Manufacturing and Automotive

Your quick-start guide to generative AI

Google Cloud

Boost your end-to-end value chain with gen AI.

$65-110B

Economic potential of gen AI in the manufacturing industry (North America)[1]

Manufacturers are facing challenges from a variety of sources. Both B2B and B2C customers increasingly expect new products and experiences delivered faster than ever before. And organizations themselves face intense global competition and operational cost pressures across the value chain.

Not only does gen AI help tackle the rising demands of B2C for manufacturers, it improves your operational efficiency end-to-end across your value chain.

There's more. Gen AI also helps manufacturing companies bust through bottlenecks in R&D, leading to faster time to market and more innovation.

There are a number of gen AI "quick wins" that manufacturing companies can deploy to streamline existing operations. Other gen AI applications are transformational and require longer lead time; these two categories of applications can be deployed in parallel.

In this guide, we explore the most promising use cases of gen AI for the manufacturing and automotive industry and share key considerations for starting your journey with gen AI.

1. McKinsey. (2023). The economic potential of generative AI: The next productivity frontier.

Consider these strategies to realize value from gen AI in your organization.

1. Embrace new product frontiers and advancements in R&D
2. Create efficient and resilient operations
3. Enrich customer interactions and experiences
4. Intensify focus on sustainability

Ready to go?

01 Embrace new product frontiers and advancements in R&D.

Manufacturing companies are grappling with numerous challenges in R&D and product development. If left unchecked, these roadblocks hinder innovation and delay time-to-market.

By modernizing idea generation, design optimization, and people management, manufacturers can address many of these common bottlenecks.

Integrating gen AI into your organization's R&D process can boost productivity and improve product quality.

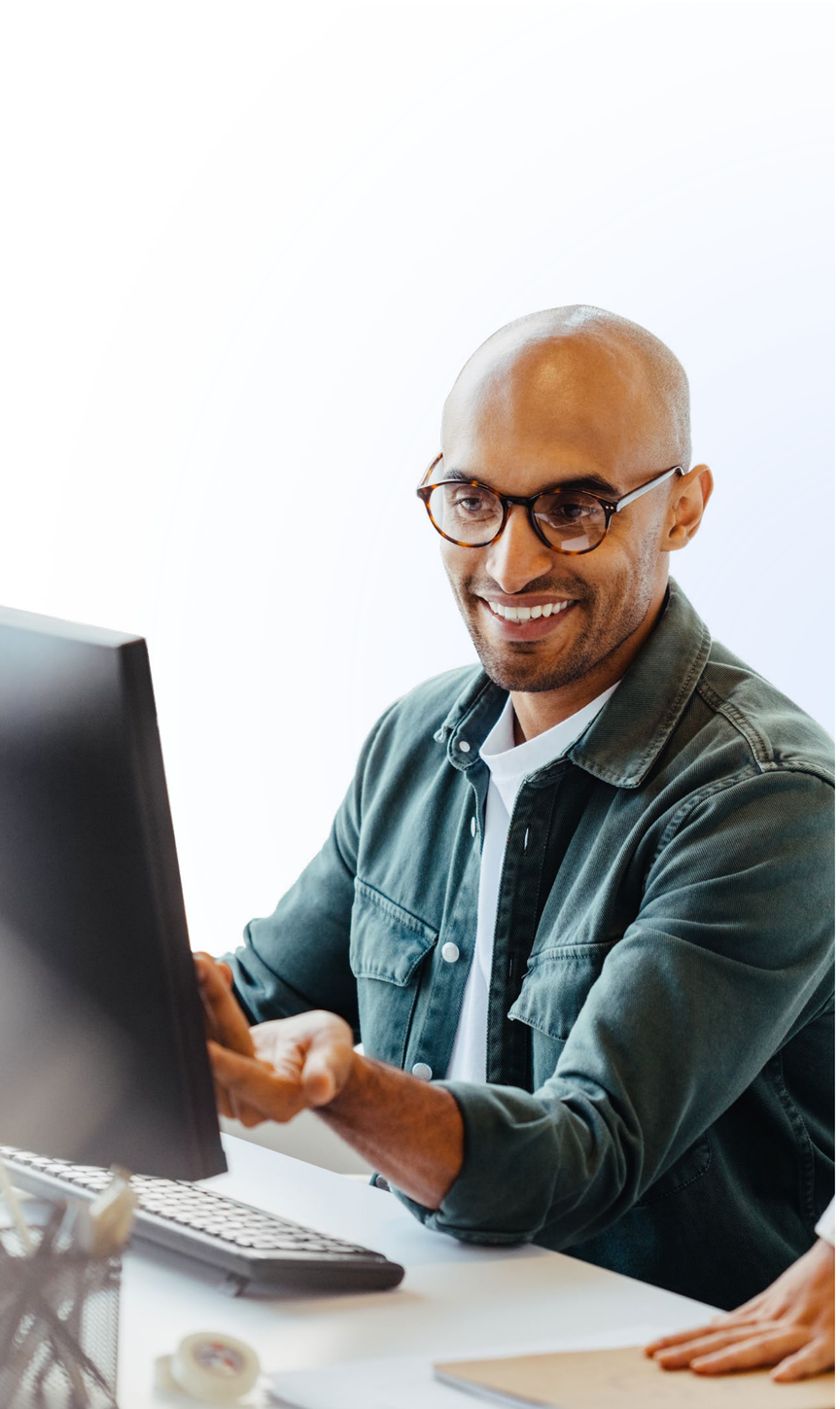
Upstream of development, gen AI can boost creativity and innovation in software design. Downstream, it can save time via automation of user training, support document generation, and multilingual translation.

Key issues:

- Idea generation and exploration
- Design optimization
- People management
- Knowledge management

Gen AI can reduce software development costs by increasing speed and efficiency in:

- Creating product definition artifacts
- Code generation and testing
- Bug detection and prevention
- Code and test documentation



20-45%

direct impact of AI on the productivity of software engineering of current annual spending on the function[1]

10-15%

reduction in R&D costs[1]

40-50%

reduction in code documentation time with generative AI compared to without generative AI[2]

2. McKinsey. (2023). Unleashing developer productivity with generative AI.

Getting started
R&D

Prioritize quick wins while charting out a long-term plan.

Short-term gains can compound to pay off substantially in the future, too. By identifying and trialing pilots on easy-to-implement tasks, your organization can maximize the value of gen AI.

Key use cases

- R&D document search and synthesis
- Developer productivity
- Conversational R&D data exploration
- Product/vehicle design companion

Here are a few areas your organization can explore right away:

- **Design development and selection**
  Gen AI helps designers generate and select designs more efficiently and optimize those designs for manufacturing.
- **Product development**
  Enterprises are using gen AI to optimize CAD models as well as to automatically generate CAD drawings.
- **Application development**
  By speeding up code time-to-production, organizations can improve efficiency and free up employees for more complex tasks.

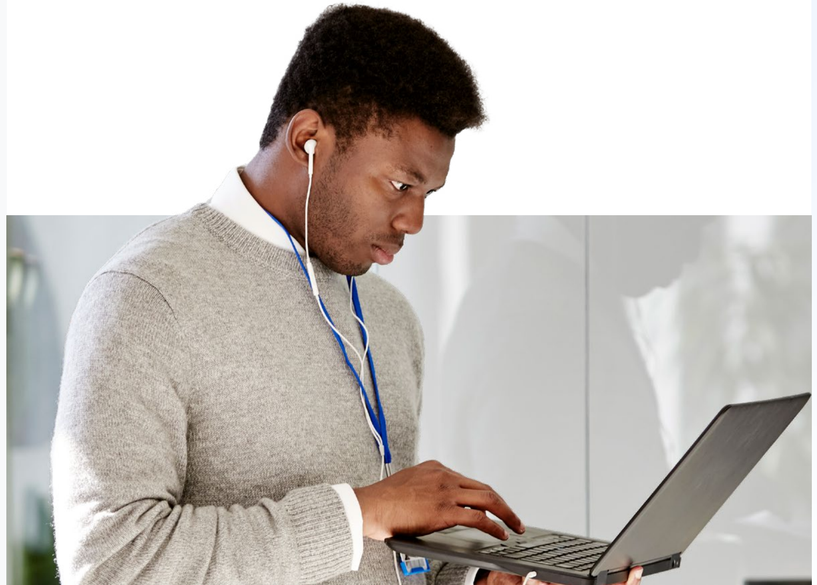
Unlock disparate data sources.

For simpler use cases, digitize and collate existing data to get started with gen AI. Most manufacturing companies have data across disparate databases, such as PLM systems, production systems, CAD tools, and more. Aggregating all this data into a common repository is key.

To tackle more complex gen AI use cases, begin to plan out a robust data infrastructure that aggregates, normalizes, cleans, and processes data.

Take a proactive approach to data security.

Your company data is a key competitive advantage, so it's important to tackle data privacy and security issues.[2] Ensure that your employees are well trained, which helps prevent IP and data leakage.



Empower your employees.

Your people are your most valuable asset, so invest in them to make the most of gen AI technology.

Building a culture focused on responsible use of gen AI begins with creating effective communications around role responsibilities with your employees.

Recipe for AI success

GE Appliances' SmartHQ consumer app will use Google Cloud's generative AI platform, Vertex AI, to offer users the ability to generate custom recipes based on the food in their kitchen with its new feature called Flavorly™ AI. SmartHQ Assistant, a conversational AI interface, will also use Google Cloud's generative AI to answer questions about the use and care of connected appliances in the home.

Read the full story

02 Create efficient and resilient operations.

Many mature manufacturing organizations today are seeking to automate and streamline end-to-end manufacturing processes — from sourcing, planning, and manufacturing, through to delivery. Especially in capital-intensive manufacturing, existing challenges can interfere with efficiency, quality, and worker safety.

Gen AI can help you improve workflow efficiency, reduce equipment downtime, and identify quality issues more quickly. All these improvements lead to a reduction in cost and waste, better safety measures, and enhanced feedback into product development.

93%

of supply-chain leaders are planning to increase resilience[3]

44%

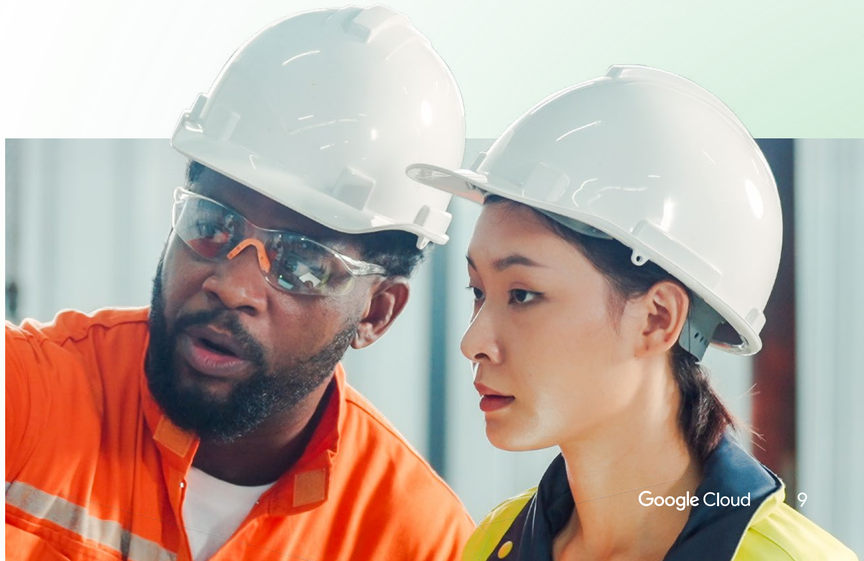
of supply chain leaders would increase resilience even at the expense of short-term savings[3]

~5-10%

increase in earnings before interest and taxes (EBIT) through a fully scaled, cloud-enabled digital-and-analytics effort at a typical industrial organization[4]

$6-10 billion

Estimated impact of gen AI back office improvements (North America)[5]



3. McKinsey. (2020). Reimagining industrial supply chains.
4. McKinsey. (2021). The CEO agenda for companies in advanced industries.
5. McKinsey. (2023). The economic potential of generative AI: The next productivity frontier.

Getting started
Efficient operations

Roll out gen AI in stages.

Identify the right implementation for your organization's needs. One easy way to get started is with off-the-shelf models to tackle pre-built cases requiring only data inputs. Following that, organizations can integrate gen AI with advanced analytics to provide more detailed insights. Lastly, the most advanced implementations involve building and custom training AI models on massive, proprietary data sets to generate recommendations and content that are tailored to your organization's needs and requirements.

Design your data strategy.

Most manufacturing companies have both structured data (e.g. in ERP software, MES systems, supply chain systems, quality management software) and unstructured data (e.g. in operating procedures manuals and troubleshooting manuals) — and both can be harnessed by gen AI applications. These data types are often previously untapped and can provide useful insights to your organization. Collaborate with your IT team to design a data unification strategy as you begin implementing gen AI in your organization.

Empower your back-end teams with gen AI.

Consider building a dedicated team to accelerate gen AI adoption — including an "action office" to oversee gen AI initiatives, cross-functional pods to implement specific gen AI use cases, and a technical foundation team to ensure a stable and secure platform.

From there, clearly communicate the company's gen AI strategy and engage in ongoing conversation and upskilling.

Getting started
Efficient operations

Balance the risk-reward trade-off.

All new technologies come with inherent risks. It's important to understand and assess the severity of risks associated with gen AI. These include concerns related to the use of proprietary data, bias that impacts hiring decisions, and model hallucinations.

Assessing these potential harms means building the right risk infrastructure — incorporating cross-functional perspectives to ensure robust AI governance.

Establish best practice controls and guardrails, and consider using technical approaches to proactively flag and filter outputs that violate policies. Seek input from communities early in the development process to develop an understanding of societal contexts. And finally, test early gen AI outputs with a variety of audiences, continuing to test and adjust regularly.

Adversarial security testing, also known as "red teaming", is a stress-test approach to internally identify vulnerabilities to attacks. Google uses these "ethical hacks" to test its AI systems and support its new Secure AI Framework.

Key use cases

- Document AI for procurement
- Product/machine document search and synthesis
- AI-driven quality control and inspection
- Conversational shop floor management

Enhance trust and security.

Remain compliant with regulations and help preserve customer trust by embedding security and data privacy requirements across tools — gen AI tools can help accelerate threat detection.

Tackle high-impact interventions for short and long-term gains.

Gen AI helps provide opportunities for quick wins across a range of roles. Begin by implementing select pilots — focusing on areas that will yield the biggest impact — and continue to iterate for organization-wide benefits.

Here are a few areas to consider when getting started:

Frontline workers
Leverage gen AI assistants to seek support in tasks such as changeovers, machine calibration, and real-time query resolution.

Frontline supervisors
Use gen AI to provide transparency in your production schedule and insights into product quality.

Corporate employees
Power diverse stakeholders to achieve efficiency in their operations – including procurement, logistics, pricing, and spend management teams.

Enterprise
Upgrade internal operations such as employee training and more robust safety measures on the shop floor.

03 Enrich customer interactions and experiences.

Manufacturers face unique challenges in delivering positive customer experiences. The primary challenges revolve around predicting OTIF (on time in-full) metrics, which are often based on a variety of variables that are difficult to have full visibility into. Getting this right can enhance the overall consumer experience.

Today, with the rise of online marketplaces, direct-to-consumer (DTC) platforms, and changing consumer preferences, a lot of companies are leveraging technology to explore direct selling routes to customers.

Gen AI can help manufacturing companies create new opportunities through direct sales channels. Even manufacturers that have limited DTC experience can leverage gen AI to build a highly personalized relationship with end customers at scale.

44%

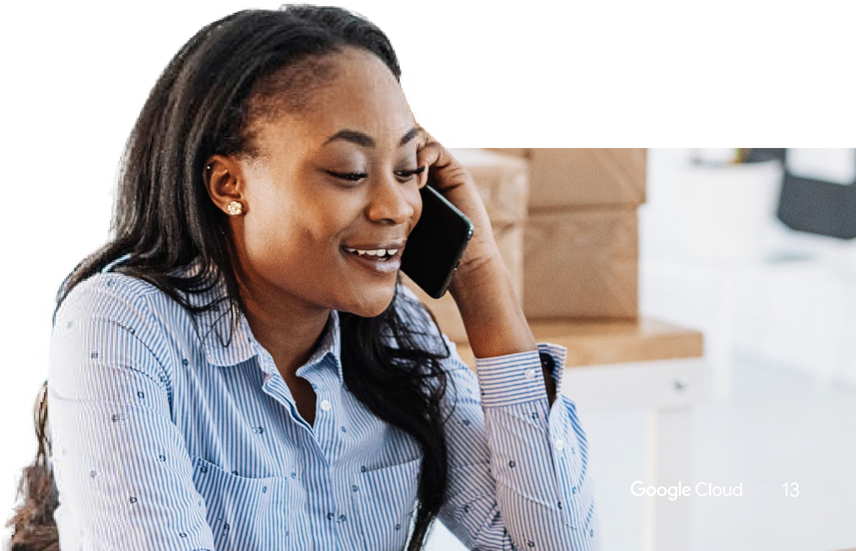
of consumers say they value a personal connection when buying[6]

50%

of consumers say they would start their car buying journey with a “configurator” to customize their purchases[7]

35%

of respondents from B2B companies say B2B e-commerce is the most effective sales channel[8]



6. McKinsey. (2023). Electric-vehicle buyers demand new experiences.
7. EY. (2022). How electric vehicles are reshaping the car buying journey.
8. McKinsey. (2023). The multiplier effect: How B2B winners grow.

Getting started
Customer experiences

Ensure data and infrastructure readiness.

AI models rely on high-quality and relevant data, such as customer data, product information, sales funnel data, and marketing campaign performance data.

Consider the status of your existing IT infrastructure and whether it can accommodate AI integrations. You may need additional computing power, data storage, or specialized software to support your chosen gen AI models.

Educate employees for an evolving ecosystem.

Coaching around prompt generation, when to leverage AI tools, and how to use them safely in customer-facing environments will be critical to effective deployment of gen AI.

And then, reskill employees as job roles transform. For example, customer service agents may need to act as a 'human-in-the-loop' — providing expert guidance on complex cases, preventing bias, and keeping interactions real.

Key use cases

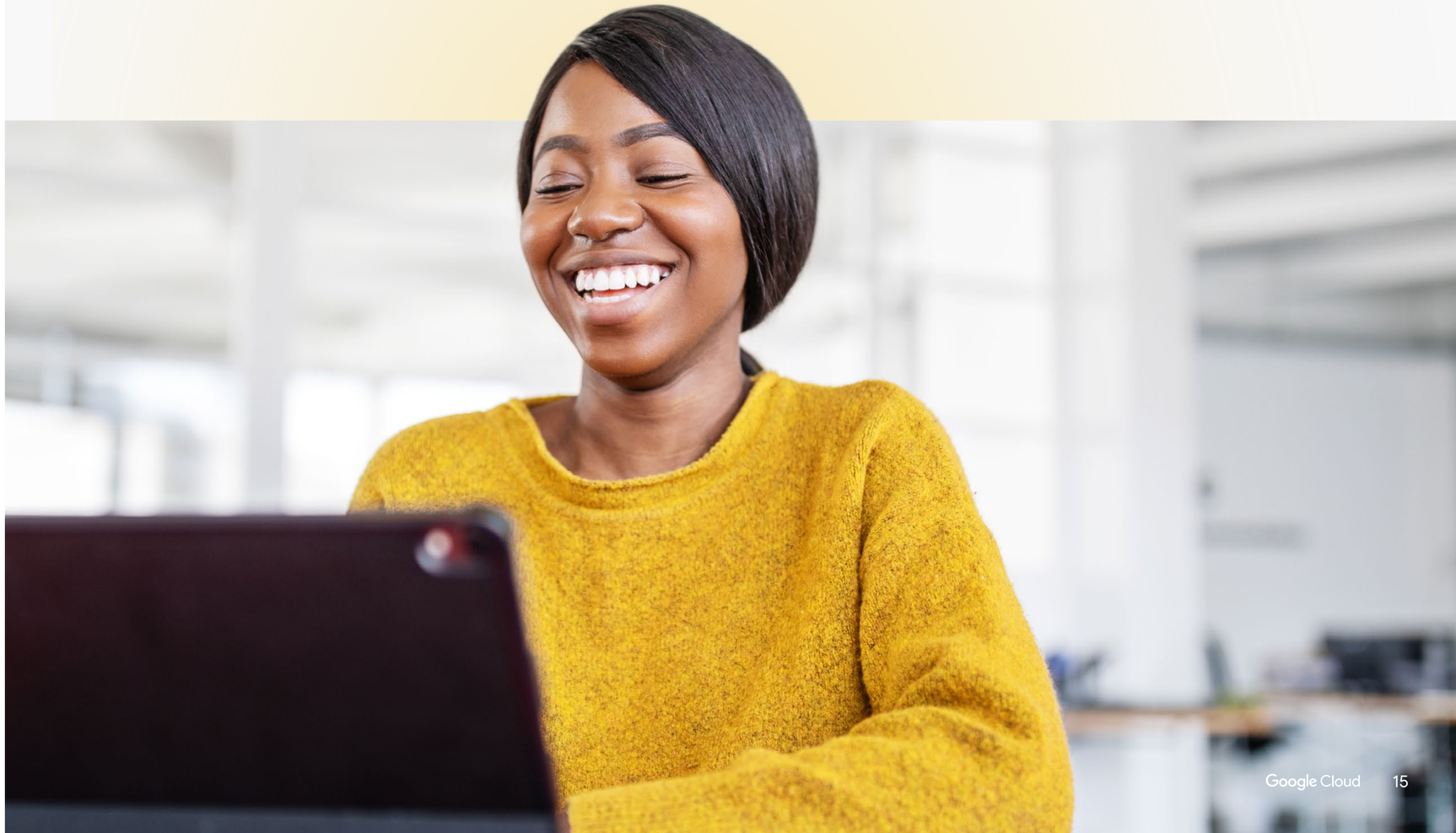
- Customer service modernization
- Product/content discovery
- Marketing campaign creative assistance
- Conversational commerce
- In-vehicle cloud custom assistant

Prioritize customer needs for quick wins and long-term gains.

Catering to your customers' expectations delivers sales today, and continues to pay off year over year. Leading manufacturers use gen AI to help support customer acquisition and servicing.

In B2B sales, gen AI can help streamline the sales process by customizing product proposals. In B2C sales, enterprises are using gen AI for personalized product recommendations — improving conversion and satisfaction.

In customer servicing, gen AI helps enable proactive customer care, such as tailored troubleshooting responses or intelligent chatbots.



General Motors partnered with Google Cloud to provide customers an OnStar Interactive Virtual Assistant (IVA) which responds to customer inquiries and solves issues for customers in a human-like manner, creating a positive customer experience while providing agents more time assisting customers requiring human intervention.

Read the full story

Generative AI has the potential to revolutionize the buying, ownership, and interaction experience inside the vehicle and beyond, enabling more opportunities to deliver new features and services.

Executive Vice President,
Software and Services, General Motors

04 Intensify focus on sustainability.

Energy consumption, waste generation and management, and navigating evolving environmental regulations have made sustainability paramount for manufacturing companies. Particularly since adhering to sustainability practices helps ensure your competitiveness in the global marketplace.

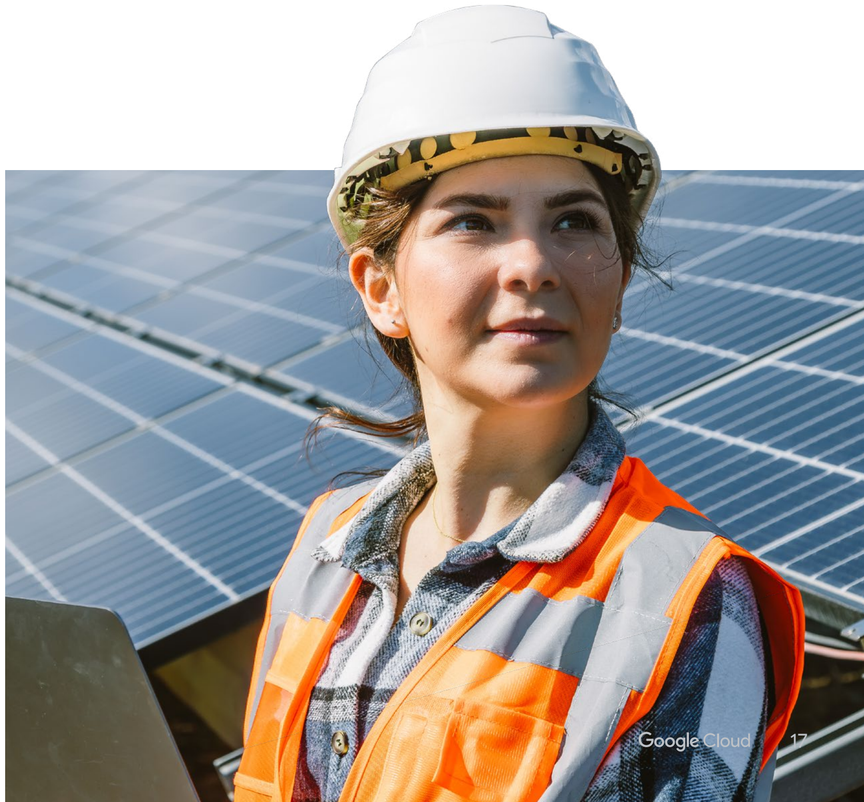
Gen AI can help your sustainability initiatives make an impact — touching sourcing, energy consumption, operational efficiency, and overall ESG reporting.

88%

of manufacturers believe that technology is critical in the transition to sustainability[9]

75%

of organizations have made clear sustainable-packaging commitments[10]



9. Deloitte. (2022). Energy Transition Trends Report.
10. McKinsey. (2022). Sustainability in packaging: Five key levers for significant impact.

Getting started
Sustainability

Embed sustainability as a core value.

Sustainable practices drive productivity and accelerate innovation, while also helping your organization comply with regulations. Creating a company-wide commitment while instilling the same ethos among employees is key.

Be sure to align your AI objectives with broader sustainability goals and ensure continuous improvement in your practices.

Embrace sustainability benefits.

Implementing gen AI-powered sustainability solutions can help your company prepare for stricter ESG standards in the future.

Gen AI can provide enhanced decision-making and data-driven insights to power strategic sustainability initiatives. Foster cross-collaboration across your organization to enable the requisite exchange of data.

Collaborate with ecosystem stakeholders.

Partner with external experts, research institutions, and other industry players to share knowledge and best practices.

Key use cases

- Sustainable sourcing
- Energy consumption optimization
- ESG reporting
- Fleet routing optimization

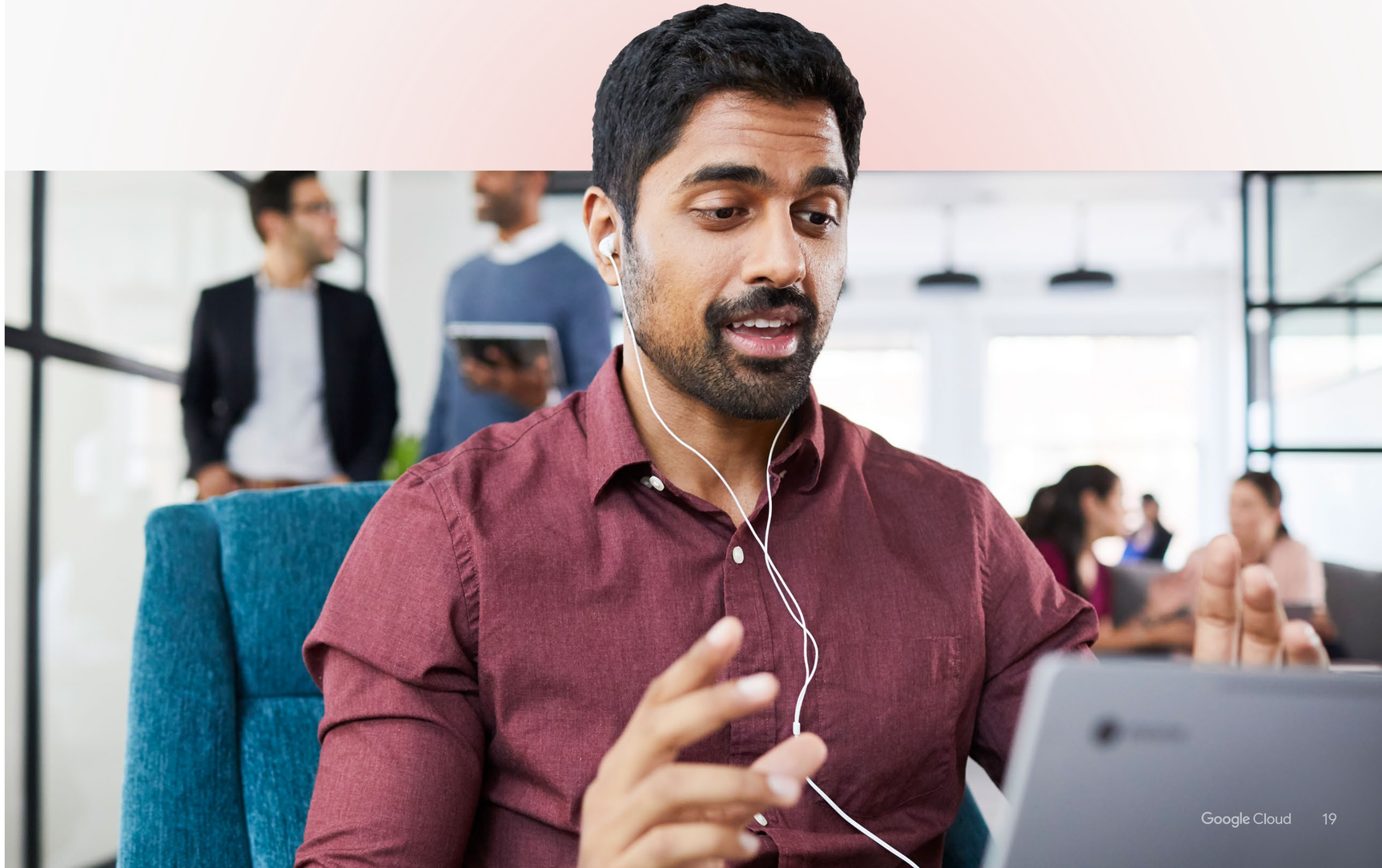
Balance quick wins and long-term gains.

Understanding the potential impact of gen AI on your sustainability strategy is key.

To get started, evaluate the environmental benefits of gen AI implementation compared to the initial investment and ongoing maintenance.

Grab the opportunity for quick wins, such as using data-driven insights to cut energy costs or make production more efficient.

As you foster cross-collaboration across your organization, begin to establish a clear view on the impact potential for gen AI. This information will help stakeholders make sustainability a North Star metric.



Get started with gen AI for manufacturing.

We've covered a number of considerations for adopting gen AI in your organization. Here are some key steps that you can prioritize, today:

Align on vision and commitment from the leadership team. By prioritizing key domains, based on impact and transformation feasibility as well as business and P&L implications.

Assess foundational capabilities for gen AI to make sure you have the right people, technology, and models in place.

Create a roadmap by identifying pilot use cases in prioritized domains and planning for scaled use cases.

Plan for company-wide adoption ensuring skill building and responsible AI practices are at the core.

Time to take action with gen AI?

When a new technology moves as fast as gen AI, it can be hard to keep up. Google Cloud can help you solve for all the considerations outlined in this guide.

Our gen AI tools are backed with frameworks, tools, and governance structures to help you hit the ground running.

→ Contact us to set up time to discuss how to get started on your gen AI journey.

Google Cloud