The future of infrastructure: How interconnected systems are reshaping infrastructure management

As physical and digital assets converge in the systems era, infrastructure should be planned, financed, protected, and operated as a whole

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Physical and digital infrastructure are no longer separate domains. Transportation networks depend on communications networks. Digital and data infrastructure depends on power systems and supply chains. Water utilities rely on sensors and operational technologies. As these systems become more interconnected, artificial intelligence is increasingly coordinating how they are planned, operated, and maintained.

Infrastructure has evolved into an interconnected operating system; so the institutions responsible for it should evolve too. Infrastructure leaders are being asked to look beyond building more assets, toward financing, delivering, operating, and protecting these increasingly interconnected systems.

Deloitte's 2026 Future of Infrastructure Survey sheds light on this shift. Infrastructure leaders surveyed across various regions expect increased investment across a wide range of infrastructure asset classes over the next three years (see methodology). However, the defining challenge is no longer simply deciding what to build. According to respondents, governments also need to determine how infrastructure priorities can be financed, delivered, operated, and secured to account for the growing interdependencies across sectors and jurisdictions. Moreover, the survey also highlights the scale of this ambition, as well as the distance between it and the current delivery capacity.

While infrastructure systems are becoming more integrated, many of the institutions responsible for planning, financing, regulating, and delivering them remain organized around individual assets and sectors. Today's infrastructure challenges increasingly stem not only from engineering but also from the organization's ability to manage complexity across connected systems.

The consequences of this mismatch are already visible in infrastructure delivery. Many governments continue to struggle to deliver infrastructure at the pace and scale their economies require. More than 1 in 10 large-scale mega- and giga-infrastructure projects globally (valued at more than US$1 billion and US$10 billion, respectively) face significant delays or cancellations.[1] Respondents rank complex policies, regulations, and permitting processes as the top implementation challenge.

This institutional friction is only part of the picture, however. The convergence that is reshaping what infrastructure should do is also affecting financing, resilience, and the technology required to operate it. Capacity gaps that were manageable when infrastructure consisted of distinct assets have become strategic liabilities in an interconnected setup. These gaps that once delayed individual projects now affect the performance of entire infrastructure ecosystems. This is because, while individual assets fail in isolation, issues within interconnected systems can trigger a cascade of failures.

The systems era of infrastructure has changed the nature of risks that organizations face. Governments need to plan, finance, and deliver infrastructure as a whole system to create synergy in how it is operated and governed. Those that do will be able to capitalize on infrastructure's economic potential.

What the survey tells us: Key data insights

- **Infrastructure performance increasingly depends on a common set of digital capabilities, including data, connectivity, controls, and analytics.** Globally, 69% of respondents expect increased demand for smart, connected, and resilient urban infrastructure; 66% expect greater integration of digital technologies into social and entertainment venues; and 59% anticipate that adoption of advanced technologies in infrastructure and transportation operations will have significant impact on infrastructure.

- **Investment priorities broaden, but making projects investable remains a challenge.** Respondents expect increased investments across infrastructure asset classes—digital, mobility and transportation, energy and water, and social and entertainment. But making projects investable remains a challenge: respondents cite budgetary constraints (31%), unclear implementation road map and return on investment (22%), limited access to long-term, reliable funding sources (22%), and lack of private sector participation (20%), as challenges to infrastructure delivery.

- **Institutional friction is one of the biggest delivery bottlenecks.** Respondents cite complex policies, regulations, and permitting processes (39%) as the most significant challenge to infrastructure delivery. But institutional friction also manifests in different ways, including complex procurement processes (29%) and obtaining environmental clearances and reviews (27%).

- **Resilience priorities advance unevenly**. **Cybersecurity resilience shows the greatest alignment in concern, action, and investment:** Fifty-five percent of global respondents agree that public and critical infrastructure needs stronger protection from cyberattacks, and 60% of government respondents report strengthening cybersecurity and incident response as the most important critical infrastructure investment priority.

- **Physical resilience—especially addressing extreme weather and natural disaster threats—shows a gap between concern and action:** While 56% of government respondents identify natural disasters and extreme weather as the greatest threat to infrastructure resilience, only 33% prioritize investing in preparedness.

- **AI has moved beyond experimentation, but scaling AI requires broader capabilities.** AI use in infrastructure extends beyond the gateway use case of predictive maintenance to encompass various tasks across the infrastructure life cycle, including energy demand forecasting, real-time asset monitoring, permitting, supply chain logistics, and weather-related modeling. In the survey, 34% of respondents cite the technology talent gap—especially in AI and cybersecurity—as a major implementation barrier.

- **Infrastructure leaders across regions recognize the importance of a broader technology stack required for modernization.** Executives are looking beyond AI to a wider technology ecosystem that includes clean or green energy (47%), data security technologies (39%), batteries and energy storage (37%), 5G (31%), and cloud computing (28%).

Five shifts shaping the next era of infrastructure

Deloitte's previous infrastructure survey, conducted in 2022, revealed that the infrastructure sector was at a turning point, buoyed by historic investment but constrained by execution challenges. Even today, these challenges remain, but the context has fundamentally changed: Infrastructure systems are becoming more interconnected; AI is reshaping how they are planned and operated; and governments increasingly need to manage a level of complexity that traditional infrastructure models were never designed to address.

The 2026 survey identifies five shifts that are reshaping the next era of infrastructure. Individually, each represents an important trend. Taken together, these five shifts reveal how infrastructure is evolving from individual assets to interconnected systems and what governments must do to keep pace. We explore the shifts across five chapters.

Chapter 1: Infrastructure is becoming a system of systems

Physical and digital infrastructure are converging into interconnected systems, where the performance of individual assets increasingly depends on one another. This chapter explores why governments should move from managing individual assets to planning and operating infrastructure as an integrated system.

The real value of connected infrastructure lies not in optimizing any one asset or network in isolation, but in giving leaders the visibility needed to understand cross-system effects and coordinate decisions across organizational and sectoral boundaries. The digital-energy nexus is one of the most important examples in the survey of this emerging system-of-systems model. But the larger implication certainly extends beyond energy, and similar relationships can be observed in other infrastructure assets.

This chapter explores how this growing interdependence is reshaping the ways infrastructure is planned, operated, and financed, and why managing it as a connected system has become a strategic imperative.

Chapter 2: Moving from capital availability to capital fit

As infrastructure needs continue to grow, government budgets alone are increasingly stretched to cover them. The record levels of private capital sitting in pension funds, with insurers, and in infrastructure funds seem like an obvious answer.[2] Yet the data shows that this capital is not being converted into delivered projects at the scale governments need.

The shortfall is rarely about money. Too many projects simply are not yet investable: revenue models are unclear, risk is misallocated or contested between public and private partners, and governance—the institutional capacity to prepare a credible project, run transparent procurement, and hold delivery to account—is often a weak link.

To address these gaps, governments are adapting how they support projects rather than transferring more risk outright. Models such as availability payments and minimum-revenue guarantees match government support to an asset's specific risk. While newer partnership models, from collaborative delivery to outcome-based contracts, are replacing rigid, one-size-fits-all public-private partnerships.

Chapter 3: Institutional friction is slowing infrastructure delivery

Within the capacity framework, even when funding and intent exist, infrastructure delivery is regularly slowed by complex processes and fragmented coordination. These extend beyond mere administrative inconveniences.

When processes become too difficult to navigate, competition narrows and smaller governments and firms are effectively locked out of the infrastructure ecosystem.

This chapter explores institutional friction as a systemic delivery problem—one that concentrates capacity on organizations that already have the resources to manage it—and how institutional reform and AI-enabled modernization can reduce friction and expand delivery capacity.

Chapter 4: Infrastructure convergence redefines the resilience strategy

Today, infrastructure has evolved into an interconnected system of systems in which digital networks, operational technologies, cloud platforms, sensors, and AI-enabled controls interact continuously. As these interdependencies deepen, disruptions rarely remain isolated. A failure in one system can cascade across others, creating consequences far beyond the original point of failure.

Therefore, resilience should no longer focus solely on protecting individual assets. It requires an integrated systems-based strategy that ensures the continuity of critical services, enables rapid recovery, and anticipates cascading failures.

This chapter explores why, in this new reality, cyber and physical resilience should not be treated as separate agendas. The survey highlights a clear inflection point in how governments approach infrastructure resilience. Cybersecurity shows what becomes possible when risk recognition translates into investment and action. Extreme weather resilience reveals the harder challenge: broad awareness of the threat, but little movement toward the investments needed to reduce it.

Chapter 5: AI is emerging as an operating layer of connected infrastructure

AI is moving beyond isolated use cases and becoming part of infrastructure's operating model, extending into earlier stages such as planning, permitting, and design.

Scaling AI across the full project life cycle requires more and better tools. It also depends on the technology foundations and organizational capabilities that many government agencies are still developing.

This chapter explores how organizations are scaling AI across the infrastructure life cycle and why organizational capability—rather than technology alone—will determine who succeeds.

The infrastructure imperative

Infrastructure has always depended on capital and institutional capacity. The interconnectedness of infrastructure adds another requirement—the ability to manage interdependence.

Since our last survey, those connections have become clearer. Interdependence now shapes resilience priorities; resilience depends on technology; and each choice can affect performance across the broader infrastructure ecosystem.

Governments making the greatest progress are the ones investing in building the organizational and institutional foundations needed to manage this complexity. Meeting that imperative can determine their ability to deliver on the most consequential public investment priorities of the future.

Methodology

In March 2026, Deloitte surveyed 985 infrastructure executives across government, the private sector, and not-for-profit organizations to understand how leaders are approaching infrastructure investment, delivery, resilience, technology, AI, and financing. The survey included respondents from 21 countries across all major regions and four infrastructure asset classes: digital infrastructure and networks; energy, water, other utilities; mobility and transportation; and social and entertainment infrastructure.

Respondents were asked about their current priorities, expected shifts over the next three years, implementation challenges, funding and financing expectations, resilience risks, and the role of AI and emerging technologies across the infrastructure life cycle. Results were analyzed globally and, where relevant, by region, entity type, government level, and infrastructure asset class.

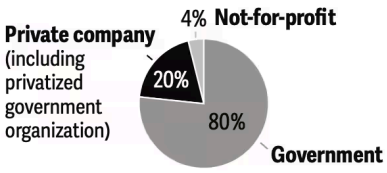
Figure 1

Survey methodology

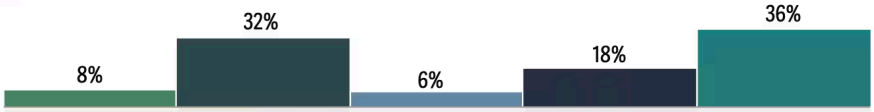
Survey overview

985 infrastructure executives surveyed across government, private sector, and not-for-profit organizations to understand how leaders are approaching infrastructure investment, delivery, resilience, technology, AI, and financing.

Respondents by sector



Respondents by region



APAC		Europe		Latin America		Middle East/ Africa		North America	
India	32%	Portugal	16%	Brazil	50%	Qatar	28%	US	86%
Singapore	24%	UK	16%	Mexico	50%	Saudi Arabia	28%	Canada	14%
Japan	23%	Germany	16%			UAE	28%		
Australia	21%	Ireland	16%			Kenya	17%		
		Netherlands	9%						
		Belgium	9%						
		Spain	9%						
		Norway	4%						
		Finland	3%						
		Sweden	2%						

Global respondents by title

Government

- Director at the local level
- Director or senior manager at the federal level
- C-suite executive
- Commissioner, director, or senior manager at the state level
- Mayor or deputy mayor
- City manager or chief of staff
- County commissioner or deputy commissioner
- Board of directors

Private company and not-for-profit

- Director of research or advisory services
- Director at the local level
- C-suite

What respondents were asked

- Top infrastructure priorities today
- Expected shifts in priorities over the next three years
- Top challenges to delivering infrastructure priorities
- Major funding sources today and how they are expected to change in the future
- Resilience risk to critical infrastructure
- Role of AI and emerging technologies across the infrastructure life cycle

Source: Deloitte analysis.

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ENDNOTES

1. Mace Group, "The future of major programme delivery," accessed Aug. 13, 2026; Rob Hakimian, "11% of worldwide major projects face delay or cancellation, Mace report finds," *New Civil Engineer,* July 3, 2025.

2. Madeline Shi, "Global private market funds' dry powder dashboard," Pitchbook, Jan. 16, 2026.

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