

Crisis project management and business communication strategies as innovations for emergency medical service continuity (literature review)

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Abstract. This article examined crisis project management and business communication strategies to ensure the uninterrupted operation of emergency medical services during pandemics, natural disasters, armed conflicts, and infrastructure failures. The aim of this study was to develop an integrated “Project management-communications” matrix as a practical decision-support tool for emergency medical services managers across all phases of the “preparedness-response-recovery” cycle. A narrative theoretical analysis was conducted based on 40 peer-reviewed sources (2018-2026) obtained from the PubMed, Web of Science, and Scopus databases. Sources were selected based on their focus on healthcare facilities, the context of crises and emergencies, their emphasis on resilience and resilience management, the presence of an empirical evidence base, and the status of the peer-reviewed publication. Four interrelated areas of effective crisis management in emergency medical services have been identified: adaptive governance and distributed leadership; structured communication architectures, including incident management systems and inter-organisational coalitions; proactive project management mechanisms with reserve capacity; and real-time digital information systems. It has been established that transformational leadership increases staff resilience by 38%, decision-making efficiency by 29%, and recovery speed by 33%. It has been found that proactive investments in preparedness yield a significantly higher return on investment compared to reactive costs associated with mitigating consequences. Crisis project management tools were positioned as organisational innovations that reduce downtime and improve the efficiency of resource allocation. The developed matrix is a structured analytical tool with practical significance for healthcare management and the sustainable development of emergency medical services

Keywords: crisis management; emergency medical services; organisational resilience; continuity planning; incident command system

Introduction

Emergency medical services (EMS) represent a structurally critical and operationally indispensable component of national health systems – a system that cannot suspend operations precisely when crisis demand peaks. L. Li *et al.* (2021), in a scientometric review of 374 articles on healthcare facility resilience published between 2000 and 2020, identify four knowledge domains shaping the field: climate change impact, resilience in response to war and epidemic, resilience assessment of healthcare facilities, and applications of information systems – demonstrating the multidimensional growth of healthcare resilience research

across both natural disaster and public health emergency contexts. V. Gkouliaveras *et al.* (2026), in a systematic scoping review of climate change and health system sustainability, demonstrate that overlapping extreme climate events are substantially compounding the EMS threat landscape, generating simultaneous surges in service demand and infrastructure damage that exceed the adaptive capacity of systems relying on reactive, non-integrated management approaches. N. Litke *et al.* (2022), examining primary care crisis management during COVID-19 in Germany, confirm that organisations simultaneously facing resource

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shortages, staff exhaustion, and information overload experience disproportionate operational disruption when no structured PM or communication framework pre-exists.

The operational, logistical, and economic consequences of EMS service disruption are well-documented. G. Atighechian *et al.* (2024), in a systematic review synthesising hospital resilience research published before and during COVID-19, document a significant shift in research priorities – from structural preparedness planning towards the psychological resilience and wellbeing of healthcare workers. M.J. Sameri *et al.* (2025), in a systematic review of 21 studies on adaptive health innovations in armed conflict settings, document key health system responses including decentralised management structures, community health worker programmes, and mobile health units – innovations that demonstrate the critical role of adaptive organisational design in maintaining service delivery under extreme operational disruption. D. Chamla *et al.* (2024), in a scoping review mapping critical resilience element for health systems in the WHO African Region, identify community engagement, protective mechanisms for the health workforce, and flexible leadership and governance as decisive factors – concluding that resilient health systems require adaptable policies at all levels, including primary care, with post-recovery planning as a core institutional capacity. S. Best & S.J. Williams (2021), in a scoping review of 30 articles on leadership and management learning for PPE supply chain resilience across pandemics, find that learning from previous pandemics was limited but COVID-19 generated extensive adaptive knowledge – with PPE supply chain resilience identified as interdependent on sustainability practices, appropriate PPE utilisation, and long-term circular economy approaches that reduce crisis-period procurement vulnerabilities.

Despite the growing body of evidence, crisis PM frameworks and business communication strategies have not been integrated into a coherent analytical model applicable to EMS management. I.M. Savin (2023), through structured interviews with 45 management-level staff in Romanian public and private healthcare providers during COVID-19, confirms that building organisational resilience in healthcare requires structured management frameworks and concrete operational solutions. F. Petrazzuoli *et al.* (2025), in a mixed-methods study with 406 primary healthcare practitioners from 16 European countries conducted via the EURIPA network, document that COVID-19 substantially altered the working practices of family medicine doctors, with significant variation in primary healthcare resilience between rural and urban settings – confirming that adaptive communication and service continuity strategies are critical across heterogeneous healthcare contexts.

The purpose of this study was to develop an integrated Crisis PM-communication matrix as a practical, evidence-based decision-support tool for EMS managers across the full preparedness-response-recovery lifecycle, positioning crisis PM and communication strategies as organisational innovations with measurable economic and

sustainability effects. The following objectives were pursued: to evaluate major crisis PM frameworks for their applicability to EMS systems; to identify and assess business communication strategies supporting EMS coordination and continuity; to analyse the economic effects and innovation dimensions of integrated PM-communication approaches in EMS; and to develop an integrated Crisis PM-communication matrix as an original analytical contribution. The scientific novelty of the study lies in the integration of PM theory, communication science, and health economics into a unified analytical framework bridging three bodies of literature that have developed predominantly in parallel.

A narrative theoretical analysis was conducted to synthesise and critically evaluate peer-reviewed evidence on crisis project management and business communication strategies in emergency medical service and broader healthcare contexts. The analysis followed a structured methodological protocol encompassing source identification, screening, selection, data extraction, and synthesis. The search was conducted in the PubMed, Web of Science, and Scopus scientific databases. The search covered publications issued between 2018 and 2026, with a priority focus on 2018-2026 sources to capture contemporary post-COVID-19 evidence; pre-2018 sources were retained only where they provided foundational theoretical frameworks unavailable in more recent literature. Searches were conducted in English. The following keyword strings and Boolean combinations were applied: (“healthcare resilience” or “health system resilience”) and (“crisis management” or “emergency management”); “emergency medical services” and (“project management” or “business communication”); “surge capacity” and “hospital management”; “incident command system” and “healthcare”; “supply chain resilience” and “healthcare”; “crisis communication” and “emergency services”; “organisational innovation” and “health system”. A total of approximately 80 candidate sources were identified.

Sources were included if they met all of the following criteria: peer-reviewed journal article, systematic review, scoping review, or comparative empirical study; primary focus on healthcare facility or health system level (not solely patient-level clinical outcomes); addressing crisis, disaster, pandemic, armed conflict, or infrastructure failure context; relevant to PM frameworks, communication strategies, organisational resilience, or supply chain management; published in English. Sources were excluded if: focused exclusively on individual clinical patient outcomes; theoretical without any empirical grounding; not published in a peer-reviewed outlet. The final analytical corpus comprised 40 sources. The Crisis PM-communication matrix was constructed through the following evidence-grounded procedure: Phase structure selection – the preparedness-response-recovery framework was adopted on the basis of its convergent presence across all six PM frameworks reviewed (Plan-Prepare-Respond-Recover (PPRR), Incident Command System (ICS), dynamic capabilities, Functional Resonance Analysis Method (FRAM), hybrid JIT-JIC, and Plan-Do-Study-Act (PDSA)); Organisational level

identification – three levels (macro: system/policy; meso: facility/organisation; micro: individual/team) were derived from the multi-level evidence base of reviewed studies, which consistently document that crisis PM and communication effectiveness differ substantively by level of analysis; Domain indicator derivation – PM and communication domains for each phase-level cell were populated only with evidence demonstrating convergence from a minimum of two independent sources, ensuring robustness of inclusion; Performance indicator selection – indicators were drawn only from sources that explicitly operationalised or quantified outcomes, ensuring the matrix remains empirically grounded and practically applicable to EMS governance decisions. The resulting 3×3 structure (three phases × three organisational levels, each with PM and communication sub-domains) constitutes the matrix's operational architecture.

Crisis project management frameworks for EMS continuity

Project management in EMS crisis contexts is best understood through the dual lenses of formalised preparedness frameworks and adaptive capability development. H.M. Ali *et al.* (2021), reviewing 70 studies, propose a Decision-Support Model for Disaster Resilient Hospitals grounded in the PPRR framework and Resilience Engineering Theory. The model identifies staff education, infrastructure resilience, and organisational adaptability as equally essential components – a triadic structure mapping directly onto the PM domains of people, assets, and process. Critically, the same authors note broad consensus that staff awareness and training in disaster plans require improvement, and that infrastructure and organisational resilience are equally important rather than substitutable.

The ICS represents the most widely adopted formal PM framework for emergency response in healthcare. G.Y. Yogadhita *et al.* (2026), reviewing 12 studies on ICS effectiveness in healthcare facilities, confirm that ICS significantly improves coordination outcomes in disaster contexts, with the Hospital Safety Index (HSI) as the most commonly used assessment instrument. The strength of ICS lies in its clear authority structures, standardised communication protocols, and scalable activation logic – all characteristic of disciplined PM. However, implementation quality varies substantially with prior training intensity, and the review notes that facilities with higher pre-crisis familiarity with ICS achieve faster and more effective activations.

Dynamic capability frameworks address the limitations of static PM tools in prolonged or unprecedented

crises. R. Rosenbäck & K.M. Eriksson (2024) documented, through two Swedish hospital case studies, that dynamic capabilities were most effective when distributed across organisational levels. In one case, lower-level managers perceived senior leadership as enabling – allowing dynamic capabilities to manifest at department level – while in the other, the absence of activated contingency plans necessitated ad hoc coordination structures. This finding aligns with M. Glette *et al.* (2025), who identified “making room for adaptations” and “conducting sound trade-offs” as critical management behaviours at the departmental level, and “ensuring good communication between workers and leaders at the macro level” as a system-level enabler.

Surge capacity management constitutes a core PM function within EMS. S. Petanidis *et al.* (2025), in a systematic review of 142 articles, identify algorithmic forecasting, temporary care facilities, staff redeployment protocols, and capacity modelling as key elements of operational surge readiness. High-income countries that have invested in IT-driven forecasting tools reduce patient wait times and improve resource allocation relative to settings relying solely on reactive protocols. K. Hugelius *et al.* (2020), examining 20 mass casualty case reports, identify five common management challenges: identifying the situation under uncertainty; balancing the mismatch between contingency plans and reality; establishing a functional crisis organisation; adapting the medical response to actual conditions; and ensuring a resilient response. The ability to change mindset, organisation, and procedure – both organisationally and individually – is identified as the central PM competency.

Supply chain PM constitutes a further domain of systemic vulnerability. S. Hobbs (2026) documents five strategic elements of effective post-pandemic supply chain redesign: hybrid just-in-time and just-in-case inventory models; vendor diversification; technology integration through blockchain and AI-driven demand forecasting; strategic regional alliances; and contingency planning embedded in routine operations. E. Sawyerr & C. Harrison (2023), interviewing 22 healthcare professionals across 17 NHS Trusts, find that supply chain unpreparedness drove unsanctioned practices – extended PPE use and redefined infection protocols – that eroded the trust capital essential for coordinated PM. Their central argument is that a resilience-seeking culture, joint problem-solving, and IT infrastructure enabling supply visibility are necessary preconditions, not outcomes, of supply chain resilience. Table 1 presents a comparative analysis of major PM frameworks applied to EMS crisis contexts, drawing on the reviewed evidence.

Table 1. Comparative analysis of crisis project management frameworks applied to emergency medical service contexts

Framework	Core mechanism	EMS application	Key evidence	Limitations
PPRR	Phase-structured readiness and response cycles with pre-defined protocols	Disaster preparedness planning; surge capacity protocols; recovery sequencing	H.M. Ali <i>et al.</i> (2021): broad consensus on staff education, infrastructure resilience, and organisational adaptability	Static; limited adaptability during novel or prolonged crises beyond pre-scripted scenarios

Continued Table 1

Framework	Core mechanism	EMS application	Key evidence	Limitations
ICS	Scalable authority structure with standardised communication channels, defined roles, and unified command	Multi-agency EMS coordination in mass casualty events; inter-facility resource management	G.Y. Yogadhita <i>et al.</i> (2026): effective across 12 studies; HSI as standard assessment instrument	Dependent on pre-crisis training intensity; implementation quality varies substantially across facilities
Dynamic capability framework	Sensing (threat detection), seizing (resource reconfiguration), and transforming (institutionalising adaptations) distributed across levels	Adaptive crisis response in pandemic and compound crises; distributed management under uncertainty	R. Rosenbäck & K.M. Eriksson (2024): distributed dynamic capabilities outperform static surge models; lower-level managers activate faster under enabling senior leadership	Harder to operationalise; requires distributed leadership maturity and organisational trust as preconditions
Resilience Engineering / FRAM	Forward-looking system function analysis; mapping resonance between process functions to identify failure risks	Surge capacity modelling; emergency department resilience threshold analysis; risk identification	B. Fabiano <i>et al.</i> (2024): FRAM combined with Bayesian networks and neural networks for risk management in healthcare and industrial settings	Technically complex; requires specialised expertise; limited uptake in routine EMS management
Hybrid JIT-JIC supply chain PM	Balancing cost-efficiency (just-in-time) with preparedness redundancy (just-in-case) in procurement and stock management	PPE, medication, and medical equipment continuity during demand surges; vendor diversification	S. Hobbs (2026): five strategic elements – hybrid inventory, vendor diversification, AI-driven demand forecasting, regional alliances, embedded contingency planning	Transition costs; procurement culture resistance; requires cross-departmental coordination and executive commitment
Organisational learning cycle (PDSA)	Iterative Plan-Do-Study-Act cycles converting crisis experience into institutionalised knowledge and protocol revisions	Post-incident review; quality lessons learned processes; protocol updating after crises	H.M. Ali <i>et al.</i> (2022): only 4 of 22 reviewed studies described a completed learning cycle, revealing a significant implementation gap	Chronically under-implemented; learning phase consistently identified as the weakest resilience phase in practice

Note: JIT = just-in-time; JIC = Just-In-Case; HSI = Hospital Safety Index; PPE = Personal Protective Equipment

Source: developed by the author

The comparative analysis in Table 1 reveals that no single PM framework is sufficient for all crisis scenarios faced by EMS systems. The evidence suggests a hierarchical deployment logic: PPRR and ICS provide the structural scaffolding for standardised response, while dynamic capability frameworks and resilience engineering tools enable adaptation under unprecedented or prolonged crisis conditions. The hybrid JIT-JIC supply model and the PDSA learning cycle constitute the operational and institutional continuity mechanisms ensuring resource availability and organisational improvement over time. C.C. Donelli *et al.* (2022), documenting lessons from managing a hospital during the COVID-19 pandemic, confirm that a combination of distributed authority and real-time adaptive communication – rather than adherence to any single PM model – was the primary driver of organisational continuity under disruptive conditions, validating the multi-framework integration logic underlying the matrix. Effective EMS crisis PM thus requires not the selection of a single framework but the deliberate integration of complementary tools across all three lifecycle phases.

Business communication strategies for EMS coordination and continuity

Business communication in crisis EMS contexts encompasses four distinct but interdependent functions: (1) command communication – vertical flows within incident command structures; (2) coordination communication – horizontal flows across departments, facilities, and organisations; (3) information management – the collection, verification, and dissemination of situational data; and (4) stakeholder communication – engagement with patients, families, media, and public authorities. Each function requires specific strategies, enabling conditions, and performance metrics. W.A.H. Abuoun *et al.* (2025) provide the most comprehensive synthesis on the communication-performance link, reporting across 150 studies that communication strategies were the most frequently cited resilience enablers. Transformational leadership – characterised communicatively by vision articulation, inspirational motivation, and transparent information sharing – improved staff resilience by 38%, decision-making efficacy by 29%, and institutional recovery speed by 33% compared

to non-adaptive leadership contexts. Wellness initiatives including mental health support and workload redistribution reduced burnout by 22% when applied systematically.

V. Haldane *et al.* (2021), in a comparative analysis of COVID-19 responses across 28 countries, identify strong and transparent leadership communication as one of four foundational elements differentiating high-performing national responses. Countries with clear, consistent, and science-based public messaging maintained population trust in EMS systems, thereby reducing information-seeking bottlenecks and inappropriate emergency department (ED) utilisation during surges. M. Ahti *et al.* (2023) synthesise healthcare leaders' lived experiences of crisis communication competencies into five clusters: comprehending the operational environment; staying resilient amidst change; adapting to and managing change; managing and caring for staff; and cooperating and communicating with diverse stakeholders. The last cluster is described as particularly demanding, requiring leaders to translate simultaneously between clinical, administrative, political, and community registers.

M. Glette *et al.* (2023), in a meta-synthesis of 47 qualitative studies from the COVID-19 context, document an extensive range of communication adaptations: healthcare

workers took on new communication roles, transitioned to digital platforms, increased cross-hierarchical contact, and reorganised workspace information flows. The same review notes, however, that some communication adaptations – particularly those bypassing formal channels – exposed systemic weaknesses in information architecture rather than compensating for them. This observation underlines the importance of structural communication design as a PM function, not an emergent outcome. Digital communication technologies have substantially extended EMS communication capacity. L. Ellis *et al.* (2023) and L. Ellis & M. Saba (2024), reviewing COVID-19 resilience literature, confirm digital communication infrastructure as a key differentiator of resilient healthcare performance. Telemedicine and e-health platforms reduced information-seeking latency, extended clinical reach beyond physical facilities, and maintained communication continuity when face-to-face coordination was impossible. H. Hadija *et al.* (2026) confirmed that organisations employing proactive digital strategies demonstrated significantly greater resilience outcomes, with digital maturity accelerating adaptation speed across all strategic domains. Table 2 presents a structured taxonomy of business communication strategies by function, evidence base, and effectiveness outcomes.

Table 2. Business communication strategies for emergency medical service continuity: functions, evidence, and effectiveness outcomes

Communication function	Strategy	Key evidence	Effectiveness indicators	Implementation prerequisite
Command communication	Structured communication plans with defined escalation protocols and briefing cadences	W.A.H. Abuoun <i>et al.</i> (2025): cited by 67% of hospital leaders as essential for staff morale and trust	Staff morale maintained; error reduction; trust preserved during acute phase; burnout reduced by 22% with wellness integration	ICS adoption; prior leadership training in crisis communication
Stakeholder communication	Transparent, science-based public messaging via dedicated spokespersons and media protocols	V. Haldane <i>et al.</i> (2021): characteristic of highly effective COVID-19 national responses across 28 countries	Sustained population trust; reduced inappropriate ED utilisation; improved public compliance with EMS protocols	Pre-designated spokespersons; aligned messaging framework; media coordination protocols
Cross-unit coordination	Cross-hierarchical information sharing; daily situational briefings; digital workspace communication tools	M. Glette <i>et al.</i> (2023): documented across 47 qualitative studies during COVID-19; workers took on new communication roles across wards	Faster adaptation; reduced duplication; improved staff alignment; information gaps reduced at all hierarchical levels	Flat communication culture; pre-established digital platforms; leadership transparency norms
Inter-organisational coordination	Healthcare coalition communication infrastructure with shared situational awareness and resource management platforms	L. Upton <i>et al.</i> (2022): SETRAC coalition maintained continuity across COVID-19, Hurricane Laura, and Winter Storm Uri concurrently	Resource allocation efficiency during concurrent crises; coalition cohesion; historically marginalised agency inclusion	Pre-established inter-organisational trust; shared communication protocols; coalition governance structure
Information management	Real-time situational awareness systems; syndromic surveillance integration; AI-driven demand communication dashboards	H. Hadija <i>et al.</i> (2026): proactive digital strategies significantly linked to greater resilience outcomes; digital maturity accelerated adaptation	Decision latency reduction; proactive resource mobilisation; 11-13 day ICU surge prediction lead time in high-income settings	Digital infrastructure investment before crisis; staff training; interoperability standards

Continued Table 2

Communication function	Strategy	Key evidence	Effectiveness indicators	Implementation prerequisite
Workforce welfare communication	Proactive peer support communication; leadership welfare check-ins; integrated digital mental health services	A. Salehi <i>et al.</i> (2021); P. Upadhyaya <i>et al.</i> (2025): mental health communication among top determinants of staff durability in long-term crises	Burnout reduction; staff retention; organisational resilience influence on safety performance 42-45% in healthcare workers over 40	Integration of mental health programme into EMS communication protocols; peer network formalisation
Digital telemedicine communication	Remote clinical consultation; teleconsultation for healthcare workers; e-health service delivery during facility closure	L. Ellis <i>et al.</i> (2023); L. Ellis & M. Saba (2024): telemedicine among most cited resilience strategies in COVID-19 first wave	Service continuity during facility closure; extended clinical reach beyond physical constraints; reduced staff anxiety	Technology access; broadband infrastructure; prior staff training; digital literacy programme

Note: SETRAC = Southeast Texas Regional Advisory Council

Source: developed by the author

A recurring and strongly evidenced theme in the literature is that EMS continuity during crises depends critically on communication flows beyond the boundaries of individual facilities. L. Upton *et al.* (2022) document how the SETRAC, a non-profit healthcare coalition, maintained EMS continuity across concurrent crises – COVID-19, Hurricane Laura, and Winter Storm Uri – through joint training, an emergency resource management platform, shared situational needs assessments, and distributed coalition governance. The coalition model operationalised inter-organisational communication as a formal PM function, with defined roles, protocols, and information systems. Notably, the inclusion of historically marginalised agencies is identified as a critical success factor, underscoring that communication equity is as important as communication technology. C. Dagenais *et al.* (2023), comparing hospital COVID-19 responses in Brazil, Canada, France, Japan, and Mali, identify the improvement of internal and external communication as the most consistent quality lesson learned (QLL) across all five countries – ahead of service reorganisation and resource creativity. The cross-national pattern confirms that communication, not merely clinical capacity, is the primary driver of resilience differentials between healthcare systems at comparable resource levels. Importantly, the authors propose a structured QLL process – integrating lessons identification, validation, and institutionalisation – as itself a communication PM deliverable.

N. Carbonara *et al.* (2024) synthesise hospital resilience literature around three inter-organisational communication functions – coordination, cooperation, and collaboration – finding that integration capabilities across all three levels are crucial determinants of hospital resilience during disruptions. Facilities with pre-established inter-organisational communication structures maintained absorptive and adaptive resilience substantially better than those creating ad hoc networks mid-crisis. A. Salehi *et al.* (2021), in a systematic review of 16 systematic reviews on human resources during long-term crises, confirm that collaboration

promotion, peer support communication, and stress management protocols are among the most impactful organisational-level strategies for workforce resilience – findings that converge with those of N. Carbonara *et al.* (2024) at the facility level. The evidence also reveals structural gaps in inter-organisational communication architecture. D.D. Saulnier *et al.* (2023) identify vertical interdependence – the linkage between community actors and regional or national public health organisations – as an underexplored dimension of resilience. E. Barasa *et al.* (2018) note that social networks and collaboration are among the most consistently identified organisational resilience factors yet among the least systematically invested. This points to a priority PM investment: the proactive development of inter-organisational communication infrastructure before crises, rather than its improvised establishment during them.

Digital technologies and information management in EMS crisis communication

Digital information systems have emerged as structural enablers of both crisis PM and business communication in EMS. B. Fabiano *et al.* (2024) review risk management tools – including Bayesian networks, fuzzy logic systems, the FRAM, and data envelopment analysis – as quantitative instruments for translating EMS situational awareness into structured PM decisions. These tools represent the most analytically sophisticated end of the crisis PM-communication spectrum, enabling probabilistic risk assessment and dynamic resource optimisation that static planning cannot achieve. At the operational level, syndromic surveillance systems demonstrate clear EMS communication value. Real-time surveillance platforms that integrate clinical, laboratory, and demographic data streams provide EMS managers with 11 to 13 days of lead time for ICU surge prediction in high-income settings (Petanidis *et al.*, 2025). Telemedicine platforms, identified by L. Ellis *et al.* (2023) as among the most cited COVID-19 resilience strategies, maintain communication continuity and clinical service delivery when physical facility operation is disrupted.

A. Pircalaboiu *et al.* (2026) situate digital risk management tools – including digital contact tracing and predictive analytics – within a broader proactive risk management framework, noting their effectiveness is contingent on aligned organisational culture, leadership accountability, and continuous staff training.

An important cautionary note is provided by H. Hadija *et al.* (2026), who confirm digital maturity as a resilience enabler while observing that organisations without corresponding training and communication norms failed to realise digital system benefits. This “hardware-software dissonance” – technically advanced systems undermined by behavioural and organisational gaps – is one of the most robust cross-cutting findings in the broader resilience literature. L. Koukou *et al.* (2024) make the same point from a management control perspective: clear performance objectives and comprehensive evaluation frameworks are necessary conditions for digital communication investments to generate EMS continuity outcomes. Workforce

mental health communication represents an emerging and evidence-supported digital application. P. Upadhyaya *et al.* (2025) document that nations with integrated digital mental health services embedded in crisis communication systems demonstrated greater overall EMS resilience, particularly through peer support networks and teleconsultation for healthcare workers in acute distress. A. Salehi *et al.* (2021), reviewing 16 systematic reviews on human resources during long-term crises, identify mental and psychological problems as the most important factor in staff durability decline, and propose mental health counselling, flexible scheduling, and organisational trust communication as the primary remedial strategies. These findings support the investment in digital communication infrastructure for workforce welfare as a core EMS PM function, not a peripheral wellbeing initiative. Table 3 presents a systematic mapping of implementation barriers and enablers for crisis PM and communication strategies in EMS, synthesising evidence across domains.

Table 3. Implementation barriers and enablers for crisis project management and business communication strategies in emergency medical services

Domain	Key barriers	Key enablers	Evidence source
Leadership	Centralised, non-adaptive styles; information gaps between levels; fragmented management systems	Transformational and distributed leadership; brave and enabling senior managers; distributed dynamic capabilities	R. Rosenbäck & K.M. Eriksson (2024); W.A.H. Abuoun <i>et al.</i> (2025)
PM framework	Static contingency plans that fail under novel or prolonged crises; absence of completed learning cycles	Dynamic capability development; PPRR integration with resilience engineering; institutionalised PDSA cycles	H.M. Ali <i>et al.</i> (2021); H.M. Ali <i>et al.</i> (2022); R. Rosenbäck & K.M. Eriksson (2024)
Communication infrastructure	Informal/ad hoc networks; absence of digital platforms; bypassing of formal channels under stress	Pre-established inter-organisational coalitions; standardised protocols; digital situational awareness platforms	L. Upton <i>et al.</i> (2022); M. Glette <i>et al.</i> (2023); N. Carbonara <i>et al.</i> (2024)
Workforce	Staff burnout (52% of studies); psychological exhaustion; behavioural non-compliance; role ambiguity	Mental health programmes; flexible work schedules; workload redistribution; peer support formalisation; welfare communication	A. Salehi <i>et al.</i> (2021); N. Carbonara <i>et al.</i> (2024); W.A.H. Abuoun <i>et al.</i> (2025)
Supply chain	Just-in-time model fragility; single-supplier dependency; information opacity; unsanctioned practices under scarcity	Hybrid JIT-JIC inventory systems; vendor diversification; blockchain-enabled supply visibility; embedded contingency planning	E. Sawyerr & C. Harrison (2023); S. Hobbs (2026)
Digital technology	Inadequate staff training; cybersecurity vulnerabilities; integration failures across legacy systems	Pre-crisis investment in digital infrastructure; tabletop cyber exercises; certified IT crisis teams; AI demand forecasting	B. Fabiano <i>et al.</i> (2024); H. Hadija <i>et al.</i> (2026)
Organisational culture	Fatalistic or resistance-to-change culture; hardware-software dissonance; trust capital erosion	Proactive learning culture; trust-building through leadership narrative communication; performance evaluation frameworks	E. Barasa <i>et al.</i> (2018); L. Koukou <i>et al.</i> (2024)
Measurement	Absence of validated EMS-specific resilience instruments; psychometric gaps in communication capacity assessment	Multi-level indicator frameworks; Nurse Team Resilience Scale; HSI; psychometric development of structural-level tools	P. Fleming <i>et al.</i> (2022); M.Z.Y. Tan <i>et al.</i> (2023)
Resource context	Lower-resource settings with chronic underinvestment; LMIC infrastructure gaps; rural-urban resilience disparities	Community health worker integration; context-adapted PM frameworks; regional coalition support; proactive preparedness investment	C. Dagenais <i>et al.</i> (2023); M.T.A.A. Alnefaie <i>et al.</i> (2025)

Note: LMIC = Low- and Middle-Income Country

Source: developed by the author

Table 3 demonstrates that EMS crisis management faces simultaneous barriers across leadership, PM framework, communication infrastructure, workforce, supply chain, digital technology, organisational culture, measurement, and resource context dimensions. No single domain is independently decisive; rather, barriers in one domain systematically amplify those in others, producing the compounding vulnerability patterns documented across multiple crisis typologies. Correspondingly, the enablers identified – transformational leadership, hybrid supply models, pre-established coalitions, and digital infrastructure – generate mutual reinforcement effects when deployed concurrently, underscoring the integrated logic of the Crisis PM-communication matrix presented in the following section.

The integrated crisis PM-communication matrix: A proposed framework

The synthesised evidence supports a central theoretical proposition: crisis PM and business communication cannot be treated as independent domains in EMS governance. Four cross-cutting relationships are particularly well-evidenced and form the foundation of the proposed integrated framework. M.Z.Y. Tan *et al.* (2023), in a meta-narrative review synthesising 32 systematic reviews on healthcare resilience, confirm the tripartite prepare-absorb-recover architecture as the most consistently evidenced framework across diverse crisis typologies, providing independent validation of the phase structure adopted in the matrix. L. Biddle *et al.* (2020), in a systematic literature review of empirical health system resilience research, similarly confirm that proactive structural investment consistently predicts better crisis outcomes than reactive capacity adjustment – a conclusion that directly underpins the proactive-reactive rationale of the matrix.

First, communication architecture shapes PM effectiveness. R. Rosenbäck & K.M. Eriksson (2024) documented that information gaps between lower-level managers and regional crisis coordinators prevented sensing – the first dynamic capability – from reaching the decision-makers who could act on it. Structured communication channels are not merely support functions but constitutive elements

of crisis PM. E. Barasa *et al.* (2018) identified information management as one of ten core organisational resilience factors, noting that its absence undermines even technically sophisticated PM systems. Second, PM structures shape communication quality. The ICS defines communication authority, reporting intervals, and information-sharing norms as project management deliverables rather than emergent, informal outcomes. G.Y. Yogadhita *et al.* (2026) found that ICS adoption correlates with improved coordination outcomes precisely because it makes communication responsibilities a structured PM function. Similarly, C. Dagenais *et al.* (2023) demonstrated that the QLL process – a PM mechanism – generates communication improvements that outlast the crisis event.

Third, the proactive-reactive axis applies equally to PM and communication. M.T.A.A. Alnefaie *et al.* (2025) argued for a strategic shift from reactive, crisis-driven investment to proactive all-hazards PM, an argument that extends directly to communication: organisations that develop shared protocols, inter-organisational trust, and digital platforms before crises communicate more effectively during them. S. Hobbs (2026) confirmed this at the supply chain level, documenting that contingency planning embedded in routine operations – rather than activated in crisis – generates sustainable PM and communication resilience. Fourth, scale integration requires PM-communication coupling. V. Haldane *et al.* (2021) found at the macro (national) level that flexible governance and iterative learning – PM functions – depend on transparent communication to operate. M. Glette *et al.* (2025) found at the meso (facility) level that managers who ensure good communication between workers and leaders also make room for adaptations and conduct sound trade-offs. L. Ellis *et al.* (2023) found at the micro (team) level that individual healthcare workers' adaptive capacity – the proximate source of resilient EMS performance – is enabled by leadership communication and organisational information flows. These findings, taken together, establish that effective crisis management is a vertically coupled system in which PM decisions and communication flows reinforce or undermine each other across all organisational levels (Table 4).

Table 4. Integrated crisis PM-communication matrix for emergency medical service continuity

Phase	Org. level	PM domain	Communication domain	Key strategies & indicators
Preparedness	Macro (system)	All-hazards governance structure; resource allocation policy; national preparedness frameworks	Public trust communication; inter-agency protocol development; coalition Memoranda of Understanding (MoUs)	Establish national EMS preparedness plans; develop ICS-aligned coalition structures; conduct joint communication drills. Indicator: % EMS facilities under active preparedness plans
Preparedness	Meso (facility)	ICS establishment; surge capacity modelling; hybrid JIT-JIC supply protocols; PDSA cycle integration	Cross-unit communication protocols; digital platform deployment; stakeholder mapping; information cascade design	ICS training; tabletop exercises; deploy situational awareness tools; establish vendor emergency contracts. Indicator: HSI score; ICS training hours per staff member
Preparedness	Micro (individual)	Staff PM competency development; role clarity documentation; mental health preparedness	Team communication norms; escalation procedure training; peer support network formalisation	Crisis communication workshops; PM competency assessments; embed mental health first-aid roles. Indicator: staff PM competency scores; communication protocol awareness rate

Continued Table 4

Phase	Org. level	PM domain	Communication domain	Key strategies & indicators
Response	Macro (system)	Crisis standards of care activation; national resource redistribution; cross-sector PM coordination	Public messaging coordination; whole-of-government communication; media management; inter-system situation reporting	Activate crisis standards protocols; designate national spokespersons; establish joint operations centre. Indicator: time to national crisis coordination; public trust index
Response	Meso (facility)	Surge capacity activation; supply chain redeployment; cross-ward staff redeployment; vendor emergency protocols	Daily situational briefings; inter-facility communication; real-time dashboard dissemination; coalition information sharing	Activate ICS; implement surge staffing plans; communicate supply status in real time; engage coalition partners. Indicator: surge capacity time-to-activation; supply continuity rate
Response	Micro (individual)	Task adaptation; role expansion; flexible deployment; just-in-time staff training during crisis	Peer communication; supervisor welfare check-ins; digital updates; informal network activation	Formalise informal peer networks; deploy teleconsultation; redistribute workloads proactively. Indicator: staff burnout rate; reported communication frequency metrics
Recovery	Macro (system)	After-action policy revision; investment reallocation; long-term resilience infrastructure funding	Public disclosure of lessons learned; cross-national knowledge dissemination; media post-event narrative management	Implement quality lessons learned processes; revise national preparedness frameworks; publish after-action reports. Indicator: policy changes per event; national QLL publication rate
Recovery	Meso (facility)	PDSA learning cycle completion; protocol and supply system updating; organisational learning review	Internal debrief communication; cross-facility learning networks; inter-coalition post-event reporting	Complete PDSA cycles; update ICS protocols; join cross-hospital learning coalitions; revise supply plans. Indicator: % learning cycles completed; protocol update frequency
Recovery	Micro (individual)	Individual debrief; competency gap documentation; skill consolidation; post-event PM training	Narrative processing; peer support communication; psychological first-aid communication; return-to-routine signalling	Conduct structured staff debriefs; activate psychological first-aid protocols; document and share individual lessons. Indicator: staff wellbeing scores post-event; debrief participation rate

Note: MoU = Memorandum of Understanding

Source: developed by the author

The integrated Crisis PM-communication matrix presented in Table 4 operationalises these relationships across the preparedness-response-recovery lifecycle and three organisational levels (macro, meso, micro). For each cell, the matrix specifies the primary PM domain, the corresponding communication domain, key strategies, and priority performance indicators. The integrated crisis PM-communication matrix addresses specific limitations inherent in each of the established frameworks it complements rather than replaces. PPRR is static in design – its pre-scripted protocols assume a predictable crisis sequence and provide limited adaptability during compound or unprecedented events (Ali *et al.*, 2021); the matrix resolves this by embedding adaptive decision criteria at each phase, enabling real-time recalibration across three organisational levels simultaneously. ICS provides excellent scalable command authority but operates on a primarily vertical logic, leaving horizontal and inter-organisational communication largely unaddressed (Yogadhita *et al.*, 2026); the matrix supplements ICS by making cross-unit and inter-organisational communication a structured, phase-specific deliverable at every level. The HSI, the most widely used EMS facility readiness instrument, assesses structural and functional preparedness dimensions but does not

include communication capacity as a scored domain (Yogadhita *et al.*, 2026); the matrix provides a complementary communication assessment layer across all nine phase-level cells. These three frameworks thus remain fully valid inputs to the preparedness and response cells of the matrix, which adds the communication, economic, and recovery dimensions they individually lack.

Despite the richness of the reviewed evidence, several limitations constrain the current application of the matrix. Pre-hospital EMS operations – ambulance services, dispatch systems, and air medical transport – are substantially under-represented in the literature, which is predominantly hospital-based. The post-crisis learning phase, where PM and communication lessons should be institutionalised, is systematically under-documented: P. Fleming *et al.* (2022) confirmed that only 22% of resilience studies address recovery and learning metrics, while H.M. Ali *et al.* (2022) found that just 4 of 22 reviewed studies describe a completed organisational learning cycle. Existing resilience measurement instruments inadequately capture communication capacity at the structural level, with significant psychometric gaps in comparative evaluation. The generalisability of the matrix to lower-resource EMS settings is constrained by the predominantly high-income-country evidence base;

C. Dagenais *et al.* (2023) demonstrated that context – resource level, governance culture, and institutional history – fundamentally shapes which strategies are feasible and effective. Future research should address: pre-hospital EMS PM and communication longitudinal studies; EMS-specific communication resilience measurement instruments; and comparative matrix implementation evaluation across diverse resource and institutional contexts.

Economic effects and innovation dimensions of crisis PM in EMS

EMS resilience, viewed through an economic lens, constitutes both a cost-containment challenge and an investment opportunity for health system managers. The economic rationale for proactive crisis PM investment is compelling: M.T.A.A. Alnefaie *et al.* (2025) argued that every unit of investment in preparedness potentially saves exponentially more in response costs – an asymmetry that applies with particular force to EMS systems, where service continuity directly affects morbidity, mortality, and downstream economic burden on health infrastructure. This positions crisis PM not merely as an operational tool but as an economic instrument for health system value creation. Indirect operational costs – longer response times, delayed care, preventable clinical deterioration – impose a measurable burden on health systems and regional economies that systematically exceeds direct expenditure. L. Li *et al.* (2021), in a scientometric mapping of healthcare facility resilience research spanning 2000–2020, document that cost-effectiveness and quantitative analytical methods have emerged as increasingly prominent tools in resilience evaluation studies – reflecting the field's maturation towards integrating economic performance assessment alongside structural resilience indicators. Innovation spillover effects – including improved staff productivity, reduced turnover, and enhanced organisational learning capacity – constitute a third channel of economic return from crisis PM investment that traditional cost analyses routinely undervalue.

Crisis PM and communication tools can be analytically positioned as organisational innovations across three dimensions. First, process innovation: ICS, dynamic capability frameworks, and PDSA learning cycles represent systematic process improvements that reconfigure how EMS organisations sense, decide, and act – the core functions of management innovation. S. Petanidis *et al.* (2025) confirmed that IT-driven forecasting tools constitute measurable productivity innovations, reducing patient wait times and improving resource allocation efficiency in EMS settings. Second, technological innovation: AI-driven demand forecasting, blockchain-enabled supply chain visibility, and real-time syndromic surveillance platforms (Fabiano *et al.*, 2024; Hobbs, 2026) represent technological innovations with quantifiable risk-reduction effects, generating efficiency gains comparable to those documented for digital innovation in other knowledge-intensive service sectors. Third, social innovation: digital mental health services, peer support formalisation,

and telemedicine-based workforce welfare programmes (Upadhyaya *et al.*, 2025) constitute innovations in the social organisation of healthcare work, with documented effects on staff retention, burnout reduction, and long-term human capital sustainability.

A critical question arising from this analysis is whether the documented economic returns of crisis PM and communication investment are specific to EMS or characteristic of any organisation with a continuous operational cycle. Several effects – reduced procurement costs through hybrid inventory systems, improved staff retention through welfare communication, and learning-cycle efficiency gains – are also observable in other knowledge-intensive, uninterrupted-service sectors, including utility networks, transport systems, and air traffic management. However, three features make the EMS context economically distinctive: first, the direct mortality-linked cost of service interruption creates a welfare loss metric absent in non-clinical continuous operations; second, the regulatory and ethical obligation for continuous provision regardless of crisis conditions constrains the cost-reduction flexibility available to commercial operators, making preparedness investment a structural necessity rather than a strategic option; third, the public-goods character of EMS means that economic returns from resilience investment are substantially externalised to the broader community through reduced downstream healthcare costs and improved population health outcomes – a social ROI that significantly exceeds the direct organisational financial return. These features position EMS-specific crisis PM investment as requiring distinct economic modelling frameworks and public policy instruments compared to general organisational continuity management.

These sustainability outcomes directly correspond to specific United Nations Sustainable Development Goals: SDG 3 (Good Health and Well-being) through sustained EMS access for populations during and after crises; SDG 11 (Sustainable Cities and Communities) through climate-adaptive health infrastructure reducing community vulnerability to extreme events; and SDG 17 (Partnerships for the Goals) through the inter-organisational coalition models that underpin coordinated EMS continuity across agencies and jurisdictions. I.M. Savin (2023), based on qualitative data from 45 Romanian healthcare managers, confirmed that management control failures during crises generate both immediate financial losses and long-term reputational and institutional costs – with systematic crisis management frameworks identified as the primary means of sustaining organisational capacity and financial stability under crisis conditions. S. Best & S.J. Williams (2021) similarly demonstrated that pandemic PPE supply chain failures imposed disproportionate costs on facilities relying on single-source procurement, while collaborative sourcing, multi-tier supplier networks, and strategic stockpiling – identified as key facilitators in the review – constitute the evidence-based economic case for proactive, redundancy-based supply chain management (Table 5).

Table 5. Economic performance indicators for crisis PM-communication domains in EMS

PM-communication domain	Economic indicator	Documented effect
Adaptive leadership & governance	Staff resilience & retention ROI	+38% staff resilience; +29% decision efficacy; burnout –22% saves recruitment costs, in W.A.H. Abuoun <i>et al.</i> (2025)
ICS	Coordination efficiency; activation cost	Faster surge activation reduces overcrowding costs; IT forecasting cuts waste, in S. Petanidis <i>et al.</i> (2025); G.Y. Yogadhita <i>et al.</i> (2026)
Hybrid JIT-JIC supply chain	Procurement cost; inventory waste	Hybrid buffers prevent emergency price-spike procurement; vendor diversity reduces dependency cost, in S. Best & S.J. Williams (2021); S. Hobbs (2026)
Digital systems & telemedicine	Productivity gain; service continuity; innovation ROI	11-13-day ICU lead time cuts emergency staffing costs; telemedicine sustains revenue during facility closure, in L. Ellis <i>et al.</i> (2023); B. Fabiano <i>et al.</i> (2024)
Inter-organisational coalitions	Shared resource efficiency; cost-sharing	Coalition resource pooling reduces per-facility surge costs; shared procurement lowers unit prices, in L. Upton <i>et al.</i> (2022); C. Dagenais <i>et al.</i> (2023)
PDSA learning cycle	Avoided future crisis costs; knowledge value	Systematic learning reduces repeated preparedness failures; QLL generates durable efficiency gains, in H.M. Ali <i>et al.</i> (2022); C. Dagenais <i>et al.</i> (2023)
Workforce welfare communication	Burnout cost avoidance; retention ROI	Organisational resilience influences safety performance 42-45% in workers over 40; mental health reduces absenteeism, in A. Salehi <i>et al.</i> (2021); P. Upadhyaya <i>et al.</i> (2025)

Source: developed by the author

Taken together, the evidence supports a core management-economic argument: crisis PM and communication frameworks in EMS are not merely operational response tools but economic and innovation assets whose proactive adoption generates measurable returns in reduced crisis expenditure, improved service continuity, enhanced organisational capacity, and long-term financial sustainability. Table 5 summarises the economic performance indicators most strongly evidenced in the literature for each of the four PM-communication domains identified in this study.

Conclusions

This study synthesised and critically evaluated evidence on crisis project management and business communication strategies for emergency medical service continuity, producing an integrated crisis PM-communication matrix as an original analytical contribution to health management science. Effective EMS crisis management was found to rest on four interdependent domains: adaptive governance and distributed leadership; structured communication architectures; proactive PM frameworks with surge and supply redundancy; and digital information systems as real-time situational awareness infrastructure. Concurrent integration across micro, meso, and macro-organisational levels is required – no single domain is independently sufficient for sustained EMS continuity.

The most generalisable finding of the synthesis is that proactive preparedness consistently outperforms reactive improvisation across all crisis typologies and resource contexts. Organisations that establish PM protocols, communication infrastructure, inter-organisational coalitions, and hybrid supply systems before crises achieve measurably

superior continuity outcomes. Crisis PM and communication strategies demonstrated measurable economic and innovation value specific to EMS – including reductions in operational downtime, improvements in resource allocation efficiency, and contributions to health system financial sustainability aligned with SDG 3, SDG 11, and SDG 17. The EMS context makes these returns particularly significant given the mortality-linked costs of service interruption and the public-goods character of emergency care. The crisis PM-communication matrix provides a structured, phase-specific, and level-differentiated decision-support tool applicable across the full preparedness-response-recovery lifecycle, directly addressing limitations of existing frameworks by adding communication, economic, and learning dimensions to PPRR phase logic, ICS authority structures, and HSI structural assessment. Prospects for further research also include longitudinal evaluation of the matrix in pre-hospital EMS and lower-resource settings; psychometric development of EMS-specific communication resilience measurement instruments; and quantitative modelling of the ROI of integrated crisis PM-communication investment across diverse national health system contexts.

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References

- [1] Abuoun, W.A.H., El-Khawass, K., & Hussein, N. (2025). Crisis management in healthcare: The impact of hospital leadership styles on navigating challenges, implementing strategies and achieving outcomes: Review article. *Egyptian Journal of Hospital Medicine*, 101(1), 5857-5862. [doi: 10.21608/ejhm.2025.471403](https://doi.org/10.21608/ejhm.2025.471403).

- [2] Ahti, M., Taipale-Walsh, L., Kuha, S., & Kanste, O. (2023). Health-care leaders' experiences of the competencies required for crisis management during COVID-19: A systematic review of qualitative studies. *Leadership in Health Services*, 36(4), 595-610. [doi: 10.1108/LHS-10-2022-0104](https://doi.org/10.1108/LHS-10-2022-0104).
- [3] Ali, H.M., Desha, C., Ranse, J., & Roiko, A. (2021). Planning and assessment approaches towards disaster resilient hospitals: A systematic literature review. *International Journal of Disaster Risk Reduction*, 61, article number 102319. [doi: 10.1016/j.ijdrr.2021.102319](https://doi.org/10.1016/j.ijdrr.2021.102319).
- [4] Ali, H.M., Ranse, J., Roiko, A., & Desha, C. (2022). Investigating organizational learning and adaptations for improved disaster response towards "resilient hospitals": An integrative literature review. *Prehospital and Disaster Medicine*, 37(5), 665-673. [doi: 10.1017/S1049023X2200108X](https://doi.org/10.1017/S1049023X2200108X).
- [5] Alnefaie, M.T.A.A., et al. (2025). Health security and healthcare system resilience: Preparedness for high-impact health emergencies. *The Review of Diabetic Studies*, 21(S2), 605-619. [doi: 10.70082/twrvdn17](https://doi.org/10.70082/twrvdn17).
- [6] Atighechian, G., Rahimi, A., Sattari, M., & Mohammadi, M. (2024). Dimensions of hospital resilience emphasized during the COVID-19 pandemic response: A systematic review. *Health Science Reports*, 7(8), article number e2300. [doi: 10.1002/hsr.2.2300](https://doi.org/10.1002/hsr.2.2300).
- [7] Barasa, E., Mbau, R., & Gilson, L. (2018). What is resilience and how can it be nurtured? A systematic review of empirical literature on organizational resilience. *International Journal of Health Policy and Management*, 7(6), 491-503. [doi: 10.15171/ijhpm.2018.06](https://doi.org/10.15171/ijhpm.2018.06).
- [8] Best, S., & Williams, S.J. (2021). What have we learnt about the sourcing of personal protective equipment during pandemics? Leadership and management in healthcare supply chain management: A scoping review. *Frontiers in Public Health*, 9, article number 765501. [doi: 10.3389/fpubh.2021.765501](https://doi.org/10.3389/fpubh.2021.765501).
- [9] Biddle, L., Wahedi, K., & Bozorgmehr, K. (2020). Health system resilience: A literature review of empirical research. *Health Policy and Planning*, 35(8), 1084-1109. [doi: 10.1093/heapol/czaa032](https://doi.org/10.1093/heapol/czaa032).
- [10] Carbonara, N., Pellegrino, R., & Luca, C.D. (2024). Resilience of hospitals in an age of disruptions: A systematic literature review on resources and capabilities. *Health Systems*, 13(3), 192-228. [doi: 10.1080/20476965.2024.2365144](https://doi.org/10.1080/20476965.2024.2365144).
- [11] Chamla, D., Iwu-Jaja, C., Jaja, A., Ndlambe, A.M., Buwa, M., Idemili-Aronu, N., Okeibunor, J., Wiysonge, C.S., & Gueye, A.S. (2024). The critical elements of the health system that could make for resilience in the World Health Organization African Region: A scoping review. *PeerJ*, 12, article number e17869. [doi: 10.7717/peerj.17869](https://doi.org/10.7717/peerj.17869).
- [12] Dagenais, C., et al. (2023). Lessons learned from field experiences on hospitals' resilience to the COVID-19 pandemic: A systematic approach. *Health Systems & Reform*, 9(2), article number 2231644. [doi: 10.1080/23288604.2023.2231644](https://doi.org/10.1080/23288604.2023.2231644).
- [13] Donelli, C.C., Fanelli, S., Zangrandi, A., & Elefanti, M. (2022). Disruptive crisis management: Lessons from managing a hospital during the COVID-19 pandemic. *Management Decision*, 60(13), 66-91. [doi: 10.1108/md-02-2021-0279](https://doi.org/10.1108/md-02-2021-0279).
- [14] Ellis, L., & Saba, M. (2024). Resilient health care research during COVID-19: Identification of the factors that develop resilient performance. *International Journal of Integrated Care*, 24(1), article number 217. [doi: 10.5334/ijic.apic3217](https://doi.org/10.5334/ijic.apic3217).
- [15] Ellis, L., et al. (2023). The rise of resilient healthcare research during COVID-19: Scoping review of empirical research. *BMC Health Services Research*, 23, article number 833. [doi: 10.1186/s12913-023-09839-0](https://doi.org/10.1186/s12913-023-09839-0).
- [16] Fabiano, B., Guastaferrro, M., Pettinato, M., & Pasman, H.J. (2024). Towards strengthening resilience of organizations by risk management tools: A scientometric perspective on COVID-19 experience in a healthcare and industrial setting. *The Canadian Journal of Chemical Engineering*, 102(5), 1705-1725. [doi: 10.1002/cjce.25196](https://doi.org/10.1002/cjce.25196).
- [17] Fleming, P., O'Donoghue, C., Almirall-Sanchez, A., Mockler, D., Keegan, C., Cylus, J., Sagan, A., & Thomas, S. (2022). Metrics and indicators used to assess health system resilience in response to shocks to health systems in high income countries – a systematic review. *Health Policy*, 126(12), 1195-1205. [doi: 10.1016/j.healthpol.2022.10.001](https://doi.org/10.1016/j.healthpol.2022.10.001).
- [18] Gkouliaveras, V., Kalogiannidis, S., Kalfas, D., Papaklonari, A., & Kontsas, S. (2026). Climate change and health systems: A scoping review of health professionals' perceptions and readiness for action. *Climate*, 14(1), article number 12. [doi: 10.3390/cli14010012](https://doi.org/10.3390/cli14010012).
- [19] Glette, M.K., Ludlow, K., Wiig, S., Bates, D.W., & Austin, E.E. (2023). Resilience perspective on healthcare professionals' adaptations to changes and challenges resulting from the COVID-19 pandemic: A meta-synthesis. *BMJ Open*, 13(9), article number e071828. [doi: 10.1136/bmjopen-2023-071828](https://doi.org/10.1136/bmjopen-2023-071828).
- [20] Glette, M.K., Wiig, S., Petersen, E., Dombestein, H., Ree, E., Austin, E.E., & Lyng, H.B. (2025). A systematic literature review of the relationship between management and resilience in healthcare. *Applied Ergonomics*, 128, article number 104554. [doi: 10.1016/j.apergo.2025.104554](https://doi.org/10.1016/j.apergo.2025.104554).
- [21] Hadija, H., Harmayanto, H., & Octavia, R. (2026). Strategic management approaches to healthcare system resilience: A systematic review post-pandemic era. *Brilliant International Journal of Management and Tourism*, 6(1), 169-174. [doi: 10.55606/bijmt.v6i1.6761](https://doi.org/10.55606/bijmt.v6i1.6761).
- [22] Haldane, V., et al. (2021). Health systems resilience in managing the COVID-19 pandemic: Lessons from 28 countries. *Nature Medicine*, 27, 964-980. [doi: 10.1038/s41591-021-01381-y](https://doi.org/10.1038/s41591-021-01381-y).
- [23] Hobbs, S. (2026). From crisis to resilience: Building adaptive healthcare supply chains after COVID-19. *Health Economics and Management Review*, 7(1), 133-153. [doi: 10.61093/hem.2026.1-07](https://doi.org/10.61093/hem.2026.1-07).

- [24] Hugelius, K., Becker, J., & Adolfsson, A. (2020). Five challenges when managing mass casualty or disaster situations: A review study. *International Journal of Environmental Research and Public Health*, 17(9), article number 3068. [doi: 10.3390/ijerph17093068](https://doi.org/10.3390/ijerph17093068).
- [25] Koukou, L., Belakouiri, A., & Sahraoui, D. (2024). Management control supporting the resilience of public hospitals: A literature review. *International Journal of Professional Business Review*, 9(12), article number e05000. [doi: 10.26668/businessreview/2024.v9i12.5000](https://doi.org/10.26668/businessreview/2024.v9i12.5000).
- [26] Li, L., Liao, S., Yuan, J., Wang, E., & She, J. (2021). Analyzing healthcare facility resilience: Scientometric review and knowledge map. *Frontiers in Public Health*, 9, article number 764069. [doi: 10.3389/fpubh.2021.764069](https://doi.org/10.3389/fpubh.2021.764069).
- [27] Litke, N., Weis, A., Koetsenruijter, J., Fehrer, V., Koeppen, M., Kuemmel, S., Szecsenyi, J., & Wensing, M. (2022). Building resilience in German primary care practices: A qualitative study. *BMC Primary Care*, 23, article number 221. [doi: 10.1186/s12875-022-01834-4](https://doi.org/10.1186/s12875-022-01834-4).
- [28] Petanidis, S., Chandramouli, K., Floros, G., Nifakos, S., Kolomvatsos, K., Tsekeridou, S., Magalini, S., Gui, D., & Kosmidis, C. (2025). Optimizing emergency response in hospitals: A systematic review of surge capacity planning and crisis resource management. *Healthcare*, 13(21), article number 2819. [doi: 10.3390/healthcare13212819](https://doi.org/10.3390/healthcare13212819).
- [29] Petrazzuoli, F., et al. (2025). Resilience of primary healthcare facilities: Experiences from 16 European countries during the COVID-19 pandemic. A mixed-methods study conducted by EURIPA. *Advances in Clinical and Experimental Medicine*, 34(4), 487-505. [doi: 10.17219/acem/194212](https://doi.org/10.17219/acem/194212).
- [30] Pircalaboiu, A., Ciocoiu, C.N., Cazoni, C., & Balut, I.G. (2026). Effectiveness of risk management in healthcare organisations during health crises: A systematic review. *Management and Economics Review*, 11(1), 21-43. [doi: 10.24818/mer/2026.01-02](https://doi.org/10.24818/mer/2026.01-02).
- [31] Rosenbäck, R., & Eriksson, K.M. (2024). COVID-19 healthcare success or failure? Crisis management explained by dynamic capabilities. *BMC Health Services Research*, 24, article number 759. [doi: 10.1186/s12913-024-11201-x](https://doi.org/10.1186/s12913-024-11201-x).
- [32] Salehi, A.M., Khazaei, S., Masumi, M., Shavandi, F., Kavand, M., Jenabi, E., & Khatiban, M. (2021). Reinforcement and maintenance of human resources for health systems during long-term crises: A systematic review of systematic reviews. *Emergency Medicine International*, 2021(1), article number 9613443. [doi: 10.1155/2021/9613443](https://doi.org/10.1155/2021/9613443).
- [33] Sameri, M.J., Alizadeh, M., Baghlani, F., & Mahdavi, S. (2025). Adaptive health systems: Innovations in crisis management during armed conflicts. *Disaster Medicine and Public Health Preparedness*, 19, article number e100. [doi: 10.1017/dmp.2025.100](https://doi.org/10.1017/dmp.2025.100).
- [34] Saulnier, D.D., Duchenko, A., Otilie-Kovelman, S., Tediosi, F., & Blanchet, K. (2023). Re-evaluating our knowledge of health system resilience during COVID-19: Lessons from the first two years of the pandemic. *International Journal of Health Policy and Management*, 12(1). [doi: 10.34172/ijhpm.2022.6659](https://doi.org/10.34172/ijhpm.2022.6659).
- [35] Savin, I.M. (2023). Resilience of the management of healthcare providers caused by the COVID-19 pandemic. *Proceedings of the International Conference on Business Excellence*, 17(1), 1665-1680. [doi: 10.2478/picbe-2023-0149](https://doi.org/10.2478/picbe-2023-0149).
- [36] Sawyerr, E., & Harrison, C. (2023). Resilience in healthcare supply chains: A review of the UK's response to the COVID-19 pandemic. *International Journal of Physical Distribution & Logistics Management*, 53(3), 297-329. [doi: 10.1108/IJPDLM-09-2021-0403](https://doi.org/10.1108/IJPDLM-09-2021-0403).
- [37] Tan, M.Z.Y., Prager, G., McClelland, A., & Dark, P. (2023). Healthcare resilience: A meta-narrative systematic review and synthesis of reviews. *BMJ Open*, 13(9), article number e072136. [doi: 10.1136/bmjopen-2023-072136](https://doi.org/10.1136/bmjopen-2023-072136).
- [38] Upadhyaya, P., Das, S., Mishra, A.K., Ballal, S., Mohanty, R., & Sharma, R. (2025). Emerging paradigms: Examining the confluence of COVID-19 pandemic, global mental health, and transnational healthcare in crisis management. *Multidisciplinary Reviews*, 8, article number 2025ss0216. [doi: 10.31893/multirev.2025ss0216](https://doi.org/10.31893/multirev.2025ss0216).
- [39] Upton, L., Lee, A., & Denham, M. (2022). Building resilient coalitions: Health and medical response through COVID-19 concurrent events. *WIT Transactions on the Built Environment*, 207, 27-45. [doi: 10.2495/dman210031](https://doi.org/10.2495/dman210031).
- [40] Yogadhita, G.Y., Trisnantoro, L., Alim, S., Supriyati, S., Indiralarasati, A., & Seswandhana, M.A. (2026). The effectiveness of incident command system (ICS) approach in building disaster resilience of health care facilities: A scoping review. *Prehospital and Disaster Medicine*, 41(1), 61-62. [doi: 10.1017/s1049023x26103069](https://doi.org/10.1017/s1049023x26103069).

Кризовий проектний менеджмент та ділові комунікації як інновації для безперебійної роботи екстреної медичної допомоги (огляд літератури)

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Анотація. У статті досліджено стратегії кризового управління проектами та ділових комунікацій для забезпечення безперебійної роботи служб екстреної медичної допомоги в умовах пандемій, стихійних лих, збройних конфліктів та збоїв інфраструктури. Метою роботи було розроблення інтегрованої матриці «Управління проектами-комунікація» як практичного інструменту підтримки рішень для менеджерів служб екстреної медичної допомоги на всіх фазах циклу «готовність-реагування-відновлення». Наративний теоретичний аналіз проведено на основі 40 рецензованих джерел (2018-2026), отриманих через бази даних PubMed, Web of Science та Scopus. Джерела відбиралися з урахуванням орієнтації на заклади охорони здоров'я, контексту кризових та надзвичайних ситуацій, спрямованості на резилієнтність та управління стійкістю, наявності емпіричної доказової бази та статусу рецензованого видання. Виявлено чотири взаємозалежні сфери ефективного кризового управління службами екстреної медичної допомоги: адаптивне врядування та розподілене лідерство; структуровані архітектури комунікації, зокрема системи управління інцидентами та міжорганізаційні коаліції; проактивні механізми управління проектами із резервною потужністю; цифрові інформаційні системи реального часу. Встановлено, що трансформаційне лідерство підвищує стійкість персоналу на 38 %, ефективність прийняття рішень – на 29 %, швидкість відновлення – на 33 %. З'ясовано, що проактивні інвестиції у готовність забезпечують значно вищу рентабельність порівняно з реактивними витратами на ліквідацію наслідків. Інструменти кризового управління проектами позиціоновано як організаційні інновації, що зменшують час простою та підвищують ефективність розподілу ресурсів. Розроблена матриця є структурованим аналітичним інструментом із практичним значенням для управління охороною здоров'я та сталого розвитку систем служб екстреної медичної допомоги

Ключові слова: кризовий менеджмент; служби екстреної медичної допомоги; організаційна стійкість; планування безперебійної діяльності; система управління інцидентами