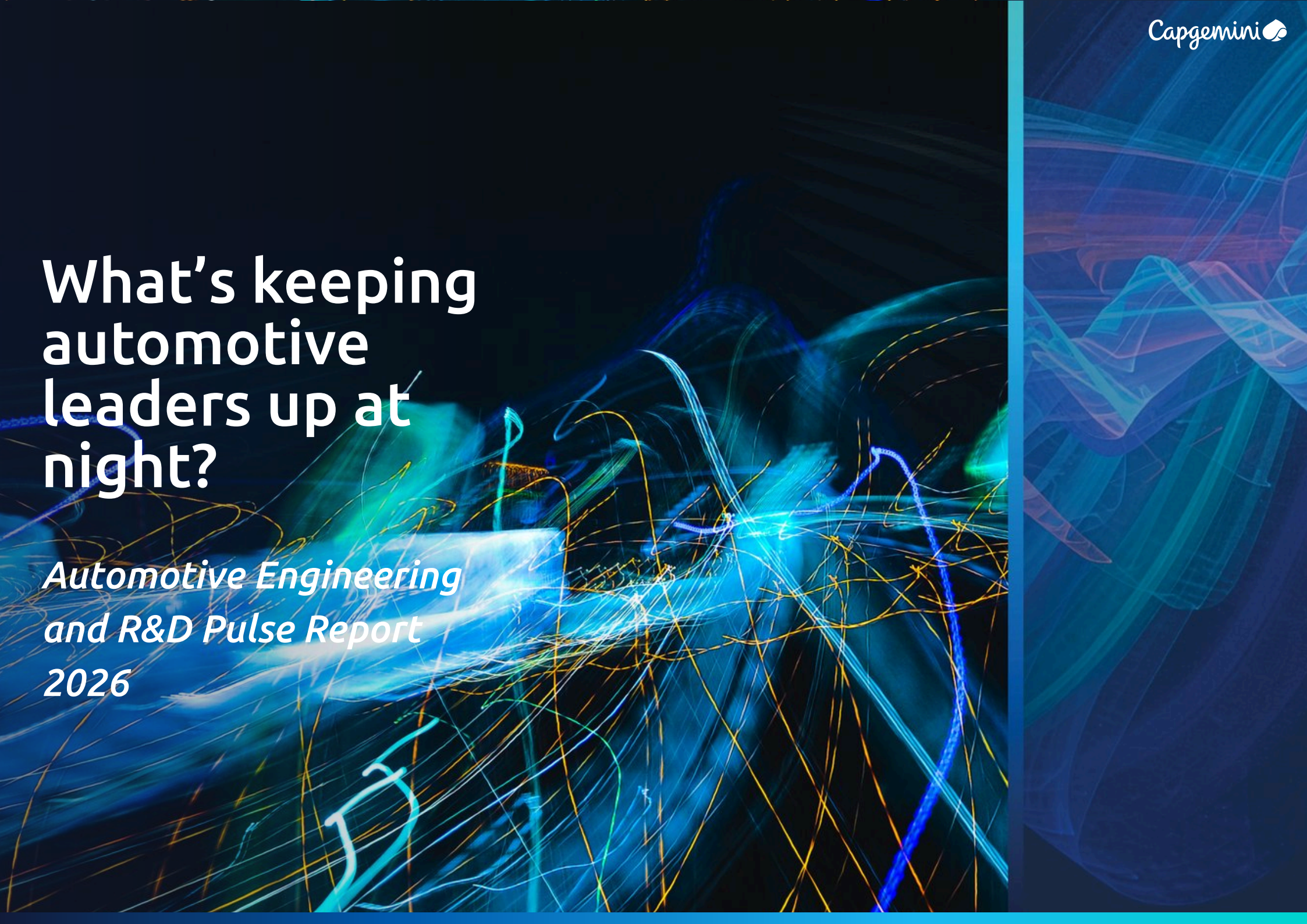


What's keeping automotive leaders up at night?

Automotive Engineering and R&D Pulse Report 2026

Pity the carmakers. Following decades of investment in refining combustion engine technology, optimizing global supply chains, and building trusted brands, established carmakers would be forgiven for believing they had an insurmountable lead.

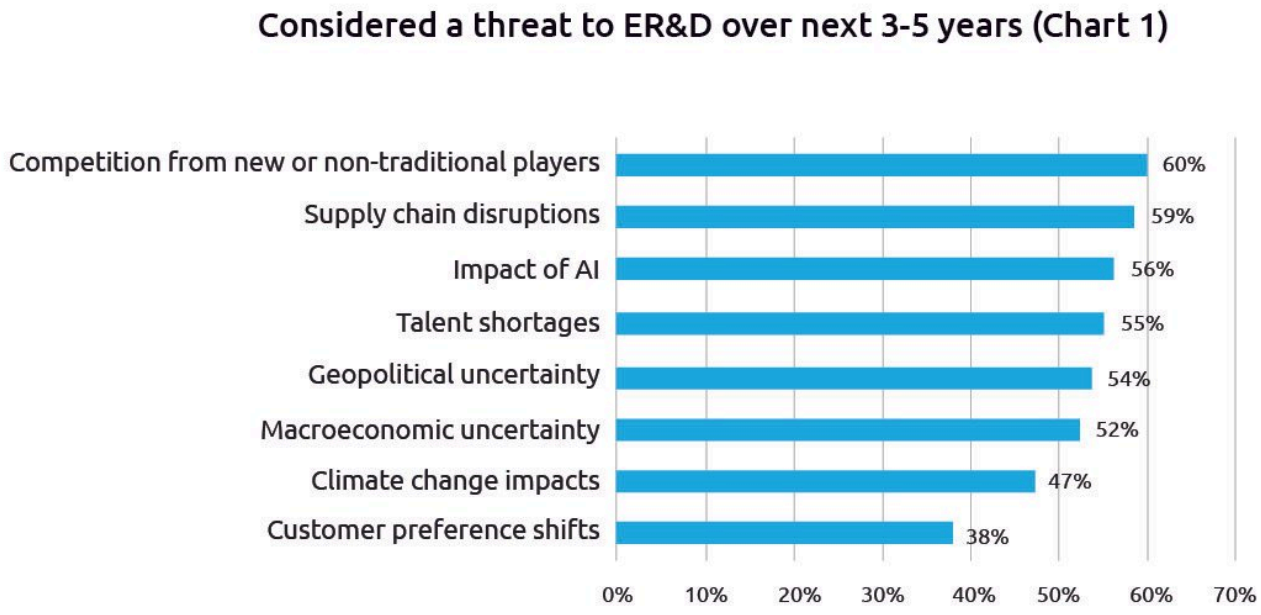
Yet, as our ER&D Pulse survey of 200 automotive leaders shows, their world has changed enormously in the past few years. It faces challenges from all sides – transformed engineering requirements from EVs and smart cars, geopolitical turmoil, and revolutionary engineering technologies, like SDVs (Software Defined Vehicles), and AI/GenAI, which their organizations are struggling to adopt at scale.

Against this backdrop of endless unknowns, Capgemini Engineering seeks to bring some clarity. We surveyed 200 automotive leaders at large organizations – as part of our cross-sector Engineering and R&D Pulse 2026 Report [1] – to understand how the sector is responding to these pressures. We believe that a collective view of the industry will help everyone, and we hope the data we present here helps companies gauge their position relative to their peers, and better understand shared challenges and solutions.

The challenges

Top of the list of automotive leaders' concerns was growing **competition from new players,** cited by 60% of respondents. New entrants from China – as well as Tesla and its imitators – are showing they can produce quality EVs 20% cheaper [2] and twice as fast. This is no longer just about lower labor costs outside the West – though it helps – but better mastery of supply chains, smart manufacturing technologies, and agile, collaborative cultures.

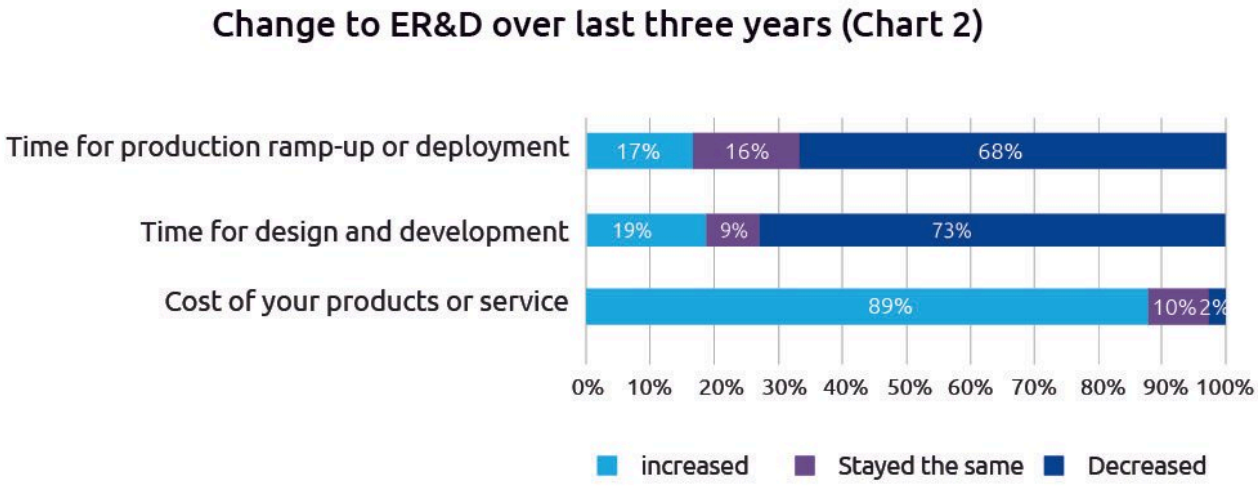
This pressure to adapt comes at a time of wider upheaval, when getting parts and skills is becoming harder, costlier, and less certain. Fifty nine percent of automotive leaders cited supply chain disruptions as a major threat to production, whilst 54% cited geopolitical uncertainty, and 55% cited access to talent (Chart 1).



A need for lower costs and time-to-market acceleration

All of this is impacting the bottom line, with 89% of respondents saying costs have increased in the last three years.

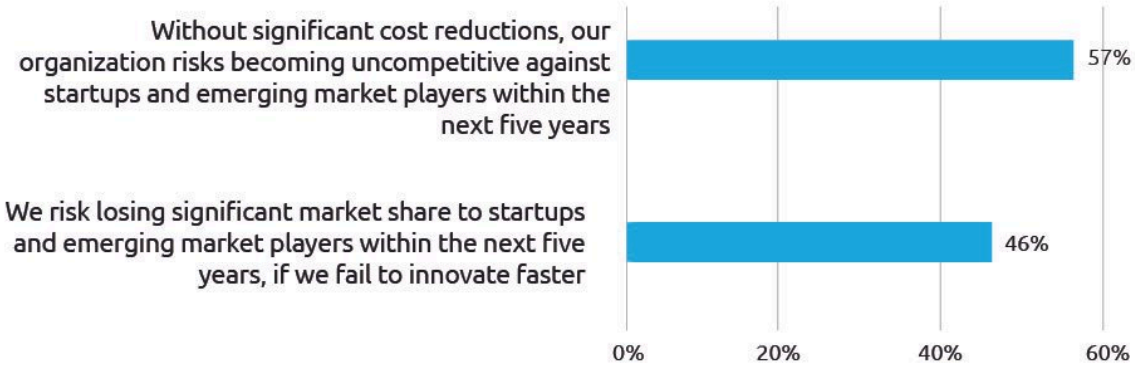
It's not all bad news, however. Companies are rising to the challenge, with most saying their product design and development time, and their production ramp-up time, have decreased in recent years (73% and 68% respectively) – no doubt a sign they are getting better at deploying new digital technologies (Chart 2).



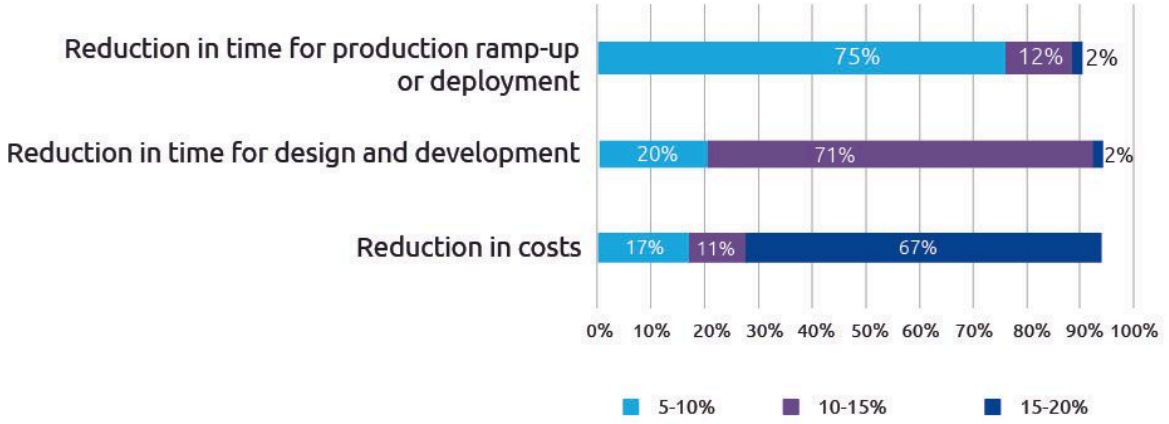
Nonetheless, companies still see an urgent need for further reductions in cost and time-to-market. Many believe they risk losing significant market share to startups and emerging market players within the next five years if they fail to make significant cost reductions (57%) or innovate faster (46%) (Chart 3).

In fact, over the next 2-3 years, most organizations say that – in order to remain competitive – they need to decrease costs by 15-20% (67% of respondents), reduce time for product or service design and development by 10-15% (71% of respondents) and reduce time for production ramp-up or deployment by 5-10% (75% of respondents) (Chart 4).

Risks to competitiveness (Chart 3)



Level of change needed remain competitive? (Chart 4)



Looming over all of this is AI, cited by 56% as a disruptive technology and seen by many as an opportunity to address the above challenges.

In a world being disrupted by new challengers, a new geopolitical order, and new technologies, all at once, how are automotive companies responding?

This report looks at data from our survey to examine industry responses, ambitions, and challenges, as well as sharing some of our own insights – learned from working with many leading automotive engineering companies – into how to thrive in this new world.

"As AI rapidly advances, we have been early adopters across our business… embedding AI directly into our vehicles… and accelerating our AI momentum across the enterprise." [3]

Ned Curic | Chief Engineering & Technology Officer | Stellantis

"AI is our key to greater speed, quality, and competitiveness – across the entire value chain." [4]

Hauke Stars | Member of the Board of Management for IT | Volkswagen Group


Capgemini
Solutions
being pursued

When asked to rank their strategic priorities in order, from a list of six, improving agility came out highest, with 63% ranking it in their top two priorities, followed by speed to market, where 59% said it was priority 1 or 2. Cost-cutting and regulatory compliance, whilst not as high in the ranked list or priorities, were both still cited as important (56% and 72% respectively) over the next 18 months.

If automotive companies are to stay competitive into the next decade, they must **become more agile** to thrive in a volatile world. And they must **reduce costs** and **shorten innovation cycles** to stay competitive, all **without compromising safety.**

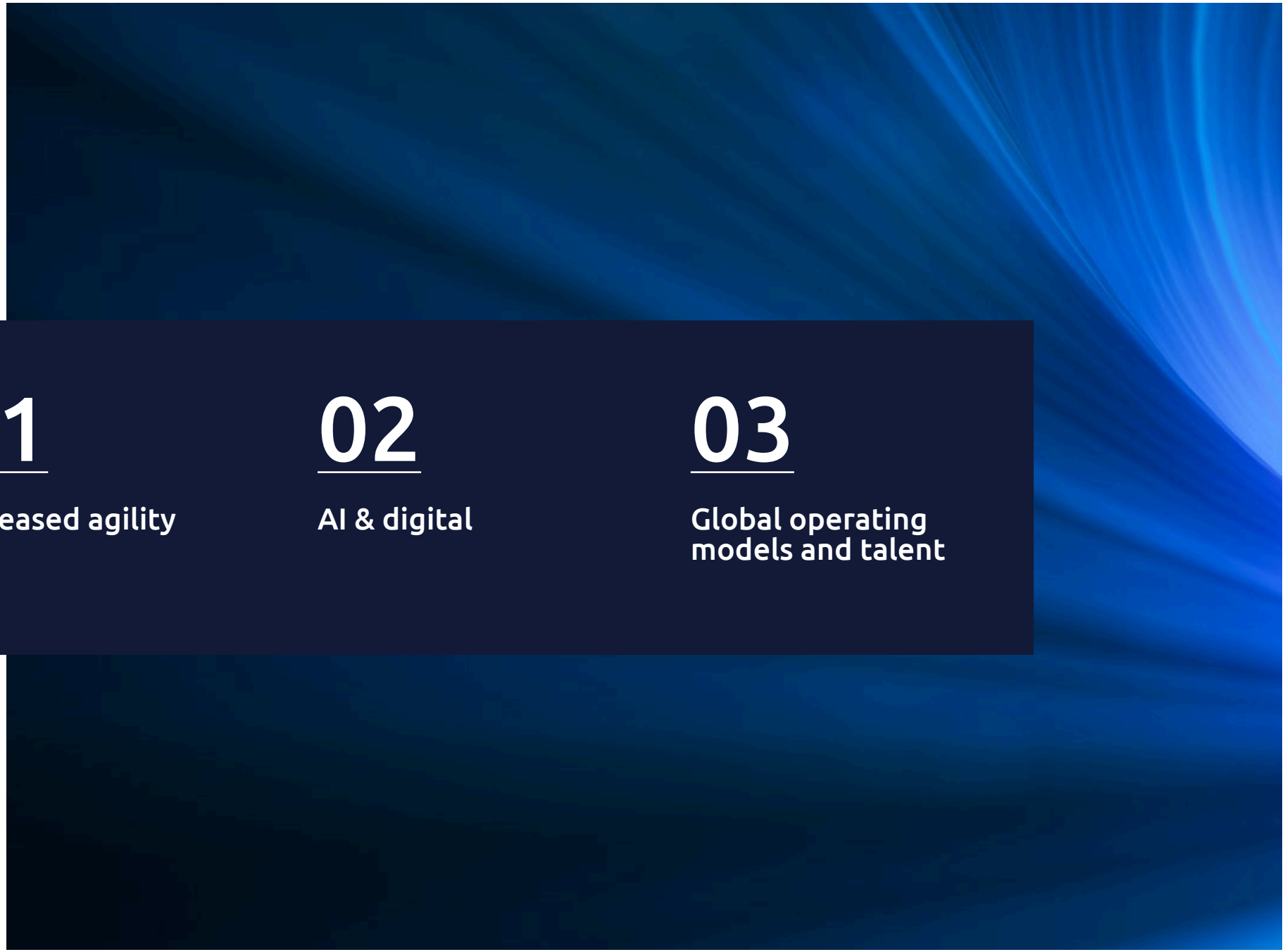
How are automotive leaders attempting to build these efficient and resilient organizations? We looked at three overlapping responses: making organizations more agile, digital technologies including AI, and global operating models and talent.

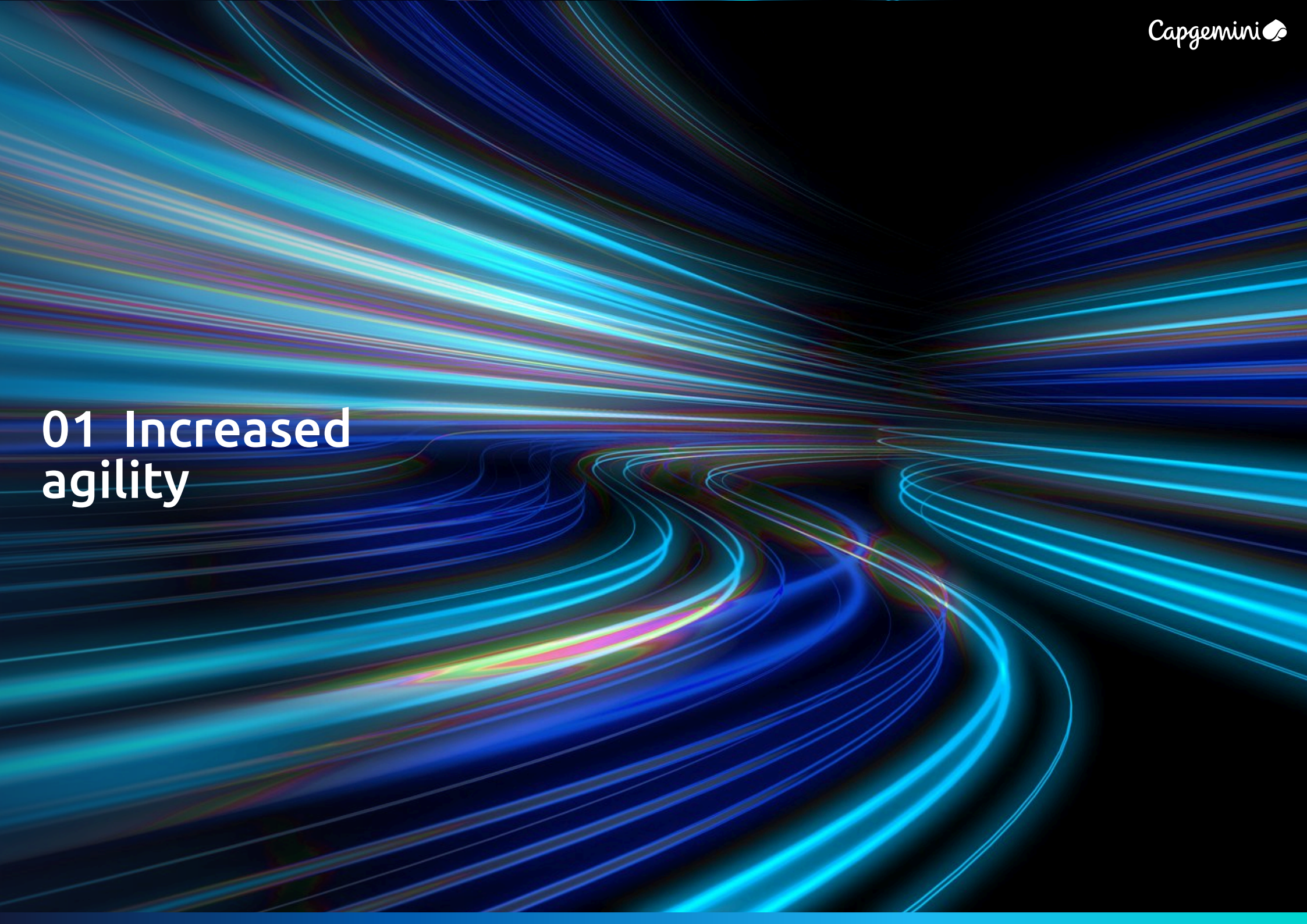
"Insurgent Chinese OEMs, for example, had an average cost per full vehicle equivalent development that was 27% of the average FVE for the top five German OEMs from 2020 to 2024." [5]

– Bain

"China's new EV-focused automakers have slashed the time required to develop a new vehicle, taking new electric models from concept to launch in roughly 24 months — twice the speed of other automotive companies, where lead times reach 40 to 50 months or even longer." [6]

– McKinsey


01
Increased agility
02
AI & digital
03
Global operating models and talent

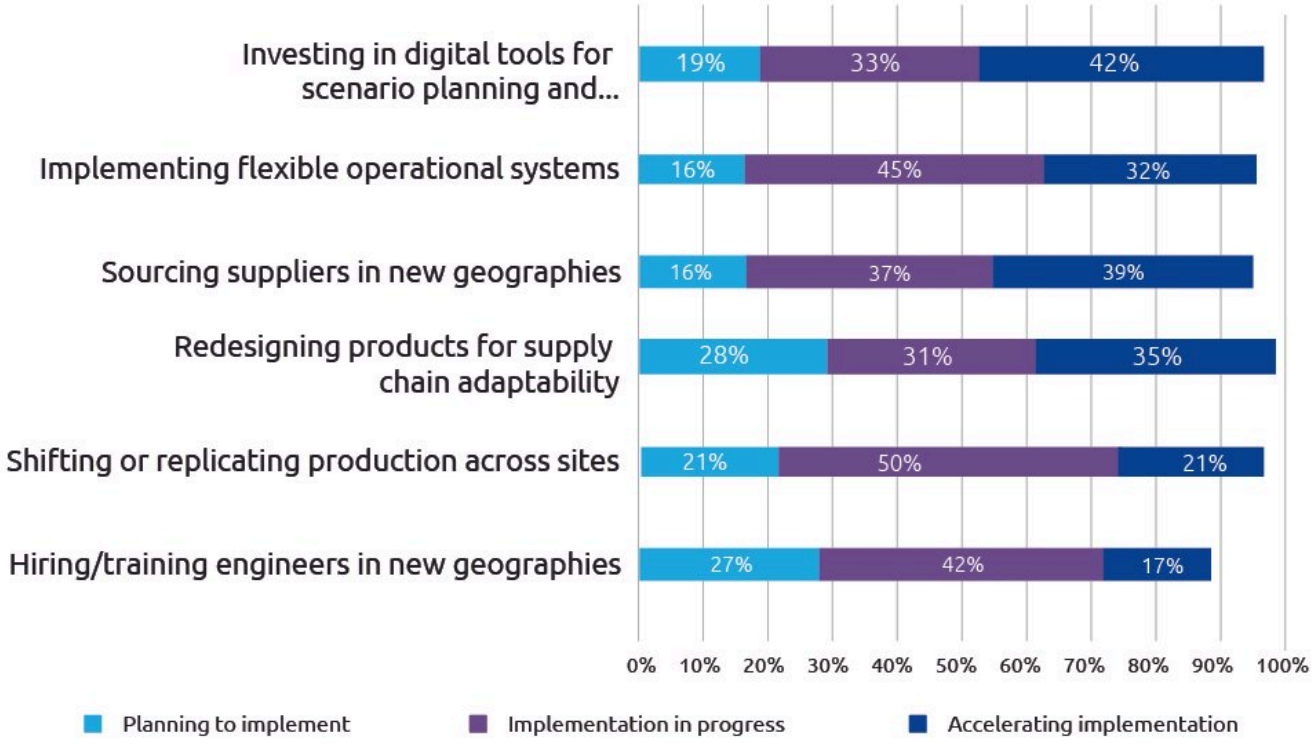

Capgemini
01 Increased agility

A key response to the structural pressures facing automotive engineering organizations is to build organizational agility – the ability to adapt rapidly to volatility without derailing cost, timelines, or compliance.

Companies are pursuing multiple levers to strengthen agility and resilience against global shocks.

93% have invested in (or are planning to invest in) digital tools for scenario modelling and risk planning. This should help them assess the impact of tariffs, geopolitical shifts and climate risks earlier, and respond proactively. Others are sourcing suppliers in new geographies to hedge against risks to individual countries (91%) or redesigning products for greater supply chain adaptability (94%), for example, through alternative materials or components (Chart 5).

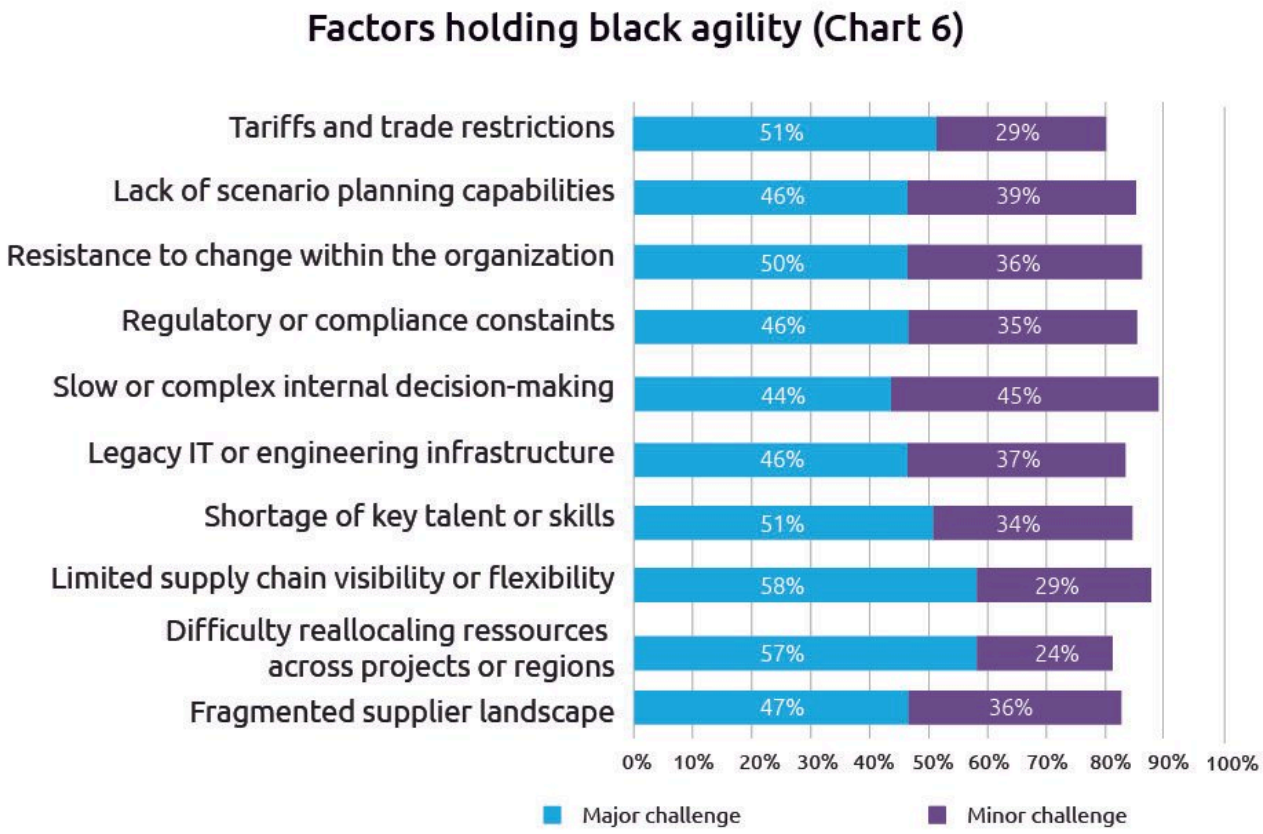
Actions over next 2-3 years to improve global agility (Chart 5)



Agility is closely linked to global delivery models and AI adoption. Investments in outsourcing and global talent (discussed in Part 3: Global operating models and talents) also help organizations reduce dependence on specific regions or constrained skill pools. AI investments stand to enhance process efficiency across engineering, manufacturing, and support functions.

Likewise, digitalisation is key to agility. Asked about approaches to improve efficiency, **77% said they were investing in digital modernization** (e.g. cloud-native platforms, DevOps, digital twins) and 52% plan to increase this over the next 2-3 years. Only with fully digitized processes can organizations become untethered from their physical locations, and be truly agile.

However, organizations recognize significant structural barriers to resilience. This includes difficulty reallocating people, capital, and assets across projects or regions (57% cited as a major challenge) and a shortage of skills (51%) (Chart 6). These constraints limit the ability to change course quickly.



As a result, internal reorganization of engineering and R&D functions is rising up the agenda. While only 24% are actively restructuring today, 59% plan to do so within the next 2-3 years, signaling recognition that legacy operating models are too rigid for a software-defined, globally distributed industry.

Fully digitized, integrated engineering environments enable distributed teams – whether in-house, outsourced, or through partners and suppliers – to collaborate seamlessly, share data securely, and operate to consistent safety and compliance standards. Manufacturing configurations can be replicated, validated, and transferred more easily. Work programs can be rebalanced rapidly when the environment changes. New talent pools can be established and scaled globally, without compromising engineering rigor.

In a sector where safety and regulatory obligations are non-negotiable, agility means designing operating models that reduce cost, shorten development cycles, and absorb shocks – while preserving the quality, traceability, and compliance that define automotive engineering excellence.

Agility in action: Digital production systems increase manufacturing agility

BMW is using digitalisation, AI, and cloud platforms to make its global production network more flexible and responsive to change. Through its BMW iFactory initiative, the company is digitizing logistics and manufacturing processes across plants, creating standardized data systems and digital twins of production facilities. These tools provide real-time transparency into supply chains and factory operations, allowing teams to simulate changes and adjust production more quickly. BMW executives say the digitalization of production logistics "significantly increases transparency and standardization, allowing us to respond more quickly to changes in demand or supply shortages".

Connecting plants through shared digital platforms allows BMW to roll out process improvements globally, coordinate suppliers more effectively, and adapt production programs faster – all while maintaining consistent quality standards. [7]

02 AI & digital

AI is one of the biggest disruptive threats and biggest opportunities in automotive R&D, engineering and manufacturing. Applied effectively, it can streamline processes across the vehicle lifecycle. But it comes with challenges around scaling use cases.

Automotive leaders are positive about AI. Many expect it to play a significant role in their goals of reducing time-to-market and cutting costs across the development lifecycle. In a sector under pressure to shorten development cycles, AI is increasingly viewed as a strategic lever.

Over the next 2-3 years, AI (including Gen AI and agentic AI) will be transformative for:

71%

Maintenance and support (e.g. AI-based diagnostics, predictive maintenance planning, intelligent support bots)

65%

Research and concept development (e.g. AI-powered literature mining, feasibility analysis, idea generation)

63%

Documentation, compliance and IP management (e.g. AI-generated documentation, automated compliance checks, patent landscape analysis)

55%

Manufacturing and operations (e.g. AI-based production scheduling, computer vision for quality control, predictive supply chain planning, autonomous material handling)

45%

Design and prototyping (e.g. generative design, AI-assisted CAD, rapid prototyping, design optimization)

44%

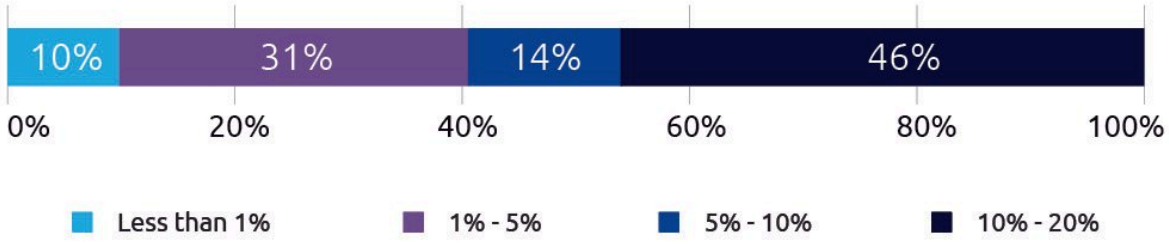
Simulation and testing (e.g. AI-enhanced simulation, anomaly detection)

Beyond efficiency gains, GenAI can improve organizational agility in tangible ways. It can generate initial CAD concepts, software code, and test cases. It can analyse supplier data to quickly identify alternative components when shortages occur.

Excitement is matched by commitment. Nearly half (46%) of respondents are allocating 10-20% (Chart 7) of their engineering and R&D budget to AI-related initiatives, and 87% expect that investment to rise.

Many execs are already seeing benefits from AI. All who had used it noted gains across the board. And many cited gains exceeding 20% in productivity, efficiency in operations, cost reduction and accelerated time-to-market. Significant proportions also cite over 20% improvements in speed to concept and enhanced product or service value (Chart 8).

Percentage of ER&D budget allocated to AI-related initiatives (Chart 7)



Benefits already realized by leadership from AI (Chart 8)

68%

say AI allows increase in more than 50% **speed to concept** due to rapid concept generation and faster iteration cycles

47%

say AI allows increase in more than 50% **enhanced product or service value** in terms of revenue impact

59%

say that **GenAI and agentic AI are enabling new opportunities for innovation and efficiency,** in goals towards cost and speed

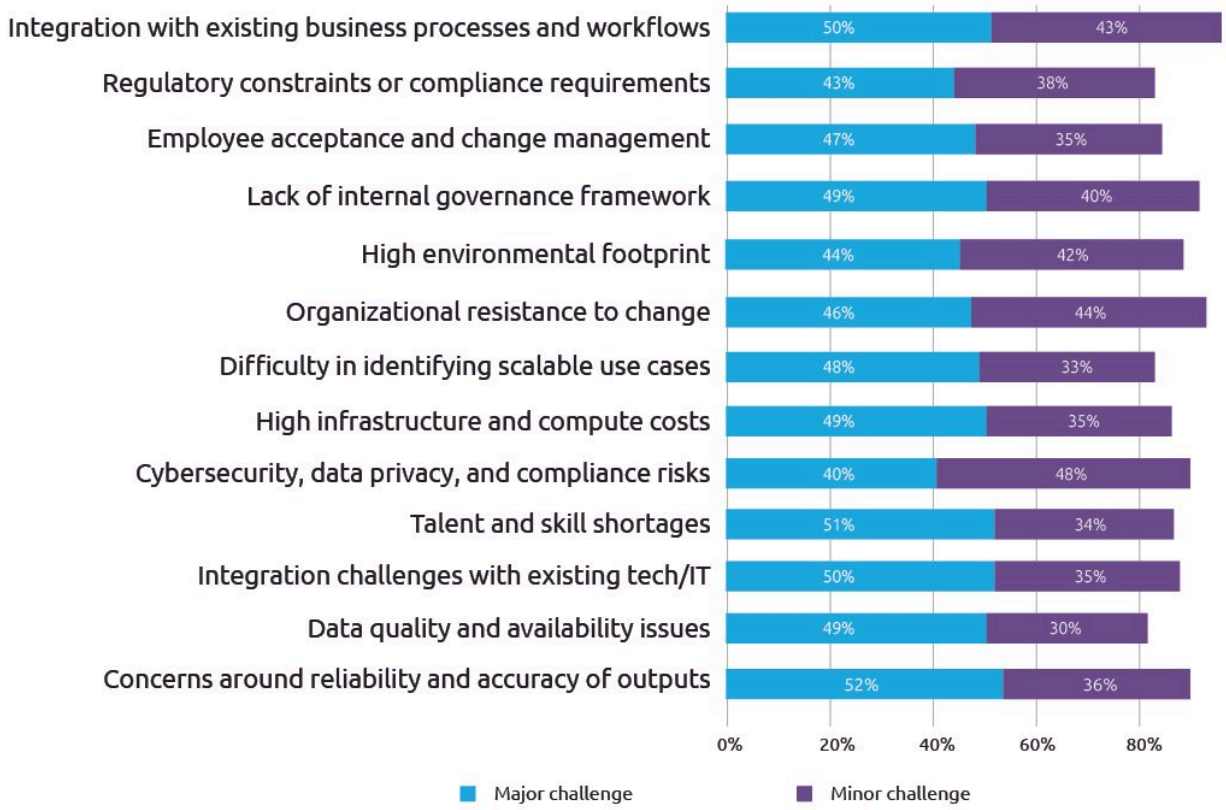
55%

say that their leadership views **GenAI and agentic AI as strategic priorities** for engineering and R&D

Nonetheless, our data and experience suggest companies should not be complacent about early AI gains. Delivering successful projects is one thing. Embedding AI safely and reliably at enterprise scale – across safety-critical engineering environments – is far more complex (Chart 9).

Despite their optimism, automotive organizations note many concerns around being able to scale GenAI and agentic AI beyond the pilot stages. These include integration challenges with both existing tech/IT systems and business processes and workflows (50% listed both as a major challenge), questions over reliability and accuracy of outputs (52%), and AI-related talent shortages (51%). Left unaddressed, these will constrain the ability to scale AI in a way that is cost-effective, compliant, and delivers organization-wide value.

Barriers to scaling Gen AI and agentic AI for engineering and R&D beyond pilot stage (Chart 9)



To truly realize the benefits of AI, organizations will need to invest in the infrastructure to support it. AI must move from a series of projects to something embedded in the organization, through the relevant platforms, including components, systems, and functions across the different vehicle models. That includes engineering vehicle platforms augmented by AI to allow access to models and data across silos, and policies and governance to give users confidence to use it correctly.

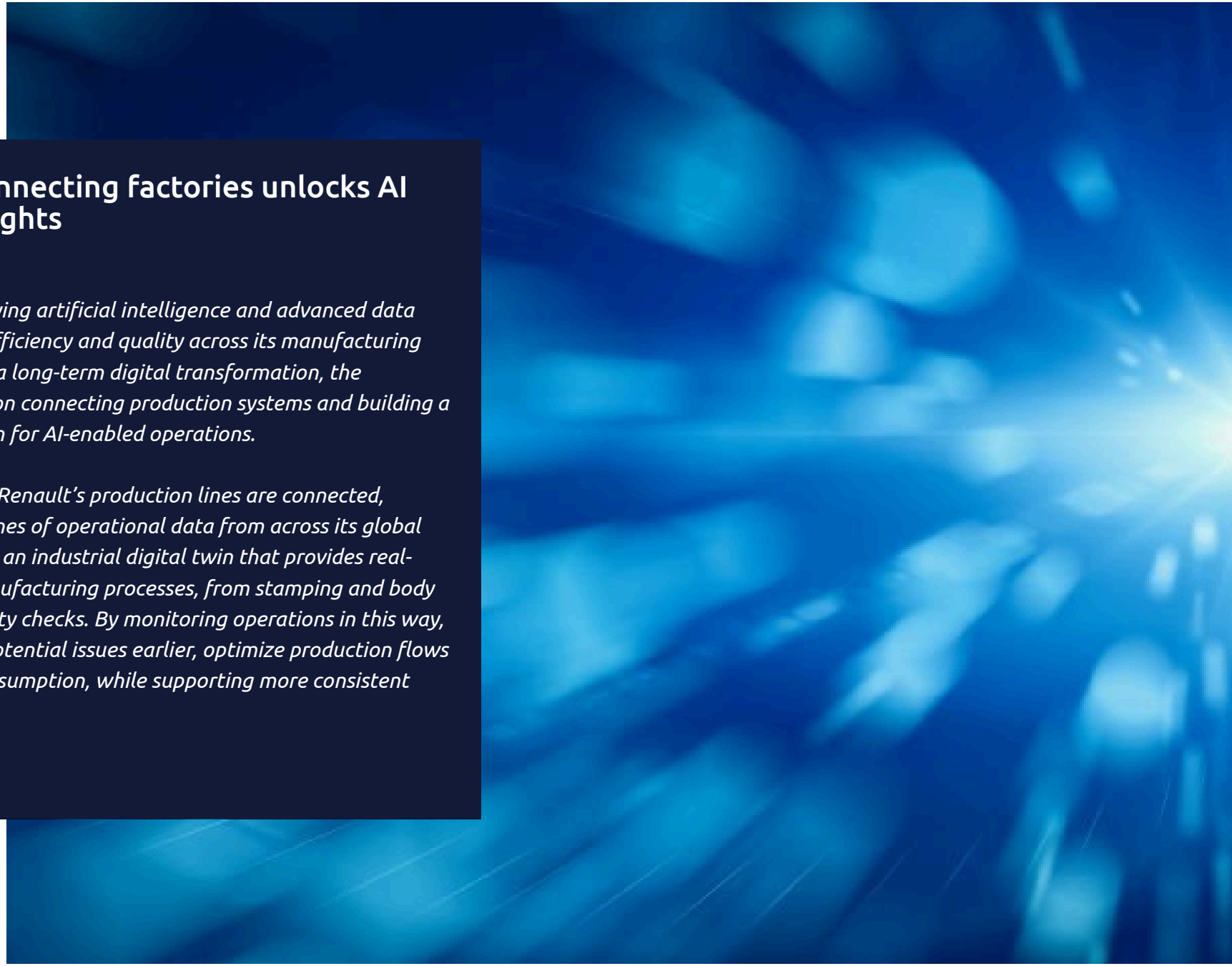
It requires well-designed human-in-the-loop and AI checks to align engineering outputs to real-world safety and compliance. And it needs investments in training and culture to nurture an engineering workforce ready for the world of human-AI hybrid teams.

AI at scale has the potential to deliver the objectives the industry demands: lower development costs, shorter innovation cycles, and a more flexible and agile organization. But it will need more than a few promising use cases to do so.

AI in action: Embedding AI across engineering and manufacturing

General Motors (GM) *is undertaking a broad transformation to integrate artificial intelligence deeply across its engineering and operations. Rather than treating AI as a standalone research effort, the company is applying it across manufacturing, product development and supply chain management as part of its shift toward software-defined vehicles and electrification.*

In its industrial operations, GM is using tools such as digital twins, predictive quality analytics and AI-supported supply chain planning to improve production efficiency and detect potential issues earlier. These capabilities help reduce costs, improve product quality and make manufacturing operations more resilient as the company invests in new vehicle technologies. [8]



AI in action: Connecting factories unlocks AI production insights

***Renault Group** is applying artificial intelligence and advanced data analytics to improve efficiency and quality across its manufacturing operations. As part of a long-term digital transformation, the company has focused on connecting production systems and building a strong data foundation for AI-enabled operations.*

Today, around 90% of Renault's production lines are connected, generating large volumes of operational data from across its global plants. This data feeds an industrial digital twin that provides real-time visibility into manufacturing processes, from stamping and body assembly to final quality checks. By monitoring operations in this way, Renault can identify potential issues earlier, optimize production flows and reduce energy consumption, while supporting more consistent vehicle quality. [9]

03 Global operating models and talent

Global operating models hold promise for all three priorities outlined at the start of this report: the potential for faster innovation, lower engineering costs, and agility. Such models do this by removing the bottlenecks caused by talent scarcity in traditional operating locations.

Crucially, outsourcing is evolving from a tactical cost-cutting lever into a strategic engine of innovation.

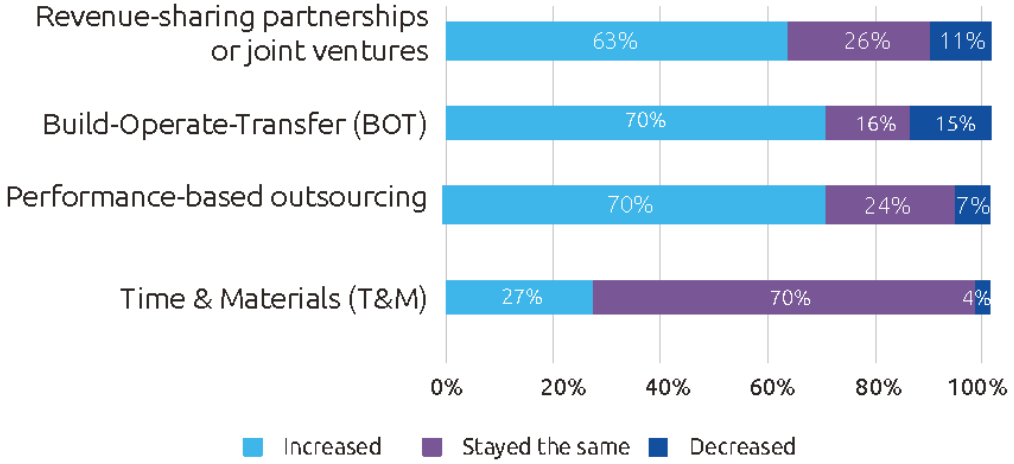
We see this in the data. 'Lift and shift' of specific engineering or R&D activities to outsourced locations still remains popular with 77% of organizations using this approach (and 63% planning more over the next 2-3 years). But the more strategic approach of establishing Centers of Excellence (CoEs) has become just as popular, with 70% operating these and 71% saying they will do more over the next 2-3 years (Chart 10).

CoEs give organizations a centralized hub of specialized expertise – with standardized best practices, optimized processes, and cutting-edge technologies that would be hard to retrofit internally. The result is scalable, high-productivity delivery that reduces cost per program while maintaining rigorous quality and regulatory standards.

Use of global operating models (Chart 10)

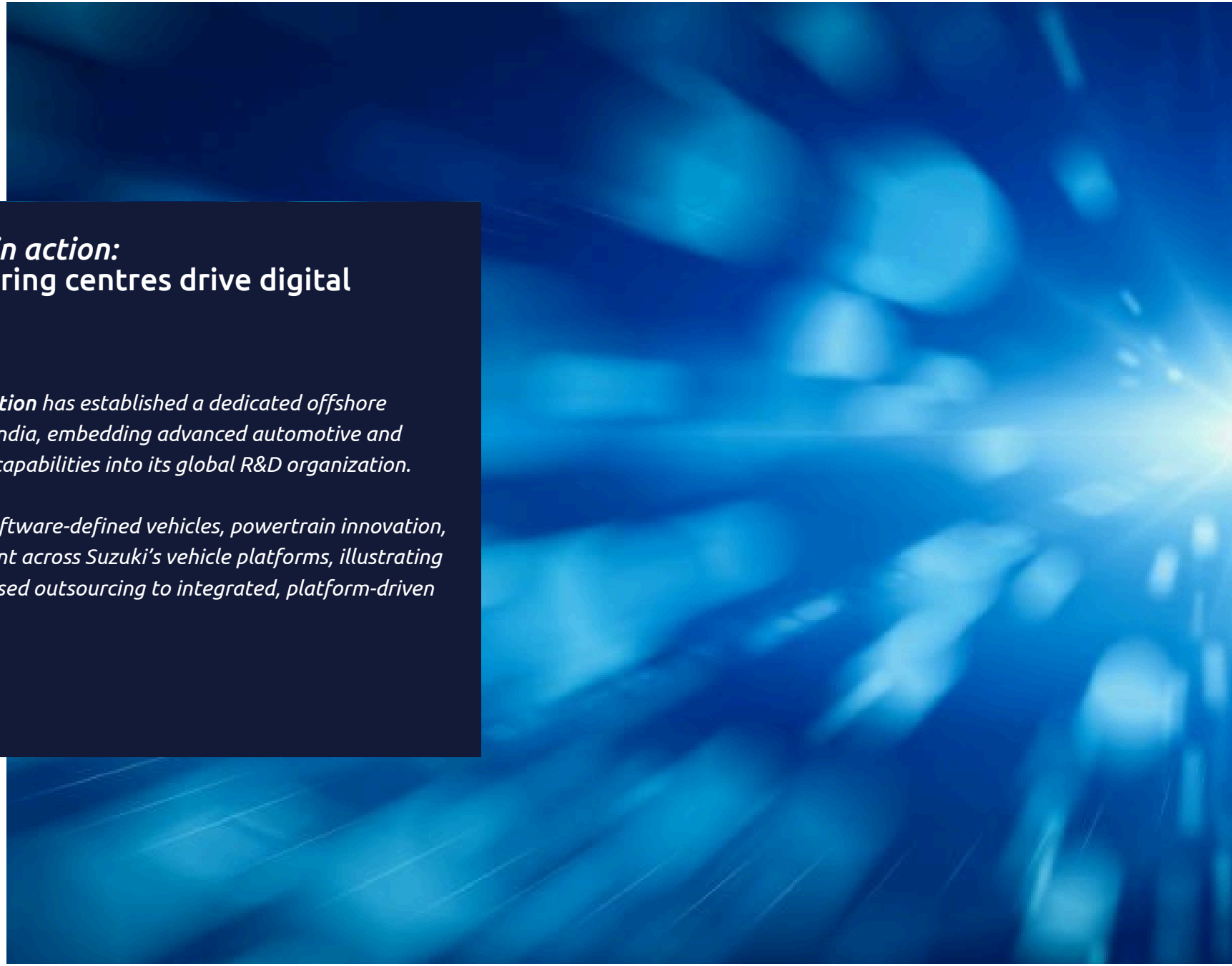
	Pursuing now	Plan to increase use
Outsourcing specific engineering or R&D activities	77%	63%
Owned offshore Centers of Excellence	70%	71%

Planned use of oursourcing models over the next 2-3 years (Chart 11)



Likewise, outsourcing models appear to be evolving. Time & Materials remains popular, but 70% plan to increase use of Performance-Based Outsourcing and Build-Operate-Transfer (BOT) (Chart 11). Both are more strategic outsourcing models that give outsourced facilities more autonomy to deliver an outcome in the best possible way. These approaches incentivize facilities to innovate to find cheaper and faster ways of delivering, whilst keeping within the boundaries of quality and compliance.

Beyond outsourcing, partnering is also accelerating. Today, 36% collaborate with external technology vendors – hyperscalers, platform providers, and innovation specialists – to advance product engineering and R&D, and 60% expect to expand these partnerships over the next 2-3 years. As vehicles become software-defined platforms, competitive advantage is shifting from vertically managed supply chains to diverse orchestrated ecosystems. The traditional OEM – Tier 1 to Tier 2 hierarchy is giving way to multiple partnerships across software, semiconductors, cloud, and AI. Winning automakers will be those that create, manage, and monetize these ecosystems – not merely assemble vehicles.



Global models in action: Global engineering centres drive digital innovation

Suzuki Motor Corporation *has established a dedicated offshore engineering center in India, embedding advanced automotive and software engineering capabilities into its global R&D organization.*

The center supports software-defined vehicles, powertrain innovation, and virtual development across Suzuki's vehicle platforms, illustrating a shift from project-based outsourcing to integrated, platform-driven engineering. [10]

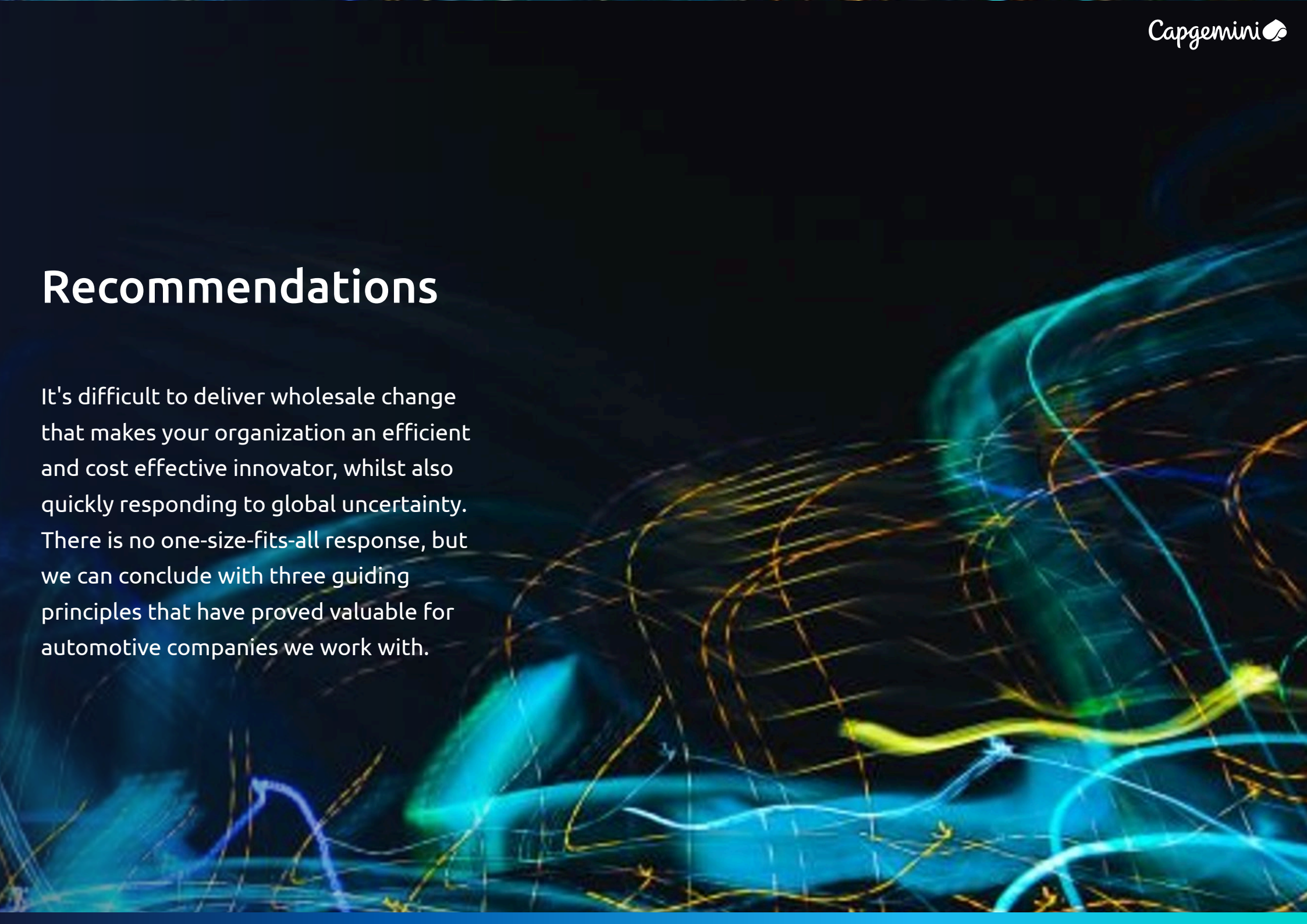
Global models in action: Strategic offshore capabilities boost R&D

Mercedes-Benz Group *has established Mercedes-Benz Research & Development India as its largest R&D center outside Germany, embedding Indian engineering teams into global vehicle platforms, software-defined vehicle architectures, and digital product development. The center illustrates how OEMs move from offshore delivery to strategic, platform-level engineering integration.*

This perfectly illustrates the shift from project-based offshoring to platform-level, embedded engineering capability, supporting multiple vehicle models and architectures globally. It also highlights India as a core pillar of its long-term engineering strategy. [11]

Recommendations

It's difficult to deliver wholesale change that makes your organization an efficient and cost effective innovator, whilst also quickly responding to global uncertainty. There is no one-size-fits-all response, but we can conclude with three guiding principles that have proved valuable for automotive companies we work with.



01

Take a *digital-first* approach to underpin agility

Digitization of processes from R&D to manufacturing is the foundation of efficient, agile global operations. A digital-first approach – a focus on using digital technologies by default, underpinned by fully digitized processes and modern, integrated infrastructure across R&D and manufacturing – enables organizations to operate beyond physical constraints.

When both are in place, organizations become untethered from their physical locations and can act globally. They can spool up talent, collaborate around the clock, or shift work packages to better-suited locations. What's more, joining up and standardizing data silos and IT systems makes AI viable at scale.

This has been known for years, but organizations are still on this journey. As such, it is worth reiterating, considering how important this step is.

Create ecosystems to embrace new technologies

As software becomes a more critical part of the vehicle, OEMs and Tier 1s should deeply embed the shift from hierarchical supplier relationships to ecosystem orchestration. That means OEMs defining a clear software and platform architecture for each product, identifying the critical capabilities they must own, and building long-term partnerships around the rest. They will need strong relationships with chipmakers, hyperscalers, systems integrators, sources of software talent and training.

02

Make AI “business as usual”

The automotive AI market is projected to grow from 5.351 USD Billion in 2025 to 59.33 USD Billion by 2035, with a CAGR of 27.2% during the forecast period 2025 - 2035.

Source

In-house, AI can make everything more efficient. But to date, most AI successes have been about upgrading a defined process. To really prove valuable, it must work at scale.

For example, a truly transformed process for component design could see requirements captured in natural language. Its designs could be generated and iterated by AI against engineering constraints, simulations and compliance checks run automatically, supply chain and sustainability impacts assessed in parallel. And its documentation, testing, and certification could be prepared continuously as the design evolves.

Here, AI does not optimize isolated steps, it supports human teams across the lifecycle. That would hugely compress innovation cycles and costs, delivering greater speed, accuracy, and value, because it operates within the context of the process as a whole.

That requires organizations to think differently. AI should not be a project delivered by specialist teams, problem by problem, but more like a tap that people can turn on as they need it.

It starts with making AI accessible where it is needed. AI developers must be able to easily access high-quality data from across the organization and libraries of pre-approved models and tools. Everyone else needs to be able to access proper AI tools, some off-the-shelf, some purpose-built for their needs.

For AI to deliver value across entire processes, companies need the digital infrastructure to host and manage such tools and data – with access permissions and standardization that allows data to be shared, and AI agents that interact across business silos.

It also requires policies for access, cyber security, robust checks on outputs baked in, and guidance on proper use, so teams have the confidence to experiment safely.

Finally, organizations need a cultural shift to human-AI collaboration. Roles, workflows, and culture must evolve, so scientists and engineers can work effectively and safely with AI. This is not just about training courses, but nurturing curiosity by giving people access to AI tools with built in safety-checks, guidance, and safe spaces to learn by doing. Our recent paper on scaling AI [11] explores this in more detail.

03

Make outsourcing a strategic lever for high-value work

The global digital transformation market size is expected to reach USD 5,493.15 billion by 2033, registering a CAGR of 19.4% from 2026 to 2033.

Source

Outsourcing has often been seen as a way to deliver routine tasks in cheaper countries. But increasingly, outsourced teams are delivering strategically valuable work from software development, to compliance management, to end-to-end product development.

This needs the aforementioned digital foundations, but also a rigorous framework for allocating and managing what gets outsourced. A practical way to do this is the Core/Context framework, popularized by Geoffrey Moore.

This framework forces organizations to distinguish between Core activities that create market differentiation and Context activities that don't.

Core covers areas like R&D for your next big innovation, which are best kept in-house.

Context is everything else. Context activities can still be mission-critical, but they do not differentiate you from your competitors. These activities make up most of the business's work, and can be safely outsourced to partners with facilities, digital technologies, local talent, and economies of scale to do things more efficiently.

Compliance, supply chain management, and production and support of profitable legacy products, are all examples of 'Context' activities that Capgemini Engineering customers have outsourced, and seen huge improvements, not just in cost and efficiency, but in product and process innovation.

The Core/Context framework provides the discipline to expand global delivery without jeopardizing safety or compliance. It helps identify Context activities for outsourcing. And it provides a process of breaking these down into clearly defined tasks that specify inputs, outputs, competencies, toolchains and KPIs. Once codified, these activities can be shifted to regions or facilities that can deliver them more efficiently, whilst keeping Core activities close to the company's own facilities.

Conclusion

Digital transformation, strategic outsourcing frameworks, ecosystem orchestration, and empowering people to use AI – these all contribute to organizational agility, reduced costs, and faster innovation. If done right, all of that is possible whilst maintaining the highest standards of safety and compliance. **Of course, none of that is easy. But transformation never is.**

There are people who can help with all of this. To discuss the challenges, opportunities and solutions raised in this paper, contact the contributors.

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Research methodology

The data in this report is based on our 200 senior leaders in automotive engineering organizations, and part of our cross-industry 2026 Engineering and R&D Pulse Report. Data was gathered via a survey of 29 questions in September 2025.

Respondent titles

- VP: 34%
- SVP/EVP: 31%
- C-level: 17%
- Senior director: 12%
- Director: 8%

Respondent sub-sector

- Tier 1 suppliers: 49%
- Passenger vehicle OEMs: 26%
- Mobility technology providers: 17%
- Commercial vehicle OEMs: 10%

Respondents' headquarters location

- Europe: 61%
- North America: 19.5%
  (14% US, 3% Canada, 3% Mexico)
- APAC: 16%
- Middle East: 3.5%

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