LTIMindtree

Automotive Technology Trends 2025-2026

Content

Rajesh's Foreword

Rajesh Sundaram
Executive Vice President
Chief Business Officer
Manufacturing, LTIMindtree

The Automotive Renaissance: From Horsepower to Computational Power

The global automotive industry is transforming. In this era of mobility change, success depends on adopting new technologies and fundamentally rethinking how automobiles are designed, manufactured, and introduced to the market.

For decades, automobiles' value was measured by their mechanical skill, engineering quality, and mass production ability. Today, that value is increasingly influenced by a more intangible asset: intelligence.

Intelligence is embedded in software-defined vehicles, decision-making supply chains, AI-augmented design, and autonomous factories. Intelligence that senses, predicts, adapts, and even learns.

This is no longer about digitizing legacy; it is about creating a new mobility stack, where physical motion is driven by computational insight. And where competitive advantage comes from cost leadership and the ability to rewire operations, customer engagement, and innovation cycles at speed.

We are witnessing a radical shift from traditional linear value chains to fluid, intelligence-driven automotive ecosystems. Technology is now the vehicle's soul, and AI is powering precision in product development and operations. Sustainability is imperative! This is not an incremental shift; it is a structural reset.

LTIMindtree has always been a frontrunner in providing futuristic automotive manufacturing solutions through the lens of convergence. The convergence of physical and digital, of design and intelligence, of products and services. From software-defined vehicles to autonomous supply chains, the winners will be those who act early and decisively on these signals of change.

The Automotive Technology Trends 2025-26 reflects this tectonic movement. It highlights emerging technologies and exposes the undercurrents of disruption, redrawing the competitive landscape. From generative design to immersive engineering, from predictive logistics to AI copilots on the shop floor, these radar signals show where the industry is headed and how bold leaders can get ahead of the curve.

The road ahead will demand bold thinking, adaptive operating models, and a relentless focus on innovation. But with the right intelligence and intent, the opportunity is immense. The road ahead will not be paved with incrementalism. It will favor those who think in platforms, build with intelligence, and scale with speed. This defining moment shapes not only the next generation of vehicles but also the next generation of value.

Let us embrace this inflection point with vision, precision, and purpose. Let's build the improved automotive manufacturing ecosystem, setting the pace for a resilient and sustainable future, faster. Together.

Naushad's Foreword

Naushad Khambhawala
Vice President
Manufacturing

From Digital-First to Intelligent Operations in Automotive

The automotive industry is undergoing an unprecedented transformation driven by rapid technological advancements, changing customer expectations, and increased focus on sustainability. As vehicles become more intelligent, connected, and autonomous, manufacturers must adopt innovation to stay competitive. At LTIMindtree, we believe that the future of automotive manufacturing depends on harnessing the power of advanced technologies such as artificial intelligence (AI), machine learning (ML), cloud, and immersive solutions to develop a brighter, more efficient, and customer-focused industry ecosystem.

Our research shows that manufacturers are increasingly adopting digital-first strategies to reduce costs, improve margins, and speed up time-to-market. A key focus is on connected ecosystems, where real-time data exchange allows seamless integration across the supply chain. From predictive maintenance powered by Intelligent Asset Management to Blockchain-Based Supply Chains, manufacturers are utilizing advanced solutions to ensure transparency, security, and operational efficiency.

Inventory management is another critical area of transformation. AI-driven Inventory Optimization and Available-to-Promise (ATP) Solutions are helping businesses minimize stock levels while ensuring rapid order fulfillment. By adopting intelligent planning tools and demand forecasting techniques, manufacturers can significantly reduce lead times and improve supply chain resilience.

The shift towards software-defined vehicles and smart manufacturing requires a holistic approach, combining digital engineering with automation. Leveraging immersive technologies, manufacturers can enhance customer experience, streamline production processes, and drive innovation across the lifecycle. These advancements redefine automotive manufacturing and create new revenue streams and business models.

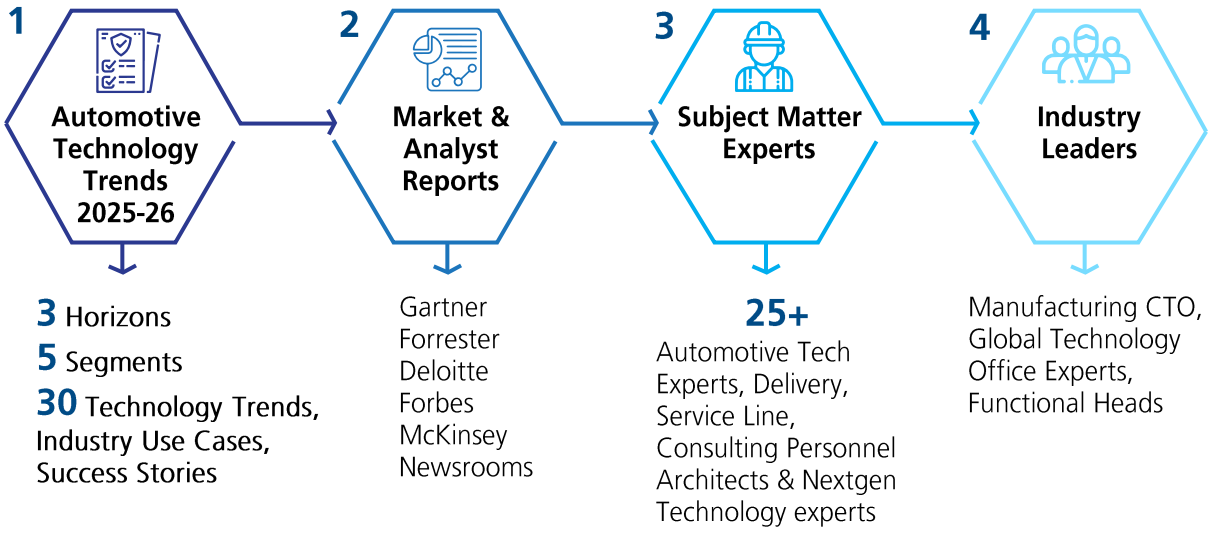
At LTIMindtree, we are dedicated to shaping the future of automotive manufacturing through technology-driven transformation. We enable manufacturers to create agile, scalable, and intelligent operations by deploying next-gen digital solutions, ensuring long-term success in a rapidly changing industry.

The Journey of Creating the Automotive Radar

Indranil Mitra
Vice President
Global Technology Office

At LTIMindtree Research, our goal has always been to decode emerging technology trends and translate them into actionable intelligence for industry leaders. The Automotive Radar was born from this vision: "To help manufacturers stay ahead in an era of rapid innovation and transformation".

This report results from months of collaborative research involving deep engagement with domain experts, analysis of global market signals, and evaluation of real-world use cases across the automotive value chain. From product development and smart manufacturing to logistics, after-sales, and customer experience, we have mapped technologies like AI, immersive, cloud, etc., that are reshaping how vehicles are designed, manufactured, and delivered.



What sets this radar apart is our research methodology. We combined qualitative and quantitative inputs from primary, secondary, and internal expert assessments to prioritize technologies based on maturity, relevance, and impact. Every trend has been carefully curated to align with strategic business outcomes, such as operational efficiency, sustainability, or digital innovation.

We believe this radar will empower automotive leaders with a forward-looking lens, enabling them to anticipate disruptions, identify the right investment areas, and drive transformation at scale.

Opening Insights

The global automotive industry stands at a defining inflection point. This Automotive Technology Trends Report 2025-2026 highlights the major advancements happening in this industry. Rapid advancements in artificial intelligence, machine learning, cloud computing, and immersive technologies enhance vehicles and redefine how mobility is imagined, built, and experienced.

This shift is a fundamental reset, where intelligence, sustainability, and digital convergence become the primary sources of competitive advantage. Emerging technologies significantly transform every part of the automotive value chain, from design and manufacturing to supply chain management, sales, and aftermarket services.

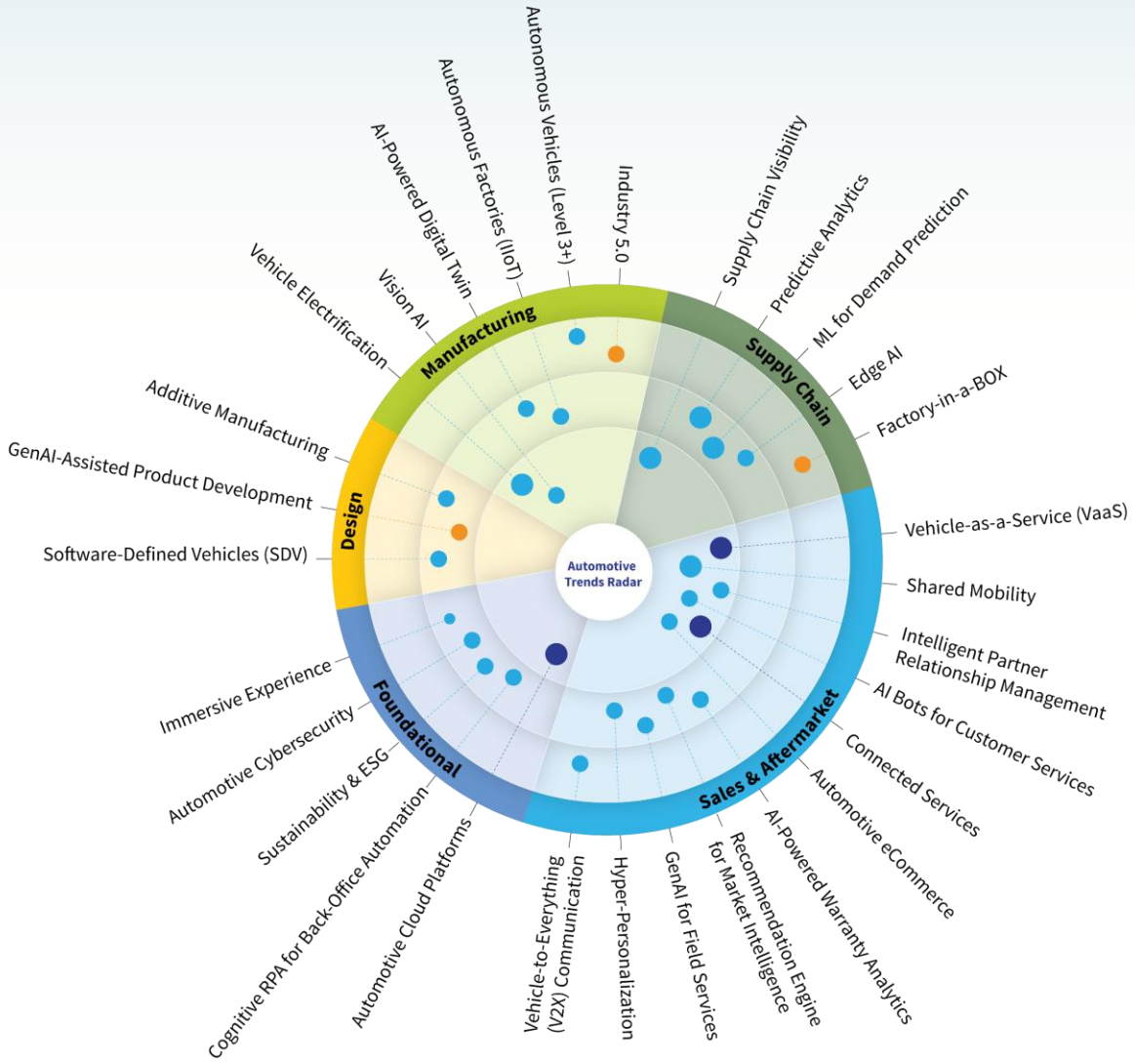
These innovations speed up development, increase efficiency, and enable new business models such as Vehicle-as-a-Service (VaaS), shared mobility, and highly personalized customer experiences.

LTIMindtree is leading this evolution, helping automotive manufacturers adopt next-generation digital solutions. Through frameworks like LTIMindtree Crystal, the company delivers actionable insights, industry-specific use cases, and early-warning systems that empower clients to anticipate change, drive operational excellence, and achieve sustainable growth.

Key Highlights:

- The industry is moving from traditional, hardware-centric models to intelligent, software-defined, and connected ecosystems to accelerate innovation, improve efficiency, and deliver differentiated customer experiences.
- Technologies such as AI, digital twins, industrial internet of things (IIoT), cloud, and immersive solutions are driving operational excellence, sustainability, and enabling new business models such as VaaS, shared mobility, etc.
- LTIMindtree serves as a transformation partner, helping automotive enterprises harness these trends through AI-driven platforms, digital engineering, and industry-specific frameworks to achieve greater agility, resilience, and long-term competitiveness in a rapidly evolving mobility landscape.

LTIMindtree Automotive Technology Trends Radar



Horizon

Horizon refers to the timeframe between the inception of a new technology trend and its adoption by the mainstream

Horizon 1 (0-1 Year)
Trend will be industrialized in less than 1 year

Horizon 2 (1-3 Years)
Trend will be industrialized within 1 to 3 years

Horizon 3 (3+ Years)
Trend will take more than 3 years

Market Potential (USD)

The likelihood of the technology trend to generate value across multiple functions

- **Low**
- **High**
- **Very High**

Adoption Phase

Adoption maturity of the technology trend in the market

- **Emerging:** Trend is at its initial stages of adoption, with innovators and early adopters exploring its potential
- **Improving:** Trend adoption is increasing with proven potential to improve efficiency and effectiveness.
- **Mature:** Trend has achieved widespread acceptance and usage among the general population or targeted audience

Value Chain Segments Overviews

	R&D, Product Design	Supply Chain	Manufacturing	Sales and Marketing	After-market
Trend	GenAI Assisted Product Development	Predictive Analytics & ML-based Supply Chain Resiliency	Autonomous Factories	Hyper-personalized Omnichannel Journeys	Vehicle-as-a-Service
	Digital twins – Virtual Testing	Realtime Decision Making – Edge AI / IOT	Vision AI in Quality Inspection	Data Driven Ecommerce Ecosystems	Over the Air Updates
	Sustainable User Centric Design	Supply Chain Flexibility through Localized Production	Human-machine Collaboration – Industry 5.0	Conversational AI	Data Driven Predictive Maintenance
Foundation					
	Cloud native platforms	Digital Twins	Left Shift Cyber Security	Immersive experiences (AR/VR)	Circular Economy
LTIM Expertise	• Product Design Support • Product Testing & Validation • Digital Collaboration	• Supplier Risk Management • Smart Contract and Traceability • Network Optimization • ERP Transformation	• Asset Management & Utilization • Worker Safety • Digital Work Instruction • Digital Twin	• Digital Pricing and Sales Excellence • Realtime Delivery Visibility • CPQ • Omnichannel Experience	• Connected Vehicle Platforms • Service Prognostics • Warranty Cost Reduction

Technology innovation is crucial for the automotive industry, boosting efficiency, agility, and competitiveness throughout the value chain. From AI-powered design and customized sales to intelligent supply chains and secure, scalable foundational platforms, innovation helps manufacturers meet changing customer demands and adapt quickly to market shifts.

1. Design

The design function is evolving from sequential, manual processes to agile, AI-augmented, and simulation-driven workflows. Generative AI, additive manufacturing, and software-defined vehicle architectures are enabling rapid prototyping, virtual validation, and continuous feature evolution. This accelerates time-to-market, enhances customization, and supports the integration of advanced safety and sustainability features.

Key Developments & Trends:

- AI and digital twins reduce design cycles and enable virtual testing to accelerate time-to-market, lower prototyping costs, and improve overall design precision and quality.
- Software-defined architectures allow for over-the-air (OTA) updates and modularity of vehicle functions and components, helping manufacturers continuously enhance features, reduce maintenance costs, and extend vehicle lifecycles without physical recalls.
- The focus is on user-centric, sustainable, and regulatory-compliant design to meet evolving customer expectations, strengthen brand trust, and ensure faster market approvals across global regions.

Enabling Success with LTIMindtree's Expertise:

With extensive digital engineering and AI-driven design expertise, LTIMindtree helps automotive manufacturers speed up innovation cycles. Using generative AI, digital twins, and collaborative platforms, LTIMindtree enables design teams to prototype quickly, virtually validate concepts, and smoothly transition to software-defined vehicle architectures. This strategy ensures clients react quickly to market demands and regulatory changes while focusing on user-centered and sustainable design.

2. Manufacturing

The adoption of intelligent, connected, and autonomous systems is revolutionizing manufacturing. Integrating IIoT, AI-powered digital twins, and advanced robotics enables real-time monitoring, predictive maintenance, and flexible production lines. These developments increase efficiency, reduce downtime, and support the shift to electric and autonomous vehicles.

Key Developments & Trends:

- Autonomous factories and IIoT enable real-time data-driven decision-making that enhances production efficiency, minimizes downtime, and improves overall equipment effectiveness (OEE).
- Vision AI and robotics automate quality inspection and safety monitoring to reduce defects, ensure workforce safety, and maintain consistent product quality, ultimately lowering operational costs and warranty claims.
- Industry 5.0 fosters human-machine collaboration and sustainable manufacturing practices such as energy optimization, waste reduction, and circular production models, helping manufacturers achieve higher productivity while meeting environmental, social, and governance (ESG) goals.

Enabling Success with LTIMindtree's Expertise:

Automotive industry players can utilize LTIMindtree's advanced manufacturing solutions to transform their operations into intelligent, connected, and agile ecosystems. By deploying IIoT, AI-powered digital twins, and intelligent automation, LTIMindtree enables real-time monitoring, predictive maintenance, and flexible production lines. These features help manufacturers reduce downtime, improve quality, and support the shift toward electrification and autonomous vehicles.

3. Supply Chain

The supply chain is shifting toward resilience, transparency, and agility. Technologies like predictive analytics, edge AI, and modular "factory-in-a-box" ideas provide real-time visibility, demand forecasting, and quick responses to disruptions. The goal is to optimize inventory, cut costs, and maintain supply chain continuity in a changing global environment.

Key Developments & Trends:

- Predictive analytics and ML enhance demand forecasting and risk management by identifying potential supply disruptions, inventory imbalances, and logistics delays early. This helps businesses optimize procurement, reduce excess stock, and improve on-time delivery performance.
- Edge AI and IoT enable real-time tracking and proactive decision-making for inventory movement, shipment routing, and supplier coordination, resulting in improved visibility, faster response to anomalies, and reduced operational costs.
- Modular and localized production models increase supply chain flexibility by bringing manufacturing closer to demand centers, reducing transportation costs, shortening lead times, and enabling faster response to market fluctuations.

Enabling Success with LTIMindtree's Expertise:

LTIMindtree collaborates with automotive organizations to develop resilient, transparent, data-driven supply chains. Using predictive analytics, edge AI, and IoT-enabled visibility solutions, LTIMindtree helps clients foresee disruptions, optimize inventory, and improve procurement processes. This leads to increased agility, cost savings, and the ability to adapt swiftly to changing global conditions.

4. Sales & Aftermarket

Digital, data-driven, and service-oriented models are revolutionizing sales and aftermarket operations. AI-powered bots, connected services, and hyper-personalization boost customer engagement, while e-commerce and shared mobility platforms create new revenue streams and business models.

Key Developments & Trends:

- AI bots and digital platforms deliver 24/7 personalized customer support that enhances customer satisfaction, builds brand loyalty, and reduces service response time and cost-to-serve.
- Connected services and OTA updates are improving vehicle uptime and user experience, enabling manufacturers to strengthen post-sale relationships, capture recurring revenue through digital services, and maintain consistent product performance throughout the lifecycle.
- Data-driven insights enable predictive maintenance and targeted marketing, helping businesses reduce unplanned downtime, optimize service operations, and increase customer retention through timely, personalized engagement.

Enabling Success with LTIMindtree's Expertise:

LTIMindtree supports automotive manufacturers and service providers by implementing omnichannel sales and service platforms, deploying AI-powered customer engagement tools, and developing connected vehicle solutions. LTIMindtree enables clients to improve customer experience, strengthen loyalty, and monetize new digital services in the changing mobility landscape.

5. Foundational Technologies

Foundational technologies such as cloud platforms, cybersecurity, immersive experiences, and sustainability solutions support the entire automotive value chain. These technologies enable secure, scalable, compliant operations, aid digital transformation, and promote environmental and social responsibility.

Key Developments & Trends:

- Cloud-native platforms enable real-time data sharing and global collaboration, allowing faster decision-making, seamless cross-functional innovation, and improved scalability across global operations.
- Cybersecurity is critical for protecting connected vehicles and data, safeguarding brand reputation, ensuring compliance with data privacy regulations, and maintaining customer trust in connected ecosystems.
- Immersive technologies (AR/VR) enhance design, manufacturing, and customer engagement, reducing training time, minimizing errors, and creating more engaging, experiential customer journeys.
- Sustainability and ESG initiatives drive decarbonization and circular economy practices, helping enterprises reduce costs, meet regulatory mandates, and enhance brand credibility with environmentally conscious consumers and investors.

Enabling Success with LTIMindtree's Expertise:

LTIMindtree is a strategic partner for foundational transformation. It helps automotive firms adopt secure cloud solutions, strengthen cybersecurity, and integrate immersive technologies. The company also advances sustainability and ESG efforts with digital tools for lifecycle assessment and traceability, enabling clients to meet compliance and promote responsible growth.

Looking Ahead

The Automotive Technology Trends 2025–2026 shows how emerging and maturing technologies are ushering in a new era of intelligent, connected, and sustainable mobility.

LTIMindtree's comprehensive capabilities across the entire value chain make it a strategic partner for automotive manufacturers aiming to lead innovation, operational excellence, and customer focus.

To access the complete insights and learn how we can collaborate to advance innovation in the automotive industry, please contact us for the detailed report and partnership opportunities. Together, let's shape the future of mobility.

Navigating the Radar

Design

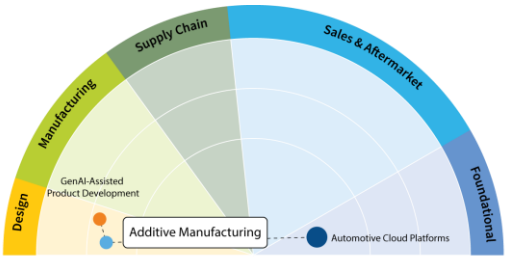
Additive Manufacturing

What Is It?

Additive manufacturing (AM) transforms automotive design by producing complex, lightweight, and durable parts that are difficult to make with traditional methods.

It pairs with AI, augmented reality (AR), and virtual reality (VR) so designers and engineers can explore advanced geometries and visualize components in 3D before they exist physically.

This combination improves prototyping and quality assurance. It accelerates innovation, increases efficiency, and supports deeper customization in automotive programs.



Additive Manufacturing

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- AM shortens the design-to-part cycle and enables rapid iteration. This speeds development while supporting complex, high-strength, lightweight structures.
- Small-batch customization becomes cost-effective. This makes bespoke parts viable for high-performance and luxury lines and improves agility.
- AI analyzes real-time data and powers generative design. This improves material usage, strengthens structures, and raises yield.
- AR/VR lets teams validate 3D parts before printing. This reduces design flaws and increases accuracy and engineering efficiency.
- The combined toolchain improves quality and lowers total cost, which raises confidence in scaling AM into production workflows.

Featured Story :

German OEM Improves Quality and Reduces Waste with AI-Driven AM

Challenge:

A Germany-based automotive manufacturer needed complex, lightweight components and tighter quality with less scrap.

Solution:

The team integrated AI with additive manufacturing to optimize 3D-printed designs and apply topology optimization. Real-time analytics predicted defects and adjusted print parameters during production.

Impact:

The approach reduced waste, improved part quality, and kept production reliable and cost-effective while meeting advanced design goals.

(See the **References** section for the full case study link)

Key Technologies :

Generative AI: AI-driven designs for lightweight, optimized automotive components.

Digital Twin: Simulates and validates designs virtually before manufacturing.

Edge Computing: Process data near 3D printers to reduce latency and faster decisions.

Key Application Areas :

Rapid Prototyping: Fast design testing and validation for new automotive components.

Complex Component Fabrication: Production of intricate designs that are difficult with traditional manufacturing.

Electric Vehicle Parts: Specialized parts for EVs, enhancing performance and efficiency.

Key Takeaways :

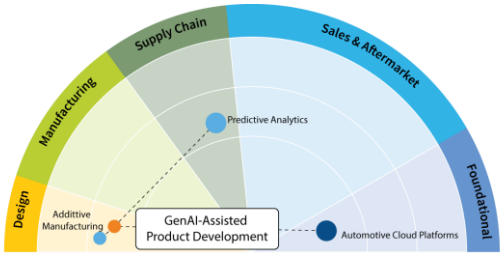
- ✓ AM combined with AI enables complex, customized parts with greater design flexibility and production efficiency, redefining automotive innovation.
- ✓ Ecosystem collaboration is essential to overcoming scalability, reliability, and regulatory challenges. This raises confidence in moving from pilots to production.

GenAI-Assisted Product Development

What Is It?

Generative AI reshapes automotive product development by optimizing design for aerodynamics, weight, and safety while honoring engineering constraints. It enables rapid ideation of shapes, layouts, and materials.

It also helps test rare scenarios, strengthens regulatory documentation, and reduces the need for physical prototypes. The result is faster, more sustainable R&D and a step-change in innovation velocity.



GenAI-Assisted Product Development

Horizon	Adoption Phase	Market Potential
2	Emerging	High

Trend Highlights :

- AI-led R&D boosts efficiency by 10–20%, enabling faster design cycles and reducing time-to-market for new vehicle platforms.
- GenAI adoption by EV leaders sets benchmarks, pushing automotive design teams to accelerate innovation and stay competitive.
- AI-driven perception systems enhance safety, advancing driver assistance and autonomous features through large-scale data training.
- GenAI enables realistic 3D simulations, using NeRF and digital twins to reduce physical testing and improve AV validation.
- Intelligent document retrieval unlocks legacy R&D, allowing designers to reuse proven concepts and make faster, data-backed decisions.

Featured Story :

Research Institute Speeds EV Design with AI and Early Engineering-Driven Sketch Integration

Challenge:

Designers needed to connect early sketches to hard engineering constraints so iterations would not stall.

Solution:

A generative AI technique fused concept sketches with constraints, optimized aerodynamics up front, and balanced aesthetics with performance using optimization theory.

Impact:

Design iterations dropped, and EV development accelerated. Performance improved through better aero, which extended range and raised efficiency.

(See the **References** section for the full case study link)

Key Technologies :

NLP: Translate design requirements into actionable engineering solutions and documentation.

Edge AI: Process design iteration locally, reducing latency in real-time prototyping.

Decision intelligence: Forecast material behaviours and lifecycle performance of automotive components.

Key Application Areas :

Autonomous driving systems: Reduce reliance on real-world data collection, accelerating the development of self-driving algorithms.

Material design and optimization: Discovering and optimizing new, lighter, stronger, and sustainable materials.

Enhanced simulation and testing: Digital twin and NeRF-generated synthetic optimize vehicle design, predict part failure, and enhance autonomous vehicle testing.

Key Takeaways :

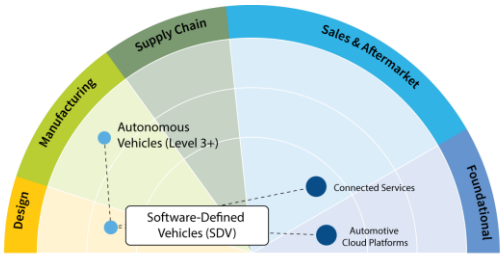
- ✓ GenAI streamlines product development, accelerates innovation, and enables intelligent, user-centric features.
- ✓ Automation of complex design and quality tasks increases efficiency and improves consistency across programs.
- ✓ Personalization and performance boundaries advance as teams iterate faster on safer, future-ready concepts.

Software-Defined Vehicles

What Is It?

Software-Defined Vehicles (SDVs) represent a shift from hardware-centric design to software-driven platforms. By integrating zonal architecture, centralized computing, cloud connectivity, and modular systems, SDVs enable continuous updates, diagnostics, and feature enhancements over-the-air.

This approach allows vehicles to evolve throughout their lifecycle, improving performance, safety, and user experience—much like smartphones—while supporting intelligent, connected, and adaptive automotive ecosystems.



Software-Defined Vehicles (SDV)

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- The shift to centralized architectures converts electronic control unit (ECU) functions into powerful computing units. This makes development faster and integration simpler.
- Flexible, scalable software platforms support continuous feature delivery via secure cloud services, increasing speed to market and customer value.
- Hardware–software decoupling allows seamless updates and automation. This keeps vehicles current without physical recalls.
- SDVs interact with their surroundings and learn from data. This enables new service-based business models and personalization.
- Onboard electronics are shifting toward high-performance computers. This lays the foundation for autonomy and next-gen user experiences.

Featured Story :

Bus OEM Unifies Legacy Systems to Meet New Regulations with SDV Architecture

Challenge:

A leading bus manufacturer struggled with new regulatory demands while running two separate legacy communications, maintenance, and reporting applications. The setup was costly and inefficient.

Solution:

The OEM adopted an SDV strategy that integrated existing systems and aligned them with industry standards and regulations.

Impact:

The new architecture met emerging legal requirements, enabled market entry, and improved operational efficiency.

(See the **References** section for the full case study link)

Key Technologies :

Generative AI: Automates software optimization and vehicle feature customization for an advanced user experience.

Edge AI: Enables real-time decision-making and localized processing within vehicles.

5G connectivity: Ensure high-speed data transfer for software integration and AI capabilities.

Key Application Areas :

Modular architecture design: Enables hardware-software separation for flexible customization and reuse across multiple vehicle models and variants.

Improved safety: SDVs can improve safety through features like anti-collision systems, driver assistance, and automatic emergency braking (AEB).

Preventive maintenance: SDVs can provide insights into vehicle performance through telematics and diagnostics.

Key Takeaways:

- ✓ As shared mobility grows, adaptable and intelligent systems will unlock new opportunities in innovation, sustainability, and user experience. Unbundle software from hardware; adopt zonal compute and virtual ECUs.
- ✓ Integrate testing early using CI/CD pipelines, simulations, digital twins.

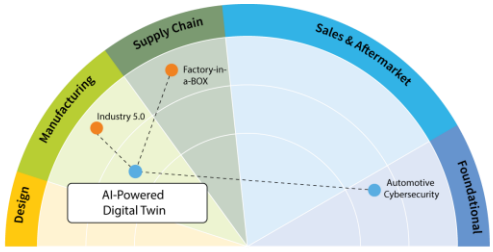
Manufacturing

AI-Powered Digital Twin

What Is It?

AI-powered digital twins in automotive manufacturing create virtual replicas of vehicles and production systems, enabling simulation and optimization from design to assembly.

Early deployments typically used statistical data analytics for descriptive and diagnostic insights. Manufacturers can predict performance, test design iterations, and optimize processes without physical prototypes by incorporating AI.



AI-Powered Digital Twin

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- AI-powered digital twins are scaling rapidly, with major OEMs investing to boost efficiency, accuracy, and decision-making.
- By 2027, AI-powered digital twins in manufacturing is expected to increase tenfold, with 75% of large enterprises already investing in these technologies.
- Digital twins optimize complex tasks, like multimachine scheduling and vehicle design, despite high initial setup effort.
- LLMs accelerate twin development, generating code and universal models to streamline simulation and reduce engineering time.
- AI integration enhances predictive capabilities, enabling performance optimization and cost reduction across manufacturing systems.
- Modern architectures unlock scalable digital twins, helping manufacturers transition from legacy systems to future-ready operations.

Featured Story :

Automotive OEM Driving Innovation with AI-Powered Digital Twins in Manufacturing and Engineering

Challenge:

A Germany-based OEM faced rising complexity, sustainability demands, and legacy systems limiting innovation, collaboration, and cost efficiency.

Solution:

Partnered with a digital platform provider to deploy AI-powered virtual twins for real-time simulation, collaboration, and modular design.

Impact:

This helped OEM in faster development, reduced IT costs, improved sustainability, and streamlined production with scalable, future-ready architecture.

(See the **References** section for the full case study link)

Key Technologies :

Augmented reality: Enable immersive visualization and interaction with digital twin models.

Machine learning: Analyzes data to optimize manufacturing processes, predict failures, and improve designs.

Edge AI: Processes sensor data locally for faster insights and minimal latency in the manufacturing process.

Key Application Areas :

Production line optimization: Simulates workflows to identify bottlenecks and optimize production efficiency using real-time data.

Quality control: Detects defects early by comparing real-time data with ideal digital twin models.

Vehicle design validation: Tests vehicle performance virtually under different conditions to accelerate design and reduce costs.

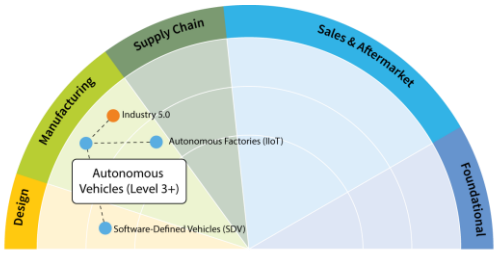
Key Takeaways :

- ✓ AI-powered Digital Twins enable automotive manufacturers to enhance design precision, streamline production, and improve vehicle performance through real-time simulation and insights.
- ✓ Manufacturers must focus on ensuring high-quality data, aligning AI models with real-world behavior, and maintaining secure, integrated systems to maximize value.

Autonomous Factories (IIoT)

What Is It?

Autonomous factories in the automotive industry leverage the Industrial Internet of Things (IIoT) to integrate interconnected sensors, cameras, and devices. These systems enable real-time data collection and analysis, optimizing manufacturing processes, reducing human error, and enhancing productivity and quality control. This automation leads to more efficient, flexible, and intelligent production lines.



Autonomous Vehicles (Level 3+)

Horizon	Adoption Phase	Market Potential
3	Improving	High

Trend Highlights :

- IIoT enables real-time machine data, improving predictive maintenance and reducing unplanned downtime in automotive plants.
- Smart sensors detect defects early, enhancing quality control and minimizing rework across production lines.
- Flexible lines adapt to design changes, boosting responsiveness and supporting agile manufacturing for evolving vehicle platforms.
- AI and edge computing optimize decisions, accelerating operations and improving throughput in connected factory environments.
- Rising connectivity increases cyber risks, requiring strong security protocols to protect data and ensure system integrity.

Featured Story :

Automotive OEM Implemented Advanced IIoT Technologies for Traceability and Product Process Data

Challenge:

The manufacturer needed real-time visibility into product and process data across legacy and modern equipment to meet traceability and efficiency goals.

Solution:

Deployed IIoT hardware and industrial automation platform to unify data collection, enable OEE reporting, and visualize shop floor operations.

Impact:

Achieved rapid deployment, improved operational transparency, reduced downtime, and aligned teams with shared performance metrics.

(See the **References** section for the full case study link)

Key Technologies :

Sensor tech: Enable real-time data collection from machines and processes for automation and monitoring.

Edge AI: Process data locally for faster response time in factory automations.

5G networks: Provide high-speed, low-latency communication for seamless machine-to-machine interaction.

Key Application Areas :

Predictive maintenance: IIoT sensors monitor equipment health in real-time, predicting potential failures before they occur.

Energy management: IIoT systems monitor and optimize factory energy usage, leading to significant cost savings and a smaller environmental footprint.

Real-time production monitoring: Tracks performance metrics and machine health to optimize manufacturing operations instantly.

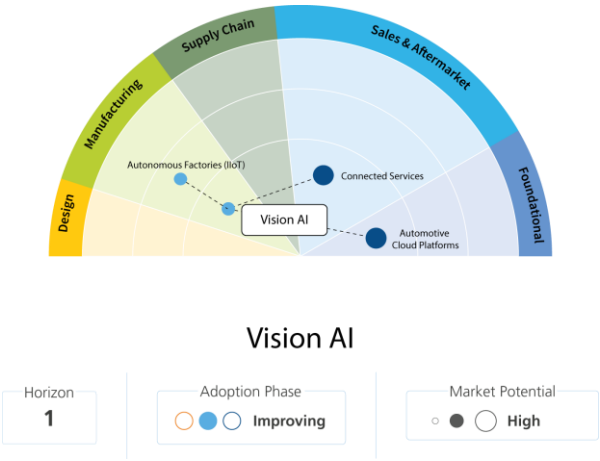
Key Takeaways :

- ✓ Autonomous factories powered by IIoT enable automotive manufacturers to boost efficiency, precision, and sustainability through real-time data, predictive insights, and smart automation.
- ✓ Manufacturers must ensure secure connectivity, reliable data integration, and scalable infrastructure to harness the full benefits.

Vision AI

What Is It?

Vision AI uses ML to extract and categorize images from multiple cameras through acquisition, processing, and analysis. It enhances safety by monitoring worker wellbeing, detecting Personal protective equipment (PPE), and ensuring automotive safety. For security, it detects intrusions, prevents unauthorized access, monitors critical areas, and safeguards resources. This dual functionality contributes to a secure environment for both human and physical resources.



Trend Highlights :

- The automotive industry has seen a rise in recalls, affecting millions of vehicles due to safety concerns. Common defects include issues with airbags, brakes, and fuel systems.
- These recalls impact consumer safety, resale value, and vehicle longevity. To tackle these issues, automotive manufacturers increasingly leverage Vision AI for overall design.
- It transforms the design process by integrating high-resolution cameras, sensors, and AI-based software to analyze visual data.
- Vision AI is revolutionizing automotive shop floors by enabling automated quality inspection, safety monitoring, and process optimization, increasing efficiency and reducing errors.

Featured Story :

Computer Vision-Based Solution for Quality Control for Leading Automotive OEM

Challenge:

Automotive manufacturer was facing a challenge to reduce time and improve efficiency of inspection, eliminate manual errors during quality checks.

Solution:

Developed computer-vision based solution with help of AWS services for porosity detection on cast aluminum cylinder head on machine line pf powertrain plant.

Impact:

This helped the manufacturer in detecting 100% defects with quality conformity and reduced wastage along with refabricating recoverable finished products.

(See the **References** section for the full case study link)

Key Technologies :

Computer vision: Enables automated defect detection and quality inspection using image analysis.

Edge AI: Processes visual data locally for low-latency decision-making.

Distributed cloud: Supports scalable storage and analysis of vision-based manufacturing data.

Key Application Areas :

Inspection for cracks in components: Early detection of minor cracks prevents costly failures and ensures reliability.

Inspecting part assemblies: Identifying proper components while detecting potential flaws, save time and expenses on expensive rework.

Painting and surface defects: Surface defect detection helps prevent vehicles from leaving the factory floor with imperfections.

Key Takeaways :

- ✓ Integrate advanced computer vision with edge and cloud processing to achieve precise defect detection, optimize assembly accuracy, and minimize material waste.
- ✓ Adopting vision AI now helps automakers maintain a competitive edge, deliver superior products, and accelerate innovation in a quality-driven market.

Industry 5.0

What Is It?

Industry 5.0 in the automotive sector integrates AI, robotics, IoT, and sustainable practices to advance production. It enables customized car parts, rapid prototyping, and real-time process monitoring. Robots create safer work environments with AI-driven predictive maintenance, letting humans focus on innovation. This evolution emphasizes eco-friendly practices, using recycled materials and renewable energy, creating a resilient, efficient, and sustainable automotive manufacturing ecosystem.

Trend Highlights :

- Industry 5.0 will reshape the automotive sector by blending human creativity with AI for advanced customization, safety, and quality.
- In manufacturing, it emphasizes human-machine collaboration, enhancing worker well-being while driving efficiency.
- AI and human expertise will enable personalized vehicle design, using data-driven insights to match customer preferences.
- Quality control will be transformed by AI-powered predictive maintenance, reducing defects and optimizing production.
- AI-driven data insights will improve sustainability by guiding eco-friendly processes, material optimization, and renewable energy use.
- This integration promotes innovation, boosts production flexibility, and fosters a more sustainable automotive industry.

Featured Story :

Cobots Helped a Japanese Automotive Manufacturer to Address Aging Workforce Challenge and Reduced Worker Costs

Challenge:

A Japan-based automotive manufacturer addressed production inefficiencies and an aging workforce at its Yokohama plant.

Solution:

Implemented cobots from a recognized robot manufacturer.

Impact:

These collaborative robots helped reduce task time overruns, eliminated the need for worker relief, and supported staff by taking on repetitive tasks like loosening bolts and installing intake manifolds. The cobots enhanced production flexibility, cut labor costs, and reduced physical strain on employees.

(See the **References** section for the full case study link)

Key Technologies :

5G network: Enables real-time communication and control for smart manufacturing systems.

IoT: Connects machines, systems, and humans for seamless data exchange and automation.

Sustainable technologies: Focuses on energy efficiency and eco-friendly manufacturing practices.

Key Application Areas :

Human-machine collaboration: Robots and humans jointly perform complex tasks, maximizing productivity.

Personalized manufacturing: AI enables customizable vehicle designs to match customer preferences better.

Sustainable practices: AI optimizes energy use, waste reduction, and eco-friendly production.

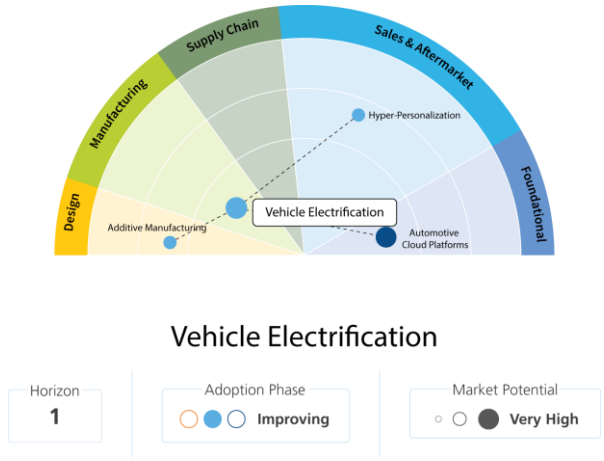
Key Takeaways :

- ✓ Leverage Industry 5.0 to combine human expertise with advanced technology, driving innovation, productivity, and positive societal impact in automotive manufacturing.
- ✓ Address challenges in human-centricity, resilience, and sustainability to lead industry transformation and secure long-term growth.

Vehicle Electrification

What Is It?

Vehicle electrification aims to revolutionize transportation by leveraging advanced technologies to enhance battery life, optimize charging speed, and improve travel range. Innovations in infrastructure, such as smart grids and fast-charging networks, empower manufacturers to design efficient and sustainable EVs. This transformative shift reduces environmental impact and drives operational excellence and competitiveness in the automotive industry.



Trend Highlights :

- Vehicle electrification is rapidly advancing with breakthroughs in battery technology, cloud-powered solutions, and digital innovations.
- Enhanced lithium-ion batteries offer improved energy density, longer ranges, and faster charging, alleviating range anxiety.
- Cloud platforms optimize battery performance, charging infrastructure, and connected vehicle ecosystems, enabling smart charging and efficient data processing.
- Digital twin models revolutionize EV production by allowing real-time monitoring, performance optimization, and design enhancements.
- AI-driven systems enhance safety and operational efficiency by analysing sensor data and predicting maintenance needs.
- These innovations, coupled with streamlined manufacturing and government incentives, are making electric vehicles more accessible, efficient, and sustainable.

Featured Story :

Asian OEM Accelerated Vehicle Electrification Using Smart Battery Management System

Challenge:

A leading Asian OEM was Facing challenges in battery estimation, hardware integration, and safety compliance, requiring precise software, diagnostics, and functional safety implementation.

Solution:

Developed a cutting-edge Battery Management System for EVs. By leveraging AUTOSAR-based software, functional safety (ASIL C), and advanced connectivity, optimized State of Charge (SOC), State of Health (SOH), and cell balancing

Impact:

enhanced battery life, reduced costs, and significantly improved the driver's experience, showcasing Sasken's expertise in EV powertrain technology.

(See the **References** section for the full case study link)

Key Technologies :

IoT: Track real-time data from EV components to improve performance and diagnostics.

Machine learning: Optimizes energy usage, battery life, and predictive maintenance.

Digital twin: Simulates EV systems for design validation and operational efficiency.

Key Application Areas:

Charging infrastructure: Deployment of fast-charging networks and smart charging solutions integrated with upgraded power grids.

Powertrain efficiency: Lightweight materials and efficient electric motors to optimize energy consumption.

Predictive maintenance: IoT-powered analytics detect anomalies, reducing downtime and repair costs.

Key Takeaways :

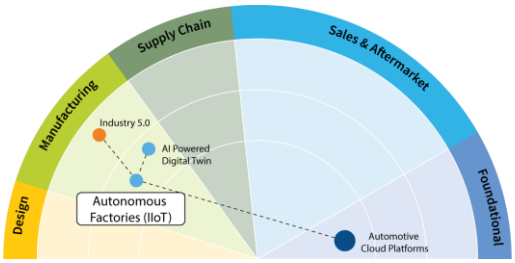
- ✓ Accelerate electrification by advancing battery technology, expanding charging infrastructure, and reducing costs to drive broader EV adoption and market growth.
- ✓ Align product portfolios with fully electric lineups and collaborate across the supply chain to secure long-term competitiveness in an eco-conscious market.

Autonomous Vehicles (Level 3+)

What Is It?

An autonomous vehicle (or self-driving car) senses its environment and operates without constant human input. It uses sensors, cameras, radar, and AI for navigation and driving, and often communicates with other vehicles and infrastructure to enhance safety and efficiency.

Level 3 automation, also called conditional automation, allows the vehicle to manage most driving tasks but may require human intervention in certain situations.



Autonomous Factories (IIoT)

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- AI and sensor advancements are elevating L3+ autonomy, improving vehicle performance and expanding consumer adoption potential.
- Evolving regulations offer clearer deployment paths, accelerating market entry and reducing compliance complexity for manufacturers.
- Smart infrastructure supports safer AV operations, enhancing traffic efficiency through connected signals and road-based sensors.
- Technology costs are expected to decline with scale, making autonomous vehicles more accessible and commercially viable over time.
- Cybersecurity is critical for AV systems, ensuring data protection, brand trust, and safe public adoption.

Featured Story :

Global Luxury OEM Achieves 40% Test Automation for Safer L3+ Autonomy Driving

Challenge:

A global luxury automotive OEM set out to develop Level 3+ autonomous features to enhance safety and driving experience.

Solution:

L&T Technology Services developed and integrated a redundant brake controller for safety, created scenarios for testing emergency-stop features, and implemented autonomous parking for convenience.

Impact:

The OEM achieved 40% automation in scenario creation and testing, strengthening safety features and improving the driving experience for drivers and passengers.

(See the **References** section for the full case study link)

Key Technologies :

Machine Learning (ML): Powers real-time decision making and adaptive driving behaviours.

Edge computing: Processes data locally for low-latency decision-making in autonomous vehicles.

Sensor tech: Integrates data from multiple sensors for accurate situational awareness.

Key Application Areas :

Autonomous valet parking: Drop passengers, then park themselves autonomously.

Enhanced driver assistance: Advanced assistance such as adaptive cruise control and lane-keeping assistance.

Highway Driving: Handle highways, including lane changes, but require driver readiness.

Key Takeaways :

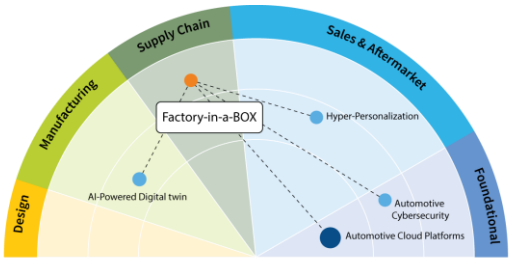
- ✓ Stay aligned with fast-paced advancements in L3 autonomy, backed by evolving regulations and public–private collaboration.
- ✓ Expect a significant rise in commercially available L3 vehicles by 2030; begin planning product and ecosystem readiness now.

Supply Chain

Factory-in-a-Box

What Is It?

A Factory-in-a-Box (FIAB) is a rapidly deployable, remotely managed, modular manufacturing supply chain network enabled by industrial digital technologies. Automotive FIAB manufacturers leverage the process of rapidly deploying products to market to achieve faster ROI on their manufacturing innovation and new disruptive business models for the supply chain.



Factory-in-a-BOX

Horizon	Adoption Phase	Market Potential
3	Emerging	High

Trend Highlights :

- Factory-in-a-Box is redefining global manufacturing agility, enabling modular, demand-driven production to address labor shortages, rising demand, and capital constraints.
- Digital technologies like IIoT and robotics are powering FIAB, allowing rapid deployment, remote monitoring, and scalable operations across diverse geographies.
- Mobile factories reduce transportation costs and emissions, helping manufacturers expand into new markets while supporting sustainability goals.
- According to Deloitte, smart factory investments are delivering measurable gains, with up to 12% productivity improvement and 30% higher labor efficiency projected by 2030.
- FIAB supports resilient supply chains, offering flexible, localized production models that align with evolving customer needs and operational efficiency.

Key Technologies :

Edge AI: Enables real-time processing and decision-making in mobile manufacturing.

Digital twin: Simulates and optimizes mobile factory performance.

5G networks: Ensures seamless communication between decentralized production lines.

Featured Story :

Transforming EV Production with Microfactories and Smart Technologies

Challenge:

Traditional EV manufacturing faced scalability issues, labor shortages, high costs, and delayed defect detection due to manual processes and centralized production models.

Solution:

Introduced modular microfactories powered by digital twins, AI-driven monitoring, and swappable battery tech to enable localized, efficient EV production globally.

Impact:

Enabled real-time issue detection, reduced production complexity, improved scalability, and empowered local businesses to build and brand affordable EVs worldwide.

(See the **References** section for the full case study link)

Key Application Areas :

Rapid prototyping and customization: Rapid prototyping and producing customized parts on demand without needing large factory setups.

Localized production: Allows for faster production and supply according to the market's changing needs without high transportation costs.

Supply chain resilience: A modular and adaptable solution that facilitates the swift relocation of production in case of disruptions.

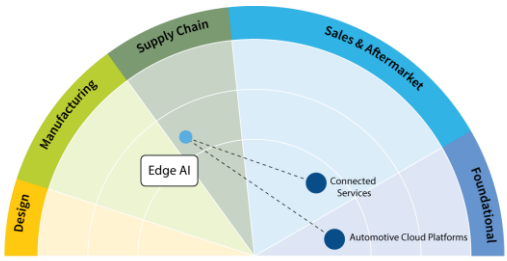
Key Takeaways :

- ✓ Deploy modular Factory-in-a-Box units near demand centers to decentralize production, reduce logistics costs, and enable faster, localized customization.
- ✓ Ensure digital integration with IIoT, AI, and robotics, supported by strong cybersecurity and scalable infrastructure to drive lean, responsive manufacturing.

Edge AI

What Is It?

Edge AI in the automotive supply chain refers to using Artificial Intelligence (AI) models directly on the local systems, allowing real-time data processing close to the source. Big data analytics involves analyzing vast amounts of structured and unstructured data to uncover patterns, trends, and insights that help optimize decision-making processes across the supply chain. Together, they enable faster, more efficient, and intelligent logistics, sourcing, and distribution operations.



Edge AI

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- Edge AI is enabling real-time decision-making across manufacturing and logistics, improving responsiveness and reducing delays in supply chain operations.
- Big data analytics is transforming forecasting and maintenance, allowing manufacturers to predict demand, optimize inventory, and reduce downtime.
- Traditional manual processes are being replaced, as supply chains adopt intelligent automation for greater efficiency and scalability.
- IoT and 5G are accelerating Edge AI deployment, enhancing connectivity and data speed for faster, localized analytics and smarter operations.
- Autonomous supply chains are emerging, driven by AI-led automation, integrated platforms, and intelligent infrastructure across global networks.

Key Technologies :

Sensor technology: IoT enables data collection, enabling real-time supply chain metrics for analytics.

Computer vision AI: Automates warehouse and logistics tracking.

Industry cloud platforms: Using cloud-edge hybrid computing balances local processing and cloud storage for efficiency.

Featured Story :

Automotive Leader Optimizes Global Supply Chain with AI-Driven Forecasting and Predictive Analytics

Challenge:

Automotive leader struggled with inventory mismatches, unreliable suppliers, production delays, and quality issues, limiting scalability, responsiveness, and operational performance.

Solution:

Implemented AI-driven forecasting, real-time inventory tracking, automated quality control, dynamic logistics routing, and predictive analytics to optimize supply chain operations.

Impact:

Improved demand alignment, reduced waste, enhanced supplier performance, minimized downtime, and boosted scalability, sustainability, and customer satisfaction across global operations.

(See the **References** section for the full case study link)

Key Application Areas :

Demand forecasting: Big data analytics predicts demand based on historic and incremental data, market trends, and external factors, enabling better planning.

Predictive maintenance: Sensors on the production equipment collect data that can be analyzed by AI to predict failure before it occurs, ensuring seamless operations.

Fleet management: Edge AI and real-time analytics to track vehicle fleets, optimize routes, and manage fuel consumption efficiently.

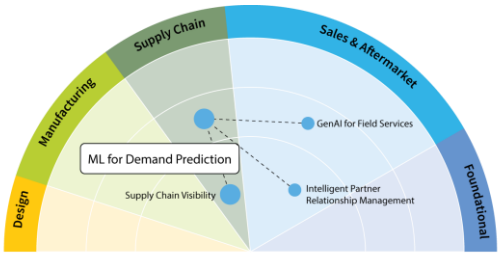
Key Takeaways :

- ✓ Adopt Big Data and Edge AI to build predictive, agile supply chains, enabling real-time decision-making and faster response to disruptions across manufacturing and logistics.
- ✓ Establish clean data pipelines and scalable infrastructure, ensuring seamless integration of edge analytics with enterprise systems for improved visibility and operational efficiency.

ML for Demand Prediction

What Is It?

In automotive manufacturing, demand forecasting is vital in production planning, inventory management, and resource allocation. Historically reliant on statistical approaches and expert insights, it struggled to identify intricate patterns and shifting market trends. Introduction of ML techniques leveraged historical sales data, market trends, and other relevant factors to uncover patterns and generate forecasts, thereby accurately predicting demand variations.



ML for Demand Prediction

Horizon	Adoption Phase	Market Potential
2	Improving	Very High

Trend Highlights :

- Machine learning is reshaping demand forecasting, with neural networks capturing complex patterns and seasonal shifts to improve inventory accuracy and reduce stockouts.
- Scalable ML models are replacing manual forecasting, enabling manufacturers to process large datasets and adapt to volatile market conditions driven by consumer trends and regulations.
- Predictive analytics is optimizing production planning, minimizing excess inventory, reducing supply chain disruptions, and improving resource utilization across global operations.
- Real-time insights from ML enhance responsiveness, allowing supply chains to react faster to demand fluctuations and operational risks.
- Data-driven forecasting is becoming a competitive differentiator, helping automotive OEMs align supply with demand and elevate customer satisfaction.

Featured Story :

Automotive Component Manufacturer Enhances Forecast Accuracy and Inventory Efficiency with Custom ML Model

Challenge:

Automotive component manufacturer faced inaccurate sales forecasts, leading to overstocking, understocking, missed sales, and inefficiencies in inventory, restocking, and warehouse operations.

Solution:

Developed a custom ML model using Long Short-Term Memory (LSTM), built APIs for accurate data extraction, and enabled predictions for new parts using shared product traits.

Impact:

Reduced forecast errors to ±20%, improved inventory tracking, streamlined operations, and enabled scalable growth through data-driven decision-making and supply chain optimization.

(See the **References** section for the full case study link)

Key Technologies :

Sensor technology: IoT enables data collection, enabling real-time supply chain metrics for analytics.

5G networks: Enhance data transmission speed for real-time analytics.

Computer vision AI: Automates warehouse and logistics tracking.

Key Application Areas :

Managing production schedules: Big data analytics predicts demand based on historic and incremental data, market trends, and external factors, enabling better planning.

Optimize logistics: Manage inventory, predict demand, and optimize logistics.

Spare parts forecasting: Predicting aftermarket service needs.

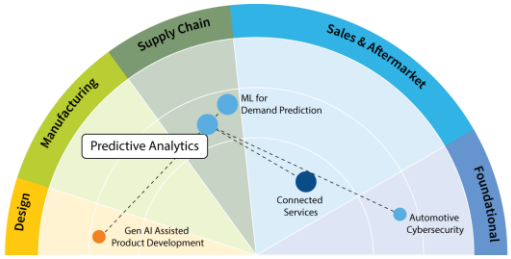
Key Takeaways :

- ✓ Shift from reactive to proactive planning by leveraging ML to anticipate market shifts and improve supply chain responsiveness.
- ✓ Overcome legacy system limitations through integrated data and predictive analytics to enable accurate forecasting, reduce waste, and optimize inventory.

Predictive Analytics

What Is It?

Predictive analytics in the automotive supply chain leverages advanced data analysis, AI, and machine learning to anticipate supply chain needs and challenges. This proactive approach optimizes costs, improves demand forecasting, enhances supplier management, and mitigates risks, ensuring efficient and resilient procurement processes.



Predictive Analytics

Horizon	Adoption Phase	Market Potential
2	Improving	Very High

Trend Highlights :

- Predictive analytics is becoming central to supply chain strategy, enabling accurate demand forecasting and reducing inventory inefficiencies like stockouts and overstocking.
- AI-powered supplier management is gaining traction, helping manufacturers consolidate vendors, renegotiate contracts, and unlock cost efficiencies.
- Digital supply chain twins are emerging, improving risk visibility and enabling proactive responses to disruptions across global operations.
- Sustainability is being driven by procurement analytics, with tools that track emissions, automate sourcing, and enhance transparency.
- Data-led supply chains are boosting agility and resilience, helping OEMs meet regulatory demands and deliver better customer experiences.

Featured Story :

Global Automaker Accelerates Sourcing Efficiency with Predictive Procurement Platform

Challenge:

A global automaker aimed to modernize sourcing to reduce costs, mitigate risks, and scale operations efficiently without increasing headcount.

Solution:

Using Predictive Procurement Platform, the company accelerated sourcing, achieved savings within a week, went live in two days, and maintained seamless workflows.

Impact:

Achieved 13% average savings, 8% in single-sourced events, went live in 2 days, delivered ROI in a week, and cut event cycle time to 4 days.

(See the **References** section for the full case study link)

Key Technologies :

Machine learning: Analyze supplier performance with pricing needs.

Edge AI: Speed up procurement data processing.

Decision intelligence: AI-powered demand forecasting to predict part requirements to optimize procurement using.

Key Application Areas :

Demand forecasting: By analyzing historical data and market trends, predictive analytics can accurately forecast demand for vehicles and components.

Risk mitigation: Evaluates supplier performance and market dynamics to proactively address supply chain disruptions and ensure business continuity.

Streamlined procurement processes: Enables the automation of routine procurement tasks, improving data accuracy and operational efficiency.

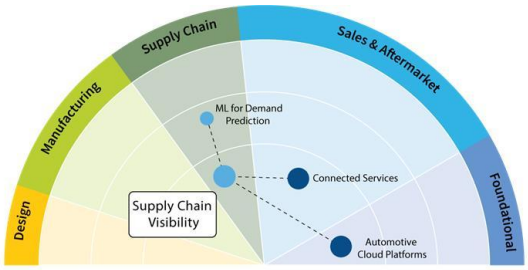
Key Takeaways :

- ✓ Adopt predictive analytics and digital twins to enhance supply chain agility, enabling proactive planning and real-time visibility across operations.
- ✓ Use machine learning for accurate forecasting and inventory optimization, reducing waste, avoiding stockouts, and improving responsiveness to market shifts.

Supply Chain Visibility

What Is It?

Supply chain visibility enables real-time tracking of parts, components, and products from suppliers to consumers. By collecting and analyzing data from various points in the supply chain, companies gain insights into inventory levels, shipment status, and potential disruptions. This visibility helps create risk thresholds and sensing algorithms to manage supply chain risks effectively.



Supply Chain Visibility

Horizon	Adoption Phase	Market Potential
1	Improving	Very High

Trend Highlights :

- Supply chain visibility is becoming mission-critical, as EV transitions, chip shortages, and manufacturing delays continue to disrupt global operations.
- Automakers are investing in visibility tools to manage e-mobility challenges, including sourcing rare earth materials and tracking supplier performance.
- Integrated data from procurement, logistics, and manufacturing is enabling risk sensing algorithms and threshold-based alerts for proactive mitigation.
- Advanced analytics are optimizing sourcing strategies, ensuring availability of critical components while maintaining cost, quality, and delivery standards.
- Visibility is evolving into a strategic advantage, helping OEMs build resilient, responsive, and competitive supply chains in a fast-changing market.

Featured Story :

Enhancing Supply Chain Visibility for Agility and Efficiency in Auto Component Manufacturing

Challenge:

The manufacturer faced fragmented supply chain processes, poor visibility, demand-supply mismatches, and limited IT capabilities, impacting responsiveness, cost control, and operational efficiency.

Solution:

LTIMindtree assisted an automotive parts manufacturer transform its supply chain by implementing an intelligent solution combining Multi-level ATP (M-ATP) and back-order rescheduling.

Impact:

Achieved 15% better demand fulfillment, 20% lower picking costs, improved component availability transparency, and enabled collaborative inventory management for agile, cost-effective supply chain operations.

(See the **References** section for the full case study link)

Key Technologies :

Machine learning: Analyze supplier performance with pricing needs.

Hyperautomation: Automates procurement workflow and approval using RPA.

Decision intelligence: Predict part requirements to optimize procurement.

Key Application Areas :

Real-time tracking and monitoring: Ensuring that parts, components, and products can be tracked from suppliers to manufacturers and ultimately to consumers.

Advanced analytics and AI: Gain insights into inventory levels, shipment status, and other critical supply chain metrics, enabling better decision-making and optimization.

Just-in-Time (JIT) Production: Enable efficient JIT production by ensuring the correct parts are available at the right time.

Key Takeaways:

- ✓ Prioritize end-to-end supply chain visibility to improve operational efficiency, ensure timely deliveries, and respond swiftly to disruptions across global networks.
- ✓ Invest in integrated technologies and data platforms, enabling real-time insights from procurement, logistics, and manufacturing to strengthen risk management and decision-making.

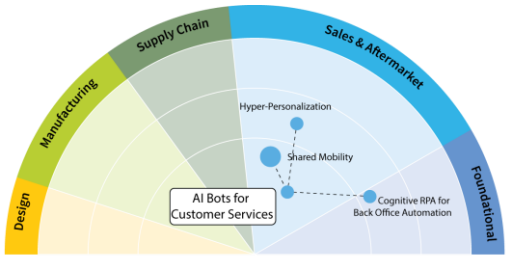
Sales & Aftermarket

Horizon 1

AI Bots for Customer Services

What Is It?

AI-powered automotive chatbots improve customer engagement and trust. They have been instrumental in driving revenue and generating leads. They can help with a variety of tasks, such as buying a new car, after-sales support, service scheduling, repair status and updates, inventory management, etc. AI-powered automotive chatbots help improve customer experience by providing personalized assistance and 24/7 support.



AI Bots for Customer Services

Horizon	Adoption Phase	Market Potential
1	Improving	High

Trend Highlights :

- AI chatbots enhance customer experience, supporting an experience-led economy where buyers value seamless engagement across the purchase journey.
- Bots deliver real-time insights, guiding customers through buying and post-sale processes with data-driven recommendations and support.
- Chatbots manage vehicle inquiries and bookings, streamlining engagement for new, used, and service-related interactions.
- Instant query resolution reduces human effort, helping resellers cut costs and improve operational efficiency.
- AI-driven automation boosts aftermarket value, enabling personalized support and stronger customer retention.

Featured Story :

German Automaker Uses WhatsApp Chatbot to Improve Service Efficiency Through Automation

Challenge:

Handling thousands of repetitive customer queries overwhelmed service teams and reduced overall service quality.

Solution:

Implemented a WhatsApp chatbot integrated with real-time repair tracking to automate responses and streamline communication.

Impact:

The chatbot handles more than 80% of customer queries instantly, reduced call volumes, improved service quality, and freed up agents for complex tasks.

(See the **References** section for the full case study link)

Key Technologies :

Conversational systems: Enhance customer engagement with human-like interactions.

Natural language processing: Enables AI bots to understand and respond to queries effectively.

Machine learning: Continuously improves bot responses based on customer interactions and feedback.

Key Application Areas :

Capturing leads: Capturing potential customer leads & nurturing existing customers.

Scheduling test drives: Replaces the longer capturing of customer data and schedules test drives.

Capturing customer feedback: Gather customer feedback for each part of their buyer's journey to improve products and processes.

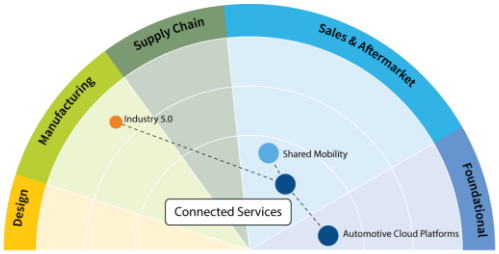
Key Takeaways:

- ✓ Adopt AI bots for 24/7 support, enabling faster, personalized customer service across sales and aftermarket touchpoints.
- ✓ Continuously train bots to handle complex queries, balancing automation efficiency with a human-like, responsive interaction model.

Connected Services

What Is It?

Automotive manufacturers are incorporating connected services to elevate vehicle ownership and management. These services offer features like remote access, predictive maintenance, and seamless integration with mobility ecosystems. By providing enhanced convenience and driving experiences, manufacturers are fostering collaboration with service providers to drive innovation in mobility.



Connected Services

Horizon	Adoption Phase	Market Potential
1	Mature	Very High

Trend Highlights :

- Connected services are expanding rapidly, driven by safety standards, autonomous tech, and widespread high-speed internet access.
- Smart vehicle systems enable real-time monitoring, charge management, and route optimization, enhancing customer experience and operational efficiency.
- Fleet management benefits from connected tech, improving logistics, reducing downtime, and streamlining service operations.
- Extended functionalities and agnostic platforms position OEMs as leaders in comprehensive electric mobility solutions.
- Connected ecosystems strengthen market presence, delivering greater customer value and enabling scalable aftermarket innovation.

Featured Story :

Connected Services Enabled Smarter, Safer Mobility in Bahrain

Challenge:

Limited access to real-time vehicle insights and safety features hindered customer experience and mobility innovation.

Solution:

Automotive manufacturer launched connected service in Bahrain, offering hands-free driving, diagnostics, navigation, and emergency support via connected vehicle technology.

Impact:

Enhanced driving confidence, improved safety, and personalized in-vehicle experiences, supporting Bahrain's shift toward smart, autonomous mobility.

(See the **References** section for the full case study link)

Key Technologies :

IoT: Enable real-time vehicle monitoring and data collection for connected services.

5G networks: Ensure fast, low-latency communication between vehicles, infrastructure, and cloud systems.

Decision intelligence: Extract insights from vehicle data to enhance services and customer experience.

Key Application Areas :

Over-the-Air (OTA) updates: Allow manufacturers to upgrade software and introduce new features without needing physical service.

In-Vehicle infotainment: Smartphone connectivity for media control and access to navigation, weather, and other services.

Connected warranty: Data from connected vehicles can be used to offer dynamic or usage-based extended warranties.

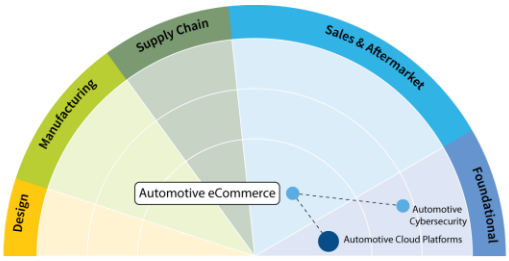
Key Takeaways :

- ✓ Position connected services as a core revenue stream, leveraging OTA updates, scalable cloud platforms, and region-specific strategies for market growth.
- ✓ Focus on delivering user-friendly, high-value features, while ensuring affordability and building long-term customer trust.

Automotive eCommerce

What Is It?

Automotive ecommerce involves the online transaction of vehicles, parts, and accessories. This includes everything from buying new or used cars to ordering replacement parts or accessories online. Rather than being an isolated process, automotive ecommerce often complements physical sales. Many automotive merchants are adopting an omnichannel strategy, enabling customers to use physical and digital channels to make informed purchasing decisions.



Automotive eCommerce

Horizon	Adoption Phase	Market Potential
1	Improving	High

Trend Highlights :

- Digital tools like AR showrooms and 3D configurators are transforming online car shopping into an immersive, experience-led journey.
- Automotive e-commerce is growing rapidly, driven by shifting consumer behavior and increased willingness to buy vehicles and parts online.
- Advances in digital marketing, payments, and logistics are making online transactions more seamless, secure, and scalable.
- Third-party marketplaces and specialized platforms offer greater product access, empowering customers with more choices and convenience.
- Online comparison and reviews streamline purchasing, helping buyers make informed decisions and enhancing overall satisfaction.

Featured Story :

LTIMindtree Enhances Personalization and Customer Experience for a Leading U.S. Motorcycle Brand Through Intelligent Automation and Connected Solutions.

Challenge:

Automakers face difficulty in activating customer segments across digital channels and delivering timely, personalized communication to drive eCommerce conversions.

Solution:

LTIMindtree deployed an AI-driven approach using smart profiling, engagement tracking, and multi-platform validation to activate customer segments and deliver personalized, timely communications—boosting lead nurturing and eCommerce conversions.

Impact:

Improved customer segmentation honoring the customer intent/interest across platforms and channels. Also, Increased eCommerce purchase conversion metrics.

(See the **References** section for the full case study link)

Key Technologies :

Conversational systems: Enhance customer experience with real-time assistance and personalized recommendations.

Decision intelligence: Enhance customer insights and inventory management.

Machine learning: Optimize pricing, demand forecasting, and personalized marketing.

Key Application Areas :

Aftermarket services: E-commerce platforms offer repair and maintenance parts, enhancing owner convenience.

Digital showrooms: Virtual showrooms and 3D configurators enable customers to explore and customize vehicles.

Rental and sharing services: Online platforms for vehicle rentals and car-sharing services provide users flexibility and convenience.

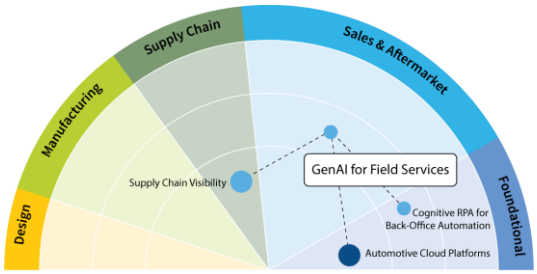
Key Takeaways :

- ✓ Leverage AI-driven personalization and AR tools to create engaging, omnichannel shopping experiences that boost customer satisfaction and sales.
- ✓ Treat e-commerce as a strategic growth engine, expanding reach across B2C and B2B markets with scalable, secure digital platforms.

GenAI for Field Service

What Is It?

GenAI for field service in the automotive industry enhances efficiency by predicting maintenance needs, diagnosing issues, and providing real-time support. It leverages data from connected vehicles to optimize service schedules, reduce downtime, and improve customer satisfaction. This technology transforms traditional service models into proactive, data-driven operations.



GenAI for Field Services

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- GenAI adoption in field service is rising, driven by connected vehicle data and demand for predictive maintenance and intelligent support.
- AI-powered virtual assistants enhance service efficiency, offering real-time guidance and improving customer experience across sales and aftermarket.
- Integrating GenAI with CRM and ERP systems maximizes operational value and streamlines service workflows.
- Addressing privacy, compliance, and talent gaps is critical to scaling GenAI responsibly in automotive environments.
- Cross-industry collaboration supports ethical AI governance, enabling safe, compliant, and innovative field service solutions.

Featured Story :

Japanese Automotive Manufacturer Transforms Enterprise Support Operations Through Intelligent Virtual Agents and Automation

Challenge:

Japanese automaker faced high volumes of repetitive support tickets, slowing resolution times and overburdening human service desk staff.

Solution:

Automaker developed AI-powered virtual agent, a proprietary GenAI chatbot tailored to enterprise needs integrating permission, security, and privacy to deliver accurate, real-time support.

Impact:

This solution drastically reduced resolution time for field technicians, matched the workload of 25 support agents weekly, and reclaimed over 70,000 hours annually for strategic tasks.

(See the **References** section for the full case study link)

Key Technologies :

Generative AI: Provide real-time troubleshooting and guided repair support for field technicians.

Augmented reality: Enhances remote diagnostics and guided repairs through AI-driven overlays.

Internet of Things (IOT): Collects real-time vehicle data for proactive service responses.

Key Application Areas :

Predictive maintenance: GenAI uses data from connected vehicles to predict part failures, enabling timely maintenance and reducing breakdowns.

Virtual assistants: AI in-car assistants aid with navigation, music, and service appointments, enhancing the driving experience.

Supply chain optimization: AI models streamline logistics, ensuring efficient supply chain management and reducing operational costs.

Key Takeaways :

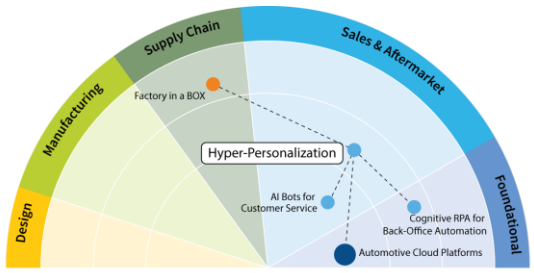
- ✓ Leverage GenAI to automate diagnostics and workflows, enabling predictive maintenance and reducing vehicle downtime for improved customer satisfaction.
- ✓ Integrate GenAI with CRM, ERP, and service platforms, ensuring real-time insights and seamless support across sales and aftermarket operations.

Hyper-Personalization

What Is It?

Hyper-personalization in the automotive manufacturing industry involves leveraging advanced technologies like artificial intelligence and machine learning to create customized experiences according to individual drivers' and manufacturers' preferences.

Hyper-personalization also involves manufacturing vehicles that can monitor the driver's condition, such as stress levels or fatigue, and adjust the driving experience to enhance safety.



Hyper-Personalization

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- Customer demand for personalized experiences is rising, driving automakers to offer tailored vehicle options and services.
- AI and machine learning enable deep data analysis, making hyper-personalization scalable and more practical across sales and service.
- Personalized offerings boost brand loyalty, helping manufacturers stand out in a competitive automotive market.
- Hyper-personalization enhances driving experience, customizing settings, maintenance, and safety features to individual preferences.
- Data-driven personalization supports sustainability, optimizing resource use and reducing waste in manufacturing and aftermarket operations.

Featured Story :

Driving Engagement Through Hyper-Personalization in Automotive Sales and Service

Challenge:

An automotive manufacturer struggled with segment-based personalization and lacked a robust data strategy.

Solution:

Implemented a Marketing Engagement Platform (MEP) using predictive modeling, dynamic content, and personalized messaging across sales and service touchpoints.

Impact:

Their Marketing Engagement platform can send hyper-personalized messages, combining sales and service communications. This approach increased responses by 7% and boosted the service business by 42%.

(See the **References** section for the full case study link)

Key Technologies :

Machine learning: Analyse customer behaviour and optimize marketing and sales strategies.

Augmented reality: Provide a customized virtual vehicle and showroom experience.

IoT: Personalizes maintenance alerts and service recommendations.

Key Application Areas :

Customized vehicle design: Manufacturers use customer data to meet specific preferences, from color choices to interior features.

Personalized in-car experience: Vehicles adjust settings such as seat positions and climate control based on the driver's past behavior and preferences.

Tailored marketing and sales: Automakers can use customer data to send personalized marketing messages, enhancing the buying experience.

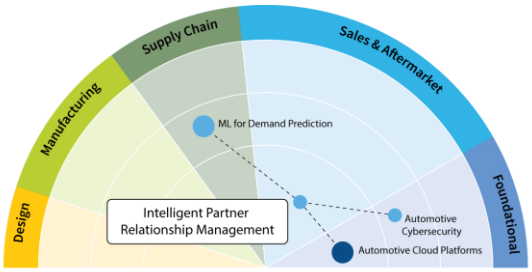
Key Takeaways :

- ✓ Redefine the customer journey with hyper-personalization, using data-driven insights to deliver seamless and emotionally engaging experiences across touchpoints.
- ✓ Leverage real-time AI and cross-functional collaboration, to co-create evolving experiences that align with individual customer needs and preferences.

Intelligent Partner Relationship Management

What Is It?

Car manufacturers often collaborate with dealerships to sell vehicles, rewarding partner sales reps with commissions, bonuses, or incentives. Intelligent Partner Relationship Management (PRM) leverages AI, data analytics, and automation to enhance collaboration with channel partners. It streamlines onboarding, improves partner performance through real-time insights, and optimizes resource allocation, driving efficiency and enabling manufacturers to scale partnerships for next-gen mobility solutions.



Intelligent Partner Relationship Management

Horizon	Adoption Phase	Market Potential
1	Improving	High

Trend Highlights :

- Intelligent PRM platforms are automating partner lifecycles, streamlining recruitment, onboarding, training, and renewals across sales and service networks.
- Advanced PRMs support co-selling and co-marketing, enabling seamless collaboration through deal registration, performance tracking, and shared resources.
- Integration with CRM, ERP, and marketing tools is improving operational efficiency and reducing manual workload for partner managers.
- PRMs are evolving into end-to-end platforms, supporting private offers, distributor records, and scalable partner ecosystems.
- Automation in PRM frees up strategic focus, allowing teams to drive growth, innovation, and stronger aftermarket engagement.

Featured Story :

LTIMindtree's Design-Led Dealer Experience Transformation for a South Korean Auto Manufacturer

Challenge:

A South Korean automotive manufacturer faced challenges due to manual workflows, in-person follow-ups, and outdated paper-based reporting systems.

Solution:

LTIMindtree identified 150+ roadmap features for phased development, leveraged 70% Salesforce out-of-the-box capabilities with 30% customization, and built dynamic dashboards for real-time insights and faster decision-making.

Impact:

Improved dealer experience through new portal design: Self-Service (Registration), Future-proof screen designs and Product Portfolio.

(See the **References** section for the full case study link)

Key Technologies :

Machine learning: Analyse customer behaviour and optimize marketing and sales strategies.

Augmented reality: Provide a customized virtual vehicle and showroom experience.

Conversational systems: AI-powered chatbots to provide real-time partner support and insights.

Key Application Areas :

Partner recruitment and enablement: Streamlining processes by accelerating content creation and adaptation.

Demand generation and co-selling: Crafting targeted marketing content tailored to specific partner needs.

Incentives management: Recommending incentive structures that motivate and reward partners, ensuring sustained performance and loyalty.

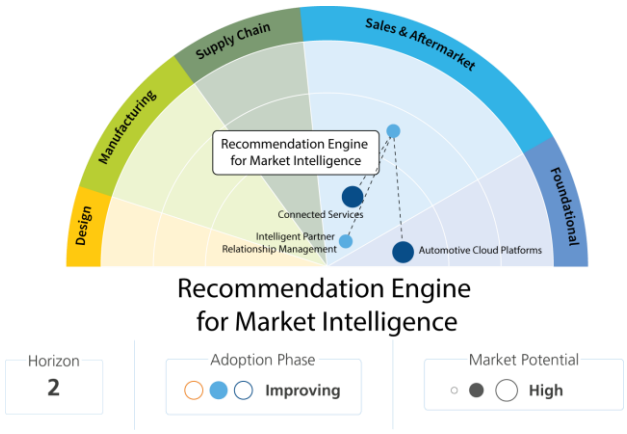
Key Takeaways :

- ✓ Adopt Intelligent PRM platforms to automate partner management, improving collaboration with dealers and distributors through AI-driven insights and streamlined workflows.
- ✓ Ensure seamless integration with CRM, ERP, and marketing systems, enabling efficient operations and consistent partner engagement across the ecosystem.

Recommendation Engine for Market Intelligence

What Is It?

AI-powered recommendation engines in the automotive manufacturing sector are designed to process extensive data and offer tailored insights and recommendations. These tools can evaluate market trends and consumer behaviors, enabling manufacturers to identify popular features or models and adapt their strategies. By forecasting the demand for specific parts or models, these engines assist in optimizing inventory and supply chain management, thereby reducing costs and enhancing efficiency.



Trend Highlights :

- AI and machine learning are powering recommendation engines, enabling deeper personalization across automotive sales and service channels.
- Digital transformation is driving data-led engagement, with advanced tools enhancing customer targeting and experience.
- Recommendation engines help track market shifts, allowing manufacturers to adapt quickly to changing consumer preferences.
- Personalized suggestions improve satisfaction and loyalty, strengthening long-term customer relationships and aftermarket retention.
- Data-driven decision-making supports product strategy, helping manufacturers align offerings with customer needs and market trends.

Featured Story :

Indian Automotive Manufacturer Accelerates Personalization with GenAI-Powered Recommendation Engine

Challenge:

The company struggled with slow, resource-heavy personalization due to manual messaging and inefficient data filtering across diverse customer segments.

Solution:

Built an AI-based recommendation engine using GenAI, GPT-3.5, and synthetic data to automate personalized, timely customer messaging.

Impact:

Improved customer satisfaction, boosted engagement and conversions, and established personalization as a core marketing strategy, saving time and enhancing scalability.

(See the **References** section for the full case study link)

Key Technologies :

Machine learning: Analyse customer behaviour and optimize marketing and sales strategies.

Augmented reality: Provide a customized virtual vehicle and showroom experience.

Conversational systems: Leverage connected vehicle data for real-time demand analysis.

Key Application Areas:

Supply chain optimization: Optimizes inventory by predicting demand for specific parts and models, and streamlines the supply chain.

Predictive maintenance: Analyzes vehicle data to predict maintenance, enhancing reliability and satisfaction.

Market trend analysis: Identify trends from market data and consumer behavior, helping manufacturers stay competitive.

Key Takeaways:

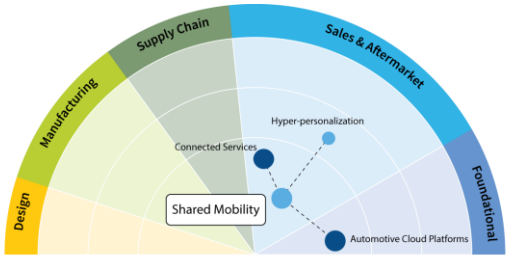
- ✓ Implement AI-powered recommendation engines to deliver personalized customer experiences, boost engagement, and drive conversions across sales and service channels.
- ✓ Ensure high-quality data and seamless integration with existing systems to enable accurate forecasting, agile operations, and scalable personalization.

Horizon 1

Shared Mobility

What Is It?

Shared mobility, encompassing ridesharing, car-sharing, and subscriptions, reshapes transportation with affordability, convenience, and sustainability. Reducing vehicle ownership and promoting carpooling helps lower emissions and ease traffic congestion. Automotive companies invest in these services to meet evolving consumer needs, unlock new revenue streams, and fulfill ESG goals. This shift underscores a commitment to sustainable practices and social responsibility in the transportation ecosystem.



Shared Mobility

Horizon	Adoption Phase	Market Potential
1	Improving	Very High

Trend Highlights :

- Automakers are integrating telematics and connectivity, enabling real-time tracking, remote diagnostics, and OTA updates for efficient shared mobility operations.
- ADAS technologies are enhancing safety and convenience, supporting autonomous capabilities in shared and fleet-based mobility models.
- Consumer adoption of shared and micromobility is rising, with long-term growth expected across urban and suburban markets.
- Mobility apps and analytics are driving smart services, enabling predictive maintenance, seamless bookings, and personalized user experiences.
- Connected ecosystems are reshaping fleet management, improving operational efficiency and supporting scalable, sustainable mobility solutions.

Featured Story :

LTIMindtree Enables Repair Automation and Cost Efficiency for a Leading Shared Mobility Provider

Challenge:

A leading shared mobility provider faced high repair costs, inconsistent maintenance, and frequent customer disputes, impacting efficiency and satisfaction.

Solution:

LTIMindtree developed a smartphone-based MDMS app to automate inspections, damage analysis, cost assessment, and digitize customer interactions and reporting.

Impact:

Achieved 20% cost savings, 10% NPS improvement, 40% faster repair cycles, and enhanced fleet visibility and staff productivity.

(See the **References** section for the full case study link)

Key Technologies :

5G: Ensure seamless communication for real-time fleet management.

Augmented reality: Enhance user experience with real-time route guidance.

Machine learning: Optimizes fleet availability based on real-time usage patterns.

Key Application Areas:

Car-sharing: Renting vehicles for short-term, flexible use.

Vehicle subscriptions: Flexible car ownership with no long-term commitment.

Fleet management: Optimizing shared vehicle operations for efficiency.

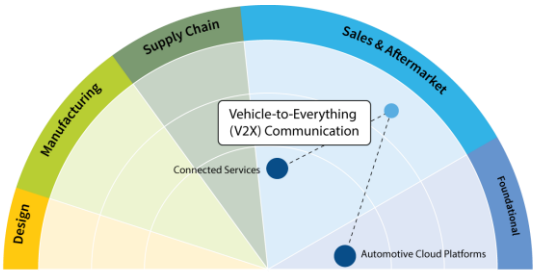
Key Takeaways :

- ✓ Embrace shared mobility as a growth opportunity, leveraging connected technologies and data analytics to optimize fleet operations and enhance user experiences.
- ✓ Adopt scalable platforms and integrate with urban systems, ensuring flexibility, real-time insights, and seamless service delivery across mobility models.

Vehicle-to-Everything (V2X) Communication

What Is It?

V2X technology enables vehicles to interact with different components in their surroundings. Its main objectives are to enhance road safety, optimize traffic flow, and minimize environmental impact. Vehicles can exchange real-time data about traffic conditions and potential dangers and even synchronize their movements to prevent accidents. This technology is essential for advancing autonomous driving and developing smart city infrastructure.



Vehicle-to-Everything (V2X) Communication

Horizon	Adoption Phase	Market Potential
3	Improving	High

Trend Highlights :

- V2X is gaining momentum with smart infrastructure, including intelligent traffic systems, roadside units, and connected roadways.
- Government regulations are shaping V2X deployment, offering standards and funding to accelerate implementation and adoption.
- 5G and low-latency networks are enabling real-time data exchange, critical for safe and responsive vehicle communication.
- Cross-industry collaboration is driving V2X innovation, with automakers, tech providers, and regulators co-developing scalable solutions.
- Infrastructure investment and standardization challenges persist, impacting seamless communication and interoperability across mobility systems.

Featured Story :

Fulton County Enhanced School Bus Operations with C-V2X Technology for Safer and Smarter Travel

Challenge:

Frequent stops at intersections led to inefficient fuel use, unreliable travel times, and reduced safety for school bus operations.

Solution:

Equipped school buses with C-V2X tech to communicate with traffic signals, enabling signal priority and smoother, safer travel routes.

Impact:

Achieved 40% fewer stops, 13% faster travel, 7% better fuel efficiency, and improved safety and mobility for students and drivers.

(See the **References** section for the full case study link)

Key Technologies :

5G: Enable ultra-fast, low-latency communication for V2X interactions.

Edge AI: Process V2X data locally for immediate decision making.

IoT: Enable real-time vehicle-to-infrastructure (V2I) and Vehicle-to-vehicles (V2V) communications.

Key Application Areas :

Emergency vehicle coordination: V2X enables emergency vehicles to clear paths by communicating with traffic and other vehicles.

Remote diagnostics and maintenance: Vehicles can send data for diagnostics and maintenance, reducing breakdown likelihood.

Collision avoidance: Vehicles can exchange positions, speeds, and directions (V2V) to alert drivers and prevent accidents.

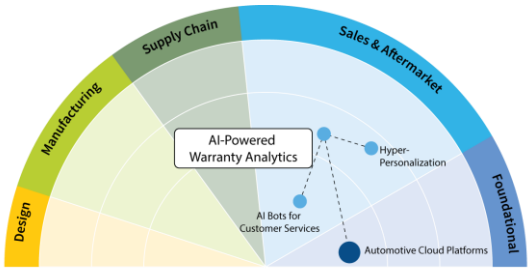
Key Takeaways:

- ✓ Integrate V2X technology to enable real-time connectivity, improving road safety, traffic efficiency, and overall mobility experiences.
- ✓ Collaborate across industry and government to address infrastructure gaps, standardization, and regulatory alignment for scalable V2X deployment.

AI-Powered Warranty Analytics

What Is It?

AI-powered warranty analytics refers to the use of AI to analyze data related to vehicle warranties. It involves applying AI and machine learning (ML) algorithms to detect patterns in warranty claims, predict potential issues, and optimize warranty processes. Automating data analysis helps automotive manufacturers reduce costs, improve product quality, and enhance customer satisfaction through more efficient warranty management.



AI-Powered Warranty Analytics

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- Warranty claims cost automotive manufacturers around 3% of revenue, with traditional analytics proving insufficient due to rising product complexity.
- AI-powered warranty analytics offers deeper, more accurate insights using machine learning for root cause analysis and predictive maintenance.
- By identifying potential failures based on manufacturing and usage patterns, manufacturers can target repairs, reduce costs, and improve product quality.
- Unsupervised learning enables proactive decision-making, helping brands stay competitive and customer-focused.
- Embracing AI-driven insights transforms warranty management from reactive to strategic, aligning with modern vehicle technologies and customer expectations.

Featured Story :

Automaker Reduces Warranty Costs and Boosts Efficiency with AI-Powered Predictive Analytics

Challenge:

Automaker facing challenges due to increasing warranty claims, manual processes, and lack of predictive tools led to high repair costs, customer dissatisfaction, and reputational risks.

Solution:

Deployed AI/ML-powered predictive analytics, built a unified data mart, and enabled early failure detection with scalable architecture and feature engineering.

Impact:

Achieved 7% warranty cost reduction, predicted failures 2 months early, improved model accuracy, and boosted customer satisfaction and operational efficiency.

(See the **References** section for the full case study link)

Key Technologies :

Decision intelligence: Improve failure prediction and warranty cost optimization.

Natural language processing: Automates claim processing and analysis.

Edge AI: Enable real-time warranty data processing from vehicles.

Key Application Areas :

Warranty cost optimization: Accurately predict future warranty costs, allowing automotive manufacturers to allocate reserves better and minimize financial risks.

Root cause analysis: AI automates the identification of common defects or issues in vehicles by analyzing claim and repair data.

Fraud detection: AI helps in identifying patterns of fraudulent warranty claims by comparing claim data against historical trends and anomalies.

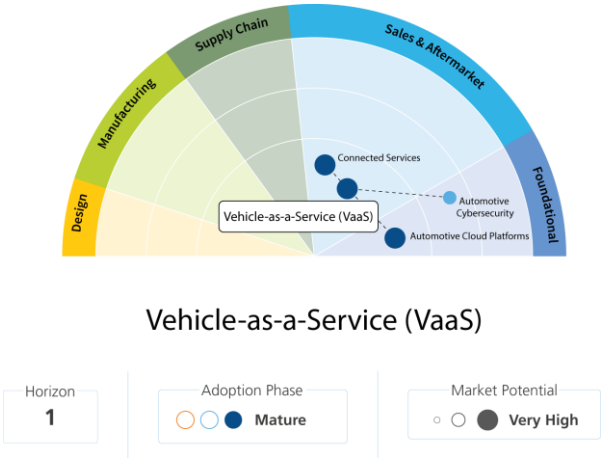
Key Takeaways :

- ✓ Leverage AI-powered warranty analytics to predict failures early, reduce recall costs, and improve customer satisfaction through proactive service strategies.
- ✓ Build unified data platforms and scalable architectures, enabling seamless integration, accurate insights, and efficient claims management.

Vehicle-as-a-Service (VaaS)

What Is It?

Vehicle-as-a-Service (VaaS) is reshaping automotive manufacturing by promoting flexible production, software integration, sustainability, and a service-focused approach. OEMs can partner with fleet operators and distributors to focus on core strengths while offering innovative solutions. Shared-use models boost the value of connected technologies and meet rising consumer demand for flexibility and convenience. Adopting VaaS is essential for capturing new market segments and staying competitive in the evolving industry.



Vehicle-as-a-Service (VaaS)

Horizon	Adoption Phase	Market Potential
1	Mature	Very High

Trend Highlights :

- Vehicle-as-a-Service is reshaping automotive business models, shifting OEMs from one-time vehicle sales to flexible, subscription-based offerings that meet evolving consumer preferences.
- This shift enables longer vehicle ownership by manufacturers, unlocking up to 50% higher profitability compared to traditional sales models.
- Partnerships with fleet operators and mobility platforms are enhancing customer experience while allowing OEMs to focus on core capabilities.
- Connected technologies and scalable systems are critical, improving asset utilization, enabling direct customer relationships, and supporting recurring revenue streams.
- VaaS adoption supports sustainable, data-driven mobility, helping manufacturers stay competitive in a rapidly evolving transportation landscape.

Featured Story :

Swedish Automaker Enhances Fleet Uptime and Service Efficiency with AI-Driven Prognostics

Challenge:

Swedish manufacturer faced frequent downtimes, limited diagnostics, and poor fleet visibility, affecting service efficiency and customer satisfaction.

Solution:

LTIMindtree implemented real-time remote prognostics, rule-based deviation detection, and fleet performance analytics to enable proactive maintenance and defect reporting.

Impact:

Automaker successfully achieved 80% reduction in vehicle downtime, 50% drop in mean time to repair (MTR), and enhanced global fleet monitoring across 1.17 million vehicles.

(See the **References** section for the full case study link)

Key Technologies :

Cybersecurity solutions: Protect VaaS platforms and connected vehicles from cyber threats.

Industrial cloud computing: Supports scalable, on-demand access to data, applications, and analytics essential for subscription management.

Sensor technology: Monitor vehicle health and environment, ensuring safety and efficiency.

Key Application Areas :

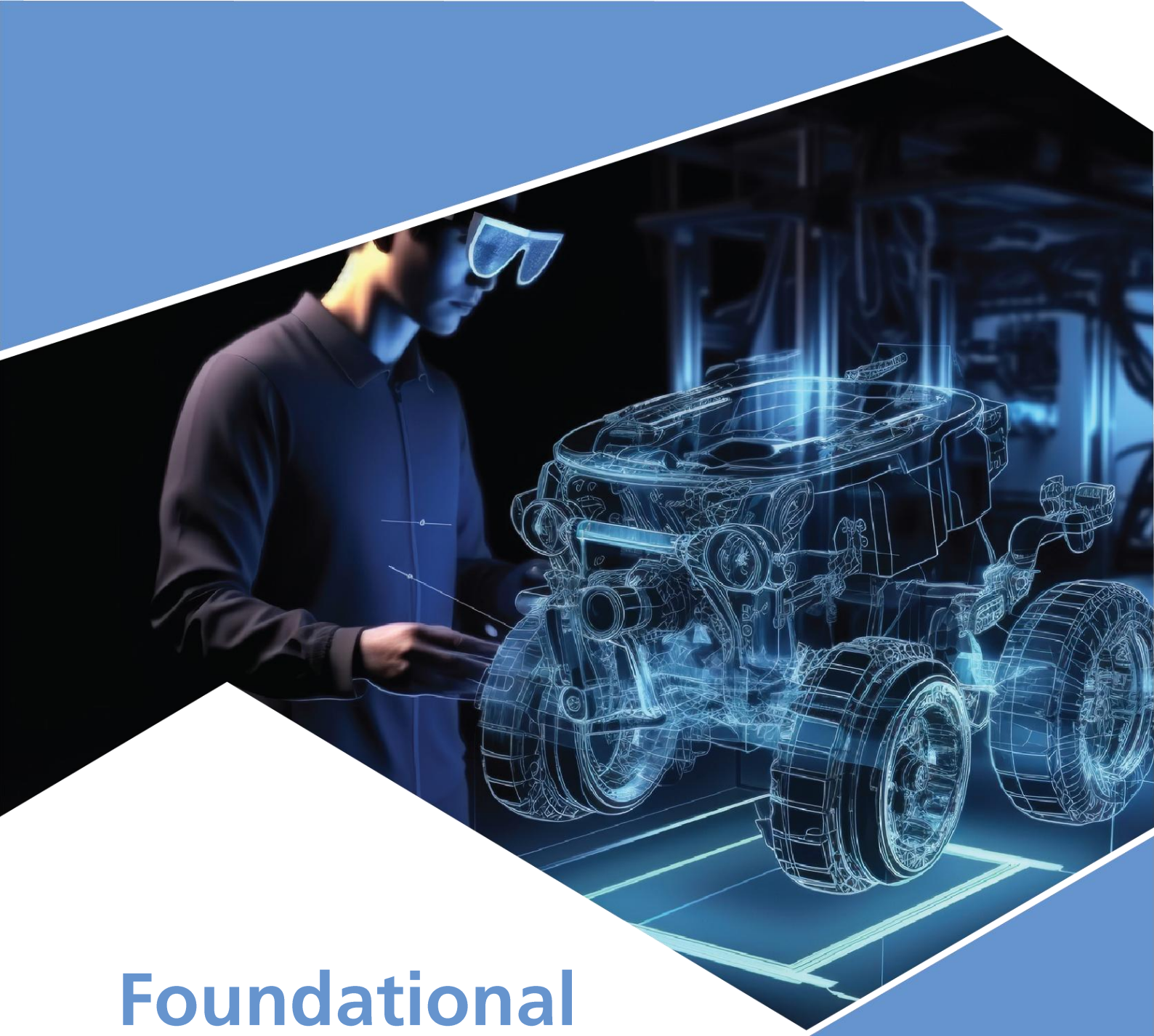
Flexible ownership: On-demand vehicle access without long-term commitment.

Subscription models: Monthly/weekly vehicle usage plans with inclusive services.

Fleet sharing: Shared vehicles for businesses and communities to optimize utilization.

Key Takeaways :

- ✓ Adopt flexible, service-based models like VaaS to meet evolving customer expectations and unlock long-term profitability beyond traditional vehicle sales.
- ✓ Collaborate with fleet operators and integrate IoT platforms, enabling OEMs to expand offerings while maintaining focus on core manufacturing strengths.

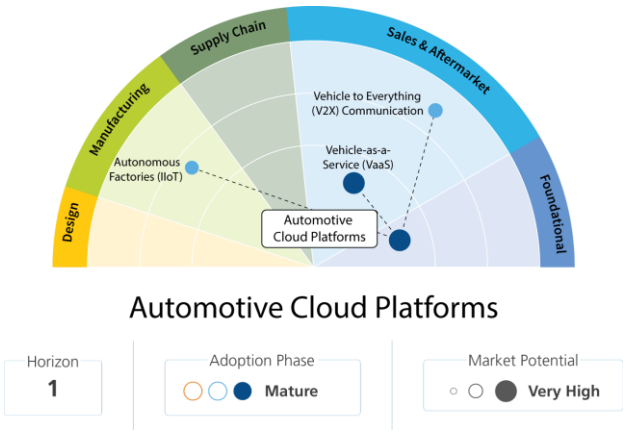


Foundational

Automotive Cloud Platforms

What Is It?

Automotive cloud platforms leverage data analytics and machine learning to enhance vehicle performance and maintenance. They enable seamless global collaboration, real-time data sharing, and over-the-air updates. These platforms offer scalable computing resources, cost-effective operational expenditure models, and flexibility for managing vehicle data, simulations, and software updates, leading to significant cost savings and accelerated development timelines.



Trend Highlights :

- Automotive cloud platforms are becoming foundational, enabling real-time data processing, over-the-air updates, and AI-driven autonomous vehicle development.
- Generative AI and cloud-based collaboration tools are accelerating design cycles, enhancing global teamwork, and supporting efficient EV charging infrastructure.
- Cloud integration is improving driver safety and personalization, powering Advance Driver Assistance System ADAS, infotainment systems, and automated logistics through robotics and smart automation.
- On-demand 3D printing via cloud platforms is reducing inventory costs and enabling flexible, localized part production.
- Cloud adoption is overcoming legacy limitations, delivering scalability, agility, and innovation across the automotive value chain in a tech-driven mobility landscape.

Featured Story :

LTIMindtree's Cloud-Native Transformation for Connected Car Ecosystem

Challenge:

The client's growing connected car user base demanded a shift from legacy systems to a cloud-native platform for scalable performance, real-time insights, and reduced operational costs.

Solution:

LTIMindtree implemented a cloud-native connected car solution using DevOps, Kubernetes, and API management tools to ensure scalability, reliability, and seamless IoT integration.

Impact:

Improved sprint velocity, 80% fewer support tickets, up to 50% lead time reduction, and 70% faster mean time to recovery (MTTR).

(See the **References** section for the full case study link)

Key Technologies :

Cloud native platforms: Enhance real-time decision-making for autonomous and connected vehicles.

Decision intelligence: Use of AI-powered predictive analytics to optimize fleet performance and maintenance scheduling.

5G networks: Ensure seamless vehicle-to-cloud communication.

Key Application Areas :

Connected vehicle services: Enable real-time telematics, remote diagnostics, and over-the-air (OTA) software updates.

Supply chain optimization: Enhances procurement, inventory tracking, and logistics with cloud-integrated AI.

Autonomous driving support: Processing sensor data and AI computations to assist self-driving functions.

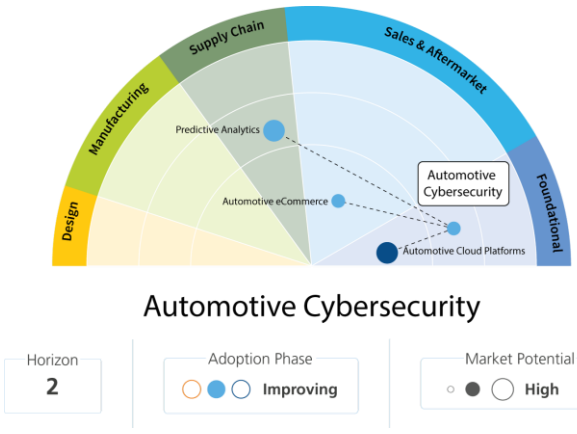
Key Takeaways :

- ✓ Leverage cloud platforms to unify automotive operations, enabling real-time data processing, over-the-air updates, and scalable AI-driven innovation across the ecosystem.
- ✓ Integrate cloud with generative AI, ADAS, and 3D printing to boost safety, personalization, efficiency, and reduce inventory and logistics costs.

Automotive Cybersecurity

What Is It?

Automotive cybersecurity refers to the protection of automotive electronic systems, communication networks, control algorithms, software, users, and underlying data from malicious attacks, damage, unauthorized access, or manipulation. This encompasses safeguarding digital aspects of modern vehicles to ensure their safe and secure operation. As vehicles become more connected and autonomous, the importance of robust cybersecurity measures continues to grow, guaranteeing driver safety and data integrity.



Automotive Cybersecurity

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- Cybersecurity is becoming foundational in automotive, protecting vehicle systems, user data, and ensuring safe, reliable mobility across connected and autonomous platforms.
- Growing connectivity and V2X communication are expanding the attack surface, driving demand for robust protection of telematics, ECUs, and electronic systems.
- Regulatory pressure is accelerating adoption of secure protocols, with real-time threat detection and compliance frameworks becoming standard across the value chain.
- Cloud-integrated security and monitoring tools are gaining traction, enabling scalable protection and faster response to evolving cyber threats.
- Cyber resilience is now a competitive differentiator, enhancing trust, safety, and long-term viability in a tech-driven automotive landscape.

Featured Story :

Automaker Strengthens Cyber Defense and Cuts Costs with Managed Detection and Response

Challenge:

The automaker lacked threat visibility, used outdated SIEM tools, and faced rising cyber risks due to poor endpoint monitoring and fragmented security operations.

Solution:

The cybersecurity provider implemented a Managed Detection & Response solution using a threat detection platform, enabling 24/7 monitoring, behavioral analytics, and proactive threat hunting across hybrid environments.

Impact:

Achieved 30% cost savings, improved threat detection, reduced response time, and enhanced IT operations with expert support—delivering value within four weeks of implementation.

(See the **References** section for the full case study link)

Key Technologies :

Self-adaptive security: AI-powered threat detection to identify and mitigate real-time cyber risks.

Zero trust architecture: Enhances access control and authentication in connected and autonomous vehicles and related infrastructure.

Intrusion detection: Continuously monitors vehicle networks to detect, prevent, and respond to cyber attacks.

Key Application Areas :

Telematics systems: Safeguarding telematics data, which includes vehicle location, speed, and diagnostics, from unauthorized access and tampering.

Supply chain security: Ensuring that all vehicle components and software are secure and free from vulnerabilities throughout the supply chain.

Secure vehicle communication: Protects data exchanged between vehicles and infrastructure to prevent interceptions and tampering.

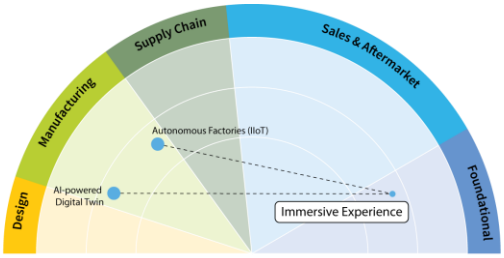
Key Takeaways :

- ✓ Embed cybersecurity across vehicle design and infrastructure, ensuring protection of electronic systems, user data, and connected services from evolving threats.
- ✓ Leverage AI-driven threat detection and flexible compliance strategies, to proactively manage risks and maintain trust in increasingly connected and autonomous environments.

Immersive Experience

What Is It?

Immersive technologies in the automotive industry, such as metaverse, Augmented Reality (AR), and Virtual Reality (VR), involve creating interactive and engaging digital environments. These technologies allow virtual simulations of vehicle designs, manufacturing processes, and customer experience, thus enhancing visualization, collaboration, and efficiency.



Immersive Experience

Horizon	Adoption Phase	Market Potential
2	Improving	Low

Trend Highlights :

- Immersive technologies are reshaping the automotive value chain, transforming design, manufacturing, and customer experience through interactive digital environments.
- AR-assisted assembly and VR training modules are improving workforce precision, reducing errors, and accelerating onboarding across production facilities.
- AR heads-up displays and mixed reality tools are enhancing driving experiences and enabling remote diagnostics and maintenance in aftermarket services.
- AI and 5G are accelerating immersive adoption, powering intuitive human-machine interfaces and virtual testing environments for next-gen connected and autonomous vehicles.
- Immersive platforms are driving efficiency and personalization, helping manufacturers deliver safer, smarter, and more engaging mobility solutions.

Featured Story :

German Automaker Elevates Customer Engagement with Mixed Reality Showroom Experience

Challenge:

Germany based automotive company needed to enhance customer engagement and vehicle presentation amid growing digital expectations and limited physical showroom access.

Solution:

The company introduced a mixed reality showroom using smart glasses, digital twins, and gesture-controlled immersive presentations of its iX1 electric car.

Impact:

Delivered richer, interactive customer experience, improved brand engagement, and showcased innovation in automotive marketing through immersive, on-demand virtual product exploration.

(See the **References** section for the full case study link)

Key Technologies :

Digital twin: Simulates and improves in-car user experience using real-time data.

Augmented reality: Enhances driving with real-time navigation, hazard alerts, and vehicle diagnostics.

Virtual reality: Enables customers to explore and customize vehicles virtually, enhancing the buying experience remotely.

Key Application Areas :

Digital Twin in manufacturing: Virtual replicas help monitor and optimize automotive manufacturing, predict maintenance, and minimize downtime efficiently.

AR/VR-enabled remote collaboration: Remote teams collaborate in virtual spaces using VR for faster model interaction, feedback, and design iteration.

Remote training and support: Virtual training sessions where participants can be trained on new tools or machinery through simulated environments.

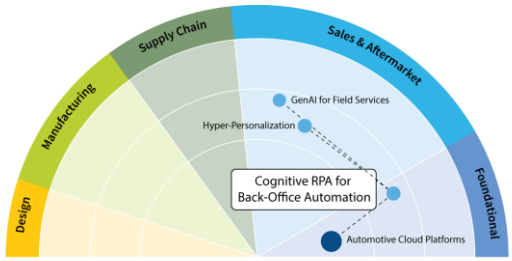
Key Takeaways :

- ✓ Adopt immersive technologies like AR, VR, and the metaverse to enhance vehicle design, customization, training, and customer engagement across the value chain.
- ✓ Focus on seamless integration and accessibility, ensuring immersive tools are scalable, intuitive, and aligned with both workforce and customer needs.

Cognitive RPA for Back-Office Automation

What Is It?

Cognitive Robotic Process Automation (RPA) for back-office automation refers to combining AI and machine learning with traditional RPA to handle complex tasks like data extraction, processing, and decision-making. It can automate processes like order processing, inventory management, and compliance checks, thereby reducing human intervention and errors. Alternatively, this is also known as intelligent process automation.



Cognitive RPA for Back-Office Automation

Horizon	Adoption Phase	Market Potential
2	Improving	High

Trend Highlights :

- Cognitive RPA transforms automotive back-office operations by automating data capture and processing across supply chain, invoicing, and customer management activities.
- Leveraging Machine Learning (ML) and Natural Language Processing (NLP), these systems learn from data inputs, adapt to exceptions, and handle evolving business rules.
- Advanced OCR capabilities enable seamless extraction and digitization of information from physical documents, invoices, and forms.
- Unlike traditional RPA, cognitive automation uses ML to make decisions, improve accuracy, reduce manual intervention, and scale data processing for complex workflows.
- The integrated toolchain boosts operational efficiency, minimizes errors, and lowers costs, empowering manufacturers to achieve greater agility and focus on strategic growth.

Featured Story :

Transforming Efficiency with RPA Automation in Automotive Tyre Manufacturing

Challenge:

The tyre manufacturer faced slow, error-prone manual data entry and document prep, pulling skilled staff away from key tasks.

Solution:

The company deployed automation platform RPA to automate data verification, extraction, and document generation across accounting and customer service processes.

Impact:

Saved 90% operation time, reduced paper usage by 85%, and cut manual errors and processing by 50%, boosting efficiency and customer satisfaction.

(See the **References** section for the full case study link)

Key Technologies :

Natural language processing: Enables automated document processing and customer interactions.

Chatbots: Automate routine queries and customer service tasks.

AI: Enables intelligent decision making and complex process automations.

Key Application Areas :

Invoice processing: Automating the reading and categorization of invoices, reducing manual efforts and errors.

Inventory management: Monitoring stock levels, predicting shortages, automating replenishment.

Compliance reporting: Automating regulatory compliance tasks, ensuring accuracy in reports.

Key Takeaways :

- ✓ Streamline complex processes and accelerate decision-making by adopting cognitive RPA, which reduces manual errors and improves operational efficiency.
- ✓ Prioritize seamless integration and proactive change management to unlock scalability, enhance data accuracy, and free up skilled talent for strategic initiatives.

Sustainability & ESG

What Is It?

Sustainability in the automotive industry refers to practices that reduce environmental impact, promote social responsibility, and ensure economic viability. This includes reducing greenhouse gas emissions, improving fuel efficiency, adopting renewable energy sources, and implementing circular economy principles like recycling and waste reduction. Automakers invest in EVs, supply chain decarbonization, recycling, regulatory compliance, fair labor practices, and ethical governance.

Trend Highlights :

- Sustainability and ESG automation help automotive manufacturers navigate complex global regulations and streamline accurate data collection for reporting.
- Investing in robust data systems and adopting standardized frameworks like Global Reporting Initiative (GRI) and Sustainability Accounting Standards Board (SASB) ensures transparency, compliance, and efficient ESG reporting.
- The shift to renewable energy is accelerating, with leading automakers targeting 100% renewable-powered plants and setting new industry benchmarks.
- Technology adoption across the value chain—such as AI-driven analytics and digital platforms—drives environmental responsibility, operational efficiency, and long-term competitiveness in a rapidly evolving regulatory landscape.
- The integrated approach enhances brand reputation, reduces risk, and positions manufacturers for sustainable growth and leadership in the future of mobility.

Featured Story :

Optimizing Production and Sustainability with Smart Technologies

Challenge:

Automotive manufacturer faced water scarcity, high energy demands, and the need for scalable, sustainable EV production in a semi-desert region.

Solution:

Deployed solar energy, water recycling, AI-driven predictive maintenance, virtual reality and smart robotics to optimize production and reduce environmental impact.

Impact:

It enabled real-time tracking of energy, water, and emissions, allowing swift action to reduce environmental impact and meet eco-friendly targets efficiently.

(See the **References** section for the full case study link)

Key Technologies :

Edge AI: Real-time monitoring to optimize driving behaviour, fleet efficiency, and maintenance, lowering environmental impact.

AI: An Intelligent system that optimizes energy consumption in factories and smart grids supporting Evs.

Digital twin: Virtual models that simulate and optimize environmental impact across vehicle design, manufacturing, and lifecycle.

Key Application Areas :

Electric Vehicles (EVs): Transitioning to EVs to reduce greenhouse gas emissions and reliance on fossil fuels.

Supply chain decarbonization: Reducing emissions throughout the supply chain by responsibly sourcing materials and improving manufacturing energy efficiency.

Eco-friendly manufacturing process: Low-impact methods such as additive manufacturing and waterless painting to minimize environmental footprints.

Key Takeaways :

- ✓ Make sustainability and ESG central to your strategy for long-term value and customer trust.
- ✓ Invest in clean energy, circular manufacturing, and transparent supply chains using digital tools for compliance and efficiency.

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Glossary

AM: Additive Manufacturing

AI: Artificial Intelligence

AR: Augmented Reality

VR: Virtual Reality

MR: Mixed Reality

ML: Machine Learning

EVs: Electric Vehicles

OEM: Original Equipment Manufacturers

GenAI: Generative Artificial Intelligence

NLP: Natural Language Processing

SDV: Software-defined Vehicle

ECU: Electronic Control Units

AEB: Automatic Emergency Braking

LLM: Large Language Models

IIoT: Industrial Internet of Things

PPE: Personal Protective Equipment

ADAS: Advanced Driver Assistance Systems

SOC: State of Charge

SOH: State of Health

OTA: Over-the-Air

3D: Three-dimensional

CRM: Customer Relationship Management

ERP: Enterprise Resource Planning

PRM: Partner Relationship Management

V2X: Vehicle-to-everything

V2I: Vehicle-to-infrastructure

V2V: Vehicle-to-vehicles

VaaS: Vehicle-as-a-Service

MTTR: Mean Time to Repair

FIAB: Factory-in-a-Box

ROI: Return on Investment

PPO: Predictive Procurement Orchestration

JIT: Just-in-Time

ICCA: In-Console Cloud Assistant

OCR: Optical Character Recognition

RPA: Robotic Process Automation

ESG: Environmental, Social and Governance

GRI: Global Reporting Initiative

SASB: Sustainability Accounting Standards Board

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