

Managing Infrastructure Projects During Crises: Governance Frameworks and Practical Lessons for Project Leaders¹

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Abstract

Infrastructure projects increasingly operate in complex and uncertain environments influenced by geopolitical conflicts, pandemics, economic disruptions, and supply chain failures. These crises introduce significant challenges to project delivery, including schedule delays, cost escalation, contractual disputes, and stakeholder coordination issues.

For public sector organizations responsible for delivering critical infrastructure, maintaining project continuity during crises is essential to safeguard public investment and ensure uninterrupted delivery of essential services.

This paper examines how project management practices can be adapted to manage infrastructure projects effectively during crisis situations. It explores the characteristics of crisis environments, governance frameworks for crisis response, supply chain resilience strategies, and the evolving strategic role of Project Management Offices (PMOs). Drawing lessons from recent global disruptions—including the COVID-19 pandemic, geopolitical conflicts affecting construction materials, and major logistics disruptions—the paper proposes a structured Infrastructure Crisis Response Model consisting of five stages: detection, assessment, prioritization, response, and stabilization.

The study highlights practical lessons for project managers and policymakers and emphasizes the importance of strong governance frameworks, centralized portfolio monitoring, adaptive decision-making, and resilient supply chains. The findings suggest that organizations that adopt structured crisis management approaches can significantly improve infrastructure project resilience and maintain delivery even in highly uncertain environments.

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1. Introduction

Infrastructure development represents a cornerstone of economic growth and societal well-being. Governments invest heavily in infrastructure systems such as transportation networks, healthcare facilities, public buildings, water systems, and energy infrastructure.

These projects are essential for:

- economic competitiveness
- social development
- urban sustainability
- public service delivery

However, infrastructure projects operate within highly complex environments. Their delivery involves multiple stakeholders, long implementation timelines, extensive procurement networks, and significant financial commitments.

Recent global events have exposed the vulnerability of infrastructure project delivery systems. Crises such as pandemics, geopolitical conflicts, and global logistics disruptions have demonstrated how external shocks can quickly disrupt project execution.

For example:

- The COVID-19 pandemic halted construction activities in many countries.
- Geopolitical conflicts increased energy and material costs.
- Global supply chain disruptions delayed the delivery of construction materials and equipment.

These disruptions illustrate the need for **crisis-ready project management systems**.

Traditional project management frameworks focus on planning, scheduling, and risk control. However, crisis environments require additional capabilities including adaptive governance, resilient supply chains, and rapid decision-making.

This paper examines how project management practices can support infrastructure project delivery during crises and proposes strategies for strengthening project resilience.

2. Literature Review

2.1 Crisis Management in Organizations

Crisis management literature emphasizes preparedness, response capability, and organizational resilience.

Mitroff (2005) describes crises as high-impact events that threaten organizational stability and require immediate action. Organizations that successfully navigate crises typically demonstrate:

- strong leadership
- clear governance structures
- effective communication systems
- rapid decision-making capabilities

Infrastructure organizations must incorporate these capabilities into project governance frameworks.

2.2 Complexity in Project Environments

Infrastructure projects operate in environments characterized by high levels of complexity.

Navigating Complexity: A Practice Guide published by the Project Management Institute emphasizes that complex project environments involve multiple interacting systems, unpredictable stakeholder dynamics, and evolving external conditions.

The guide identifies several characteristics of complex projects:

- dynamic stakeholder environments
- evolving requirements
- uncertainty in outcomes
- interdependencies among project components

Crises further increase project complexity by introducing unexpected disruptions and accelerating decision cycles.

The PMI guide highlights the importance of **adaptive leadership, systems thinking, and continuous monitoring** when managing projects in complex environments.

2.3 Risk and Uncertainty in Project Management

Project management literature distinguishes between risk and uncertainty.

Risk refers to identifiable events with measurable probabilities. Uncertainty refers to situations where outcomes and probabilities cannot be fully predicted.

Crises often fall into the category of uncertainty rather than conventional project risk. Consequently, traditional risk registers may not adequately capture such events.

Adaptive project management approaches are therefore necessary to manage crisis conditions effectively.

3. Types of Crises Affecting Infrastructure Projects

Infrastructure projects may be affected by several categories of crises, as summarized below.

Crisis Type	Typical Impact
Geopolitical conflicts	Energy price volatility and shipping disruptions
Economic disruptions	Funding uncertainty and project delays
Pandemics	Workforce shortages and site shutdowns
Natural disasters	Damage to infrastructure assets
Supply chain failures	Material shortages and procurement delays
Cybersecurity events	Disruption to project information systems

Table 1: Types of Crises Affecting Infrastructure Projects

Each category introduces unique project management challenges.

4. Impacts of Crises on Infrastructure Projects

Crisis situations affect project performance across multiple dimensions.

- **Schedule Delays**

Supply chain disruptions and labor restrictions can delay project activities.

- **Cost Escalation**

Material price volatility can significantly increase construction costs.

- **Contractual Disputes**

Force majeure claims and contractual disagreements may arise.

- **Resource Constraints**

Workforce shortages and equipment delays can affect project progress.

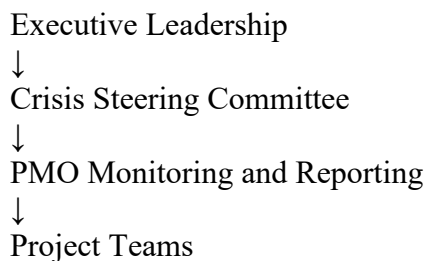
- **Project Reprioritization**

Governments may prioritize projects essential to public safety and national continuity.

5. Crisis Governance Framework

Effective crisis management requires structured governance mechanisms.

Crisis Governance Hierarchy:



Executive leadership establishes strategic priorities, while crisis steering committees coordinate responses across agencies. The PMO provides monitoring and decision-support functions, and project teams implement operational mitigation strategies.

6. Infrastructure Crisis Response Model

A structured crisis response framework can improve organizational resilience.

Infrastructure Crisis Response Model

- Detect – Identify early warning indicators
- Assess – Evaluate project impacts
- Prioritize – Focus on critical infrastructure
- Respond – Implement mitigation strategies
- Stabilize – Restore portfolio stability

This framework enables organizations to transition from reactive responses to proactive crisis management.

7. Strategic Role of the PMO During Crisis

During crisis situations, the Project Management Office plays a critical strategic role.

Key responsibilities include:

- centralized portfolio monitoring
- escalation of risks to leadership
- development of decision-support dashboards
- coordination across project teams and agencies

By consolidating project information and providing analytical insights, the PMO enables leadership to make informed decisions during uncertain conditions.

8. Contract Management During Crises

Contractual issues frequently arise during crises.

Typical challenges include:

- force majeure claims
- extension of time requests
- material substitution approvals

- variation claims

Clear documentation and adherence to contractual procedures are essential to ensure transparency and fairness.

9. Lessons from Global Crisis Events

COVID-19 Pandemic:

Construction shutdowns and workforce restrictions disrupted infrastructure projects globally.

Geopolitical Conflicts:

Energy price volatility significantly increased construction material costs.

Suez Canal Blockage:

The 2021 shipping disruption demonstrated the vulnerability of global supply chains.

These events highlight the need for resilient procurement and logistics strategies.

10. Key Lessons for Project Managers

Based on global experience, several lessons emerge for project managers:

- Prioritize life-safety infrastructure
- Maintain strong stakeholder communication
- Document decisions carefully
- Diversify supply chains
- Monitor contractor financial stability
- Enable rapid governance decisions
- Use data dashboards for visibility
- Promote cross-agency collaboration
- Maintain financial contingency reserves
- Capture lessons learned

11. Conclusion

Global crises have become a defining characteristic of the modern project environment. Infrastructure projects are particularly vulnerable due to their complexity, long durations, and dependence on global supply chains.

While crises cannot always be prevented, resilient project management practices can significantly reduce their impact.

Organizations that strengthen governance frameworks, empower PMOs, diversify supply chains, and adopt adaptive decision-making mechanisms will be better equipped to sustain project delivery during uncertain conditions.

For governments and infrastructure organizations, investing in crisis-ready project management systems is essential to safeguard public investments and ensure the continuity of critical infrastructure services.

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About the Author



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Dr. Vinod Manikkara is Head of Strategic Projects, PMO at the Ministry of Works, Kingdom of Bahrain. With more than three decades of experience in infrastructure project management, he has led major capital projects across transportation, public buildings, and utilities sectors. His research interests include project governance, risk management, and infrastructure resilience.