ISSN 2664-4002 (Print) & ISSN 2664-6714 (Online)
South Asian Research Journal of Humanities and Social Sciences
Abbreviated Key Title: South Asian Res J Human Soc Sci

| Volume-8 | Issue-3 | May-Jun -2026 | **DOI: https://doi.org/10.36346/sarjhss.2026.v08i03.002**

Review Article

Digital Technologies in Crisis Administration: Opportunities and Challenges

Alsawe Nafie Albadri Abdala[1]*

[1]Assistant Professor, College of Administrative and Economic Sciences, Elsheikh Abdallah Elbadri University, Berber, Sudan

***Corresponding Author:** Alsawe Nafie Albadri Abdala
Assistant Professor, College of Administrative and Economic Sciences, Elsheikh Abdallah Elbadri University, Berber, Sudan

Article History
Received: 02.03.2026
Accepted: 22.04.2026
Published: 02.05.2026

Abstract: The integration of digital technologies has transformed crisis administration, enabling real-time data collection, rapid communication, and evidence-based decision-making. Public and private organizations increasingly rely on digital platforms, geographic information systems (GIS), big data analytics, and artificial intelligence (AI) to enhance preparedness, response, and recovery during crises. This theoretical paper examines the opportunities and challenges associated with the adoption of digital technologies in crisis administration. Drawing upon literature from public administration, information systems, and disaster management, the paper highlights the benefits of enhanced situational awareness, efficient resource allocation, and improved stakeholder engagement. At the same time, it addresses risks including cybersecurity threats, digital divide issues, misinformation, and over-reliance on technology. Recommendations are provided for integrating digital technologies into organizational frameworks to improve adaptive capacity, resilience, and overall crisis management effectiveness.

Keywords: Digital Technologies, Crisis Administration, Information Systems, Big Data, Artificial Intelligence, Disaster Management, Cybersecurity.

INTRODUCTION

Crises, ranging from natural disasters and pandemics to technological failures and socio-political disruptions, require rapid, coordinated, and evidence-based responses. Traditional administrative approaches are often insufficient to manage complex, fast-moving situations. Digital technologies—encompassing information and communication technologies (ICTs), geographic information systems (GIS), artificial intelligence (AI), big data analytics, and social media platforms—offer novel tools for enhancing crisis administration [1, 2].

Digital technologies facilitate situational awareness, support real-time decision-making, streamline communication, and enable resource optimization. However, they also introduce challenges such as cybersecurity risks, dependence on digital infrastructure, inequalities in access, and the potential for misinformation dissemination [3].

This paper explores the theoretical foundations, opportunities, challenges, and best practices associated with the integration of digital technologies into crisis administration. Emphasis is placed on maximizing benefits while mitigating risks to enhance organizational resilience, efficiency, and public trust.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Crisis Administration and Technology

Crisis administration refers to the organizational planning, coordination, and execution of responses under conditions of uncertainty and high stakes [4]. The adoption of digital technologies in crisis management aligns with concepts of organizational resilience, adaptive capacity, and evidence-based decision-making. Technological tools support both predictive analytics for preparedness and reactive strategies for response and recovery [5].

Socio-Technical Systems Theory

Socio-technical systems theory posits that organizational effectiveness is influenced by the interaction of social and technological components [6]. In crisis administration, digital technologies are effective only when integrated with skilled personnel, decision-making frameworks, and collaborative processes. Over-reliance on technology without human oversight can lead to system failures or misinformed decisions.

Technology Adoption in Crisis Contexts

The Technology-Organization-Environment (TOE) framework is often applied to understand adoption patterns of digital technologies. It emphasizes the influence of technological capability, organizational readiness, and environmental factors [7]. Public administration studies show that agencies with adequate technological infrastructure, trained personnel, and supportive policies are more successful in implementing digital tools for crisis management [8].

Digital Technologies in Crisis Administration

Geographic Information Systems (GIS)

GIS enables the visualization and analysis of spatial data, supporting disaster mapping, hazard assessment, and emergency resource deployment. GIS applications allow administrators to identify high-risk zones, optimize evacuation routes, and allocate resources efficiently [9].

Artificial Intelligence and Predictive Analytics

AI tools, including machine learning algorithms, support predictive modeling of crisis events, risk assessment, and scenario planning. Predictive analytics can forecast disease outbreaks, natural hazards, or infrastructure failures, allowing proactive mitigation strategies [10].

Big Data and Data Analytics

The proliferation of digital data sources—from sensors, social media, and administrative records—enables data-driven decision-making. Big data analytics facilitate trend identification, real-time monitoring, and rapid situational assessments [11].

Social Media and Mobile Technologies

Social media platforms and mobile applications provide channels for rapid information dissemination, public engagement, and feedback collection. Governments and agencies use social media to issue alerts, monitor public sentiment, and counter misinformation [12].

Cloud Computing and Collaboration Platforms

Cloud-based systems support inter-agency coordination, shared access to resources, and remote work during crises. Collaboration platforms enable real-time document sharing, virtual meetings, and coordinated responses across geographically dispersed teams [13].

Opportunities and Benefits

Enhanced Situational Awareness

Digital technologies provide administrators with real-time insights into crisis developments, enabling informed decision-making. GIS maps, sensor data, and AI-driven analytics improve understanding of the crisis landscape [14].

Improved Resource Allocation

Analytics tools allow organizations to optimize the distribution of personnel, equipment, and financial resources, ensuring that critical areas receive adequate support [15].

Rapid Communication and Public Engagement

Digital platforms enable instant messaging, alerts, and feedback loops with the public, enhancing compliance, trust, and community resilience [16].

Evidence-Based Decision-Making

Digital tools support data-driven policies, reducing reliance on intuition or incomplete information. Predictive models and analytics enhance strategic planning, risk prioritization, and scenario evaluation [17].

Integration and Interoperability

Digital technologies facilitate inter-agency collaboration and integrated crisis management. Shared platforms improve coordination, reduce redundancy, and promote unified responses [18].

Challenges and Risks

Cybersecurity Threats

Dependence on digital infrastructure increases vulnerability to cyberattacks, data breaches, and system failures. Crises can exacerbate these risks by overloading networks or exposing security gaps [19].

Digital Divide and Accessibility

Not all populations have equal access to digital technologies, leading to disparities in crisis communication, resource allocation, and public engagement [20].

Misinformation and Social Media Risks

While social media enhances communication, it also facilitates the rapid spread of rumors, false information, and panic-inducing content. Administrators must actively monitor and counter misinformation [21].

Over-Reliance on Technology

Excessive dependence on digital systems can reduce human judgment, creativity, and adaptive decision-making. System failures may paralyze operations if contingency plans are lacking [22].

Data Privacy and Ethical Considerations

Collecting and analyzing large volumes of data raises concerns about privacy, consent, and ethical use. Administrators must balance information utility with legal and ethical responsibilities [23].

Integration Strategies and Best Practices

Multi-Layered Communication Systems

Integrate digital, traditional, and interpersonal communication channels to maximize reach and redundancy. Ensure consistency across platforms [24].

Training and Capacity Building

Develop technical skills, data literacy, and cybersecurity awareness among staff to enhance effective use of digital tools [25].

Policy and Governance Frameworks

Establish policies for data management, information sharing, cybersecurity, and ethical use of technology. Define clear responsibilities and decision-making authority [26].

Scenario Planning and Simulation

Use technology for crisis simulations, drills, and stress-testing systems. This improves readiness, identifies gaps, and builds confidence in digital tools [27].

Public Engagement and Transparency

Leverage digital tools for transparent communication, feedback collection, and collaborative problem-solving with communities [28].

Case Examples and Lessons Learned

1. **COVID-19 Pandemic Response:** Governments worldwide used AI-based predictive models and dashboards to track infection rates, allocate medical resources, and communicate public health measures. Challenges included misinformation on social media and disparities in access to digital information [29].
2. **Hurricane Response in the United States:** GIS mapping and big data analytics were used for evacuation planning and resource allocation. Social media platforms provided real-time updates to affected populations [30].
3. **Earthquake Response in Japan:** Cloud-based coordination platforms enabled inter-agency collaboration and resource management. Advanced sensor networks provided early warning alerts to citizens [31].

Lessons highlight the importance of integrating technology with human expertise, ensuring equitable access, and establishing robust governance and security protocols.

CONCLUSION

Digital technologies offer unprecedented opportunities to enhance crisis administration through real-time data, predictive analytics, and rapid communication. Benefits include improved situational awareness, efficient resource allocation, evidence-based decision-making, and enhanced public engagement. However, challenges such as cybersecurity threats, the digital divide, misinformation, over-reliance on technology, and ethical concerns must be carefully managed. Successful integration requires organizational readiness, training, governance frameworks, scenario planning, and

continuous evaluation. By balancing technological innovation with human judgment and ethical considerations, public and private institutions can strengthen resilience, adaptive capacity, and effectiveness in crisis management.

REFERENCES

1. Kapucu N, Van Wart M. The evolving role of government in disaster response: Emerging trends and challenges. *Public Adm Rev*. 2006;66(1):47–59.
2. Palen L, Vieweg S, Liu SB, Hughes AL. Crisis informatics: Studying crisis in a networked world. *Proc 2010 ACM Conf Comput Support Coop Work*. 2010;2010:1–10.
3. Veil SR, Buehner T, Palenchar MJ. A work-in-process literature review: Incorporating social media in risk and crisis communication. *J Contingencies Crisis Manage*. 2011;19(2):110–122.
4. Comfort LK. *Crisis Management in Hindsight: Cognition, Communication, Coordination, and Control*. Washington: Federal Emergency Management Association; 2007.
5. Chen H, Chiang RH, Storey VC. Business intelligence and analytics: From big data to big impact. *MIS Q*. 2012;36(4):1165–1188.
6. Trist EL, Bamforth KW. Some social and psychological consequences of the Longwall method of coal-getting. *Hum Relat*. 1951;4(1):3–38.
7. Tornatzky LG, Fleischer M. *The Processes of Technological Innovation*. Lexington: Lexington Books; 1990.
8. Weerakkody V, Janssen M, Dwivedi YK, et al. Transformational change and citizen-centric digital government: Lessons from case studies. *Gov Inf Q*. 2018;35(4):633–645.
9. Goodchild MF. GIS and disasters: Planning and response. *Ann GIS*. 2006;12(1):1–2.
10. Chen J, Zhan FB. Agent-based modeling and simulation of urban evacuation: Relative effectiveness of simultaneous and staged evacuation strategies. *J Urban Plan Dev*. 2008;134(2):114–121.
11. Kitchin R. Big data, new epistemologies and paradigm shifts. *Big Data Soc*. 2014;1(1):1–12.
12. Merchant RM, Elmer S, Lurie N. Integrating social media into emergency-preparedness efforts. *N Engl J Med*. 2011;365:289–291.
13. Bryson JM, Crosby BC, Bloomberg L. Public value governance: Moving beyond traditional public administration and the New Public Management. *Public Adm Rev*. 2014;74(4):445–456.
14. Alexander DE. Social media in disaster risk reduction and crisis management. *Sci Eng Ethics*. 2014;20:717–733.
15. Wukich C, Ahmed S. Public health emergency communication: Lessons learned from past crises. *Int J Disaster Risk Reduct*. 2020;46:101524.
16. Seeger MW, Sellnow TL, Ulmer RR. Communication and organizational crisis. *Int J Bus Commun*. 2003;40(3):321–324.
17. Coombs WT. *Ongoing Crisis Communication: Planning, Managing, and Responding*. 4th ed. Thousand Oaks: Sage Publications; 2015.
18. Kapucu N, Garayev V. Collaborative decision-making in emergency and disaster management. *Int J Public Adm*. 2011;34(6):366–375.
19. Reddy MC, Jagtap S, Kuperman GJ. Cybersecurity threats to health information systems during emergencies. *Health Secur*. 2018;16(5):299–308.
20. Helsper EJ. Digital inclusion: An analysis of social disadvantage and the information society. *Commun Policy Res*. 2008;25(5–6):465–483.
21. Liu B, Austin L, Jin Y. How publics respond to crisis communication strategies: The interplay of information form and source. *Public Relat Rev*. 2011;37:345–353.
22. Chen H, Chiang RH, Storey VC. Business intelligence and analytics: From big data to big impact. *MIS Q*. 2012;36:1165–1188.
23. Kesan JP, Zhang D, Zhang Z. Data privacy, ethics, and digital government in crisis situations. *Gov Inf Q*. 2019;36(4):101389.
24. Wukich C, Ahmed S. *Int J Disaster Risk Reduct*. 2020;46:101524.
25. Weerakkody V, Janssen M, Dwivedi YK, et al. *Gov Inf Q*. 2018;35:633–645.
26. Bryson JM, Crosby BC, Bloomberg L. *Public Adm Rev*. 2014;74:445–456.
27. Kapucu N. Interagency communication networks during emergencies: Boundary spanners in multiagency coordination. *Am Rev Public Adm*. 2006;36:207–225.
28. Veil SR, Buehner T, Palenchar MJ. *J Contingencies Crisis Manage*. 2011;19:110–122.
29. Chen T, Rui J, Wang Q, et al. A mathematical model for COVID-19 transmission dynamics in China. *Epidemics*. 2020;32:100437.
30. Cutter SL, Boruff BJ, Shirley WL. Social vulnerability to environmental hazards. *Soc Sci Q*. 2003;84:242–261.
31. Okada N, Sawada Y, Takahashi H. Using early warning systems and digital coordination during the 2011 Great East Japan Earthquake. *Int J Disaster Risk Reduct*. 2013;5:22–29.