactive prevention. Early identification of hazards enables timely interventions that are psychologically, organizationally, and financially less demanding than post-event remediation. From a cognitive standpoint, proactive strategies reduce emotional overload, stress reactivity, and attentional fragmentation, thereby preserving decision-making capacity under pressure. This preventive orientation also facilitates the strategic allocation of organizational resources, enhancing operational efficiency and psychological resilience (Agnew et al., 2013).

From a conceptual perspective, risk is commonly defined as the probability of a negative event and the magnitude of its potential consequences. Psychologically, risk perception is intrinsically connected to subjective evaluations of vulnerability, control, and threat, influencing emotional responses, motivational engagement, and behavioural adaptation. Vulnerability represents a key dimension of risk analysis, reflecting the susceptibility of individuals, systems, and assets to harm, as well as their capacity to cope with disruptive events (Samaranayake et al., 2022). Risk assessment typically involves estimating the likelihood of human injury, material damage, economic disruption, and environmental impact, integrating objective indicators with subjective judgment processes. Consequently, risk identification serves not merely as a technical exercise but as a cognitive transformation of uncertainty into structured, actionable knowledge, enabling informed organizational decisions (Shen et al., 2017).

In operational terms, risks are described through two interrelated components: conditions and consequences. Conditions refer to situational factors that generate uncertainty or threat, while consequences encompass the anticipated short- and long-term effects of risk materialization. Accurate articulation of these components facilitates strategic planning by clarifying the scope, urgency, and potential severity of intervention needs (Idris et al., 2014). Risk analysis thus aims to convert raw data into meaningful decision-relevant information, allowing organizations to prioritize interventions, optimize resource allocation, and anticipate cascading effects. Monitoring further sustains this process by enabling continuous evaluation of risk dynamics and the adaptive refinement of mitigation strategies (Nazif-Munoz et al., 2022; DiGuseppi et al., 2022).

Communication constitutes a central pillar of effective risk management, serving both instrumental and psychological functions. Transparent information exchange fosters shared situational awareness, promotes trust, and enhances collective efficacy in addressing uncertainty. Within organizational contexts, risk communication supports emotional containment, clarifies responsibility, and strengthens coordination across hierarchical levels. Moreover, it facilitates preparedness among vulnerable groups, contributing to resilience-building and the mitigation of industrial and institutional hazards (Olleja et al., 2022).

Taken together, the literature underscores that risk and safety management represent complex socio-cognitive systems, in which technical safeguards, organizational structures, and psychological processes converge. While substantial research has documented the operational and regulatory dimensions of risk management, comparatively less attention has been devoted to the psychological mechanisms shaping managerial perceptions and preventive decision-making, particularly within public-sector organizations. This gap is especially salient in Eastern European institutional contexts, where organizational cultures, administrative structures, and leadership practices may significantly modulate safety-related

cognition and behaviour. Addressing this limitation requires integrative frameworks capable of capturing the interplay between cognitive appraisal, emotional regulation, organizational dynamics, and systemic prevention strategies.

2. Research Methodology

The present study aims to examine managers' perceptions of risk and safety management in Romanian public institutions, with particular emphasis on its role in accident prevention and its influence on the functioning of the work system. From a psychological perspective, the research focuses on how decision-makers cognitively and emotionally process risk-related information, evaluate organizational vulnerabilities, and integrate preventive strategies into institutional practices. A quantitative, cross-sectional survey design was adopted to allow systematic investigation of the interrelationships among key components of the work system and their perceived contribution to organizational safety.

2.1. Conceptual Framework: The Work System Approach

The work system is conceptualized as a complex, dynamic structure composed of four interdependent components: the worker (executor), means of production, work environment, and workload. These elements interact continuously, shaping organizational performance, employee well-being, and safety outcomes. Dysfunction or imbalance in any single component may propagate across the system, increasing risk exposure and accident susceptibility.

The worker represents the central operational agent, transforming organizational inputs into concrete outputs. Individual characteristics, such as professional competence, experience, adaptability, motivation, and emotional stability, directly influence task execution quality, compliance with safety procedures, and adaptive responses to hazardous situations. Psychologically, work behaviour is closely associated with risk awareness, perceived control, and subjective evaluations of potential consequences.

The means of production include the technical resources, tools, and technologies employed in the work process. Their adequacy, reliability, and ergonomic suitability influence not only productivity but also psychophysical comfort and occupational safety. Technical deficiencies or insufficient training in equipment use can increase cognitive load, occupational stress, and operational error rates.

The work environment encompasses the physical, social, and organizational conditions under which tasks are performed. Leadership style, interpersonal relationships, organizational culture, and communication climate critically shape psychological safety, motivation, and proactive engagement in prevention practices. A supportive organizational environment fosters trust, responsibility, and safety-oriented behaviour, whereas a dysfunctional climate amplifies uncertainty, anxiety, and risk-taking tendencies.

The workload refers to the cognitive, emotional, and operational demands associated with specific professional roles. From a psychological standpoint, clarity of task objectives, coherence of expectations, and balance between demands and resources are essential for maintaining performance and preventing mental fatigue. Excessive or poorly structured workload may induce cognitive overload, attentional lapses, and emotional exhaustion, thereby increasing accident vulnerability.

2.2. Research Objectives and Hypotheses

Based on the conceptual framework and the theoretical foundations of organizational psychology, occupational safety, and risk management, the study formulated the following research objectives:

- O1: To analyse the work system as an integrated structure from the perspective of risk and safety management.
- O2: To examine the fundamental components of the work system (worker, means of production, work environment, workload).
- O3: To identify interdependence relationships among work system components and their implications for accident prevention.

Correspondingly, the following research hypotheses were formulated:

- H1: There is a statistically significant relationship between the characteristics of the worker and workload, reflected in task execution quality and perceived safety levels.
- H2: There is a statistically significant positive relationship between the work environment and task structure, indicating that organizational climate directly influences professional performance and safety.

For clarity, the relationships among research objectives, key variables, hypotheses, and applied analytical methods are synthesized in Table 1.

Table 1. Research framework: objectives, variables, hypotheses, and analytical methods

Research Objective	Variables Involved	Hypothesis	Statistical Method
O1	Worker, Means of Production, Work Environment, Workload	–	Descriptive statistics; correlation analysis
O2	Worker – Workload	H1	Spearman's rho correlation
O3	Work Environment – Task Structure	H2	Spearman's rho correlation

Note. Spearman's rho correlation coefficient was applied due to the ordinal nature of the data and deviations from normality.

Participants and Data Collection Procedure

Data were collected between August and November 2025 using a standardized questionnaire administered to managers from diverse public institutions across Romania. Participants occupied leadership, supervisory, or decision-making roles, reflecting their central involvement in organizational safety management and policy implementation.

Participation was voluntary, and respondents were informed about the purpose of the study, confidentiality of responses, and ethical research principles. A total of 512 valid questionnaires were obtained and included in the statistical analysis, providing a robust empirical foundation for testing the proposed hypotheses.

Measures and Statistical Analysis

Data processing and statistical analysis were conducted using SPSS (Statistical Package for the Social Sciences). Given the ordinal nature of questionnaire responses and deviations from normality, Spearman's rho correlation coefficient was employed to examine the strength and direction of associations between the investigated variables.

The selection of Spearman's rho is methodologically justified, as this non-parametric indicator enables reliable assessment of monotonic relationships when parametric assumptions are violated. This analytical approach allowed for rigorous examination of interdependencies among work system components and managerial perceptions of risk and safety management effectiveness.

Statistical analysis provided an objective and reproducible framework for identifying significant relational patterns, reducing interpretative bias, and enhancing the validity of empirical conclusions. The results form the basis for interpreting the psychological and organizational mechanisms underlying accident prevention and managerial engagement in safety practices.

3. Results and Discussions

To test the research hypotheses and examine the interrelationships among the core components of the work system, Spearman's rho correlation coefficient was employed (Table 2). This nonparametric statistic is particularly suitable for analysing ordinal data and distributions that deviate from normality, making it appropriate for the questionnaire-based dataset used in this study. Spearman's rho provides robust estimates of both the strength and direction of associations between variables, thereby enabling a nuanced examination of how psychological, organizational, and technical factors converge in shaping risk perception and safety management practices.

3.1 Correlational Structure of the Work System

The correlation matrix presented in Table 2 reveals a consistent pattern of strong and statistically significant positive associations among all components of the work system. These findings confirm the fundamentally interdependent nature of organizational safety, wherein individual, technical, and environmental factors interact dynamically to influence risk management effectiveness.

Table 2. Values of the Spearman *rho* correlation coefficient

Spearman's rho		Executor (worker)	Means of Production	Work Environment	Workload
Executor (worker)	Correlation coefficient	1.000	.718**	.737**	.923**
	Sig. (2-tailed)		.000	.000	.000
	N	512	512	512	512
Means of Production	Correlation coefficient	.921**	1.000	.700**	.784**
	Sig. (2-tailed)	.000		.000	.000
	N	512	512	512	512
Work Environment	Correlation coefficient	.837**	.800**	1.000	.947**
	Sig. (2-tailed)	.000	.000		.000
	N	512	512	512	512

Spearman's rho		Executor (worker)	Means of Production	Work Environment	Workload
Workload	Correlation coefficient	.823**	.784**	.895**	1.000
	Sig. (2-tailed)	.000	.000	.000	
	N	512	512	512	512

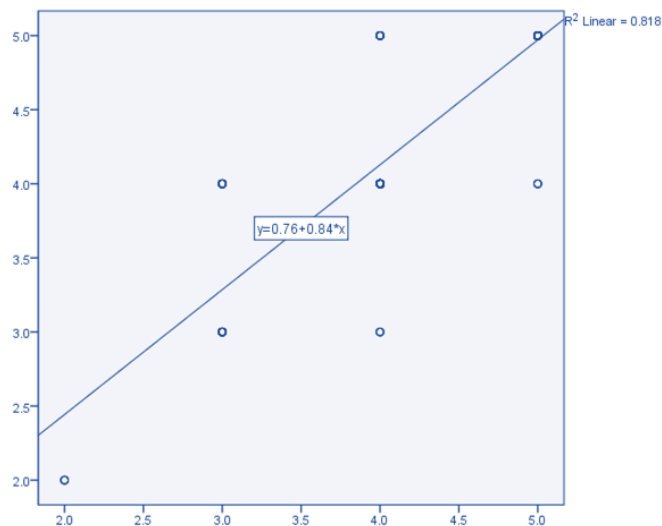
Note: **. Correlation is significant at the 0.01 level (2-tailed).

Source: processing data obtained through SPSS program

Executor (Worker) and Means of Production

A strong positive correlation was observed between the Executor (worker) and Means of Production ($\rho = 0.72$, $p < .001$), indicating that employees' competencies, experience, and engagement are closely linked to how production tools and technologies are perceived and utilized. The scatterplot analysis (Figure 1) confirms this relationship, showing a concentrated and near-linear distribution, with a coefficient of determination of $R^2 = 0.81$. This suggests that over 80% of the variability in executor performance and perception is explained by the adequacy and usability of production resources.

Figure 1. Scatter diagram – correlation between Executor (worker) and means of production



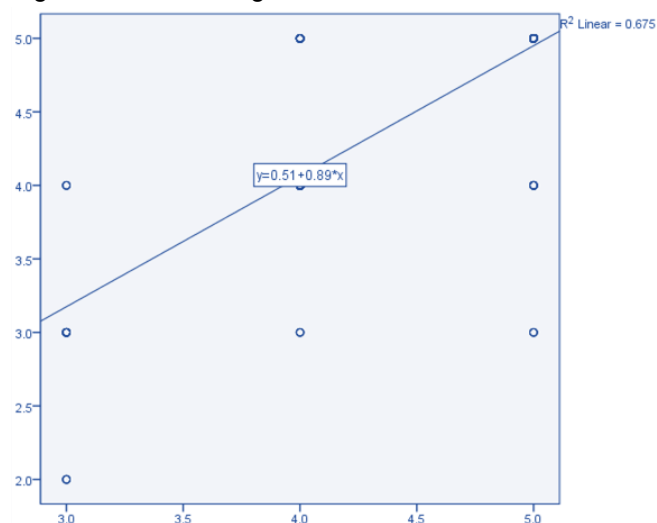
Source: processing data obtained through SPSS program

From a psychological perspective, this finding aligns with human factors and ergonomics theories, which emphasize the compatibility between human capabilities and technological systems. Well-designed, accessible, and ergonomically optimized equipment enhances perceived control, reduces cognitive strain, and fosters adaptive coping behaviours, thereby lowering accident risk. Conversely, poorly designed tools increase workload, frustration, and error propensity, reinforcing unsafe operational patterns.

Executor (Worker) and Work Environment

The relationship between the Executor and Work Environment was also strong and statistically significant ($\rho = 0.74$, $p < .001$). Figure 2 illustrates a stable and near-linear pattern ($R^2 = 0.67$), indicating that favourable environmental conditions significantly shape employee attitudes, motivation, and safety behaviour.

Figure 2. Scatter diagram – correlation between Executor (worker) and Work Environment



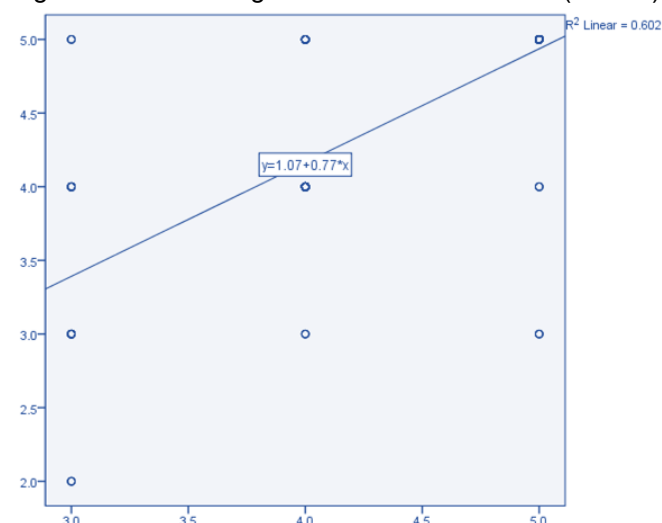
Source: processing data obtained through SPSS program

Psychologically, these results highlight the central role of the psychosocial work climate, including leadership style, interpersonal trust, communication openness, and perceived organizational support. A supportive and safety-oriented environment fosters emotional security, enhances attentional resources, and promotes compliance with safety procedures. In contrast, adverse organizational climates may heighten anxiety, cognitive overload, and disengagement, thereby amplifying vulnerability to accidents.

Executor (Worker) and Workload

The strongest association was observed between the Executor and Workload ($p = 0.92$, $p < .001$), confirming Hypothesis 1. As depicted in Figure 3, the near-perfect linear distribution ($R^2 = 0.85$) reflects a profound interdependence between individual capacities and task demands.

Figure 3. Scatter diagram – between Executor (worker) and Workload



Source: processing data obtained through SPSS program

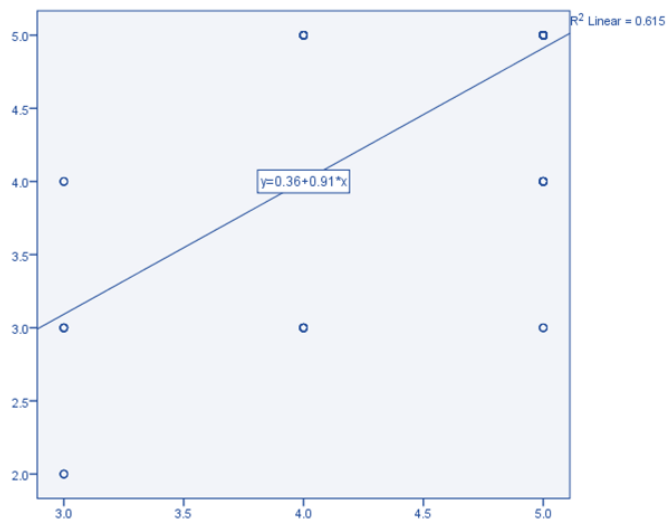
This result underscores the psychological principle that workload is not merely a structural attribute but a subjective cognitive and emotional experience. Task complexity, role ambiguity, time pressure, and responsibility burden interact with personal skills, motivation, and resilience. Excessive workload, especially under conditions of low autonomy or insufficient support, may precipitate fatigue, attentional lapses, emotional exhaustion, and ultimately unsafe behaviours. Therefore, adaptive workload calibration emerges as a critical strategy for accident prevention and performance sustainability.

3.2 Technical and Environmental Interdependencies

Means of Production and Work Environment

A significant positive relationship was identified between Means of Production and Work Environment ($p = 0.70$, $p < .001$). The scatterplot (Figure 4) reveals a concentrated linear pattern ($R^2 = 0.61$), indicating a strong mutual reinforcement between technological infrastructure and organizational context.

Figure 4. Scatter diagram – correlation between Means of Production and Work Environment



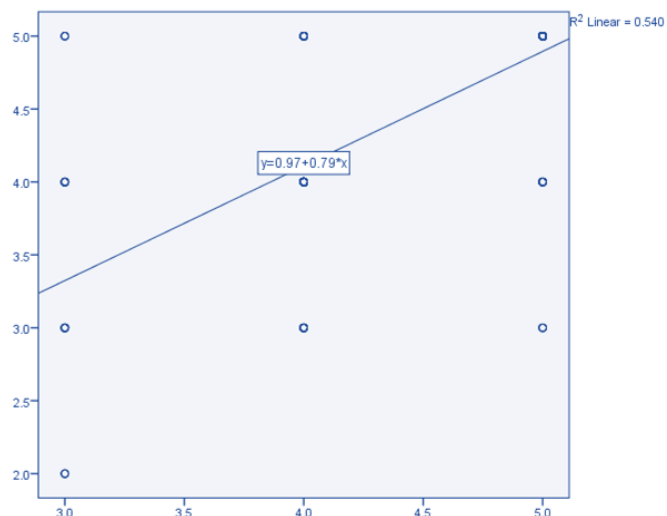
Source: processing data obtained through SPSS program

This finding reflects the principle of socio-technical systems integration, whereby technological adequacy contributes to the creation of psychologically safe and operationally efficient environments. Modern, well-maintained, and ergonomically sound equipment enhances comfort, reduces stress, and supports sustained vigilance. In turn, a positive organizational environment promotes correct equipment usage, maintenance adherence, and procedural compliance.

Means of Production and Workload

The correlation between Means of Production and Workload was also significant ($p = 0.78$, $p < .001$), with the scatter analysis (Figure 5) indicating a moderate-to-strong association ($R^2 = 0.54$). This relationship suggests that equipment quality directly influences task complexity, physical effort, and cognitive load.

Figure 5. Scatter diagram – correlation between Means of production and Workload



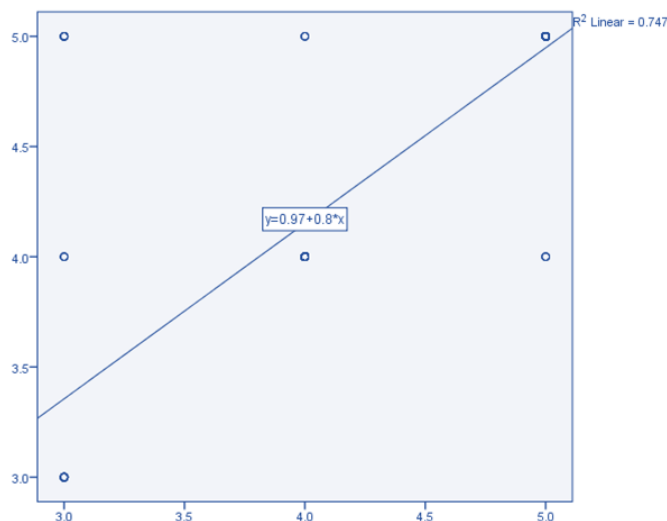
Source: processing data obtained through SPSS program

From a psychological standpoint, appropriate technological support simplifies task execution, reduces mental workload, and enhances operational fluency. In contrast, obsolete or malfunctioning equipment amplifies task difficulty, increasing frustration, attentional strain, and accident probability.

3.3 Environmental Determinants of Task Structure

The strongest correlation in the model was observed between Work Environment and Workload ($p = 0.95$, $p < .001$), fully confirming Hypothesis 2. The scatter diagram (Figure 6) reveals an almost perfect linear association ($R^2 = 0.74$), indicating that organizational climate and environmental conditions fundamentally shape task design and workload perception.

Figure 6. Scatter diagram – correlation between Work Environment and Workload



Source: processing data obtained through SPSS program

This finding reinforces contemporary models of occupational psychology, which emphasize that workload is co-constructed within social and organizational contexts. Supportive leadership, transparent communication, procedural clarity, and safety-oriented organizational culture collectively buffer cognitive overload, promote adaptive coping strategies, and facilitate sustained attention. Conversely, dysfunctional organizational climates

intensify time pressure, ambiguity, and emotional exhaustion, dramatically increasing safety risks.

Taken together, these findings demonstrate that accident prevention cannot be effectively addressed through isolated technical or procedural interventions. Instead, safety emerges as a systemic psychological phenomenon, shaped by continuous interactions among human factors, technological systems, environmental conditions, and organizational structures.

The strong intercorrelations observed among all components support a holistic, systems-based model of risk management, consistent with contemporary safety science paradigms. From this perspective, safety is not merely the absence of accidents but the dynamic presence of adaptive regulatory mechanisms that sustain cognitive stability, emotional resilience, and behavioural coherence under complex operational demands.

These results extend existing psychological theories of organizational safety by empirically demonstrating that perceived environmental support and workload regulation are central mediators of employee safety behaviour. Moreover, they underscore the importance of leadership strategies that integrate ergonomic design, organizational culture development, and psychological well-being promotion into unified accident prevention frameworks.

The findings provide clear guidance for institutional policy and managerial practice:

- Ergonomic optimization of equipment should be prioritized to reduce cognitive and physical strain.
- Psychologically supportive work environments must be cultivated through leadership development, open communication, and trust-based organizational cultures.
- Workload calibration strategies should align task demands with employee capacities to prevent burnout, attentional fatigue, and unsafe behaviours.
- Integrated safety interventions, combining technical, organizational, and psychological approaches, offer the most effective pathway toward sustainable accident prevention.

Conclusion

The present study provides robust empirical evidence that the core components of the work system, the executor (worker), means of production, work environment, and workload, form a tightly interconnected and dynamic structure that fundamentally shapes organizational performance, safety, and psychological well-being. Rather than functioning as isolated variables, these components interact continuously, generating reciprocal influences that determine both individual and collective outcomes. From a psychological and organizational perspective, understanding this systemic interdependence is essential for the development of work environments that are not only productive, but also safe, healthy, and psychologically sustainable.

The findings underscore that organizational effectiveness and accident prevention are inextricably linked to the quality of interactions among human, technical, and environmental factors. Optimizing task allocation, ensuring ergonomic and functional technological resources, and cultivating supportive organizational climates contribute decisively to enhancing performance, reducing uncertainty, and promoting adaptive professional behaviours. A well-structured work system facilitates cognitive clarity, emotional regulation, and behavioural coherence, enabling workers to meet organizational objectives while maintaining high levels of professional satisfaction and psychological resilience.

Ensuring occupational health and safety emerges as a central dimension of system effectiveness. The results demonstrate that perceived safety is closely associated with reduced occupational stress, enhanced vigilance, and stronger adherence to safety protocols. From a psychological standpoint, the subjective experience of safety constitutes a foundational condition for sustained attention, motivation, and engagement. Work environments characterized by clarity, predictability, and interpersonal trust foster emotional stability, reduce anxiety, and strengthen preventive orientations, thereby substantially lowering the likelihood of accidents and adverse events.

Furthermore, the study highlights the strategic importance of continuous professional development and organizational learning. Access to training opportunities, constructive feedback, and supportive leadership enables the ongoing enhancement of workers' cognitive, emotional, and technical capacities. Such developmental processes not only elevate individual performance but also strengthen organizational adaptability and safety culture. Human capital thus emerges as a critical protective factor, mediating the relationship between system design and accident prevention.

From a systemic perspective, effective risk and safety management requires the integration of psychological principles into all levels of organizational functioning. Risk perception, decision-making under uncertainty, and safety behaviours are deeply embedded in cognitive, emotional, and social processes. Accordingly, managerial strategies must account for these psychological dynamics when designing tasks, allocating resources, and implementing safety protocols. A coherent safety management system, grounded in psychological insight, facilitates proactive identification of vulnerabilities, supports adaptive responses, and fosters a culture of shared responsibility.

Importantly, the results emphasize that optimizing the work system is not a static objective but a continuous developmental process. Ongoing feedback mechanisms, participatory decision-making, and organizational openness to change enable dynamic adjustment to evolving operational demands and emerging risks. Such adaptive processes promote psychological safety, enhance trust, and strengthen long-term organizational commitment, thereby sustaining performance and resilience.

Looking forward, future research should prioritize the development of psychologically informed risk assessment frameworks tailored to the Romanian organizational context, particularly in sectors characterized by elevated accident potential. The absence of a unified methodological approach integrating human factors underscores the need for multidisciplinary collaboration. Combining insights from organizational psychology, risk management, engineering, and environmental sciences can facilitate the creation of comprehensive and context-sensitive safety models.

Integrating psychological dimensions into risk assessment and prevention strategies holds significant promise for advancing accident prevention, reducing the psychosocial impact of adverse events, and enhancing organizational sustainability. By embedding human-centered principles within technical and managerial systems, organizations can move toward more resilient, adaptive, and ethically responsible models of occupational safety and performance.

Credit Authorship Contribution Statement

Riza, I. and Bogdan, A. M. jointly contributed to the conceptualization and methodological design of the study. Riza, I. conducted the empirical investigation, performed data curation and statistical analysis, and prepared the original draft of the manuscript. Bogdan, A. M. contributed to data interpretation, visualization, critical revision of the manuscript, and editing content. Both authors reviewed and approved the final version of the manuscript.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Acknowledgments

N/A

Data Availability Statement

The data that support the findings of this study are not publicly available due to ethical and privacy restrictions related to the protection of participants and institutional confidentiality. However, the data are available from the corresponding author upon reasonable request.

Ethical Approval Statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and international guidelines for research involving human participants. According to institutional regulations, formal ethical committee approval was not required for anonymous questionnaire-based survey studies. Prior to participation, all respondents received detailed information about the purpose and procedures of the study and provided informed consent. Participation was voluntary, anonymous, and confidential, and all data were processed in compliance with applicable data protection regulations.

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