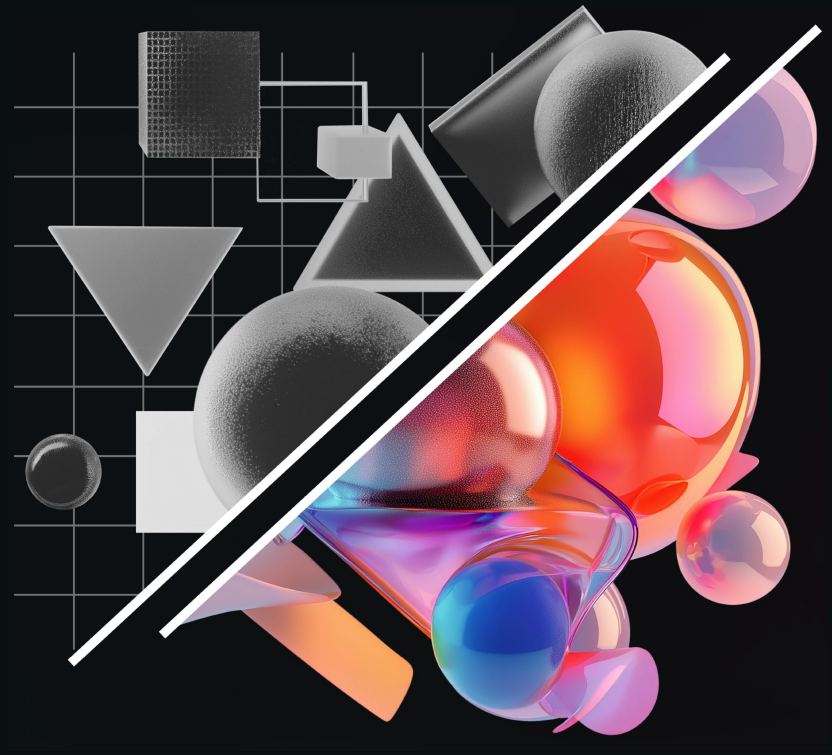
June 2025

The State of **Engineering AI**

Annual benchmark of AI adoption in engineering



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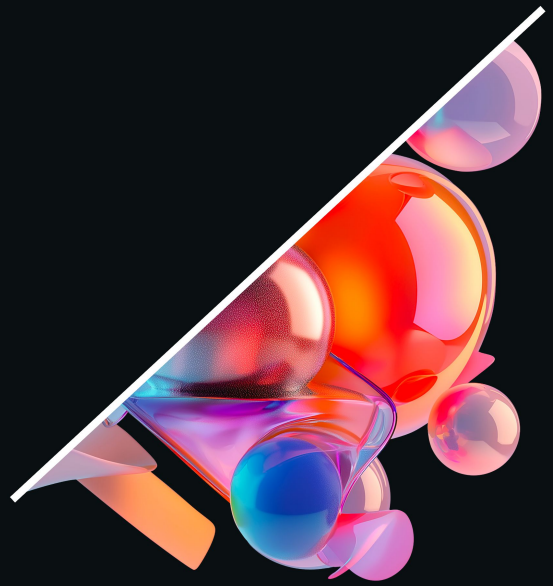


INTRODUCTION

Engineering leaders are under mounting pressure to deliver more innovation in less time. From tighter budgets and faster RFQ responses to sweeping industry shifts like electrification, the demands on engineering teams are intensifying. AI is increasingly viewed as a critical tool for meeting these challenges by helping teams work faster, design smarter, and make better decisions earlier.

But while ambition is high, the path forward is far from straightforward. SimScale commissioned this global survey of 300 senior engineering decision-makers to better understand how organizations are approaching AI in their design and simulation workflows. This report focuses not on abstract potential, but on the real-world state of adoption and readiness across people, processes, and technology.

What we found is a growing tension. Engineering organizations recognize the opportunity, but many are still held back by legacy tools, fragmented data, and internal misalignment. At the same time, cloud-native platforms with more accessible AI-powered workflows are beginning to gain traction, pointing the way toward a more scalable future.

This report offers engineering and simulation leaders a clear-eyed look at where the industry stands today and what it will take to close the gap between AI expectation and AI execution.

METHODOLOGY

To better understand the current state of AI readiness in engineering, SimScale partnered with Global Surveyz to conduct a global survey of 300 full-time employees in May 2025. Respondents were senior engineering leaders, including CTOs, VPs and Heads of Engineering, and VPs and Heads of Simulation, all at the director level or above.

Participants were drawn from companies with over 1,000 employees across three markets: the United States, the United Kingdom, and Germany. The survey focused on six core industries, with 50 respondents from each: Architecture, Engineering, and Construction (AEC), Automotive and Transportation, Electronics and High Tech, Energy, Life Sciences and Healthcare, and Machinery and Industrial Equipment.

The goal was to capture a cross-sectional view of how large engineering organizations are approaching the adoption of AI across design and simulation workflows, including their expectations, challenges, and operational maturity.

KEY FINDINGS

93% of engineering leaders expect productivity gains from AI, but only 3% are achieving very high impact

The survey reveals a striking expectation-execution gap. While nearly all respondents expect AI to boost productivity and 30% expect very high gains, just 3% report achieving those outcomes today. This disconnect points to urgent challenges in infrastructure, data readiness, and team alignment that must be addressed to translate ambition into action.

Cloud-native users are 3 times more likely to have mature AI programs and 6 times more likely to have clean, centralized data.

Organizations using cloud-native simulation tools report a 10% rate of AI maturity compared to just 3% among on-premise users. They are also 6 times more likely to have accessible, well-structured data, cited as a top enabler of AI success. These findings reinforce cloud-native platforms as a prerequisite for meaningful AI progress.

A disconnect between technical teams and leadership is slowing AI adoption.

CTOs estimate that 42% of technical teams resist AI, but only 29% of team leaders report such resistance. This reveals a cultural misalignment that may be delaying adoption. The data suggests that technical teams are more open, ready, and motivated to adopt modern tools than leadership assumes. Rather than being hesitant, they are eager to leverage AI to drive innovation. It is now up to engineering leadership to remove obstacles, enable access, and support the momentum already building on the ground.

KEY FINDINGS II

Siloed data and legacy tools remain the biggest barriers to AI adoption.

55% of respondents cite siloed data as a major obstacle, and 51% of on-premise users report struggles with outdated CAE tools. These systemic blockers are deeply tied to infrastructure choices and highlight the urgency for engineering organizations to modernize their tool stacks.

Cloud-native adopters are twice as confident in achieving AI goals within the next year.

Organizations using cloud-native simulation tools report a 10% rate of AI maturity compared to just 3% among on-premise users. They are also 6 times more likely to have accessible, well-structured data, cited as a top enabler of AI success. These findings reinforce cloud-native platforms as a prerequisite for meaningful AI progress.

SURVEY REPORT FINDINGS

AI Adoption Remains in Its Infancy

The vast majority of engineering organizations are still in the early stages of adopting AI. Just 7% report having a mature AI program in place, while 42% are experimenting with pilots and 44% are only beginning to plan their efforts. In total, 86% of surveyed companies are still in exploratory or pre-adoption phases.

These results confirm what many engineering leaders may already suspect: AI adoption in engineering remains immature. While AI is widely acknowledged as a key driver of future innovation, most teams are still figuring out how to apply it meaningfully within their workflows. Rather than a cause for concern, this early-stage status should be seen as an opportunity.

For organizations not yet fully committed, there is still time to shape strategy, define best practices, and gain a competitive edge. Notably, early adopters tend to be those leveraging cloud-native engineering stacks (Figure 2). These allow for faster experimentation, easier access to unified data, and greater scalability. Such tools help overcome common blockers tied to legacy systems and fragmented infrastructures.

As engineering teams move from planning to execution, the technology foundation they choose will be critical. Pilots and plans are only a starting point. Without the right infrastructure and cross-functional alignment, many early efforts risk stalling. The data suggests that cloud-native platforms are not simply a technology preference; they are quickly becoming a core enabler of AI maturity in engineering.

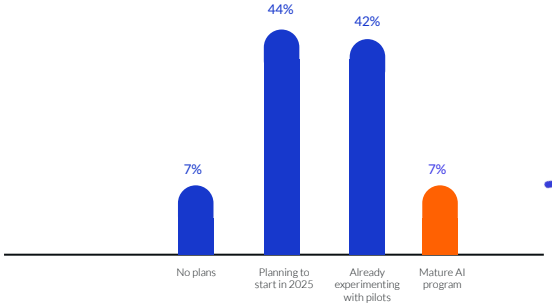


Figure 1: **What Best Describes your Organization's Current Status with AI Adoption?**

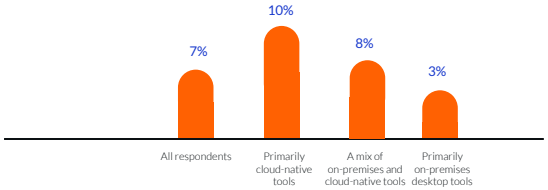


Figure 2: **"Mature AI Program" by Current CAE and Simulation Toolstack**

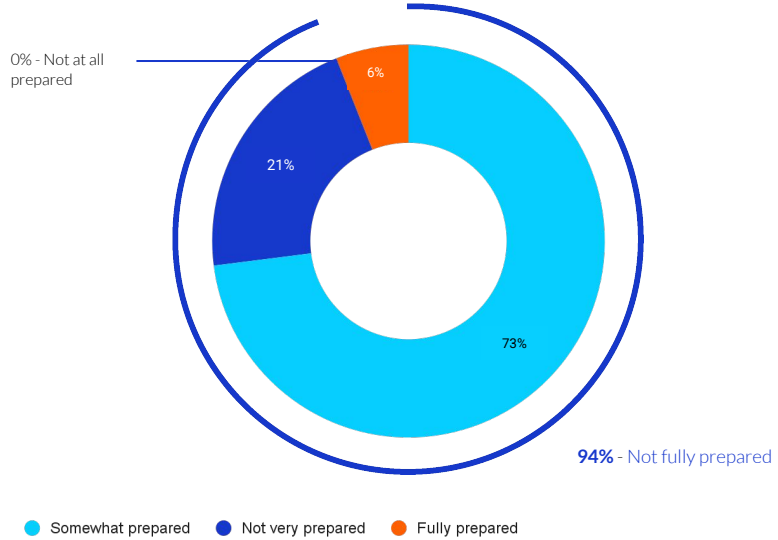
Most Organizations Are Not Ready for Scaled AI

Of those who did not already report having a mature AI program in place, only 6% say their organizations are fully prepared to adopt AI across design and simulation workflows in 2025. The majority, 73%, feel only somewhat prepared, while 21% admit they are not very prepared. This means 94% of organizations still lack full readiness, even as expectations around AI adoption continue to grow.

The difference in readiness is closely tied to infrastructure. Organizations that report being fully prepared are three times more likely to be using cloud-native engineering tools than those relying on on-premises systems. Cloud-native platforms provide faster access to unified data, enable real-time collaboration, and remove many of the technical blockers that prevent teams from scaling AI.

This readiness gap is not theoretical. As AI becomes embedded in engineering workflows, unprepared organizations face a real risk of being outpaced by more agile competitors. To close this gap, engineering leaders need to invest in modern tools, align teams around shared goals, and develop a clear roadmap that moves beyond pilots and into scalable deployment.

Figure 3: **How Prepared is your Organization to Fully Adopt AI Across Engineering Design & Simulation Workflows in 2025?**



AI Still Sits on the Strategic Sidelines for Many

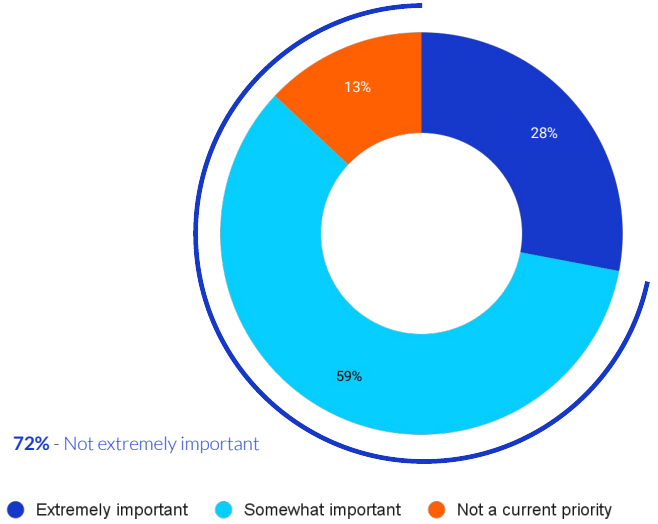
AI is broadly recognized as important, but few engineering leaders consider it mission-critical today. While 59% of respondents say AI plays some role in their current engineering and design simulation strategy, only 28% describe it as extremely important.

This disconnect suggests a growing risk. AI is no longer an emerging trend. It is rapidly becoming foundational to how leading engineering organizations operate. Yet 72% of respondents do not see it as an essential pillar of their strategy. This lack of urgency raises questions about whether organizations truly understand the scale of the transformation underway.

It is possible that some teams underestimate the speed at which engineering AI is evolving or feel held back by the complexity of implementation. But hesitation carries consequences. The small number of companies that already treat AI as a strategic imperative are moving quickly. They are building competitive advantages in speed, efficiency, and innovation that others may struggle to catch up to.

History offers a clear warning. Industries that delayed investing in electrification or digital transformation have been left behind. Engineering leaders who view AI as a future consideration rather than a current imperative risk making the same mistake.

Figure 4: **How Important is AI in your Current Engineering & Design Simulation Strategy?**



The Expectation-Execution Gap in Engineering AI

Across the survey, one theme stands out more than any other: the gap between what engineering leaders expect from AI and what they are actually experiencing today. While 30% of respondents believe AI could deliver very high productivity gains across engineering workflows, only 3% report achieving that level of impact.

This gap is not a minor discrepancy. It reflects a 10 to 1 ratio between those expecting transformational value and those actually seeing it. In other words, engineering teams overwhelmingly believe in AI's potential, but very few have been able to realize it.

The reasons are complex. Many organizations are applying AI to narrow, isolated parts of the workflow, often focusing only on simulation speed rather than redesigning the entire engineering process. Without broader integration, the gains remain limited. This misalignment between scope and expectation helps explain the results.

With nearly every team expecting AI to raise productivity, but few achieving meaningful results, the risk of disillusionment and competitive stagnation is real. This moment calls for a shift in mindset from viewing AI as a point solution to embracing it as a system-wide enabler of engineering transformation.

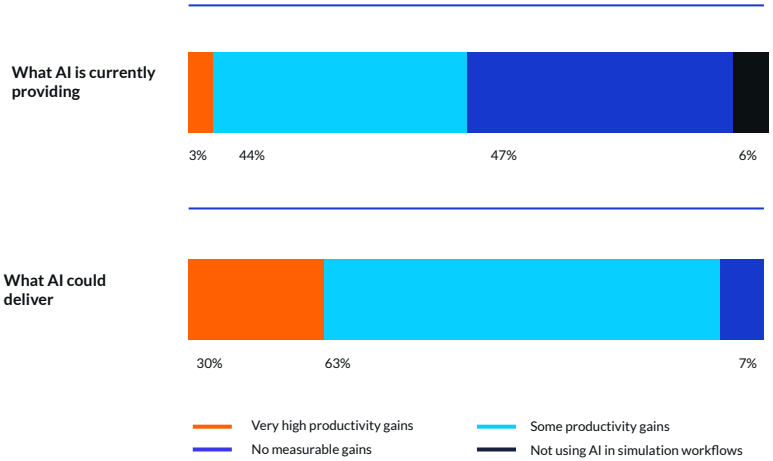


Figure 5: **The Expectation-Execution Gap in Engineering AI**

AI Seen as a Driver of Growth, Not Just Efficiency

Engineering leaders see AI as a broad-based driver of value across both the product lifecycle and the balance sheet. The results point to a strong belief in AI's potential to fuel innovation, accelerate delivery, and improve business performance. Notably, the top three expected benefits, greater design innovation (54%), improved engineering productivity (51%), and faster time to market (47%), are all high-value, forward-looking outcomes that go beyond efficiency. Leaders are looking to AI not just to optimize, but to push the boundaries of what their teams can deliver.

Other expected gains include increased product quality (41%) and stronger competitiveness or sales (39%). In contrast, reduced cost or higher margin was selected by only 31% of respondents, signaling that AI is being seen less as a cost-cutting tool and more as a top-line growth enabler. These priorities reflect a clear shift in how engineering teams are thinking about AI's role in strategic value creation.

This perspective aligns with broader enterprise goals: getting to market faster, delivering more differentiated products, and empowering teams to make confident decisions earlier in the process. It also echoes the earlier finding that while few organizations have reached AI maturity, expectations for its impact are high.

The wide range of anticipated benefits reflects AI's versatility across the engineering workflow, from early-stage design exploration to performance validation and optimization. But to unlock this value, organizations will need to focus their efforts. Selecting the right use cases, investing in enabling infrastructure, and removing workflow friction will be key to turning these expectations into results.

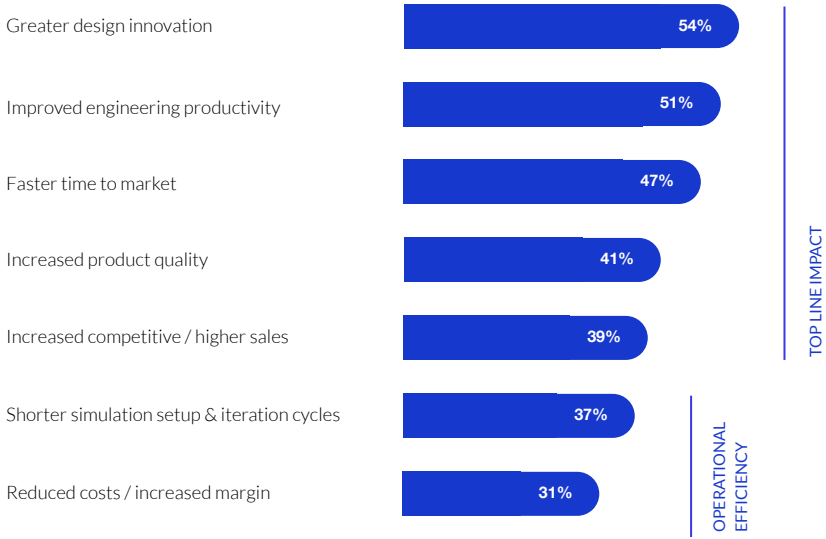


Figure 6: **What are the top Areas where you Expect the Greatest Business Impact if your Organization Adopts AI-Accelerated Engineering?**

* Question allowed more than one answer and as a result, percentages will add up to more than 100%

Infrastructure, Not Budget, Is the Biggest Barrier to AI Adoption

AI adoption in engineering is not being held back by lack of interest or budget. It is being blocked by infrastructure. The top barriers reported by respondents include siloed data that is difficult to access or use for AI (55%), legacy desktop CAE tools that cannot support modern workflows (42%), and compliance or intellectual property concerns (42%).

Respondents who reported being slowed down by legacy desktop CAE tools were far more likely to be on-premise users. Among those relying primarily on on-prem tools, 51% cited this barrier, compared to only 36% of cloud-native users.

These are not surface-level issues. They are systemic barriers that stem from outdated environments built for a different era. On-premise tools fragment data across machines, departments, and geographies, making it nearly impossible to generate the clean, centralized datasets that AI needs to function effectively. Legacy tools not only slow down processes, they actively prevent AI from being deployed at scale.

Engineering teams are motivated to embrace AI, but they are being held back by tools and systems that were never designed to support it. Cloud-native platforms offer a path forward by removing these barriers and enabling AI-ready workflows from day one.

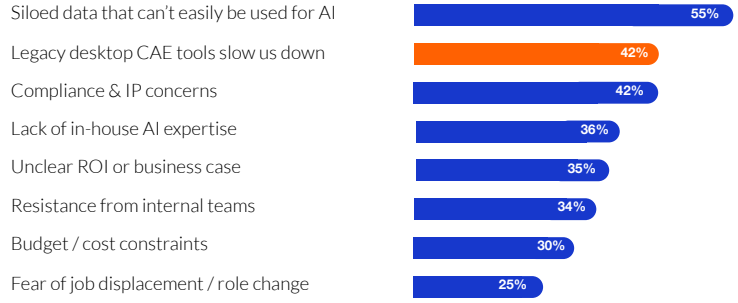


Figure 7: **What are the Top Barriers to Adopting AI Across Engineering & Simulation Workflows?**

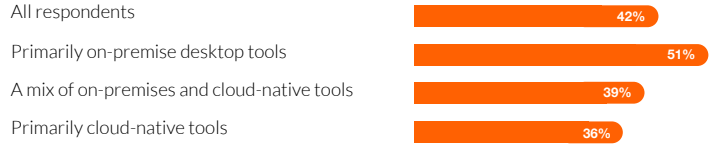


Figure 8: **"Legacy Desktop CAE Tools Slow Us Down" by Current CAE and Simulation Toolstack**

* Question allowed more than one answer and as a result, percentages will add up to more than 100%

Engineering Leaders Know the Formula for AI Readiness

The most commonly cited enablers moving teams toward AI adoption are clear and consistent. A modern cloud-native tool stack is the top factor at 59%, followed closely by unified, well-structured simulation data (57%) and easy-to-use AI models and templates (44%).

Together, these three priorities represent the foundations of successful engineering AI adoption: flexible infrastructure, accessible data, and repeatable knowledge. They also reflect a strong awareness among decision-makers of what is required to turn ambition into action. The challenge is not knowing what to do, but putting the right pieces in place.

Cloud-native platforms provide the flexibility and scalability that AI demands. They reduce friction, unify teams, and eliminate the silos created by legacy desktop tools. Centralized, well-structured simulation data is critical for training and deploying AI models effectively. Without clean data, AI simply cannot deliver results. And templated AI models offer teams a faster, more accessible path to value, especially when integrated into everyday tools.

Interestingly, upskilling and training resources rank lowest at 32%, suggesting that once the core enablers are in place, teams feel confident adopting AI without heavy reliance on external support.

Engineering leaders know what is needed. Now the focus must shift to building the conditions that allow AI to thrive.

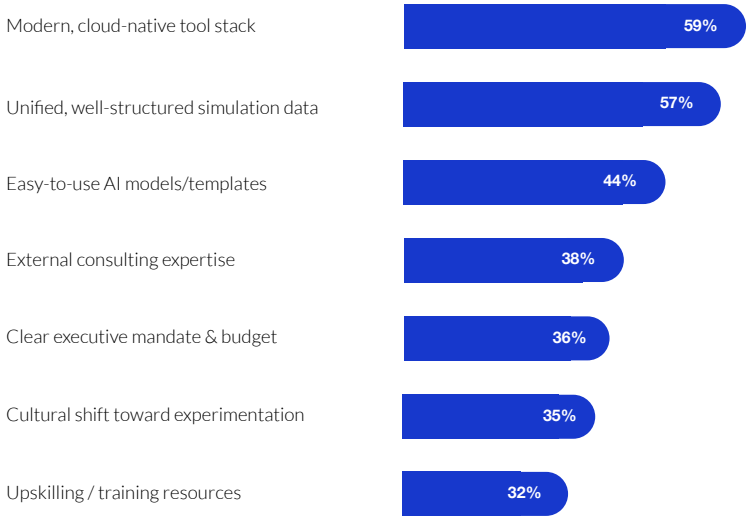


Figure 9: **What are the Top Enablers that Would Most Help your Organizations Start or Accelerate use of AI in Engineering and Simulation Workflows?**

* Question allowed more than one answer and as a result, percentages will add up to more than 100%

Early Cloud Adopters Are Already Pulling Ahead

Most engineering organizations still rely on legacy infrastructure. Just 17% of respondents report using a primarily cloud-native toolstack for their CAE and simulation needs. The majority, 51%, use a hybrid mix of on-premises and cloud-based tools, while 32% remain primarily on-premises.

This points to a market still dominated by traditional desktop software, despite rising awareness of the benefits that cloud-native platforms can offer. The opportunity for disruption is clear. As complexity increases and AI becomes central to engineering, legacy systems are proving to be a constraint rather than a foundation for growth.

The gap is particularly visible at the regional level. In the United States, cloud-native adoption is at 26%. In the EU, it is just 8%. That means US teams are over three times more likely to have modernized their CAE stack, positioning them to move faster and scale AI more effectively.

The connection between infrastructure and outcomes is reinforced by the fact that respondents using cloud-native tools are twice as likely to feel confident about meeting their AI goals in the next 12 months compared to those using on-prem systems (Fig. 16).

The message is simple: confidence follows capability. Early movers are already seeing the strategic advantages of modernizing their engineering stack. Cloud-native adoption not only improves scalability and data accessibility; it also drives clarity, momentum, and measurable progress toward AI goals.

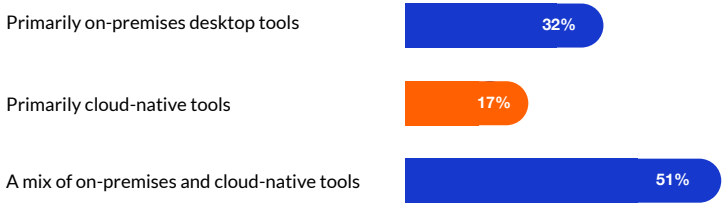


Figure 10: **Which Best Describes your Organization's Current CAE and Simulation Toolstack?**

Figure 11: **"Primarily Cloud-Native Tools" by Region**

Legacy Tools Add Friction to AI Adoption

For most engineering teams, implementing AI is not impossible, but it is not seamless either. 59% of respondents said it is difficult to integrate AI practices using their current simulation and CAE toolstack. Only 40% found it somewhat easy.

This finding highlights a broader challenge across the industry. Legacy and hybrid environments are not designed to support AI. They introduce friction at every stage, from accessing simulation data to connecting models with other tools in the engineering workflow. The issue is not cultural resistance or lack of willingness. It is a matter of usability and integration. Older systems were never built with AI in mind.

The data also reveals a strong correlation between ease of adoption and tool choice. Among respondents who say AI implementation is easy, 60% use cloud-native stacks. By contrast, only 24% of those with on-premise setups say the same. That is a nearly threefold difference in perceived implementation ease.

Cloud-native platforms do not just enable AI. They make it easier to adopt, scale, and apply meaningfully across engineering teams. For leaders still operating in legacy environments, this should be a wake-up call. Improving ease of use and lowering adoption barriers will require more than training. It will require modern infrastructure purpose-built for AI workflows.

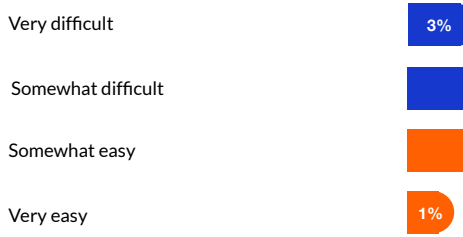


Figure 12: **Ease of Fully Implementing AI-Accelerated Engineering with Current Tool Stack**

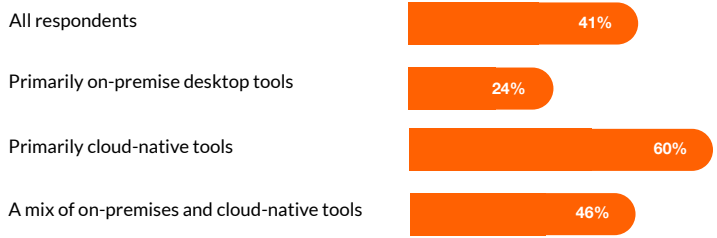


Figure 13: **Easy Implementation by Current CAE and Simulations Tool Stack**

Reliance on Experts Is Slowing Teams Down

Most organizations are still leaning heavily on specialized expertise to adopt AI in simulation workflows. 76% of respondents report a moderate-to-high reliance on AI experts. No respondents reported having no reliance, underscoring that nearly all teams still see specialized knowledge as a necessary part of their AI journey.

This moderate reliance may seem reasonable at first glance. But it likely reflects deeper inefficiencies. Many engineering leaders may be overestimating how much external or expert support is truly required, especially as tooling evolves. This perception is particularly common in organizations still using legacy or on-prem systems, where fragmented environments create more barriers to access, integration, and knowledge transfer.

The risk is not just about cost. Overreliance on external specialists slows down workflows, undermines internal momentum, and creates bottlenecks that reduce team autonomy. In many cases, it limits innovation by forcing teams into narrow execution paths dictated by a handful of technical experts.

The opportunity lies in democratization. With cloud-native platforms, well-structured data, and easy-to-use AI models, organizations can shift from dependency to empowerment. Simulation and design teams should not need to defer to experts at every stage. Instead, experts should become advisors and accelerators, not gatekeepers. AI in engineering needs to work the same way it already does outside of engineering: accessible, intuitive, and valuable to everyone who uses it. Only then can teams unlock the speed, creativity, and autonomy that AI promises.

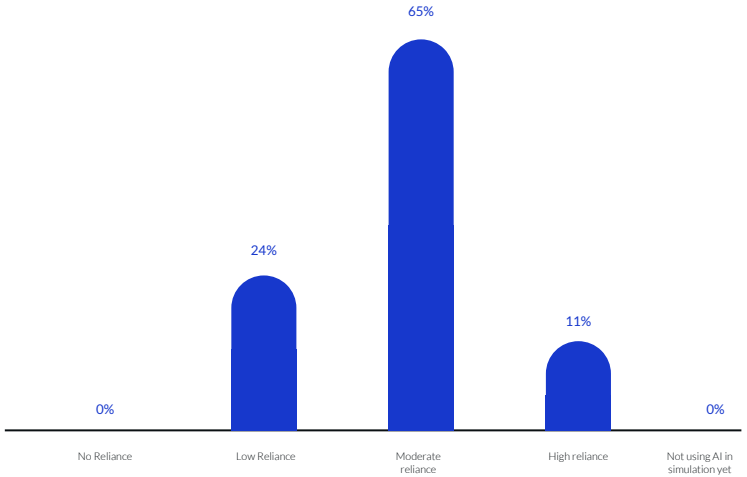


Figure 14: **To what Extent does your Organization Need or Rely on Specialized AI Expertise to Leverage AI in Simulation Workflows?**

Confidence Follows Capability, Not the Other Way Around

Most engineering leaders are optimistic about the role AI will play in their workflows, but few are confident it will happen soon. The majority of respondents describe themselves as either confident (44%) or neutral (45%), while 12% express a lack of confidence altogether.

This suggests that while ambition is high, both confidence and real progress are lacking. Many organizations are still working through the practical and cultural challenges of scaling AI. As shown earlier in the report, expectations are high, but very few are currently achieving those outcomes. Confidence and execution continue to lag behind intent.

One of the clearest factors influencing confidence is infrastructure. Among respondents using cloud-native platforms, 54% express confidence in achieving their AI goals in the year ahead. That figure drops to 25% among those still relying primarily on on-premise tools. This reinforces a central finding across the report: confidence follows capability. The right foundation enables action.

A deeper issue is the disconnect between technical teams and executive leadership. While CTOs perceive 42% resistance to AI adoption among their teams, those teams report only 29%. This suggests that operational teams may be more AI-ready, and more eager to adopt new tools, than leadership assumes. Misalignment at the top may be stalling progress more than actual resistance on the ground. Without clearer communication and shared understanding, well-intentioned strategies risk being delayed or derailed before they even begin.

Bridging the gap between ambition and action requires more than vision. It requires alignment, infrastructure, and a focus on enablement. With the right tools and structure in place, engineering leaders can seize the opportunity AI presents and turn potential into performance.

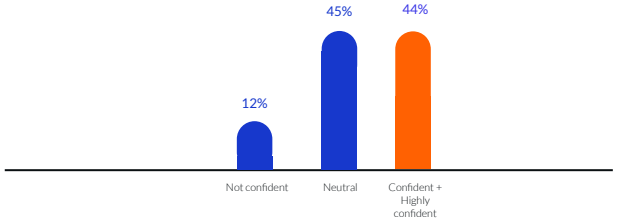


Figure 15: **Confidence in AI-Accelerated Engineering (Next 12 Months)**

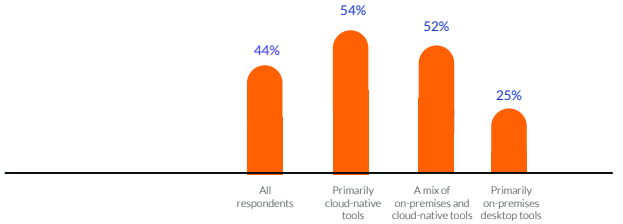


Figure 16: **"Confident + Highly confident" by current CAE and Simulation Toolstack**

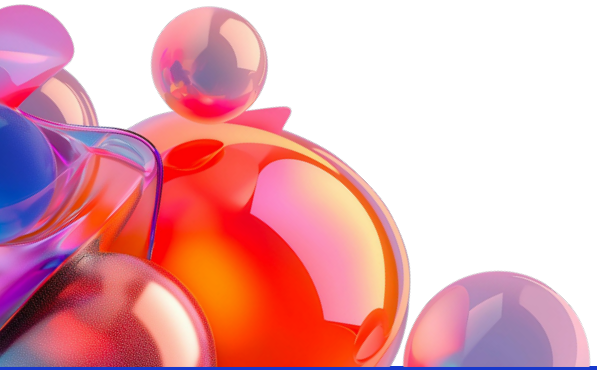
CONCLUSION: CLOSING THE GAP

The ambition for Engineering AI is clear. Nearly all leaders surveyed believe AI will unlock significant productivity and innovation in their teams. Yet just 3% are seeing that promise fully realized today. This report has uncovered the reasons why — and where the most forward-looking organizations are beginning to pull ahead.

The most progressive teams are not simply experimenting with AI. They are rebuilding their foundations to scale it. They are modernizing their architecture by eliminating siloed desktop tools and adopting cloud-native, open platforms. They are treating engineering data like infrastructure: centralized, versioned, structured — and accessible across workflows.

They are designing agentic workflows into their systems, not just bolting on AI features. These teams define where autonomous agents can make decisions and move quickly from proof-of-concept to fully integrated loops, where AI actively drives iteration inside live engineering processes. Where needed, they build or own agents internally — especially where IP sensitivity or speed matters.

The takeaway is simple: the barrier isn't technical feasibility — it's architectural and organizational readiness. The Engineering AI leaders of tomorrow aren't waiting for perfect ideas. They're executing today, with speed, clarity, and conviction.



DEMOGRAPHICS

Figure 18: **Country**

50% United States

25% United Kingdom

25% Germany

Figure 19: **Industry**

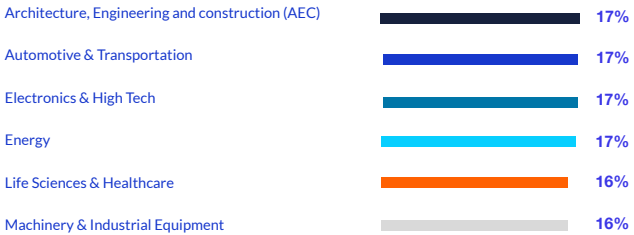


Figure 20: **Company Size**

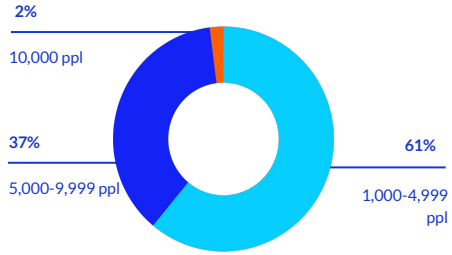


Figure 21: **Job seniority**

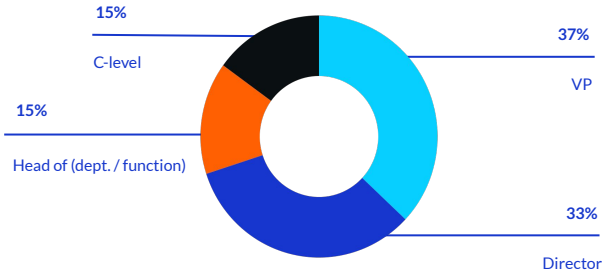
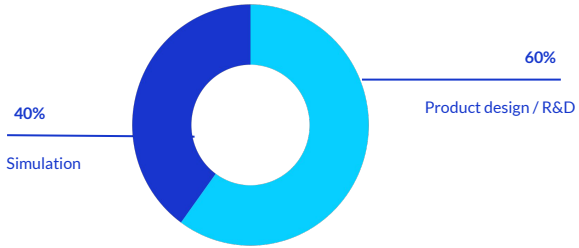
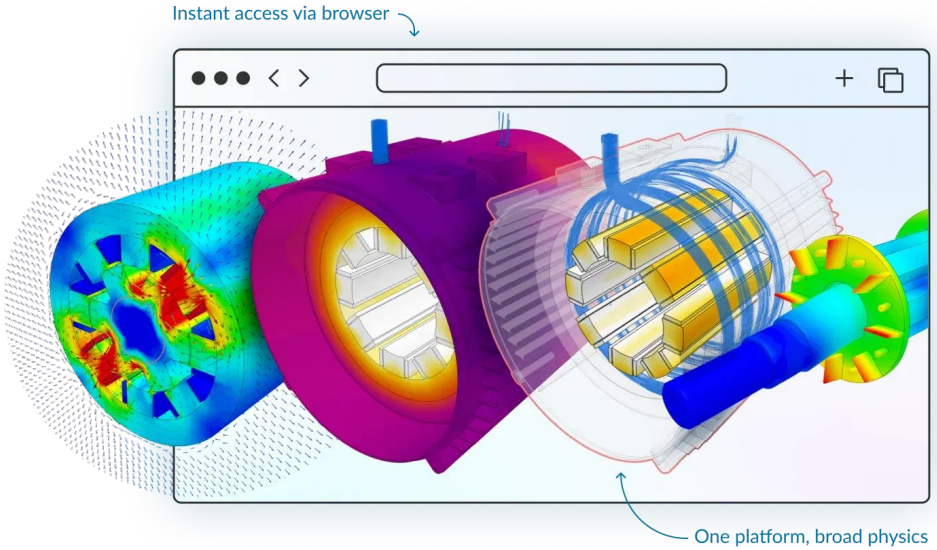


Figure 22: **Main Area of Responsibility**



About SimScale

SimScale is advancing the future of engineering with the world's first AI-native engineering simulation platform. Trusted by more than 700,000 users, SimScale empowers engineers everywhere to innovate faster by exploring 1000's of engineering decisions in seconds. By integrating AI workflows with computational fluid dynamics (CFD), finite element analysis (FEA), electromagnetic, and thermal simulation in a single cloud-native platform, SimScale empowers teams to engineer the irreplaceable.



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