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Technology Primer: AI-driven fleet management platforms aim to advance safety across fleets

Analysts - Beatriz Minamy

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Introduction

Next-generation fleet management platforms are enhancing safety practices across operations by integrating data from the entire fleet ecosystem through cloud-based, AI-enabled software. These connected platforms highlight driver and worker safety as a priority, as transportation companies seek scalable, software-driven solutions to reduce risk and improve operational performance. According to 451 Research's Supply Chain Digital Transformation Survey 2025, improving operator and driver safety ranks among the top challenges that trucking companies aim to address through technology. This highlights the strategic role of AI in enhancing operational safety and mitigating risk.

The Take

AI-native operational platforms are redefining driver safety in commercial transport — shifting from reactive "detect and review" models to proactive, orchestrated execution. By integrating IoT devices like cameras, sensors and trackers, these platforms enable in-cabin monitoring, predictive coaching, hazard detection, fatigue management and cargo protection. They deliver 360° situational awareness, gamified training and real-time alerts to prevent incidents before they occur. The benefits include preventing fatalities, lower insurance costs and overall total cost of ownership, and greater efficiency. However, realizing the full potential of "AI-oT" platforms in the fleet space requires overcoming fragmented data systems, legacy infrastructure and the absence of standardized enterprise safety programs. Organizations must define clear policies, operational protocols and team responsibilities to expand the adoption of safe driving AI platforms. Workforce upskilling is key to supporting automation and ensuring long-term success.

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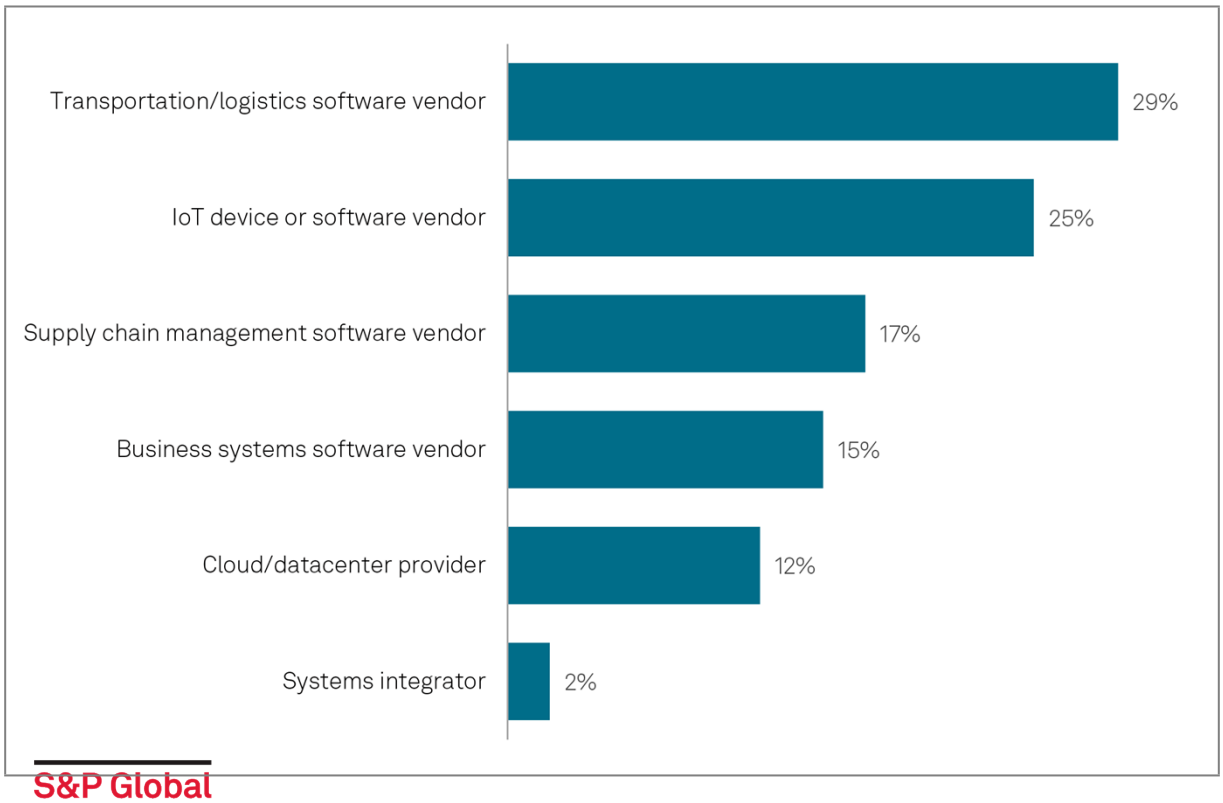
Context

Advances in software, IoT, AI-powered monitoring systems, connectivity and real-time data analytics are now enabling more proactive safety management. They help organizations identify risks early, intervene effectively, and foster a culture of accountability and continuous improvement. A growing number of vendors are embracing a platform-based approach, consolidating safety, compliance and operational tools into unified, cloud-native ecosystems. This trend is accelerating adoption by offering modular, scalable solutions that integrate with existing fleet infrastructure while enabling continuous innovation.

Yet automotive OEMs (original equipment manufacturers) continue to build brand-specific, proprietary systems that restrict third-party access and hinder interoperability. These siloed architectures make it difficult for fleets to extract consistent, actionable data across vehicle brands. While some fleet tech providers are partnering directly with OEMs to enable smoother data integration, these efforts are often limited by the lack of common data models and APIs. Despite these efforts, integration remains a major challenge for most fleets, which typically operate vehicles from multiple OEMs due to legacy contracts and M&A. This diversity complicates the deployment of standardized safety, fleet monitoring and performance solutions. As a result, demand is rising for aftermarket platforms that offer cross-OEM compatibility and centralized fleet management, regardless of vehicle brand or system architecture. Our Supply Chain Digital Transformation data shows that the majority of carriers partner with transportation software vendors (29%) and IoT device vendors (25%) to support digital transformation (Figure 1).

While aftermarket platforms enhance situational awareness by providing safety alerts and actionable insight, they do not offer active vehicle control like Advanced Driver Assistance Systems (ADAS), which remain integrated within the vehicle architecture, allowing the vehicle to make decisions in response to risks. A key disadvantage of ADAS is that their capabilities are typically limited to the vehicle itself and may not provide fleet-wide visibility or centralized management.

Figure 1: Lead tech partner for commercial transportation digital transformation



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Source: 451 Research's Supply Chain Digital Transformation Enterprise Survey 2025.
Q. Which of the following, if any, is the primary or lead partner supporting digital transformation at your organization?
Base: All respondents (n=100).
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Regulatory landscape and market overview

In the European Union, the General Safety Regulation requires driver monitoring systems (DMS) for new vehicles. These rules apply to both passenger and goods transport vehicles, and will soon require advanced distraction detection capabilities. In the US, while DMS is not yet federally mandated, the Federal Motor Carrier Safety Administration enforces safety standards such as hours-of-service limits, driver qualification checks and vehicle inspections. DMS adoption is strongly encouraged and expected to become part of future FMCSA updates. These regulations are accelerating the shift toward AI-powered safety platforms, pushing fleet operators to adopt proactive, data-driven approaches to driver safety.

Market dynamics are adding pressure to modernize fleet operations. Global truck sales above six tons declined in 2024, with Western Europe and North America experiencing the steepest drops. The outlook for 2025 points to continued weakness in these regions, while China and parts of Asia are expected to see modest gains. In the US, new truck registrations are projected to fall 10% to 522,000 units. Replacement demand is rising as fleets age and emissions standards tighten, but fragmented fleet composition and limited system interoperability continue to hinder digital transformation. According to the S&P Global Mobility MHCV Industry Global Report 3Q 2025, global truck sales above 6 tons are forecast at 3.10 million units in 2024, 3.01 million in 2025 (down 2.9% year over year), with a rebound to 3.23 million units in 2026 (up 7.3% y/y).

Enhancing safety with AI

AI adoption in commercial transportation is accelerating, with safety a leading driver for investment. Nearly 56% of commercial transportation vendors already deploy AI technologies, and another 40% plan to implement AI within the next 12 months. Video analytics and computer vision are widely used, with 40% of organizations utilizing these capabilities and an additional 40% planning to adopt them in the coming year.

Hybrid AI systems (46%) and reinforcement learning (46%) are among the most widely used approaches by trucking companies to optimize transport and logistics operations. These technologies are commonly applied to safety use cases such as fatigue detection, real-time driver coaching during idling and hands-free interaction, helping fleets proactively manage risks and improve operational efficiency.

Additionally, 95% of commercial transportation organizations report that AI has increased the value of IoT data collected from their devices, unlocking deeper insight and enabling more predictive capabilities. This is helping fleets move from reactive to proactive risk management, driving measurable improvements in safety and operational efficiency.

Despite this momentum, barriers remain: Data privacy concerns (37%), data quality management (36%), and data transfer and processing (34%) are the top concerns cited by transportation providers when deploying AI technologies in support of IoT deployments (Figure 2). Privacy sensitivities peak when implementing driver-facing cameras, which often meet resistance from drivers. Education is also key — many drivers are unaware of the consequences of unsafe behavior. In regions with strict distracted driving laws, even two infractions for mobile phone use while driving can result in license

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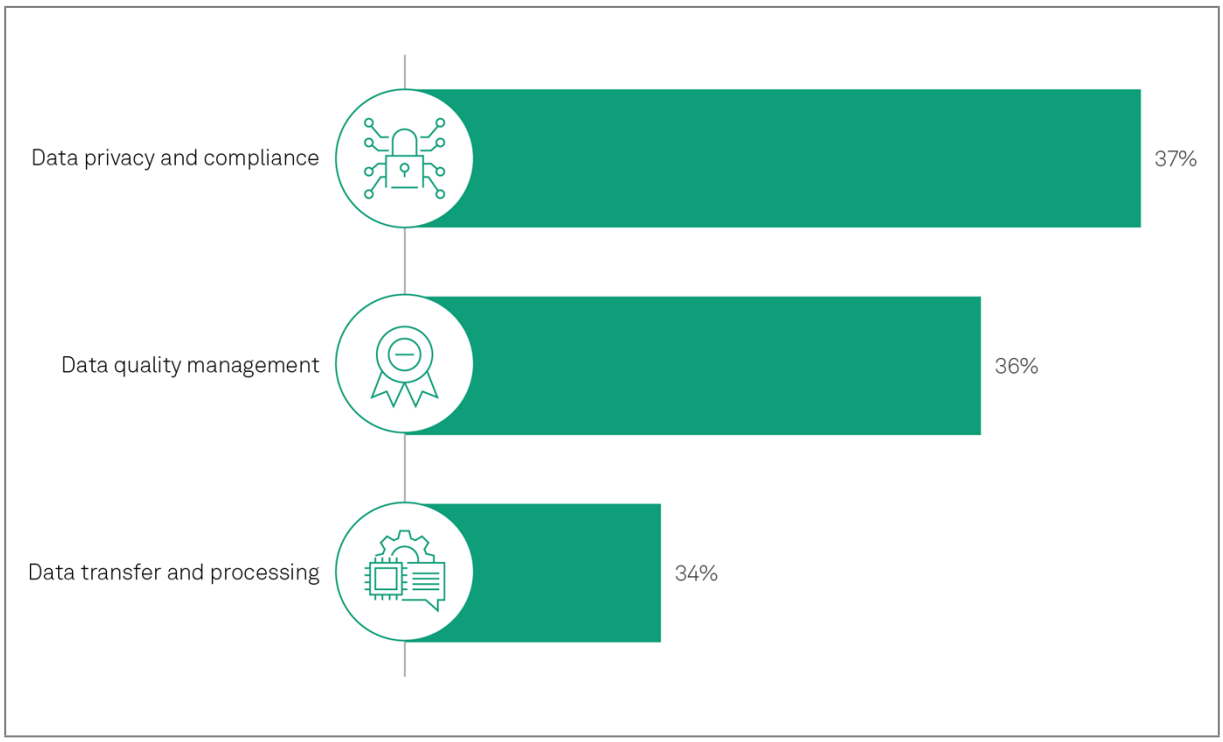
suspension or job termination. Fleet managers aren't immune; they may face legal liability, job loss or even jail time in serious cases. These risks underscore the importance of safety programs. Beyond privacy, poor data quality and fragmented OEM systems make it hard to generate reliable insight across mixed fleets. Without harmonized inputs, AI struggles to deliver accurate alerts. Meanwhile, data transfer issues delay real-time interventions.

The business case for AI is also under scrutiny. While 80% of transportation organizations track ROI on their IoT initiatives, only 15% expect returns above 50%. Still, the benefits are clear: improved driver safety, enhanced productivity for drivers and fleet managers, reduced accident frequency, reduced insurance costs, and lower fuel costs. However, integrating data from disparate systems remains a challenge. Real-time data ingestion and correlation are often hampered by inconsistent formats and missing metadata, making fleet management a complex task.

Figure 2: Top three barriers to implementing AI in commercial transportation companies



Source: 451 Research's Supply Chain Digital Transformation Enterprise Survey 2025.
Q. What challenges do you face in deploying AI/ML technologies?
Base: All respondents (n=95).
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From insight to implementation

AI is playing a key role in improving safety in commercial transportation. While adoption trends offer valuable context, organizations need more than just awareness — they need clarity on which AI technologies are delivering measurable impact and how they're being deployed in real-world scenarios. Figure 3 outlines the key AI technologies supporting driver and fleet safety.

Figure 3: AI technologies supporting driver and fleet safety

AI type	Status	Key technologies	Primary use cases

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Computer vision	Established	- Driver monitoring systems - AI dashcams (front, rear, side view) - ADAS	- Detect fatigue/distraction - Visual hazard detection - Lane keeping
Predictive analytics	Scaling	- Predictive maintenance - Driver risk scoring - Failure forecasting	- Prevent breakdowns - Identify risky drivers - Schedule proactive service
Machine learning	Scaling	- Behavior modeling - Incident pattern recognition - Safety score calibration	- Identify emerging risk patterns - Improve safety scoring models - Support continuous learning
Edge AI	Emerging	- Onboard decision engines - Real-time sensor fusion	- Local hazard response - Low-latency safety actions
Reinforcement learning (RL)	Emerging	- Adaptive cruise control - Route optimization under dynamic conditions	- Learn optimal driving behavior - Adjust to traffic/weather in real time
Natural language processing (NLP) / GenAI	Emerging	- Voice assistants - Driver coaching interfaces	- Hands-free interaction - Real-time feedback and alerts
Optimization algorithms	Established	- Route planning - Charging schedule optimization (for EVs)	- Reduce exposure to risk zones - Ensure safe energy management
Deep learning	Scaling	- Multimodal sensor analysis - Image and audio classification	- Detect complex hazards - Enhance perception in low-visibility or noisy environments
Agentic AI	Emerging	- Autonomous safety agents - Self-directed risk mitigation systems - Vehicle agentic AI assistant	- Make independent safety decisions - Coordinate across systems without human input - Streamline maintenance and safety management across fleets.

Source: S&P Global Market Intelligence 451 Research.
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Key Market players

As AI becomes central to safety in commercial transportation, companies are driving advances in driver monitoring, predictive analytics and hazard detection. With no single vendor or approach dominating the market, fleets increasingly combine technologies to meet their specific operational and regulatory needs. The following examples highlight the variety of solutions shaping the industry.

Amazon Web Services' IoT FleetWise is a cloud-based platform for collecting, processing and analyzing vehicle data. It supports real-time monitoring, machine learning applications and integration with edge computing devices for fleet safety and maintenance use cases.

Geotab's MyGeotab platform provides a scalable telematics solution that combines vehicle diagnostics, driver behavior analytics and predictive maintenance tools. Its open architecture enables integration with third-party AI applications, allowing fleets to customize safety and operational workflows across diverse vehicle types. MyGeotab transforms raw vehicle data into actionable insight, helping managers optimize performance, reduce costs and maintain compliance across complex operations.

LynxT's Safety Intelligence Platform offers AI-based telematics tools for analyzing driver behavior in real time and generating predictive risk scores. It is compatible with OEM and

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aftermarket installations and can be integrated with broader fleet management platforms.

Motive's Integrated Operations Platform delivers a unified solution for fleet safety, spend management, equipment monitoring and workforce automation. Its AI Vision suite includes fatigue detection, blind-spot monitoring and predictive maintenance, helping fleets proactively manage risk and vehicle health. Through its partnership with Fleetio, Motive enables two-way syncing of Driver Vehicle Inspection Reports, automated fuel transaction imports, and centralized access to maintenance and telematics data. This integration enhances operational visibility, streamlines compliance and connects driver behavior with asset performance to reduce costs and improve uptime.

Netradyne's Driver i AI Fleet Camera System delivers a vision-based safety platform that uses edge AI cameras to capture and assess driving behavior in real time. The system supports driver scoring, automated coaching and compliance reporting, helping fleets improve safety outcomes and reduce liability. With real-time alerts and full-context video, Driver i empowers fleet managers to proactively address risky driving behaviors and reinforce safe practices through intelligent, in-cab feedback and post-trip analysis.

Samsara's Connected Operations Cloud offers a comprehensive platform for managing safety and operational tasks across fleet and jobsite environments. Its AI-based safety system helps identify potential risks and supports workers through features such as automated coaching, training modules, multi-camera setups with real-time alerts, weather notifications and driver performance tracking. The system includes components for vehicle maintenance, route planning, commercial navigation and small asset tracking.

Smart Eye's AIS+ platform is a driver monitoring system that uses computer vision to detect signs of distraction and fatigue. It includes optional video recording and haptic feedback, and can be integrated with fleet management platforms such as Geotab.

Verizon Connect's Reveal platform includes fleet tracking, safety monitoring and regulatory compliance. The Extended View Cameras provide near-360-degree coverage, along with an in-cab monitor. This supports improved visibility, incident documentation and driver awareness. The platform also integrates a customizable Driver Vehicle Inspection Report (DVIR) system, available in the US and Canada. It allows drivers to complete inspection forms, upload visual documentation and send real-time alerts to fleet managers. The DVIR system supports maintenance coordination through API integration with third-party providers.

Conclusion

The following recommendations are designed to help fleets achieve safety improvements, streamline integration, and ensure compliance and trust as the technology landscape evolves:

- Quantify and communicate the business impact of AI-driven safety investments. Safety programs are more likely to receive sustained support when they deliver rapid, visible improvements alongside long-term, compounding gains. By tracking and sharing both short-term wins and ongoing benefits, fleets can build a compelling case for continued investment in AI safety technologies.
- Select platforms that operate across different vehicle brands and legacy systems. Since most fleets use a mix of OEMs and technologies, true value comes from consolidating safety data into a canonical safety event model — a standardized format for capturing and sharing safety events.
- Promote driver acceptance and address privacy concerns through transparent policies and targeted training. Driver buy-in is a critical factor for adoption of DMS and dashcams.
- Monitor key performance indicators, document success stories and actively share proven solutions across the organization. Consistent measurement drives improvement, while sharing results helps scale best practices.

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- Proactively adopt technologies and practices that meet or exceed current and emerging regulatory standards. With regulations increasingly focused on proactive monitoring, and US standards emphasizing duty cycles, driver qualification and inspections, fleets should anticipate changes and ensure their systems are compliant.
- Focus on user experience: A user-friendly experience is key — solutions empower drivers and managers with clear insight, easy integration and confidence in compliance as technology evolves.

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