

## Prospective Strategies to Enhance Resilience for Public Emergencies Preparedness: A Human Resources Management Perspective

Tathiana de Mello Sampaio<sup>1,2\*</sup>, Alex Santos Príncipe<sup>1,2</sup>, Misael Sousa de Araujo<sup>1,2</sup>

<sup>1</sup>Oswaldo Cruz Foundation; Rio de Janeiro, Rio de Janeiro; <sup>2</sup>Department of Management and Industrial Technology, SENAI CIMATEC University Center; Salvador, Bahia, Brazil

**This study aims to identify human resources management strategies that enhance organizational resilience for public health emergency preparedness. To achieve this goal, a literature search was conducted covering the period from 2016 to 2023, along with an external environmental scan to extract contributing factors for the study. The results pertain to strategies focused on enhancing skills, promoting worker health, and ensuring compliance with regulations to safeguard professionals. It is concluded that the pandemic has provided valuable experiences and positive examples that can enhance productivity capacity, with lessons learned that are essential for future public health emergency preparedness and practices that should be perpetuated.**

**Keywords:** Resilience. Emergency Management. Preparedness. Human Resources.

In a world where uncertainties, complexity, and chaos coexist, shaping organizational decisions in the context of health emergencies, addressing these challenges is imperative. According to the International Health Regulations, health emergencies pose significant risks to public health and necessitate a coordinated international response [1], thereby presenting health within an increasingly complex and dynamically adverse scenario. These global challenges demand a thorough analysis tailored to the vulnerabilities of each context, with short-, medium-, and long-term measures in place. The emergence of health emergencies has accelerated in recent years, with diseases like Polio, Ebola, Zika, COVID-19, and Monkeypox affecting global populations [2,3]. Consequently, public health organizations must continuously implement measures to prevent, control, and mitigate harm during outbreaks, epidemics, pandemics, disasters, or when facing population assistance challenges [4], underscoring the need for robust organizational resilience [5,6].

Organizational resilience must exhibit flexibility and dynamism to support institutions, particularly during times of rapid change and unexpected health crises, enabling swift and effective responses to adversity for survival, growth, and competitive advantage [7]. Beyond mere survival, organizational resilience entails adaptation, proactivity, and seizing opportunities in challenging business environments such as the health sector, rebounding regardless of known or unknown changes [7]. Public health emergencies heighten the complexity of organizational challenges, necessitating a nuanced understanding of global complexities and promoting locally optimal actions, including guidelines for preparing human resources at all levels to cope with health crises.

A key focus of this work is the research on building resilience in health systems [8], with a specific emphasis on preparing human resources. In this regard, the World Health Organization has established the Health Emergency and Disaster Risk Management Framework (H-EDRM) is a mechanism that strengthens an integrated approach to managing health emergencies and disaster risks at national and organizational levels.

In today's knowledge era, human capital, a crucial dimension of intellectual capital, stands as a primary dynamic asset capable of providing a competitive edge. It embodies valuable, rare, inimitable, and irreplaceable attributes that

---

Received on 26 September 2023; revised 22 December 2023.  
Address for correspondence: Tathiana de Mello Sampaio.  
Avenida Orlando Gomes, 1845, Piatã. Salvador, Bahia,  
Brazil. Zipcode: 42701-310. E-mail: tathiana.sampaio@aln.  
senaicimatec.edu.br.

J Bioeng. Tech. Health 2024;7(1):63-68  
© 2024 by SENAI CIMATEC. All rights reserved.

positively influence organizational resilience [9]. Some scholars have expressed concerns about the preparedness of human resources to act effectively in such situations. The collaboration among various stakeholders and the interconnectedness between sectors to overcome challenges and enhance preparedness for future disasters are focal points [10,11].

Additionally, the availability of information, whether through information systems, communication channels, or digital technologies, plays a pivotal role [10-12]. The significance of this study lies in capturing emerging trends and successful practices for the human capital of public health organizations, structuring them systematically to enable managers to make agile and proactive decisions in the face of future health crises.

Therefore, this study aims to identify human resource management strategies that enhance organizational resilience for public health emergency preparedness.

## Materials and Methods

The method proposed in this study comprises two complementary parts: a literature review and an environmental scan. In the literature review, we identified challenges and opportunities in human resources management related to disaster preparedness and public health emergencies, drawing insights from recent events, notably the COVID-19 pandemic. The environmental scan allowed us to observe shifts in the external environment and their potential impact on professionals' work. It enabled us to apply these insights effectively in future public health emergency management.

### Literature Research

In this study, we conducted a literature search on the Web of Science database focusing on heightened Public Health Emergencies (PHE) between 2016 and 2023. Our search generated 128 titles using a structured search string for the investigated

object. After screening and evaluation by the authors, we selected 14 studies for analysis. These studies provided insights into challenges, gaps, and human resource management strategies that can enhance organizational resilience for public health emergency preparedness.

## Environmental Scanning

One crucial step in mapping a potential emergency scenario is conducting an environmental scan to identify and adapt to external changes [13]. This management process involves situational analysis of the external environment, aiding decision-making through information acquisition, analysis, and utilization. It provides valuable insights for directing efforts during existing or imminent crisis events, benefiting organizational learning and performance [14]. Using techniques like STEEP (Social, Technological, Economic, Environmental, and Political) analysis facilitates understanding existing conditions and anticipating future adversities and opportunities for innovation, thereby fostering greater organizational resilience [14].

## Results and Discussion

In complex PHE contexts, organizational challenges revolve around incorporating ethical values into decision-making processes within complex adaptive systems filled with ambiguities and uncertainties [16].

Strategic resilience hinges on institutional legacies and values to achieve a future vision.

The COVID-19 pandemic highlighted disruptions in health services due to understaffing, emphasizing gaps in HR planning, governance, information systems adoption, and resource allocation [17]. Addressing these challenges requires expanding staff capacity through training, responsibilities review, skills consolidation, PPE utilization, volunteer team organization, and HR plan management [16].

The World Health Organization established the H-EDRM to strengthen health systems' resilience,

emphasizing personnel planning, occupational health, security, and capacity building across technical, epidemiological, diagnostic, service, and communication areas [18]. This systemic approach comprehensively tackles human resource planning challenges in PHE.

At the organizational level, it prioritizes occupational health actions, multidisciplinary work, workload adaptation, specific staff hiring measures, and intensifying digital technologies to support productive activities [12].

Interagency coordination, interdisciplinary integration, alignment of guidelines, public-private HR strategy agreements, and breaking silos between government areas are essential for coping with health crises [10,19].

Employees' psychological resilience and organizational culture are crucial in public health crises, necessitating a flexible, continuously trained workforce participating in prevention protocols and post-event learning [8].

Based on identified weaknesses, challenges, and gaps from recent studies outlined prospective strategies for human resource preparation and management at the organizational, actors, and employee levels. Table 1 summarizes these strategies and their alignment with the external environment, guiding organizations toward greater resilience for public health emergency preparedness.

In addition to these initiatives, the environmental scanning brought several contributions and reflections that will guide organizations on the need for articulation for future health emergencies in an anticipated way. Figure 1 illustrates the primary core strategy, contributions, and diagnosis for each scope of the STEEP analysis. Through it, we noticed signs of change in careers, organization operations, and human resources management at work, especially when there is an upcoming health emergency. Therefore, the parameters identified and the diagnoses mentioned should be considered when defining the organizational strategy and updating internal policies for worker protection and actions to increase resilience.

## Conclusion

The study emphasizes the critical role of organizational resilience in managing Public Health Emergencies (PHEs), particularly highlighted during the COVID-19 pandemic. It reflects on lessons learned from this crisis, revealing vulnerabilities, opportunities, and positive examples that can guide the development of strategies to enhance organizational resilience. The research underscores the centrality of human resources in organizations, including public health agencies, and how various factors discussed in the literature and environmental scanning analysis can impact professionals in their roles. The environmental scanning process highlighted disruptions across social, technological, environmental, economic, and political dimensions, signaling career changes, human resources management, and internal processes and policies.

The identified strategies and positive practices are crucial for implementation to improve organizational preparedness for future public health emergencies. It is imperative to integrate these lessons learned into organizational strategies and policies to foster greater resilience and effectively navigate similar crises in the future.

## Acknowledgments

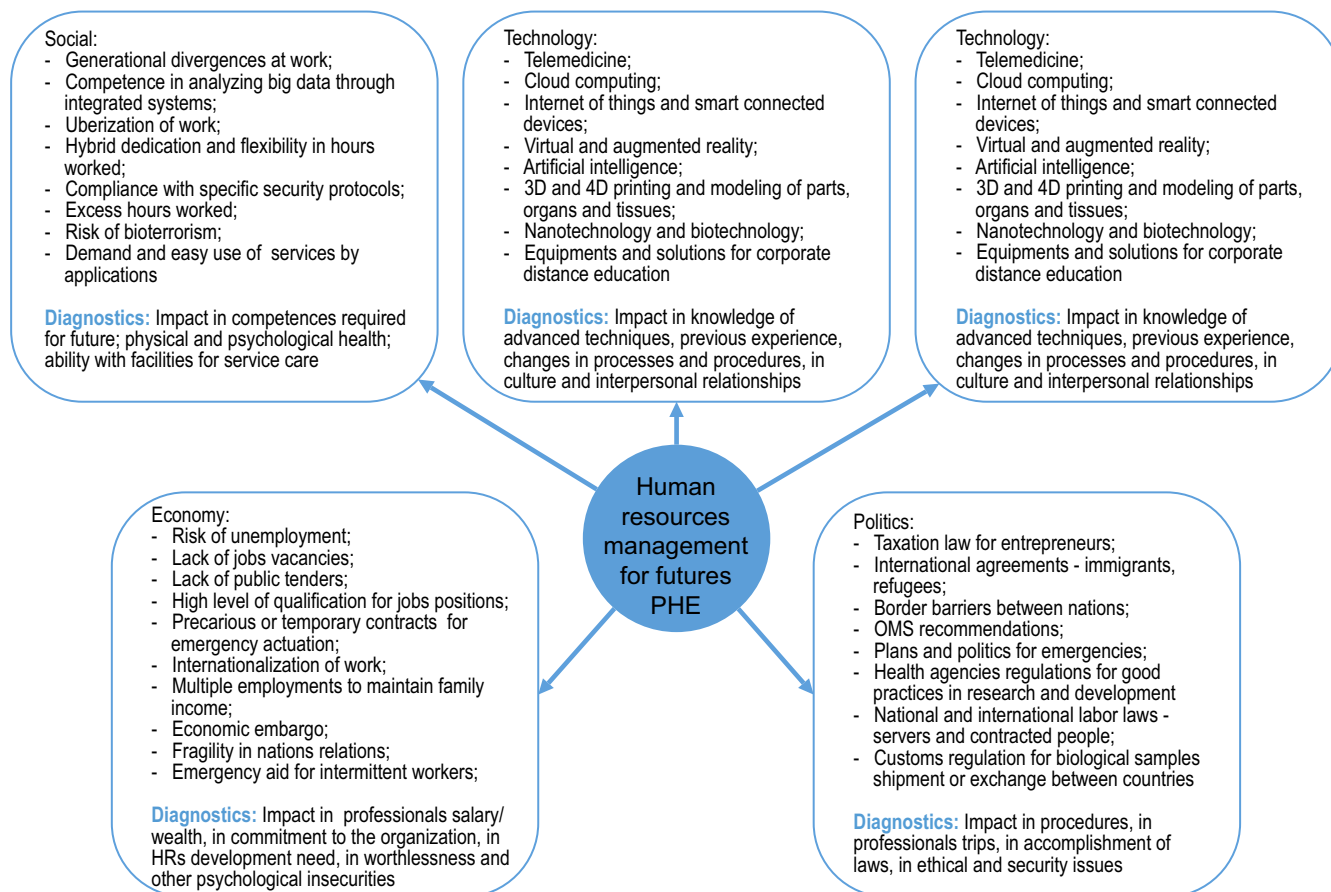
We are thankful for the financial support from the National Council for Scientific and Technological Development (CNPq); IW is a CNPq technological development fellow (Proc. 308783/2020-4).

## References

1. Presidência da Republica. Decreto nº 10.212, de 30 de janeiro de 2020.
2. Wilder-Smith A, Osman S. Public health emergencies of international concern: A historical overview. *Journal of Travel Medicine* 2020;27(8). doi: 10.1093/JTM/TAAA227.
3. Lamptey E. Weighing in on monkeypox against the criteria of public health emergency. *Global Health Journal* 2023;7(2):117–119. doi: 10.1016/j.glohj.2023.04.003.

**Table 1.** Prospective strategies for public health emergency preparedness.

Dimensions	Strategies	Descriptions	References
Organization	Governance & leadership	Integrated structures, partnerships and responsibilities with clear leadership to support a coordinated and interoperable system	[16,20-22]
	Emergency plan and practices and experiences dissemination for preparedness	Develop a plan through a dynamic, collaborative planning process; invest in testing and practicing plans and processes; Gather rules, regulations, unity of purpose and priority for change and action	[16,21-23]
	Risk analysis	Consolidated knowledge of community hazards and risks, systematics and dynamics of risk events, disasters and emergencies	[16,24]
	Surveillance and monitoring	Timely information to provide situational awareness and guide action	[16,21,22,24]
	Resources	Ensure dedicated resource capacity and mobilization capability	[16]
	Communication and dissemination	A strategy to transmit clear and coherent messages on the networks, to the public and between organizational levels;	[16,23]
	Learning and assessment	Evaluation as a strategy to build resilience	[16]
	Digital technologies and agile processes	Use of digital technologies for increasing effectiveness and efficiency, and for coherent data system for situational awareness	[16,20,22,23]
Actors	Future studies - strategic foresight	Perform scanning of the environment, scenarios to identify future opportunities and threats; visioning methods; appreciation request; focus on ambidexterity; road mapping; activity plans for long-term strategies	[20,21]
	Collaborative networks	Develop strong relationships, partnerships and networks; relationships between government, community organizations, customers, institutions and other kind of businesses	[16,19,21-23]
	Community involvement	Understanding and engaging with the community; contribution on preparedness process improvement; community as a partner on solutions development, enhancing knowledge through relational capital	[16]
Employees	Workforce capacity	Develop skills and support knowledgeable, skilled and resilient staff; recruitment and conduction to activities according to education, training and professional development pathway	[16,19,23]
	Staff engagement	Commitment to work; sense of belonging; mission valence	[20,21]
	Creativity and solutions for preparedness and innovation	Stimulate the creativity of professionals; produce a favorable climate for innovation in products, services and processes.	[20,21]
	Workers' health and psychological resilience	Investing in actions that contribute to the professional life quality inside and outside work; support to staff needs	[19,20]

**Figure 1.** STEEP analysis based on PH manager's multidisciplinary perspectives.

- Ministério da Saúde Secretaria de Vigilância em Saúde Departamento de Vigilância em Saúde Ambiental. Plano de Resposta às Emergências em Saúde Pública. Ministério da Saúde 2014. Available at: <http://editora.saude.gov.br>.
- Duchek S. Organizational resilience: a capability-based conceptualization. *Business Research* 2020;13(1):215–246. doi: 10.1007/s40685-019-0085-7.
- Paeffgen T. Organisational resilience during COVID-19 times: A bibliometric literature review. *Sustainability (Switzerland)* 2023;15(1). doi: 10.3390/su15010367.
- Martín-Rojas R, Garde Sánchez R, de Moura D, Amelia Tomei P. Gestão estratégica de resiliência organizacional (GERO): proposição de framework. *Revista Brasileira de Gestão de Negócios* 2023;3:1–21. doi: 10.7819/rbgn.v23i3.4118.
- Forsgren L, Tediosi F, Blanchet K, Saulnier DD. Health systems resilience in practice: a scoping review to identify strategies for building resilience. *BMC Health Serv Res* 2022;22(1). doi: 10.1186/s12913-022-08544-8.
- Ju J. How open innovation drives intellectual capital to superior organizational resilience: evidence from China's ICT sector. *Journal of Intellectual Capital* 2023. doi: 10.1108/JIC-12-2022-0251.
- Bustamante Izquierdo P, Puertas EB, Hernández Hernández D, Sepúlveda H. COVID-19 and human resources for health: analysis of planning, policy responses and actions in Latin American and Caribbean countries. *Hum Resour Health* 2023;21(1). doi: 10.1186/s12960-023-00795-8.
- Orlando S, Kamberi F. The COVID-19 pandemic response and its impact on post-corona health emergency and disaster risk management in Italy.
- Margherita A, Nasiri M, Papadopoulos T. The application of digital technologies in company responses to COVID-19: an integrative framework. *Technol Anal Strateg Manag* 2023;35(8):979–992. doi: 10.1080/09537325.2021.1990255.
- Aldehayyat JS. Environmental scanning in business organisations: Empirical evidence from a Middle Eastern country context. *Management Research Review* 2015;38(5):459–481. doi: 10.1108/MRR-02-2014-0032.
- Marzouk M, Elshaboury N, Abdel-Latif A, Azab S. Deep learning model for forecasting COVID-19 outbreak in

- Egypt. *Process Safety and Environmental Protection* 2021;153:363–375. doi: 10.1016/j.psep.2021.07.034.
15. Fergnani A. From scenarios to strategy: top three methods. *Predict* 2020. <https://medium.com/predict/from-scenarios-to-strategy-top-3-methods-6705a37c3265>. Accessed on Aug 4, 2023.
  16. Khan et al. Public health emergency preparedness: A framework to promote resilience. *BMC Public Health* 2018;18(1). doi: 10.1186/s12889-018-6250.
  17. Singh MBG, Lindblom S, Reif MS, Thakkar NP, Papali A. Telecritical care clinical and operational strategies in response to COVID-19. *Telemedicine and e-Health* 2021;27(3):261–268. doi: 10.1089/tmj.2020.0186.
  18. World Health Organization (WHO). Health emergency and disaster risk management framework. 2019. <https://apps.who.int/iris/handle/10665/326106>. Accessed on Aug 4, 2023.
  19. Lamberti-Castronuovo A, Parotto E, Della Corte F, Hubloue I, Ragazzoni L, Valente M. The COVID-19 pandemic response and its impact on post-corona health emergency and disaster risk management in Italy. *Front Public Health* 2022;10. doi: 10.3389/fpubh.2022.1034196.
  20. Aksay K, Şendoğdu A. Improving organizational resilience in businesses: a qualitative study on the effect of COVID-19. *Journal of Economy Culture and Society* 2022. doi: 10.26650/JECS2021-1040786
  21. Fathi M, Yousefi N, Vatanpour H, Peiravian F. The effect of organizational resilience and strategic foresight on firm performance: competitive advantage as mediating variable. *Iranian Journal of Pharmaceutical Research* 2021;20(4):497–510. doi: 10.22037/ijpr.2021.116145.15723.
  22. Houser RS. The role of public health emergency management in biodefense: a COVID-19 case study. *Disaster Med Public Health Prep* 2023;17:e185. doi: 10.1017/dmp.2022.113.
  23. Khan AS, Wittenauer R, Patel R, Baseman J, Miller A, Errett NA. Developing a concept of operations template to guide collaborative disaster research response between academic public health and public health agencies. *Disaster Med Public Health Prep* 2023;17:e39. doi: 10.1017/dmp.2021.280.
  24. Keita M et al. Investing in preparedness for rapid detection and control of epidemics: analysis of health system reforms and their effect on 2021 Ebola virus disease epidemic response in Guinea. *BMJ Glob Health* 2023;8(1): e010984. doi: 10.1136/bmjgh-2022-010984.