

The People Paradox in Supply Chain AI Integration



Executive Summary

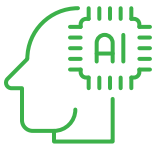
Supply chain leaders know AI is a game-changing operational engine, but actual deployment is hitting a wall. While strategic buy-in is high, the movement from pilot project to full enterprise adoption often stalls. To help executives overcome these hurdles, a joint research initiative between the Association for Supply Chain Management (ASCM) and the Digital Supply Chain Institute (DSCI) examines how global organizations are navigating the real-world human and operational challenges of scaling AI across supply chain networks.

Drawing on insights from senior supply chain executives, the data reveals that the primary bottlenecks to adoption are not executive skepticism or a lack of buy-in. Instead, leadership teams face three distinct business hurdles:

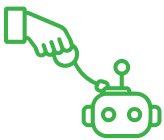
1. An unready workforce
2. A deep-seated inability to trust AI to act autonomously
3. Persistent challenges in demonstrating clear return on investment

As a result, organizations are caught in a high-interest, low-execution cycle — holding technology on a short leash until talent, trust and measurable business value catch up.

Key Findings



Workforce-readiness gap: An overwhelming 83% of respondents report that their employees are unprepared to use AI effectively. This creates an immediate growth bottleneck, particularly because 91% of organizations plan to use AI to augment human workers rather than replace them.



The “short leash” paradox: Across 13 core supply chain functions, AI is mostly restricted to generating data insights rather than executing decisions autonomously. By keeping AI on a leash, companies miss out on speed and efficiency gains, effectively using powerful predictive tools as little more than digital spreadsheets.



Top-down disconnect: While AI strategy is heavily mandated by executive leadership, middle managers — the operational leaders typically responsible for putting AI to work — are largely unengaged. When middle management is left out, frontline adoption stalls, tools are resisted or ignored, and executive directives fail to deliver real operational change.



Security catch-22: Cybersecurity issues are widespread, with 92% of leaders expressing significant concerns over new risks introduced by AI. Yet implementation lags far behind awareness: Organizations selected an average of just 2.3 out of 6 standard security controls — including continuous monitoring, secure data-sharing and incident-response plans. This gap exposes companies to risk, threatening supplier networks and digital infrastructure before scaling can safely happen.

The AI Adoption Reality — Wide Curiosity, Shallow Integration

While AI commands executive attention, its deployment across end-to-end supply chains is still in its infancy. Results to date are positive, yet incremental rather than transformational. More than half of leaders (55%) describe their AI deployments as "somewhat successful," reflecting isolated wins rather than sweeping operational overhauls.

When putting AI to work, executives are motivated primarily by operational velocity and financial discipline. The top expected payoffs over the next two years center on faster decision-making through shorter planning cycles (46%), overall supply chain cost reduction (42%) and higher process automation rates (40%).

The Adoption Continuum

To measure actual daily use across 13 core supply chain functions, adoption was tracked on a 1-to-5 continuum — ranging from no AI use at all (1) to full autonomous execution without human review (5). Across the board, average adoption sits at just 1.94, revealing how far away most organizations are from true human-machine collaboration. A breakdown across business functions highlights where companies are moving forward and where they are falling behind:

Where AI lives today: Planning activities lead the adoption journey. Demand planning registers the highest usage score at 2.28, followed closely by supply and inventory planning at 2.12. These functions serve as safe proving grounds where predictive analytics deliver immediate value without requiring automated physical execution.

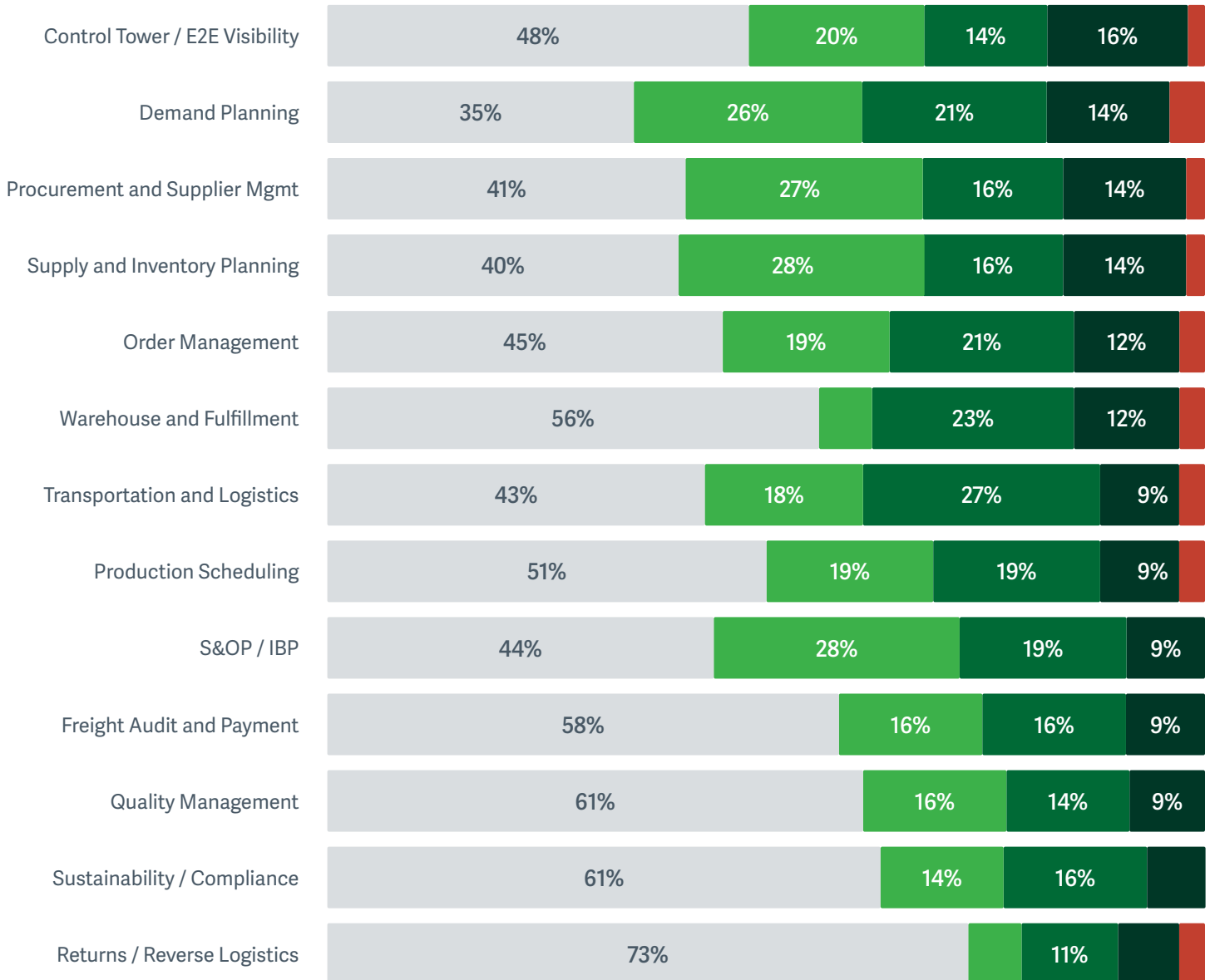
Where AI lags: Execution-heavy roles trail significantly. Quality management scores 1.70, while sustainability and compliance sit at 1.67. Reverse logistics ranks lowest overall at 1.59, showing minimal penetration. The business risk is clear: By leaving physical operations out of the AI roadmap, companies create data blind spots that undercut early gains made in planning.

The S&OP outlier: Despite planning's general dominance, sales and operations planning presents a glaring exception. Scoring 1.93, S&OP trails other planning categories. Because S&OP relies on cross-functional alignment and human consensus, leaders struggle to integrate automated insights when multiple departments are involved — proving that organizational silos, not just technology, slow adoption.



The AI Autonomy Spectrum Across Supply Chain Functions

■ No AI use = 1
 ■ Insights only = 2
 ■ Recommends, human decides = 3
■ Auto-execute with review = 4
 ■ Auto-execute no review = 5



Readiness and Engagement Gaps

The fundamental barrier to scaling AI across global supply chains is organizational readiness. While algorithms advance rapidly, human capabilities, skills and leadership structures are struggling to keep pace. An overwhelming 76% of leaders firmly believe AI will augment human workers rather than replace them, yet they admit their teams are unprepared to work alongside the technology. This creates an execution bottleneck where executive ambition outpaces workforce capability — leaving only 14% of organizations feeling fully prepared for an AI-augmented future.

Executives overwhelmingly view AI as a driver of role evolution rather than elimination, with 51% expecting automation to shift human workers toward higher-value decision-making and 40% expecting new roles to emerge alongside automated functions. In contrast, just 7% predict AI to directly replace workers.

Crucially, executive skepticism is notably absent from the primary adoption hurdles. Instead, deployment is stalled by a tie between a lack of workforce skills and resources (33%) and an unclear business case or return on investment (33%). Secondary barriers include poor data quality (25%), governance and compliance risks (21%), and change-management challenges (21%).

Preparedness Shapes Expectations for AI Coexistence



The Executive Divide — Prepared vs. Unprepared

In addition, a sharp divide separates the small minority of organizations making tangible progress from the overwhelming majority struggling to scale:

17%

Prepared: Companies with an AI-ready workforce share a distinct operational trait — they learned by doing. Having put AI to work across an average of six supply chain functions, this group achieves a 71% project success rate. Practical experience builds institutional confidence, sharpens employee skills and establishes clear business value.

83%

Unprepared: The vast majority remain stalled early in their adoption journey. Roughly 64% of these organizations are stranded in pilot or planning stages, yielding a meager 28% project success rate. More than half report no active AI use across all evaluated supply chain functions. Without hands-on exposure, workforce capability remains stagnant and investment stalls.

Leadership Takeaways



Fund upskilling as a core software cost.

Treat workforce training as an essential enablement expense rather than an optional line item.



Target specific operational friction.

Replace vague enterprise pilots with focused use cases that demonstrate clear, rapid financial return.



Break pilot paralysis through active deployment.

Build organizational capability through real-world implementation rather than waiting for perfect data.



Reframe role evolution explicitly.

Communicate clearly how task automation elevates human decision-making to secure frontline buy-in.



Strategic Mindsets — Augmenters vs. Replacers

As supply chain leaders navigate AI adoption, two distinct philosophies have emerged regarding the role of human effort: The overwhelming consensus views technology as an amplifier of workforce capability, while a small minority approaches AI strictly through a cost-reduction lens.

90%

Augmenters: Most supply chain leaders approach AI as pragmatic builders, prioritizing team capability, operational speed and workflow efficiency over headcount reduction. These executives actively put AI to work across an average of 3.6 supply chain functions, with 41% directly leading or implementing projects. Rather than assuming seamless adoption, augmenters recognize that human capability is their biggest bottleneck, with 85% expressing significant workforce readiness concerns, as augmentation requires continuous upskilling to deliver business value.

10%

Replacers: A small, directional subset of leaders view AI through a defensive lens, driven primarily by short-term cost cuts. Replacers focus heavily on reducing headcount and operational spending. This defensive posture carries over into risk perception, with 67% expressing severe cybersecurity concerns, compared to just 16% of augmenters. Yet despite their focus on replacing labor, these executives demonstrate lower operational engagement. More than half (55%) act strictly as observers, deploying AI across an average of just 2.6 functions.

Importantly, labor replacement today remains confined to narrow, transactional tasks. Current targets center on frontline customer service chatbots, routine order-execution triggers and automated safety-stock thresholds — repetitive processes that require minimal strategic oversight.

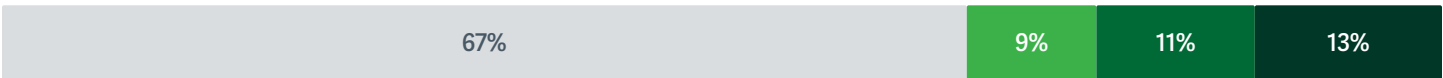
Practical AI Deployment by Strategic Mindset

- No AI use = 1 Insights only = 2 Recommends, human decides = 3
- Auto-execute with review = 4 Auto-execute no review = 5

Augmenters



Replacers



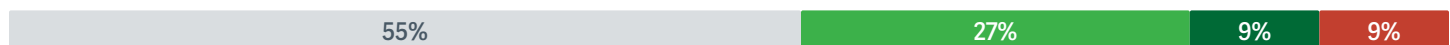
AI Autonomy by Strategic Mindset

Function	Augmentors (n=509)		Replacers (n=54)	
	Mean	SD	Mean	SD
Demand Planning	2.36	1.22	1.50	1.00
Supply and Inventory Planning	2.16	1.17	1.50	1.00
Order Management	2.13	1.19	1.50	1.00
Procurement and Supplier Mgmt	2.12	1.14	1.75	1.00
Transportation and Logistics	2.10	1.13	2.00	1.41
Control Tower / E2E Visibility	2.05	1.22	2.00	1.41
Warehouse and Fulfillment	2.00	1.21	1.75	1.50
Production Scheduling	1.95	1.12	1.75	1.50
S&OP / IBP	1.92	0.98	2.00	1.41
Freight Audit and Payment	1.77	1.01	1.75	1.50
Sustainability / Compliance	1.59	1.00	1.50	1.00
Quality Management	1.67	1.03	2.00	1.00
Returns / Reverse Logistics	1.64	1.14	1.20	0.45
Total (all functions)	1.97	1.13	1.70	1.11

AI Leadership and Implementation Across Employee Levels

■ Lead AI
 ■ Implement / scale
 ■ Influence / approve
 ■ Aware only
 ■ Not involved

Executive / C-level



Vice president



Director



Manager



Staff / associate



Source: Q7 (position) x Q26 (role in AI). Bases: Exec 11, VP 7, Director 24, Manager 43, Staff 10. Top rows are small — directional.

A Strategy Trapped at the Top

Compounding the workforce-readiness deficit is a stark disconnect across corporate hierarchies. Engagement with AI follows a steep downward curve from the C-suite to the shop floor:

Executive concentration: Fully 82% of C-suite leaders actively lead, implement or scale AI initiatives, with vice presidents following closely behind. Strategy is established at the top with high energy and clear intent.

Operational stall: Momentum plummets at the director level, where direct leadership drops to just 12% — and 50% of directors report being merely "aware" of AI efforts without active involvement.

Frontline isolation: At the execution layer, adoption fades into passive observation. A majority of managers (51%) and staff or associates (70%) sit strictly in the "aware only" category, while 20% of frontline staff report no involvement at all.

This stark drop-off underscores a critical implementation gap. While executives set the vision, the managers and frontline employees tasked with daily execution are largely disengaged, undertrained and unprepared to put AI to work.

Leadership Takeaways



Avoid the pure cost-cutting trap.

Viewing AI strictly as labor replacement stifles broader innovation, operational velocity and scale.



Engage middle management early.

Involve directors and frontline managers in tool selection and workflow design to prevent execution stalls.



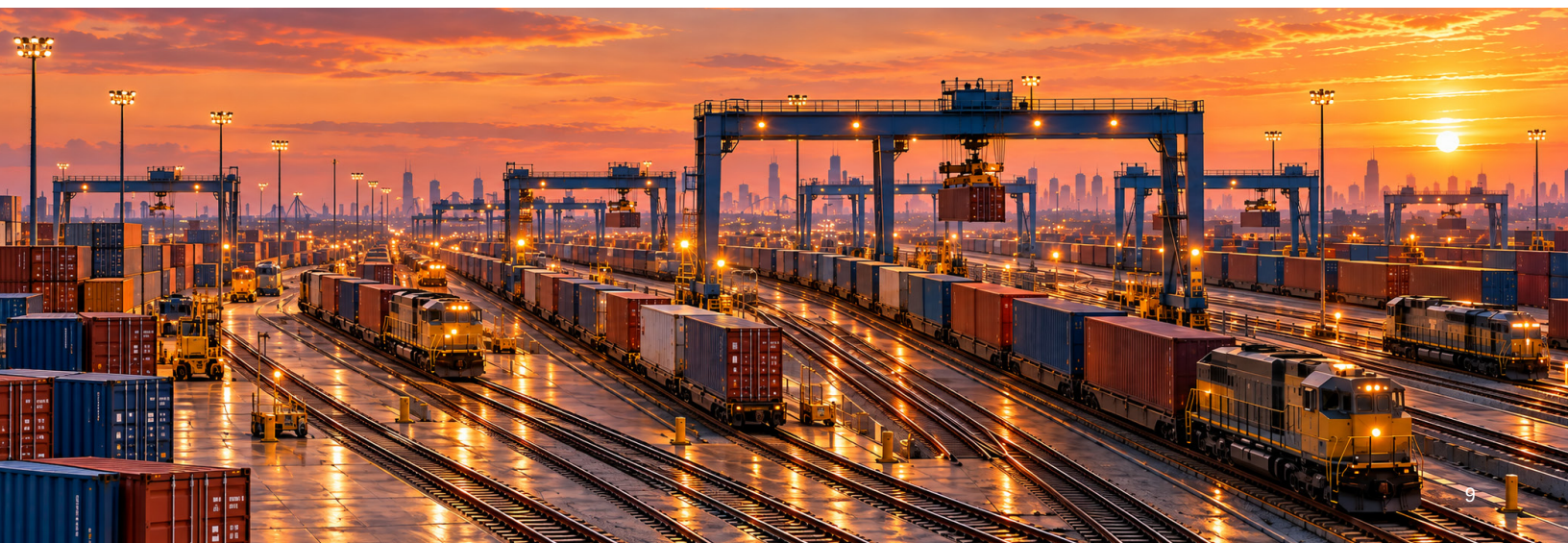
Convert awareness into active adoption.

Provide role-specific enablement to move operational teams from passive observation to daily tool use.



Set explicit automation guardrails.

Restrict autonomous AI to transactional tasks while keeping complex planning and sourcing under human oversight.



The Vulnerability Dilemma — High Anxiety, Low Governance

As supply chains become increasingly digital and interconnected, putting AI to work introduces new business and cybersecurity risks. While executives recognize the heightened risk profile associated with third-party integration, operational safeguards are still alarmingly sparse across partner networks.

The Cybersecurity Challenge

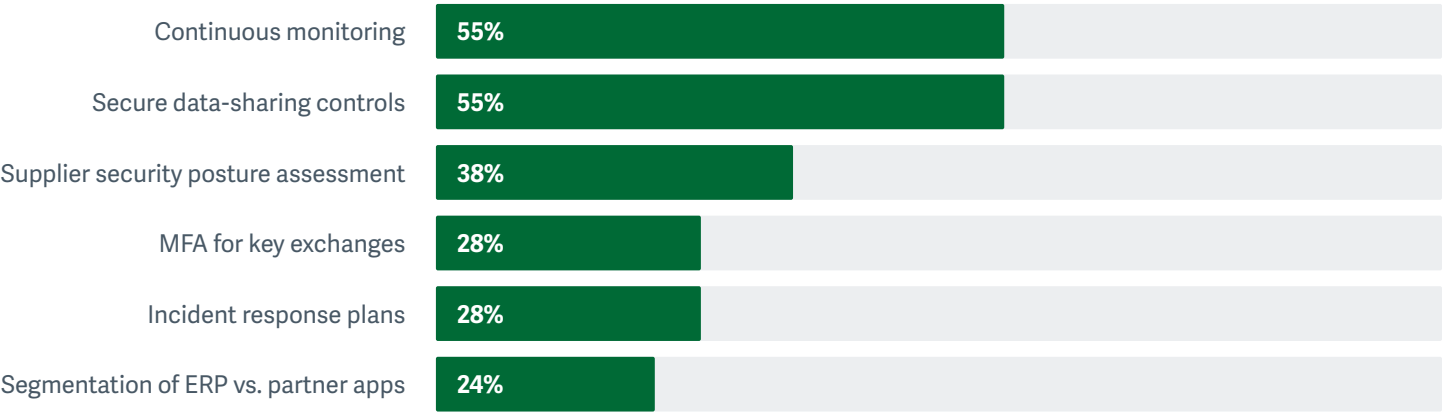
An overwhelming 92% of supply chain leaders express significant cybersecurity concerns regarding exposure introduced through AI-enabled suppliers and trade partners. Yet this high level of anxiety has not translated into robust technical defenses and governance protocols:

Minimal control adoption: The average organization implements just 2.3 out of 6 standard cybersecurity practices.

Limited partner monitoring: Barely half (55%) of organizations use continuous third-party risk monitoring or secure data-sharing protocols with suppliers.

Scarce technical safeguards: Advanced operational controls are dangerously rare. Only 28% of organizations maintain AI-specific incident response plans or enforce multi-factor authentication for key data exchanges, and a mere 24% have implemented system segmentation to prevent lateral breach movement across enterprise software.

Six Cybersecurity Practices Explored



The pattern: The two visible "keep watch / control the data" basics — continuous monitoring and secure data sharing — lead at 55% each. The structural and preparatory defenses fall to the bottom: network segmentation (24%), multi-factor authentication (28%). Organizations are doing ongoing hygiene while underinvesting in the defenses that contain a breach once it happens.

Base: the 29 respondents reporting at least one control in place. Small sample — read the ranking and the gap, not the precise percentages.

Decision Clarity vs. Algorithmic Bias

When evaluating model risk, executives maintain a clear operational priority:

91%

Demand for explainability: An overwhelming majority insist on total transparency into how AI models generate predictions and recommendations. Leaders refuse to trust "black box" algorithms when making high-stakes sourcing, planning or inventory decisions.

43%

Lower emphasis on bias: Fewer than half express concern over potential algorithmic bias in supplier selection or inventory allocation.

Leadership Takeaways



Mandate baseline cyber compliance.

Enforce multi-factor authentication, encryption and continuous risk monitoring across all supplier AI feeds.



Contain breach risks through architecture.

Deploy system segmentation and dedicated AI incident plans to prevent localized vendor breaches from spreading.



Demand explainable AI models.

Prioritize platforms offering clear auditing trails and transparent decision logic to build internal operational trust.



Audit algorithmic bias systematically.

Establish governance protocols that evaluate model behavior to prevent systematic skew in sourcing and inventory allocation.



Executive Action Roadmap

The research points to a singular conclusion: Supply chain leaders have accepted AI in principle, but their organizations have not yet learned to execute it in practice. Belief and access are no longer the constraining factors — organizational capacity is.

Meanwhile, market capabilities are accelerating rapidly. AI is evolving from generating recommendations to executing decisions across planning, sourcing and logistics, with technology partners embedding these capabilities directly into core data flows. As tariff shifts, demand shocks and geopolitical disruptions intensify, competitive advantage will belong to organizations that can sense and re-plan fastest. Companies that remain in observation mode will not choose when AI enters their supply chain; their partners and customers will choose for them.

Scaling supply chain AI cannot be accomplished through software budgets or endless pilot programs alone. It requires decisive leadership across talent, operational autonomy and risk governance. Executive teams should focus on seven immediate imperatives:

1

Assign executive sponsorship and set a timeline

Name a single senior executive accountable for transitioning AI from pilot to production across the enterprise. Within 90 days, this sponsor should deliver a diagnostic of current usage, identify priority functions for deployment, outline required workforce capabilities and capital investment, and establish governance protocols. To ensure practical adoption, the sponsor's core mandate must include engaging all operational levels, shifting AI deployment from a software push to a collaborative, cross-functional redesign.

2

Select a deliberate starting point and commit

The ideal first deployment is not the most ambitious, but the one the organization can readily digest: a process supported by clean data, an accountable functional owner, a high-frequency decision cycle and measurable business impact. While demand and inventory planning are proven proving grounds, leaders must connect these initial planning models to downstream execution processes so that real-time operational feedback prevents downstream blind spots.

3

Build a targeted data foundation

With 25% of leaders citing poor data quality as a primary barrier, AI cannot scale on inaccurate or siloed inputs. Rather than delaying progress for an enterprise-wide data overhaul, isolate the specific data streams required for prioritized deployments, assign dedicated data owners and resolve formatting gaps within that defined scope. Each deployment will naturally strengthen the foundation for the next.

4

Redefine return on investment

In a volatile operating environment, the primary value of AI lies in velocity — the speed at which an enterprise moves from detecting a disruption signal to executing a response. Build the business case around response speed and operational resilience rather than relying solely on headcount reduction or legacy cost metrics.

5

Empower middle management to drive functional adoption

Executive sponsors establish strategy, but directors and functional managers must own execution. Grant directors authority over deployments within their functions and tie adoption targets to their performance objectives. Initiatives that lack dedicated functional owners below the executive level inevitably stall.

6

Prepare to demonstrate AI risk posture

Executive sponsors establish strategy, but directors and functional managers must own execution. Grant Customers, value chain partners, insurers and regulators are increasingly auditing how AI-driven decisions are governed and secured. Assume these inquiries will arrive within the year, and establish verifiable evidence of technical safeguards, data privacy, and governance protocols.

7

Expand AI authority deliberately

Define explicit operational parameters, function by function, under which AI is permitted to act autonomously, and expand those boundaries as system reliability and trust develop. Confining AI solely to generating insights is a prudent starting point, but maintaining that restriction indefinitely limits enterprise value.

Diagnostic Questions for Executive Leadership

The following questions serve as a functional diagnostic — helping leaders move beyond strategic intent and evaluate whether the organizational structures, risk protocols and decision-making frameworks exist to support true AI scale:

Executive accountability: Who holds single-point executive accountability for scaling AI across the end-to-end supply chain, and do they have the cross-functional authority needed to enforce adoption? Use this question to ensure a single senior leader can break organizational silos and drive enterprise adoption.

Decision autonomy: Which routine supply chain decisions should AI be authorized to execute autonomously today, and which can be prepared for hand-off within two years? Use this question to set clear operational boundaries for automated execution, moving the enterprise beyond passive data generation toward real-time operational speed.

Middle management alignment: Are directors and functional managers actively co-designing AI deployments within their workflows, or are systems being pushed down as top-down mandates? Use this question to identify change-management friction early and ensure middle managers act as process owners rather than passive observers.

Governance and risk audit: Can the organization present a verified, evidence-backed AI risk and governance posture if a key customer, insurer or regulator requests proof tomorrow? Use this question to verify that cyber defenses, data privacy protocols and model explainability standards can withstand immediate external scrutiny.

Value metrics: Is the AI business case measured by response velocity and disruption mitigation, or are decision-makers still attempting to justify technology investments solely through headcount reduction? Use this question to align financial payback models with strategic resilience and response speed rather than narrow labor-replacement targets.

The transition from treating AI as an exploratory tool to embedding it as a core operating system is fundamentally a management challenge, not a software problem. Supply chain networks are rapidly shifting toward real-time automated execution, leaving little margin for passive observation. By establishing clear executive sponsorship, empowering functional managers, bridging the workforce gap and evaluating success through operational speed, leaders can build supply chains that don't merely absorb market volatility — they expect and outmaneuver it.

Appendix: Methodology and Demographics

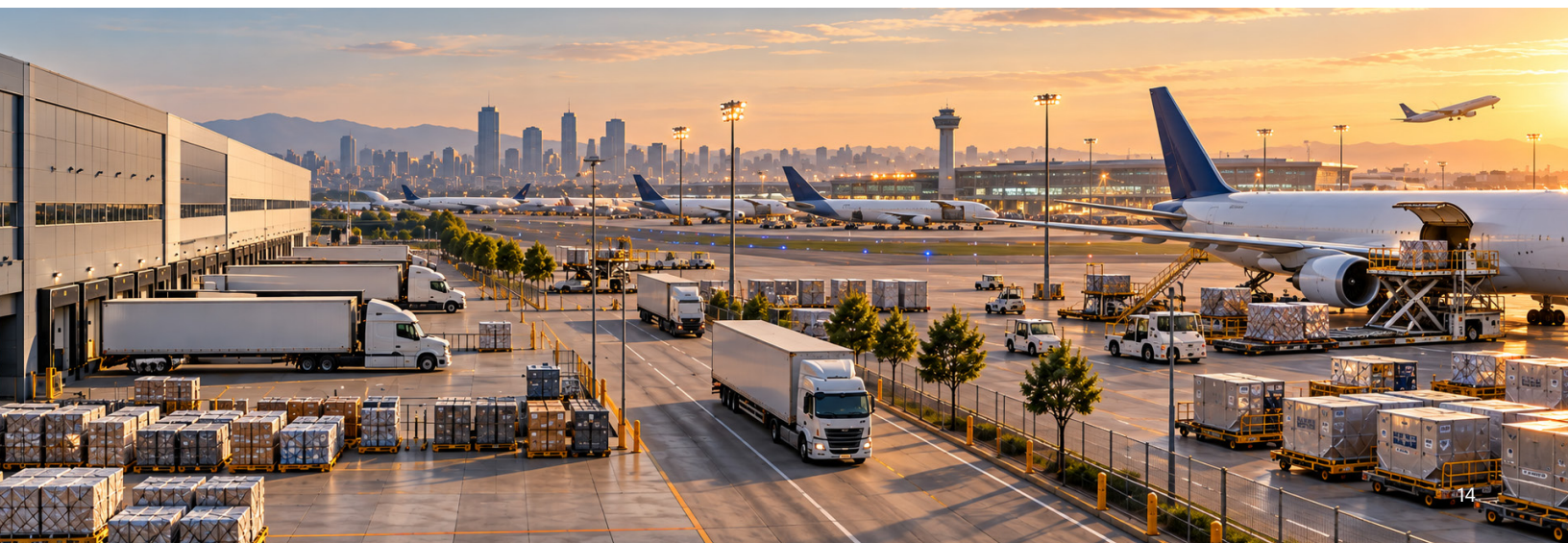
This report is based on an empirical survey designed to measure AI adoption, workforce readiness and governance controls across global supply chains. A total of 144 responses were collected, of which 107 met the rigorous criteria required for detailed analysis.

Survey respondents span all organizational tiers, led by managers at 43.4% and directors at 24.2%. C-level executives account for 11.1%, staff and associates represent 10.1%, vice presidents make up 7.1% and other roles comprise the remaining 4%.

Participating organizations represent a broad cross-section of enterprise scale, including companies earning \$1–\$4.9 billion (22.7%) and less than \$25 million (18.6%). Organizations generating \$10–\$49.9 billion account for 15.5%, followed by \$100–\$499.9 million at 12.4%.

North America forms the primary geographic base for respondents at 62.2%, followed by Europe at 13.3% and global or multinational headquarters at 8.2%. Asia, Africa, Latin America and those preferring not to say each represent 3.1%, while Middle East and Oceania round out the distribution at 2% each.

Industrial or manufacturing is the largest sector represented at 26.5%, followed by consumer packaged goods (13.3%), pharmaceutical or health care (12.2%), and transportation or logistics (10.2%). Retail comes in at 7.1%; technology at 6.1%; aerospace at 4.1%; chemical at 3.1%; utilities, automotive and education at 2% each; and government or military at 1%.



About DSCI

The Digital Supply Chain Institute (DSCI) is a non-profit applied research organization founded by the Center for Global Enterprise. DSCI is dedicated to transforming traditional global supply chains into dynamic, digital-first ecosystems. Through thought leadership, collaborative research, and implementation programs, DSCI helps its members use digital transformation for competitive advantage, enhanced agility, and cyber resilience.

Learn more at dscinstitute.org.



About ASCM

The Association for Supply Chain Management (ASCM) is the global pacesetter of organizational transformation, talent development and supply chain innovation. As the largest association for supply chain, ASCM members and worldwide alliances fuel innovation and inspire accountability for resilient, dynamic and sustainable operations. ASCM is built on a foundation of world-class APICS education, certification and career resources, which encompass award-winning workforce development, relevant content, groundbreaking industry standards and a diverse community of professionals who are driven to create a better world through supply chain.

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