

The New Manufacturing Revolution: the Global Challenge

**Makers' Workshop
A new manufacturing model for Europe**

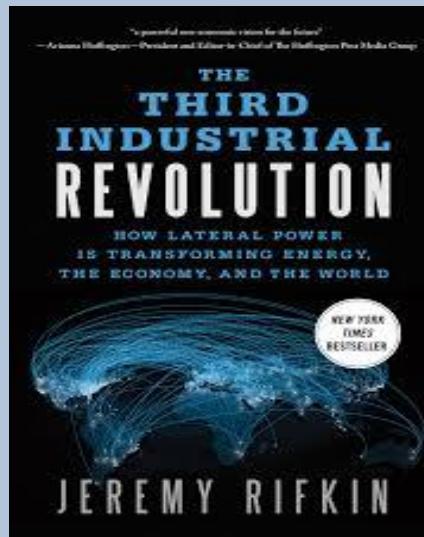
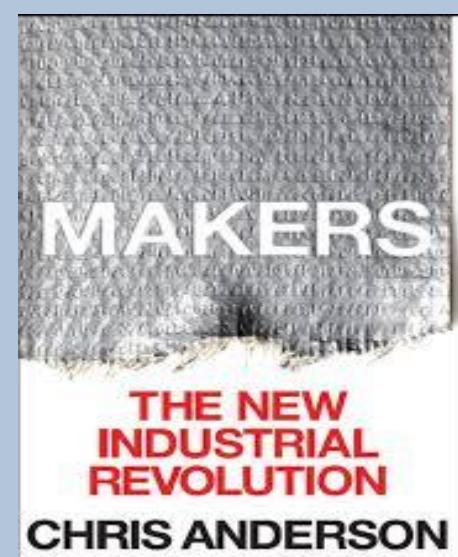
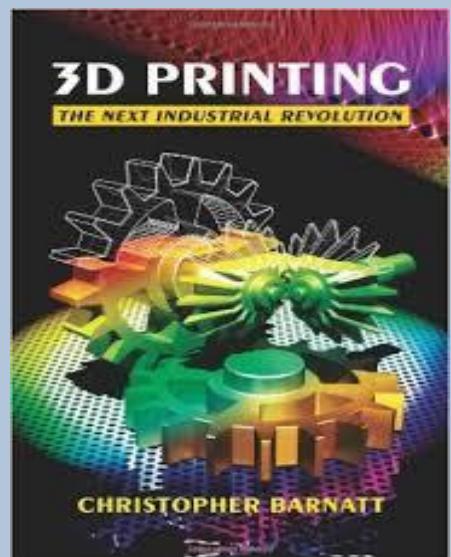
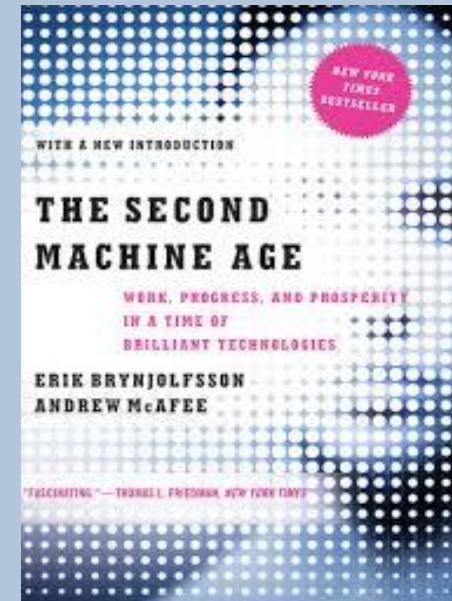
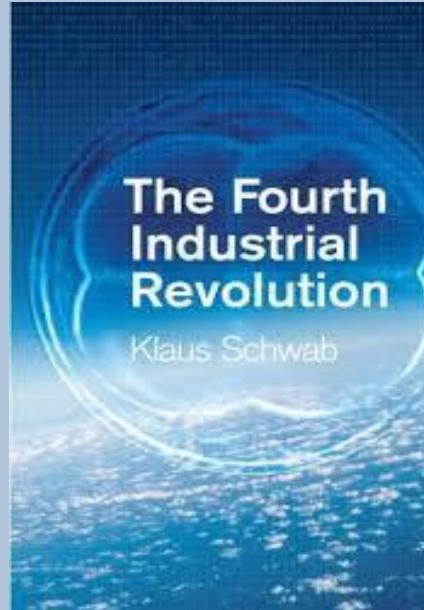
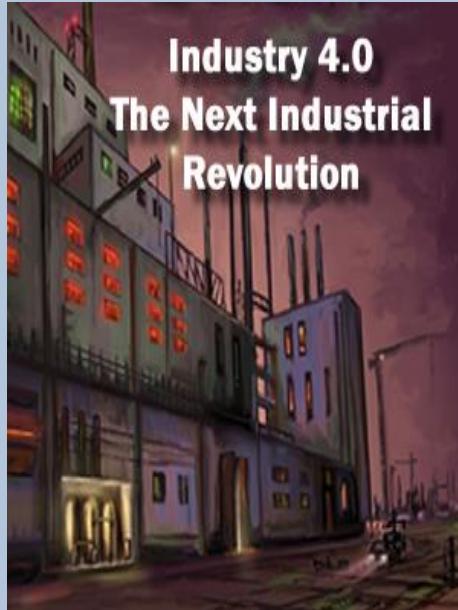
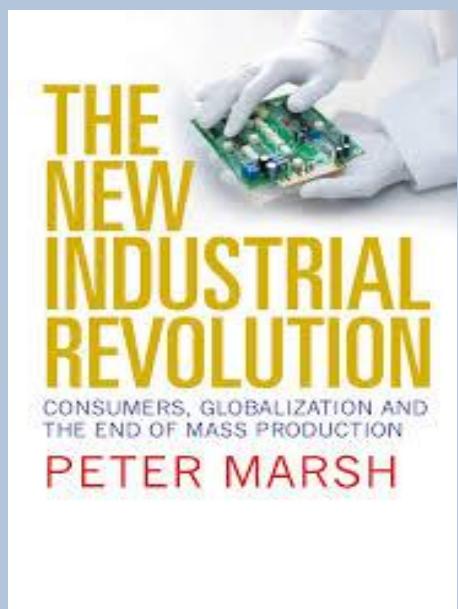
Birmingham Business School June 28, 2016

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The New Industrial Revolution

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Manufacturing is changing



WHY ARE WE BOTHERED ABOUT MANUFACTURING?



ENTROPY: THE WORLD IS MOVING IRREVERSIBLY TO DISORDER



Natural tendency towards chaos



Humans like to impose structure where they can



Manufacturing puts order into materials

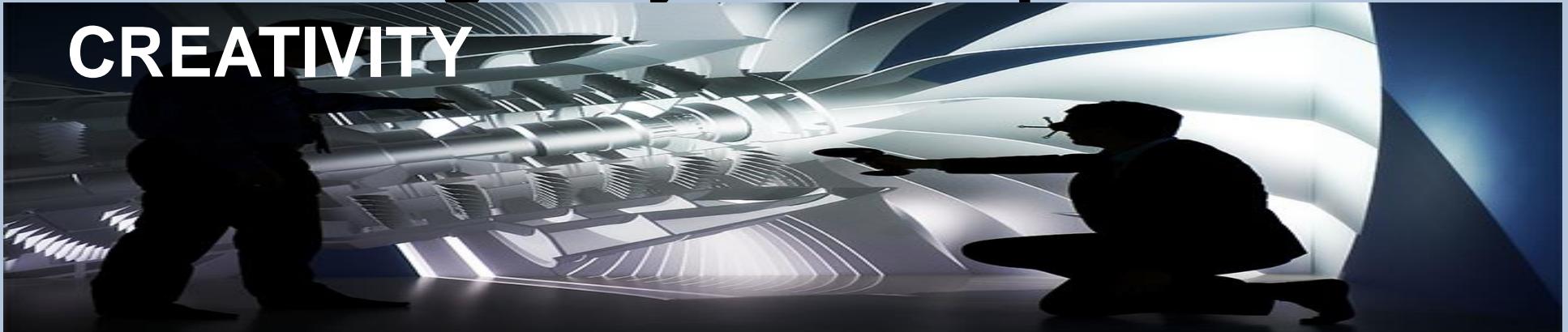


DIGITISATION



We need to go beyond computers

CREATIVITY



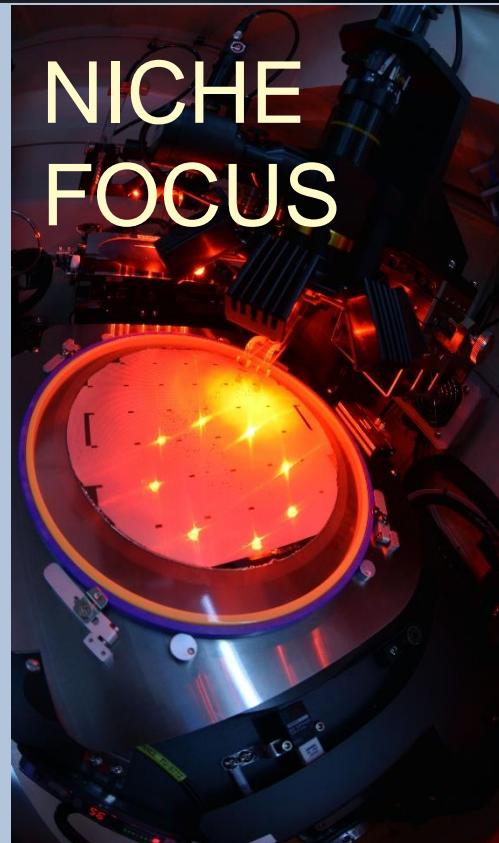
CONNECTIONS



CUSTOMISATION



NICHE FOCUS



SERVICE THINKING



CREATIVITY



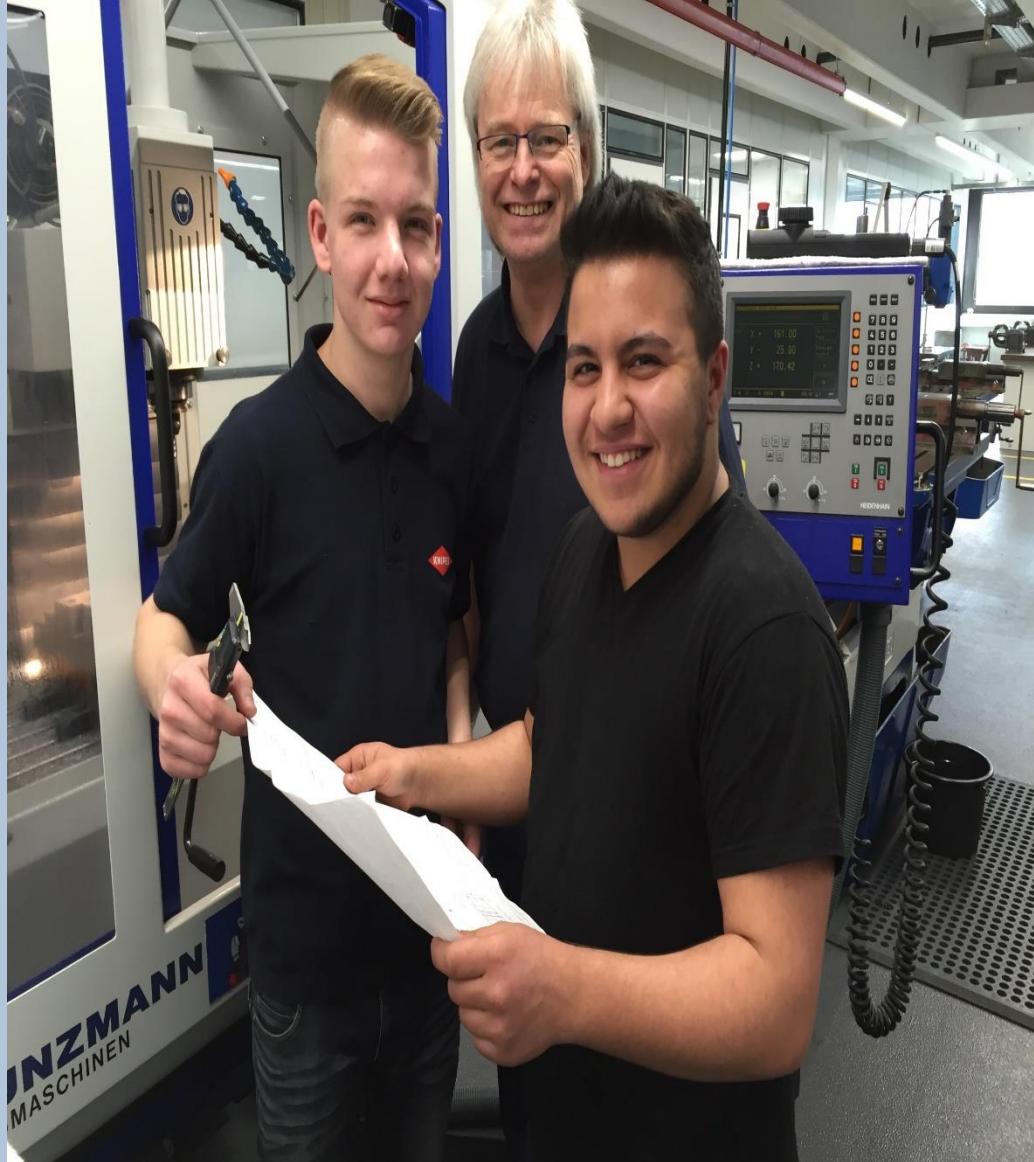
Pliers paradise: Ralf Putsch at Knipex



A century of innovation in Germany



Traditional engineering meets digital world



Ocean Harvest Technology (Ireland): seaweed as a food resource



Ingredients from seaweed are extracted and then processed (right) into animal feed in plant in Vietnam

DIGITISATION



Digitisation alters the workplace: manufacturing software from ESI (France)

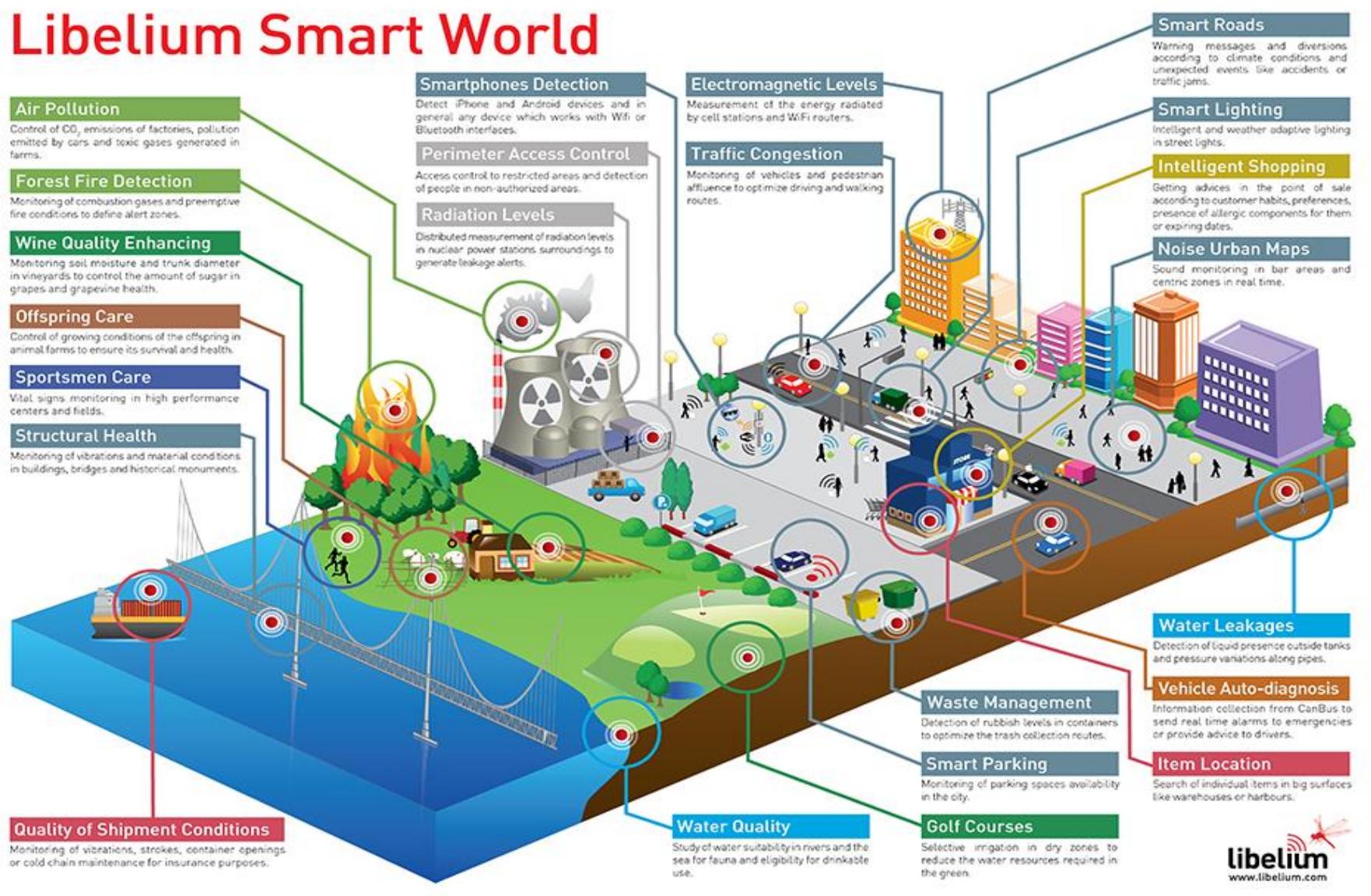


Courtesy of Jungheinrich
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The internet of things: connecting up everything (machines/products/people)

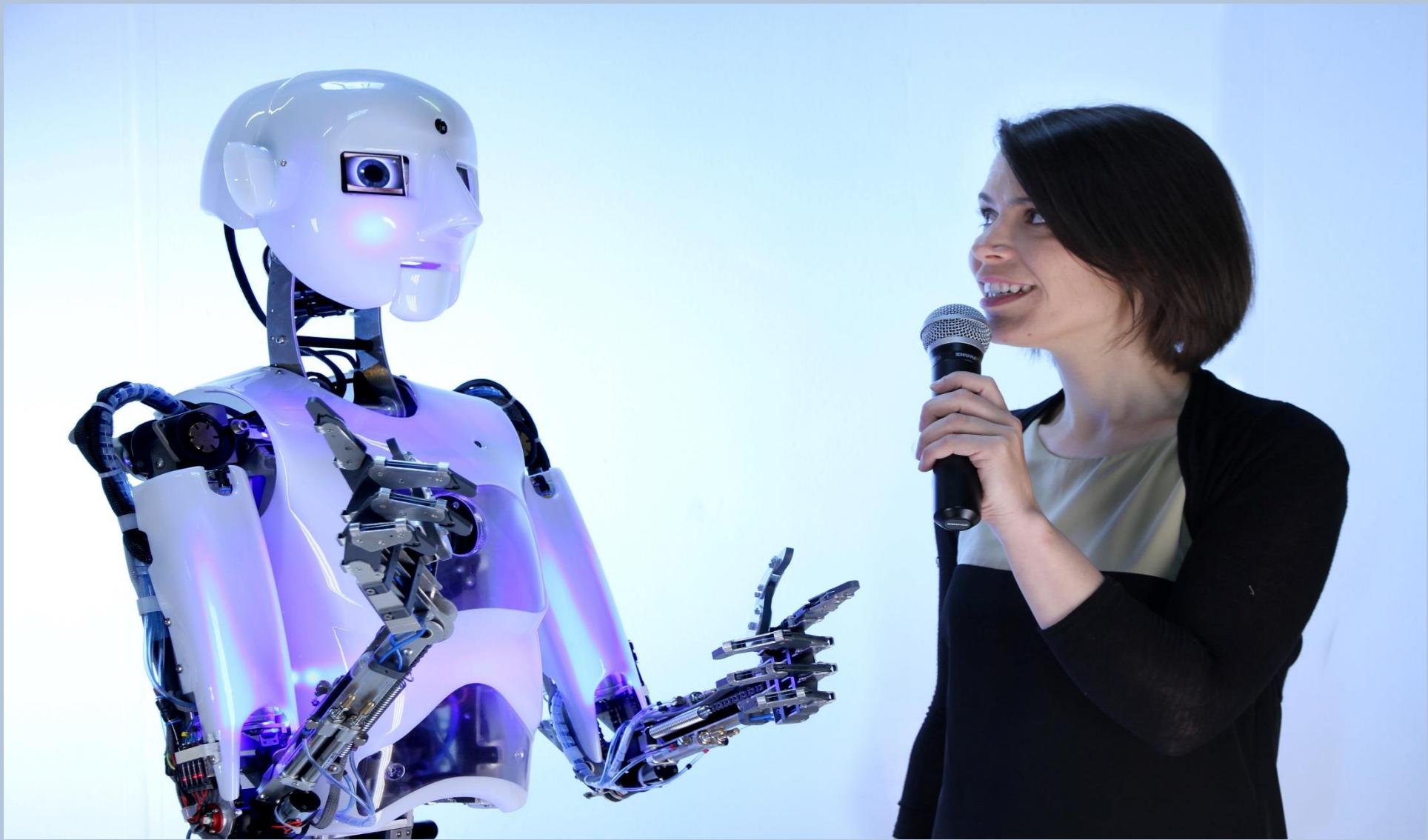
Libelium Smart World



Emutex (Limerick) produces software for connecting vending machines



New digital products– Engineered Arts in Britain



CONNECTIONS



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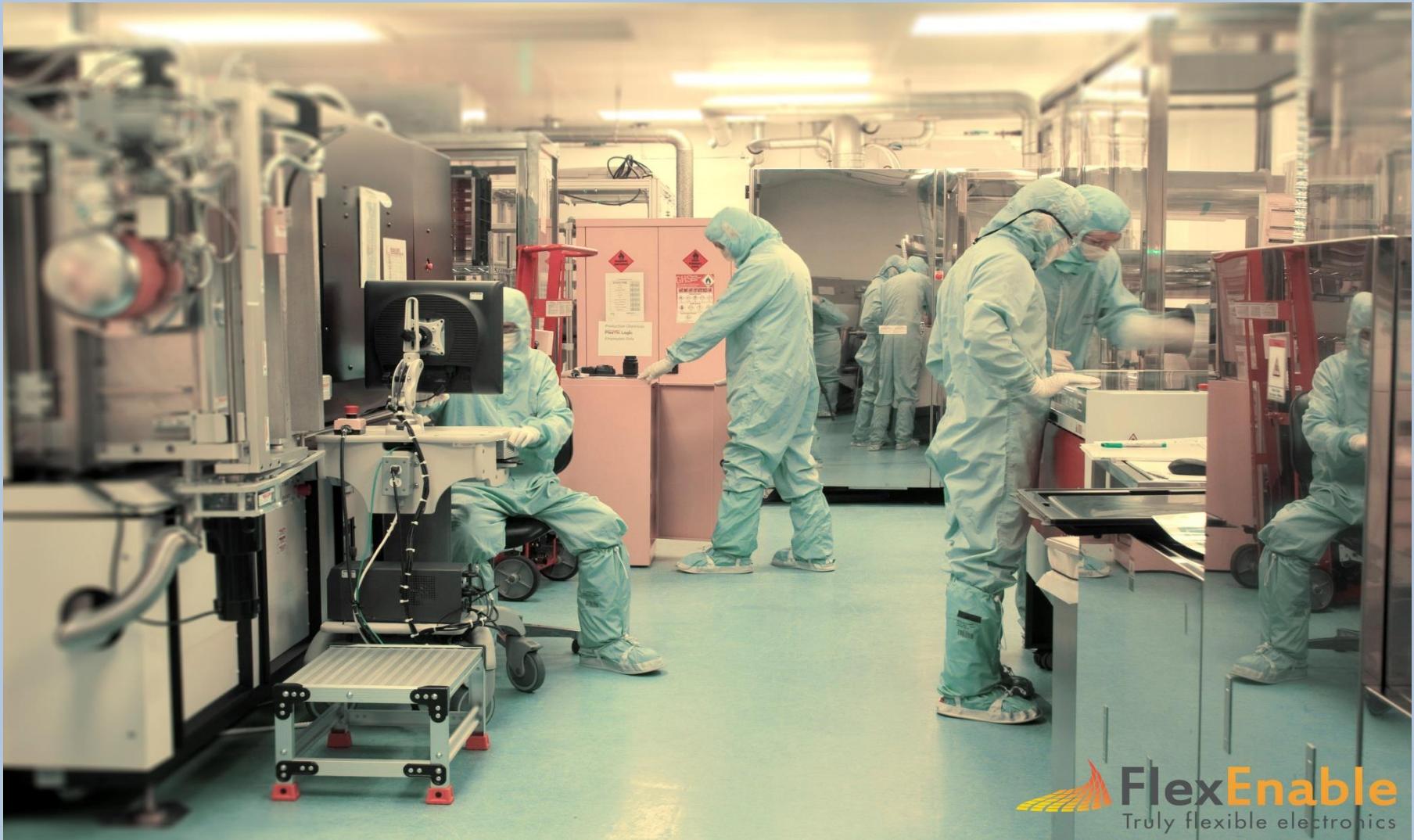
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PCH (Ireland): global force in manufacturing organisation/supply chains



Top: Liam Casey of PCH, which works with many global companies. Bottom: OpenBike (sensors, instruments for cycling) and Calliope (water management in the home), two US businesses that have worked with PCH

Connections at work: Flexenable making new displays/sensors in Cambridge (UK)



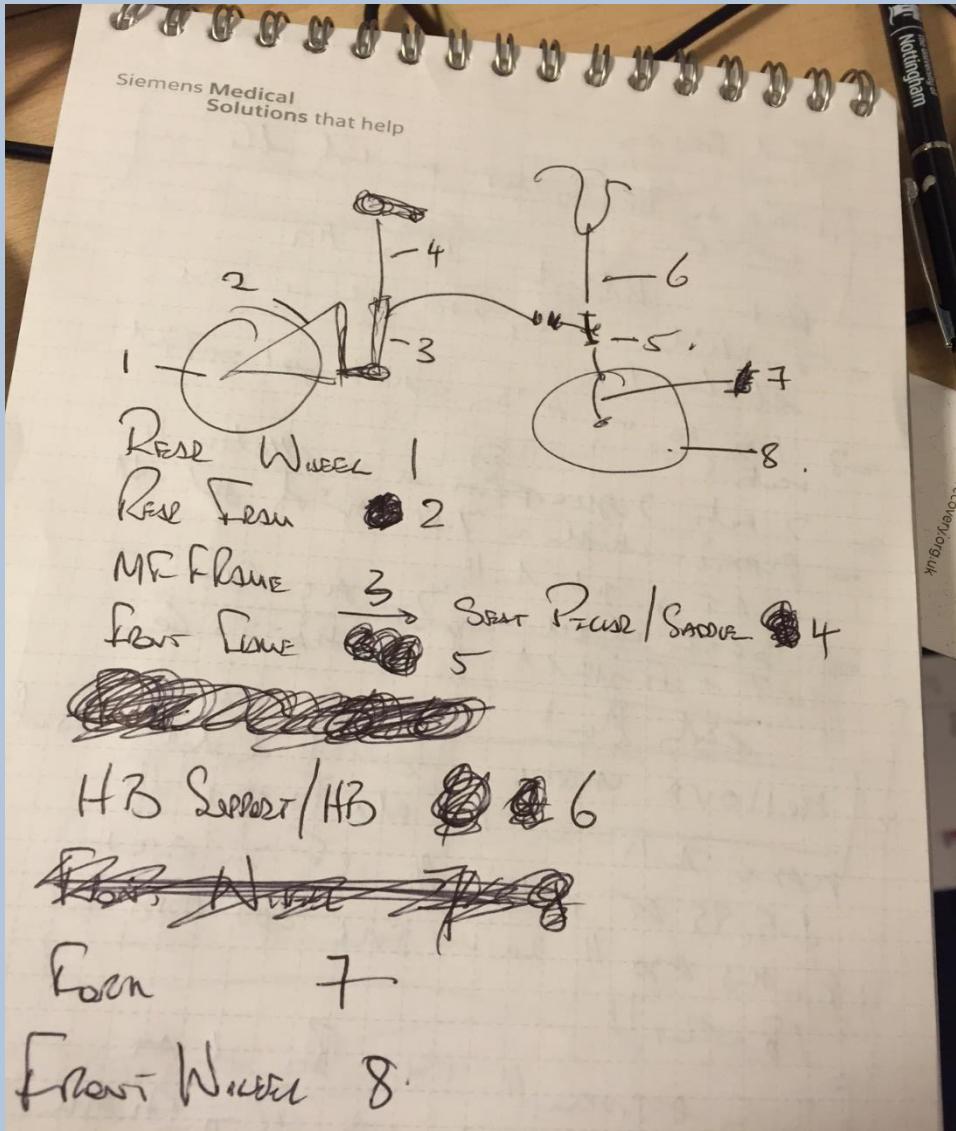
Startups also need to make connections: Oryx Lifestyle in Qatar



CRAFT



Brompton Bicycles: “simple” product, ingenious design



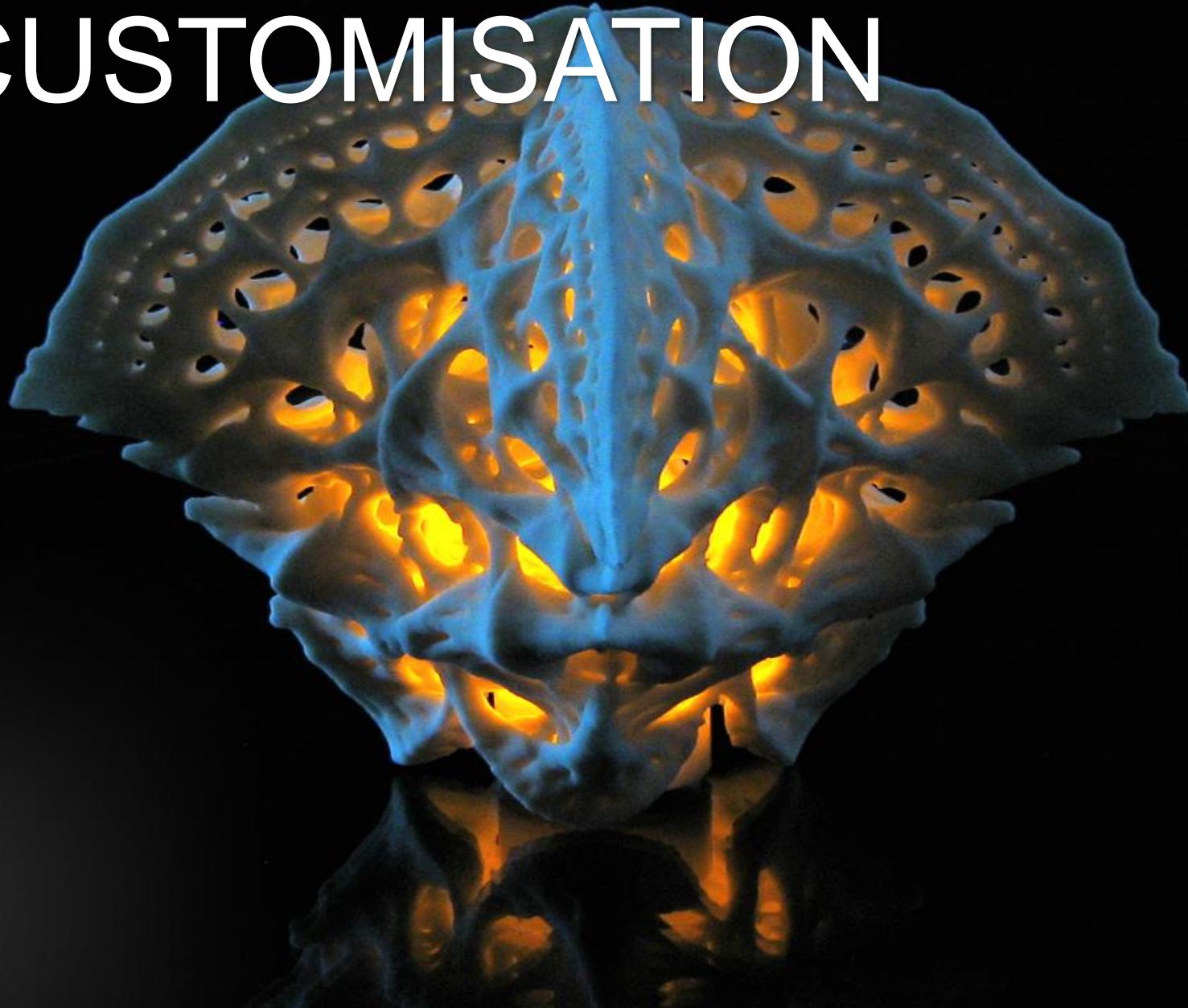
Craft not computers is the key



Sold in the world, made in London



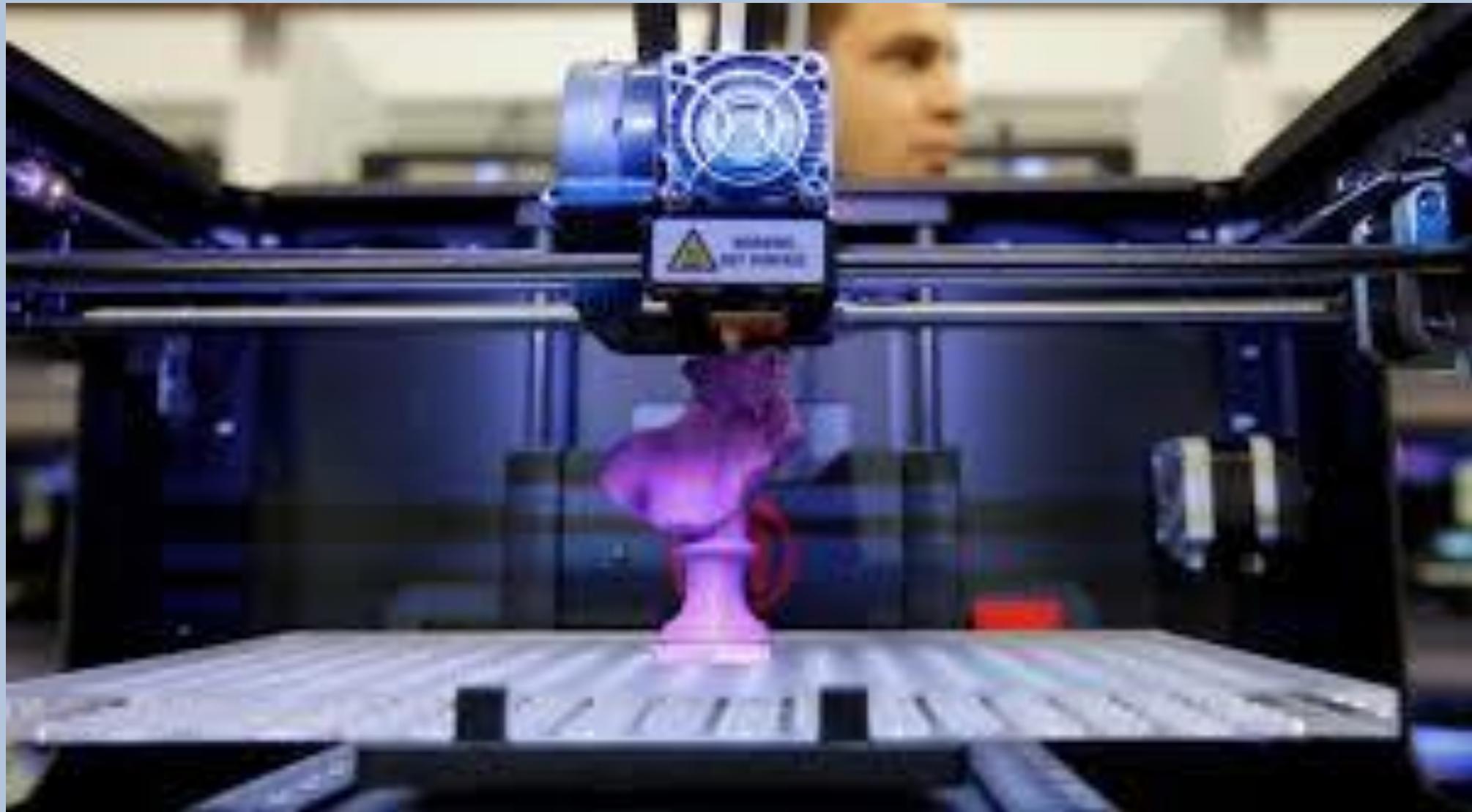
CUSTOMISATION



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3D printing part of a trend: customisation, specialisation leads to personalisation



Michael Tyson (Australia): 3D printed guitars



Local Motors (US) makes bikes, cars from 3D printing



Bloc Blinds (N.Ireland): home furnishings in multiple variations



Cormac Diamond: engineering ideas led to a fast growing consumer goods manufacturer

Customised chemistry – Ipsen, Dublin



SERVICE THINKING

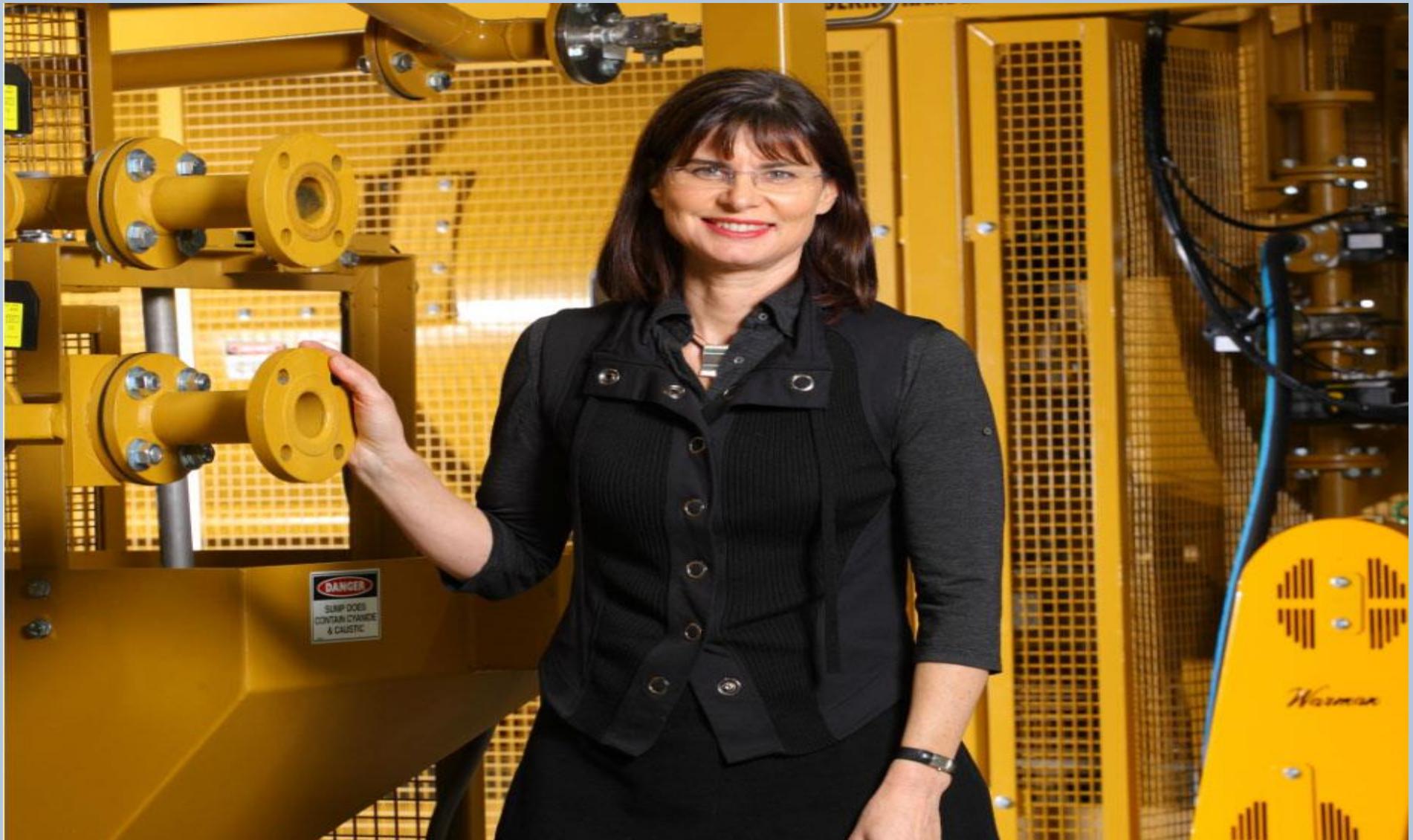


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Calzavara (Italy) brings together manufacturing, building services in telecoms towers



Service thinking – Gekko in Australia (mining systems/service)



NICHE FOCUS



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Air Tractor of Texas flies forward in the narrow field of crop sprayers



Phytolux: specialist LED-based lighting for greenhouses to aid plant growth



John Guest pipe fittings specialist (London)

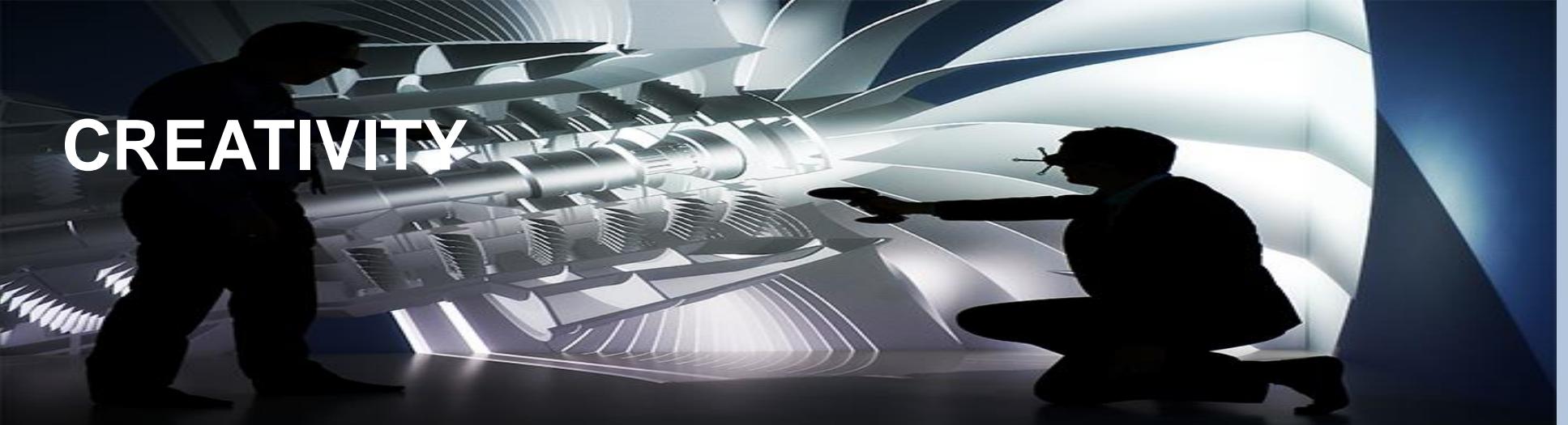


Massive investment in machinery



Saying No to outsourcing: company owns its own guard dogs

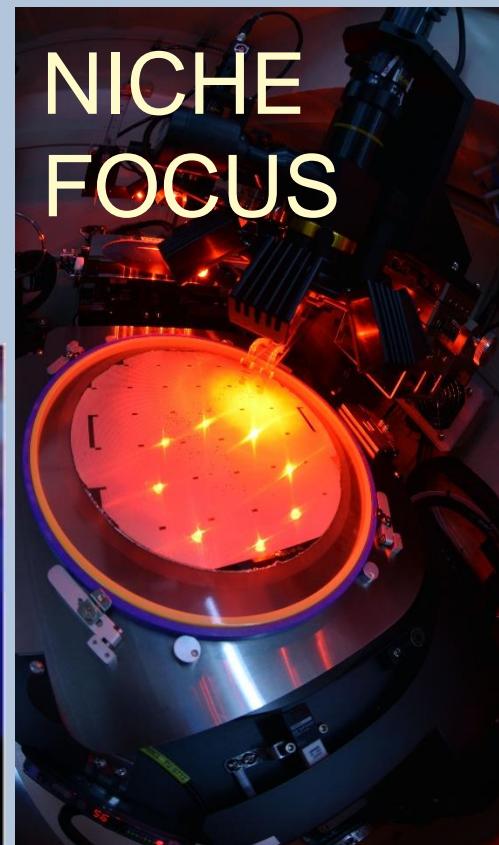




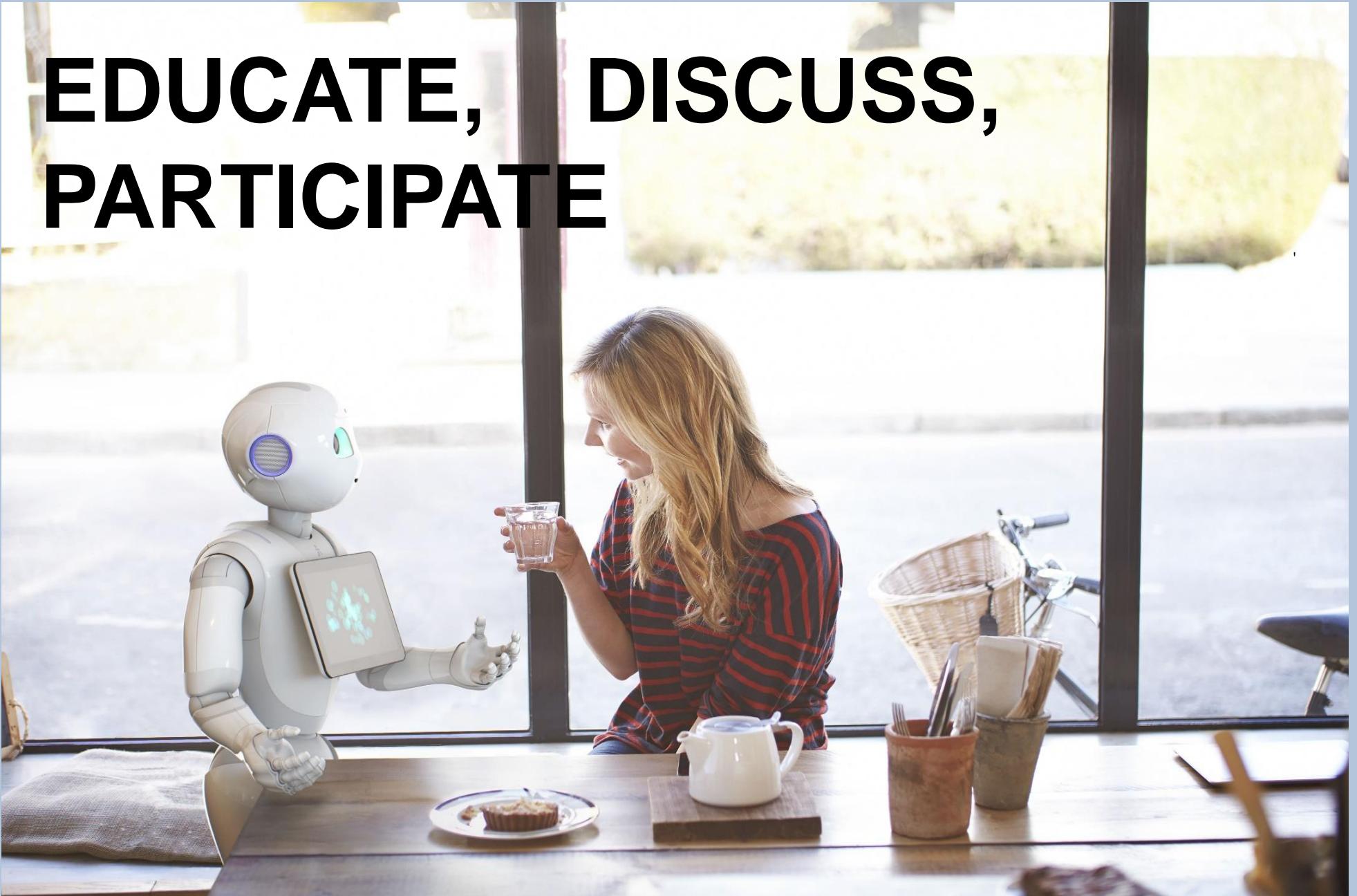
CREATIVITY



CUSTOMISATION



EDUCATE, DISCUSS, PARTICIPATE



Look to the future with young people – Formaplex parts/tools maker in the UK





MADE HERE NOW

**Explore the new world of manufacturing in Britain -
amazing advances in science and technology with great career opportunities**

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