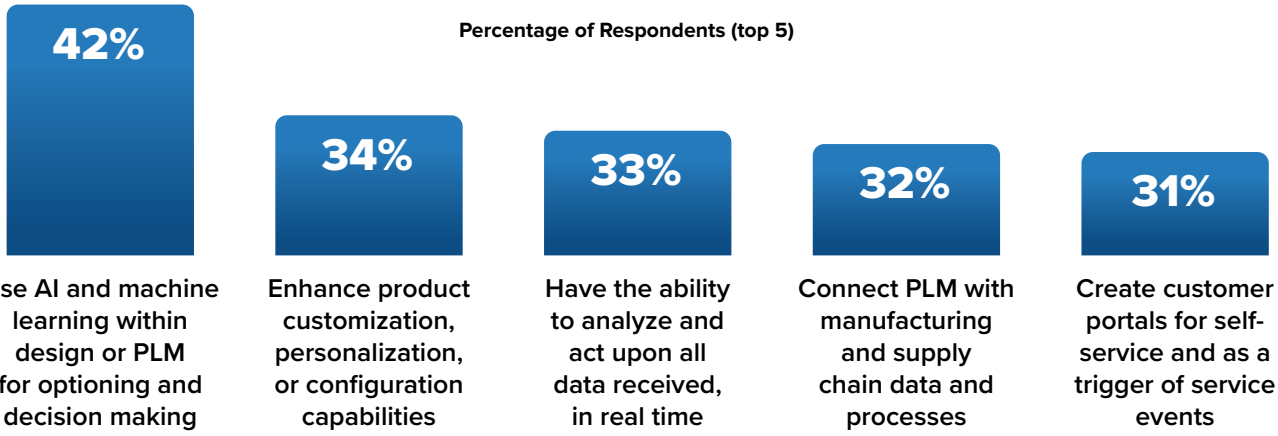
Driving Collaborative, Resilient Automotive Engineering

Automakers and their suppliers are challenged by customer demand for new features and services, regulatory compliance, and functional safety and quality. Closed-loop engineering and software development plus artificial intelligence (AI) enables innovation and resilient decision making while meeting customer demand.

Importance of AI and Decision Support Across the Engineering Life Cycle

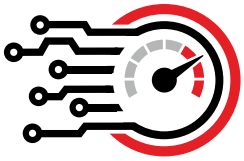
Percentage of Respondents (top 5)



Source: IDC Product and Service Innovation Survey, May 2019, n = 100 (EOVC: auto, machinery, A&D) PLM = Product life-cycle management

AI-powered engineering and software development enables rapid design and development, the ability to accurately meet customer demand, and resilient decision making across ideation, manufacturing, and service. The graphic shows the importance of an intelligent platform approach to engineering.

- AI and machine learning (ML) applied to multiple, dynamic data models across product and software engineering improves optioning, efficiency, and quality.
- Innovation, service, and customer experience optimization are top reasons automotive and transportation manufacturers are looking to AI/ML.
- Manufacturers understand the need to work across multiple domains – including business, engineering, manufacturing, supply chain, and service – to effectively bring physical and digital products to market.



Cars are now among the most complex, connected, and smart products, producing petabytes of data and including thousands of lines of software code.

Engineering Requires Intelligence and Resiliency

The engineering and operations challenges of today's smarter cars require automotive manufacturers to work both internally and externally across domains. Internal remote collaboration among the global team is now necessary. A collaborative, ecosystem approach to design and engineering is also critical to meet data and software demands, as well as greater levels of automation, infotainment, and drivetrain electrification. Automakers must work closely with tier 1 suppliers, academia, and other partners during initial design and development, sales, and customer acquisition. The engineering and development team expands to include design, product management, engineering (mechanical, electrical, and software), digital engineering and operations, and supply chain partners. The complexity of product and of value chain requires a keen focus on data management, analytics, cloud computing power, simulation, security, connectivity, and quality, all enabled by AI and ML. The goal of this platform approach across domain and technology is to ensure the safety and quality of semi-autonomous and fully autonomous vehicles as they hit the road.

Benefits of Collaborative, Continuous Engineering Life-cycle Management

Progress continues toward autonomous vehicles, but there are multiple layers of complexity for manufacturers and suppliers to address. This complexity demands a closed-loop, model-based systems engineering (MBSE) platform approach. Potential benefits include:

- 10% faster time to market with products and services
- 10% improvement in time to volume
- 25% reduction in the cost of overall product quality

Sources: IDC PlanScape: Digital Transformation of NPDI, 2019; IDC PlanScape: Digital Twins, 2018. Cross-discrete manufacturing industry metrics.

For automotive engineering to truly be collaborative and resilient requires the unification of data from early stage ideation and innovation management to service. Once this closed-loop digital thread is established, manufacturers can quickly iterate through the engineering and product life cycles, making sound decisions complemented by AI.