



# AI and the Digital Roadmap

## Unlocking mining production through AI transformation

Matthew Jaster, Senior Editor

During a recent conference session on AI and manufacturing in Las Vegas, one presenter made a valid point about simplifying and accelerating shop floor processes. “AI has the potential to revolutionize the way companies design, develop, manufacture and operate.” This is happening in gear manufacturing shops, automotive OEMs, production plants—even mining facilities.

To maintain growth in its Americas copper operations, for example, Freeport-McMoRan needed to increase production. But with a portfolio of mature mines and aging technology, it was looking at significant cash outlays and lengthy permitting to open new mines.

The alternative was to increase copper production from the mines it had. Freeport believed the answer would lie in improving operations with advanced analytics, but it lacked the technology skills and capabilities to design and deploy AI at scale.

Data engineers, metallurgists, and mining engineers from Freeport collaborated with McKinsey’s data scientists and experts to improve operations at a single aging mine in Bagdad, AZ. The goal was to create a digital solution that could improve every aspect of operations, prove its value, and be easily scalable to all Freeport’s mines.

This was the start of an analytics journey for Freeport. McKinsey helped Freeport create a digital roadmap using AI, advanced analytics, and agile work methods to increase productivity at every step of Freeport’s processes. The new approach favored minimum viable products that could be continuously improved, rather than the traditional goal of “perfecting” a solution before it was deployed.

To entrench this capability, McKinsey brought in agile coaches to train teams to operate faster and better.

“One of the key things that McKinsey brought to the table was developing the model with the users in the room, so that they’re building ownership and conviction right from the very get-go,” said Cory Stevens, president, mining services at Freeport. “This helped with the acceptance and the adoption, creating co-ownership across the team.”

Freeport had a big leg up for its AI transformation because it had built a central cloud-based data architecture. A key component was a data warehouse to store the data collected from sensors installed on the company’s trucks, shovels and stationary machines, allowing Freeport to capture second-by-second performance readings. It used that data to train an AI model custom-designed and built by McKinsey to find operational improvements that could increase output at lower cost.

Instead of running the plant at a single setting all day, Freeport could now adjust settings every hour to maximize production from a given type of ore, quickly boosting production by 5-10 percent. The amount of additional copper production Freeport is projected to unlock over five years is equivalent to one new processing facility without the eight to ten year wait to bring a new facility online. Once the AI models were built in a modular way, Freeport was able to easily adapt and scale throughout its mines in the Americas.

Through this invaluable case study, Freeport cultivated a culture of experimentation and an openness to change. This AI-journey led to a +200 million increase in annual copper production across mines and, more significantly, the avoidance of building a new processing facility costing between \$1.5–2 billion.

“Modern mining is a complex and technical undertaking. Technologies such as cloud, centralized data warehouse, wireless mesh networks, and IoT sensing, allowed us to bring the data closer to the field and learn from past experiences,” said Bertrand Odinet, chief information officer and chief innovation officer at Freeport.

This case study was part of McKinsey’s “Rewired in Action” showcase that provided real-world examples of digital and AI transformations. Learn more here:

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