

The New Manufacturing Revolution: the Global Challenge

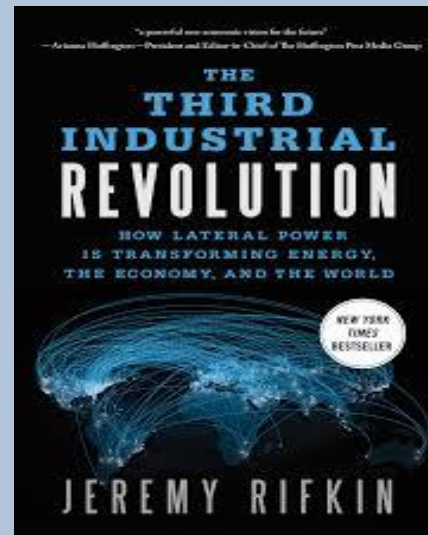
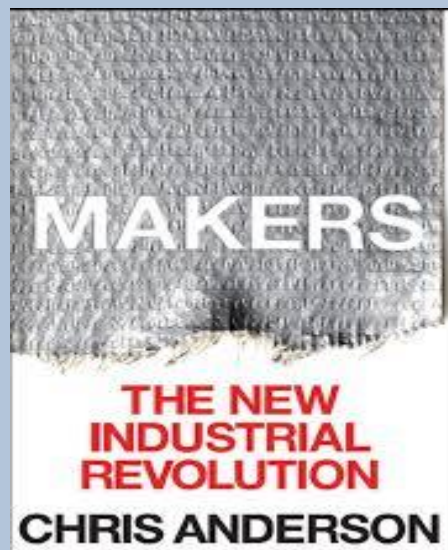
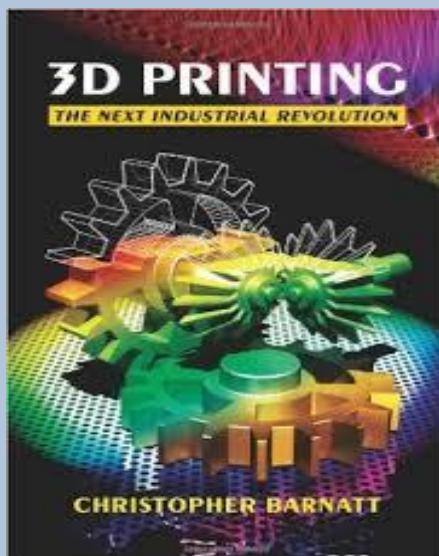
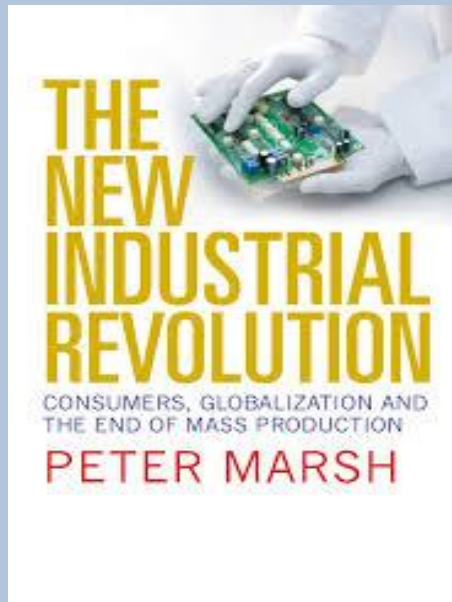
Makers' Workshop
A new manufacturing model for Europe

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

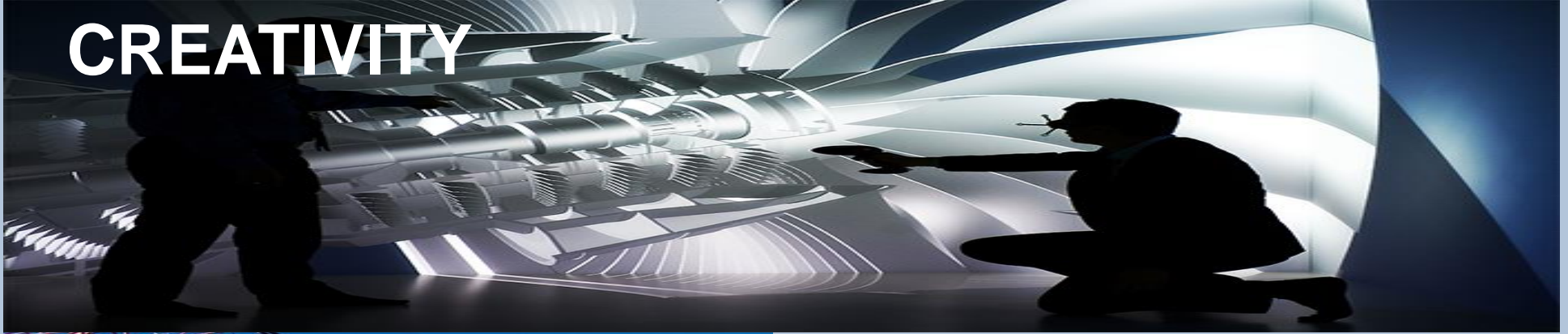


DIGITISATION



We need to go beyond computers

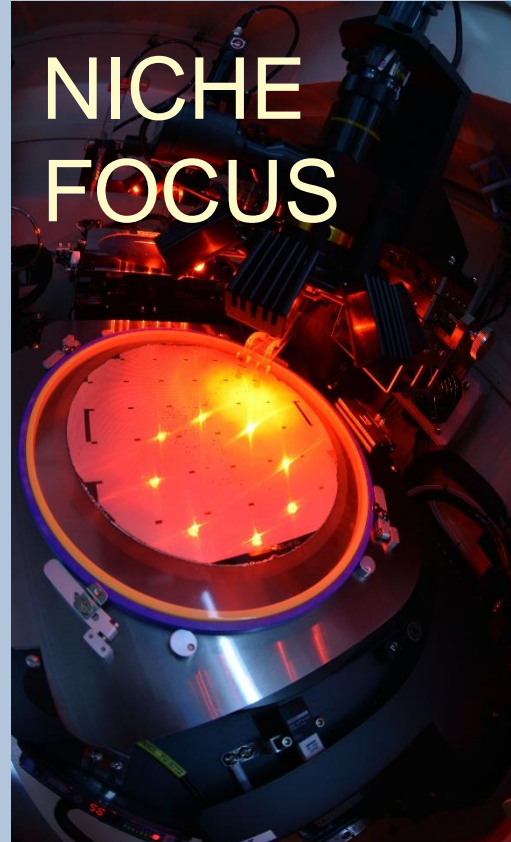
CREATIVITY



CONNECTIONS



**NICHE
FOCUS**



**SERVICE
THINKING**



CUSTOMISATION



CREATIVITY



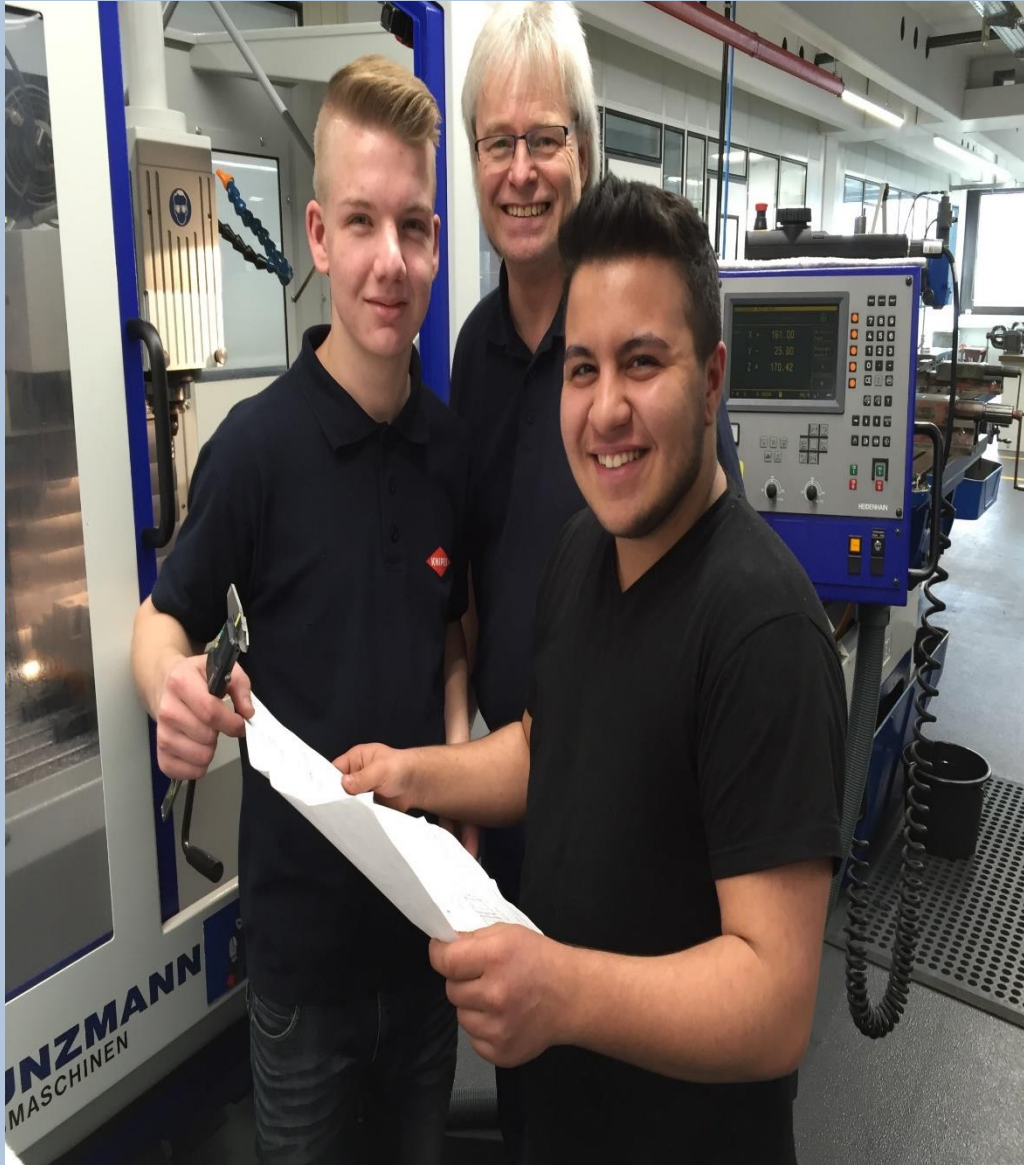
Pliers paradise: Ralf Putsch at Knipex



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

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

Libelium Smart World

Air Pollution

Control of CO₂ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection

Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing

Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care

Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care

Vital signs monitoring in high performance centers and fields.

Structural Health

Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions

Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection

Detect iPhone and Android devices and in general any device which works with WiFi or Bluetooth interfaces.

Perimeter Access Control

Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels

Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels

Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion

Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads

Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting

Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping

Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps

Sound monitoring in bar areas and centric zones in real time.

Water Leakages

Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis

Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location

Search of individual items in big surfaces like warehouses or harbours.

Waste Management

Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking

Monitoring of parking spaces availability in the city.

Golf Courses

Selective irrigation in dry zones to reduce the water resources required in the green.

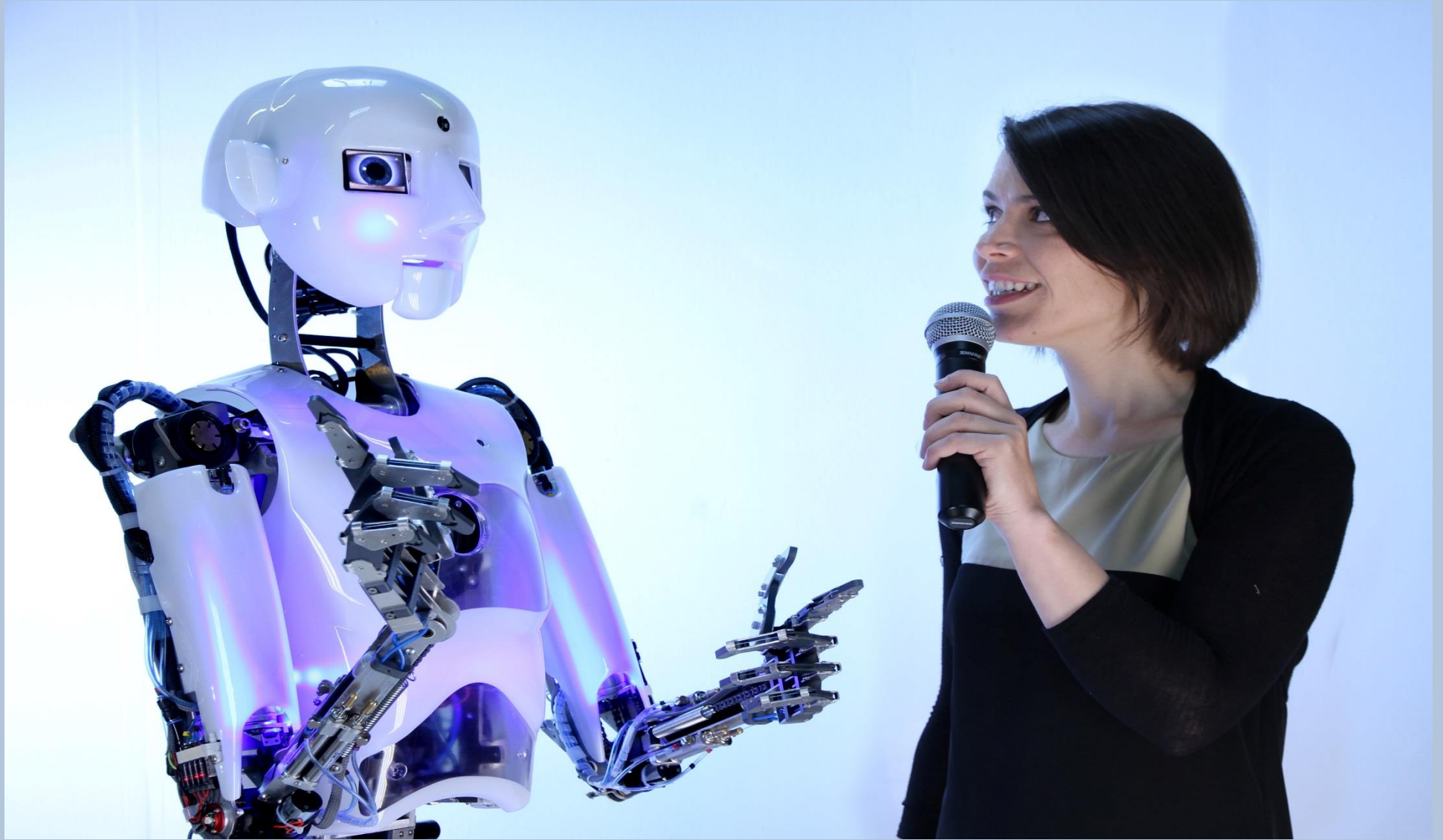
Water Quality

Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Emutex (Limerick) produces software for connecting vending machines



New digital products– Engineered Arts in Britain



CONNECTIONS

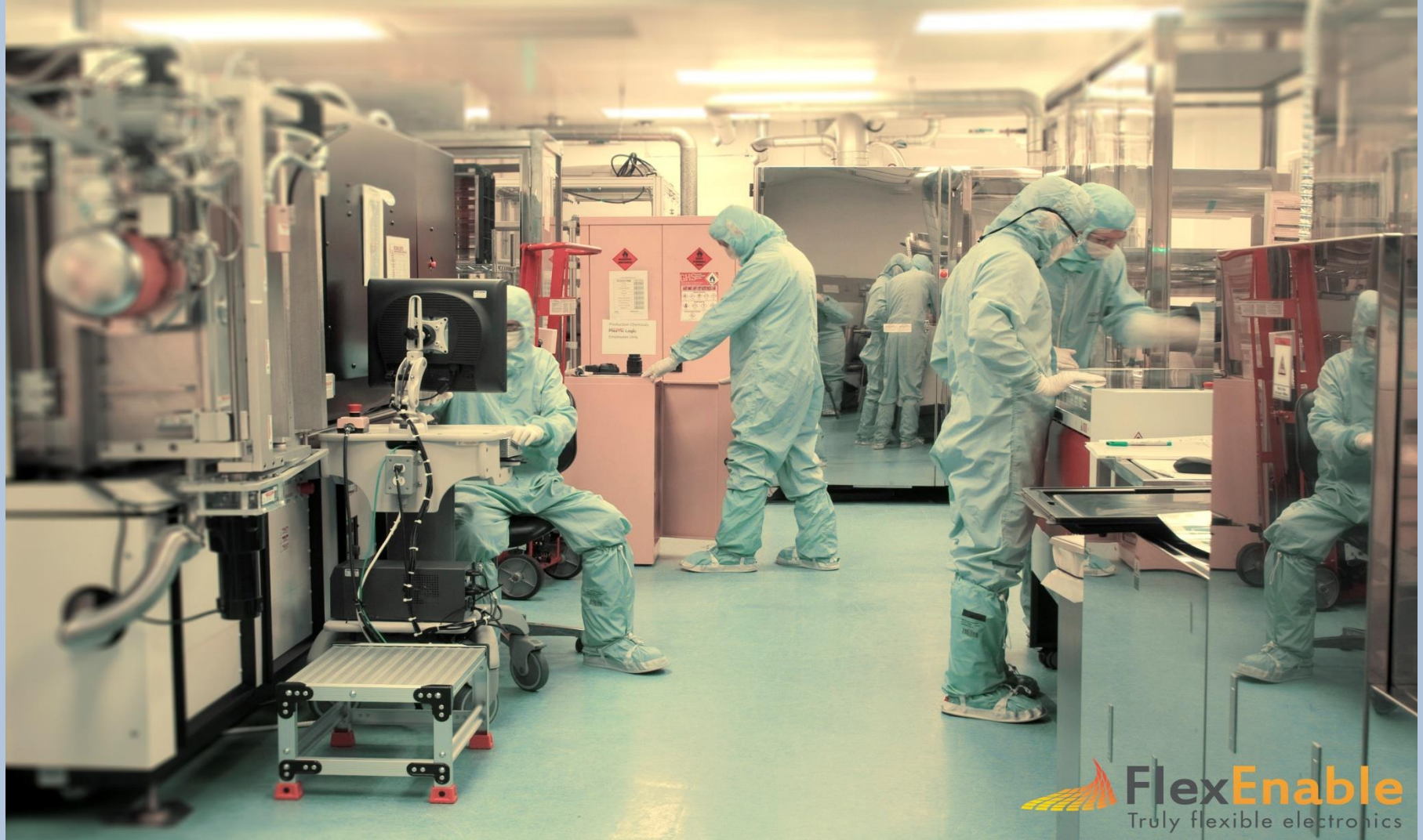


PCH (Ireland): global force in manufacturing organisation/supply chains



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)



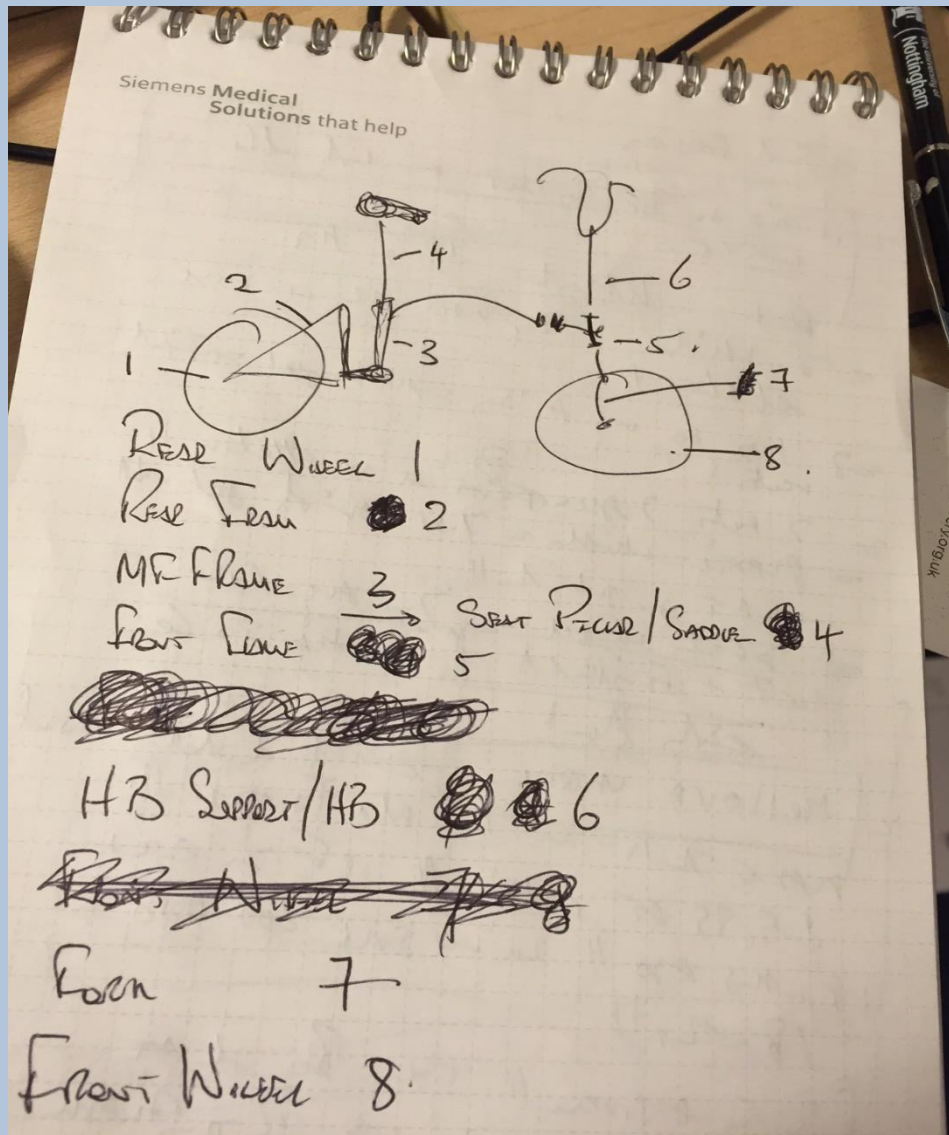
Startups also need to make connections: Oryx Lifestyle in Qatar



CRAFT



Brompton Bicycles: “simple” product, ingenious design



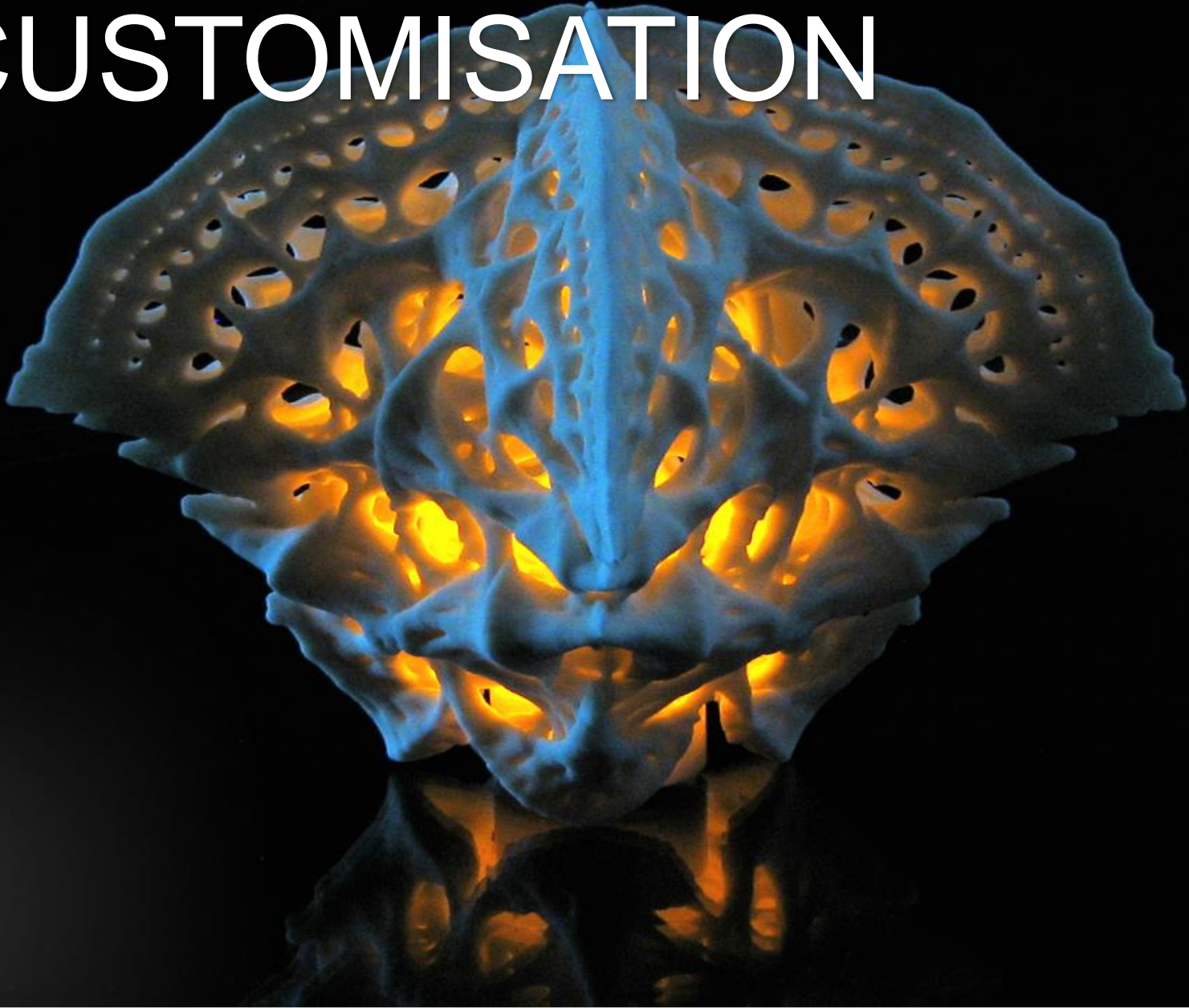
Craft not computers is the key



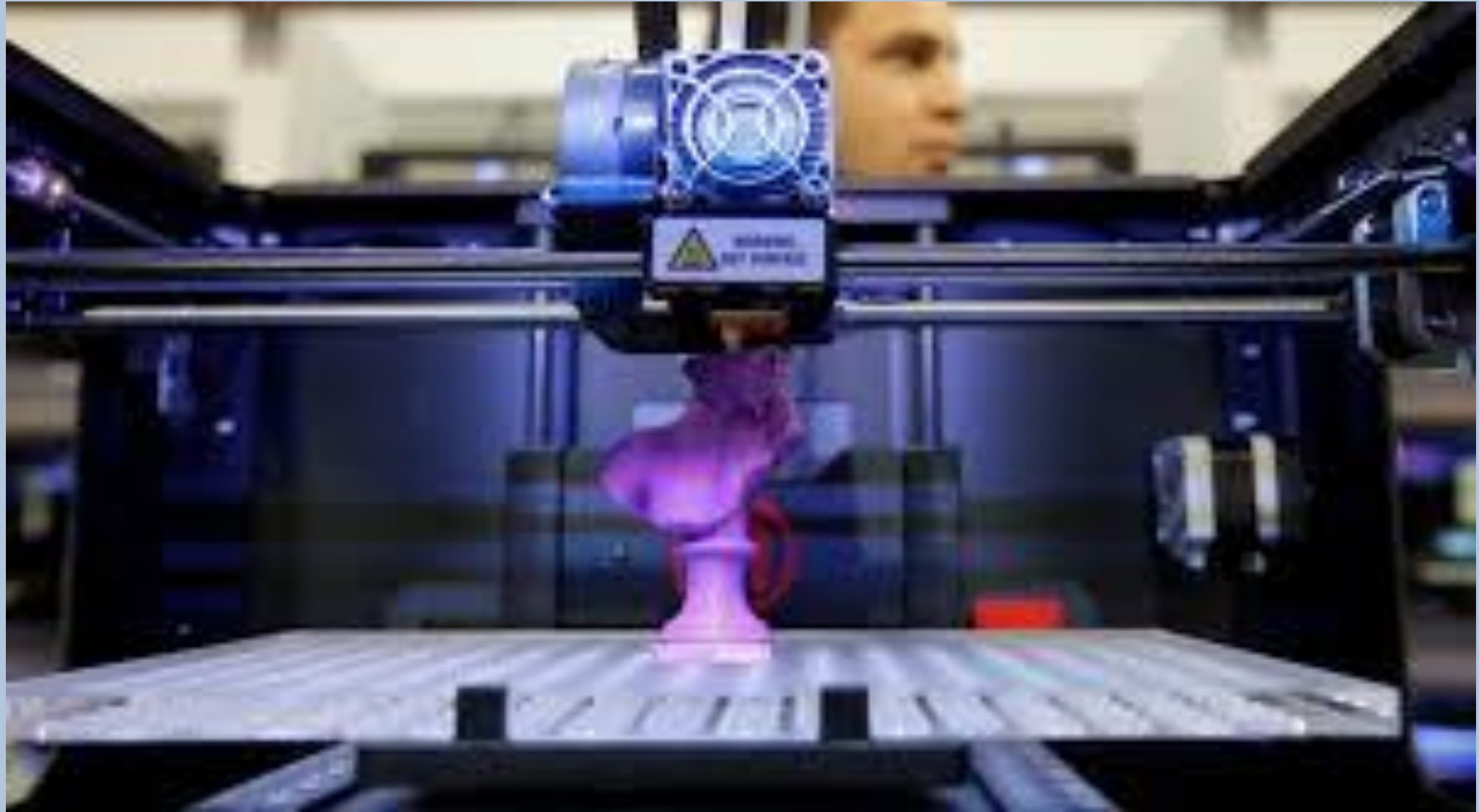
Sold in the world, made in London



CUSTOMISATION



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

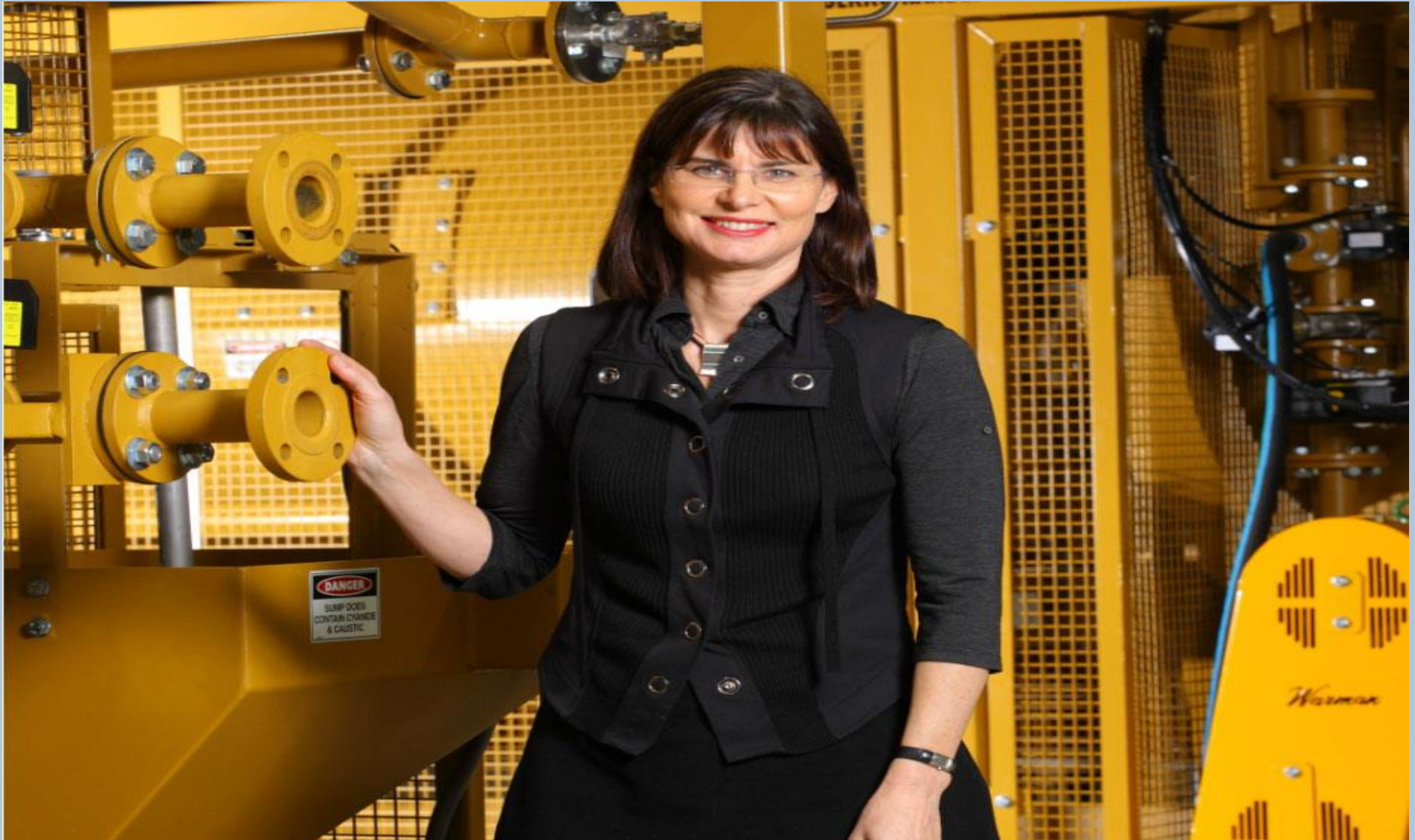


view: Header and Footer: Fixed date

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



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



NICHE FOCUS



'View-Header and Footer-Fixed date'

'Select View-Header and Footer' and insert footer text for all slides

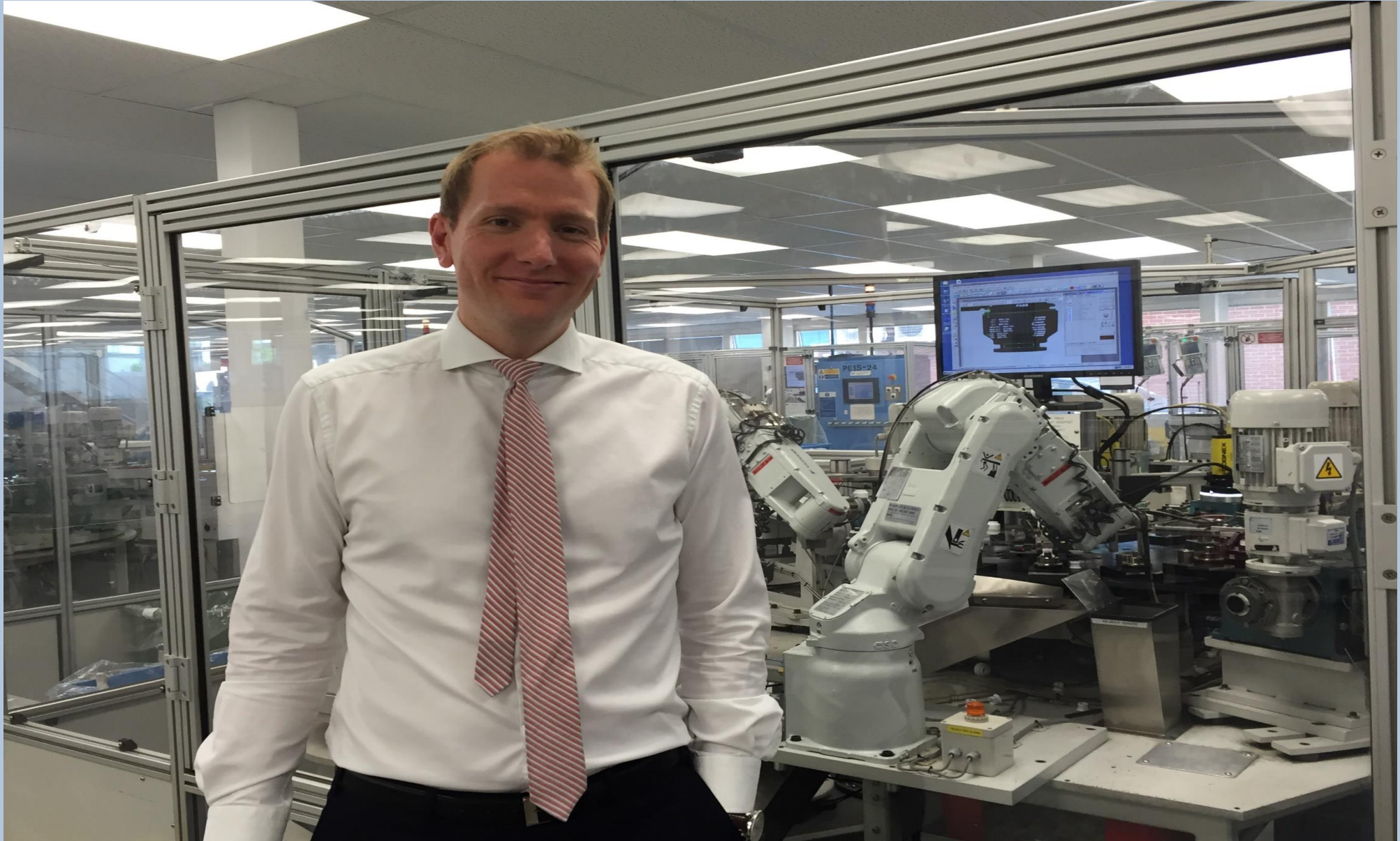
Air Tractor of Texas flies forward in the narrow field of crop sprayers



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



John Guest pipe fittings specialist (London)



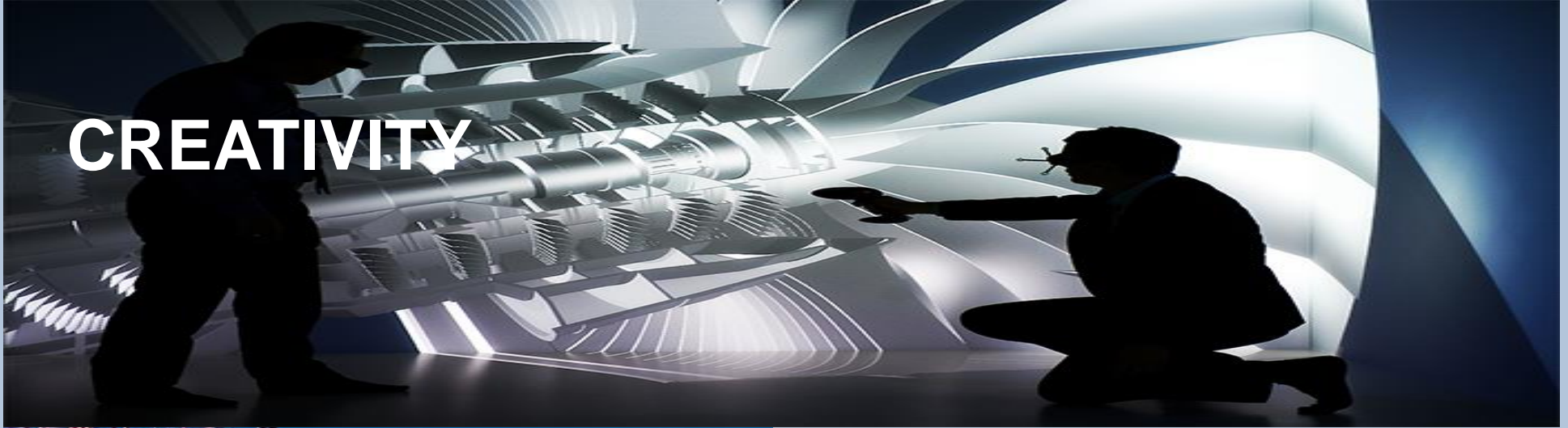
Massive investment in machinery



Saying No to outsourcing: company owns its own guard dogs



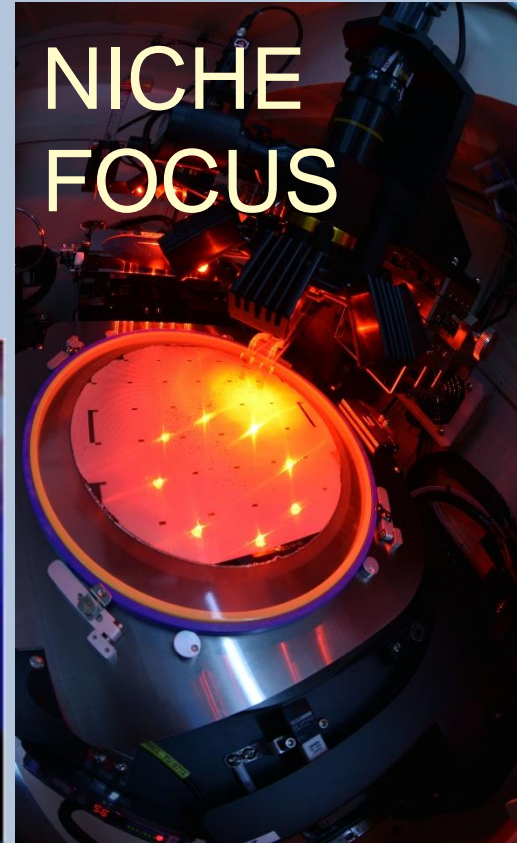
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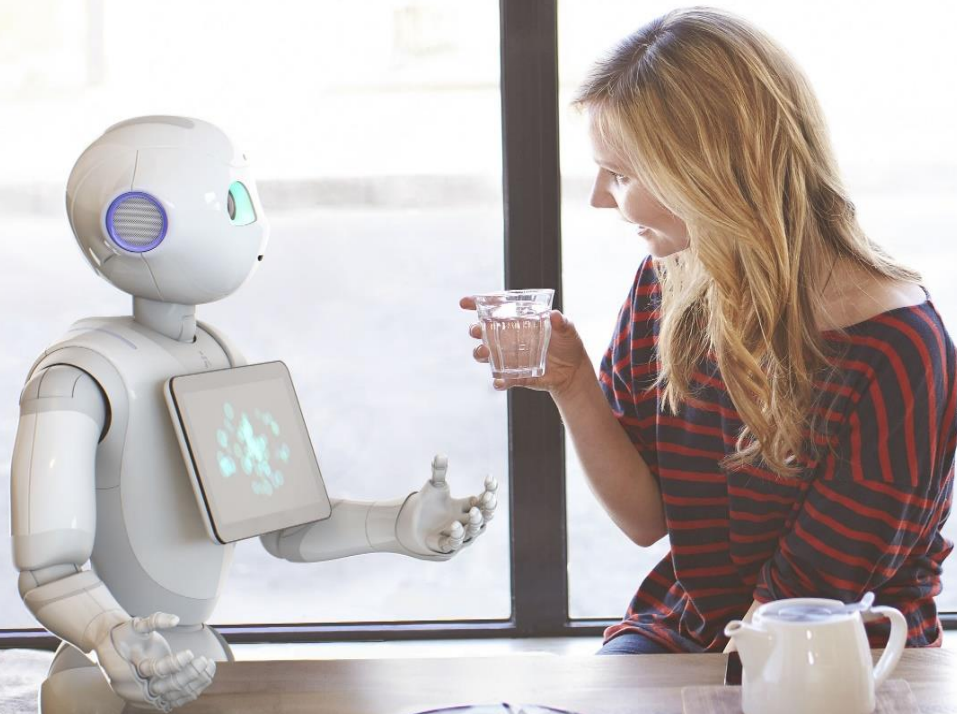
**SERVICE
THINKING**



CUSTOMISATION



EDUCATE, DISCUSS, PARTICIPATE



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





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