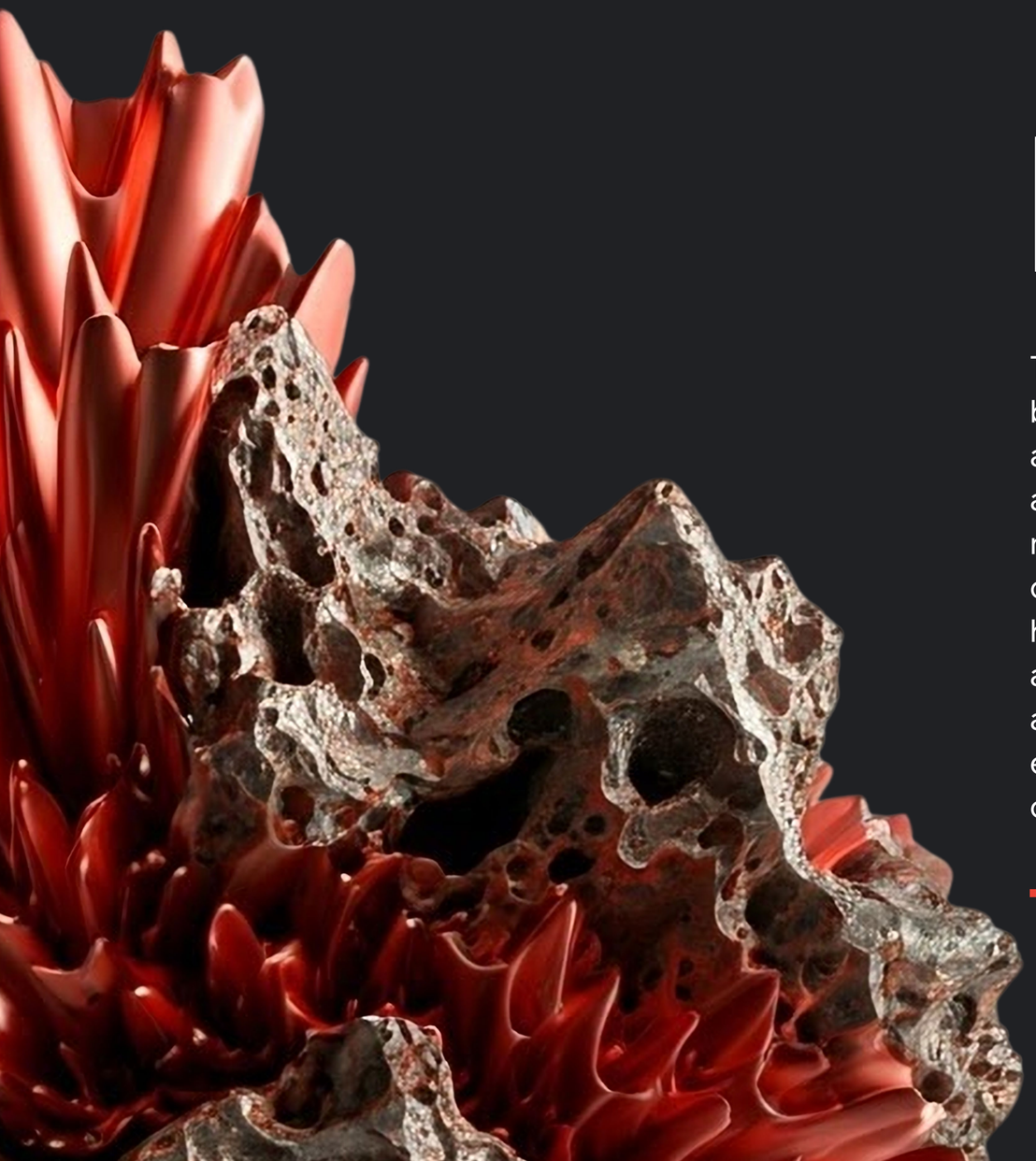
Google Cloud

The agentic era: Reshaping the future of business

Manufacturing



Introduction

The manufacturing landscape is undergoing a seismic shift, driven by the rise of intelligent agents. We're entering what can be described as the agentic era, a time where multi-modal AI-powered assistants are not just automating tasks, but fundamentally reshaping how manufacturers operate, innovate, optimize production, and manage complex supply chains. These increasingly sophisticated agents can help understand complex operational data, production processes, and supply chain dynamics. They can also anticipate needs and take action on your behalf—all while under your supervision. This ebook explores how manufacturing organizations can harness the power of agents to thrive in this new reality.

Innovate or fall behind: The relentless pressure in manufacturing

Fragmented technology systems have been a problem for decades.

There is a long-standing problem of fragmented technology systems within businesses. Today, you have a lot of technology that works amazingly, but achieving seamless integration to unlock its full potential is often difficult.

Current trends are putting pressure on the manufacturing industry to adopt even more technologies faster.

Businesses are facing unprecedented pressure to adapt and innovate at overwhelming speed. It's not just about keeping up; it's about staying competitive and relevant in a rapidly evolving landscape.

A surge of cutting-edge technologies adds new complexity.

We are seeing an explosion of incredible new technologies—things like large language models (LLMs), intelligent agents, generative AI, automated workflows, and enterprise-wide search tools. Each of these holds immense promise. However, this rapid innovation, while exciting, also introduces a new wave of complexity.

Organizations are asking:

- How do we make sense of all these new tools?
- How do they fit together within our existing infrastructure?
- And most importantly, how can we actually use them effectively to solve real business problems and drive value?

The core challenge isn't merely understanding these technologies in isolation. It's about harnessing their collective power to achieve tangible outcomes.

Organizations need to be able to:

- **Access information quickly:** Getting the right information to the right person (employee or customer) at the right time is crucial. How can these new AI-driven tools sift through vast amounts of data—structured and unstructured—to surface what's relevant, instantly?
- **Connect data sources:** Most businesses have data scattered across various systems, silos, and formats. Real power comes from connecting these disparate sources. How can LLMs and agents help bridge these gaps and create a unified view of the data landscape?
- **Take action:** Insights are only valuable if they lead to action. How can organizations embed these technologies into workflows to not just analyze or predict, but to actively assist in decision-making, automate tasks, and drive outcomes?

This is where Google Cloud comes in. We understand that navigating this new, complex technological landscape can be daunting. Our goal is to abstract away much of this underlying complexity. One successful way organizations are seeing success is to apply a clear approach—a way to systematically harness AI to find critical information, understand its implications, and empower decisive action.

Unlocking the agentic era: Find, understand, act

As organizations navigate the agentic era, they need a seamless way to find, understand, and act on their data.

Find

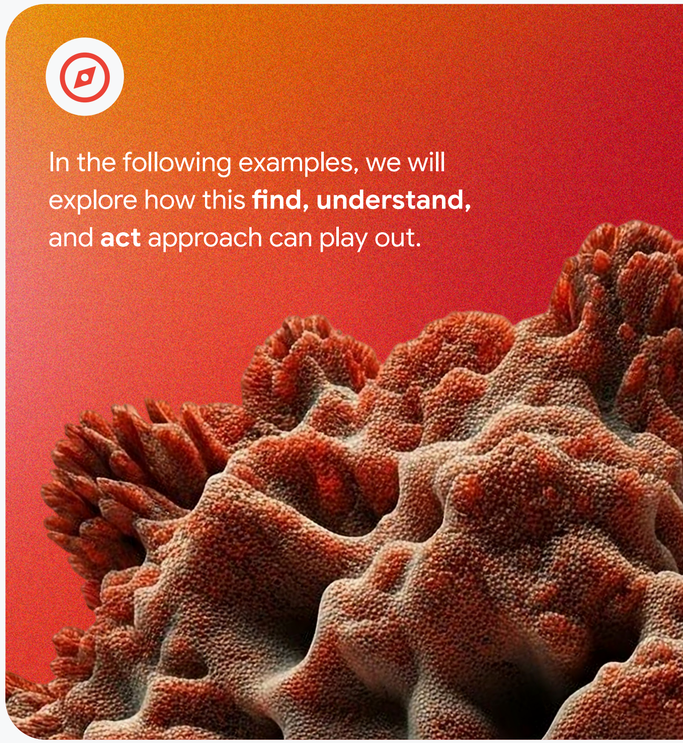
Finding relevant, useful, and personalized information can be a huge challenge, particularly as organizations amass more data, in many different formats, and across many disparate systems. Time wasted searching for insights and information can be a huge drag on productivity. Alongside this, search behaviors are changing, incorporating multiple modalities such as text, images, audio, and video. Query understanding is becoming increasingly complex. Being able to quickly find information and take action is a key enabler for the agentic era and provides the foundation for downstream agentic tasks. Imagine a workforce empowered to instantly find exactly what they need, when it is needed, enabling action to unlock value and drive innovation.

Understand

Simply finding information is no longer enough. The real advantage comes from the ability to rapidly understand complex sources—encompassing both structured and unstructured data—and harvest key insights. Envision the ability to rapidly summarize information, transforming raw data into clear, concise insights, and enabling faster and better informed decisions.

Act

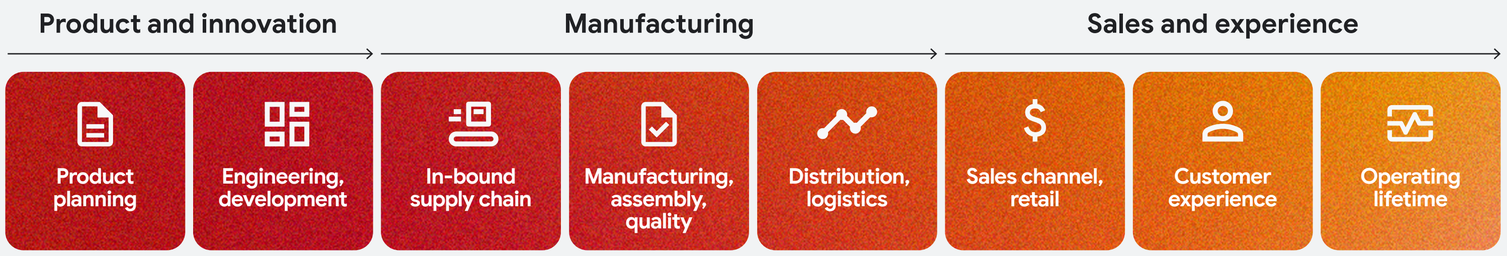
The final step is to translate insights into tangible action. In the agentic era, businesses need AI to take action, helping employees turn information into workflow-driven tasks. The business can then move forward with speed.



Agents in action: Transforming key functions in manufacturing

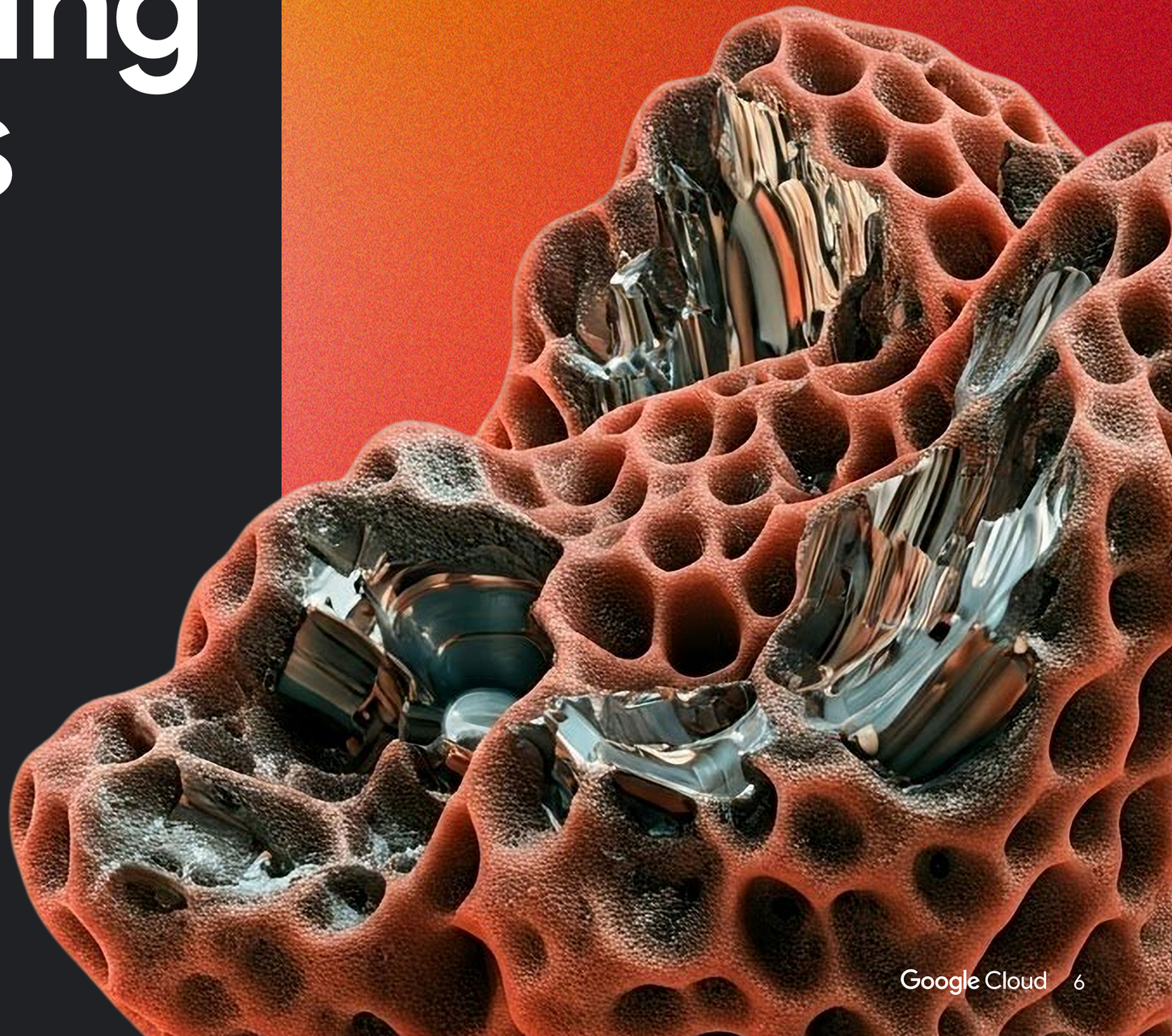
Let's explore how AI agents can help transform specific functions within manufacturing organizations, particularly in areas like accelerating product design and development, and enabling proactive factory asset optimization. By seamlessly integrating into existing workflows and providing intelligent automation, agents can help empower teams across these areas to achieve new levels of efficiency, insight, and impact.

These common applications are designed to inspire your thinking and illustrate how the agentic era may influence your business, while encouraging you to consider the unique opportunities within your own organization.



Manufacturing applications

01. Product and innovation
02. Manufacturing and supply chain
03. Sales and experience



Manufacturing | Application 01

Product and innovation

Streamlining the process from concept to production

Intelligent automation can assist manufacturing teams in their efforts to help streamline the product design process from concept through to production. By bringing together capabilities like searching sales and social data for design insights, checking compliance requirements, simulating performance, and analyzing for manufacturability, AI agents can help create conceptual designs, identify potential challenges, and evaluate material options. Integrating intelligent automation offers potential improvements by assisting with the development of Bill of Materials (BOMs) and computer-aided design (CAD) models, optimizing designs, and preparing release documentation, aiming to accelerate time-to-market and improve product design outcomes.

Search

- Search sales, images, and social data for product design insights
- Check compliance with standards and regulations

Simulate

- Create AI-generated conceptual designs and choose high-growth potential models
- Simulate performance, explore materials, analyze for manufacturability, and identify challenges

Develop

- Develop BOM and list of CAD models, and optimize design by reducing weight
- Develop release documents, send for prototyping, and initiate manufacturing process

Reasoning: Agents can help perform gap analysis to recommend new product ideas, perform spatial analysis to recommend features (for example weight reduction opportunities), and help validate compliance with industry regulations.

Manufacturing | Application 02

Manufacturing and supply chain

Rapidly diagnosing industrial asset performance issues

Intelligent automation can assist maintenance and operations teams in their efforts to help rapidly diagnose industrial asset performance issues and minimize downtime. Tools that support scanning model/serial numbers, performing diagnostics based on time series data, and collecting audio samples may help agents analyze sensor data to identify potential problems and examine multiple variables to pinpoint specific malfunctions. AI agents can help offer the ability to reason proactively to assist with suggesting potential solutions, displaying relevant repair manual details, and creating work orders with special instructions for technicians, aiming to accelerate repairs and improve overall equipment effectiveness (OEE).

Scan

- Scan model and serial number, and perform diagnostics based on time series data collected
- Start motor in test mode and submit audio sample for testing

Analyze

- Analyze time series data to identify potential motor problem
- Examine sound along with other set variables to identify specific motor malfunctions

Suggest

- Suggest multiple possible solutions to malfunction and display relevant repair manual details
- Create a work order with special instructions, then email order to technician

Video ingestion/multimodality: Agents can help to ingest voice, noise, and vibration inputs to assess equipment health.

Manufacturing | Application 03

Sales and experience

Elevating customer engagement and streamlining sales processes

Intelligent automation can assist sales and customer-facing teams in their efforts to help elevate customer engagement and streamline sales processes.
By integrating with CRM systems, product databases, and market intelligence, AI agents can help identify and qualify leads more effectively, understand customer needs with greater precision, and configure complex product solutions. They can also help with automating the generation of customized quotes, tracking order statuses, and providing customers with instant access to technical information or support. For aftermarket services, AI agents can help proactively identify opportunities for maintenance, spare parts, or upgrades based on equipment usage data and customer history, aiming to improve customer satisfaction, enhance sales team productivity, and help create new revenue streams.

Gather

- Capture real-world, in-use product feedback across channels
- Gather conversational, performance, and survey data—providing information directly from customers using the product

Process

- Process all data while extracting and summarizing sentiment, topics, and trends
- Correlate conversational feedback with operational data to uncover root causes, transforming raw data into actionable, customer-centric insights

Route

- Route actionable insights via integrated workflows to product, R&D, and quality
- Drive data-informed updates, design changes, and roadmap priorities for continuous, customer-focused product improvement

Continuous learning and improvement: The system continuously learns from new internal and external data, actual results, and customer feedback, helping to constantly improve its impact.

Why Google Cloud for agents

Deliver more impact with AI agents by easily tailoring AI for your specific needs. Only Google Cloud offers the most open and comprehensive platform for building and adopting agents at scale.

Accelerate deployment with AI assistants, applications, and agents that are ready for use today.

To help organizations do more with AI agents, Google Cloud offers a range of options tailored to different business needs and skill sets.

These options range from integrated Gemini assistants for Google Cloud and Google Workspace to AI applications such as Customer Engagement Suite, which leverages agents to deliver exceptional customer experiences at every touchpoint.

We also offer purpose-built vertical AI agents for common use cases and Vertex AI Search that has been optimized for specific industry needs, with additional agents planned for the coming year.

Build and manage multi-agent systems.

Every enterprise will soon rely on multi-agent systems—multiple AI agents working together—even when built on different frameworks or providers. Our robust developer platform, Vertex AI, features the broadest range of enterprise-ready tools to build AI agents and enable a multi-agent ecosystem.

Vertex AI includes Agent Development Kit (ADK), a new open-source framework that simplifies the process of building sophisticated multi-agent systems while maintaining precise control over agent behavior. With ADK, developers can build an AI agent in under 100 lines of intuitive code.

And to help every organization maximize the benefits of agentic AI, Google Cloud's open Agent2Agent (A2A) Protocol enables seamless collaboration between agents—regardless of the underlying model or framework—and is supported by over 50 leading technology partners.

Easily scale adoption of AI agents across the enterprise.

Put AI agents in the hands of every employee with Gemini Enterprise. This central platform uniquely combines Google's enterprise search, conversational AI (chat), and Gemini with third-party agents. It enables your workforce to efficiently find and synthesize internal information, interact with AI agents, and take action directly within their enterprise applications.

Gemini Enterprise is built on Google's secure-by-design infrastructure, and connected to over 100 enterprise applications such as Salesforce, SharePoint, and Slack, with native support for access control.

Ready to see the agentic era unfold?
Explore hundreds of real-world examples showcasing how Google Cloud customers are putting generative AI to work for tangible business impact.

Unlock your agentic future

The agentic era promises a future of unprecedented efficiency, innovation, and customer engagement. By understanding the potential and implementing the find, understand, and act approach, your organization can position itself to thrive in this transformative landscape.

Now is the time to make transformative changes, and Google Cloud helps our customers do that every day by making siloed systems a thing of the past. With security built-in and a comprehensive portfolio of technologies and applications, we can help you unlock the unprecedented efficiency, innovation, and customer engagement that the agentic era promises.

Connect with our team to explore how we can help every employee in your organization get ahead with AI agents.