

STATE OF PRODUCT DEVELOPMENT

7 TRENDS SHAPING
PRODUCT INNOVATION

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Understanding the State of Product Development

Why Product Development Matters More Than Ever

Is your approach to product development helping you compete or holding you back?

Product development teams today face growing pressure to respond to market volatility, supply chain disruptions, and global competition. At the same time, they're dealing with long-standing challenges like manual inefficiencies, poor collaboration, disconnected systems, and workforce shortages. These issues cause costly delays, especially during engineering-to-manufacturing hand-offs. In the past, these inefficiencies were tolerated. But today's market demands more agility, and the tools to support it are finally available. Advances in digitalization, simulation, and AI are helping teams move faster and smarter. These issues are shaping product development.

This research identifies seven trends that are reshaping product development and as companies confront this new reality. Top Performers are leading the way in adapting to these trends to gain a competitive edge. What are they doing differently, and what can others learn?

About the Research

This study is based on a survey of 233 professionals involved in product development across design, engineering, and manufacturing roles. The findings reveal the biggest challenges teams face today, the trends driving change, and the strategic moves Top Performers are making to reduce risk, accelerate innovation, and deliver better products faster.





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Executive Summary

State of Product Development

Product development continues to face an era defined by growing complexity, shrinking margins for error, and accelerating market demands. This is exacerbated as companies are under increasingly pressure not only from traditional competitors, but also from nimble startups, vertically integrated disruptors, and offshore manufacturers. At the same time, they must manage ongoing supply chain volatility, shifting customer expectations, and a growing need for smarter, more connected products.

To remain competitive, companies must design faster, adapt to change more easily, and eliminate costly inefficiencies. Yet many are still burdened by manual tasks, disconnected tools, and poor collaboration, especially between engineering and manufacturing. These challenges are not just frustrating for employees; they lead to missed deadlines, higher costs, and compromised quality. In fact, 78% of respondents report increased manufacturing and development costs due to product development challenges.

Key Findings

Top Performers, companies that consistently meet or exceed product development goals, are leading the way. Compared to Others, they are:

- 77% more likely to use fully or mostly integrated product development platforms

- Nearly two times more likely to be using AI in development
- Significantly more likely to involve design engineers in simulation and to support supplier collaboration with real-time data

Top Performers aren't just adopting new technologies; they're redefining their processes to reduce risk, speed innovation, and build resilience.

About This Report

This report analyzes the current state of product development and examines seven key trends revealed by the research that are reshaping how companies approach product development. These trends include the shift to integrated platforms, greater use of simulation and AI, stronger design-to-manufacturing alignment, and strategies to engage the workforce and collaborate with suppliers.

This report also examines workforce dynamics, including the impact of manual work on motivation and generational preferences for recognition and growth. It concludes with actionable strategies companies can use to modernize their development approach and gain a lasting competitive edge.



Top Performers are **77% more likely** to use fully or mostly integrated product development platforms.

Why Product Development Is Under Pressure

Today's Market

Product development has always been complex, but many companies are feeling more pressure than ever before. They are navigating a perfect storm of disruption, driven by market shifts, increasing technical complexity, and organizational misalignment. As a result, engineering and manufacturing teams must achieve more with less time, fewer resources, and greater risk.

A New Wave of Competition

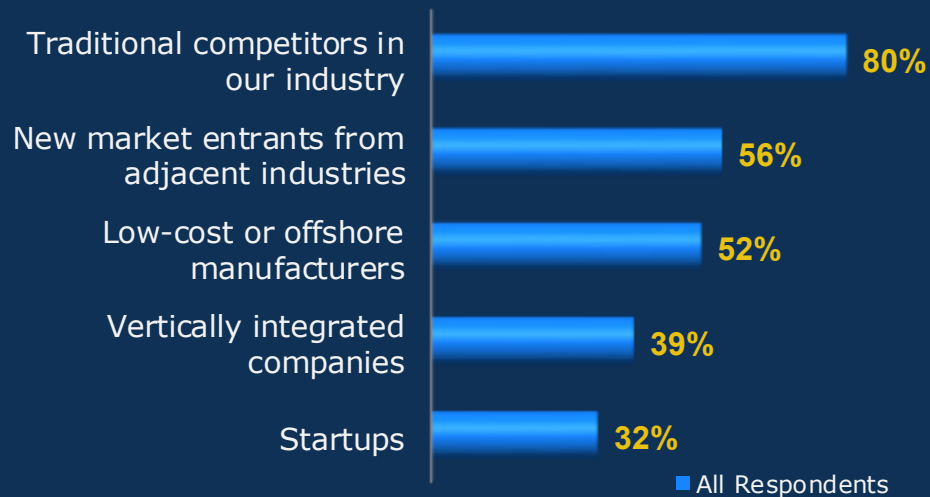
Adding to the pressure, competition is coming from all directions. In addition to long-standing rivals, companies now face other sources of competition (see graph). With competition intensifying, businesses must move faster and differentiate through innovation, product performance, quality, and customer experience.

As competition arises from various fronts, companies need to work harder to set themselves apart. Strong product development is essential for achieving that differentiation.

How to Respond

Given these challenges, companies should evaluate the top obstacles facing product development teams and address them to empower them to deliver effectively. While many operate under the belief of "if it ain't broke, don't fix it," they may underestimate how much these common challenges can harm the business. Thankfully, technological advancements have created new opportunities to overcome these challenges and develop efficiencies that can enhance a company's competitiveness.

SOURCE OF COMPETITION



Strong product development is **essential** for achieving differentiation.

Top Challenges Facing Product Development

Numerous Challenges

Product development is critical to company success, yet teams face significant hurdles (see graph). These issues stretch teams thin as they lose time due to manual work, miscommunication, rework, and difficulty adapting to market volatility. To stay competitive, companies must overcome these barriers to enable faster, smarter innovation and break down silos.

Volatility

Market conditions are increasingly unstable, with ongoing supply chain disruptions, geopolitical uncertainty, and rising material costs. These factors make volatility and supply chain issues the top challenges facing teams. This unpredictable environment demands greater agility in product design and sourcing, and the right systems to support fast, informed decisions.

Engineering-to-Manufacturing Hand-offs

Hand-offs between design and manufacturing remain a major source of inefficiency. Miscommunication,

outdated drawings, and misaligned data versions contribute to delays and rework. Disconnected tools make collaboration, traceability, and real-time access harder. As a result, 78% of respondents report higher development and manufacturing costs due to development challenges, while 43% these challenges result in production errors and rework.

Growing Complexity

Today's products are increasingly complex and multi-disciplinary. They often include mechanical, electrical, and electronic components, plus software, and are tailored to specific markets or customers. This means:

- More data to manage
- More stakeholders to coordinate
- More systems to integrate

With these added layers, the potential for errors increases, complicating the assessment of design decisions and changes. Consequently, 50% of respondents indicate that development challenges lead to lower product quality and performance, while 69% say they cause delays.

Manual and Repetitive Tasks

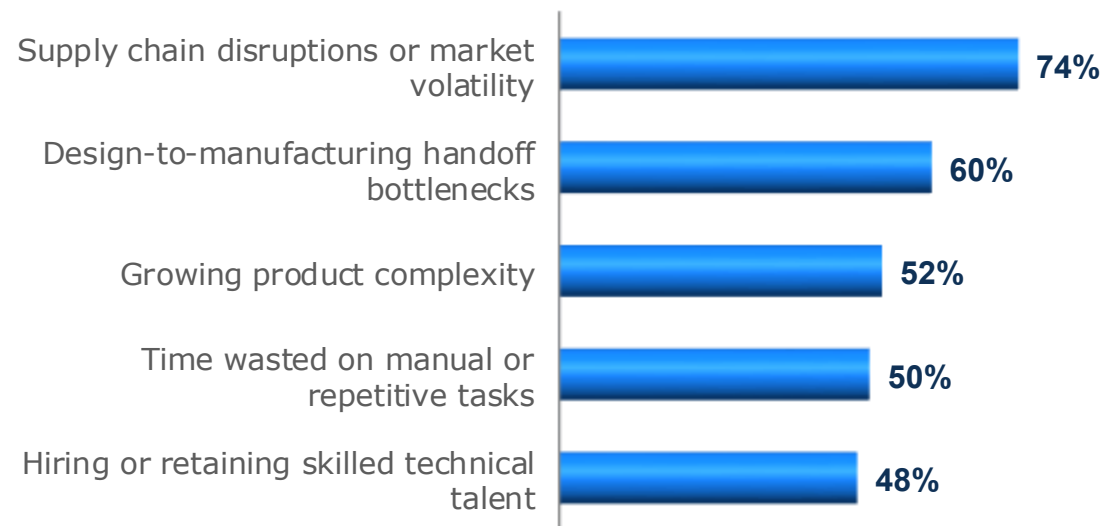
Teams often waste excessive time on low-value tasks, like searching for files, re-entering data, or fixing version issues. These inefficiencies slow decision-making and reduce productivity. As a result, engineers spend less time on design and innovation and more time chasing data and correcting mistakes. Meanwhile, manufacturing teams experience delays and rework due to outdated or incomplete information.

This contributes to why 58% of respondents report that these challenges reduce productivity.

The Skills Gap

Finding and retaining skilled talent has become an increasing concern. As experienced engineers and manufacturing workers retire, finding replacements is hard. New hires often lack hands-on experience, and training takes time, leaving teams stretched and hurting productivity.

TOP PRODUCT DEVELOPMENT CHALLENGES



■ All Respondents

Identifying Top Performers

How Top Performers Were Defined

To define Top Performers, Tech-Clarity identified the top 25% of companies that outperform their competitors in metrics that indicate product development success. These metrics are the ability to:

- Develop products efficiently
- Design high-quality products
- Develop innovative products
- Meet product cost targets
- Meet release deadlines

Top Performers excel in these areas, which indicates greater overall business success. To identify best practices, we analyzed what Top Performers do differently compared to Others.

Top Performers' Advantage

Top Performers have more effective product development practices than their peers. In fact, they are 69% more likely than Others to easily collaborate and share data across disciplines and departments. This makes them 61% more likely to manage hand-offs to manufacturing extremely well and 54% more likely to meet customer expectations.

Top Performers' Approach

Let's examine the seven trends shaping product development and how Top Performers are responding to overcome today's top product development challenges.



PERCENTAGE RATING THEIR PROCESSES AS 'OUTSTANDING' OR 'EXCEEDS EXPECTATIONS'

METRIC	TOP PERFORMER	OTHERS
Easily collaborate and share data across disciplines / departments	49%	29%
Handoff to manufacturing	60%	38%
Meet customer expectations	68%	44%

Top Performers are **69% more likely** than Others to easily collaborate and share data across disciplines and departments

1. Rebuilding Supply Chains

Rethinking Supply Chains

Global supply chains are undergoing a significant transformation. Disruptions, geopolitical tensions, and rising material costs are pushing companies to rethink how and where they source parts and manufacture products.

From Global to Local

Many companies, especially OEMs, are shifting away from offshore outsourcing and toward local suppliers. Over the next five years:

- 44% of OEMs plan to shift from offshore to local suppliers
- 34% plan to reduce offshore outsourcing
- 31% intend to increase local domestic outsourcing

This shift presents both opportunity and pressure for local suppliers.

Opportunity for Suppliers

Proximity alone isn't enough. OEMs want suppliers who can collaborate efficiently, communicate clearly, and deliver high-quality products with minimal delays or rework.

Improvement Opportunities

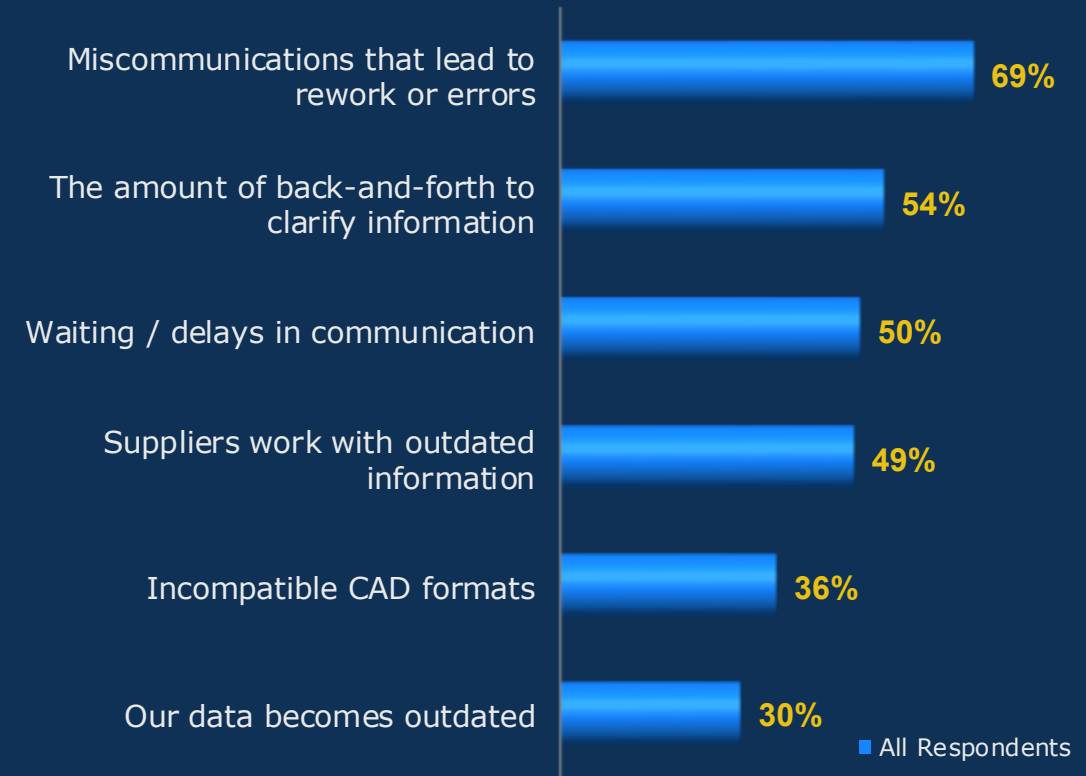
All respondents cite supplier-related issues that increase costs, often due to poor collaboration (see graph). These issues occur frequently as 12% experience them daily, 40% weekly, and 30% monthly. Survey participants estimate that these problems add, on average, 30% more development time to their projects. Improving collaboration could significantly reduce this.

Improving Collaboration

To address these challenges, 63% of Top Performers have strategies to improve collaboration, and 52% plan to use cloud platforms. Cloud platforms connect OEMs and suppliers via a shared digital thread. This improves access to accurate data. Benefits include:

- Fewer errors from outdated drawings
- Faster resolution of questions or changes
- Better alignment between engineering intent and manufacturing execution

COST DRIVERS WHEN WORKING WITH SUPPLIERS



Survey participants estimate that these problems add, on average, **30% more development time** to their projects.

2. Connecting Design-to-Manufacturing

Design-to-Manufacturing

The hand-off from design to manufacturing is one of the biggest bottlenecks in product development, and when done poorly, it can be one of the most costly.

The Cost of Disconnection

Engineering and manufacturing teams often rely on different tools, disconnected systems, outdated printouts, and manual processes like file transfers. This creates silos, and there is no opportunity to create a digital thread. This disconnection can lead to delays, errors, and rework. Fragmented workflows force engineering and manufacturing teams to manually re-enter data, convert file formats, or track down the latest version of a drawing. This not only wastes time but also introduces risk and errors into the process. Delays cascade downstream, compressing manufacturing timelines and increasing the likelihood of production errors.

Consequently:

- 65% of companies cite miscommunication between design and manufacturing as a leading source of delays

- 59% report rework due to design-manufacturing misalignment
- 51% blame delays on errors from manual data re-entry between systems

Therefore, better methods are needed to keep engineering and manufacturing aligned.

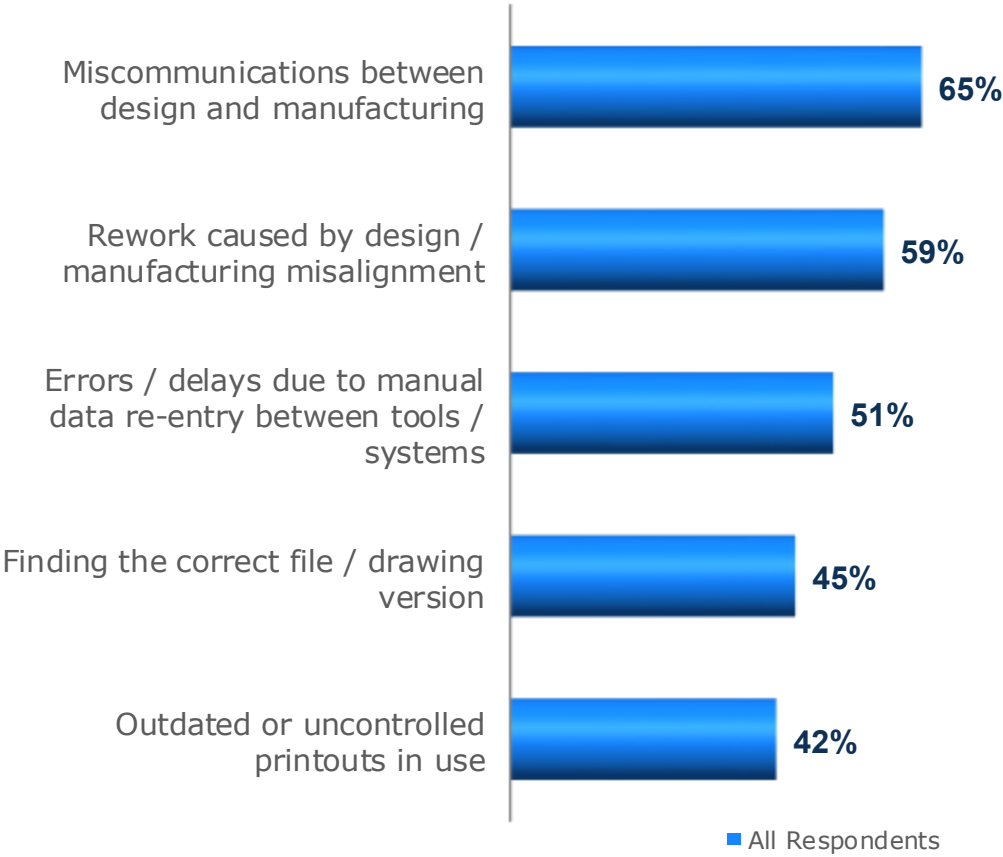
Integrated Platforms

Top Performers are addressing the disconnect by adopting integrated platforms that serve both engineering and manufacturing. Most Top Performers, 55%, use a fully or mostly integrated system, compared to just 31% of Others. Cloud-based solutions further improve access and efficiency for distributed teams.

Collaboration as a Competitive Advantage

Fixing the design-to-manufacturing disconnect isn't just about efficiency; it's also about agility. With supply chain volatility and market pressures, companies need seamless collaboration between teams to respond faster, reduce costs, and bring better products to market.

MOST FREQUENT SOURCES OF DELAYS
IN PRODUCT DEVELOPMENT

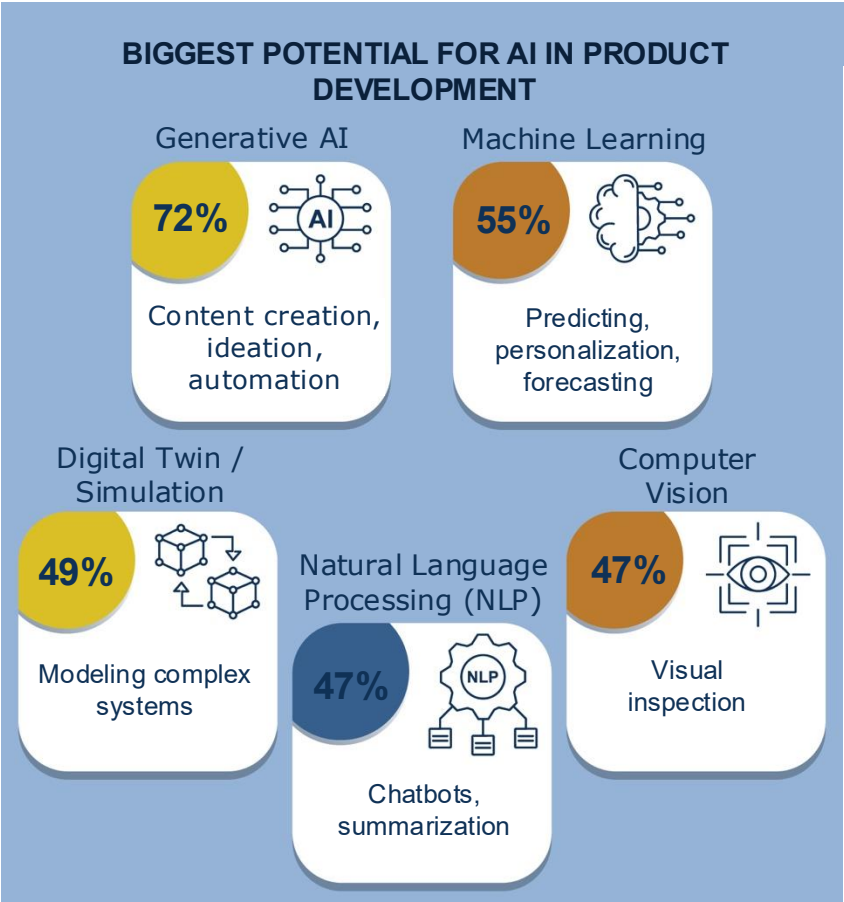


55% of Top Performers use a fully or mostly integrated system, compared to just 31% of Others.

3. Embracing AI in Product Development

Artificial Intelligence (AI) Trends

AI is one of today’s most talked-about technologies, and it’s beginning to reshape product development. While many companies are in the early stages, adoption is accelerating, especially among Top Performers.



Generative AI Leads the Way

AI encompasses various technologies, but generative AI, which creates content, is viewed as having the most potential in product development. It can aid ideation, model alternatives, and jumpstart concept design. Other valuable AI applications include machine learning, which helps forecast and personalize, and digital twins that simulate complex systems (see graphic).

Top Performers Are Ahead

While most are still experimenting, Top Performers are nearly twice as likely as Others to use AI in product development already. AI can benefit them by reducing manual work, improving decisions, providing design guidance, and accelerating design.

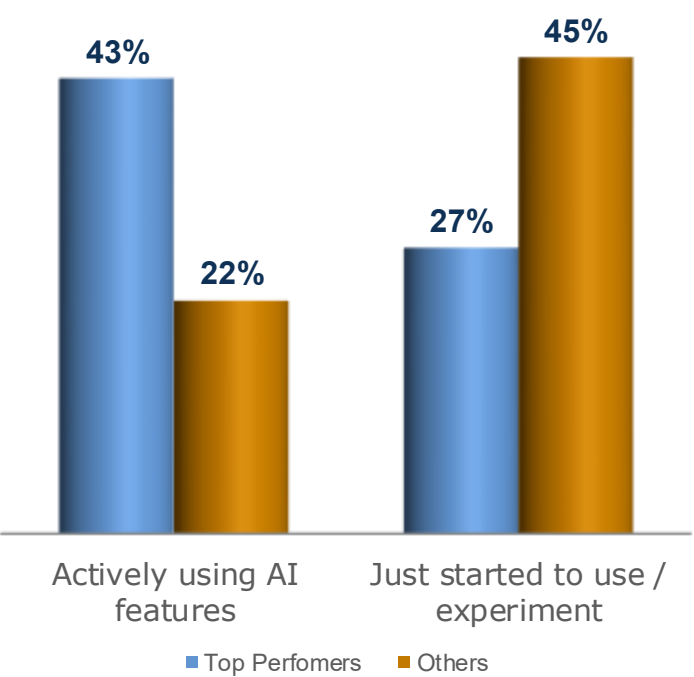
Barriers to Adoption Remain

Despite the enthusiasm for AI, adoption isn't without friction. Tech-Clarity's research¹ finds that of those who have started to adopt AI, the biggest hurdles include:

- Inadequate data to train AI models
- Cultural resistance or distrust
- Weak data governance

Interestingly, those yet to adopt AI are less likely to anticipate these hurdles. Increased awareness of potential obstacles can help with strategizing and can lead to a more successful experience.

AI USAGE IN PRODUCT DEVELOPMENT



From Potential to Practice

AI has much potential, and its promise lies in amplifying human expertise, not replacing it. To adopt it, start by defining clear goals, training teams, piloting use cases, and building trust. A phased approach focused on practical, high-value problems and gradually applying lessons learned to larger problems can deliver value more quickly than a "big bang" strategy that attempts sweeping changes too soon.

4. Expanding Simulation

Growing Adoption

Simulation is a powerful tool that accelerates innovation, reduces costs, improves quality, and identifies problems earlier. As companies recognize these advantages, adoption is increasing, especially among Top Performers.

Simulation Moves Upstream

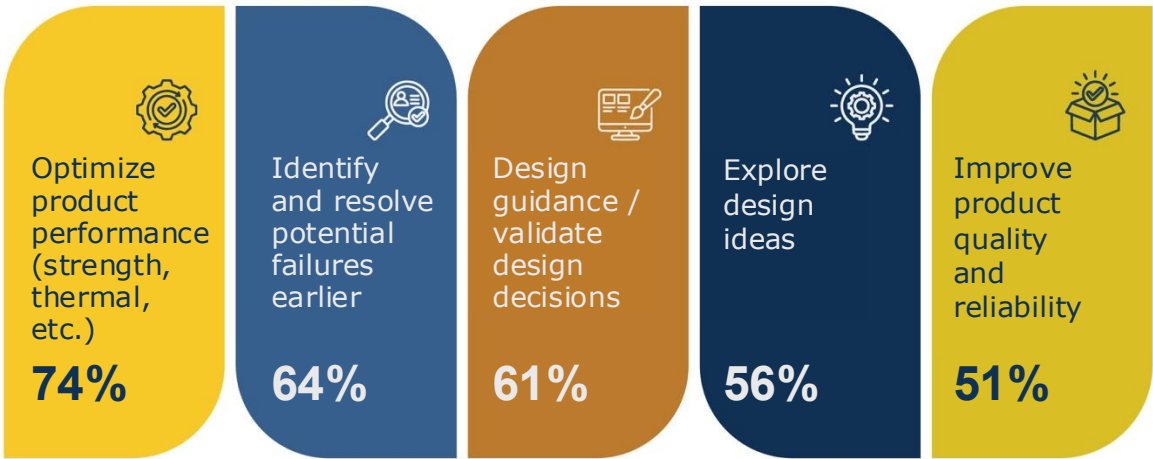
Top Performers use simulation earlier in development and involve a wider range of roles. In addition to dedicated analysts, design engineers, manufacturing engineers, process

engineers, and even industrial designers are leveraging simulation. Further, nearly half of Top Performers start using it during concept design, allowing them to quickly explore more ideas and start detailed design with a more optimized concept.

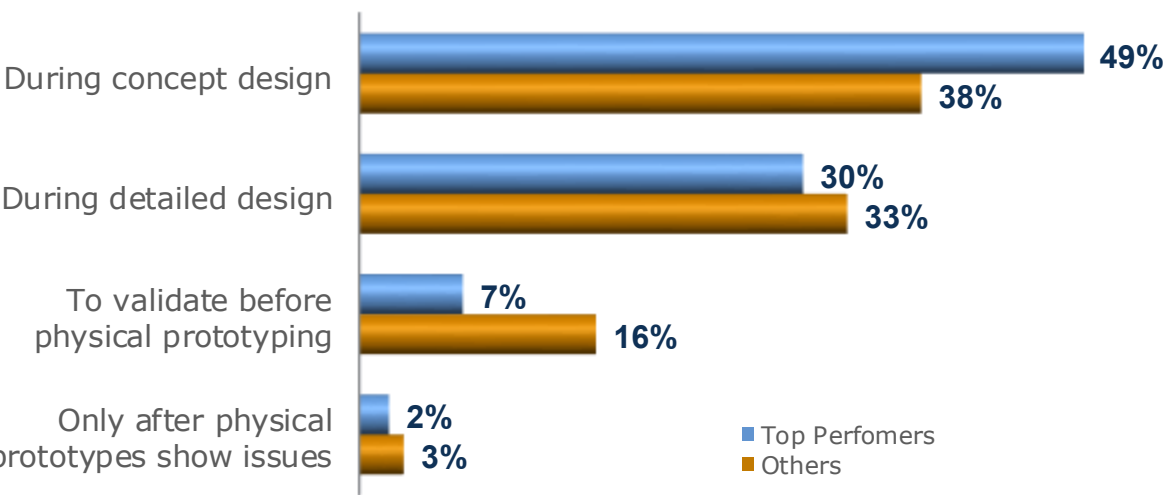
Not Just Validation

Simulation now goes beyond identifying problems late in the process. It's used for optimization, design guidance, and exploration, particularly among Top Performers.

TOP PERFORMER GOALS FOR SIMULATION



HOW EARLY IS SIMULATION USED?



Impact on Prototypes

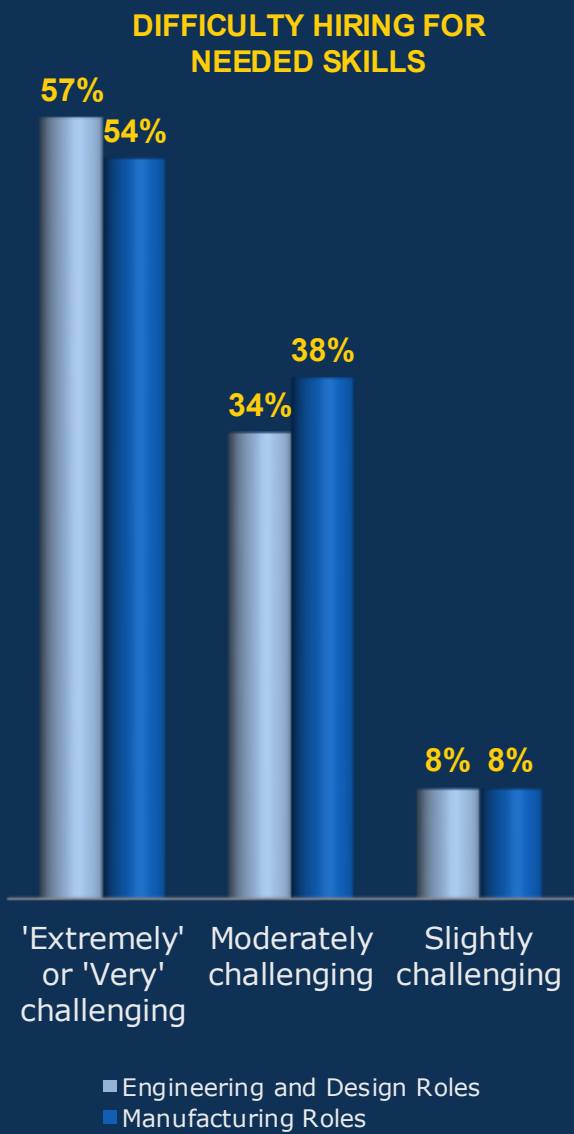
Simulation enables more evaluation in digital environments. An impressive 99% of companies report that it has positively influenced testing by reducing physical prototypes and increasing test efficiency. In fact, 47% use it to guide testing strategies like sensor placement, and 45% say it reduces physical test iterations.

believe they could benefit from greater simulation use. However, adoption barriers hold them back: lack of expertise (reported by 68%), high licensing costs (55%), limited time (47%), tool complexity (42%), and disconnected tools (32%). As vendors work to reduce these obstacles through AI, digital twins, and improved accessibility, simulation usage should continue to expand.

Future Adoption Trends

Simulation adoption should continue to grow as 87% of respondents

5. Addressing Talent Shortages



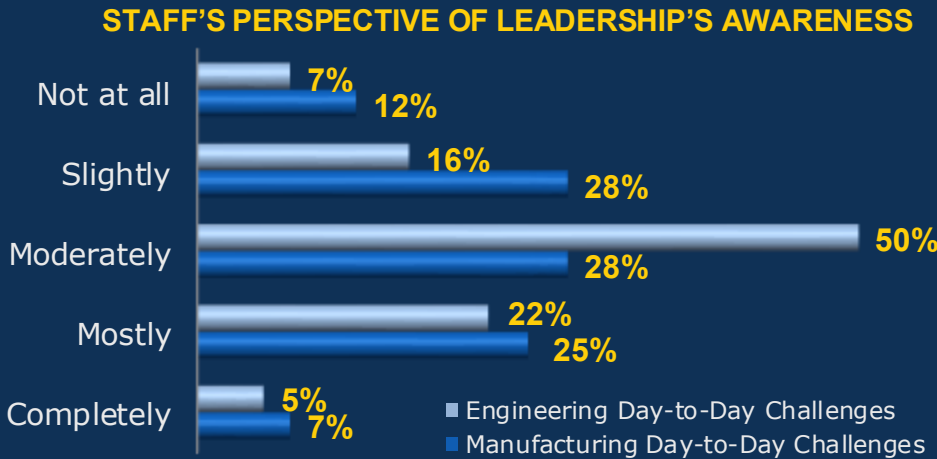
Shrinking Talent Pool

Behind every product is a team, and those teams are under strain. In fact, 92% report difficulty hiring for technical roles, and it is worsening. The wave of baby boomer retirements, accelerated by the COVID pandemic, has created a growing experience gap in both engineering and manufacturing that's hard to fill. The research shows that even when companies find candidates, many lack hands-on experience or an understanding of how products are produced. Some struggle just to find people willing to do the work.

Retention Is Also a Challenge

Retaining talent has become more difficult, especially in a competitive job market where skilled engineers and technicians are in high demand. Competition from other employers is cited by 74% of respondents as a top workforce obstacle. Given the cost of hiring and training, turnover is more disruptive than ever, increasing pressure on current staff. Understanding what motivates employees can help. While all generations value career advancement and meaningful work, differences exist. The research finds:

- Baby boomers and Gen X are motivated by recognition and technical challenges.
- Millennials and younger workers prioritize work-life balance and continuous learning.
- Manual tasks, waiting for approvals, and too many meetings are especially demotivating for younger employees.



The Management Gap

Another concern is the disconnect between leadership and staff. Seventy-three percent of engineers feel management doesn't fully understand their day-to-day challenges. Similarly, manufacturing workers believe leadership underestimates shop floor realities. Conversely, 47% of managers think they completely or mostly understand engineering challenges, while 49% say the same for manufacturing.

This disconnect can hurt morale and productivity. When leadership misjudges what slows down teams, such as manual tasks, re-entering data, and version confusion, it becomes harder to fix the root of the problem.

Getting Ahead Means Closing the Gap

To remain competitive, companies must make better use of their existing workforce. That means automating low-value tasks, improving collaboration, and investing in tools that support, not hinder, engineers and technicians.

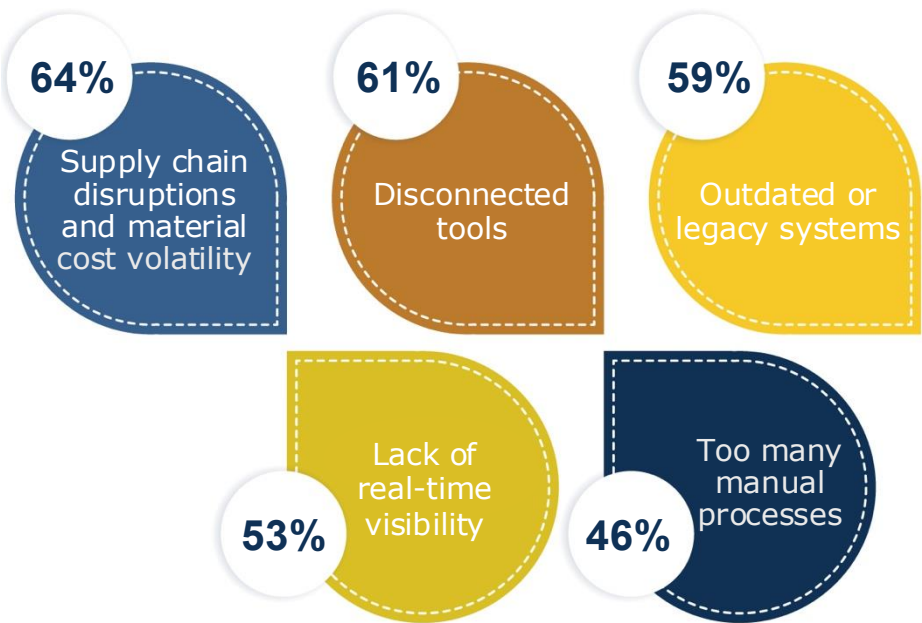
6. Unifying Tools Through Integrated Product Development Platforms

Cost of Standalone Tools

The biggest barriers to improving product development include disconnected tools, outdated systems, lack of visibility, and too many manual processes (see graph below). This makes it extremely difficult to respond to disruptions or make improvements. Outdated systems also frustrate younger employees accustomed to modern technology.

Reinforcing the point, companies report using an average of 5.1 standalone design tools and 6.3 different systems to manage product data and processes. Each tool transition requires data to be translated, re-

BARRIERS TO IMPROVING PRODUCT DEVELOPMENT



entered, or reconciled manually. This adds business cost (see graph on right) due to increased risk, wasted time, and a greater likelihood of errors.

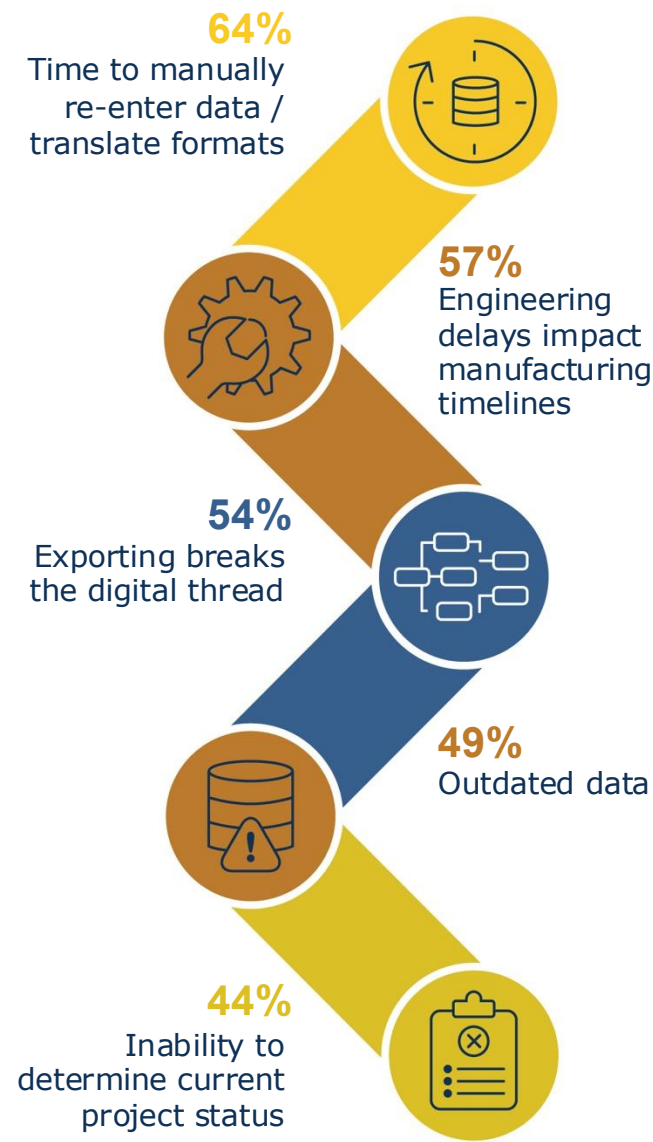
Benefits of Integration

Given the cost of disconnected solutions, Top Performers are 77% more likely than Others to have a more integrated solution. Additionally, 63% have a strategy to reduce the number of tools they use. Overall, companies believe an integrated product development platform offers numerous benefits (see graph below).

EXPECTED BENEFITS OF AN INTEGRATED PLATFORM



HOW MULTIPLE SYSTEMS INCREASE COST



7. Adopting Agile Strategies

Shift Toward Resilience

Top Performers are aligning product development investments with long-term business goals. The top graphic shows the goals driving investment in product development software over the next one to three years. These efforts will help to adapt to complexity, volatility, and rising customer expectations.

Future-Ready Strategies

To meet objectives and address top challenges, Top Performers are embracing these forward-looking strategies:

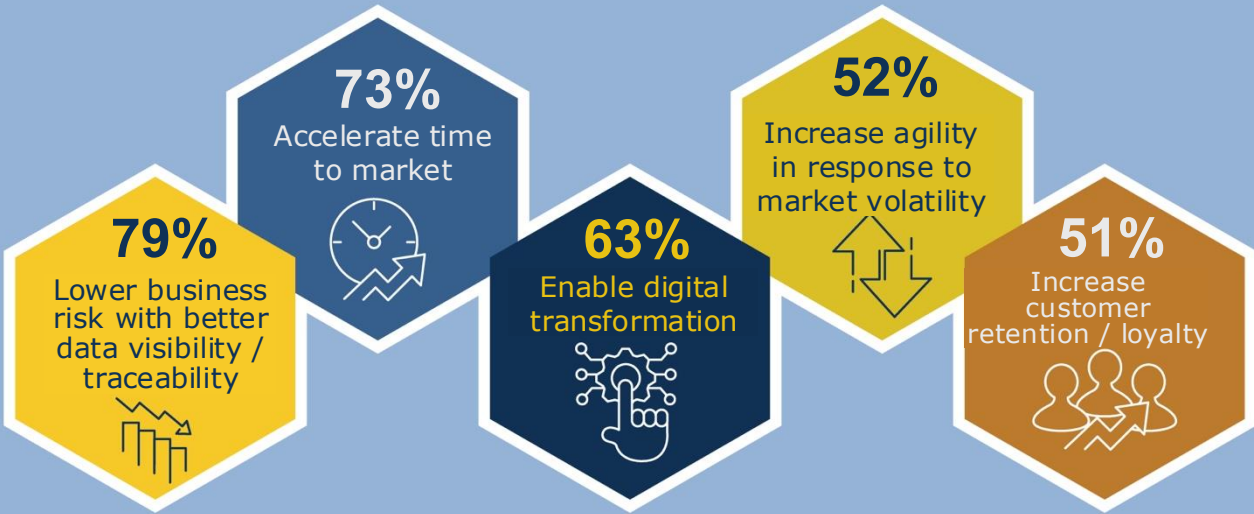
- **73% are aligning engineering and manufacturing**
Shared data and understanding reduce design-to-production friction.
- **65% are investing in integrated platforms**
Transitioning from disconnected tools to unified environments can improve traceability, collaboration, and speed.

- **63% are improving communication and collaboration**
Real-time data access supports better decisions across teams and locations.
- **52% are adopting cloud-based infrastructure**
Cloud tools offer flexibility and real-time access for distributed teams.
- **48% are automating manual and repetitive work**
Automation boosts efficiency and frees engineers for higher-value tasks.
- **46% are expanding simulation use**
Simulation earlier in development optimizes design and reduces prototypes.

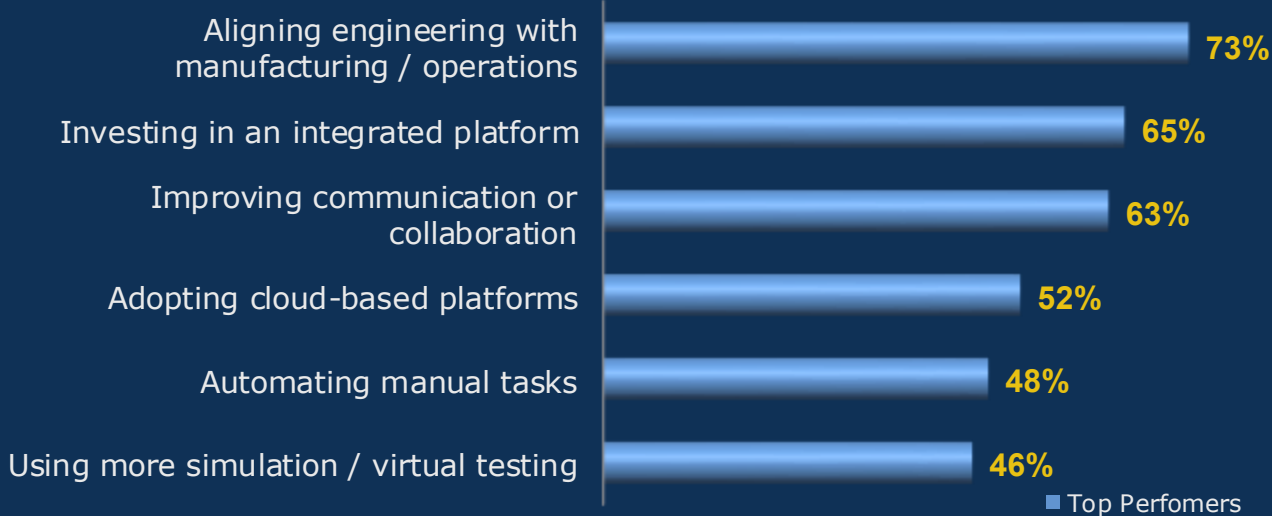
Plan for What's Next

The most successful companies are rethinking how they operate. By prioritizing agility, integration, and digital-first tools, they're preparing for the future and building a competitive advantage now.

TOP PERFORMERS' PRIMARY GOALS DRIVING INVESTMENT IN PRODUCT DEVELOPMENT SOFTWARE OVER THE NEXT 1 TO 3 YEARS



STRATEGY TO ADDRESS TOP PRODUCT DEVELOPMENT CHALLENGES



Recommendations

Recommendations and Next Steps

Based on industry experience and research for this report, Tech-Clarity offers the following recommendations for product development teams:

- **Integrate disconnected tools:** Consolidate design, engineering, and manufacturing systems into a unified platform to reduce errors, rework, and delays. Top Performers are 77% more likely than Others to use a fully or mostly integrated product development solution.
- **Eliminate manual tasks:** Automate repetitive, low-value work to boost productivity and allow engineers to focus on innovation. Overall, 61% of respondents cite manual tasks as the most demotivating part of their job, prompting 48% of Top Performers to implement a strategy to automate manual tasks.
- **Strengthen design-to-manufacturing collaboration:** Align teams with shared, real-time data to improve communication and reduce costly hand-off errors. Sixty-five percent cite miscommunication between design and manufacturing as a top cause of delays, and 73% of Top Performers have strategies to align engineering and manufacturing.
- **Expand simulation usage:** Use simulation earlier and across more roles to cut physical prototyping, identify issues sooner, and improve design quality. Seventy-four percent of Top Performers use simulation to optimize performance.
- **Embrace AI and automation:** Invest in AI tools, especially generative AI, to accelerate ideation, improve accuracy, and reduce manual workflows. Top Performers are nearly twice as likely as Others to use AI during development already.
- **Prepare for workforce shifts:** Make engineering and manufacturing roles more rewarding by reducing frustration with manual tasks, recognizing contributions, and offering growth opportunities tailored to generational preferences. Forty-eight percent say hiring and retaining technical talent is a top challenge, making it critical to keep existing staff motivated.
- **Support supplier collaboration:** Share real-time data with local suppliers to reduce miscommunications, rework, and delays. This will help you adapt to supply chain shifts and nearshoring trends. Respondents say supplier collaboration issues add 30% more time to their development cycles. Avoiding these issues will improve productivity.



65% of companies cite miscommunication between design and manufacturing as a leading source of delays

About the Research

Data Gathering

Tech-Clarity gathered and analyzed responses to a web-based survey from 233 manufacturers. Survey responses were collected by direct email, social media, partners, and online postings by Tech-Clarity.

Industries

The respondents represent a broad cross-section of industries. 22% were from Industrial Equipment, 18% High-Tech, 16% Automotive, 15% Aerospace & Defense, 13% Life Sciences, 13% Consumer Products, and others.*

Company Size

The respondents represent a mix of company sizes, including 16% from less than \$50 million, 13% between \$50 million to \$100 million, 14% between \$101 million to \$250 million, 19% \$251 million to \$1 billion, 21% \$1.1 billion to \$5 billion, and 16% greater than \$5 billion. 1% did not disclose their company size. Company sizes were reported in US dollar equivalent.

Geographies

Responding companies report managing projects in North

America (75%), Western Europe (66%), Asia (49%), Latin America (17%), Australia (16%), Eastern Europe (16%), Middle East (9%), and Africa (6%).*

Title

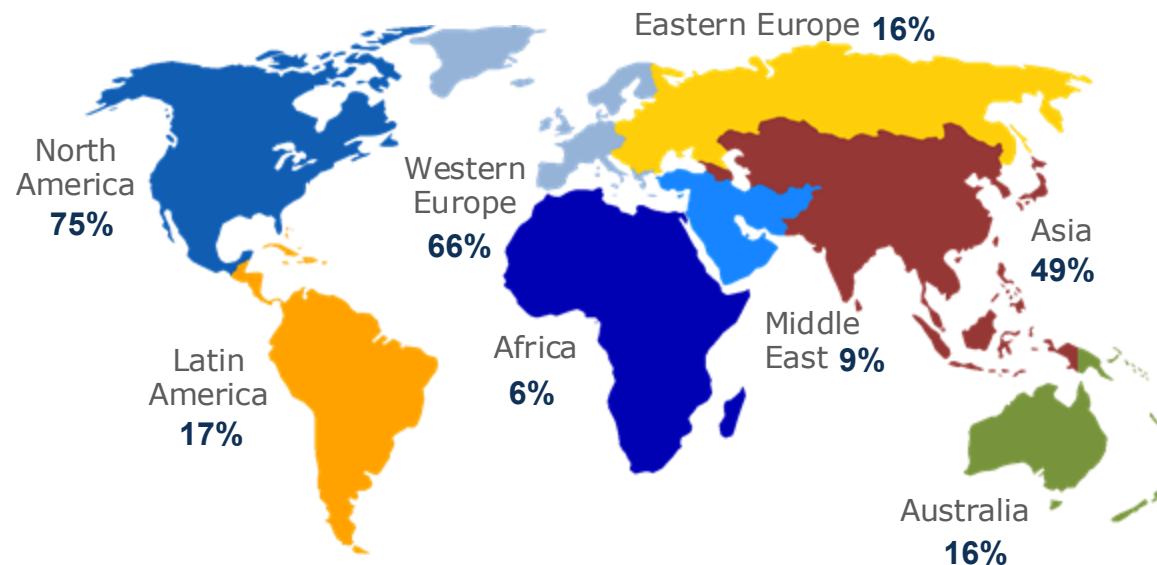
The respondents comprised of 18% Executive and VP level, 23% Directors, 18% Managers, 15% Supervisor / Team Leader, and 26% individual contributors.

Organizational Function

Of the respondents, 35% Product Design/Engineering roles, 17%

Manufacturing, 11% Manufacturing Engineering, 10% Industrial Design, and a variety of other roles including General Management, IT, and more.

* Note that the values may total greater than 100% because companies reported doing business in multiple industries and geographies.



Acknowledgements



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About the Author

Michelle Boucher is the Vice President of Research for Engineering Software for Tech-Clarity. Michelle has spent over 20 years in various roles in engineering, marketing, management, and as an analyst.

Michelle graduated magna cum laude with an MBA from Babson College and earned a BS in Mechanical Engineering, with distinction, from Worcester Polytechnic Institute. She is an experienced researcher and author, having benchmarked over 7000 product development professionals and published over 90 reports on product development best practices.

Tech-Clarity is an independent research firm dedicated to making the business value of technology clear. We analyze how companies improve innovation, product development, design, engineering, manufacturing, and service performance through the use of digital transformation, best practices, software technology, industrial automation, and IT services.



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1. Fraser, Julie. "Making Manufacturing Analytics and AI Matter." Tech-Clarity, 2025.

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