# Digital twins in manufacturing: predictive maintenance that pays

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A digital twin is a software model of a physical asset, kept up to date with data from sensors. Predictive maintenance uses that data to spot when a machine is likely to fail, so it can be fixed on your schedule rather than the machine's.

**TL;DR The short version**

- A digital twin is a software model of a physical asset kept up to date with sensor data.
- Predictive maintenance uses that data to spot likely failures so you can fix machines on your own schedule.
- It pays on assets where failure is costly and gives warning, and fails with too little failure history or untrusted alerts.

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## How it works

- Sensors report vibration, temperature, current and other signals.
- The data flows to a model of the asset.
- The model compares current behaviour with normal and with known failure patterns.
- Maintenance is triggered by condition, not only by the calendar.

## What makes it pay

- Pick assets where failure is costly and gives warning.
- Start with a clear failure mode and enough history to learn from.
- Connect predictions to a maintenance process that acts on them.

## Where it goes wrong

- Not enough failure examples to learn from.
- Alerts that nobody trusts because of false alarms.
- A model with no owner, drifting as equipment and conditions change.

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## Sources and further reading

1. ISO 23247 series. Digital twin framework for manufacturing. iso.org.

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