Understanding Infrastructure Investment Risk Through Coordination and Asset Management

How greater visibility into the management of physical assets and the organisations responsible for them can reveal risk before it becomes visible.

Infrastructure Investment Risk — Looking Beneath the Return

Infrastructure investment continues to expand across developing and high-growth markets. Across the Middle East and Africa, the capital base supporting that development is substantial and growing. Middle Eastern sovereign wealth funds reached approximately US$6 trillion in assets in 2025, deploying around US$127 billion during the year—48% more than the previous year[1]. Across Africa, 36 sovereign wealth funds and 16 public pension funds manage more than US$400 billion, while globally it is estimated that more than one-third of sovereign investor capital deployed since 2016 has gone into infrastructure and energy.[2].

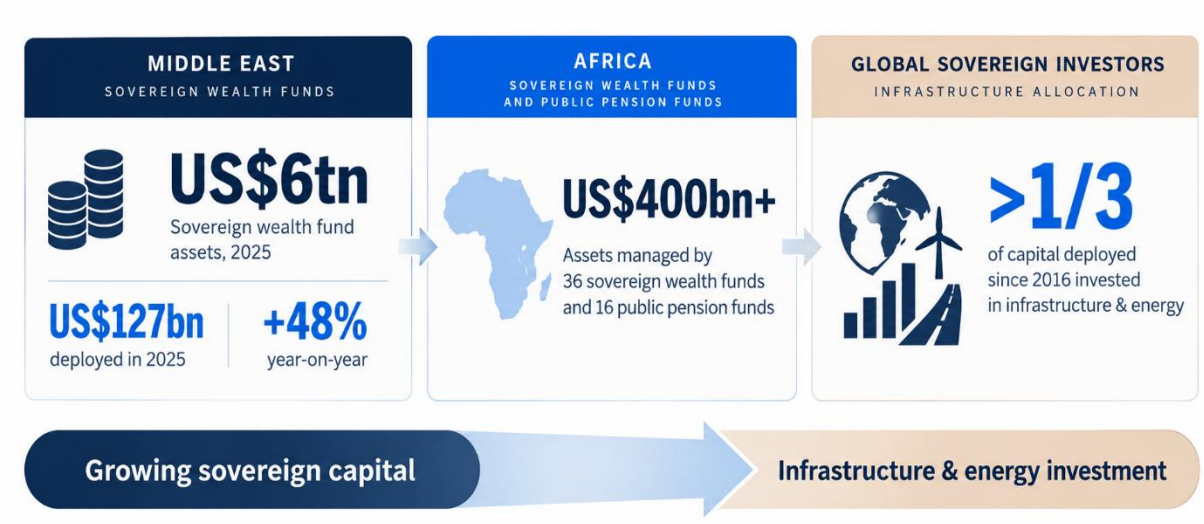


Figure 1: Growth and deployment of sovereign investment capital across the Middle East and Africa, and the increasing global allocation of sovereign capital to infrastructure and energy.

Much of this capital is being deployed into transport, energy, utilities, logistics and other productive infrastructure intended to support economic growth and generate long-term returns. These investments present significant opportunity for their respective economies. But the value and returns delivered from infrastructure ultimately depend on something very physical: the condition and reliability of the assets underpinning them.

As increasing amounts of capital are committed to these assets, understanding the risks that can affect their ability to deliver those returns becomes increasingly important. Investors already have well-established ways of assessing many dimensions of that risk. Financial analysis can test

[1] PwC (2026), *TransAct 2026: Middle East*, citing Global SWF Report 2025.
[2] UN Trade and Development (UNCTAD) (2025), *Leveraging the Potential of Sovereign Investors for Infrastructure Investment in Africa*, UNCTAD/DIAE/2024/2.

valuations, forecasts, cash flows and market exposure, while Enterprise Risk Management can assess governance, strategic and operational risks. These perspectives are important, but they do not necessarily provide visibility of how decisions and activities across the organisation are affecting the physical assets on which future returns ultimately depend.

This becomes particularly important in rapidly developing infrastructure markets. Building and sustaining increasingly complex asset systems requires capability spanning project delivery, operations, maintenance, risk, commercial management and leadership. The experience required to understand how these activities interact over the life of the assets, and how their combined effect influences investment value, can be difficult to find and develop at the same pace as investment.

How well an asset can perform depends on cumulative that begin when the idea for a new asset is established. Decisions made during planning, project delivery, operation, maintenance and renewal progressively influence asset condition, reliability,operational cost, risk and ultimately the value realised from the investment. Each activity may be competently managed in its own right, while the combined effect of decisions made across the organisation produces a very different outcome at the asset level.

For outside investors and analysts, this creates a particular challenge. Governance arrangements, risk processes, financial reporting and individual operating activities can all appear sound, while the consequences developing within the physical asset system remain difficult to recognise. Identifying those consequences requires the experience to connect organisational decisions and activities with what is occurring in the assets themselves.

The discipline of Asset Management, supported by the ISO 5500X series, provides a basis for making those connections by considering how an organisation realises value from its assets across their lifecycle. Understanding how decisions are coordinated adds another dimension: whether objectives, priorities, risk and the trade-offs affecting the assets are understood, shared and acted upon coherently across the organisation.

A key question an infrastructure investor has to ask:

How can I better understand the risks within physical assets and the organisation's ability to manage them?

Having a better understanding of the operating conditions of physical assets and understanding how well the organisation is coordinating decision making across functions becomes a key advantage in removing uncertainty and maximising the value driven from an investment.

This article examines that question through a real infrastructure investment case in which quantitative analysis identified risk that had not been made visible through organisational operations or external expert reviews. The approach to be detailed demonstrates how material risk can exist despite apparently sound governance and reporting, why it can remain difficult for an outside investor to identify, and how greater visibility can improve the basis for managing the uncertainty it creates.

Asset-Related Enterprise Risk — When the Data Is Not Enough

Infrastructure investors typically bring considerable capability to understanding financial performance, market exposure and investment risk. They can interrogate forecasts,

identify patterns in performance and test the assumptions on which expected returns depend. The organisations operating the assets will generally have their own enterprise risk, governance and operational reporting processes providing further visibility of risk.

These sources provide important information about an investment, but they do not necessarily provide the experience required to recognise risk developing within the physical assets or to understand the organisational decisions and activities producing it. An investor can therefore have extensive information about an investment without having equivalent visibility of the inherent asset-related risk underlying it.

This becomes particularly important when the available evidence appears contradictory. Quantitative analysis may indicate an unexplained risk while organisational governance appears appropriate, management remains confident and operational reporting indicates that the business is performing as expected. In this situation, knowing that risk may exist is different from understanding what the risk actually is.

Without understanding its source, it is difficult to determine whether the exposure is temporary or structural, whether management is already controlling it, whether intervention is required or what its potential consequences for future investment value might be.

For asset-intensive investments, understanding this risk requires looking beyond the individual indicators to the system producing them. Physical assets sit at the end of a long chain of organisational decisions. Their condition and performance are influenced by how capital has been allocated, projects delivered, capability developed, risks managed, maintenance performed and operational priorities balanced over time. The discipline of Asset Management provides a structured way of connecting these activities with the value, performance and risk ultimately carried by the assets.

Assessing this requires evidence from three broad sources:

- organisational documents and artefacts
- engagement with key stakeholders
- observation of the physical assets and their operating environment.

Together, these allow the organisation's stated intent to be compared with how that intent is understood and translated into practice, and ultimately with the condition and performance of the productive assets themselves. The value comes from connecting these sources rather than considering any one of them in isolation.

Understanding how decisions are coordinated provides a further means of testing that connection. It allows the assessment to move beyond whether appropriate governance, processes and activities exist to examine whether the people influencing the same assets share a sufficiently coherent understanding of objectives, priorities, risk and the trade-offs they are collectively managing.

This adds important context to the assessment of asset-related risk. The condition and performance of physical assets do not result from a single decision or activity, but accumulate through decisions made across the organisation and throughout the asset lifecycle. Understanding that exposure therefore requires examining both the assets themselves and the decisions that have shaped them over time.

Asset Risk Develops Across the Lifecycle

The risk physical assets pose to investors is often most visible once an asset fails, performance deteriorates or costs begin to rise. The decisions that created that exposure, however, are almost always made much earlier and can appear entirely reasonable when considered individually.

A reduction in operating or maintenance expenditure, for example, may deliver an immediate financial benefit while increasing workload, reducing the precision of maintenance or allowing emerging defects to remain unresolved. Reduced supervision can allow work practices to develop that progressively undermine equipment performance. During project delivery, pressure to meet cost or schedule commitments can result in reliability or safety protections being modified, deferred or overlooked, creating operational inefficiencies and additional costs that persist long after the project has been completed.

None of these decisions necessarily produces an immediate failure. Their significance lies in how their consequences accumulate. Increased maintenance pressure can contribute to defects; defects can accelerate deterioration; deteriorating condition can reduce reliability and increase operating costs; and unresolved problems can progressively increase the probability and consequence of failure. Decisions that initially improved cost or schedule performance can therefore create an exposure substantially greater than the benefit they originally delivered.

The same dynamic operates across the asset lifecycle. Decisions made during planning and project delivery establish the conditions under which an asset enters service, while subsequent decisions about funding, capability, maintenance, operations and risk determine whether those conditions improve or deteriorate. The resulting asset condition is therefore not simply a technical issue; it reflects a history of organisational decisions and trade-offs between cost, risk, performance and opportunity.

For an investor, the difficulty is that much of this development can occur before its financial consequences become obvious. If the underlying decisions and their cumulative effect on the assets are not visible, expected costs, reliability and future performance carry greater uncertainty than the available reporting may suggest. As that exposure develops, it can translate into unexpected capital requirements, operating costs, disruption and ultimately greater volatility in investment returns.

Understanding Coordination in Asset Management

Physical Asset Management is defined as the “coordinated activity of an organisation to realise value from assets.” The difficulty is that coordination itself is often not readily observable.

Governance structures, management systems and defined accountabilities can show how an organisation intends decisions to be made. They do not necessarily show whether people across the organisation are making those decisions with a sufficiently shared understanding of objectives, risk and the trade-offs required to deliver value from the assets.

This distinction becomes important when assessing investment risk. Different parts of an organisation can be performing their respective roles effectively while interpreting the same priorities and risks differently. The question is therefore not whether everyone makes the same decisions, but whether there is sufficient coherence in how decisions are made and how competing objectives are resolved across the system. What may appear as a functioning operational organisation on the surface may be undermining coordination leading to greater asset risk and volatility in value returns and performance.

It is possible to examine how well an organisation is coordinating its asset management and operations by assessing recurring tensions in organisational decision-making: balancing short and long-term priorities, cost and capability, absorbing or escalating risk, declared objectives and practised priorities, formal authority and distributed judgement, and functional versus broader system priorities.

These tensions present as polar pairs relative to the objectives an organisation is intending to achieve. Neither side of these tensions is inherently right or wrong. Their significance lies in how individual stakeholder and functional groups are coordinated and the pattern the tensions create across the organisation.

Three characteristics help make that pattern visible:

Direction identifies how decisions tend to resolve.

Coordination identifies how consistently the underlying decision logic is shared.

Distribution identifies where differences in that decision logic occur across organisational levels and functions.

Together, these provide a way of examining something that conventional governance and risk assessment can struggle to make visible: whether the organisation is sufficiently coordinated to recognise and manage the risks developing within the physical asset system.

Where coordination is weak, the consequences are likely to accumulate in the physical asset system over time. Decisions that are individually reasonable can collectively influence asset condition, reliability, capability and exposure in ways that were neither intended nor fully understood. These consequences can remain difficult to see because the information used to understand them is fragmented across functions and organisational levels, while established governance, reporting and individual activities can continue to appear effective. The physical assets may therefore be carrying the cumulative evidence of developing risk before the organisation—or an outside investor—has a sufficiently connected view to recognise it. Identifying this requires specific experience at the asset level, combined with the ability to look across the organisation and recognise where the decisions affecting those assets have become fragmented.

The significance for an investor is therefore not simply whether these risks exist, but whether there is sufficient visibility to recognise them when conventional indicators suggest the organisation is operating as intended. The following case demonstrates this problem in practice. Quantitative analysis had indicated elevated investment risk, yet governance, management systems, external assessments and operational reporting provided little explanation for it. Understanding the exposure required connecting organisational intent, decision-making and operational practice with the physical condition of the assets themselves.

Case Study — Identifying an Unexplained Infrastructure Investment Risk

A large government-owned holding company had undertaken quantitative risk analysis across its transport and logistics investments. The analysis indicated elevated risk within its infrastructure portfolio, but neither the source nor nature of the exposure could be identified.

The difficulty was that the analysis did not align with the organisational narrative. The operating organisation consistently reported that its assets and operations were in good order.

Governance structures, management systems, risk processes and supporting documentation were in place, while previous external assessments had reviewed governance and administrative arrangements and reported alignment with globally recognised standards.

Viewed through the existing governance, reporting and conventional assessment methods, the source of the risk was not apparent to those within the system. The quantitative analysis had created uncertainty, but without having an understanding of what was driving the exposure there was no clear basis for determining its significance or how it should be addressed.

An Enterprise Asset Risk assessment was therefore undertaken to identify where risk may exist beyond the available data. The approach combined a strategic review of how the organisation intended its assets to be managed with a tactical and practical examination of how they were actually being maintained and operated. Strategic documentation and organisational artefacts were reviewed alongside stakeholder interviews and leadership observation, maintenance practices and onsite inspection of asset condition. ISO 55001 provided a structured reference, augmented by practical technical, operational, commercial and leadership experience.

Together, these sources of evidence allowed the organisation's stated intent and leadership understanding to be compared with operational practice and ultimately with the condition of the assets themselves. This was important because no individual source provided the complete picture. The assessment required the organisational, operational and physical evidence to be considered together to understand both the exposure and its broader context.

The review exposed a materially different picture from that presented through the organisation's established reporting and governance processes. The findings extended from organisational strategy and leadership through project delivery and maintenance capability to the safety, condition and reliability of the assets themselves.

The following discoveries were outcomes from the assessment:

- Significant safety-related issues were identified, with existing safety controls and practices requiring substantial improvement.
- Asset condition was found to be extremely poor, alongside gaps in the training and capability available to onsite maintenance teams.
- A large proportion of automated process and safety controls had been decommissioned during asset installation, reflecting shortcomings in project scoping and execution.
- Across several areas of senior leadership, there was limited practical asset knowledge and experience with which to recognise risks that were evident at the asset level.
- Differences were evident among mid and senior leaders in both their objectives and their understanding of what was required to sustain asset reliability.
- Corporate strategies had become increasingly disconnected from practical organisational requirements, limiting their relevance to the employees they were intended to engage and guide.



Figure 1: ***Evidence of lubrication practice.*** *Inspection identified both dry grease points and grease application points heavily contaminated with dust. These conditions were inconsistent with the reported maintenance practices and increased the likelihood of premature bearing failure.*



Figure 2: Operating environment and maintenance practice. Significant dust accumulation was evident around operating equipment despite established housekeeping and filter-cleaning requirements, raising questions about whether documented maintenance practices were being consistently executed.



Figure 3: ***Premature material deterioration.*** *Inspection identified deterioration and delamination of rubber components inconsistent with their expected operating condition, requiring investigation of material suitability for the application and operating environment.*

The physical evidence gave practical context to the broader findings. Relatively simple observations at the asset level were inconsistent with reported maintenance practices and demonstrated that documented requirements were not always reflected in the way the assets were being managed. Other findings extended beyond maintenance into project delivery, leadership capability and the connection between organisational strategy and operational requirements.

The significance therefore lay not in any one deficiency in isolation. Evidence of risk existed across strategy, leadership, project delivery, maintenance practices, organisational capability and the

physical assets themselves. Taken together, these observations provided a view of the organisation materially different from that suggested by its governance arrangements and established reporting.

The quantitative risk signal could now be reconciled with observable evidence. The risk had not been absent or inherently hidden; the evidence required to identify it existed across the organisation and within the assets themselves, but had not previously been connected into an enterprise-level understanding of what was occurring. Identifying its significance required a breadth of Asset Management, operational and organisational experience capable of connecting onccordinated evidence that had previously been considered separately.

The assessment had therefore established what was happening and where the exposure existed. It also revealed an important contradiction: documented strategy, established governance and leadership conviction coexisted with an operational reality materially different from what the organisation believed was occurring.

Understanding how these apparently contradictory conditions could coexist required looking more closely at how decisions were being understood and resolved across the organisation.

Understanding the Disconnect Through Coordination

The assessment had established a disconnect between documented strategy, leadership understanding and the operational reality observed across the organisation and its assets. The coordination analysis provided an additional way of showing how those contradictory conditions could coexist.

Rather than reassessing whether governance processes or Asset Management activities were present, the analysis examined how decisions were being resolved when people across the organisation encountered competing requirements. These included immediate versus longer-term needs, cost containment versus maintaining sufficient capability, whether risk was managed locally or escalated to higher decision authority, and whether functional priorities or broader organisational requirements prevailed.

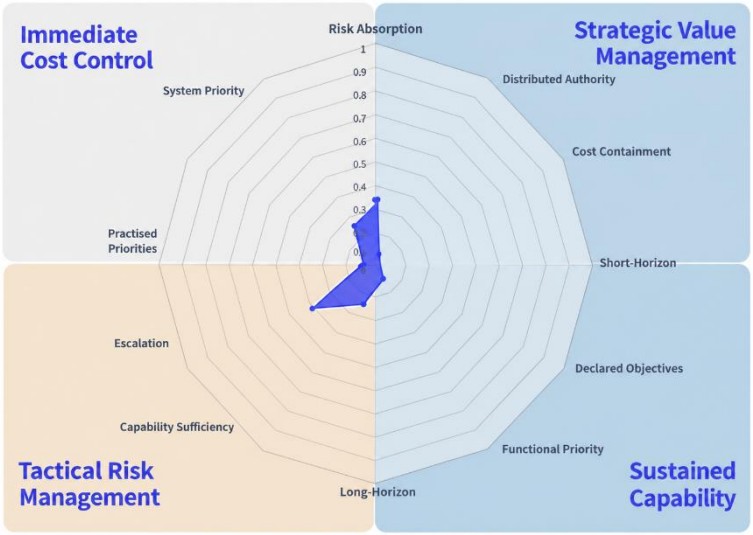


Figure 2: Decision Tendency Profile

The Decision Tendency Profile showed that collectively, stakeholder decisions tended most strongly toward local absorption of risk (problems were not escalated), with additional tendencies

toward shorter horizons (immediate needs vs longer-term value) and functional priorities (tactical rather than strategic). These results were then considered against the evidence established through the Enterprise Asset Risk assessment.

The significance of these tendencies lies in what they allow to accumulate. When emerging problems are absorbed locally, their immediate consequences may be managed without the underlying exposure becoming visible to those responsible for broader risk, capital or strategic decisions. When this is combined with shorter decision horizons, keeping an asset or operation functioning today can take precedence over addressing the conditions affecting its future reliability. Functional priorities can reinforce this further, because the consequence of a decision made in one area may only become apparent later in another.

This pattern was visible in the assessment evidence. Maintenance teams were operating within the capability and resources available to them while asset condition deteriorated. Process and safety controls had been decommissioned during project delivery, transferring consequences from the project environment into subsequent operations. Maintenance and operational practices addressed immediate requirements but were not consistently preventing deterioration, while risks evident close to the assets were not acquiring the same visibility or significance at senior levels. Individually, these conditions appeared as project, maintenance, safety or operational issues; collectively, they represented a developing exposure to asset reliability, operating cost, safety and future investment value.

This helps explain how senior leaders could remain committed to the organisation's documented objectives and confident that they were being implemented while the operational and physical evidence showed a materially different reality. The assessment did not identify an absence of strategic intent. Rather, the decisions through which that intent was translated were progressively being shaped by immediate requirements, local management of risk and functional priorities.

The consequence was not simply organisational misalignment. It was that risk could accumulate in the assets without being recognised at the level where its broader significance could be assessed and addressed. Deteriorating condition, maintenance limitations and the consequences of earlier project decisions could therefore persist while governance and reporting continued to present a comparatively coherent organisational picture. For an investor, this creates uncertainty around the true condition of the productive system, the future capital and operating expenditure required to sustain it, and the reliability of the performance on which expected returns depend.

The Decision Tendency Profile therefore showed more than the direction in which decisions tended to resolve. Considered against the assessment evidence, it provided a means of understanding how apparently reasonable decisions across different parts of the organisation could collectively contribute to the exposure observed in the assets. Establishing why those tendencies persisted, and where the differences in decision logic occurred, required examining the level and distribution of coordination.

Understanding the Level of Coordination

A profile of decision tendencies, The Decision Tendency Profile, showed how decisions tended to resolve across the organisation. A separate question was how coordinated those decisions were. Coordination considered the extent to which stakeholders shared a common understanding of the objectives, priorities and trade-offs influencing their decisions, rather than whether they necessarily made the same decision in every circumstance.

This distinction was important. Differences in individual decisions are expected across an organisation because people operate with different responsibilities, information and constraints. Low coordination becomes significant when those differences reflect materially different understandings of what the organisation is trying to achieve, what risks matter, when they should be escalated, or how competing requirements should be balanced.

The assessment therefore considered the level of coordination associated with each of the six decision tendencies.

Decision Tendency	Coordination	What the result indicated
Short-Horizon ↔ Long-Horizon	32%	Limited shared understanding of how immediate operational requirements should be balanced against longer-term asset needs.
Cost Containment ↔ Capability Sufficiency	28%	Different views existed around the level of capability and resources required to sustain asset performance relative to cost pressures.
Risk Absorption ↔ Escalation	22%	Significant differences existed in how emerging risks were understood, owned and escalated across the organisation.
Declared Objectives ↔ Practised Priorities	16%	The weakest coordination occurred around how documented organisational objectives translated into priorities and decisions in practice.
Distributed Judgement ↔ Authority Reliance	30%	Differences existed in how decision authority and judgement were understood and exercised across organisational levels.
Functional Priority ↔ System Priority	18%	Functional areas were not operating from a sufficiently shared understanding of how their decisions affected broader organisational and asset requirements.

Table 1: Coordination across the six Decision Tendencies

The results indicated generally low coordination across the decision environment, with the greatest differences occurring around the translation of declared objectives into practised priorities, the treatment of risk and the relationship between functional and broader organisational requirements. This added an important dimension to the Decision Tendency Profile. The issue was not simply that decisions tended toward risk absorption, shorter horizons or functional priorities; the understanding behind those decisions was not consistently shared across the organisation.

A low coordination result did not, by itself, identify which stakeholder groups were creating the difference or imply that one group held the correct view. It indicated that people influencing the same assets were operating from materially different understandings of the objectives, priorities and trade-offs they were collectively managing.

Understanding the significance of those differences therefore required looking beyond the organisation-wide coordination result to establish where the disconnect was occurring across organisational levels and stakeholder groups.

Where the Disconnect Occurred

Breaking the coordination results down by organisational level showed that the differences were not evenly distributed. Importantly, relatively strong coordination within individual groups did not necessarily translate into coordination between them.



Table 2:Distribution of Decision Tendencies by Organisational Level

Executive, senior and functional management remained strongly oriented toward the organisation's documented strategic intent, with considerable consistency around longer-term objectives, organisational priorities and the management arrangements intended to deliver them. This supported a strong leadership conviction that the organisation was operating broadly as intended.

The tactical and operational environment was markedly different. Those closest to the assets were dealing with the immediate requirements of keeping the operation running, managing emerging problems with the resources and capability available to them, and absorbing risks that were not being resolved elsewhere in the organisation. Their decisions were consequently more strongly oriented toward shorter horizons, practised priorities and immediate functional requirements.

This distribution explains why the organisation-wide Decision Tendency Profile could be misleading if considered in isolation. The tendencies toward risk absorption, shorter horizons and functional priorities did not represent a common decision logic across the organisation. They reflected materially different environments: management was largely coordinated around strategic intent, while those closer to the assets were making decisions in response to the operational conditions they faced. Each group could therefore be relatively coherent internally while the organisation remained poorly coordinated between them.

This was particularly significant for risk. Operational personnel had direct visibility of deteriorating condition, maintenance limitations and the practical consequences of earlier decisions, but were largely managing these within day-to-day operations. Management, meanwhile, continued to make decisions from an understanding shaped by strategy, governance and reporting. Risk could therefore be visible and actively managed at one level without its cumulative significance becoming visible to those making broader risk, capital and strategic decisions.

The consequence was greater than disagreement between organisational levels. Problems could continue to be managed tactically without addressing the conditions creating them, while management retained confidence in a strategic position increasingly disconnected from the assets required to deliver it. This increased uncertainty around how emerging risks would be recognised, escalated and addressed, and around the future cost and reliability consequences carried by the assets.

Viewed alongside the physical evidence, the significance of the coordination results becomes clear. Poor project scoping, decommissioned controls, inadequate maintenance capability and deteriorating asset condition had developed within an organisation that still possessed documented strategy, governance and strongly coordinated intent within parts of its management structure. The issue was not an absence of intent or activity, but a weak connection between strategic management and operational reality that allowed materially different understandings of risk, priorities and asset requirements to persist.

Making the Investment Risk Visible

The combined evidence allowed the unexplained quantitative risk signal to be connected to what was occurring within the organisation and its assets. Rather than relying on any single indicator, the assessment brought together organisational intent, stakeholder understanding, decision coordination and physical asset condition to establish both the nature of the exposure and the organisational environment in which it had developed.

For an investor, this provides visibility of two related dimensions of infrastructure risk:

- **Risk Condition** — the exposure evident in the operation, reliability and condition of the productive assets.
- **Risk Capability** — the organisation's ability to recognise emerging exposure, understand its broader significance and coordinate an appropriate response across the organisation.

The distinction is important because identifying deficiencies in the assets establishes only part of the investment risk. Individual defects, maintenance deficiencies or reliability issues can be corrected. The broader question is whether the organisation can recognise why those conditions developed, understand their cumulative significance and make the coordinated decisions required to prevent or manage similar exposure in the future.

In this case, the physical evidence established the condition of the assets, while the coordination evidence showed why confidence in the organisation's ability to recognise and manage that exposure required greater scrutiny. Strategies, governance and leadership intent were present, but materially different understandings of risk, priorities and asset requirements persisted across the organisation.

The unexplained quantitative signal could therefore be converted into a more informed understanding of both the exposure carried by the assets and the organisation's ability to manage it. For an investor, that distinction provides a stronger basis for determining whether the risk requires additional capital, management intervention, closer oversight or another response appropriate to the investment.

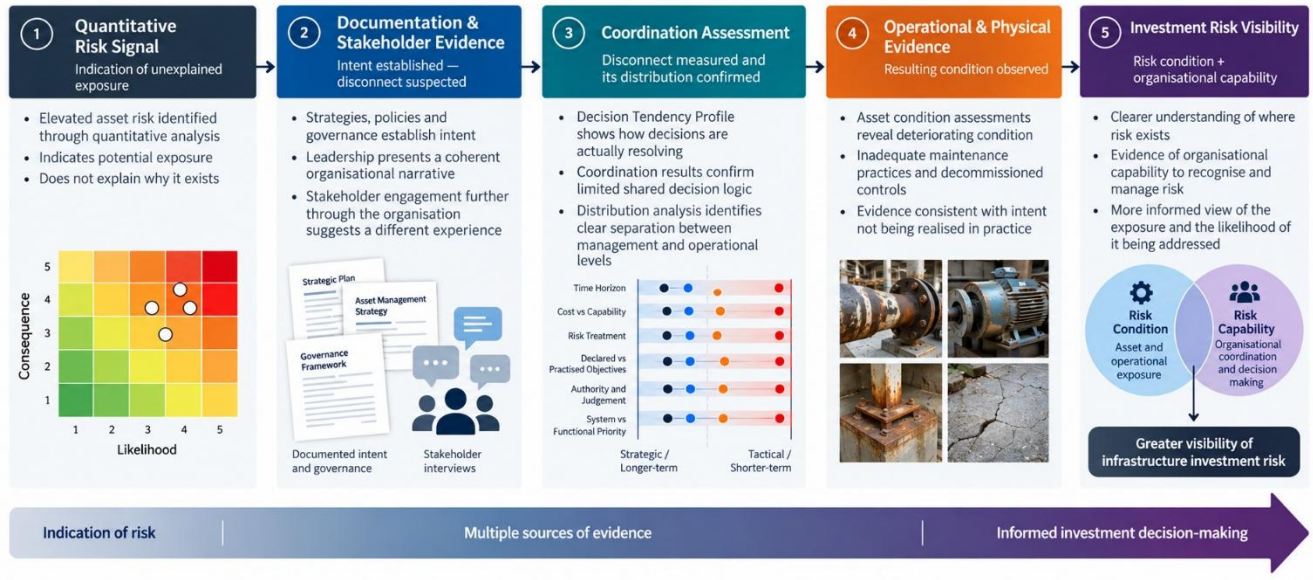


Figure 3:Building Visibility of Infrastructure Investment Risk

From Asset Risk to Investment Value

For an infrastructure investor, the value of greater visibility is practical. Understanding both the exposure within the assets and the organisation's ability to manage it provides a stronger basis for decisions about capital, management intervention and investment risk.

The objective is not to eliminate uncertainty, but to understand more of what sits behind it. Asset Management and coordination provide an additional source of evidence that can help investors identify risks that may otherwise remain obscured until they affect performance.

Greater visibility provides a stronger basis for managing that uncertainty, reducing volatility and protecting expected returns.

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