

# Simulation Accelerates the Shift to Digital Engineering

Manufacturers are accelerating product development, and simulation, driven by AI and high-performance computing (HPC), delivers better products faster.



**John Snow**  
Research Director,  
Product Innovation Strategies, IDC



**60%** of manufacturers consider accelerating product design to be a key business initiative.



**53%** say that expanding generative AI usage is a key business initiative for engineering departments.



**49%** say that adopting AI tools is a priority for transforming product life-cycle management.

n = 148 (PLM decision-makers for complex and high-tech industries);  
Source: IDC's Product and Service Innovation Study, June 2025

## Digital engineering's competitive imperative

New technologies continue to accelerate product development, acting as a competitive differentiator in the marketplace. AI and cloud-based high-performance computing enable digital engineering processes to run faster, especially for complex software-defined products comprising mechanical, electrical, and digital systems.

Digital engineering supports continuous optimization of design processes by leveraging the power of multiphysics analysis to evaluate

comprehensive digital models of systems and products. Many of these systems can be represented as reduced-order models (ROMs), which reduces the need for simulating individual components and instead assesses the holistic performance of the mechanical, electric, and electronic systems involved. ROMs help manufacturers adopt digital engineering using legacy technologies because these simplified models require less computing power.

When full-fidelity simulations need to be run, secure cloud environments can be employed in which intellectual property is encrypted and sequestered, and only the resulting simulations are shared. Simulation-driven digital engineering allows manufacturers to realize product innovation even in the face of an aging technology infrastructure.

## Hybrid environments, AI, and HPC

Accelerating product development while still meeting cost, quality, and performance targets relies on advanced simulations, which run significantly faster with GPU-accelerated HPC. However, this can present a challenge for manufacturers as they try to adopt digital engineering practices using a legacy technology stack.

As a result, many manufacturers are pursuing a hybrid technology environment, allowing them to progressively replace legacy, on-premises infrastructure with cloud-based and AI-enabled technologies. Hybrid environments combine new and legacy technologies, enabling digital engineering to seamlessly integrate with existing workflows and infrastructure, minimizing disruption to engineering processes. For manufacturers that are moving into digital engineering, simulation is a logical starting point as technologies like cloud, HPC, and AI can have a direct impact on the accuracy, speed, and accessibility of simulation, all helping to accelerate the design process.

Cloud improves data security, HPC accelerates simulation runs, and AI speeds simulation processing and the application and understanding of results to digital engineering environments. Each technology increases opportunities for improving design optimization. Specifically, high-fidelity simulation results can be used to train AI models, enabling engineers to explore extensive design spaces, with good levels of accuracy, without repeatedly running full simulations for every configuration. Hybrid environments that integrate both modern and legacy technologies allow manufacturers to transition into a more competitive digital engineering strategy, powered by cloud, AI, and HPC.

## Responding to the digital engineering imperative

The complexity of creating successful, software-defined products and systems relies on digital engineering practices based on multiphysics simulation. Digital engineering relies on multiphysics simulation, which runs at its best when leveraging cloud, AI, and HPC technologies. This is the path for reducing time to market, decreasing costs, and increasing performance and quality for software-defined products.

---

### Message from the sponsor



Digital engineering's structured synergy of advanced technologies builds the foundation for an adaptable, scalable ecosystem that evolves alongside increasingly fast-moving technological advancements. By enabling smart product design, fostering real-time collaboration, and optimizing performance, digital engineering simplifies complexity and unlocks the full potential of AI-powered engineering innovation.

[Learn more.](#)