



THE HEDGEHOG, THE FOX & THE MACHINE

HOW AI IS REIMAGINING PROJECT LEADERSHIP

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EXECUTIVE SUMMARY

Megaprojects are no longer constrained primarily by engineering difficulty. They are constrained by integration. As programs grow larger, faster, and more interdependent, success depends less on deep technical mastery alone and more on the ability to integrate engineering, finance, regulation, politics, and stakeholder interests under conditions of uncertainty. Yet most organizations continue to produce leaders optimized for depth rather than integration.

This paper examines that mismatch and asks whether artificial intelligence can resolve the leadership paradox at the core of megaproject delivery.

Drawing on in-depth interviews with senior executives across infrastructure, energy, defense, and data-intensive sectors, supported by a targeted executive survey, the research identifies four core findings.

ONE

Complexity shifts the leadership advantage toward integrators. As megaprojects scale, they increasingly fail not because of insufficient technical expertise, but because of weak coordination across interfaces.

Leaders with cross-disciplinary experience, the *'foxes,'* are better equipped to manage system-wide trade-offs, stakeholder dynamics, and cascading risks than deep specialists, the *'hedgehogs,'* operating in isolation. Technical depth remains essential, but it must be orchestrated rather than allowed to dominate decision-making.

TWO

Organizations systematically fail to produce integrative leaders. Despite recognizing the value of integration, most organizations rely on a T-shaped development model that is difficult to execute at scale. Specialists are promoted into integrative roles in the hope they will broaden, yet the skills that justify promotion often become barriers to success at the next level.

Middle-management structures further entrench this problem, creating a persistent shortage of integrative leaders at both mid and senior levels. The result is an *'expertise trap,'* where experience hardens into bias and organizations repeat failure patterns.



THREE

AI is an asymmetric enabler that favors integration over specialization. AI does not level the leadership playing field. It disproportionately strengthens integrative leaders by augmenting their ability to synthesize across domains, model complex scenarios, and identify cross-cutting risks at scale. By contrast, AI does not give specialists the judgment, political intelligence, or adaptability required to become integrators.

The greatest value from AI emerges when it is applied to fundamentals – baseline planning, mobilization, risk identification, and interface management – rather than technical novelty.

FOUR

A new leadership archetype is emerging: the lion. Taken together, the findings point to the emergence of a third archetype: the lion. *Lions combine fox-like integration with hedgehog-like analytical discipline through AI-native workflows.* They do not attempt to master every domain personally. Instead, they orchestrate deep specialists and AI systems to maintain coherence, speed, and reliability across complex programs. Organizations that are reweighting leadership portfolios toward integrators, embedding AI into governance, and operating as networked teams are already moving in this direction.



STRATEGIC IMPLICATIONS FOR BOARDS AND EXECUTIVES

The implications are direct and time-sensitive:

- Reweight leadership portfolios away from specialist-heavy compositions toward integrators supported by AI.
- Deploy AI to fundamentals before innovation, using it to improve execution reliability rather than chasing novelty.
- Institutionalize AI-supported governance, embedding synthesis and evidence into decision-making rather than treating AI as a personal productivity tool.
- Redesign career pathways, particularly in middle management, to support integration explicitly rather than hoping it emerges organically.

AI will not rescue organizations that cling to legacy leadership models. But for those willing to reshape how leadership is composed, developed, and governed, AI enables a decisive shift. *The competitive advantage in megaproject delivery will belong to organizations that deliberately cultivate lion leaders, rather than those that hope hedgehogs will somehow become foxes under pressure.*

For executives, the question is no longer whether AI will reshape project leadership. It already has. The question is whether your organization will shape that transformation intentionally, or whether it will be shaped by it.

INTRODUCTION

'The Hedgehog, the Fox and the Machine' is a thought leadership collaboration between Dr. Atif Ansar (Executive Chairman, Foresight Works and Senior Fellow, University of Oxford) and Jamie Page (Founder of Origin Analytics) that examines how artificial intelligence is transforming leadership in the delivery of major capital programs (megaprojects).

The paper introduces a framework centered around two leadership archetypes: the Hedgehog – the deep technical expert – and the Fox – the agile integrator. Drawing on interviews with senior leaders across transport, energy, defense, and data infrastructure, it explores a key paradox in megaproject delivery:

while clients often prioritize technical mastery, *the scale and complexity of today's programs increasingly demand adaptive, systems-level leadership.*

The research examines whether AI can help resolve this gap by strengthening integrative leadership under conditions of complexity. The study combines executive interviews with a targeted survey and will culminate in a publication aimed at C-level audiences across infrastructure, energy, defense, and real estate sectors. This is a timely and thought-provoking piece with original data points that we believe would make for a compelling feature or leadership trend article for megaprojects and capital-intensive industries.



A TALE OF TWO PROGRAM DIRECTORS

In early 2015, Andy Mitchell was appointed Chief Executive Officer of Tideway, the special-purpose company established to finance and deliver the Thames Tideway Tunnel. A civil engineer from Imperial College, Mitchell began his career at Arup and Halcrow. From those technical origins he shifted quickly into program leadership across multiple sectors and geographies. By the time he arrived at Tideway, he had already served as Program Director and board member at Crossrail, where he had demonstrated an unusual capacity to bridge engineering, finance, regulation, and politics. He was integrative by instinct, moving laterally across domains rather than staying in one technical silo.

The challenge before him was immense. The Thames Tideway Tunnel was conceived as a 25-kilometer interceptor sewer under London. Yet Mitchell's daily agenda was not about civil engineering calculations. It was about creating a new regulated company from scratch, raising billions of pounds from long-horizon investors, designing a bond issuance program, recruiting a board and executive team, procuring and contracting for main works, managing compulsory purchase and community opposition at more than twenty sites, and sustaining political legitimacy in Westminster and City Hall. He was, in effect, the chief executive of a temporary organization with the

budgetary weight of a publicly listed company. Unlike established corporations with decades of accumulated governance and institutional memory, Mitchell had months to assemble an equivalent platform from scratch. Across town, Andrew Wolstenholme faced a parallel but different test. In 2011 he became Chief Executive of Crossrail, at the time Europe's largest infrastructure program. Wolstenholme's background was also in civil engineering, educated at Southampton and seasoned as an officer in the Royal Engineers. He had spent over a decade at BAA, rising through the delivery of Heathrow Terminal 5. There he became identified with mastery of construction methodology, risk frameworks, and project execution. His reputation was built on deep technical expertise and the authority that comes from delivering one of the most complex aviation projects in Europe.

“THE FOX KNOWS MANY THINGS, BUT THE HEDGEHOG KNOWS ONE BIG THING”

But Crossrail required something more. It was not one airport terminal but a vast new railway across London, composed of dozens of tunneling contracts, multiple stations, new signaling, rolling stock, and highly charged stakeholder politics. The chief executive needed to knit together contractors, government sponsors, regulators, and the public. For Wolstenholme, this meant stretching from his strong base in technical mastery into the much more ambiguous world of stakeholder management, political navigation, and public legitimacy. Eventually, he was succeeded by Mark Wild, another leader more attuned to the lateral and integrative demands of the role.

Major project directors are not simply engineers or program managers. They are chief executives of temporary organizations. Their budgets and accountabilities rival those of publicly listed companies, but unlike Shell or Diageo, they do not inherit decades of institutional architecture. They must build it from scratch in months. Crossrail's budget of roughly £15 billion and Tideway's of more than £4 billion are comparable in scale to the annual revenues or market capitalizations of FTSE 100 companies such as Marks & Spencer, EasyJet, or Taylor Wimpey. *Yet where those companies have evolved governance systems over a century or more, the project director must assemble the equivalent virtually overnight.*



It is at this point that we can turn to a useful lens. The political philosopher Isaiah Berlin, in his essay *The Hedgehog and the Fox* (1953), drew on an ancient Greek fragment to describe two archetypes of thought: The fox knows many things, but the hedgehog knows one big thing.

¹ Archilochus fragment 201 DK: ἐν δὲ μέγα ἐπίσταται ἔχινος, ἀλώπηξ δ' ἐπίσταται πολλὰ – preserved via Erasmus' Adagia and later popularized by Berlin (1953). The proverb has a long lineage. Some ancient sources, such as Zenobius, claimed Archilochus borrowed it from Homer's lost Margites, suggesting it was already proverbial in the archaic world. Archilochus (7th c. BCE) used it in his satirical Epodes, contrasting the fox's many tricks with the hedgehog's single defense. Later writers like Ion of Chios and Plutarch elaborated: the hedgehog's trick was ingenious but limited, effective only until a stronger predator appeared. Roman-era accounts reinforced this view, often depicting the hedgehog as ultimately defeated by the fox.

In the modern period, classicist C. M. Bowra argued Archilochus identified with the fox, admiring versatility over rigidity. Isaiah Berlin, in his 1953 essay *The Hedgehog and the Fox*, reinterpreted the proverb entirely, turning it into a metaphor for intellectual worldviews: hedgehogs understand the world through one unifying idea, while foxes pursue many ends without a single overarching vision. Berlin applied it to Tolstoy, but the categories map neatly onto leadership.



ARCHETYPES OF LEADERSHIP IN MEGAPROJECTS

The contrasting experiences of Andy Mitchell and Andrew Wolstenholme raise a deeper question. What kinds of leaders thrive when asked to direct a temporary organization with billions at stake? Are there recognizable patterns in the way leaders approach these roles?

A useful frame comes from political philosophy. In 1953, Isaiah Berlin published an essay titled *The Hedgehog and the Fox*, borrowing an Archilochus fragment: that the cunning fox knows many things, but the hedgehog

has one big defense. Berlin used this aphorism to distinguish between two archetypes of thought (e.g., singular-minded Dante vs. pluralist Shakespeare), and the contrast applies directly to leadership. When translated into the world of megaprojects, these archetypes take on an almost psychological texture. Each carries both a light side – strengths that make the leader invaluable in certain contexts – and a shadow side that can undermine them when conditions shift.

THE HEDGEHOG ARCHETYPE

The hedgehog embodies depth. The light side of this archetype is discipline, mastery, and accumulated expertise. Hedgehog leaders are steeped in their craft; they bring years of experience in a given field. They are analytical, systematic, and grounded in rigorous training. Their intelligence often shows as a sharp, focused IQ, applied to the most difficult technical puzzles. They are steady, dependable, and unwavering when the stakes are highest.

Yet the same qualities carry a shadow. Hedgehogs can become stubborn, insisting that the way they have always done things must be the right way. They may grow defensive when asked to innovate or to adapt methods honed over decades. Their commitment to mastery can close them off from new possibilities.

In the shadow, *the hedgehog resists change, mistrusts untested ideas, and turns inward to defend expertise rather than outward to engage with shifting realities.*

In the context of megaprojects, the metaphor is more than literary flourish. It captures a live tension between leaders whose strength lies in depth and mastery (hedgehog) and those whose advantage lies in adaptability and integration (fox). The rest of this paper explores how this ancient dichotomy continues to shape outcomes when billions are at stake, and whether artificial intelligence might enable leaders to embody both qualities at once.

**“HEDGEHOG
LEADERS ARE
STEEPED IN THEIR
CRAFT”**



THE FOX ARCHETYPE

The fox, by contrast, represents breadth. The light side of this archetype is agility, cleverness, and integration. Fox leaders are adaptive and open to new ideas; they see connections across finance, engineering, regulation, and politics. *They are innovative and lateral thinkers, often quick to frame solutions by combining elements from disparate domains.* Their intelligence shows not only as IQ, but also as emotional intelligence (EQ) and political intelligence (PQ). They can charm and inspire, but also cajole and persuade, weaving coalitions where none seemed possible. They thrive in ambiguity, where

adaptability and openness are essential.

The shadow of the fox is equally clear. In their restless search for opportunities, foxes can become chaotic. They risk chasing change for its own sake, without grounding in long-term stability. *Their openness can tip into instability, leaving teams exhausted or uncertain.* They may appear to be 'winging it,' a jack of all trades but master of none. In the shadow, the fox destabilizes structures and undermines the very coherence a program of scale requires.

THE PARADOX OF LEADERSHIP IN MEGAPROJECTS AND THE ROLE OF AI

Megaprojects demand two qualities that are rarely found in a single leader. They require the depth and discipline associated with technical mastery, and they require the breadth and adaptability that comes from moving across domains. Without depth, programs descend into chaos. Without breadth, they stagnate or collapse under their own rigidity.

This is the paradox at the heart of project leadership. The director of a £15–20 billion program is effectively the CEO of a temporary organization with responsibilities on par with a publicly listed company. Yet unlike companies such as BP, Vodafone, or Unilever, which have had a century to develop governance, culture, and systems, a megaproject must assemble its institutional architecture in a matter of months. *In this environment, technical mastery alone is not enough, but nor is breadth without anchor. The challenge is how to combine both.*

Here, artificial intelligence may play a catalytic role. If archetypal leadership patterns tend to divide into 'hedgehogs' who go deep and 'foxes' who go broad, then AI could be the tool that helps leaders transcend the limits of their native orientation.

For hedgehog leaders, AI can act as a widening lens. It can broaden horizons by offering comparative datasets, scenario modeling, and simulations that challenge entrenched assumptions. It can surface alternative strategies, expose groupthink, and provide adaptive options that a technically trained mind might otherwise resist.

For fox leaders, AI can serve as a scaffolding for depth. It can supply the structured expertise, risk analytics, and technical detail that prevent decisions from drifting into superficiality. AI can anchor lateral agility with evidence, offering foxes a way to ground their adaptability in rigorous analysis rather than intuition alone.

This raises the central research question that guides the rest of this paper: *Can artificial intelligence serve as a metamorphic force in megaproject leadership, enabling leaders to embody both depth and breadth – both hedgehog and fox – at the same time?*

METHODOLOGY

The preceding sections establish the central paradox of megaproject leadership: success requires both deep technical mastery and broad adaptive integration. They also pose the question of whether artificial intelligence can act as a metamorphic force that helps leaders navigate this tension.

To address this question, we designed a mixed-methods study that combines qualitative interviews with a complementary quantitative survey, capturing both lived executive experience and broader patterns of adoption and sentiment across sectors.

EXECUTIVE INTERVIEWS

We conducted in-depth, one-to-one interviews with senior executives responsible for the delivery, governance, or oversight of some of the world's most complex megaprojects across infrastructure, energy, defense, and real estate. Each interview lasted approximately 60 minutes and followed a semi-structured format. Five core questions provided a common spine for comparison, while open-ended discussion allowed participants to surface unprompted insights, examples, and tensions. Participation was voluntary. Interviews were conducted via Microsoft Teams and, unless

otherwise requested, recorded to ensure accuracy. Where participants consented to attribution, quotations are attributed by name; where consent was not granted, quotations are retained verbatim but attributed generically to preserve confidentiality. With these safeguards in place, *participants spoke candidly about organizational dynamics, leadership pressures, political constraints, and their experiences integrating AI into project leadership and delivery.*

QUANTITATIVE SURVEY

To complement the interviews, we administered a structured survey to the interview cohort and extended participation to an additional group of senior executives, including Executive Directors and Chief Technology Officers. *The survey explored current and planned use of AI tools, organizational culture and readiness, perceived risks, trust in AI systems, and leadership capability implications.* The survey was used

to contextualize interview findings and assess their prevalence rather than to test formal hypotheses. Because the core contribution of the paper is explanatory rather than statistical, survey findings are presented in an appendix rather than as a parallel results stream, preserving narrative coherence while maintaining transparency and empirical grounding.

“INTERVIEWS PROVIDED RICH NARRATIVE INSIGHT INTO HOW LEADERS INTERPRET AND RESPOND TO COMPLEXITY, WHILE SURVEY RESPONSES OFFERED DIRECTIONAL EVIDENCE”



ANALYTICAL APPROACH AND LIMITATIONS

The combination of qualitative and quantitative methods allowed us to capture both depth and breadth. Interviews provided rich narrative insight into how leaders interpret and respond to complexity, while survey responses offered directional evidence on adoption patterns, constraints, and areas of convergence or tension. Findings were triangulated across interviews, survey results, and internal organizational artifacts shared by participants where available.

The sample is intentionally senior and sector-focused and is not statistically representative. Most respondents

were based in Europe and North America, which may bias perspectives toward particular regulatory and institutional contexts. As with all interview-based research, self-reporting may reflect selective emphasis or retrospective rationalization. *For these reasons, the results should be read as exploratory and interpretive rather than definitive or predictive.* This methodology provides the foundation for the Results section that follows, which presents a set of empirically grounded propositions on how leadership in megaprojects is evolving in response to AI.



RESULTS

Our findings are organized around four propositions that trace a clear arc from diagnosis to solution.

ONE

First, we establish that as megaprojects become more complex and interdependent, they increasingly benefit from leaders with cross-disciplinary experience ('foxes') who can integrate across domains, rather than deep specialists ('hedgehogs') who optimize within them.

TWO

Second, we show why this insight rarely translates into practice: organizations systematically promote specialists into integrative roles because the widely endorsed T-shaped development model is structurally difficult to execute at scale, creating a persistent shortage of mid-level integrative leaders.

THREE

Third, we demonstrate that AI disproportionately strengthens integrative leaders and delivers greatest value when deployed to improve baseline plan quality rather than pursuing technical novelty.

FOUR

Finally, we identify the emergence of a new leadership archetype – the 'lion' – who combines fox-like integration with AI-enabled analytical discipline, suggesting a path forward that resolves the organizational capability gap. Together, these propositions reveal both why megaprojects struggle to develop effective leadership and how AI may fundamentally reshape the skills required for success.

PROPOSITION 1: THE DEPTH – BREADTH TRADE-OFF AND THE GENERALIST ADVANTAGE UNDER COMPLEXITY

As Alison Atkinson, Chief Projects and Development Officer at Anglo American and former Chief Executive of the UK Atomic Weapons Establishment (AWE), observed, "megaprojects are not engineering exercises. They're social, financial, political systems." *Megaprojects are becoming larger, more interdependent, and more institutionally complex.* As they do, leadership effectiveness depends increasingly on the ability to integrate across technical, commercial, and stakeholder domains rather than on deep expertise within any

single discipline. Leaders with deep specialist backgrounds ('hedgehogs') tend to ensure strong technical rigor but can struggle to see how different parts of a problem fit together. Leaders with cross-disciplinary experience ('foxes') are better able to integrate ideas across domains but may overlook technical detail. As projects become more complex and interdependent, they increasingly benefit from leaders with cross-disciplinary experience, particularly when supported by strong specialists.

Executives consistently acknowledged this trade-off as structural rather than a personal shortcoming. One executive reflected on a peer known for singular expertise: “If you wanted the best tunneling plan, you went to him. But if you asked how that plan impacted railway operations or the budget, he was at a loss.” This illustrates the hedgehog’s blind spot, where intense focus in one domain can obscure system-wide ramifications.

“ONE HEDGEHOG ALONE CANNOT POSSIBLY PROVIDE SUFFICIENT DEPTH AND SYSTEM EXPERTISE FOR EACH OF THE DISCIPLINES REQUIRED”

Several executives also noted that specialists can inadvertently create silos. Danny Di Perna, Executive Vice President and Chief Operating Officer of Alstom, explained why depth alone cannot substitute for integration in complex engineered systems: “One hedgehog alone cannot possibly provide sufficient depth and system expertise for each of the disciplines required to cover, for example, brakes, damping and aerodynamic systems, etc. The fox on top must assume the integration role.” Consistent with this, our interviews suggest that megaprojects often initially favor hedgehog leaders for their technical prowess during planning and early execution, but as complexity grows, leadership advantage shifts toward fox-like integration.



INTEGRATION AS THE CRITICAL FAILURE POINT

Respondents warned that breadth without technical anchoring can lead to drift. Safety, regulatory compliance, and basic system functionality depend on deep specialist expertise. Dominic Kieran, Global Managing Director of Cameco, noted that “risk assessment and management are often missing,” and that “sector scars help,” underscoring the role of hard-earned experience in preventing failure in safety-critical environments. Andrew McNaughton, Executive Director of AWE and Vice President of the Institution of Civil Engineers (ICE), similarly emphasized that organizations “do need confidence that the outputs are right.” Yet technical rigor alone does not determine whether a megaproject succeeds.

Respondents consistently pointed to integration – not engineering capability – as the point where complex programs actually break down.

Dominic Kieran articulated this directly: “Complex projects fail not from lack of technical knowledge – we have more engineering capability than ever – but from inability to integrate across domains, adapt to changing conditions, and align diverse stakeholders.” He described the same dynamic operationally: “Small disturbances ripple across the schedule, and once you add regulatory hold points, the whole system locks up. It’s not that the engineering isn’t good. It’s that the integration isn’t there.”

THE GENERALIST ADVANTAGE UNDER COMPLEXITY

Several executives described how generalist leaders thrive under conditions of complexity. One senior project advisor observed that “our most successful director could speak the language of engineers in the morning, financiers by noon, and environmental campaigners by evening.” The ability to navigate and translate across multiple domains was repeatedly cited as decisive. Alison Atkinson linked this shift directly to governance expectations, noting that “boards are shifting. They no longer want only hedgehogs; they want leaders who can operate at board level, system thinkers.”

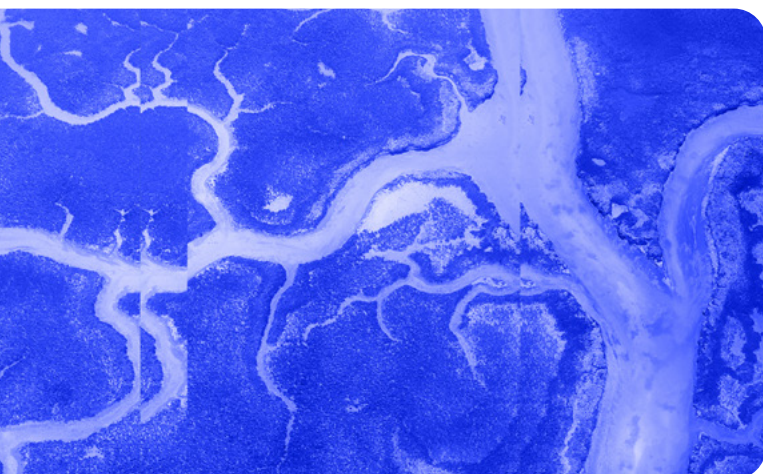
Adaptability under shifting constraints also proved critical. Dominic Kieran described environments where fixed planning assumptions break down quickly: “Treat it like a greenfield with a fixed schedule and you’re off course within an hour.” Nancy Novak, Chief Innovation Officer of Compass Datacenters, described the operational posture of such leaders as grounded in resourcefulness rather than individual mastery: “You don’t have to be the expert at everything. Use resources, stay curious, ask questions.” *For this reason, some organizations encourage non-linear career paths to cultivate this capability, enabling leaders to understand how decisions in one domain propagate across others.*

Importantly, generalist leadership does not imply superficiality. The strongest “fox” leaders in our

interviews were explicit about the limits of their own knowledge and exercised discernment in how they led. They focused on building strong teams, surrounding themselves with deep specialists, and orchestrating those capabilities toward coherent objectives. In practice, the generalist leader acts as an integrator and translator across disciplines, ensuring that specialist contributions are sequenced, aligned, and resolved at interfaces rather than optimized in isolation.

These dynamics become more pronounced as AI is introduced into leadership and planning workflows. Several respondents suggested that AI can help specialist leaders overcome the hedgehog blind spot. Andrew McNaughton observed that “in my experience, moving a hedgehog to a fox is nearly impossible. With AI, you can, however, develop foxes with hedgehog traits.” As Jamie Sanders, Head of Global Procurement of Rio Tinto, cautioned, *leadership judgment cannot be delegated to systems*: leaders must understand AI capabilities, limits, and trust thresholds to integrate outputs responsibly.

In sum, breadth of experience equips leaders to handle the multifaceted challenges of megaprojects more effectively, making the fox style especially valuable under conditions of complexity. This sets up the next question: why those who succeed as hedgehogs often struggle when promoted into integrative leadership roles.



“BOARDS ARE SHIFTING. [...] THEY WANT LEADERS WHO CAN OPERATE AT BOARD LEVEL, SYSTEM THINKERS.”

PROPOSITION 2: WHY ORGANIZATIONS CAN'T PRODUCE INTEGRATIVE LEADERS

Most organizations follow a T-shaped career model ([see Figure 1](#)), which prescribes building deep technical expertise in a single discipline (the vertical bar) before expanding into broader, cross-functional leadership (the horizontal bar). The underlying logic is that depth confers hedgehog credibility, while breadth enables fox-like integration. This model creates a structural paradox. Organizations systematically promote

specialists into integrative roles in the hope of cultivating homegrown foxes. *Yet our interview data show that this widely endorsed model is difficult to execute at scale, resulting in a persistent shortage of integrative leaders at both mid-level and senior levels.* Attempts to compensate by relying on additional technical expertise often reinforce the very silos that create the gap.

THE PROMOTION PARADOX AND CAREER PIPELINE FAILURES

The skills that justify promotion are often not the skills required to succeed at the next level. Jamie Sanders described how traditional promotion pathways create systemic capability constraints: "Traditional career ladders (scheduler > planner > project exec) will shrink. We'll need new pathways: developing leaders who can validate AI outputs, understand data inputs, and decide when to trust or challenge AI."

Yet leaders who rose through technical mastery often struggle with this transition. Sanders noted that "leaders who rose by gut instinct and past experience may resist – AI undermines the very instincts that made them successful." This creates a double bind: the very expertise that justified promotion becomes a barrier to the integrative capability the role requires.

Nancy Novak described the demanding nature of this transition from her own experience: "We support equal career paths for individual contributors (SMEs) and managers, with lateral movement. AI can accelerate leadership transitions that currently require coaching and hand-holding – for example, distilling workshops/meetings into key threads to help a hedgehog see the strategic forest, faster." The fact that such transitions require extensive coaching and hand-holding indicates how structurally difficult the

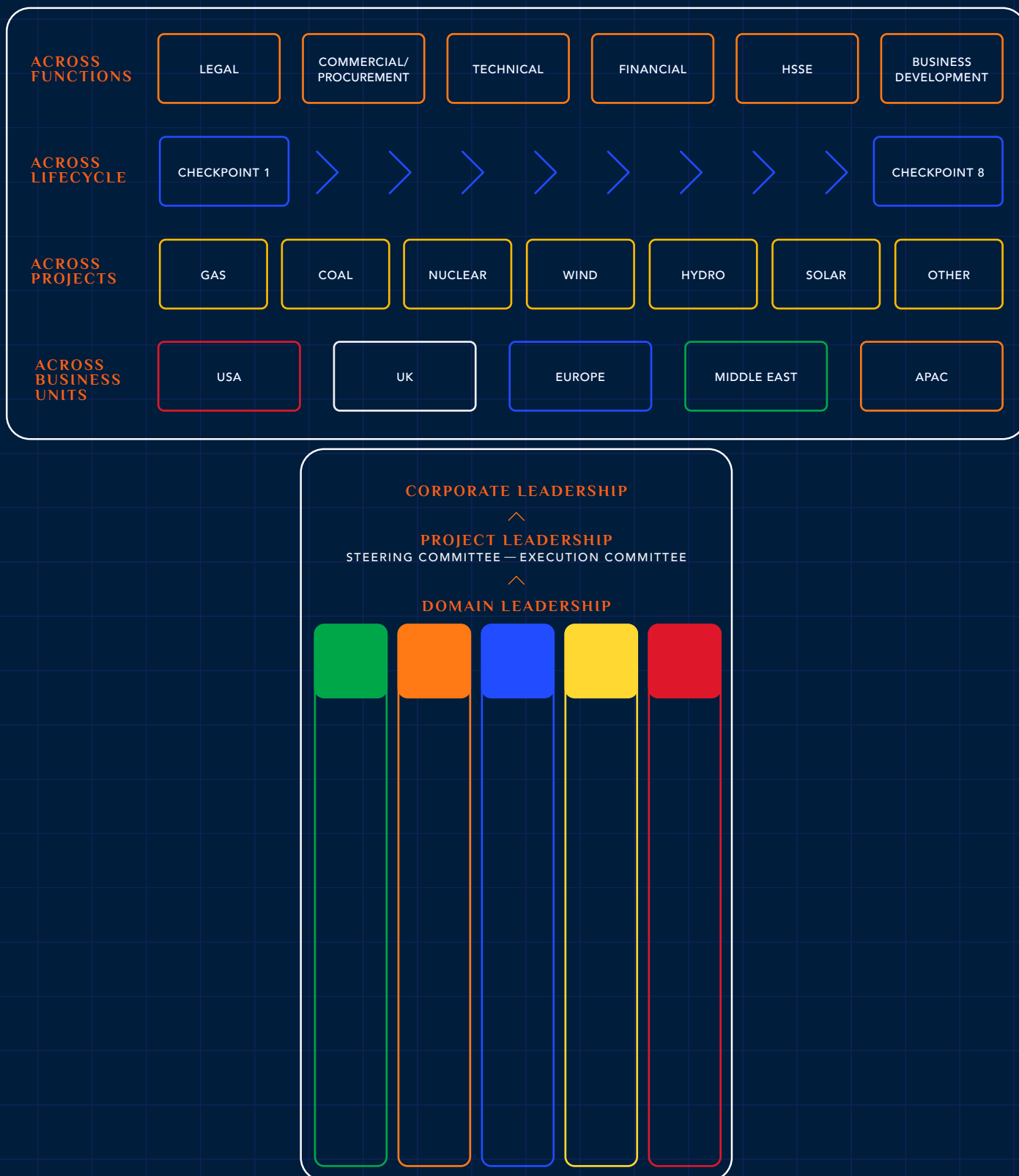
“WE’LL NEED [...] LEADERS WHO CAN VALIDATE AI OUTPUTS, UNDERSTAND DATA INPUTS, AND DECIDE WHEN TO TRUST OR CHALLENGE AI.”

metamorphosis from specialist to integrator proves in practice.

The result is predictable organizational behavior. Sanders observed that when facing this capability gap, "some will resist, others adapt. We need to assess skills, decide what to build in-house versus buy, and move within 12–24 months or fall behind." Yet most organizations lack clear mechanisms to make this assessment or execute such transitions systematically.

FIGURE 1: THE T-MODEL OF CAREER PROGRESSION

The “T-Model” of career progression in megaproject organizations. Early-career individuals develop deep expertise in one discipline (vertical bar), then are expected to expand their knowledge across multiple areas to become integrative leaders (horizontal bar).



WHY T-SHAPED DEVELOPMENT FAILS AT SCALE

Morgan Parker, Chair and Non-Executive Director of Qiddiya, articulated the structural impediment: “Tech capacity will outpace organizational agility. Megaprojects are traditional and slow adopters – look at modularization, still resisted.” He added that adoption depends heavily on “ownership structures: founder-led firms move faster; institutions resist.” Dominic Kieran illustrated how entrenched systems actively resist integrative capability development, “Adoption among individual hedgehogs can be high; they want change, but the [collective] system blocks it. No one person – except the CEO – can shift the system alone.”

FOUNDER-LED FIRMS MOVE FASTER; INSTITUTIONS RESIST

Several executives pointed to the middle-management layer as particularly vulnerable, positioned between strategic decision-making at the top and execution at the frontline. This layer faces a particular threat from integrative capabilities augmented with AI.

THE CAPABILITY GAP

Most megaproject organizations exhibit persistent capability gaps at the middle-to-upper management level, where hybrid integrators are most needed and least available. Evidence of this came from multiple sources, including internal org charts and capability assessments we were allowed to review. *Figure 2*, for example, highlights missing or weak functions in a best-practice project organizational structure. The under-resourcing problem creates a vicious cycle. When both technical and integrative functions are stretched thin, the visible pain typically manifests in technical delivery backlogs – delayed designs, incomplete calculations, unresolved engineering queries. This makes the political case for hiring more

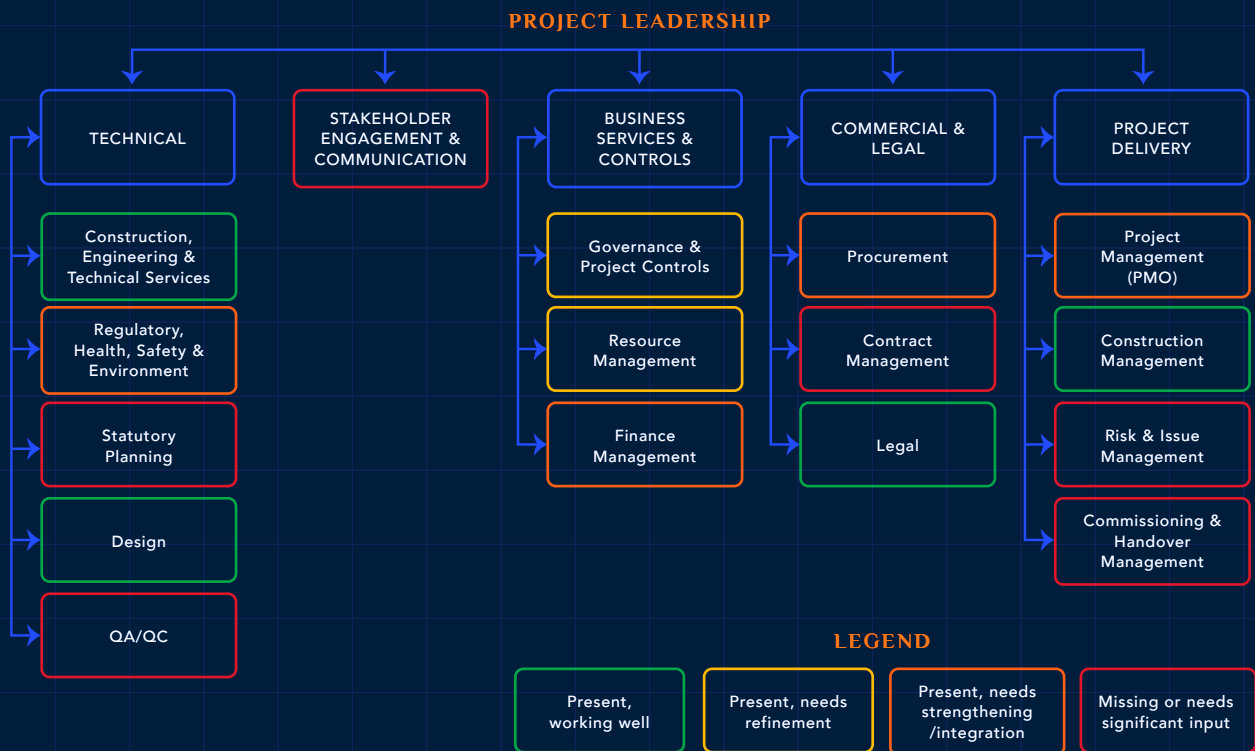
The top makes decisions, the frontline does the work, and the middle’s intermediary function becomes vulnerable. As the executive put it, “The top and middle don’t pour concrete or fix submarines; the frontline does.”

One of the executives stated this plainly: “Early findings suggest middle managers – often hedgehogs in HQ – may lose power as AI arrives, sometimes using safety or cybersecurity to block change.” This resistance reflects structural rather than individual issues. Kieran explained: “Where roles are threatened is the non-deep-technical middle – procurement gunk, schedulers, etc.” The problem extends beyond resistance to incentive design. Interestingly, some organizations are rethinking organizational design to address this. One approach mentioned was creating *matrix structures or specific integrator roles* (like a ‘Chief Integration Officer’ on the project) to force more cross-functional oversight. Another measure is *adjusting incentive systems*: traditionally, specialists are rewarded for depth (e.g., meeting engineering KPIs), while breadth gets lip service. To encourage breadth, one company started evaluating and rewarding project leadership on performance against overall outcomes such as on-time delivery.

integrators weaker, not stronger. Specialists argue: “We can’t even get the engineering done, why are we hiring another stakeholder manager?” *The result is that organizations respond to integration failures by attempting to hire additional specialists, a strategy constrained by tight labor markets that simultaneously reinforces siloed thinking and exacerbates the very integration problems it is meant to solve.* Several executives described this dynamic explicitly, noting that attempts to bring in broad leaders often face resistance from overworked technical teams who want “more hands” in their own domain rather than someone to connect across domains.

FIGURE 2: ORGANIZATIONAL CAPABILITY GAPS IN A MEGAPROJECT

Figure 2: An industry-standard project capability structure. Color coding indicates areas that were present but needed strengthening (amber) or missing significant capacity (red). Notably, integrative functions like Stakeholder Engagement and certain Project Controls were particularly under-resourced, reflecting gaps in cross-functional leadership capacity.



The result is an organization where integrative functions remain particularly underpowered or ambiguously owned, even relative to technical functions which themselves face capacity constraints. The capability gap extends to succession planning. Several executives noted that when a broad leader leaves or retires, companies struggle to replace them: “We had to go external to hire our last program director, because internally we didn’t have anyone with that mix of experience,” said one executive. The internal talent pool often has many solid technical leads but few with the breadth required for enterprise-level program integration. Alison Atkinson described how this manifests in hiring and assessment: “Plants need process discipline. Technology-driven areas need adaptable people. Assessments now emphasize moving from activity to action to achievement, balancing analytical rigor with

execution drive.” Morgan Parker articulated the board-level recognition of this gap: “*With AI, leaders don’t need technical backstories; they need to trust and validate inputs, mobilize outputs into action, and inspire culture and purpose. Leadership shifts from ‘I’ve done this before’ to coach, mentor, galvanizer.*” Yet organizational succession planning frequently fails to produce leaders with these integrative capabilities internally. Davendra Dabasia, discussing system-level barriers, noted: “It’s not people – it’s systems and structures. Staff want AI to make life easier. What blocks adoption are organizational impediments rather than individual resistance.” This observation reinforces that the capability gap reflects structural organizational design failures rather than talent shortages. These structural failures culminate in what several executives described as an expertise trap.

THE EXPERTISE TRAP

Morgan Parker stated the paradox forcefully: “Knowledge no longer holds the same value – experience creates bias.” In rapidly changing contexts, what worked previously can become a constraint rather than an asset.

“KNOWLEDGE NO LONGER HOLDS THE SAME VALUE – EXPERIENCE CREATES BIAS.”

Organizations continue to overweight technical certainty and underweight adaptability. Alison Atkinson noted that effective project delivery requires moving beyond technical optimization: “AI could normalize across past projects to reveal why delivery slips – usually interfaces, friction points, and delayed decisions.” The emphasis on “interfaces” and “delayed decisions” points to integration failures rather than technical inadequacies.

Nancy Novak described how integration tools help address this pattern: “We have simple, non-disruptive AI that helps us ask better questions and align teams. It improves understanding of motivations, risk management, prediction, and breaks down silos by using empirical data rather than opinions – bringing the human element back in.” The phrase “breaks down silos by using empirical data rather than opinions” highlights how organizational expertise can calcify into opinion-based decision-making that resists empirical challenge.

Danny Di Perna reinforced this from an engineering perspective: “The big chunk is complexity: hundreds of designers + hundreds of suppliers + dozens of internal manufacturing sites – everyone is in the kitchen tweaking the recipe. Design mini-loops explode the permutations and with the growing complexity, it is

very easy to come off the master plan.” This illustrates how deep technical expertise, when not integrated across domains, can paradoxically slow delivery rather than accelerate it.

Where transitions from specialist to integrative leader do succeed, it is typically through deliberate organizational support. However, such interventions remain exceptional. Mark Thurston, Chief Executive Officer and David Martin, Director of Digital, Data and Technology, of Anglian Water described recruiting explicitly for different capabilities: “When our board worked with Korn Ferry to recruit the CEO, the key factors were personal resilience (the sector can be turbulent) and big capital delivery experience – not water/regulatory backgrounds (learnable, or present in the team). *Looking ahead to 2030/33/35, the CEO profile could shift to organizational dynamics and technology acumen over regulation/water/big-capex.*”

This signals recognition that integrative capability matters more than domain-specific expertise, yet most organizations lack systematic pathways to develop such leaders internally.



Proposition 2 reveals a structural leadership development failure rather than an individual one. Organizations promote specialists because they have no reliable alternative, T-shaped development proves difficult to execute at scale, middle-management layers resist integration, and deep expertise without adaptive capability can lock in failure patterns. The next proposition examines how AI might help resolve this organizational challenge – not by transforming specialists into integrators, but by enabling integrators to access technical depth and by strengthening the integrative functions where projects most commonly fail.

PROPOSITION 3: AI AS ASYMMETRIC ENABLER: WHY INTEGRATION MATTERS BEFORE INNOVATION

Propositions 1 and 2 established that megaprojects increasingly require integrative leaders yet organizations systematically fail to produce them at scale. *This raises a critical question: can AI help resolve this capability gap?* Our interview data suggest it can, but not in the way most organizations expect:

AI disproportionately strengthens integrative leaders and delivers greatest value when deployed to improve baseline plan quality, risk identification, interface management, and resource realism, rather than pursuing technical novelty.

WHY AI FAVORS INTEGRATORS OVER SPECIALISTS

AI's primary advantage lies in processing scale and cross-domain synthesis, capabilities that directly augment integrative leadership while offering limited benefit to deep specialists. This creates what several executives described as a metamorphic asymmetry. *AI can make foxes more reliable and structured by providing analytical depth and process consistency, but it cannot imbue hedgehogs with imagination, emotional intelligence, or political judgment.*

Jamie Sanders articulated this distinction clearly when describing where AI adds value: "Humans can't process the combinatorial complexity of schedules and costs. AI can run millions of scenarios, improve forecasting, and enable earlier interventions." This computational advantage matters most for integrators who must synthesize across multiple domains, not specialists who operate within a single technical field. Andrew McNaughton reinforced this pattern when discussing scenario planning: "Once multiple changes hit simultaneously, human teams can't model all scenarios. AI could rapidly run what-if scenarios, highlight implications of each change, and improve decision-making. Not just early warnings, but real-time modeling across multiple overlapping changes." The key phrase is "implications of each change" across overlapping domains. This is integrative work, not specialist work.

Morgan Parker described the same dynamic at the strategic level: "AI could simulate millions of micro-decisions per project (like quant hedge funds). Predict downstream impacts of scope change, for example, turning a Holiday Inn into a Ritz-Carlton." The value lies in understanding ripple effects across cost, schedule, and quality, precisely the cross-domain integration that foxes must perform but hedgehogs rarely attempt. Sanders made the access-to-knowledge argument explicit: "Procurement: Managing \$30B spend and 20,000 suppliers. Humans can't sustain consistent quality at scale. *AI offers unlimited scalability, sustainable processes, and faster decisions.*" Scale and consistency favor those who must coordinate across many actors, not those who dive deep into one



technical problem. AI democratizes access to specialized knowledge, which strengthens generalists more than it strengthens specialists. Yet AI cannot supply what makes integrative leadership difficult in the first place. Sanders noted the boundary clearly when discussing what leaders need: “The challenge is finding leaders who blend technical grasp with EQ/PQ. Leaders don’t need to be AI coders, but must understand capabilities, limits, trust thresholds, and data sources. Leading an AI-enabled organization requires belief, discernment, and the ability to integrate, not super-user skills.” Andrew McNaughton listed the capabilities AI cannot replace: “High PQ (political quotient) to navigate stakeholders, comfort with complexity, critical analysis

and challenge, EQ to lead teams.” Morgan Parker stated the implication directly: *“AI may actually increase humanity in leadership, emphasizing judgment, humility, integrity.”* The asymmetry is structural. AI excels at what computers do well, processing volume, identifying patterns, synthesizing data across domains, and rapidly modeling alternatives. It cannot perform what makes leadership hard, navigating ambiguity, building trust, making judgment calls under uncertainty, and aligning diverse stakeholders. Integrators gain analytical depth from AI; specialists do not gain the imagination, adaptability, or political skill required for fox-like leadership.

THE FUNDAMENTALS-FIRST DEPLOYMENT STRATEGY

Despite AI’s potential, executives consistently emphasized that value comes from improving fundamentals, not pursuing novelty. The principle, as one executive stated, is simple: “Projects do not go wrong, they start wrong.” This recognition shifts AI deployment toward setup and initial plan quality, better risk identification, more accurate resource estimation, and clearer interface definitions, rather than operational novelty. Davendra Dabasia, Chief Executive Officer of Mace Consult, stated the empirical basis clearly: “London 2012’s success came from prioritizing data systems and structures in the first year, spreadsheets then, but still highly organized. In today’s megaprojects, digital architecture and mobilization are often neglected, leaving AI to sit on top of bad data. *Programs that invest early in clean data unlock repeatable opportunities and real AI advantage.*”

Several executives pointed to early development and mobilization as the highest-leverage intervention point for AI. The emphasis on “early development challenge” reflects a pragmatic recognition that projects fail at setup, not execution. Dabasia reinforced this with concrete examples: “The two focus areas are Program level, AI to accelerate mobilization and baselining (front-end planning). People level, AI to cut admin

burden (e.g., automated bids, H&S plans, project execution plans). Together, these could free 30% to 40% of staff time for higher-value client work.”

“PROJECTS DO NOT GO WRONG, THEY START WRONG.”

The strategic advantage of fundamentals was quantified by Dabasia: “Baseline schedules can now be generated in hours instead of years. AI provides a strong head start but must be validated by technical experts. The strategic advantage of shaving 6 months off mobilization can be decisive in bids.” This is not technical innovation; it is execution reliability. Dominic Kieran described the operational imperative: “AI could speed re-sequencing and replanning, and help quantify the risk of what we’ve found to release hold points faster.” Faster replanning matters more than better designs when regulatory hold points stop work for entire teams.

Nancy Novak described how fundamentals create strategic value at scale: “Campus-scale programs with thousands of variables are strategic. AI supports environmental, cost, and constructability analysis and

helps future-proof living campuses (data centers, fabs, universities) through continuous retrofits and upgrades.” The value compounds when fundamentals are standardized. Mark Thurston and David Martin explained the systemic opportunity: “AI and ML have phenomenal opportunity, especially as we’ve created a ground-up data model we trust. If we were starting tomorrow or doing future phases, we’d automate more, using five to six years of data to improve planning and production.” *Reliability and excellence in fundamentals earns permission to innovate. Attempting innovation before achieving reliability produces neither.*

“(FOXES) CAN USE AI TO GET ANALYTICAL INSIGHTS, BUT IF THEY IGNORED HUMAN ANALYSTS BEFORE, WHY TRUST AI NOW?”

Several executives noted that standardization amplifies AI effectiveness. Alison Atkinson observed, “I’m a fox by nature. AI supports my drive for standardization. Mines, after all, are conceptually simple, ball mills, flotation, pipelines, but humans complicate them.”

This insight points to a deeper pattern. *Western delivery models often overvalue bespoke complexity, which reduces AI effectiveness. Simplification, repeatability, and standardization increase AI’s yield on both speed and cost.* Each layer of standardization, whether in design through parametric models, process through repeatable playbooks, or data through common ontologies, multiplies AI’s pattern recognition and decision support capabilities.

Jamie Sanders captured the mindset shift required: “Yes, but with caveats. Project execution leaders (Foxes) can use AI to get analytical insights, but if they ignored human analysts before, why trust AI now? Conversely, analysts (Hedgehogs) must shift from pride in deep calculation to new skills, validating AI outputs. Mindset is the barrier.” Trust builds through demonstrated value on familiar problems, not speculative gains on novel ones.

This proposition reveals that AI’s value lies not in replacing human judgment but in augmenting integrative capacity and improving baseline execution. Organizations that deploy AI to address fundamentals, clean data, baseline planning, risk identification, interface management, gain compounding advantages. Those that pursue technical novelty before mastering fundamentals dissipate effort without building capability. The next proposition examines what leadership archetype emerges when integrators gain AI-enabled analytical depth.





PROPOSITION 4: THE RISE OF THE LION: AI-ENABLED INTEGRATIVE LEADERSHIP

Propositions 1 through 3 established that megaprojects favor integrative leaders, that organizations fail to develop them systematically, and that AI asymmetrically strengthens integrators.

Our interview data suggest the emergence of a new archetype, the lion, who combines fox-like integration with hedgehog-like analytical discipline through AI-native workflows.

REWEIGHTING LEADERSHIP PORTFOLIOS TOWARD INTEGRATORS

Traditional portfolios have weighted heavily toward specialists, often 80/20 hedgehog-to-fox. Several executives described shifts toward configurations closer to 60/30/10 lion-to-fox-to-hedgehog distributions. Morgan Parker made this explicit. "Yesterday we added AI as one of 13 KPIs for 2025. *Every C-suite leader must demonstrate an AI-positive bias in their division.*" This was not a technology mandate but a leadership composition mandate.

Jamie Sanders articulated the urgency. "Currently, it's curiosity-driven. Use Copilot if you want. No mandate. That's too slow. At this pace it'll take two to three years, but we don't have that time. Rio needs a stronger top-down direction." The phrase "we don't have that time" signals competitive necessity rather than optional experimentation. Several executives described a common pattern: top-down mandate combined with decentralized experimentation and rapid scaling once benefits are proven.

THE LION ARCHETYPE AND AI-NATIVE WORKFLOWS

Lions combine broad integrative capability with analytical discipline, switching between synthesis and analysis without losing effectiveness. Andrew McNaughton captured this. “Most project leaders are foxes with little AI uptake so far. *But if you can demonstrate AI’s benefits, reduced workload, better decisions, foxes will adopt.* They don’t need hedgehog-level mechanics. They just need confidence in AI outputs. That’s where AI helps foxes gain hedgehog traits.”

Importantly, AI can nudge hedgehogs toward broader awareness without requiring them to become foxes. AI systems like advanced project dashboards supply specialists with synthesized cross-discipline insights they might not naturally cultivate. One technology manager described how their construction director now receives finance and permitting issues flagged alongside construction metrics, forcing him to pay attention to dependencies he would otherwise miss. This does not transform the hedgehog into a fox but expands operational awareness enough to prevent siloed decision-making. Instead, hedgehogs must use AI to amplify their own productivity and effectiveness, operating at greater scale and speed. Productivity gains must come from better systems and tooling rather than more people.

“PRODUCTIVITY GAINS MUST COME FROM BETTER SYSTEMS AND TOOLING RATHER THAN MORE PEOPLE.”

The critical distinction is that lions orchestrate human specialists and AI capabilities toward coherent outcomes rather than mastering every domain personally. Dominic Kieran described this when discussing daily replanning. “You don’t need massive org change, same trades, better deployment. AI impacts leadership decisions. Workers receive clearer instructions.” Traditional leaders absorbed complexity upward and issued directives downward. *Lions synthesize AI-generated insights, validate them against context, and coordinate execution without requiring deep technical mastery in each domain.*

“WILL BOARDS GIVE NEW GENERATIONS THE FREEDOM TO TECHNOFY THE BUSINESS, TAKE A PUNT [...] ?”

Mark Thurston provided insight into organizational adaptation. “The idea that structures and cultures don’t allow businesses to take advantage of AI feels misplaced. If the executive team and board want to embrace it, that’s leadership, make it part of what you stand for and implement it.” He noted a perceived tension in recruitment. “The question is, will boards give new generations the freedom to technofy the business, take a punt on a bright young thing who’s never delivered at this scale but is so tech-savvy they’ll make it happen in unconventional, non-routine ways?” This reflects broader organizational debates about whether technology fluency should weigh more heavily against traditional project delivery experience in leadership selection.

AI-SUPPORTED GOVERNANCE AND NETWORKED TEAMS

Several executives described AI's governance role as creating evidence-based anchor points without replacing human judgment. *Executives described AI being embedded into governance processes as a synthesis and assurance layer rather than a decision-maker.*

This governance model implements specific AI-augmented mechanisms including real-time project synthesis for board decisions, automated milestone verification using multiple data sources, predictive risk modeling based on current project state, and stakeholder sentiment analysis for early political warning. Alison Atkinson described the operational shift. "Data strategy, secure in-house environment, invite vendors in to test, avoid black-box AI. Team psychology is crucial. AI raises questions leaders haven't even thought of, which can feel threatening."

"AI RAISES QUESTIONS LEADERS HAVEN'T EVEN THOUGHT OF, WHICH CAN FEEL THREATENING."

However, executives emphasized AI's limitations. Tools are only as good as data and models. One executive noted that while AI flagged procurement risks effectively, it missed political undercurrents that experienced leaders detected through intuition. AI aids both foxes and hedgehogs but cannot replace the contextual judgment and stakeholder management that define integrative leadership.

Lion-led organizations operate as networked, AI-connected teams where integration happens continuously rather than episodically through reporting lines. Dominic Kieran described this operational reality.

"Leadership becomes developing a nimble organization, people comfortable going home not knowing tomorrow's tasks. Some cross-skilling is needed, and traditional trade boundaries can be obstacles." The phrase "not knowing tomorrow's tasks" signals that fixed role definitions give way to fluid task allocation based on real-time synthesis.



Nancy Novak articulated the cultural foundation. "Culture is central. When the CEO says adopt AI, we run it through our cultural lenses, Pareto 20 over 80, one percent continuous improvement, continuous curiosity." Davendra Dabasia described staffing shifts. *"Recruitment is shifting, future project managers will be data and tech project managers rather than purely construction-trained. Senior leadership must show adaptability to technology."*

Rather than transforming hedgehogs into foxes through T-shaped development, organizations can develop lions who combine integration and analysis through AI-native workflows. This requires portfolio reweighting toward integrators, AI-supported governance, and networked architectures. The competitive advantage belongs to organizations that develop lions systematically. The evidence suggests this transition is underway in leading organizations, driven by competitive necessity.

CONCLUSION: FROM PARADOX TO PRACTICE

This paper began with a paradox. Megaprojects demand both the depth of technical mastery and the breadth of adaptive integration, yet these qualities rarely coexist in a single leader. Organizations recognize that complexity favors integrators, but they systematically produce specialists. They endorse T-shaped development models, but struggle to execute them at scale. They invest billions in technical expertise, but fail at the interfaces where specialists must collaborate.

Our research suggests that artificial intelligence offers a structural resolution to this paradox, but not in the way most executives expect. AI does not transform hedgehogs into foxes through technical augmentation alone. Rather, it enables the emergence of a new leadership archetype – the lion – who combines fox-like integration with hedgehog-like analytical discipline through AI-native workflows. This shift represents more than incremental improvement. *It signals a fundamental reordering of how organizations should compose, develop, and deploy project leadership.*

THE STRATEGIC IMPERATIVE: REWEIGHT BEFORE YOU REBUILD

The evidence across our interviews and survey data points to three immediate actions for organizations serious about megaproject performance in an AI-enabled environment.

First, reweight leadership portfolios from specialists to integrator-heavy compositions. The traditional 80/20 hedgehog-to-fox ratio made sense when technical mastery was the binding constraint. It no longer does. Several leading organizations are shifting toward configurations closer to 60/30/10 – lions, foxes, and hedgehogs – with lions occupying the roles that require both integration and analytical depth. As Jamie Sanders noted, organizations must “move within 12 to 24 months or fall behind.”

Second, deploy AI to fundamentals before pursuing novelty. The strongest value signals in our data came from organizations using AI to improve baseline plan quality, accelerate mobilization, strengthen risk identification, and standardize repeatable processes.

These are not glamorous use cases, but they create the execution reliability that earns organizational slack and investor confidence. As one executive stated plainly, “Projects do not go wrong, they start wrong.”

Organizations that chase AI-enabled innovation before mastering AI-enabled fundamentals dissipate effort without building capability.

Third, institutionalize AI-supported governance mechanisms across the enterprise rather than treating AI as a personal productivity tool. The most sophisticated applications of AI in our study were not individual dashboards or copilots, but governance-level systems that synthesize real-time project data, flag cross-domain implications, model scenario alternatives, and anchor evidence-based decision-making. These systems do not replace human judgment. They strengthen it by surfacing blind spots, identifying pattern deviations, and making transparent the trade-offs that executives must navigate.

WHAT THIS MEANS FOR BOARDS AND EXECUTIVES

For boards and C-suite executives overseeing megaprojects, the implications are direct. The next chief executive you recruit should not be selected primarily for depth of technical expertise or sector experience, both of which AI increasingly commoditizes. *Select instead for integrative capability, political intelligence, and comfort operating at the intersection of human and machine intelligence.* Technical expertise becomes a team capability rather than a personal credential. The lion leader surrounds themselves with deep specialists, orchestrates their contributions, and uses AI to synthesize insights across domains. Organizations must also confront an uncomfortable reality about middle management. The evidence suggests that middle-management layers, particularly those populated by non-deep-technical coordinators, face structural displacement as AI strengthens both

top-level synthesis and frontline execution. Organizations that manage this transition poorly create organizational resistance that slows AI adoption precisely when speed matters most. The answer is not to preserve legacy roles through political compromise, but to redesign career pathways, retrain talent, and create explicit roles for integration rather than hoping it emerges organically from promotion.

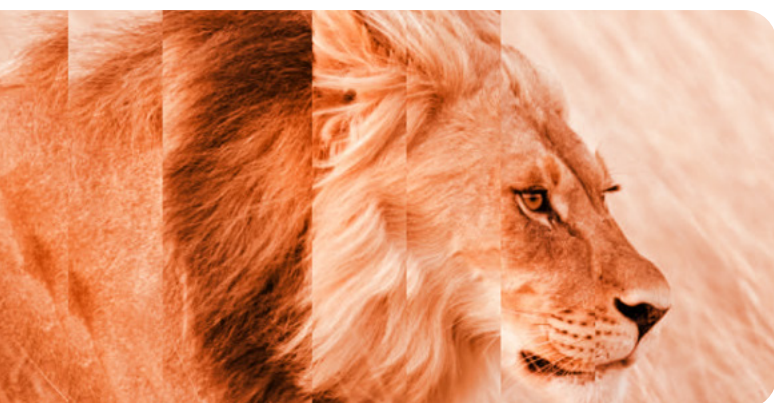


THE RESEARCH FRONTIER: WHAT WE STILL DON'T KNOW

Our findings open as many questions as they answer. We have demonstrated that AI strengthens integrative leaders and that a new archetype is emerging, but we have not yet quantified the performance delta between lion-led and traditionally led megaprojects.

The next phase of research should track project outcomes—cost variance, schedule adherence, stakeholder satisfaction, safety performance—across matched pairs of projects led by traditional versus AI-enabled integrative leaders.

We also lack longitudinal data on how organizations successfully transition specialists into lions at scale. The executives we interviewed described pilots, experiments, and pockets of excellence, but none claimed to have industrialized lion development as a systematic capability. What assessment tools predict who can make the transition? What coaching, rotation, and AI fluency training accelerate it? These are practical questions that demand answers if the lion archetype is to move from theory to practice.



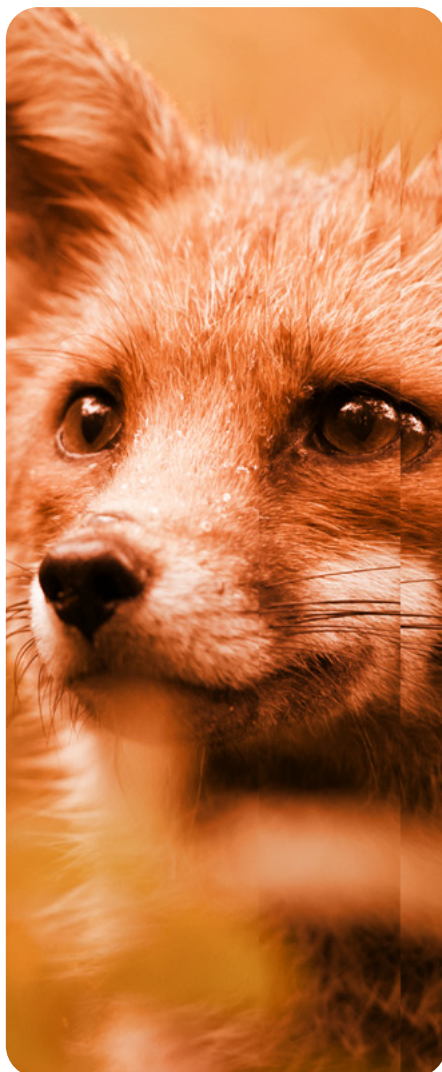
A CLOSING REFLECTION

There is a temptation, when discussing AI in leadership, to drift toward either utopian enthusiasm or dystopian anxiety. Our research supports neither. AI is a tool that amplifies certain human capabilities while rendering others obsolete. It strengthens integrators who can synthesize across domains but offers little to specialists who cannot adapt. It improves fundamentals when deployed with discipline but creates waste when chasing novelty.

What remains distinctly human—and what AI cannot replicate—is the judgment required to navigate ambiguity, the emotional intelligence to build trust under pressure, the political skill to align fractious

stakeholders, and the moral courage to make difficult decisions when data is incomplete and consequences are uncertain. *These capabilities have always defined great project leadership. AI does not diminish their importance.*

The hedgehog, the fox, and the machine are not competitors. They are collaborators in a system that demands all three. The hedgehog anchors the system in technical rigor. The fox ensures coherence across domains. The machine amplifies both, surfacing insights that neither could generate alone. The lion integrates all three, orchestrating human and artificial intelligence toward outcomes that matter.

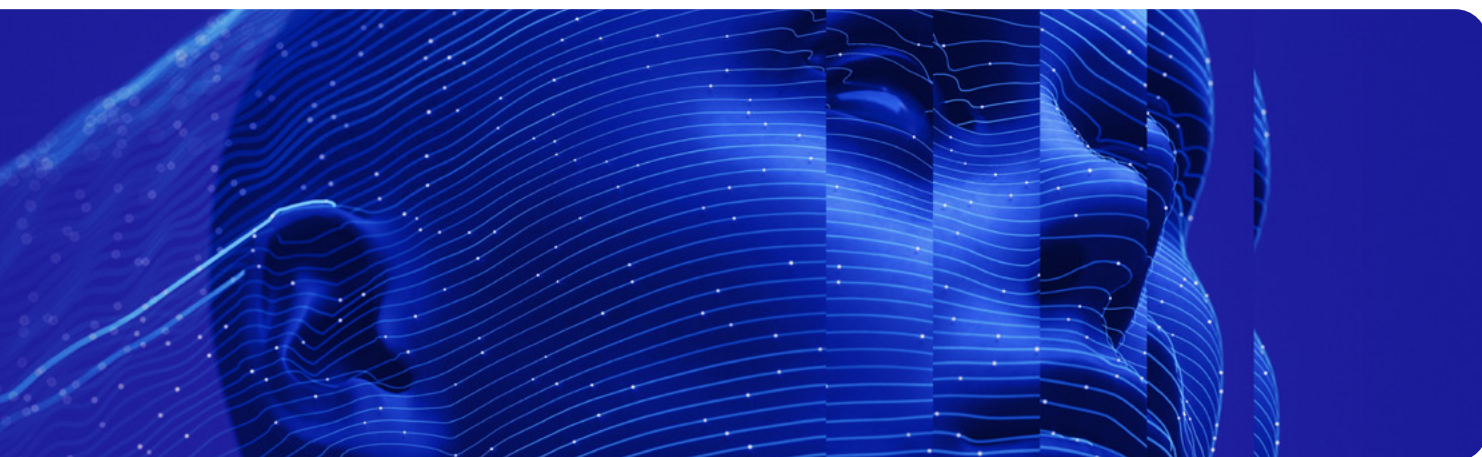


APPENDIX: SURVEY RESULTS

SURVEY OVERVIEW AND SAMPLE

A quantitative survey was administered alongside the executive interviews and completed by 22 senior leaders involved in the delivery, governance, or oversight of major capital and megaprojects. Respondents included Chief Executives, Executive Directors, Chief Technology Officers, and senior

program leaders across infrastructure, energy, defense, and data-intensive real estate sectors, primarily based in Europe and North America. The survey was designed to contextualize and triangulate interview findings and assess the prevalence of observed themes among senior decision-makers.



AI ADOPTION STATUS

AI adoption among respondents was already widespread. Of the 22 respondents:

- **8** reported AI actively deployed in project delivery
- **10** reported piloting or experimenting with AI
- **4** reported planned deployment within 12 months
- **0** reported having no plans to adopt AI

In aggregate, 18 of 22 organizations (**82%**) were already using or actively testing AI. This supports the interview finding that AI is no longer speculative in megaproject environments but has entered mainstream delivery practice, even if unevenly embedded.

Adoption timing further reinforces this conclusion.

When asked when AI first became part of the project delivery toolkit:

- **11** respondents cited 2024
- **4** cited 2023
- **2** cited 2022
- **2** cited before 2022
- **3** reported not yet adopting AI

This indicates a sharp recent inflection, with AI adoption accelerating rapidly over the past 18–24 months.

FUNCTIONAL CONCENTRATION OF AI USE

AI usage was concentrated in functions associated with coordination, synthesis, and information flow rather than narrow technical execution.

Among 21 respondents selecting tools in use:

- **15** reported use of general-purpose AI assistants (e.g., Copilot)
- **13** reported use of large language models
- **10** reported use in scheduling and resourcing
- **9** reported use of custom-built proprietary tools
- **8** reported use in design automation
- **4** reported use in AI-powered cost engineering tools

Planned adoption exceeded current usage across cost estimating, scheduling, procurement, document management, and risk and controls, reinforcing the finding that AI is being positioned to support integrative leadership activities rather than replace specialist judgment. For example:

- Cost estimating: **6** using now, **16** planned
- Scheduling: **9** using now, **11** planned
- Procurement: **6** using now, **12** planned
- Document management: **9** using now, **11** planned
- Risk and controls: **6** using now, **9** planned



LEADERSHIP AND ORGANIZATIONAL READINESS

Respondents characterized current organizational culture as measured rather than fast-moving.

Of 18 respondents:

- **7** described their culture as pro-innovation or actively evolving
- **6** as cautiously open to change
- **5** as conservative or risk-averse
- **0** characterized their organizations as fast-moving

However, when asked what culture would be required to succeed with AI in the next 6–12 months, responses shifted:

- **7** emphasized greater experimentation and learning
- **5** emphasized increased adaptability and openness
- **4** emphasized stronger top-down change
- **2** believed maintaining the current culture would suffice

This divergence between current and required culture mirrors interview evidence that adoption is constrained less by intent than by leadership behavior, governance clarity, and tolerance for controlled experimentation.

TRUST, GOVERNANCE, AND VALIDATION

Trust in AI systems was predominantly conditional rather than absolute. Of 18 respondents assessing trust from a data privacy and security perspective:

- 13 reported medium trust that varies by use case or tool
- 3 reported low trust with significant concerns remaining
- 1 reported high confidence in safeguards and compliance
- 1 reported not having evaluated trust

When asked what would most increase organizational trust in AI systems, respondents emphasized technical and governance factors over regulatory signaling:

- 9 cited demonstrated cybersecurity controls
- 9 cited clearer vendor transparency
- 6 cited on-premise or private cloud deployment
- 6 cited cultural or leadership alignment
- 3 cited custom-built solutions
- 1 cited regulatory certifications

These responses align with interview findings that trust is earned through validation, explainability, and leadership judgment rather than blind automation or external assurance alone.

PEOPLE AND PROCESS MATURITY

Survey responses indicate that AI adoption has not yet resulted in widespread workforce displacement. Of 22 respondents:

- 12 reported no impact on staffing levels
- 5 reported reduced hiring plans
- 5 reported accelerated hiring in AI-related roles
- 1 reported workforce reduction or redundancies
- 2 were unsure

This suggests that AI is currently reshaping capability mix rather than driving headcount reduction.

AI usage penetration remains limited at the workforce level. Of 20 respondents estimating active usage:

- 7 reported 0–10% of staff using AI
- 6 reported 11–25%
- 1 reported 26–50%
- 3 reported 51–75%
- 3 reported 76–100%

Despite near-universal organizational exposure, the majority of respondents reported that fewer than a quarter of their project workforce actively uses AI tools today, reinforcing interview evidence that adoption remains shallow without mandate or leadership intervention.



LINKAGE TO CORE PROPOSITIONS

Overall, the survey results corroborate the paper's core propositions. Near-universal AI experimentation combined with shallow workforce penetration supports the argument that leadership advantage is shifting toward integration under complexity rather than technical mastery alone. The concentration of AI use in coordination-heavy functions reinforces the asymmetric impact of AI on integrative versus specialist roles.

Finally, conditional trust, cultural lag, and delayed scaling align with interview evidence that AI-enabled performance gains depend less on technology availability than on leadership, governance, and execution discipline.

