



## GreenNEWS #8

### Smart manufacturing for SMEs: digital twins and practical alternatives

#### Why digital transformation matters

**Digital transformation is no longer a luxury—it's becoming essential**, even for small and medium-sized manufacturers. Faced with growing pressure to **increase efficiency, cut waste, and lower operating costs**, many SMEs are turning to emerging technologies to stay competitive. Among these, **digital twins** are often viewed as one of the most powerful tools available.

#### What is a digital twin?

A **digital twin** is a dynamic virtual model of a physical machine, process, or production line. By connecting real-time data from IoT sensors with AI-based analytics, it allows companies to **simulate changes, detect problems early, and optimize performance** without interrupting ongoing operations. For SMEs, this means the potential to **reduce material waste, save energy, and minimize downtime** while improving decision-making on the production floor.

#### The challenges of implementation

However, the path to implementing digital twins is rarely straightforward. Many SMEs struggle with **high initial investment costs**, especially when considering the infrastructure required to install sensors, connect systems, and manage cloud-based analytics platforms. The **technical complexity of integration, data security risks, and limited in-house expertise** often pose additional barriers.

#### More accessible starting points

Fortunately, embracing digital innovation **doesn't have to begin with a full-scale digital twin**. There are **more accessible alternatives** that can still deliver meaningful improvements in productivity and sustainability.

- **Cloud-based platforms** offer flexible tools for data management and process optimization without large upfront investments. These services are **easy to scale** and often include **built-in security features** and **automatic updates**, reducing the technical burden for smaller teams.

However, companies must consider **dependence on internet connectivity** and **data privacy concerns** when using third-party providers.

- **Modular automation systems** is another practical approach. These allow manufacturers to **upgrade operations gradually** by adding functional units as needed. This flexibility makes it easier to **adapt to changing production needs** without major disruptions. While this path still requires some investment and technical integration, it often provides a **more manageable entry point** for SMEs looking to modernize step by step.

### **Choose the path that fits**

**Digital twins remain a compelling vision of the future—but they are not the only option.** By exploring more practical solutions like cloud tools or modular automation, SMEs can move toward **smarter, more sustainable manufacturing** in ways that match their **resources, capabilities, and long-term goals**.