ASEC 2025 Conference

The 6th International Electronic Conference on Applied Sciences

09–11 December 2025 | Online

MDPI

Artificial Intelligence as a Decision-Support Tool in Crisis Management

Daniel Chovanec, Jozef Ristvej, Boris Kollár and Jozef Kubás
Department of Crisis Management, University of Žilina, Žilina, 01026, Slovakia

INTRODUCTION & AIM

Artificial Intelligence (AI) is rapidly emerging as a transformative tool across multiple domains, including crisis and disaster management. Its potential to enhance decision-making, accelerate response operations, and improve situational awareness is widely recognized. Yet, despite technological progress, the practical integration of AI into real-world crisis management systems remains uneven. In Slovakia, digital innovation in this field progresses slowly, and recent policy reforms still lack concrete steps toward operational adoption of AI-driven tools.

To bridge this gap, it is essential to understand how AI can support crisis managers in predictive analysis, resource allocation, and strategic coordination, while also acknowledging risks connected to data quality, transparency, and accountability. Strengthening human expertise, education, and institutional readiness is therefore crucial. AI should not replace human judgment, but reinforce it—providing faster, more informed, and more reliable decision support in high-pressure crisis environments

METHOD

This study applies a multi-layered analytical approach to examine the role of AI as a decision-support tool in crisis management.

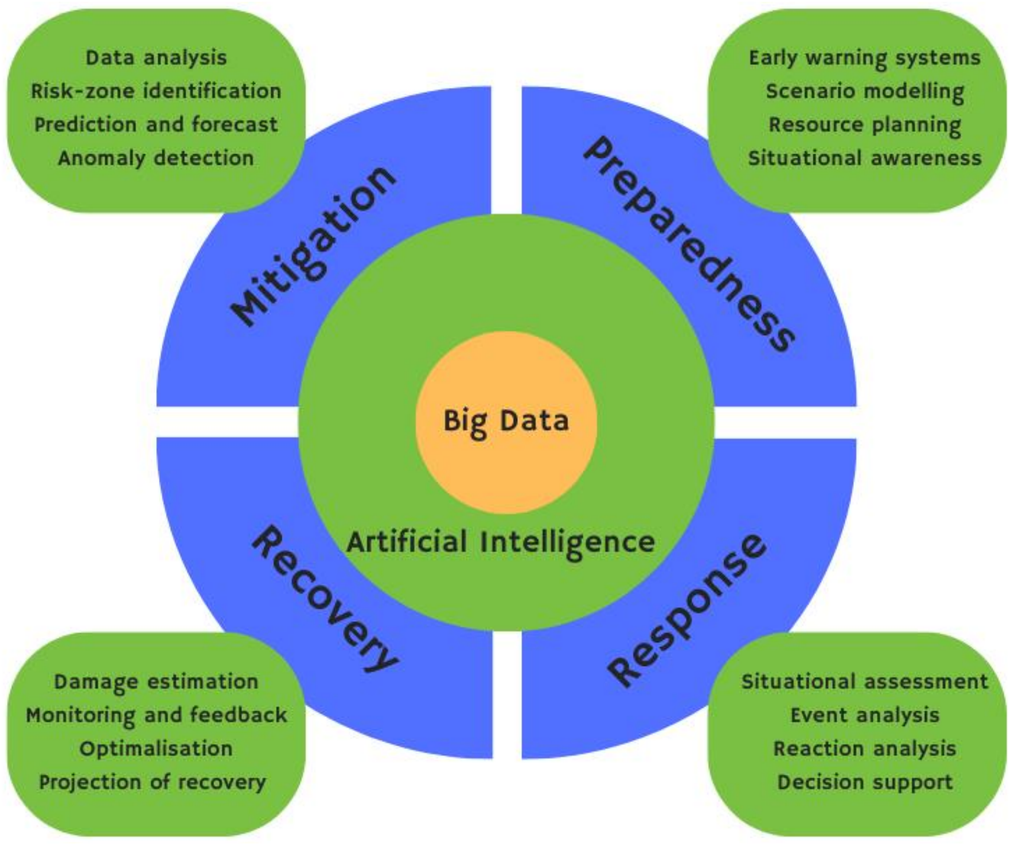
The methodology combines:
Framework Analysis: Evaluation of existing national crisis management structures, strategic documents, and reform proposals to identify how AI-related elements are addressed, omitted, or underdeveloped.
Comparative Policy Review: Systematic comparison of Slovakia's strategic environment with selected neighbouring countries, Czech Republic and Poland, focusing on their national strategies, digital innovation agendas, and practical steps toward integrating AI and advanced technologies into crisis management systems.
Expert and Academic Insight Analysis: Synthesis of findings from academic literature, expert assessments, and relevant practice-oriented reports to map current trends, benefits, and risks associated with AI deployment in high-stakes decision-making.
Gap Identification: Cross-analysis of strategic frameworks, comparative insights, and expert perspectives to reveal discrepancies between technological potential and actual implementation in Slovakia.

This combined approach enables a structured understanding of where AI integration stands today and what strategic, organisational, and educational changes are needed to advance its use in crisis management.

RESULTS & DISCUSSION

The analysis reveals a substantial gap between the technological potential of AI and its practical implementation in Slovakia's crisis management system. While strategic documents acknowledge the importance of digitalisation, they do not provide operational steps for integrating AI tools. In contrast, Czech Republic and Poland show clearer progress through dedicated digital strategies, pilot projects, and stronger institutional support for data-driven decision-making.

Three major findings emerge:
Fragmented strategic environment: AI is mentioned only indirectly or remains absent in crisis management frameworks, no unified roadmap exists for adoption.
Low operational readiness: limited data infrastructures, weak interoperability, and insufficient analytical capacities restrict large-scale AI use.
Human capital gap: responders and public officials lack specialised training for working with AI-supported decision tools, reducing trust and usability.



CONCLUSION

While AI holds strong potential to enhance crisis-related decision-making, its operational use in Slovakia is still limited by fragmented strategies, insufficient data infrastructures, and a lack of trained personnel. Comparative insights from the Czech Republic and Poland show that clearer national direction and targeted investments significantly accelerate digital transformation in crisis management.
AI-supported tools using big data can deliver value across all phases of the crisis cycle. However, their successful integration depends on strengthening human competencies, developing interoperable data systems, and establishing strategic frameworks that guide responsible adoption.