



Smart virtual models for sustainable industry

Background

Bloc Digital Ltd, working with the **University of Derby**, set out to create **advanced virtual models of manufacturing systems** that help businesses **monitor and improve their operations**. These “smart twins” use **artificial intelligence to spot problems**, explain what’s causing them, and **suggest solutions** — all in real time. This helps manufacturers run more **efficiently and reduce waste, supporting sustainability goals**.

The challenge

Most current virtual models simply display data, leaving teams to figure out what’s wrong and how to fix it. Manufacturers need **smarter tools** that can:

- Detect problems as they happen and explain why they are happening
- Suggest actions to reduce downtime and save energy

What’s innovative about this project?

This project added **AI-powered reasoning tools** to Bloc Digital’s platform, turning static digital dashboards into **interactive problem-solvers**.

What it does: Gives operators real-time advice, predicts when maintenance is needed, and recommends ways to save energy.

Why it’s unique: Makes data easy to understand and act on, cutting decision time and reducing waste.

Impact on industry: Helps businesses work more efficiently, save money, and cut emissions — while putting the East Midlands at the front of digital innovation.

Key achievements

- Built a **working prototype** of the smart virtual model system
- Successfully **combined AI with real-time manufacturing data**
- Delivered new research that **advances industry knowledge**
- Created a solid foundation for **commercial rollout**

“It’s been a **fantastic experience** working with EMCCA and the University of Derby. The pace that the East Midlands Investment Zone project has allowed has meant that we **delivered benefits to the market when the market needed it.**” - Bloc Digital Ltd

Next steps

The next phase will focus on fine-tuning the system to make it **even more accurate and responsive**, then preparing it for **wider rollout by working with local manufacturers**, providing training, and securing funding for commercial launch.

Why this matters for the East Midlands

The East Midlands is home to major manufacturing and construction companies that **rely on accurate data to stay competitive**. This technology helps them **improve productivity, cut costs, and lower their carbon footprint**, supporting growth and making the region a leader in sustainable industry.