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COO Agenda

The European automotive industry has reached a breaking point

A quick look at the main insights

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Introduction

The European automotive industry has reached a breaking point. For the last five years, many OEMs, suppliers, and regulators have assumed a steep EV ramp-up and fast phase out of ICE demand and production. This directed many investments along the value chain in products and capacity for EVs. Actual market development, however, requires course correction in the industry.

European Automotive faces several structural challenges:

A. **Geopolitical tensions** disrupting supply chains, tariffs, raw material access, and the regulatory environment, are forcing footprint and sourcing decisions under high uncertainty. Since 2020 alone, 40 countries have introduced new critical raw material export restrictions, nearly double the number from the previous decade.
B. **Structural overcapacity at home** built up during the assumed EV ramp-up, now weighing on utilization, fixed-cost absorption, and plant economics across the continent. European players are hit hardest, where factory utilization in high-cost markets has dropped well below the 70–75% breakeven threshold.
C. **Intensifying competition from Chinese players** is bringing a significant price and speed advantage in both product development cycles and cost position, in China as well as in European markets, with Chinese OEMs hitting the market with 30% to 35% lower cost bases.
D. **An aging workforce** combined with a shrinking talent pipeline for both traditional manufacturing skills and the new software, electronics, and battery competencies the industry now depends on. Labor shortages and widening skill gaps alone are projected to erode around EUR 100bn in cumulative value between 2026 and 2030.
E. **Mature Markets are stagnating** as global light vehicle sales across North America, Europe, and Japan/Korea are forecast to remain essentially flat from 2025 to 2030.
F. **The rise of AI and physical automation** are simultaneously a competitive threat and the most powerful lever for operational reset. Industrial data and AI-enabled production are reshaping the factory floor faster than legacy operating models can absorb, and only those who can scale models and applications will turn the disruption into advantage.

At the same time, much of the industry's cash was consumed over the last years, which was especially true in case of family and private debt financed suppliers, and the industry now carries a **triple cost-burden** driven by simultaneous investments in:

- Next-generation EV platforms to counter the Chinese attack at home and abroad
- Prolonged and updated ICE and hybrid technologies (PHEV, REEV, HEV) to serve sustained demand in North America and an extended European transition
- AI-defined vehicle architectures

Each of these alone would strain balance sheets; carried together, they leave little room for error. Capital discipline and operational excellence are therefore no longer optional levers, but existential ones.

The industry has been off course, and the COO is key to correcting the course. We have derived six key themes that should be on top of the agenda of each COO.

1 | Current issues

A. Dependency on US & China

I. THE RULES OF GLOBAL TRADE HAVE CHANGED – PERMANENTLY

The logic underpinning the global economy is undergoing a fundamental shift. Where businesses once optimized for Cost, Delivery, and Quality the new imperative is securing supply, managing dependencies, and reducing exposure to structural risk. Governments around the world are intervening with growing confidence, deploying export controls, raw material restrictions, data regulations, and targeted trade measures as instruments of economic and national security policy. Access to critical technologies, materials, and ecosystems can no longer be taken for granted: it is increasingly conditional, politically influenced, and subject to rapid change. Since 2020 alone, 40 countries have introduced new critical raw material export restrictions, nearly double the number from the previous decade.[1] At the same time, geopolitical tensions are reshaping technology supply chains in real time; Chinese authorities, for instance, have directed domestic companies to discontinue cybersecurity software from over a dozen US and Israeli firms on national security grounds. For industrial companies, this is not a passing disruption to be managed tactically. Trade and regulatory fragmentation have become permanent features of the operating environment. As a result, the traditional framework built around the triangle of cost, delivery, and quality is no longer sufficient. A new model is needed, one that expands this foundation into a pentagon by adding two additional imperatives: resilience and de-risking. These are not optional enhancements. They are now core management priorities, as fundamental to long-term competitiveness as price and delivery performance ever were.

II. EUROPE IS TRAPPED IN DEPENDENCIES

European OEMs and suppliers face compounding structural vulnerabilities. Europe's competitive position is increasingly shaped by dependencies it does not control. The digital stack remains tied to US-dominated platforms such as cloud, AI tooling, and core enterprise software, while transition-critical materials and components are heavily linked to China-connected supply chains. Competitiveness today therefore depends as much on access and resilience as it does on cost and innovation, with supply security and regulatory compliance becoming decisive strategic factors. Europe's position in this landscape is paradoxical: the region remains a meaningful contributor to global R&D, yet its share of the world's top research investors has declined,[2] and frontier AI development, the defining control layer of tomorrow's software stack, is concentrated almost entirely in the US and China. The uncomfortable truth is that innovation investment does not automatically translate into strategic control. Europe continues to invest, but the platform and model layers that will determine how technology is accessed, controlled, and governed are being defined elsewhere. For European industrial companies, this is not an abstract concern, it is an operational reality that must be reflected in technology strategy, sourcing decisions, and long-term investment planning.

III. WHAT COOs NEED TO DO

1. Transparency first – Make geopolitical exposure manageable

Objective: Reduce dependency and disruption risk by creating full visibility, clear ownership, and deliberate decoupling where required.

Core Strategic imperatives are:
- Clarify Dependencies: Establish "tier-n" supplier transparency, define critical "red items," assign clear owners, and embed dependency visibility into sourcing and procurement workflows.
- Build Capabilities: Launch targeted academies in software, manufacturing, and power electronics with measurable outputs.
- Decouple Structure: Create separate US, China, and EU logistics and data lanes to buffer regulatory disruptions.
- Lock Platforms: Define your China posture and standardize platforms across OS, data strategy, and ADAS roadmap.

2. Flexibility beats footprint optimization

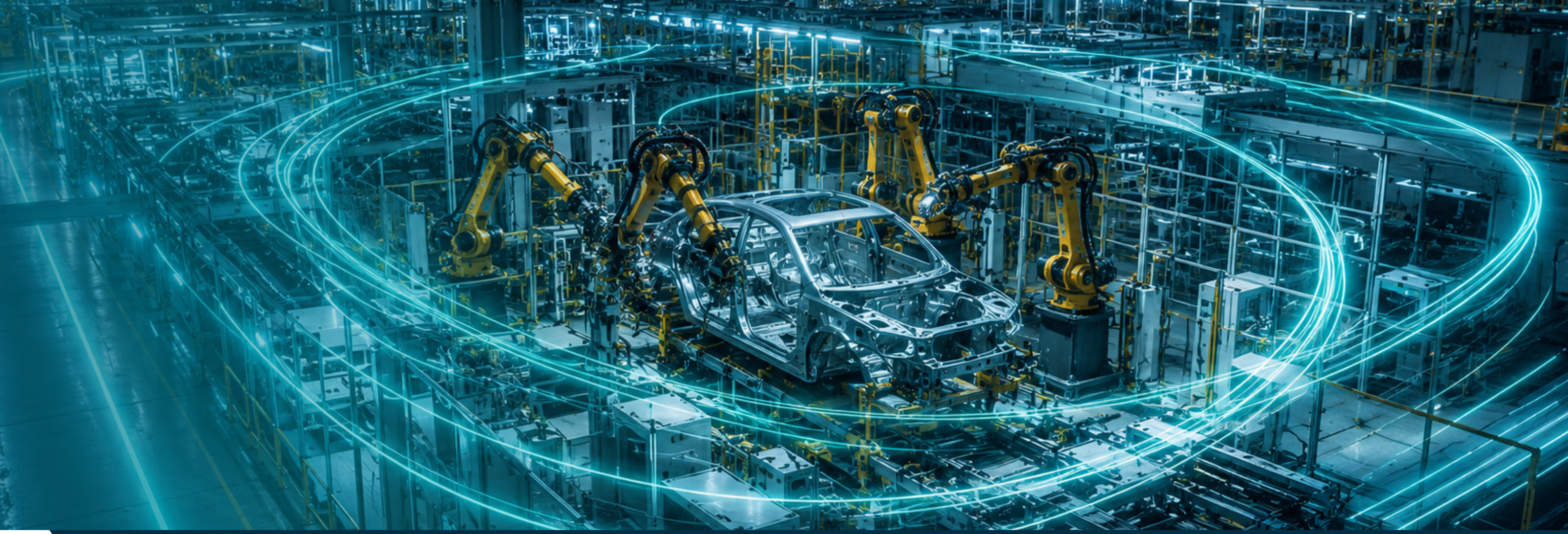
Objective: Replace the single globally optimized footprint with modular regional networks that can localize, re-route, and scale fast under trade, policy, or supply disruptions.

Core Strategic imperatives are:
- Regionalize Value Logic: Each region needs its own demand, trade, and supplier strategy.
- Modularize & Standardize: Keep platform interfaces, quality systems, and core processes copy-exact to preserve scale.
- Design for Reconfiguration: Build the network to shift volume, switch suppliers, and reroute fast and not just minimize unit cost.
- Tailor Manufacturing Concepts: Match regional models to local realities (EU: automation & flexibility; NA: scale & speed; CN: cost & ecosystem).
- Track Flexibility KPIs: Measure changeover time, alternate-qualification speed, and rerouting time alongside cost and OEE.

3. Regional speed

Objective: Push decision rights closer to regions and plants, while enforcing a small set of global standards, governance rules, and KPIs to avoid fragmentation.

Core Strategic imperatives are:
- Empower Regions: Give plants and regions real decision-making authority over local customers, regulations, and supply conditions.
- Accelerate Decisions: Replace long approval chains with regionalized ownership and accountability at the right level.
- Modularize the System: Design processes and technologies to be reusable across regions without forcing uniformity.
- Set Global Guardrails: Define a small set of non-negotiables – tech architecture, KPI framework, governance rules – to prevent fragmentation.
- Align on Cross-Functional KPIs: Track throughput, working capital, and delivery reliability consistently across all regions.



B. Volatile demand and flexibility

I. THE END OF PREDICTABLE VOLUME IS A NEW OPERATIONAL REALITY

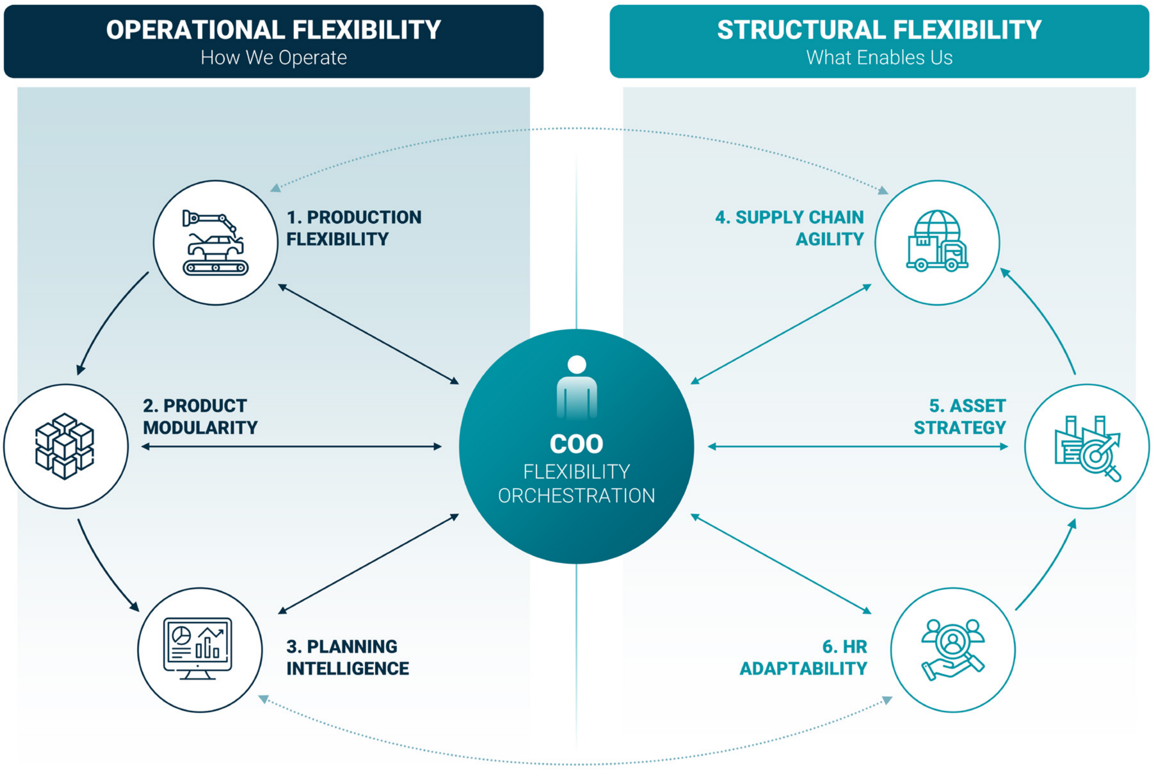
The automotive industry is undergoing a period of intense "Volatile Demand", moving away from the era of predictable, globally uniform markets toward a fractured landscape defined by four critical dimensions: Powertrain uncertainty, regional divergence, shrinking lifecycles, and structural overcapacity. Powertrain uncertainty stems from fluctuating adoption rates for electric vehicles, forcing manufacturers to manage multiple propulsion technologies at once.[3] Accelerating regional divergence highlights the collapse of the "One-World Product" strategy, as regions like China, Europe, and North America set vastly different regulatory and technological targets.[4] Simultaneously, the industry is grappling with shrinking lifecycles, where the rapid pace of software innovation demands much faster development times than traditional hardware cycles. Finally, entrenched structural overcapacity defines the current production environment, as legacy manufacturing footprints remain expanded even as global demand patterns shift and underutilization threatens the stability of established automotive hubs in high-cost regions.

II. THE MARGINS ARE UNDER PRESSURE

Four interconnected forces are placing the long-term profitability of traditional manufacturers under severe strain. First, powertrain uncertainty has created a triple cost burden: OEMs must fund parallel ICE, BEV, and hybrid platforms simultaneously, pushing per-unit costs up to 30% over a focused competitor.[5] Second, shrinking lifecycles have opened a development speed gap as Western cycles struggle to compete with the pace set by Chinese innovators, leaving new models obsolete upon arrival. Third, regional divergence has made coherent global planning increasingly difficult, as consumer preferences, regulatory timelines, and powertrain readiness fragment sharply across markets. Fourth, structural overcapacity is hitting European players hardest: factory utilization in high-cost markets has dropped well below the 70–75% breakeven threshold.[6] Taken together, these four pressures form a compounding trap. Manufacturers must recover rising R&D expenditure over shorter product lives and across smaller, less predictable regional volumes, all while absorbing the financial drag of chronically underutilized production capacity. Each dimension intensifies the others, and the margin for delay is shrinking.

III. WHAT COOs NEED TO DO

With regard to volatility, there is one clear message: volatile demand is now a structural operating condition, not a temporary market disturbance. The winners will not necessarily be the companies with the biggest footprint or the broadest portfolio, but the ones that build disciplined flexibility across production, product architecture, planning, supply chain, assets, and workforce.



Flexibility must not become complexity. Every flexibility lever requires a simultaneous push on modularization and standardization, otherwise, the COO trades demand risk for operational chaos. Six dimensions of flexibility the COO must orchestrate along the entire value chain:

1. **Production flexibility:** Mandate multi-powertrain capability for all new investments; retrofit legacy lines within 24 months with documented ROI.

2. **Product Modularity:** Establish module governance with veto power over late design changes. Link bonuses to carry-over and reuse shares.

3. **Planning Intelligence:** Deploy digital twins at top sites within 12 months. Mandate simulation capability for ±40% volume & full powertrain -mix; matching the volatility OEMs already face.

4. **Supply Chain Agility:** Add supply chain risk dashboard (top 100 suppliers) to monthly S&OP; red-status suppliers trigger ad-hoc actions like dual-sourcing.

5. **Asset Strategy:** Require utilization stress-tests for all >€100M investments with documented external customer Plan B if own-brand volume drops.

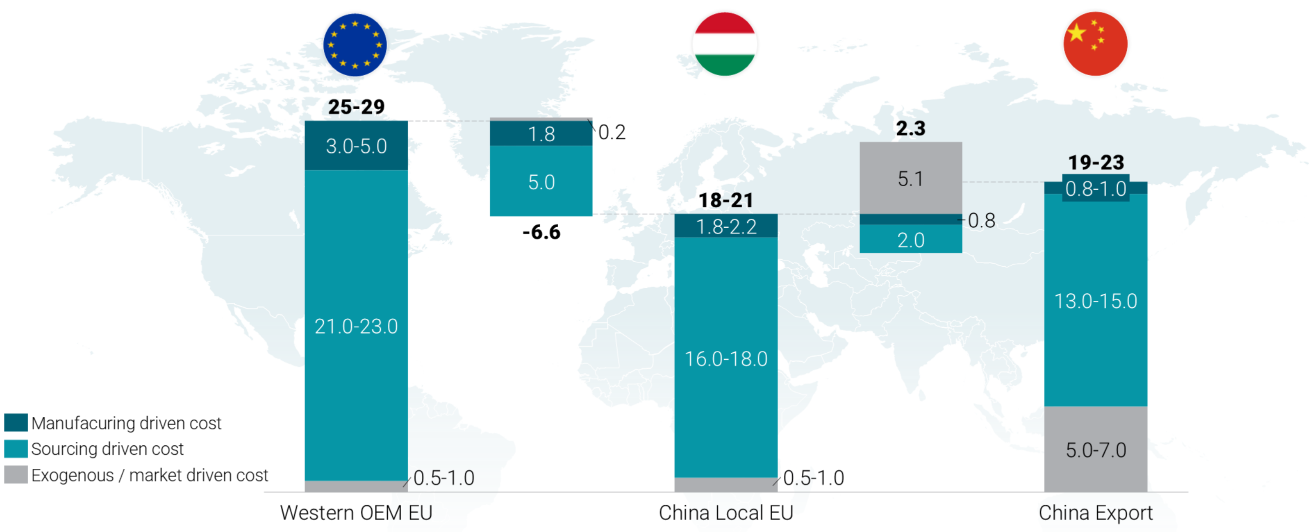
6. **HR Adaptability:** Mandate role-based skill matrices, cross-training targets and a permanent contingent talent pool for all critical operations roles.

C. Cost pressure

I. CHINA'S STRUCTURAL COST ADVANTAGE IS RESHAPING EUROPE

China's competitive advantage in the automotive sector has moved far beyond simple aggressive pricing; it now represents a fundamental structural gap that is forcing a total rethink of European production and supply chains. With Chinese OEMs hitting the market with cost bases 30% to 35% lower than domestic players, the impact is already visible in the numbers: European vehicle output has buckled, dropping from a pre-2020 high of 17 million units to just 14 million today. This isn't a temporary dip, but a compounding crisis for local manufacturers who are stuck with a much higher cost floor for both vehicles and core components. Tariffs and trade measures can provide temporary relief, but they cannot close a gap rooted in product design, supply chain architecture, and manufacturing efficiency.

Comparison B segment SUV BEV cost structure
('000 € per vehicle)



II. THE PRESSURE IS ALREADY HITTING AND SUPPLIERS FEEL IT FIRST

The ongoing decline in vehicle production is reducing plant utilization and increasing cost per unit. For example, Volkswagen's plant utilization decreased from 79% in 2019 to 69% in 2024, while Mercedes-Benz saw a drop from 85% to 69%. Suppliers are exposed to volume risk 12 to 24 months earlier, as re-sourcing decisions are typically made well before OEM volume reductions become visible. At the same time, the increasing use of Chinese vehicle components shifts cost advantages outside the European industrial ecosystem. Widespread job cuts among European suppliers indicate that the system is already under significant strain. In addition, intensified pricing pressure is eroding margins across volume segments. OEMs continue to push cost reductions downstream, exacerbating the already high pressure on Tier-1 suppliers, who are simultaneously facing declining revenues in a challenging market environment.

III. WHAT COOs NEED TO DO

To close the cost gap, COOs need to hard-wire AI into plants, reset footprints towards regional-for-regional production and build local supplier bases wherever they win on total cost:

1. **Production strategy:** Reset the manufacturing footprint toward regional-for-regional production. Close small, underutilized plants and consolidate into scalable core facilities in regions where local production wins on total cost. Avoid sustaining low-volume factories that deepen fixed-cost exposure.

2. **Plant efficiency:** Industrialize AI and robotics across plant operations: Move from pilots to embedded deployment to systematically reduce labor overhead, waste, and variability. Target the indirect-to-direct ratio, which runs 30% to 40% at Western OEMs versus 15% to 20% in Chinese BEV plants.

3. **Workforce and plant structures:** Use the future retirement wave as a structural workforce reset: Reduce indirect layers and legacy org structures through automation and AI rather than backfilling, converting headcount reduction into lasting productivity gains.

4. **Supplier Network:** Force cost-critical components (particularly battery modules) into regional supply chains. Develop capable local sub-suppliers in each key region to reduce the 60% to 75% BEV-critical import dependency that transfers cost advantage outside the European industrial system.

D. Socio-economic transformation

I. WORKFORCE CRISIS IS ALREADY UNDERWAY

The European automotive sector faces a structural workforce challenge that is already measurable in its impact on value creation. With 13 million workers and annual gross value-added approaching EUR 300bn,[7] the sector is on track to lose in the order of EUR 100bn [8] in cumulative value between 2026 and 2030 from labor shortages and widening skill gaps alone. Three converging forces are driving this deterioration:

Aging populations and urbanization-driven regional depopulation are shrinking labor pools, while migration is less able to relieve workforce gaps. This amplifies persistent labor shortages across manufacturing, engineering, IT, and maintenance. At peak, nearly one in five EU vehicle manufacturers reported labor as a factor directly constraining production.[9]

The skill gap is widening as education and training pipelines fail to keep pace with technological change. Around 2.4 million automotive workers across Europe need retraining by 2030 [10] to remain productive in an electrified, software-defined value chain. Up to a quarter of the workforce sits in roles where skills no longer fully match what the work requires, a figure consistent with the OECD average [11] for skills mismatch across advanced economies and likely conservative for a sector mid-way through the most disruptive technology transition in its history.

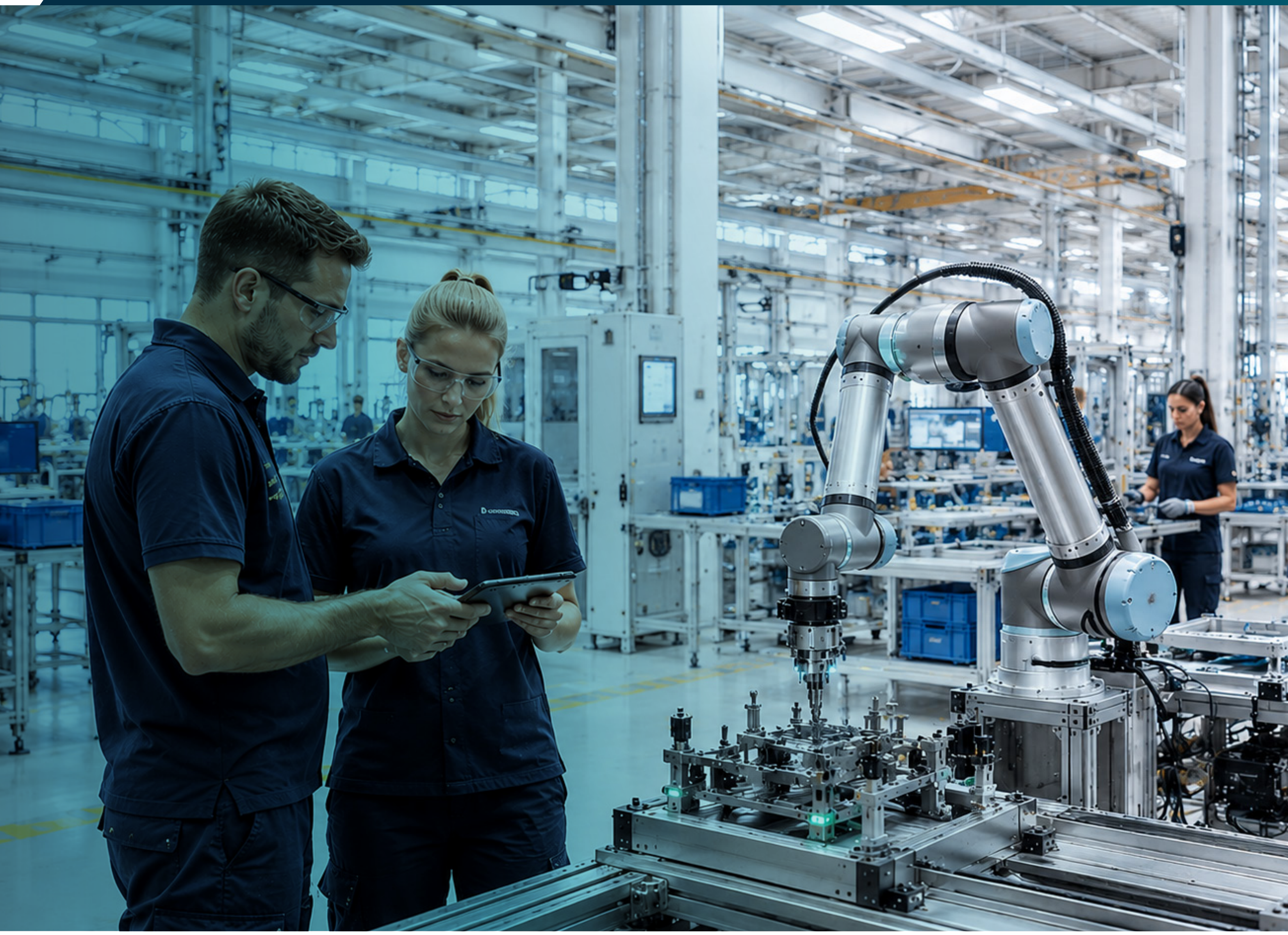
Expectations for work-life balance and job quality are rising, pushing up wage demands and making physically demanding roles harder to fill. In parallel, societal pressure for local employment, job quality, and social stability continues to increase, narrowing the options available to manufacturers seeking to restructure.

II. THE WORKFORCE CHALLENGE OFFSETS PRODUCTIVITY

The workforce challenge facing European automotive manufacturers is not static. It is intensifying over the course of the decade and undermining value creation, a situation that cannot be reversed once it has occurred. Up to a quarter of the sector's workforce currently occupies roles where skills no longer fully match what the work requires, and each mismatched worker carries an estimated productivity penalty of ten to twelve percent based on OECD research [11] on the relationship between skills allocation and output. This gets further aggravated by the drag from unfilled vacancies, an undertrained transitioning workforce, and ongoing restructuring friction.

The structural problem is that the gap is not closing on its own. Training pipelines fail to absorb displacements in the specific roles and regions where the transition pressure is highest leaving a growing backlog. Organizations that continue to rely on legacy operating models, expert-dependent structures, and passive talent strategies will face progressive deterioration in throughput, working capital efficiency, and delivery performance.

What makes this particularly urgent is timing: the expiration of major German OEM employment-safeguard agreements in 2029 and 2030 creates a compressed, high-stakes window for structural realignment. Companies that delay will find themselves navigating workforce restructuring under significantly greater pressure, with fewer degrees of freedom. The question is no longer whether transformation is necessary, it is whether organizations will act before the window closes or be forced to react after it does.



III. WHAT COOs NEED TO DO

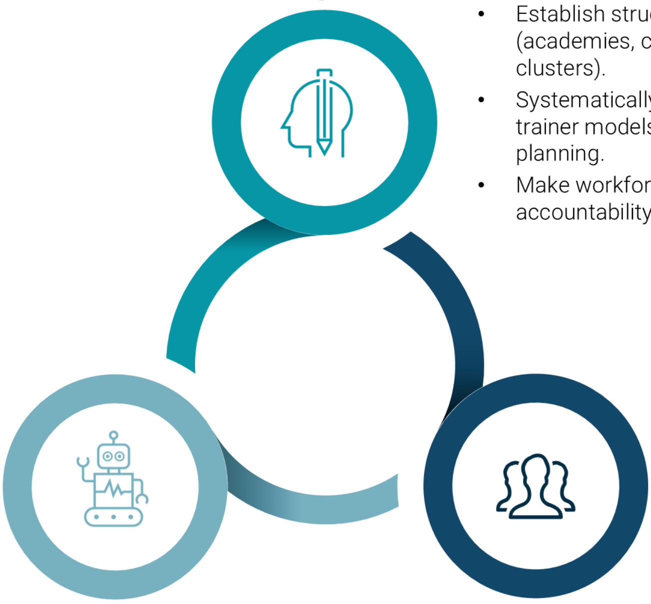
To navigate the current industry volatility, COOs must execute a coordinated "Call for Action" centered on three strategic pillars: building capabilities, redesigning work, and securing talent.

1. **Build capabilities:** Sustainable performance comes from measurable skill development, AI-driven workforce planning, and accountable leadership.

2. **Redesign work:** From human-machine collaboration to agile operating models. Advanced technologies create value only when operating models, roles, and teams are redesigned around it.

3. **Secure talent:** Strengthening EVP and building sustainable talent pipelines. Talent advantage comes from combining strong retention, compelling roles, and resilient external ecosystems.

Build capabilities



- Establish structured capability architecture (academies, certifications, critical skill clusters).
- Systematically scale skills through train-the-trainer models and AI-enabled workforce planning.
- Make workforce development a core COO accountability embedded in leadership roles.

Redesign work

- Redesign plants around human-machine collaboration and scalable automation.
- Shift from expert-dependent structures to standardized, knowledge-codified operating models.
- Organize work in smaller, multi-skilled, digitally enabled teams.

Secure talent

- Redesign industrial roles to be attractive, high-tech, and ergonomically advanced.
- Create flexible career pathways and internal mobility across shopfloor, engineering, and digital roles.
- Build strong external talent ecosystems (universities, vocational institutes, regional hubs).

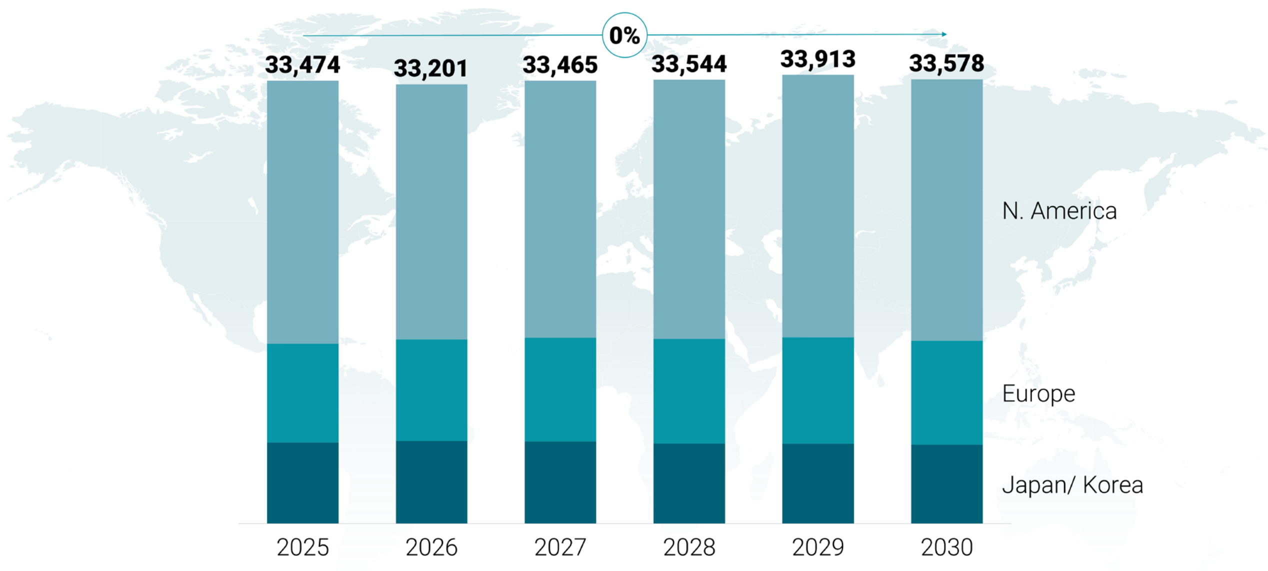
Winning socio-economic transformation requires aligning capabilities, operating models, and talent strategies – together and at scale. When implemented together, we project these responses can unlock a 30% higher value creation [12] versus competitors in the automotive industry by 2030.

E. New markets

I. MATURE MARKETS HAVE REACHED A STRUCTURAL CEILING

Global light vehicle sales across North America, Europe, and Japan/Korea are forecast to remain essentially flat from 2025 to 2030,[13] hovering near 33.5 million units with 0% net growth. This stagnation reflects converging pressures: market maturity, rising price sensitivity, EV adoption plateauing in early-adopter segments, intensifying competition from Chinese entrants, and accelerating regulatory complexity. Growth, therefore, must be sourced elsewhere, specifically in Latin America, South-East Asia, and India, where demand dynamics, demographic profiles, and powertrain preferences diverge sharply from legacy markets.

Global light vehicles sales forecast 2025-2030
(mn. Sales)



II. ONE-SIZE-FITS-ALL OPERATIONS ARE OBSOLETE

To capitalize on growth in emerging markets, automotive manufacturers must abandon global standardization in favor of localized, region-specific portfolios that align with unique economic and consumer realities. In Latin America, customers are highly price sensitive. Flex-fuel vehicles dominate, especially in Brazil (~80% of new sales).[14] EV share of new passenger vehicles sales expected to reach 10–20% in 2028.[15] In the South-East Asia region many buyers are first-time car owners upgrading from two-wheelers. EV adoption remains low, with hybrids gaining traction. Meanwhile, the Indian market shows the highest share of Small Cars sales, accounting for around 27% of revenue share in 2023.[16] Buyers prioritize fuel efficiency and increasingly expect basic connectivity.

III. WHAT COOs NEED TO DO

To capture growth in new markets and drive operational excellence, COOs must pull three specific strategic levers across the Footprint and Plant levels.

At the Footprint Level, COOs must

1. **Lead Commercial Optimization** by aligning product offerings with local demand and high-profit pools; this involves rationalizing portfolios, optimizing pricing, and ensuring SKU best-fits for specific locations to achieve a positive EBIT impact.

2. Second, they must focus on **Regionalized Footprint Optimization,** which targets a +2–3% EBIT uplift. This requires optimizing capacity utilization, taxes, and tariffs across the sub-network, while making critical make-or-buy decisions and managing the phase-in/phase-out of products.

At the Plant Level, COOs are responsible for

3. **“4 Walls” Optimizations,** focusing on operational levers within a single facility’s control. Key actions include maximizing production efficiency, optimizing overhead, and streamlining working capital. By improving in- and outbound logistics and truck utilization, COOs can realize a +5% EBIT impact in focus plants.

Ultimately, winning in this volatile environment requires activating these levers in tandem to transform regionalized footprints into high-performance, efficient manufacturing hubs.

F. Physical AI: The new production reality

I. PHYSICAL AI ENTERS THE FACTORY FLOOR, SELECTIVELY BUT IRREVERSIBLY

Physical AI is the convergence of foundation-model AI with embodied systems on the factory floor: Cobots, AMRs, humanoids, and self-orchestrating mobile manipulators that perceive, learn, and act in a closed loop. Physical AI arrives on the shopfloor – selectively but irreversibly. AMRs already deliver measurable returns: over **18,000 mobile robots** (AGVs/AMRs) operate across **hundreds of automotive factories; 61%** of OEMs deploy robotic tuggers; e.g., BMW Spartanburg runs material supply "almost exclusively" through smart transport robots on a centralized orchestration system by idealworks. Cobots address the ergonomic burden that drives assembly absenteeism. BMW deploys them for door insulation, Ford for precision sanding, Comau's MyCo family ships commercially in six models. Humanoids have moved from demonstration to bounded production: BMW's Figure 02 pilot logged **1,250 hours** and supported **30,000 vehicles** at 84-second cycle times, but that success depended on structured, repetitive tasks. Body shop work is not a universal entry point for humanoids. The right design principle is to match form factor to task complexity.[17]

Mobile robots solve structured logistics flows. Cobots support defined, ergonomic, or variant-rich assembly. Humanoids may become relevant where Brownfield environments and human-designed workstations make traditional automation difficult – in most cases, however, feet may not be necessary in industrial environments after all.
COOs who define safety, integration, and data concepts before choosing the form factor scale faster than those who default to the most complex machine. The adoption path is best read as a maturity sequence:

AI as Manufacturing Operating System: Four adoption waves (Figure 2) [18]

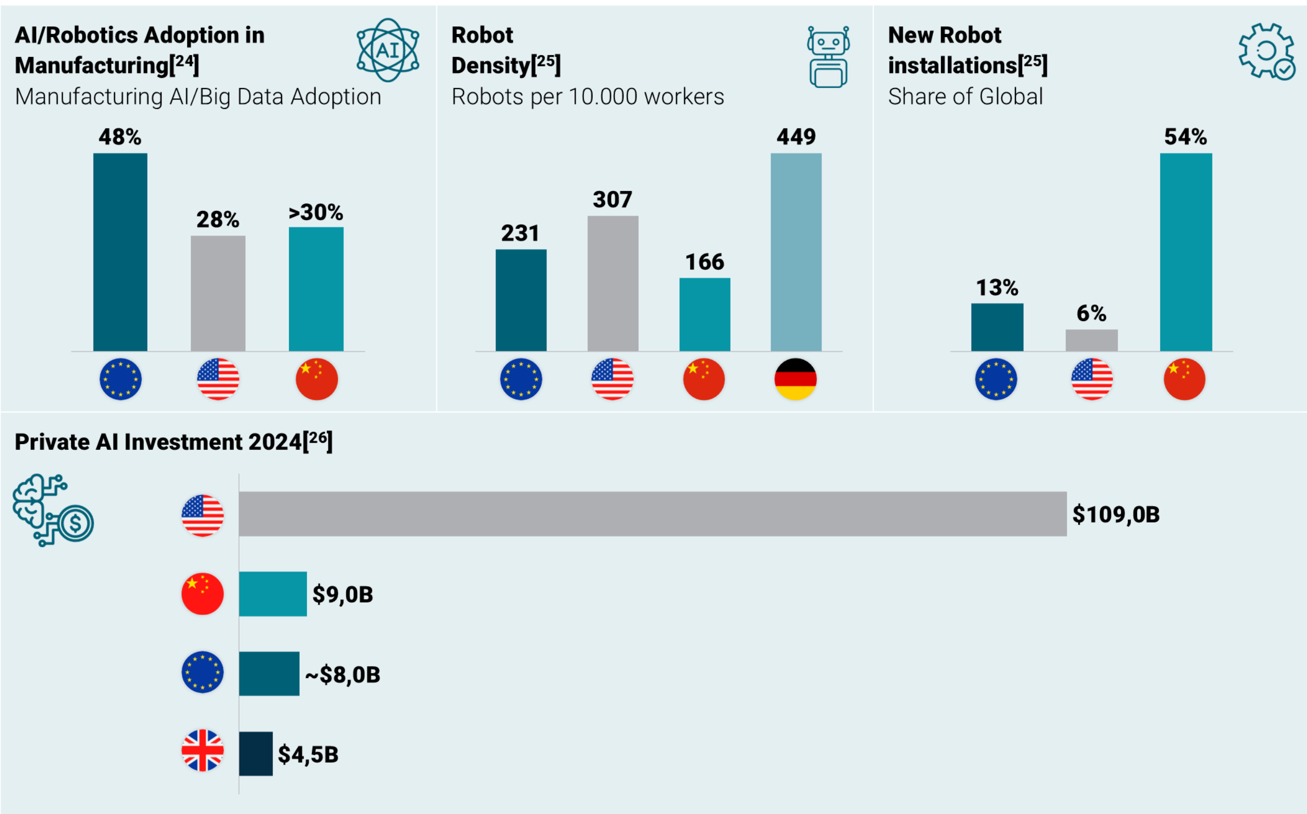
WAVE	TIMEFRAME	KEY USE CASES	STATUS
01 Optimization AI	2024–2026	Predictive maintenance, AI vision inspection, throughput prediction, energy optimization	**In production**
02 Active AI	2026–2028	Inline quality control, process parameter tuning, adaptive robotics, logistics orchestration	**Scaling now**
03 Physical AI at scale	2028–2030	AI-guided cobot assembly, AMR fleet intelligence, self-calibrating stations, digital twin governance	**Early adoption**
04 AI-native manufacturing OS	2030+	Software-defined factory, vPLC, real-time digital twin, closed-loop AI, lights-out cells	**Horizon planning**

II. AI IS ALREADY THE FACTORY'S OPERATING SYSTEM, BUT EUROPE RUNS IT ON SOME ONE ELSE'S STACK

AI use cases and mobile robots are already in production today. What is still emerging is the scalable Physical AI architecture: AI decision layers, robotics, safety concepts, industrial data pipelines, and workforce routines combined into one operating model. Around 70–80% of production still runs on legacy infrastructure, where ecosystem fragmentation and safety certification under ISO 10218 slow every deployment, and roughly 65% of manufacturing leaders struggle to fill vacancies due to evolving skills.[19] By 2028, supervisors, team leaders and part of their team will need AI fluency. The scarce resource will be the person qualified to orchestrate the system.

Physical AI is reshaping production economics on a 24- to 36-month window. Europe enters this shift from a paradoxical position. On the surface, European manufacturers appear well placed: 48% of EU manufacturing firms already deploy AI and big data applications, compared with 28% in the US.[20] The deeper picture is less comfortable. US private AI investment reached USD 109 billion in 2024, against an EU aggregate of roughly USD 8 billion.[21] China installed 54% of the world's new industrial robots in 2024.[22] US hyperscalers capture roughly 72% of European cloud customer spending.[23] High AI and robotics adoption without capital depth and platform control is a vulnerability, not industrial leadership.

Europe's AI Paradox – adoption vs. investment gap, robot installation shares



The risk is architectural. Without an active data and platform strategy, European industry repeats the smartphone-era pattern: world-class manufacturing capability running on an operating system defined and owned by others. Across the WEF Global Lighthouse Network, AI already delivers measurable returns: Predictive maintenance reduces unplanned downtime by 35–50%, AI-based paint shop inspection generates USD 12–36 million in annual savings per 1,000 jobs-per-hour (JPH) plant.[27]

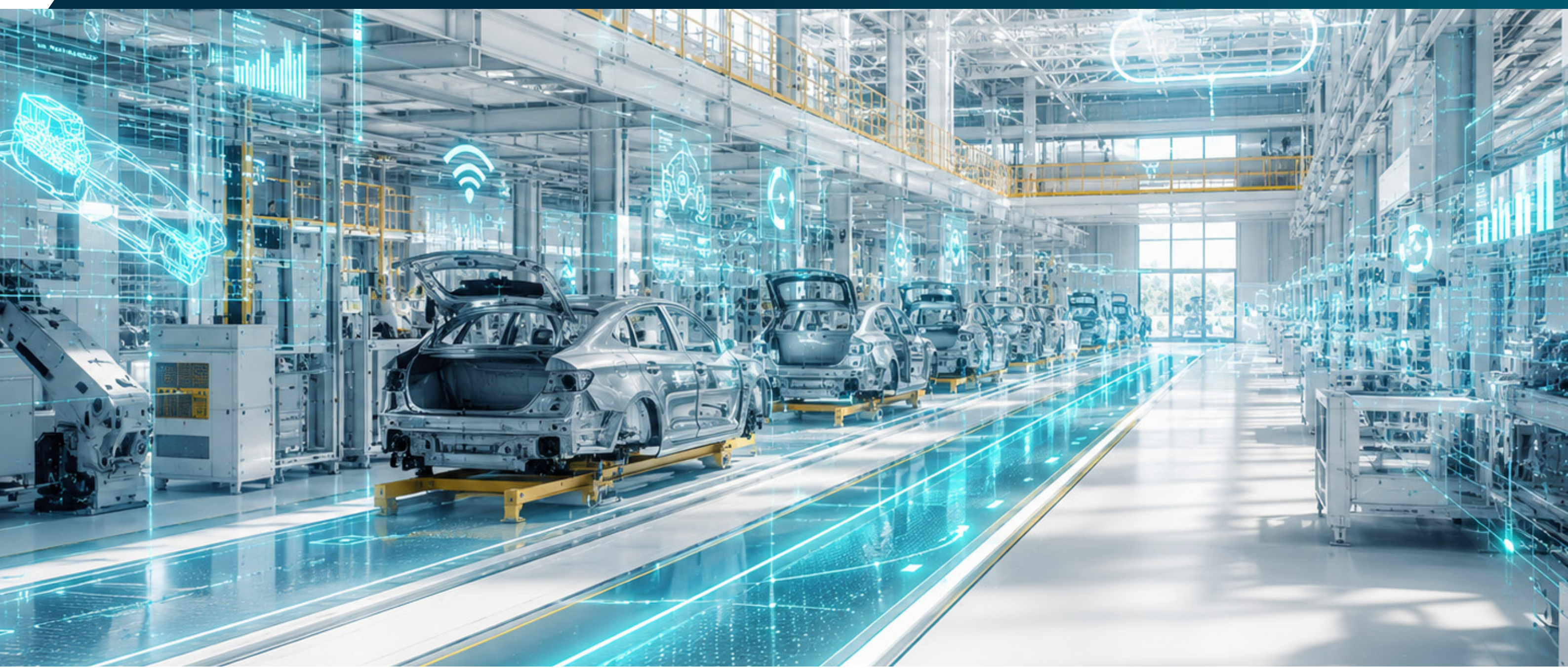
However, those returns flow through software, cloud, and AI stacks defined elsewhere. AI will reach the shopfloor, that is a certainty. The danger is that the underlying control layer is set by external technology ecosystems. The conclusion is uncomfortable, but clear. European manufacturers who treat this as another efficiency cycle will not just fall behind on cost. They will lose the ability to shape the architecture they operate in.

III. WHAT COOs NEED TO DO

Physical AI algorithms are increasingly open or accessible. The training data they require is not. This is where Europe holds a strategic asset most COOs are not yet treating as such: industrial operating data. Europe's 48% AI adoption rate in manufacturing and Germany's 449 robots per 10,000 employees [28] generate the high-density, real-world industrial data that Physical AI developers urgently need and cannot fully replicate from simulation. Every teleoperation log, sensor stream, quality image, maintenance event, and line-performance signal from a mature production environment represents negotiation leverage - but only if it is captured, governed, and consciously shared. As Lars Gleim, Professor for Cloud Computing & Agentic AI, Westfälische Hochschule puts it: "Teleoperation data is the gold standard. Wherever you can capture it today, you should." European manufacturers are not short of data. They are short of the decision to use it and treat it as leverage.

To navigate, COOs must execute six strategic "moves" to transition from diagnosis to action within the next two years.

1. **Map and assert your industrial data position.** Identify the data assets that matter for Physical AI: teleoperation logs, sensor streams, quality images, maintenance histories, process parameters, digital twin data. Define what stays proprietary, what can be shared, and under which partnership terms. The negotiation leverage disappears once the equipment is on the floor.



2. **Own and orchestrate your Physical AI agenda at C-level.** Establish a single AI-in-Operations lead under the COO, positioned across IT, production, and supply chain, with P&L authority and OEE accountability. Physical AI cannot sit between functions; it needs one operational owner.

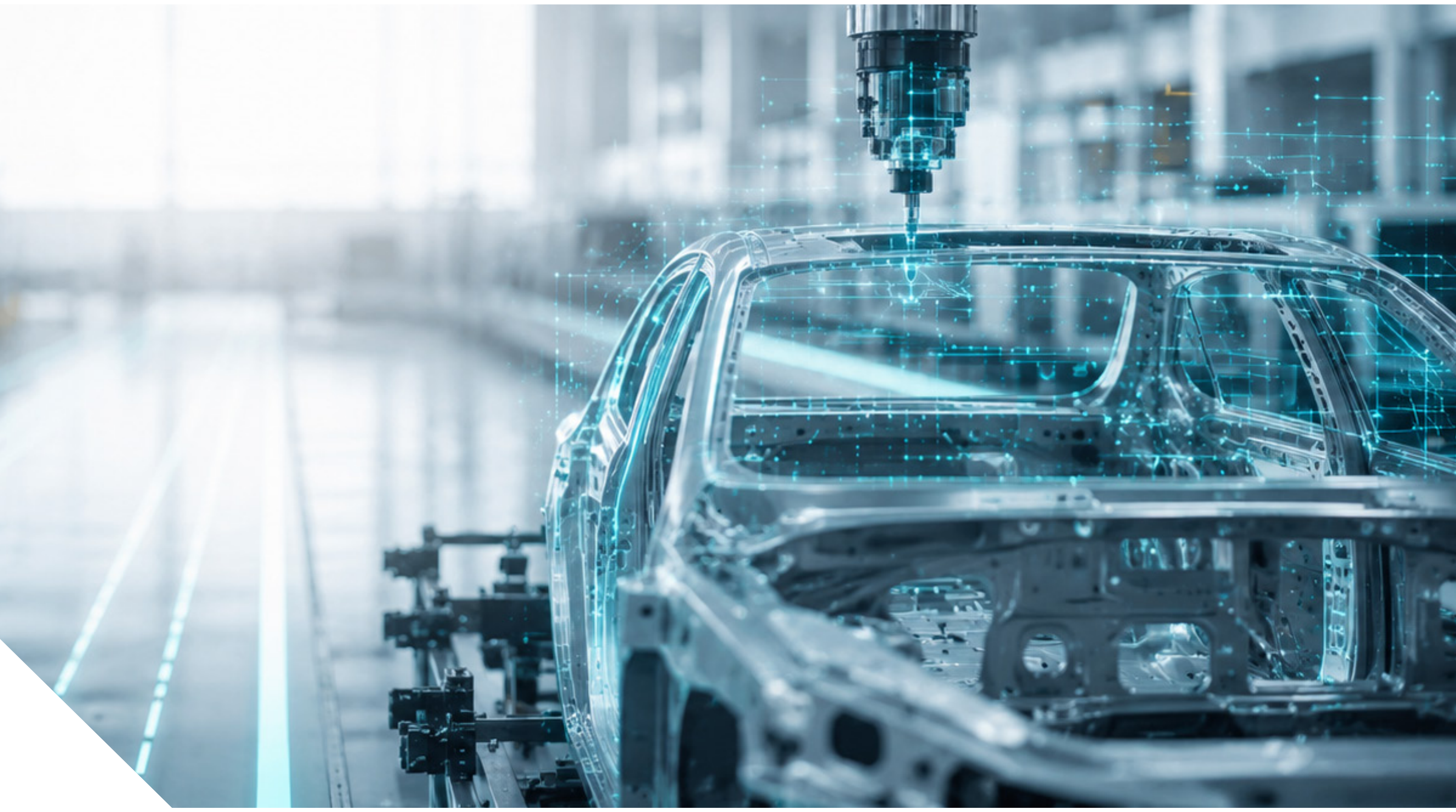
3. **Focus the portfolio on 5–8 top AI use cases across operations by 2028.** Prioritize use cases that directly address cost, speed, and capacity, such as to compress ramp-up and changeover times. Fewer use cases scaled across more sites, not more pilots.

4. **Design a humanoid and cobot lighthouse in 2026.** Launch one pilot by Q4 2026 in a bounded, structured task. Safety and integration concept first, form factor second. The lighthouse should produce a replicable deployment pattern, not a technology showcase.

5. **Design a virtualized line lighthouse in 2026.** Virtualize one pilot line from planning through to changeovers as a replicable template, cutting on-site commissioning effort by 50–70%. This is the bridge from individual AI use cases to software-defined production.

6. **Build your organization for the AI-augmented factory.** Redesign roles with clear AI-in-the-loop task splits and updated skill profiles. This is the operational counterpart to the workforce transformation agenda.

Physical AI demands architectural decisions now: on data ownership, platform partnerships, safety concepts, and workforce redesign. COOs who act early can turn Europe's industrial data and manufacturing depth into leverage. Those who wait will execute someone else's playbook on someone else's infrastructure.



2 | Overall implications for the COO agenda

European automotive is off course, and the correction required is operational, not cyclical. Geopolitical fragmentation, China's cost and speed advantage, structural overcapacity, labor shortages, and the rise of AI are breaking the logic of the old operating model built on global efficiency, stable volume assumptions, and incremental optimization.

The consequence is clear: COOs must redesign operations around six priorities to manage cost, volume, speed, resilience, and dependencies at the same time:

1. **Align production networks regionally:** Transitioning to regional networks and "tier-n" transparency reduces cost risks associated with trade barriers and enhances speed by localizing decision rights. Resilience improves as tariff and trade-barrier shocks are absorbed locally. Dependencies on single-source supply chains are identified and reduced.

2. **Manage volatility with flexible systems:** Embedding flexibility into product architecture and adaptive operations compresses retooling and reaction times, allowing plants to absorb demand swings without losing profitability.

3. **Structurally reset cost and scaling logic:** Shifting to regional-for-regional production and closing underutilized factories directly addresses the 30-35% structural cost gap against emerging competitors. Volume is matched to viable capacity rather than legacy footprint and resilience improves as fixed-cost exposure shrinks.

4. **Adapt capabilities and leadership:** Building workforce capabilities, designing roles around AI-augmented work and securing talent for orchestration roles close the gap between technology adoption and operational scaling. Cost of labor inefficiency falls and dependencies on shrinking external talent pools are reduced through internal capability building.

5. **Expand into growth regions:** Differentiating product portfolios for Latin America, South-East Asia, and India allows for Volume growth in regions where legacy "one-size-fits-all" models fail. At the same time dependencies on saturated home markets are reduced.

6. **Anchor automation, AI, and virtual production architecture in the core operating model:** Physical AI is becoming the factory's operating layer, and Europe's industrial data is the negotiation asset that determines who sets the terms. Treat shopfloor data as leverage to shape the architecture. Cost drops as AI-augmented production compresses labor and quality cost. Speed of ramp-up, changeover, and engineering iteration accelerates;

COOs need to move from optimization to orchestration by making dependencies transparent, regionalizing footprints, hardwiring flexibility into products and plants, and scaling the few technology and capability bets that matter most. The **winners** will not be those with the most pilots or the lowest nominal cost base, but **those who can translate fragmentation and disruption into a resilient, regionally competitive, AI-enabled production system, driven by an organization that can execute under uncertainty.**

While these six priorities are deeply interconnected, they do not constitute a uniform mandate. Execution must be tailored and sequenced according to each organization's specific pain points, existing capabilities as well as financial possibilities. Rather than pursuing all levers simultaneously, organizations should develop a prioritized roadmap that addresses topics in a deliberate, capability-driven sequence.

> ***European automotive is off course, and the correction required is operational, not cyclical.***

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