



INFRASTRUCTURE SECURITY: KEEPING OUR CITIES RUNNING / part 1



Global Urban Resilience Monthly Programme

Monday 14th October 2024, 12:00 / BST



Executive Summary

This session marks the third event of the ISRM Global Urban Resilience Monthly Webinar Series, which has been developed in collaboration with esteemed organisations including the UK National Preparedness Commission, the International Federation of the Red Cross (IFRC) and other global partners. Today's session focuses on the theme of infrastructure resilience in major cities. Participants from around the world gathered to explore the pressing challenges facing urban environments in an era marked by escalating environmental, political and socio-economic instability.

The session opened with a stark acknowledgment of the growing unpredictability of the global landscape, including the increasing severity of climate-related disasters such as hurricanes, floods and wildfires. It was also emphasised that once-rare events, such as cities being submerged or facing extreme heat are no longer anomalies but regular features of the urban reality. Against this backdrop, the webinar framed a key question: What will effective city management look like as we approach 2030?

Past long-term strategies, such as "Vision 2030" are now becoming immediate operational concerns. Cities worldwide—many located near coasts or rivers—must now rapidly adapt to shifting conditions, including sea-level rise and infrastructure vulnerability. The conversation underscored the urgency of closing the capability gap in planning and modelling urban resilience to meet these new challenges.

The webinar featured contributions from global experts in engineering, water policy and security. Speakers included representatives from the Institution of Civil Engineers, McDonald Indonesia's water policy programme and the New York and New Jersey Port Authority. While one panellist was delayed due to a potential emergency, the session proceeded with a strong lineup of voices offering insight into multidisciplinary approaches to resilience.

Co-chaired by a leading resilience officer from Greater Manchester and supported by a Strategic Steering Group of representatives from seventeen countries, the programme encouraged both expert and audience participation. Following initial panel presentations, the session transitioned into a roundtable discussion with interactive engagement from attendees encouraged throughout.



Emma Antrobus

North-West Director,
Institution of Civil Engineers



Mike Edgerton

Manager, Port Security,
Port Authority of New York and New Jersey



Andy Citawarman

Water Sector Lead,
Mott MacDonald, Indonesia



/ Facilitator /

Dr David Rubens

Executive Director,
Institute of Strategic Risk Management

BUILDING RESILIENT INFRASTRUCTURE: A CORNERSTONE OF SUSTAINABLE URBAN FUTURES

The Imperative of Infrastructure Resilience for Sustainable Urban Development

The critical importance of infrastructure resilience must be underscored in the pursuit of robust and sustainable urban environments. Infrastructure functions as the backbone of any city, delivering essential services that sustain daily life and uphold public well-being. In an era where infrastructure systems are increasingly interconnected and interdependent, the traditional definitions of infrastructure are also expanding.

Particularly noteworthy is the growing prominence of digital infrastructure. Access to the digital realm should now be regarded as a fundamental right, on par with access to water, energy and other basic utilities. Concurrently, green infrastructure is gaining rightful recognition as an integral element of resilient urban systems, contributing to environmental sustainability and climate adaptation.

Nonetheless, the pursuit of enhanced infrastructure resilience presents complex challenges. These include the necessity of striking a careful balance between system robustness, redundancy and the constraints posed by cost-efficiency and limited funding. Moreover, it is imperative to acknowledge the wide array of risks that modern infrastructure must withstand—ranging from natural hazards such as heatwaves, floods and earthquakes to malicious threats, including cyberattacks and acts of sabotage. Recognising and addressing these multifaceted challenges is essential for ensuring that urban infrastructure can support both current and future generations in an increasingly uncertain world.

Strengthening Infrastructure Resilience in an Era of Urbanisation and Climate Risk

The critical role of infrastructure resilience has become increasingly pronounced amid accelerating urbanisation and intensifying environmental pressures. Representing a global membership exceeding 97,000 professionals, the Institution of Civil Engineers (ICE) is committed to ensuring that infrastructure systems enable both people and the planet to thrive.

Embedding resilience within infrastructure design, delivery and policymaking is imperative, particularly as urban migration increases and the interdependence of critical systems becomes more complex. ICE's global initiative, Enabling Better Infrastructure, exemplifies this commitment. Rooted in the United Nations Sustainable Development Goals, the programme promotes eight guiding principles that shift infrastructure planning toward socially driven outcomes, rather than focusing solely on asset delivery.

These principles emphasise:

- **Reusability**
- **Inclusivity and**
- **Long-term value** supported by strategic planning tools that aid governments in benchmarking and developing evidence-based infrastructure policies.

In the United Kingdom, ICE leverages global insights to influence domestic policy and advocate for future-proof investment decisions that reflect the realities of climate change. Resilience strategies, however, are frequently hindered by legacy economic models and outdated planning cycles that fail to account for the scale and urgency of emerging risks.

In response, ICE calls upon the UK government to undertake a national review of the economics of climate adaptation. Furthermore, national policy statements should be revised to explicitly account for climate hazards and define clear protection standards.

The reliance on outdated risk assumptions—such as the concept of one-in-100-year flood events—is increasingly untenable.

Mandatory adaptation reporting under the Climate Change Act would ensure that infrastructure owners and operators are proactively assessing and mitigating evolving threats. Emerging tools such as digital twins offer significant potential in this context, enabling more accurate modelling of infrastructure systems and their responses to future scenarios.

In conclusion, there is a pressing need to transition from historically based planning approaches to adaptive, systems-oriented strategies. Although progress is underway, it must be significantly accelerated. Without a unified framework for assessing climate risk and the cost of inaction, infrastructure decisions risk remaining reactive rather than preventative. Crucially, while investments in resilience may require substantial initial funding, the long-term economic and societal cost of inaction is demonstrably higher.

Bridging the Gap: Advancing Climate-Resilient Infrastructure in Indonesia Through Localisation and Strategic Integration

Indonesia faces vast and complex infrastructure challenges that require urgent, coordinated and adaptive responses. Drawing on experience gained through close collaboration with international development partners—including the UK Foreign, Commonwealth and Development Office (FCDO), the Australian Department of Foreign Affairs and Trade (DFAT), the Asian Development Bank and the World Bank—it is clear that translating Indonesia’s ambitious climate objectives into actionable, context-specific strategies remains a critical national priority.

Although Indonesia has committed to achieving net zero emissions and climate-resilient infrastructure by 2045, the path toward these goals is fragmented and inconsistent across its thirty-four provinces. A significant barrier lies in the disconnect between national climate policy commitments and the operational capacity of local governments to implement them effectively. While high-level strategies for inclusive, low-carbon development are in place, many regional and municipal authorities—particularly those beyond Jakarta—face challenges including limited technical capacity, outdated regulations and constrained fiscal mechanisms.

Jakarta’s land subsidence, reaching rates of up to 20 cm annually, exemplifies the scale of these infrastructure and climate-related vulnerabilities. This phenomenon not only questions the long-term viability of conventional engineering interventions, such as sea walls, but also highlights the urgent need for systemic, localised approaches rooted in risk assessment and systems thinking.

At Mott MacDonald, efforts are underway to demonstrate the integration of climate resilience into infrastructure planning and delivery. A notable example is the citywide inclusive sanitation programme in South Sumatra, which addresses multiple dimensions of resilience—flood and energy resilience, emissions reduction and resource recovery. Beyond technical benefits, such initiatives create circular economy opportunities, such as the conversion of waste into organic fertiliser supported by local market development.

However, a persistent policy barrier remains: innovation frequently outpaces regulation. Governments often hesitate to revise regulatory frameworks without proven outcomes, while pilot initiatives struggle to gain traction without policy support—resulting in a “chicken-and-egg” dilemma. Under the UK FCDO’s Green Cities and Infrastructure Programme, cross-government engagement is being fostered at national, provincial and municipal levels to better align strategic planning with climate finance eligibility. Proposals that are climate-smart, inclusive and low-carbon are more likely to attract international funding, reinforcing the value of integrated, forward-looking planning.

Digital tools are also playing an increasingly vital role. Technologies such as impact-based forecasting, smart infrastructure systems and enhanced emissions tracking offer new capabilities for local authorities to visualise climate risks, evaluate trade-offs and inform evidence-based decisions.

Ultimately, greater localisation of planning and implementation is essential to reduce delays and enhance responsiveness. Empowering local governments will require sustained capacity building, regulatory flexibility—such as enabling multi-year contracting—and ongoing international cooperation. Despite these challenges, collaboration with institutions such as the Institution of Civil Engineers (ICE) and the UK Infrastructure Projects Authority is helping to chart a more resilient, inclusive and adaptive future for Indonesia’s urban infrastructure landscape.

Empowering Cities as Frontline Leaders in Climate Resilience and Adaptation

Recognising the growing role of cities as central actors in climate adaptation and mitigation is a strategic imperative. Institutions such as the Institute of Strategic Risk Management (ISRM) and the Institution of Civil Engineers (ICE) are increasingly engaging at the city level, where their influence and collaboration have proven more impactful than at the national scale. This shift reflects a broader global trend: cities are assuming leadership in climate action, often exceeding national governments in both ambition and implementation.

In the United Kingdom, the ongoing devolution agenda serves as a catalyst for local leadership in resilience planning. Cities such as Greater Manchester and the West Midlands, empowered by devolution agreements, are taking significant steps to prioritise climate resilience and develop context-specific solutions. Nevertheless, the landscape of local governance remains uneven. Many cities across the UK are still in the early stages of devolution and lack the resources, authority or political capital necessary to implement comprehensive climate strategies.

Despite these disparities, there are encouraging signs of progress. Inter-city collaboration is strengthening, with urban areas increasingly aligning their efforts and submitting joint proposals to central government. This coordinated approach is enhancing both credibility and policy influence at the national level.

However, persistent structural barriers must be addressed. Financing mechanisms remain a major constraint; current models often pit cities against one another in competitive funding rounds, favouring short-term visibility over long-term strategic planning. Furthermore, a widespread culture of risk aversion within planning and engineering disciplines inhibits innovation. The prevailing demand for established precedents discourages the adoption of novel, future-oriented solutions, meaning that transformative initiatives are typically driven only by particularly motivated individuals or teams.

While various programmes—such as the 100 Resilient Cities initiative—have made valuable contributions, a comprehensive national framework to align and scale such efforts remains absent.

The UK's historical failure to articulate and maintain a coherent long-term infrastructure vision is evidenced by projects such as the Heathrow expansion and High Speed 2 (HS2), which have suffered from inconsistent planning and political volatility. The lack of a sustained, strategic approach to infrastructure planning continues to impede the delivery of climate-resilient outcomes.

To enable cities to fulfil their full potential in the climate transition, it is essential to establish mechanisms for improved coordination, risk-sharing and long-term support.

This may include:

- Reforming funding structures
- Fostering a culture of innovation and
- Providing sustained capacity-building at the local level.

Only through such measures can urban centres be truly empowered to deliver lasting, transformative change in the face of a changing climate.

Regional Coordination and the Political Dimensions of Infrastructure Resilience in the New York–New Jersey Metropolitan Area

Effective governance and security management in the New York–New Jersey region necessitate a unique model of regional coordination, particularly in light of its status as a bi-state, high-density metropolitan area. The Port Authority of New York and New Jersey operates under a governmental structure that is both administrative and distinctly regional in nature, shaped by the deep interdependence of the two states.

One of the central challenges lies in balancing regional imperatives with localised political agendas. This reflects a broader trend in U.S. governance: parochialism, wherein political actors prioritise short-term, narrowly defined local interests over long-term, region-wide benefits. Such tendencies often hinder the implementation of strategic infrastructure and resilience initiatives that are essential to the collective welfare of the metropolitan area but may not align with the immediate objectives of specific constituencies.

Despite these complexities, the New York–New Jersey region has demonstrated significant leadership in resilience planning, especially in addressing climate change and infrastructure vulnerabilities. The region’s strategic posture has been shaped in part by transformative experiences during past crises—most notably, the devastation wrought by Hurricane Sandy in 2012 and the transportation paralysis following the events of September 11, 2001. These incidents revealed systemic weaknesses in supply chain logistics, intermodal transportation and emergency response mechanisms—particularly in geographically constrained areas such as Manhattan, Brooklyn, Queens and Long Island.

In the aftermath of these crises, substantial efforts have been undertaken to enhance regional preparedness, including initiatives aimed at mitigating risks associated with sea-level rise and increasingly severe weather events. Nevertheless, progress remains subject to political flux. Long-term investments and infrastructure adaptation strategies are frequently affected—if not stalled—by shifting political priorities and funding constraints.

Notwithstanding these obstacles, the Port Authority continues to advance its security and resilience agenda, working in concert with regional planning bodies and stakeholders who increasingly recognise the urgency of proactive action. Ultimately, infrastructure resilience in this context is not solely a technical undertaking; it is fundamentally a political challenge that demands alignment, negotiation and sustained collaboration across jurisdictions and institutional boundaries.



RESILIENCE ALL OVER THE WORLD

Global Resilience Gaps: Addressing the Blind Spots in Urban Preparedness

A critical question must be posed at the outset: where are the resilience deserts within the global urban network? While much of the discourse on resilience gravitates toward established global cities such as New York, London, Jakarta, Geneva or Dubai, comparatively little attention is given to urban centres such as Dakar, Cairo, Lagos or Rio de Janeiro—places where governance is often fragmented and resilience planning remains nascent or entirely absent.

This oversight represents a significant blind spot in the international approach to resilience. The lack of foundational planning capacity in these cities is not a localised concern; rather, it constitutes a systemic risk with global implications. In an era defined by deep interconnectivity, the vulnerability of any major urban centre—especially those experiencing rapid growth—can have far-reaching ripple effects across economies, supply chains, migration patterns and climate responses. Resilience, therefore, cannot remain the preserve of affluent, well-governed cities. It must be recognised as a collective responsibility and a global imperative.

In this context, inclusive engagement becomes vital. The invitation to perspectives from cities in the Global South or outside traditional centres of influence is particularly noteworthy. Such contributions enrich the global dialogue and foster a more accurate and comprehensive understanding of current resilience capacities—and the significant work that remains.

This recognition underscores the need to reassess how support is structured for cities in the early stages of their resilience planning. Priorities should include the development of more accessible funding mechanisms, equitable knowledge-sharing platforms and cross-border collaboration. Without such measures, the risk of a bifurcated urban future looms large—where some cities are equipped to navigate future challenges, while others remain increasingly exposed.

Ultimately, the resilience challenge transcends technical considerations; it is fundamentally a matter of equity, access and international solidarity.

Resilience in Practice: Lessons from Greater Manchester's Urban Development Journey

Reflecting on Greater Manchester's engagement with resilience planning, the city joined the 100 Resilient Cities initiative in 2017, adopting a globally recognised framework that identifies seven key qualities of resilient urban systems: reflective, resourceful, robust, redundant, flexible, inclusive and integrated. Though often revisited only in passing, these principles remain highly pertinent to current urban planning efforts.

One particularly resonant observation, as highlighted in recent discussions, concerns the vulnerability of communities in dense urban environments when transport networks are disrupted. This issue has gained renewed relevance for Greater Manchester, where ongoing densification of the city centre presents both opportunities and risks. The potential for social and physical isolation during infrastructure breakdowns is increasingly being recognised as a priority planning concern.

The spatial complexity of urban expansion poses further challenges. Greater Manchester is currently planning for six designated growth areas and anticipating a population increase of approximately 10%—an expansion that effectively demands infrastructure on the scale of an entirely new city. Aligning this scale of growth with resilience principles requires not only foresight but also integrated planning across administrative boundaries and coordination with national infrastructure strategies.

A critical insight emerging from this process is the recognition that cities do not operate in isolation. The infrastructure and economic decisions made in one locality often generate consequences far beyond their immediate geographic scope. As such, Greater Manchester's resilience planning is increasingly situated within broader regional and national contexts, acknowledging the interdependence of systems and stakeholders.

Equally important is the social dimension of resilience. A recurring theme is the need to address the underlying socio-economic disparities that shape urban vulnerability. Much like achieving personal health is easier when the individual is already well, building urban resilience is significantly more feasible in communities that are fundamentally stable and equitable.

However, many urban areas face growing inequality, systemic disenfranchisement and the marginalisation of certain populations—particularly along lines of poverty and ethnicity. These realities, though not always publicly acknowledged, have manifested in social unrest across Europe and the United States, highlighting the urgent need for more inclusive approaches to urban resilience. Finally, the experience of Greater Manchester underscores the value of international knowledge exchange. The most enduring lessons in resilience come not only from technical analysis but also from shared human experience. A people-centred, equity-driven perspective is essential for building cities that are not only prepared for future shocks but are also places where all residents can thrive.

Resilience in a Continental Nation: Reflections on Australia's Geographic and Climatic Challenges

Australia presents a distinct resilience context, shaped by its vast landmass, dispersed urban centres and escalating climate risks. Unlike many nations, Australia's cities are expansive in area but relatively modest in population. Perth, for example, spans approximately 6,500 square kilometres while housing fewer than two million residents. Urban centres such as Sydney and Melbourne, though considered close by Australian standards, remain separated by roughly 800 kilometres. This geographical spread significantly complicates mutual aid and disaster response coordination. The 2019–2020 bushfires along the East Coast exemplified this challenge: the unprecedented scale of the crisis overwhelmed traditional support systems, rendering assistance not only delayed but, at times, logistically unfeasible.

Australia also faces critical interdependencies within its infrastructure networks, many of which only become apparent in moments of disruption.

A notable example occurred when chemical supplies essential for water purification on the eastern seaboard—sourced predominantly from Western Australia—were jeopardised due to flooding that severed major transport corridors such as the Nullarbor Highway and transcontinental rail lines. Although temporary solutions were found, the event exposed the fragility of national supply chains in the absence of diversified transport options. The dissolution of Australia's national shipping line has further limited the country's logistical resilience, leaving it heavily reliant on overland freight systems.

Within the state of Victoria, where fire-prone vegetation and complex topography present persistent risks, bushfires remain a prominent concern. However, in terms of long-term threat, flooding has emerged as a more serious and escalating hazard. Intensifying flood events are causing widespread and prolonged damage, prompting insurance markets to adjust accordingly. As a result, flood insurance has become prohibitively expensive for many residents and businesses, leading to lower uptake and increasing collective vulnerability.

Meanwhile, the growing impact of heat stress cannot be overlooked. Though Australia is globally recognised for its hot climate, cities such as Melbourne have not historically endured prolonged high temperatures. This trend is rapidly shifting, placing acute stress on infrastructure systems that were not engineered for such extremes. Public transport, power grids and communication systems are showing signs of strain. For instance, Melbourne's rail infrastructure was designed for a temperature range centred around 20°C—a threshold now regularly exceeded.

Fundamentally, climate change is not a distant or future challenge in the Australian context—it is a present and evolving reality. Yet, institutional responses remain constrained by slow adaptation cycles and limited agility in the face of accelerating environmental change. As one observer aptly noted, the concern is not about the future of climate change but about current institutional inertia and the lag in learning and adaptation.

In response, an emerging trend is the grassroots mobilisation of communities. In several regions, local populations are initiating their own disaster preparedness and response efforts, often independent of formal government structures. While these “zero responders” can provide immediate and effective action, their presence can also lead to coordination and safety challenges when formal emergency services arrive. This dynamic signals a shift in the traditional top-down model of emergency management, highlighting the need for new frameworks that better integrate community-led initiatives into broader resilience planning.

Air, Heat and Health: Confronting the Overlooked Dimensions of Environmental Risk

In October 2019, a firsthand encounter with environmental extremes offered a stark reminder of the growing interconnection between air quality, climate and public health. While in Australia during the height of the bushfires, Dr David Rubens who had not suffered from asthma in 17 years experienced acute respiratory distress triggered by smoke exposure. Shortly thereafter, travel to Delhi—one of the world’s most polluted cities—exacerbated the condition. This back-to-back exposure resulted in long-term respiratory effects and a renewed dependence on medication, underscoring the severe and cumulative health impacts of environmental degradation.

This experience highlights the breadth of environmental risks now manifesting across diverse geographies. In Australia, record-breaking bushfires produced hazardous air quality levels, while cities like Delhi grapple daily with pollution levels far exceeding safe thresholds. At the same time, extreme heat has emerged as an escalating and insufficiently addressed risk. The 2022 heatwave in the United Kingdom, during which temperatures reached an unprecedented 40°C, demonstrated the nation’s systemic unpreparedness for sustained high temperatures. When discussions were held with European counterparts regarding a continent-wide strategy for managing infrastructure and public life in extreme heat conditions, the response was unequivocal: no such strategy currently exists.

The challenge lies not only in the physical limits of infrastructure systems but also in the limitations of current governance, planning and policy foresight. Transportation networks, healthcare systems, housing and energy infrastructure across much of Europe and other temperate regions were never designed for the frequency or severity of heatwaves now being experienced. These systems are rapidly approaching the thresholds of their functional capacity.

Moreover, this is no longer an issue confined to traditionally hotter climates. Heat is increasingly a universal risk, reaching northern regions with alarming speed and intensity. Countries that once considered themselves insulated from the impacts of extreme heat are now confronting the need for adaptation at scale.

Insights from regions already affected—such as Greece, which has endured multiple years of intense heatwaves and wildfires—reinforce the urgency of collective action. The global nature of the threat demands coordinated resilience strategies that are informed, inclusive and future-oriented. Without a substantial shift in planning and investment, societies will continue to face preventable disruptions to health, economic stability and daily life. The message is clear: air quality and heat are not isolated environmental issues. They are deeply human challenges, affecting lungs, homes, livelihoods and entire urban systems. It is imperative that resilience frameworks evolve to match the scale and immediacy of the risks now confronting us.

Resilience at the Crossroads: Nepal’s Infrastructure Challenges in a Geopolitical Context

Situated between two rising global powers—India and China—Nepal occupies a uniquely complex geopolitical position that deeply influences its infrastructure development and resilience planning. The country remains heavily dependent on imports, particularly from India, for critical resources including construction materials, agricultural inputs and essential commodities for food and energy security. This reliance exposes Nepal to acute vulnerabilities, particularly in times of crisis and complicates efforts to build robust and climate-resilient urban systems.

In evaluating the full lifecycle of infrastructure projects—whether hydropower generation, transportation networks or digital infrastructure such as data centres—Nepal faces persistent systemic constraints. Much of its digital communication and data management infrastructure is externally sourced, with a significant dependency on Indian networks. This dependence becomes especially problematic during natural hazards where disruptions from earthquakes, flash floods and landslides regularly sever key power, transport and communication links, compounding the immediate impacts and delaying recovery.

Recent climate-induced events, such as flash floods in the Solukhumbu region, have underscored the fragility of Nepal's existing systems. These incidents have disproportionately affected vulnerable, low-lying communities and highlighted the country's limited capacity to respond quickly and effectively. Meanwhile, Kathmandu, the nation's capital, faces growing environmental pressures—including severe air pollution—and is undergoing a challenging transition from fossil fuel-based transportation to electric mobility. While aligned with global sustainability objectives, this transition is constrained by limited technical infrastructure, high financial costs and a shortage of specialised expertise.

International financial institutions such as the World Bank and the Asian Development Bank have extended support for these modernisation efforts, but the practical challenges remain considerable. Promising innovations like digital twin technologies, remote health monitoring and next-generation urban infrastructure present exciting opportunities, yet their implementation in Nepal's context is complicated by continued reliance on external systems, limited domestic capacity and political uncertainty.

Ultimately, Nepal's resilience challenges must be understood within a broader geopolitical framework. As a smaller nation navigating relationships with powerful neighbours, its path toward infrastructure resilience is shaped as much by politics and strategic alignments as by climate change or engineering. The country's experience offers a critical perspective on the intersection of environmental vulnerability, technological ambition and geopolitical complexity in the Global South.



GLOBAL RESILIENCE

Resilience Beyond Borders: Rethinking Global Interdependence and Systemic Vulnerabilities

A particularly resonant point raised in recent discussions is that resilience cannot and does not stop at national borders. This insight is not only applicable to the United Kingdom but serves as a fundamental truth in today's interconnected global system. From supply chains and digital infrastructure to economic stability and public health, the critical systems that underpin modern life are intrinsically transnational.

When the concept of “resilience deserts” was introduced, it was not intended to highlight any single nation, but rather to provoke broader reflection on the global landscape—on those regions or sectors where a deficit in resilience planning has exposed systemic vulnerabilities. Within this context, the fragility of global supply chains has emerged as a central concern.

The heavy reliance on single points of production—such as China's dominance in global manufacturing or Taiwan's central role in semiconductor fabrication—underscores a key vulnerability in the world's economic architecture. These dependencies are not merely operational or commercial risks; they are deeply entwined with geopolitical tensions and questions of strategic autonomy. The resilience of such systems must therefore be assessed with both technical and geopolitical lenses.

Perhaps the most illustrative and universally shared example of resilience failure in recent history is the COVID-19 pandemic. The crisis laid bare the weaknesses across multiple sectors, from healthcare infrastructure and global logistics to digital networks and food security. Supply chains strained under unprecedented pressure and the lack of redundancy or strategic reserves in many countries revealed the fragility of what were previously considered efficient global systems.

his global experience should serve as a turning point. It highlights the need to move beyond isolated, national resilience strategies and adopt a more integrated, anticipatory approach to global risk and interdependence. The challenges of the 21st century—whether pandemics, climate disruptions or cyber threats—require a redefinition of resilience that is systemic, shared and globally coordinated.

From Global Systems to Local Impact: Rethinking Fragility in the Age of Hyperlocalisation

In discussions of resilience, an emerging question is whether the global perspective that once guided planning and policy has given way to a more localised—or even parochial—approach. The COVID-19 pandemic, in particular, appeared to accelerate a shift toward hyperlocalisation. As nations and communities sought to control what was within their immediate reach, this often led to inward-looking strategies, such as the localisation of supply chains and a renewed emphasis on self-sufficiency.

A case that exemplifies the complex interplay between global disruption and local consequence is the 2021 blockage of the Suez Canal. While widely analysed as a major disruption to international trade routes, the downstream effects were also deeply personal. In one anecdotal but telling instance, a local restaurant in the United Kingdom was unable to serve Tsingtao beer due to the shipping delays caused by the incident. This seemingly minor inconvenience served as a powerful reminder of the global interdependence that underpins even the most routine aspects of daily life in an island nation where the majority of goods are imported.

This experience underscores a broader realisation: while much of the discourse on resilience focuses on preparedness and adaptability, far less attention is given to the underlying fragility of the systems we depend upon. Today's supply chains, infrastructure networks and technological systems are more complex and interdependent than ever before. However, with that complexity comes an increased susceptibility to cascading failures—where a single point of disruption can have widespread and unpredictable consequences.

In reassessing resilience, it is imperative to acknowledge this duality. Strengthening resilience must involve not only planning for future risks but also confronting the uncomfortable truth of how vulnerable modern systems have become. Only through a balanced understanding of both resilience and fragility can truly robust and sustainable strategies be developed.

Resilience or Fragility? Lessons from the Baltimore Bridge Disruption on Supply Chain Redundancy

The temporary closure of the Baltimore Bridge in March—a key artery for shipping along the U.S. East Coast—served as a critical stress test for regional and national supply chains. Though the disruption lasted approximately three months, the wider implications have underscored the need to examine whether current systems are genuinely resilient or alarmingly fragile.

The incident highlighted the importance of redundancy, a concept that distinguishes robust systems from those vulnerable to a single point of failure. The term, raised by a colleague during discussion, provoked reflection on whether supply networks have sufficient backup and flexibility to withstand shocks. In the case of Baltimore, a fortunate aspect was the inherent adaptability of shipping routes. Many vessels routinely dock at multiple U.S. ports before arriving in Baltimore, allowing cargo to be redirected and offloaded at alternative locations. However, this solution was only partial; the real test lay in the subsequent inland logistics. The movement of goods into the broader economy depended on the responsiveness and coordination of supporting infrastructure, including road and rail transport, warehousing and distribution systems.

While the shipping community managed the Baltimore challenge with some agility, the incident exposed a broader and more pressing concern: the fragility of supply chain security. As engagement in this field deepens, there is growing recognition of the need to integrate business impact analysis into security risk assessments. Such an approach allows for a clearer understanding of the cascading effects that an unexpected disruption can produce, particularly in systems that are increasingly complex and interdependent.

Ultimately, the Baltimore closure was a contained event, but it served as a critical reminder of the hidden vulnerabilities within our supply systems. Mapping these systems is an intricate undertaking and their stability can never be assumed—not even in periods of apparent stability. As global logistics grow more sophisticated, so too must our frameworks for evaluating risk, resilience and operational continuity.

Contextual Resilience: Lessons from the Houston Snowstorm on Localised Infrastructure Vulnerabilities
Recent years have underscored the growing frequency and impact of unprecedented events, many of which reveal systemic vulnerabilities that had previously gone unrecognised. A notable example is the snowstorm that struck Houston, Texas—a weather event that, while moderate by global standards had disproportionate and devastating effects on the region.

This event introduced many to the concept of “winterising”—the process of preparing infrastructure to withstand cold weather conditions. In Houston, a city unaccustomed to severe winter weather, infrastructure had not been designed or adapted for freezing temperatures. Comparatively, locations such as Minnesota, Scandinavia or Ukraine might have viewed the storm as relatively mild. Yet, for Houston, the consequences were catastrophic.

The key insight from this experience is that resilience must be context-specific. An incident that is routine or manageable in one region can become a crisis in another if systems are not tailored to the risks relevant to their local environment. The Houston snowstorm revealed how assumptions embedded in infrastructure design and planning can rapidly unravel when faced with atypical conditions.

Ultimately, this case reinforces the broader principle that effective resilience planning must go beyond generic preparedness. It must consider local conditions, environmental expectations and the adaptability of existing systems. As climate variability increases and unpredictable events become more common, tailoring resilience strategies to regional realities becomes not just prudent—but essential.

Governance as the Crucial Barrier to Climate Resilience in Indonesia

In the Indonesian context, one of the most pressing challenges to advancing climate resilience lies not in the lack of technical innovation or financing, but in the governance dimension of Environmental, Social and Governance (ESG) frameworks. Despite a growing appetite for public-private partnerships and the exploration of multi-functional infrastructure—such as dams that serve water supply, flood protection, climate adaptation and ecotourism—progress is frequently hampered by complex institutional and regulatory hurdles.

The bureaucratic landscape is often described by practitioners as “bureau-crazy,” reflecting the sheer number of agencies and decision-makers required to approve, endorse or de-risk new infrastructure approaches. This institutional inertia discourages innovation and often leads to the prioritisation of short-term, cost-efficient solutions over long-term resilient investments.

One recurring challenge is the prevailing emphasis on immediate financial returns, such as high internal rates of return, which tends to overshadow long-term system reliability and lifecycle efficiency. For example, infrastructure redundancy—such as twin-pipe water systems—is often viewed as prohibitively expensive during the planning phase, despite the long-term benefits it offers in operational resilience and cost reduction over time.

However, there are emerging signs of regional progress. Initiatives such as cross-provincial water supply networks, the ASEAN power grid and Indonesia’s growing participation in cross-border electricity trade with Singapore highlight the potential for collaborative resilience strategies. Yet these efforts remain constrained by institutional resistance to unfamiliar models and a regulatory environment that is ill-suited to first-of-its-kind infrastructure projects.

To overcome these barriers, systemic institutional reform and a shift in mindset among public-sector leaders are essential. Elevating long-term resilience as a core evaluation metric—rather than an ancillary consideration—will be vital in moving from pilot projects to scalable, sustainable infrastructure across Indonesia and the broader Southeast Asian region.

Bridging the Gap Between Urgency and Bureaucratic Timelines in Resilience Planning

One of the central challenges in this engagement is the misalignment between the urgency of today’s crises and the slow pace of bureaucratic decision-making. This tension was underscored during a recent presentation at a European Union summit. A moment that encapsulated the issue involved a delegate proudly announcing that, after 16 years, the EU had reached consensus on a definition of the word “crisis”—a milestone that could now enable a framework to be developed within the next five to seven years. While intended as a triumph of consensus-building to those facing immediate environmental and infrastructure challenges, it underscored a concerning lag between recognition and action.

This disconnect between real-time risk and institutional response is a critical barrier to effective resilience planning. Yet, disengagement is not a viable option. If climate adaptation, infrastructure resilience and governance reform are to be meaningfully addressed, it is imperative to work within these systems—while simultaneously pushing them to evolve more rapidly and with greater responsiveness.

Accelerating Resilience: The Case for Private Sector Leadership and Blended Finance

It is increasingly evident that, particularly in regions facing acute environmental and infrastructural challenges such as Jakarta, the private sector—and at times philanthropic actors—must assume a leading role in advancing resilience. Traditional government-led approaches, while essential, are often hampered by inertia and procedural delays. In contrast, blended finance models have shown significant potential in catalysing progress, serving not only to deliver results but also to demonstrate feasibility and build public sector confidence.

The urgency of the situation cannot be overstated. In cities like Jakarta, the consequences of environmental degradation are already being acutely felt. Air quality issues comparable to those in Australia and India are having direct impacts on public health and workforce productivity. Increased illness and employee absenteeism are no longer hypothetical risks but pressing operational realities for businesses and institutions.

At the core of the challenge lies a fundamental misalignment between the pace of systemic change and the speed at which on-the-ground impacts are emerging. Resilience frameworks and delivery mechanisms are advancing too slowly to meet the scale of present-day demands.

This recognition drives a growing commitment among private actors to accelerate implementation through innovative finance, cross-sectoral partnerships and action-oriented strategies. By demonstrating what is possible in real terms—rather than waiting for perfect policy conditions—these efforts offer not only immediate benefits but also a pathway for more responsive and adaptive public sector engagement.



FINAL THOUGHTS

Collaboration Over Certainty: Advancing Resilience Through Informed and Inclusive Innovation

Drawing from extensive experience at the intersection of engineering, government and resilience planning, it is evident that one of the most persistent obstacles to progress is a widespread institutional aversion to risk. Yet, it is precisely in moments of challenge that innovation finds its footing. When decision-making spaces include diverse perspectives, are informed by reliable data and united by a shared sense of urgency, meaningful advancements in resilience are possible.

While there are no definitive solutions—particularly given the unpredictable pace and scope of climate change—there is a growing body of evidence, momentum and a pressing imperative to rethink outdated approaches. The path forward does not depend on finding a silver bullet, but rather on fostering collaborative frameworks where technical experts, policymakers and community voices co-create practical and adaptive strategies.

Success in this arena hinges on the ability to make a compelling, data-driven case—one grounded in demonstrable outcomes, iterative learning and a commitment to long-term impact. By empowering those already working across sectors and disciplines, resilience efforts can move beyond rhetoric and toward systemic change. Ultimately, it is this combination of informed action and purposeful collaboration that will shape a more resilient future.

The Multidisciplinary Nature of Resilience: Bridging Boundaries to Address Complex Global Risks

One of the most defining characteristics of resilience, as observed through professional experience, is its inherently multidisciplinary nature. This is both its greatest strength and one of its most complex challenges.

Building resilient systems—whether in the context of climate, infrastructure or national security—requires expertise that extends far beyond science or engineering. It touches on transportation logistics, economic policy, urban governance and the shifting landscape of global geopolitics.

For professionals in the security and risk management fields, the scope of required knowledge has expanded dramatically. Where once the focus may have been primarily on traditional threats, today's resilience work demands fluency in areas such as global supply chains, maritime trade disruptions in regions like the Red Sea and the political dynamics of local leadership. These issues are no longer peripheral—they are central to effective resilience planning and response.

The key lesson is that siloed approaches are no longer tenable. Addressing the interconnected risks of the modern world requires collaboration across disciplines, institutions and geographies. As complexity increases, so too must the diversity of perspectives and skills brought to the table. It is within this intersection—between professions, sectors and global systems—that both the challenge and the opportunity of resilience truly reside.

Empowering Systems Thinkers: The Role of Inclusive Leadership in Addressing Infrastructure and Resilience Challenges

Through extensive work in the domains of resilience, systems thinking and infrastructure planning, a critical insight has emerged: the importance of including the right voices at the table. In a world increasingly shaped by globalisation and systemic interdependencies, many of the challenges faced today qualify as “wicked problems”—complex, multi-layered issues that defy simple or linear solutions. Defining these problems correctly is often more difficult than solving them, which underscores the value of structured frameworks such as the Infrastructure Systems Resilience (ISR) model in bringing clarity and direction.

This theme was further reinforced during a recent session that highlighted the breadth of talent and innovation across disciplines and geographies. What became evident is that true resilience—especially in urban systems and critical infrastructure—is less about diagnosing failure and more about empowering capable individuals to lead adaptive change. This means cultivating emerging leaders, supporting professionals who bring a systems-based perspective and forging strong partnerships across the public, private and academic sectors.

What offers optimism amid these complex challenges is the growth of a truly global community committed to collaboration and shared learning. The momentum behind platforms such as the Institute of Strategic Risk Management (ISRM) signals a positive shift toward integrated, inclusive and forward-thinking approaches. Continued engagement with such networks is essential to ensure future-ready infrastructure and governance systems that can withstand evolving risks and uncertainties.



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Dr Ebru A. Gencer

Adjunct Associate Professor
of Architecture, Planning
and Preservation, Columbia University
Founding Director, Center
for Urban Disaster
Risk Reduction
and Resilience (CUDRR+R)

ABOUT

ABOUT THE ISRM GLOBAL URBAN RESILIENCE PROJECT

The ISRM Global Urban Resilience Project was developed out of a series of papers written together with the International Federation of the Red Cross / Red Crescent Societies, and more recently in partnership with the National Preparedness Commission.

It is designed to bring together academics, policy makers and practitioners from across the global urban resilience and major city management spectrum to facilitate action-oriented dialogue and interaction from multiple perspectives.

The launch of the ISRM Management Award in Global Urban Resilience and Major City Management in May 2024 set the foundation for the latest series of programmes, based on the 130 participants from over thirty countries who participated in the programme.

For more details on the Global Urban Resilience and Major City Management project, or to discuss how you can be involved, please contact

✉ info@theism.org

🌐 www.theism.org

Kleoniki Theodoridou
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Majkl Velner
Design and Formatting