



How to Scale AI and Capture Value Fast in Manufacturing

A practical, research-backed playbook for C-suite leaders, plant operators and technical teams.

Manufacturers don't need more pilots – they need repeatable wins that travel from one production line to many while preserving trust and safety. Drawing from Tech-Clarity's global research and SAS thought leadership, this e-book shows how manufacturers can use AI to deliver fast value that lasts.





Contents

- 01** Executive summary
- 02** The case for AI now
- 03** Quick wins for immediate ROI (90-180 days)
- 04** Manufacturing AI ROI: What the data shows
- 05** The 12-week cadence: From pilot to proof
- 06** DataOps essentials: Making data work for AI
- 07** Governance and scale: Building trust at every step
- 08** Oversight that scales
- 09** Agentic AI: Industrial copilots for scalable autonomy
- 10** Persona playbook: What leaders and teams need
- 11** FAQs about AI in manufacturing
- 12** About the research

01

Executive summary

The shortest route to ROI starts near the work: **quality, equipment health, bottlenecks and energy**. Tech-Clarity's research confirms that organizations advance fastest when data quality and governance are addressed early.

Three essential moves:

- ✓ **Start where you can see results quickly:** Focus on key metrics at the line level that tie directly to daily work.
- ✓ **Make it repeatable before scaling:** Create templates for data, models, processes and training so other sites can follow easily.
- ✓ **Follow an AI blueprint:** Make sure people, processes, data and AI work together reliably and responsibly.

Speed builds credibility; governance sustains it.



The data from **423 responses** from companies that manufacture or produce worldwide is conclusive. Those companies investing in analytics and AI are gaining substantial benefits.

Julie Fraser, Vice President, Tech-Clarity



Top three priority outcomes for investments in manufacturing operations and analytics in 2025





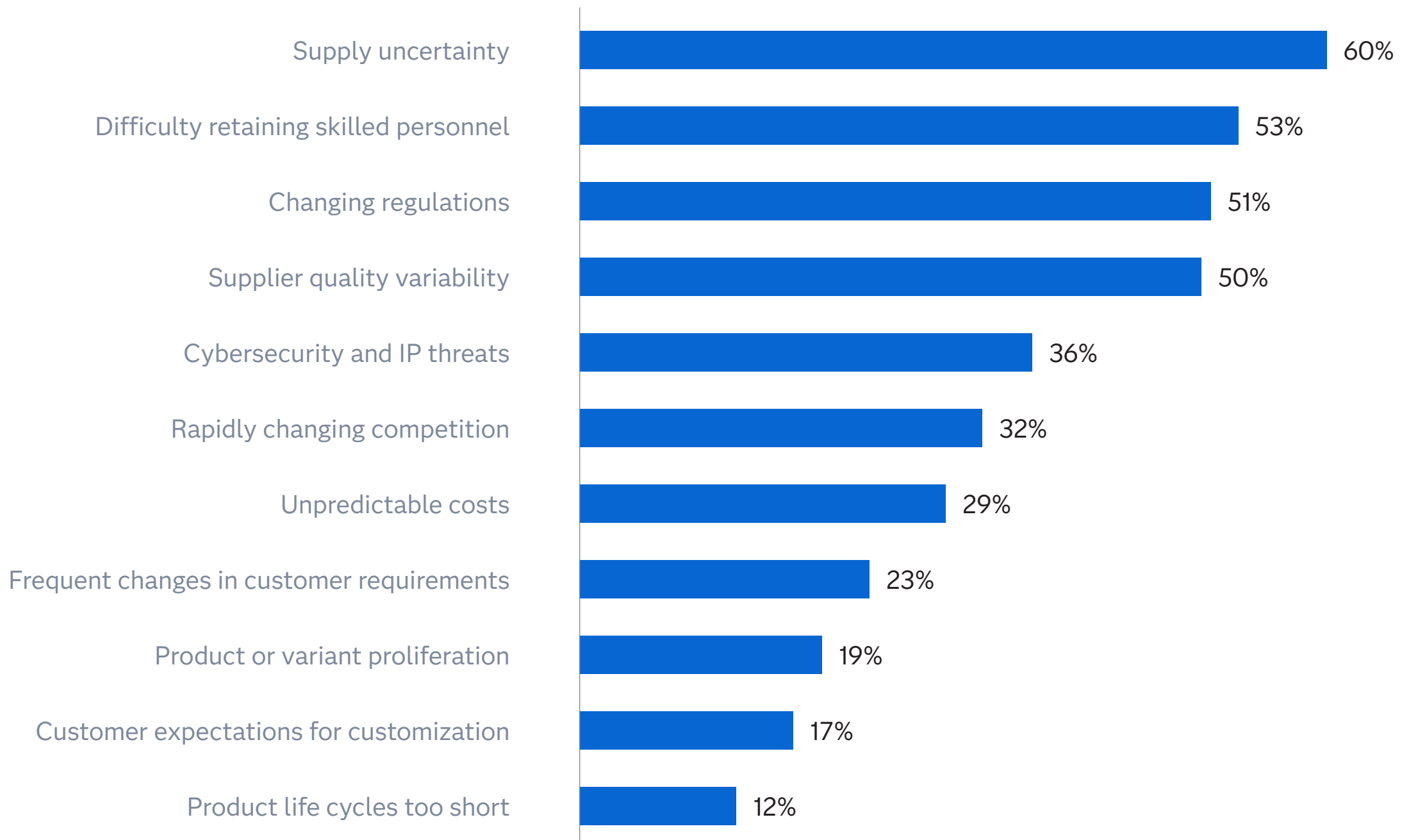
02

The case for AI now

Factories are rich in data but short on insight, and fragmented systems with uneven maturity often slow progress – even when leadership is aligned. It’s no surprise that **99% of manufacturers** in the Tech-Clarity study are now investing in analytics and AI to close this gap.

The path to real impact starts with clean data and connected workflows, not model novelty. When integration and governance are in place, AI evolves into the operating system that drives smarter, faster decisions.

Business challenges with significant impact



03

Quick wins for immediate ROI (90-180 days)

Start where data sits closest to the decisions being made and the actions are unambiguous. The study points to four operational domains that meet this bar – and where measurable KPI gains are most quickly realized.

- ✓ **Quality analytics:** Track production quality, spot common defects and identify ideal batches.
- ✓ **Asset performance:** Monitor equipment health and prioritize maintenance.
- ✓ **Throughput and flow:** Keep an eye on work in progress, production pace and schedule adherence.
- ✓ **Energy optimization:** Track energy use per unit, detect leaks and monitor temperature patterns.

Quick wins aren't shortcuts. They're what give you the proof and confidence to scale.

“ Top performers doing better on operations metrics are also outperforming others on business metrics. More of them are using dashboards, analytics and AI.

Julie Fraser, Vice President, Tech-Clarity



Mini checklist



Focus on one production line and one key metric.



Set clear success criteria and a simple pipeline with baseline checks.



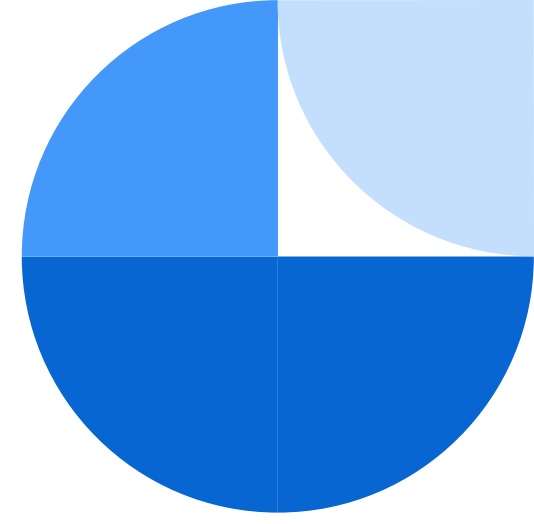
Share insights in tier meetings and track ROI before and after, with context notes.

Top areas that benefit significantly from analytics



04

Manufacturing AI ROI: What the data shows



Across the board, manufacturers are getting real returns by using AI to streamline work and automate tasks.



LG Chem

Automated raw material scheduling boosted profits by 4%, worth over \$6.8 million.



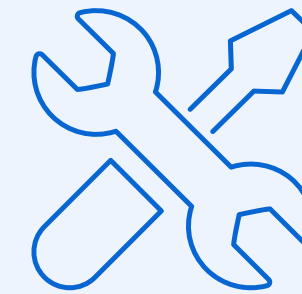
Siemens

AI planning cut production time by 15% and costs by 12%, while clearing bottlenecks and achieving 99.5% on-time delivery.



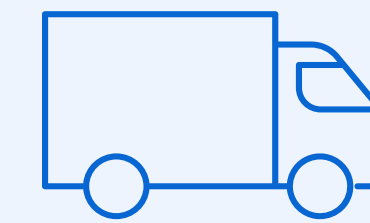
Georgia-Pacific

Saved hundreds of millions, cut unplanned downtime by 30% and improved overall equipment efficiency by 10%.



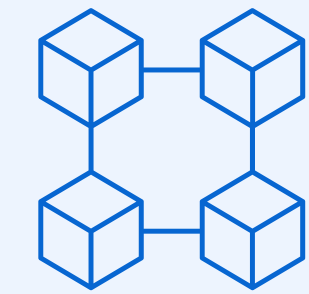
Volvo Trucks

Reduced diagnostics time by 70%, repair time by 25% and warranty costs by 4%-6%, generating \$46.7 million in benefits.



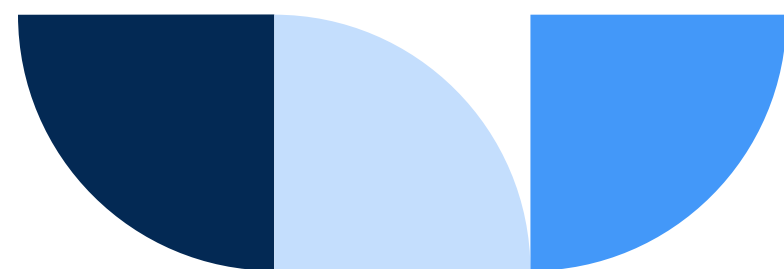
Unilever

AI-driven supply chain improvements cut inventory costs by 10% and logistics and transportation expenses by 7%.



General Mills

Optimized logistics planning saved \$20 million and is expected to reduce \$50 million in manufacturing waste in 2025 through real-time insights.



05

The 12-week cadence: From pilot to proof

Twelve weeks is enough to prove, package and prepare for rollout – provided you focus on one KPI and a right-sized data pipeline.

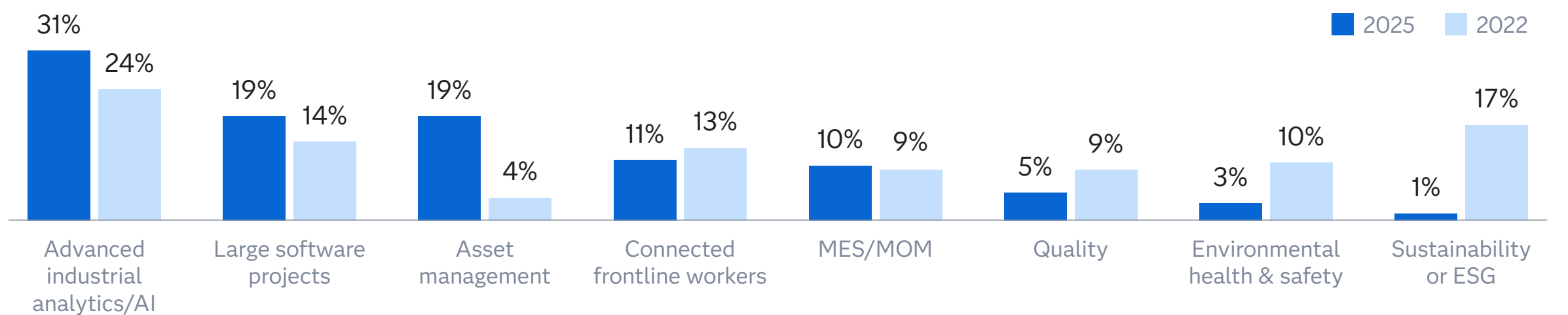


By week 12, you should have **evidence** and a **template**, not just a model.

“ Analytics may pay off faster than other software. ”

Julie Fraser, Vice President, Tech-Clarity

Top areas that benefit significantly from analytics





06

DataOps essentials: Making data work for AI

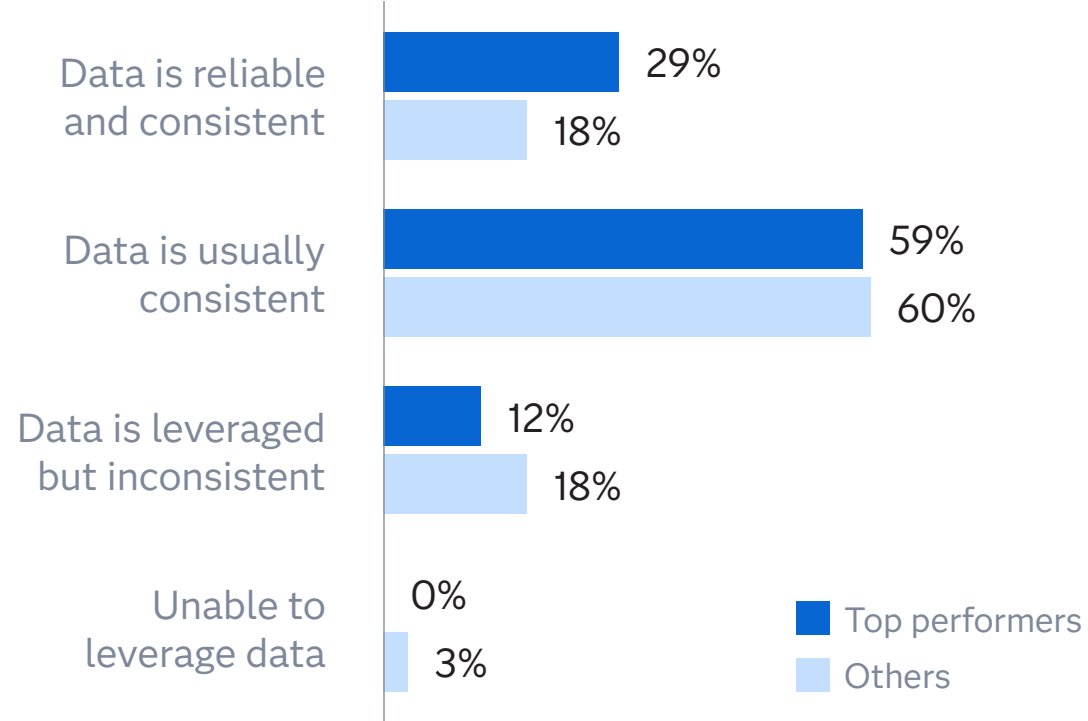
DataOps turns data into a reliable, repeatable asset – like a factory where raw materials are transformed into finished goods. It reduces errors, removes bottlenecks and adapts to data changes. As the study emphasizes, **“It all goes back to data quality.”** It’s the biggest driver of how quickly AI delivers results.

What to standardize

- ✓ **Context model:** Map your equipment, track process steps and account for shift schedules.
- ✓ **Validation gates:** Check data for out-of-range values, sudden changes or missing info, and run basic process-control checks.
- ✓ **Feature management and monitoring:** Keep track of feature versions, watch for delays or changes in behavior and review system health weekly.

Treat data pipelines like assets: specified, monitored and continuously improved.

Maturity of manufacturing DataOps



Manufacturing DataOps needs improvement.

Julie Fraser, Vice President, Tech-Clarity



07

Governance and scale: Building trust at every step

AI pilots often get stuck when moving to new sites. To scale successfully, you need clear governance and reusable templates. Before expanding, make sure KPIs improve consistently, templates are ready to use and governance steps are in place.

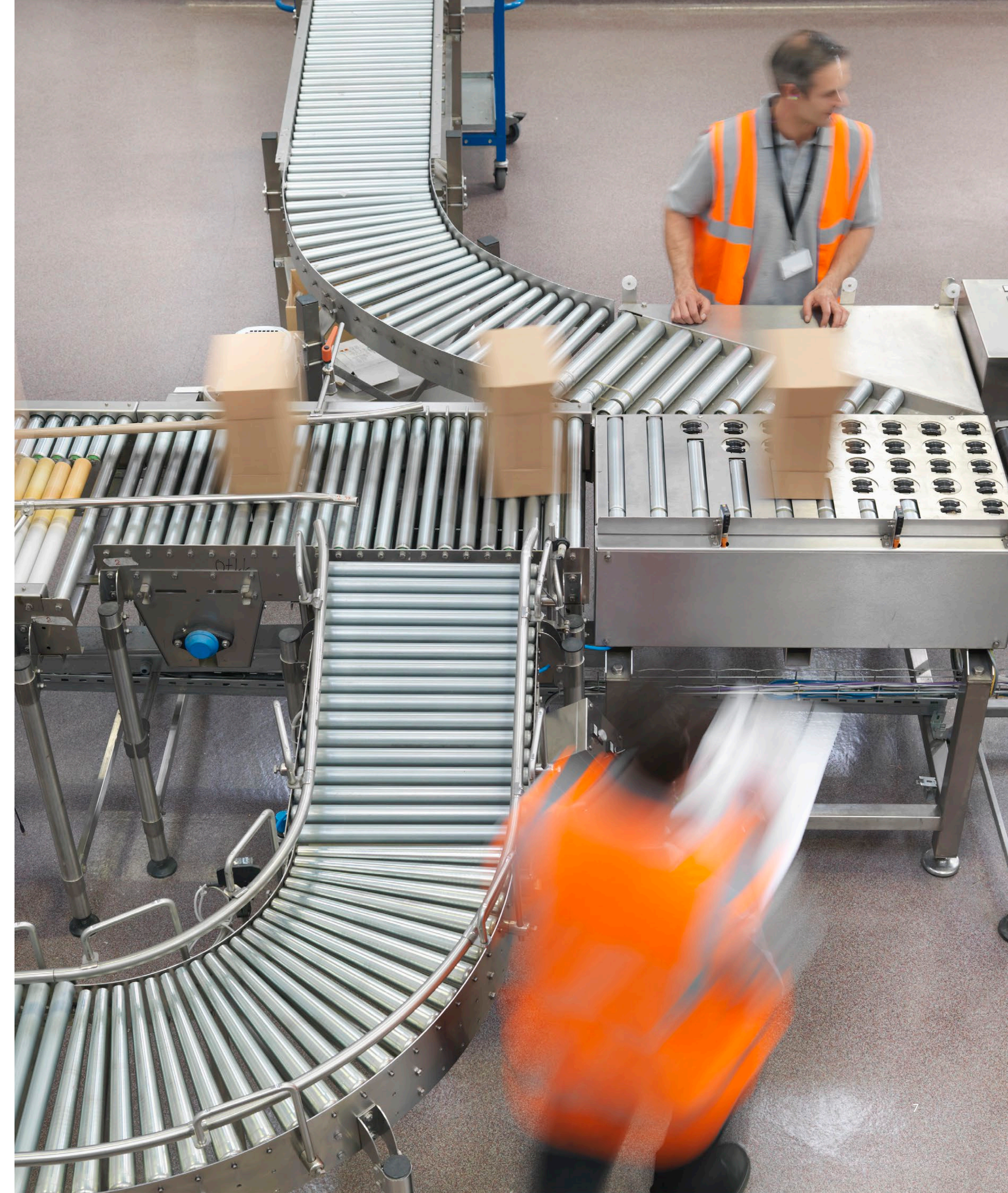
Scale-gate criteria

- ✓ **Proven results:** Key metrics improve consistently across multiple sprints and production lines.
- ✓ **Templates ready:** Data maps, features, alerts and SOPs/training are validated and ready to use.
- ✓ **Model oversight:** Model card, monitoring plan, retraining policy and rollback triggers are in place.
- ✓ **ROI confirmed:** Benefits align with the MESA ROI Guidebook used in the study.

Don't just scale software. Scale the system of data, decisions and behaviors under clear ownership.

Percentage rating their annual performance change over the past 3 years as 'Better' or 'Significantly better'

Metric	Top performer	Others
Change in perfect orders	76%	29%
Change in operating margin	75%	29%
Change in cost quality	69%	29%



08

Oversight that scales

Human-in-the-loop reviews are important at the start, but they can't keep up as decisions multiply. The solution isn't to take humans out but to build oversight into policies and automation so trust grows as AI works more independently.

Ninety-five percent of AI failures come from bad integration and governance, not bad models. Oversight is what keeps things on track.



How oversight evolves

Manual → Policy-driven checks: Move from hand-checked reviews to automated, rule-based oversight.

Ad hoc → Targeted sampling: Shift from random checks to focused reviews of key or unusual cases.

Reactive → Automated safeguards: Replace last-minute fixes with automatic alerts, holdouts and emergency shutdowns.



Guardrails to embed

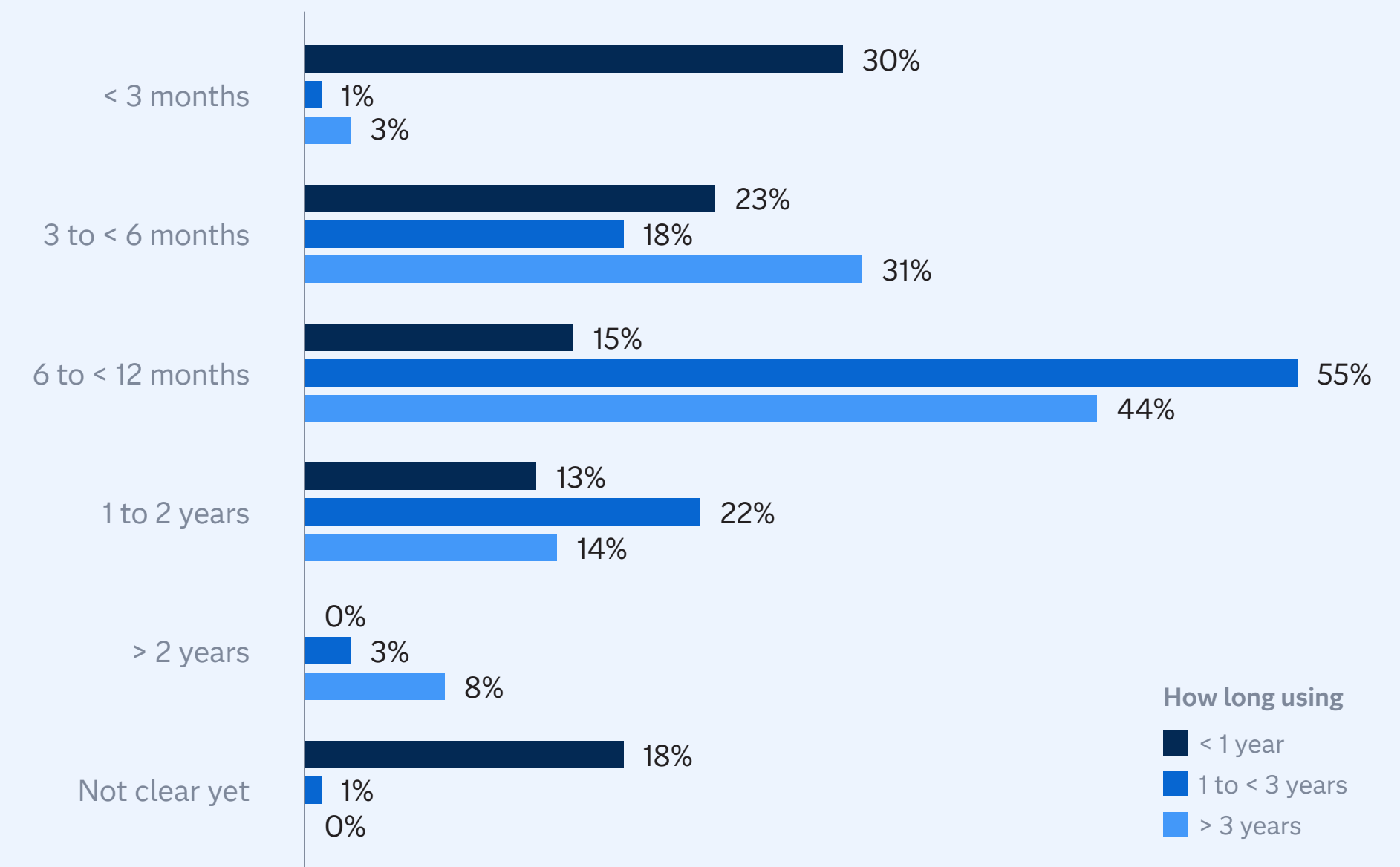
Clear decision ownership: Document who is responsible for each AI decision in the governance charter.

Transparent models: Use model cards to record assumptions, limits and how the model will be monitored.

Safe rollback: Set triggers to pause or revert the model if performance drifts or bias appears.

Oversight keeps scaling safe. Lock in guardrails before AI goes full speed.

Timeframe to achieve the expected benefits or ROI of predictive analytics by length of time in use



Safeguards must evolve as AI systems become more autonomous.

Josh Beck, Application Security Architect, SAS



09

Agentic AI: Industrial copilots for scalable autonomy

Manufacturing is moving toward goal-driven autonomy. **Agentic AI** – one of 2025's fastest-growing innovations – acts like an industrial copilot, turning insights into action while staying within governance rules. It can:

- ✓ Speed up workflows in real time.
- ✓ Personalize decisions and scale capacity.
- ✓ Strengthen operational resilience.

Start small with use cases like maintenance, quality or scheduling copilots. Each should follow policies, be monitored continuously and include rollback triggers.

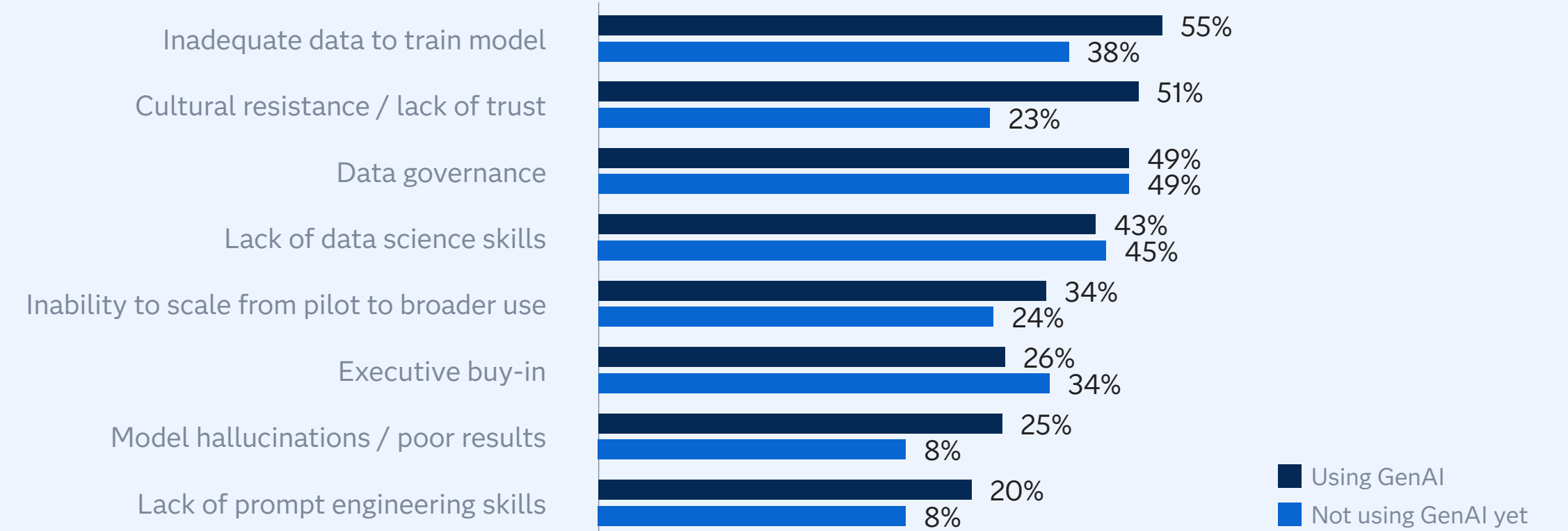
Business alignment and strong guardrails are crucial. Gartner predicts that **over 40%** of agentic AI projects will fail by 2027 if value isn't clear or risks aren't controlled.

“ Virtual and embodied artificial intelligence (AI) agents will elevate the manufacturing industry to become near autonomous.

→ World Economic Forum



GenAI adoption challenges – Actual and predicted

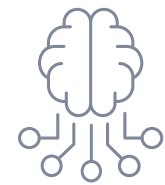


GenAI adoption benefits by length of time using GenAI



10

Persona playbook: What leaders and teams need



C-suite leaders:

Invest in three AI use cases tied to business KPIs and require a scale gate before rolling out to other sites. Use an AI blueprint to align strategy, governance and monitoring.



Plant leaders:

Focus on one KPI on one production line, integrate insights into meetings and SOPs and approve templates for repeatability.



Technical teams:

Build pipelines for each use case with clear context, validation checks, versioned features, monitoring and rollback safeguards.

When strategy, operations and engineering align on one KPI, one cadence and one scale gate, organizations gain value fast – and value that lasts.

Recommendations

- ✓ Invest now in smart manufacturing and analytics.
- ✓ Build your manufacturing data management foundation.
- ✓ Give your frontline workers all they need.
- ✓ Prepare for AI.
- ✓ Follow the top performers' path.



11

FAQs about AI in manufacturing



Where's the fastest ROI?

Start near the line – where data is clear and impact is direct. Quick win areas include quality analytics, predictive maintenance and energy optimization.



Why do pilots stall?

Not because of model accuracy, but because of integration and governance. Without templates, data controls and ownership, scaling fails.



How do we keep AI trustworthy?

Build in governance early. Use model cards for transparency and monitoring dashboards for drift. Trust grows when systems are observable and auditable.



What's a realistic timeline?

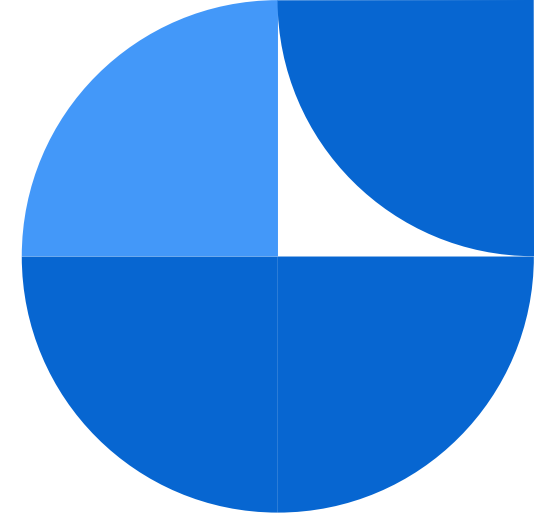
Twelve weeks from proof to scale:

- **Weeks 1-2:** Define KPIs and review data.
- **Weeks 3-6:** Build a simple pipeline and baseline checks.
- **Weeks 7-10:** Develop model and set up monitoring.
- **Weeks 11-12:** Measure ROI and prepare for scale.



What's generative AI's role?

It speeds insights and makes AI more usable – but only with strong data and governance. It's an augmentation, not a shortcut.



12

About the research

This e-book draws on Tech-Clarity's ***Making Manufacturing Analytics and AI Matter*** (licensed by MESA), expert insights on responsible AI at scale (Fraser, 2025; **Coombs, 2025**) and SAS' own data and AI expertise.

The Tech-Clarity research reflects input from over 400 manufacturers worldwide, examining how companies are implementing AI to enhance performance, efficiency and reliability across operations.





See how AI can transform your manufacturing operations at sas.com/manufacturing.



To contact your local SAS office, please visit: sas.com/offices