



INSPIRING

Great British Manufacturing

The Journey Towards a Smart Factory of the Future

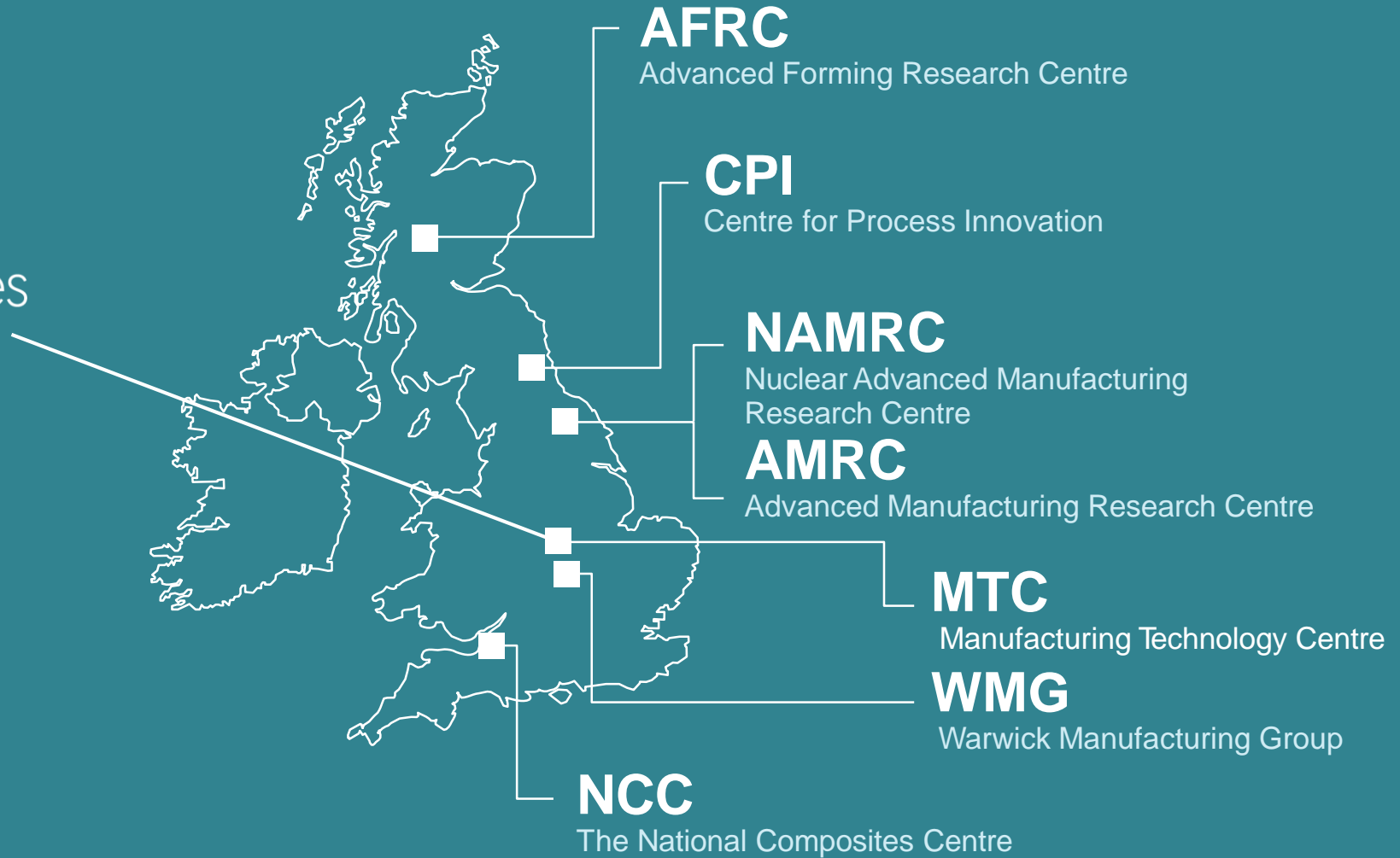
9th November 2021

HIGH VALUE MANUFACTURING CATAPULT

mtc | Manufacturing Support Services

- 800 employees
- Assist with improving quality, cost and delivery performance of existing operations,
- Identify new technologies and de-risk investments for the next step change.
- Match-funding grant for SMEs

“Set us the challenge”



MTC Manufacturing Support Services



<https://vimeo.com/showcase/6136066/video/348589749>

Your presenters



Sylvain Briand

SW Regional Manager
Manufacturing Support Services
MTC



Mark Wise

Senior Advisor
Business Transformation
MTC



David Roddis

Senior Advisor
Digital Transformation
MTC

The Journey Towards a Smart Factory of the Future

Mark Wise

09-Nov-2021

Today's Topics Covered:

The History behind Smart Factory

What is a Smart Factory?

Why would you want to create a Smart Factory?

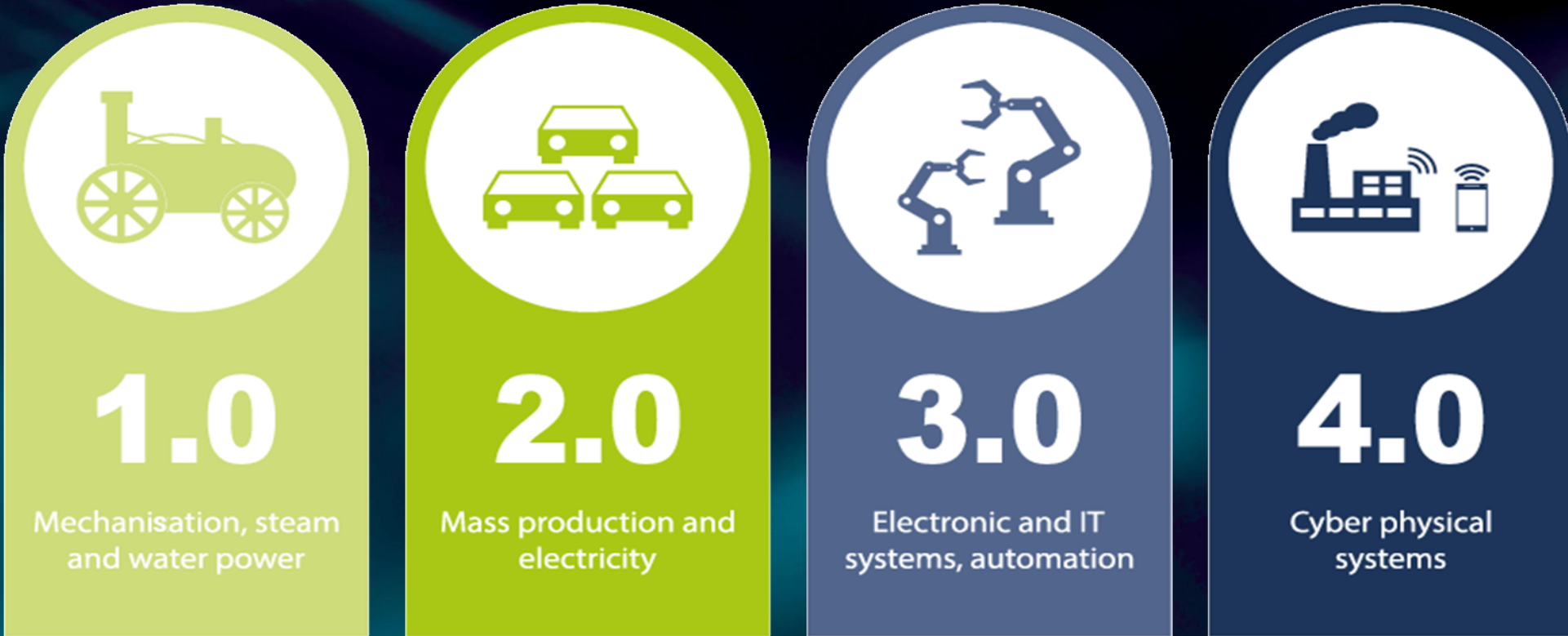
What are the Smart Factory enablers?

How do you create a Smart Factory?

Smart Factory examples

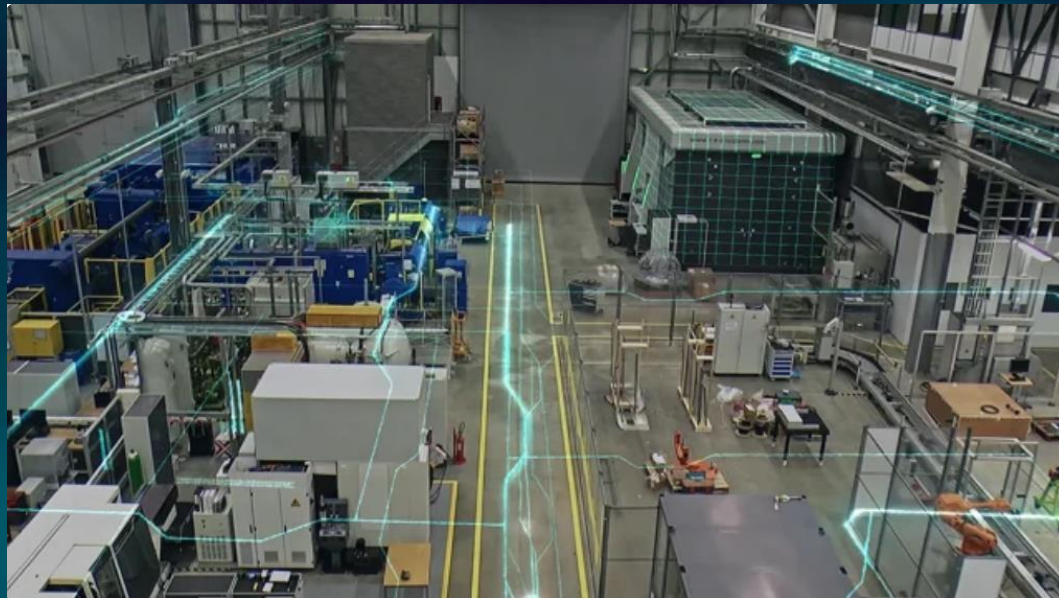
The History behind Smart Factory

The 4th Industrial Revolution – industry 4.0



What is A Smart Factory?

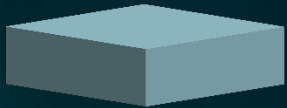
A fully-integrated, collaborative manufacturing systems that responds in real-time to meet changing demand and conditions in the factory, in the supply chain and in customer need.



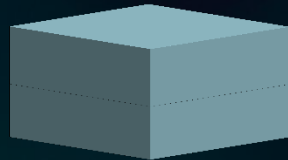
Extracting value from the data

The Smart factory & Industry 4.0

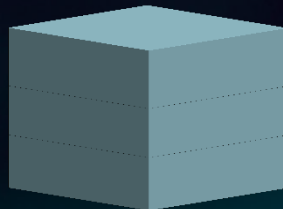
Computerisation



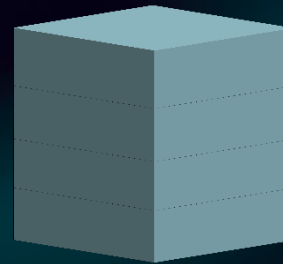
Connectivity



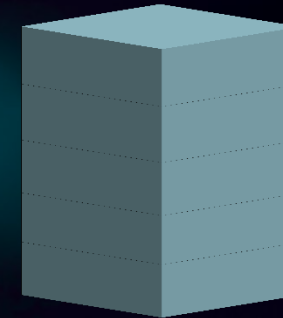
Visibility



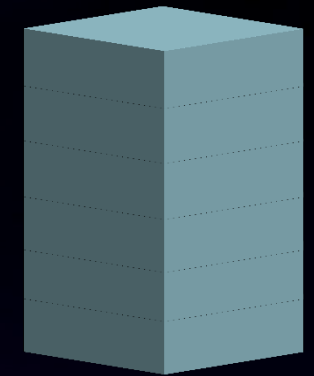
Transparency



Predictive Capability



Adaptability



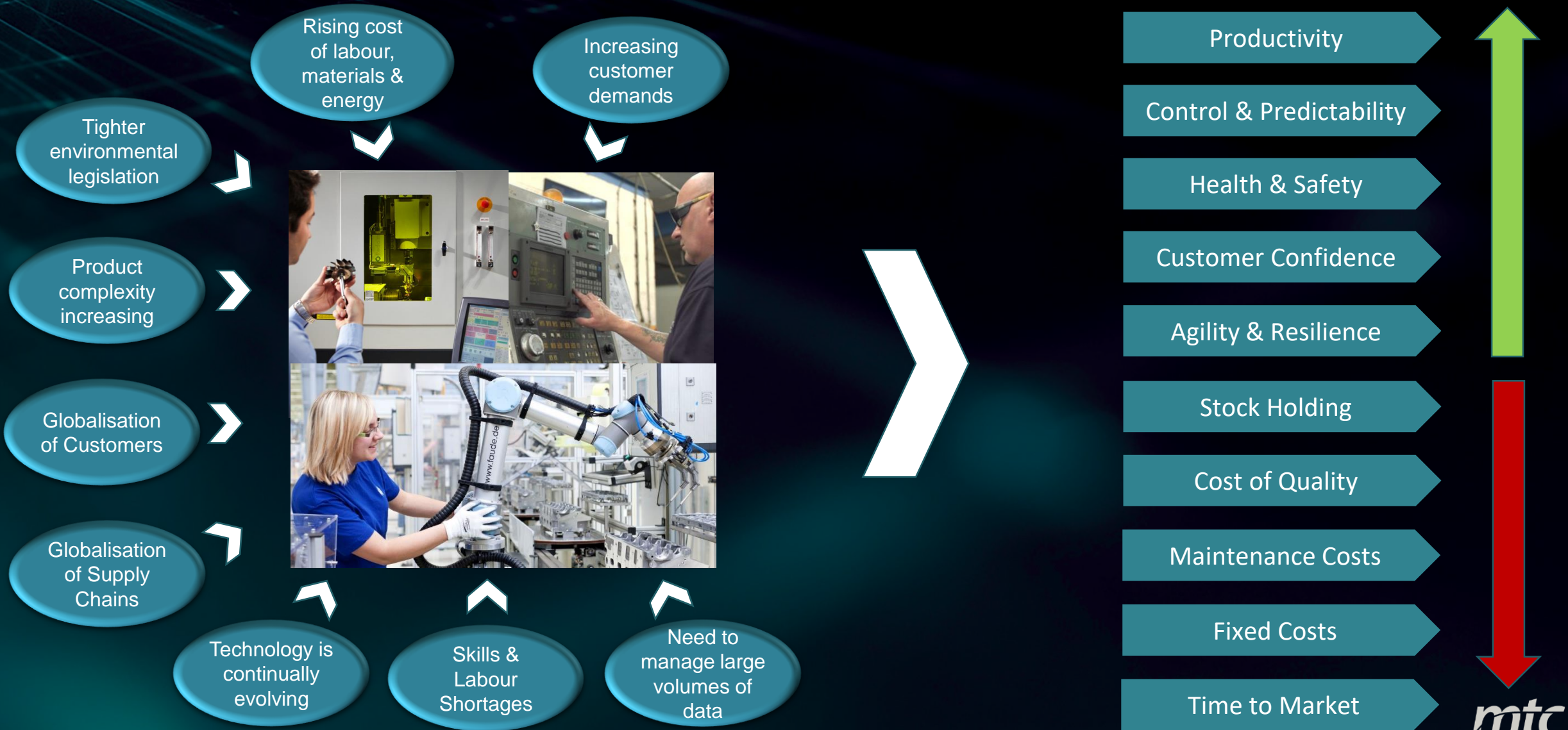
What is happening?

Why is it happening?

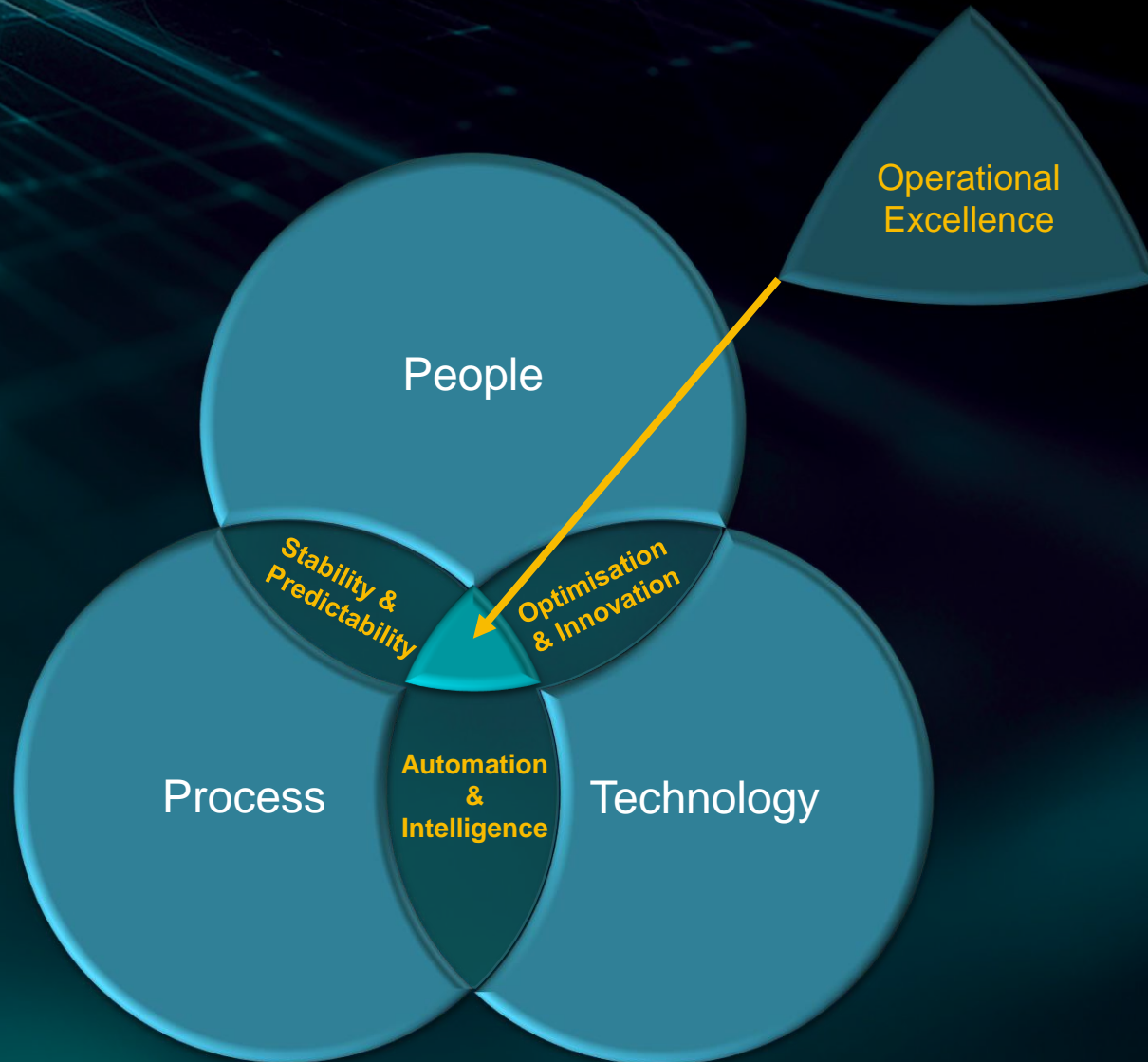
What will happen?

Self optimisation?

The Challenges & Smart Factory Drivers



Elements of the Smart Factory



People:

- Highly motivated People following well-engineered processes with a high degree of compliance in order to bring **Stability** and **Predictability**

Process:

- Well-engineered & efficient processes leverage technology to **Automate** many of the repetitive and /or lower-level tasks and decisions

Technology:

- Advanced digital Technologies deliver powerful **Optimisation** capabilities to support operations and remaining productive during times of stress or disruption
- Technology tools designed to capture process data enable advanced analytics and reporting providing the entire operation with **Actionable Intelligence**

Smart Factory Enablers - Industrial Digital Technologies

BIG DATA AND ANALYTICS



Discover hidden patterns, unknown correlations, market trends, customer preferences

THE INDUSTRIAL INTERNET OF THINGS



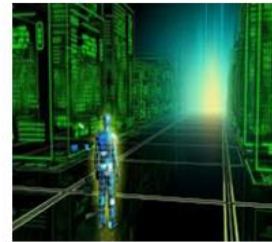
Monitor, control, exchange and analyse machine and process performance

HORIZONTAL AND VERTICAL SYSTEM INTEGRATION



Integrate individual machines, equipment, production units, people and supply-chains

SIMULATION



Predict the future - performance of products & processes

THE CLOUD



Store, access, and share big data real-time

CYBER SECURITY



Defend systems, networks and data from cyber attacks

AUGMENTED REALITY



View the future - performance of products & processes
De-risk innovation

AUTOMATION & ROBOTICS



Enable consistent, efficient, flexible performance

ADDITIVE MANUFACTURING



Rapidly build products, production-tooling, prototypes

Smart Operator Workstation

Operator Notifications

- Indicate when tool is enabled, and torque values

Minimal UI

- Eliminates H&S risks and increases tool usability

Operation Status Board

- Navigate work orders, operations, and steps

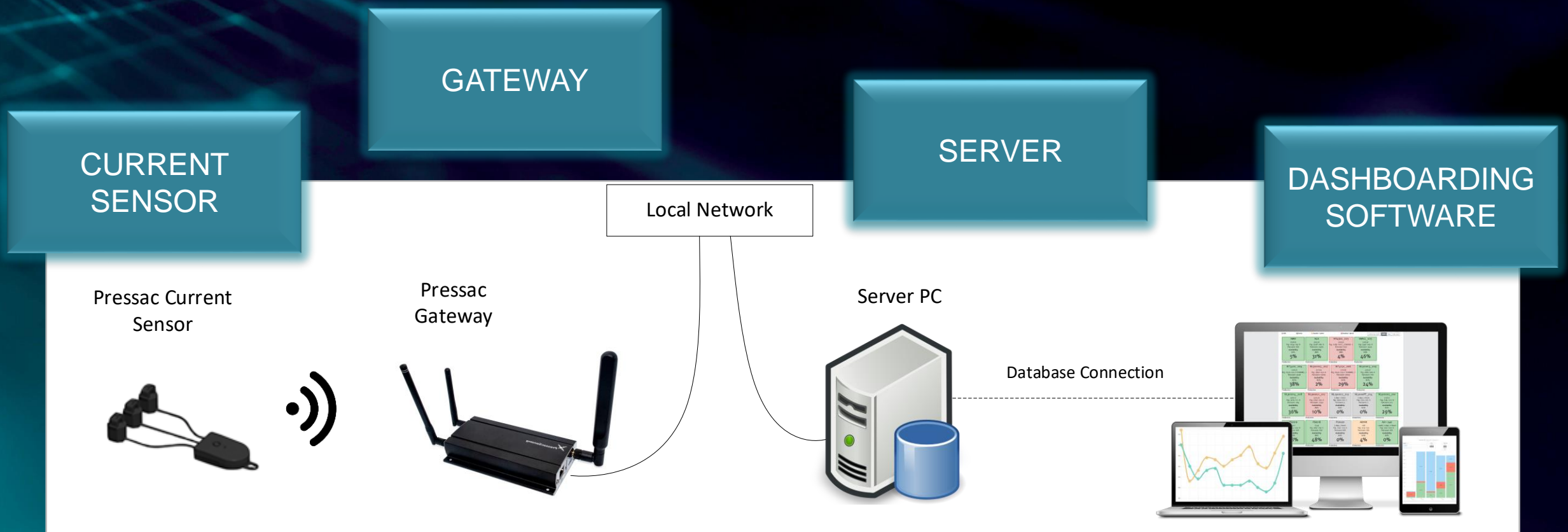
Accurate Tool Location

- Indicates the position of the materials and tools for the step



The Start Point can be relatively low cost

Low Cost Machine Connectivity



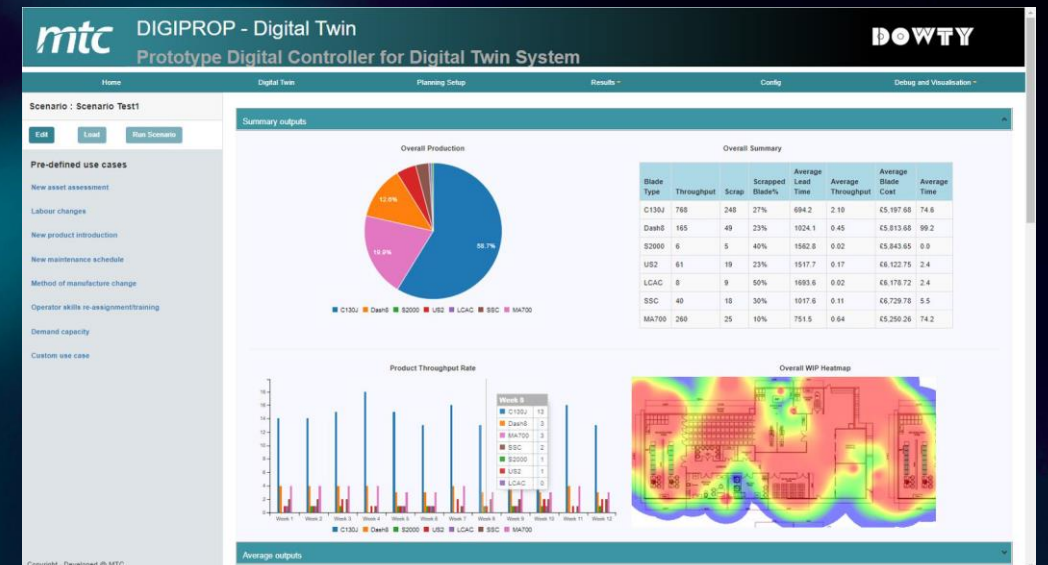
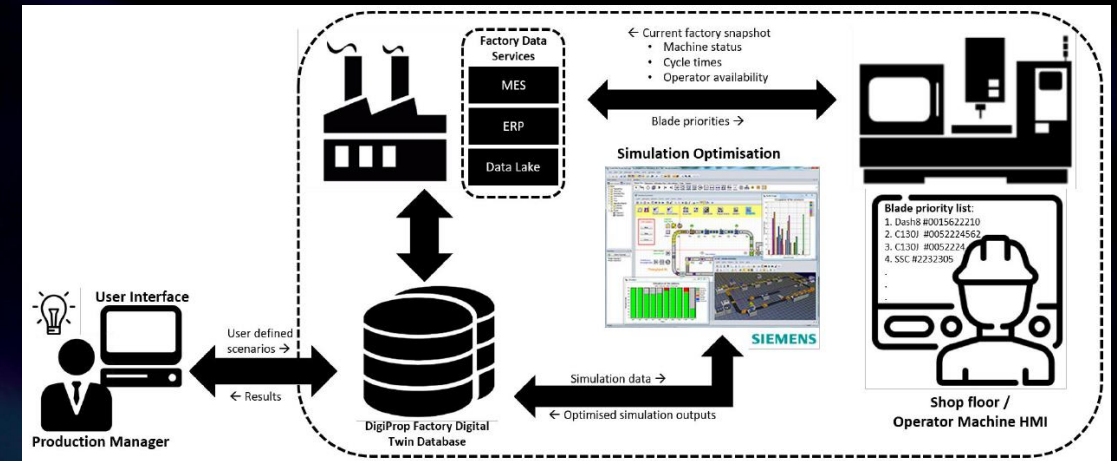
Factory Digital Twin

Challenge

- Model a complex and dynamic discrete manufacturing value chain
- Generate forecasts for key metrics, including throughput, machine utilisation and material usage
- Use of live factory data to create optimised production schedules
- Make accessible and relevant to a range of end-users and roles
- Easy for end users to operate, no simulation experience required
- Scalable into a production-ready tool

Solution & Benefits

- Development of a Discrete Event Simulation to capture composite propeller blade value streams
- End user workshops to refine requirements
- Design and implementation of a Factory Digital Twin architecture to link live data and user inputs to the simulation model and to store outputs
- Web-based, user-friendly interfaces for defining 'what if' simulation scenarios
- Smart production scheduling using prioritisation of work orders based upon a range of priorities
- Forecasting of future factory performance against a range of business KPIs



Factory in a Box

Simulation for Design, Build and Operations

A fully-integrated, collaborative manufacturing system that responds in real-time to meet changing demand and conditions in the factory, in the supply chain and in customer need.

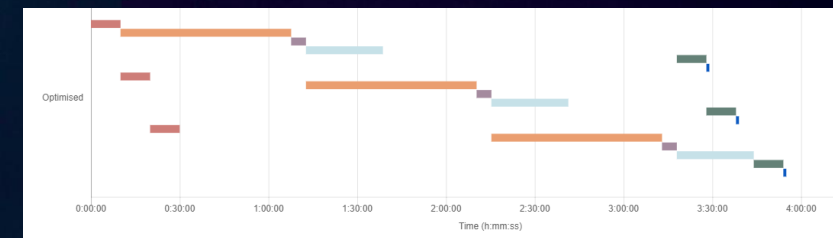
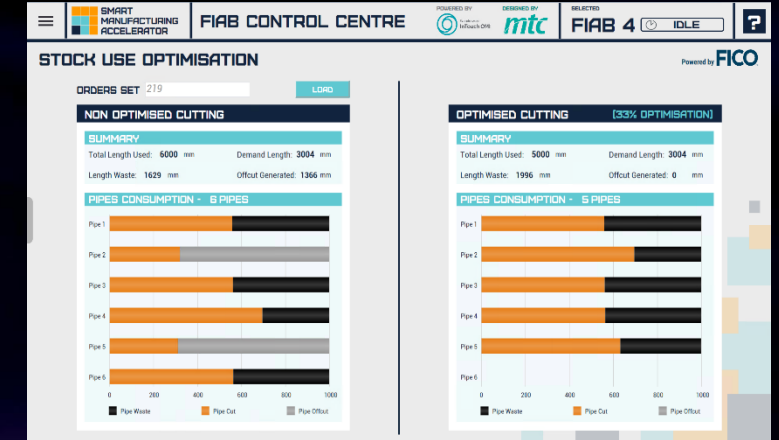
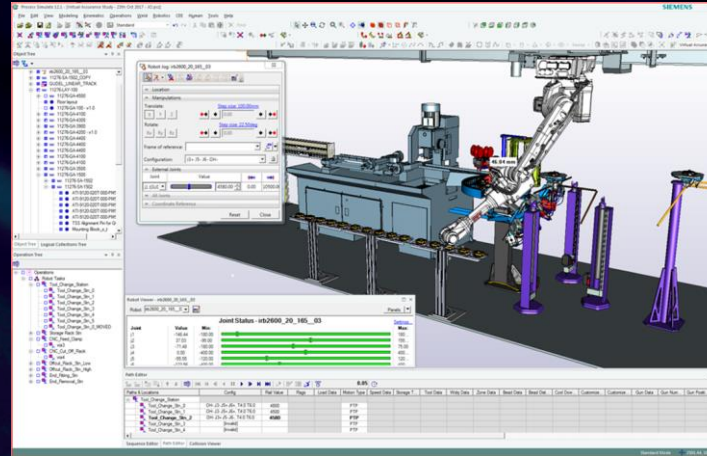


Factory in a Box

Simulation for Design, Build and Operations

The MTC Factory in a Box project utilised modelling and simulation throughout the design and build, as well as deploying simulation tools for “in-service” decision support:

- Cost modelling and capacity analysis to support early concept design.
- Process simulation for layout validation, robot down-selection, automated robot path planning, and virtual commissioning.
- Predictive digital twin, integrated schedule and stock optimisation.
- Hardware-in-the-loop controls and process digital twin.



How to get started?

1



Understand how a smart factory can support your business strategy – build a vision

2



Identify where you are and where you want to be – what challenges to overcome

3



Create a plan of action to close the gaps – your roadmap

4



Start your journey

**Engage
your
team**

Open Forum

Any Questions for the road ahead?

Together we impact society.
The **RIGHT** Way



Want to contact us? mss@the-mtc.org



Thank you for listening

Set us the challenge!

T 07866 033218 E Sylvain.Briand@the-mtc.org

DISCLAIMER:
The data contained in this document contains proprietary information. It may not be copied or communicated to a third party, or used for any purpose other than that for which it was supplied, without the MTC's prior written consent ©MTC

CATAPULT
High Value Manufacturing
High Value Manufacturing