FLANDERS MAKE

JOINING FORCES FOR A NEXT GENERATION MANUFACTURING INDUSTRY IN FLANDERS

Economic trade mission of the Grand Duchy of Luxembourg to Flanders
24th November 2016

FLANDERS MAKE
MANUFACTURING INNOVATION NETWORK

EcoMechatronics : smart machines, new applications

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FLEMISH INDUSTRY MOTOR OF THE ECONOMY

- 15% of the total added value in Flanders
- 80% Flemish export
- 80% private R&D spending in Flanders
- Higher productivity growth (Belgium 1995-)
  - Industry: +2.02% annually
  - Economy: +0.76% annually
- Indirect job creation
- High and low-skilled employment

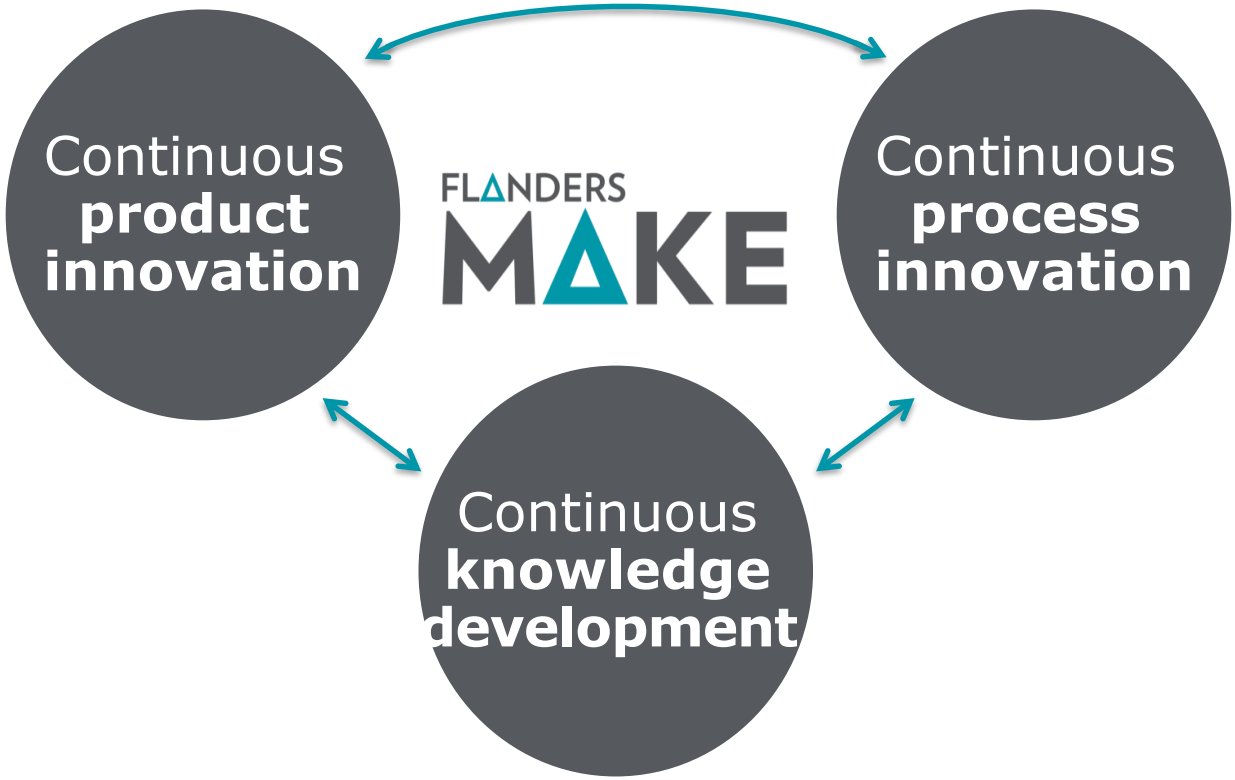
Megatrends and manufacturing

- changing **demographics** (growing world population, ageing societies, increasing urbanisation)
- globalisation and future markets
- scarcity of **resources** (energy, water, other commodities)
- the challenge of **climate change** (increasing CO2, global warming, ecosystem at risk)
- dynamic **technology and innovation** (ICT and virtualisation, technology diffusion, the age of life science, ubiquitous connectivity, sensing and digitalisation)

- **global knowledge society** (know-how base, gender gap, war for talent, multiplication of data and information)
- **mass customisation** (personalised customisation)

How to maintain/increase our manufacturing capacity

ECOSYSTEM, HOLISTIC APPROACH OF MANUFACTURING IN FLANDERS



Mission Flanders Make

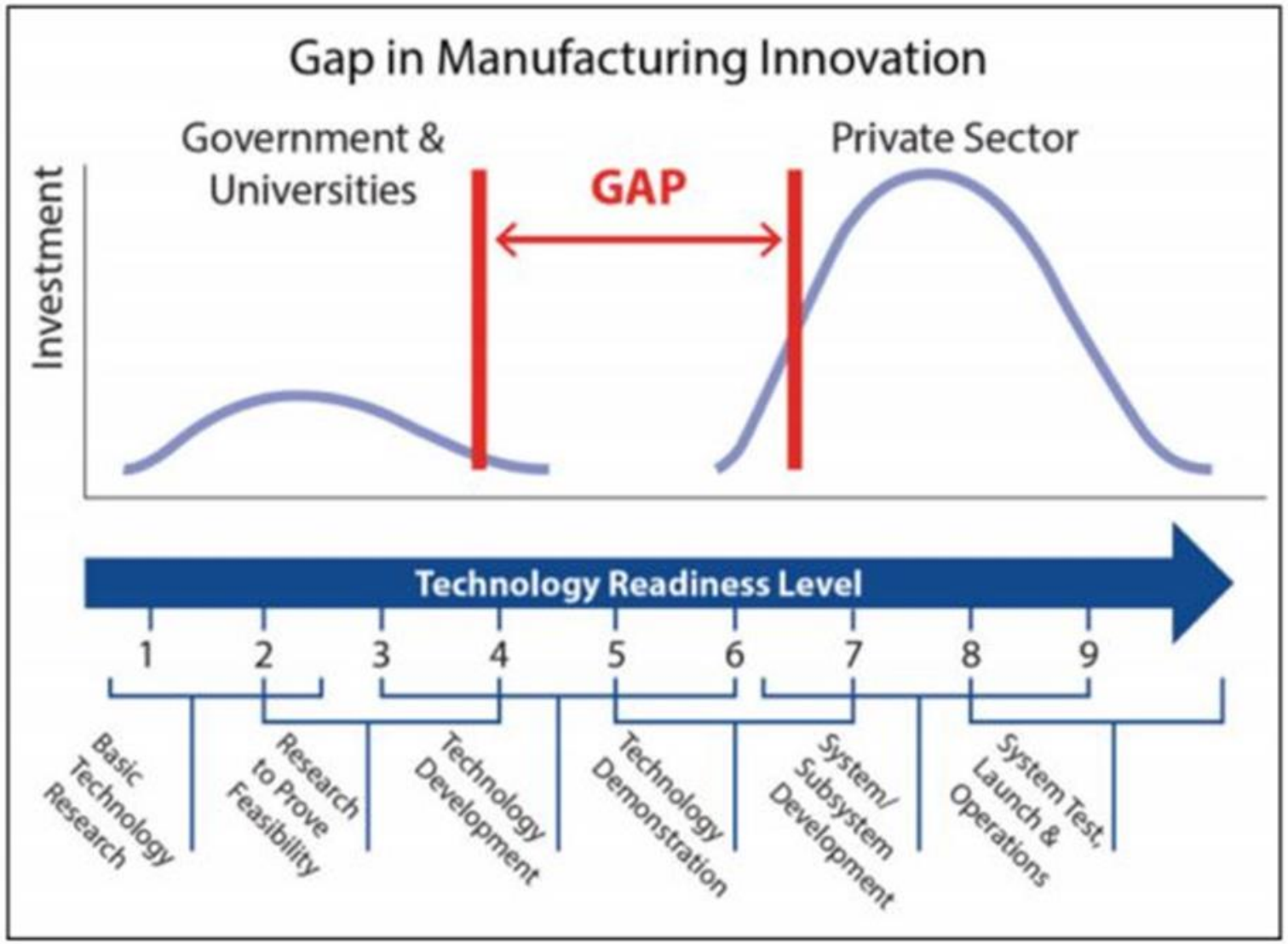
To strengthen the **long-term international competitiveness** of the Flemish manufacturing industry by carrying out **excellent, industry-driven, pre-competitive research** in the domains of

- **Mechatronics**
- **Product development methods**
- **Advanced manufacturing technologies**

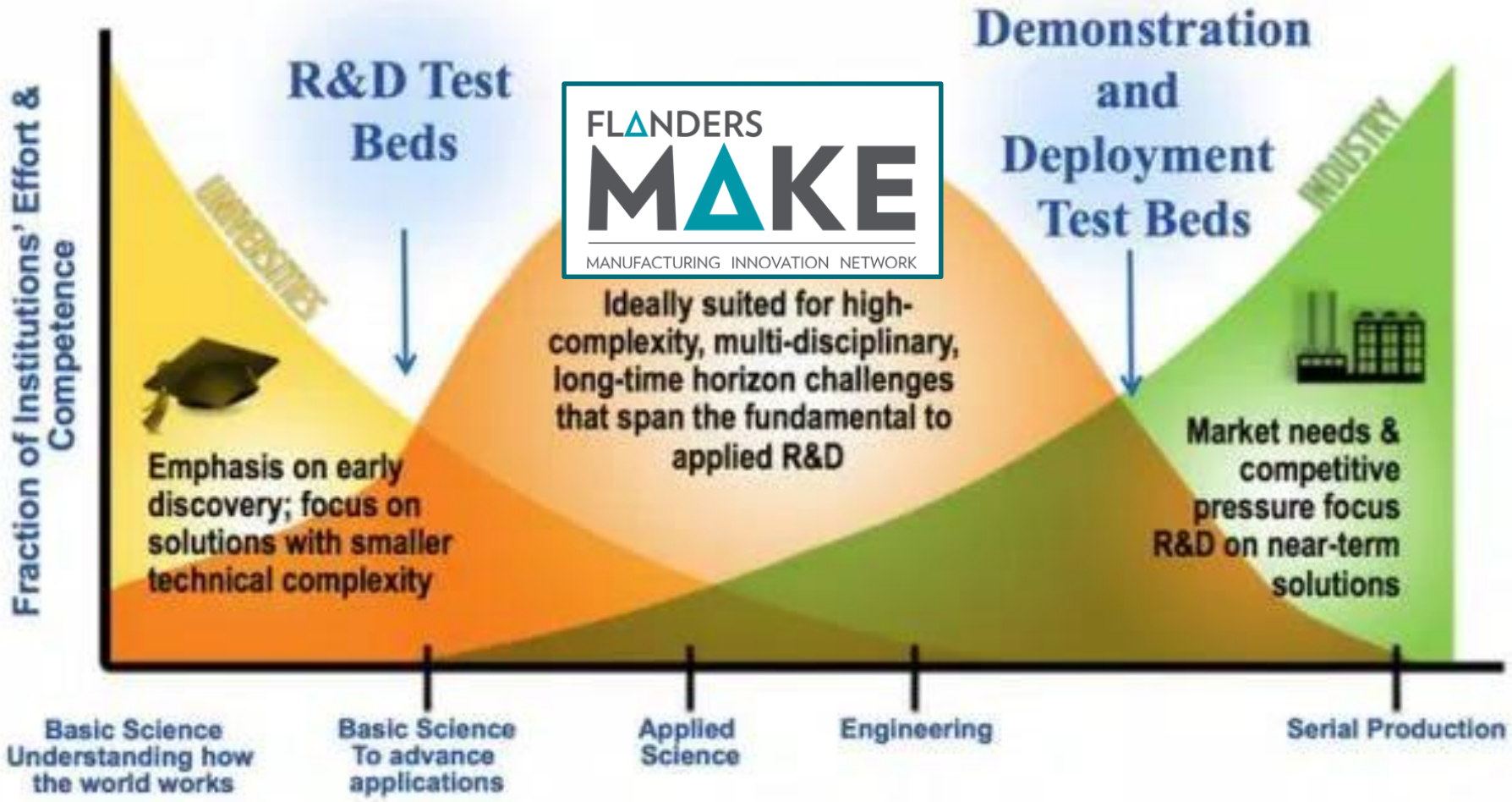


Aiming at **product & process innovation**
for the **vehicles, machines** and **factories** of the future

What : Valley of death in Research & Innovation



Bridging the "Valleys of Death"



Flanders Make focus : industrial orientation and valorisation of research

- A strong international network
- Excellent technological research
- State-of-the-art research infrastructure

Academic research

KU LEUVEN

Universiteit Antwerpen

UNIVERSITEIT GENT

universiteit hasselt

Vrije Universiteit Brussel

Applied research

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INDUSTRY

Industrial research

Joining forces, growing stronger!

Flanders Make

Flanders Make: strategic priorities

Autonomous & green vehicles

Smart interconnected machines

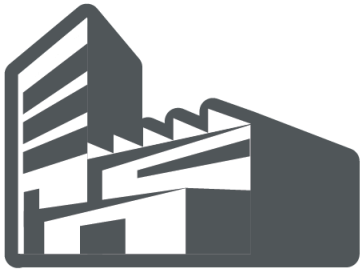
Agile production

Technology competences

Infrastructure based services

Research programs

- Clean energy-efficient motion systems
- Smart monitoring systems
- Autonomous systems
- Intelligent product design methods
- Smart and lightweight structures
- Additive manufacturing for serial production
- Manufacturing for high precision components
- Agile & human-centered production and robotic systems



Flanders Make: first year achievements

- Broad network incl. 80 members companies
- Team of 400 top researchers

- >30 new research projects since mid 2014
  - with >35 large companies & SME's
  - focus on collaboration/open innovation
  - € 50 million research investment

COOPERATIONS POSSIBILITIES & INNOVATION RESULTS

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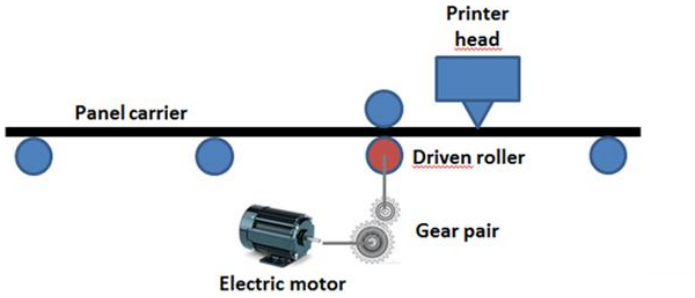
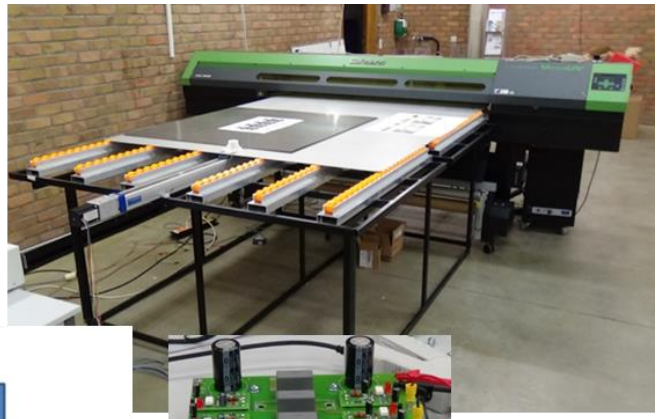
Cooperation possibilities

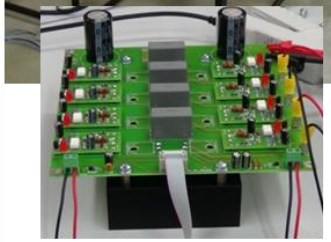
- Bi-lateral contracts with Industry
  - Use of FM infrastructure for testing and validation
  - Contract research using Flanders Make competences
- Government funded
  - Contract research within R&D projects
- Flanders Make funded
  - ICON projects (generic problems with valorisation on industrial cases)
  - SBO projects (user group participation, use case contribution)

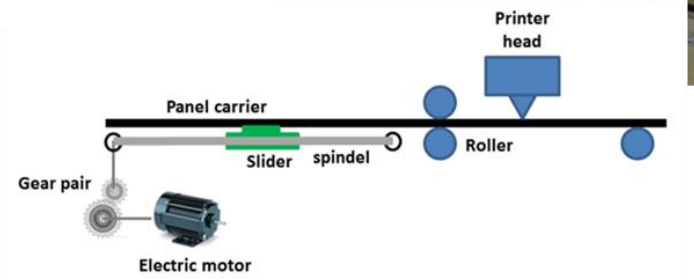
Cooperation possibilities

- Bi-lateral contracts with Industry
  - Use of FM infrastructure for testing
  - Contract research using Flanders Make network competences





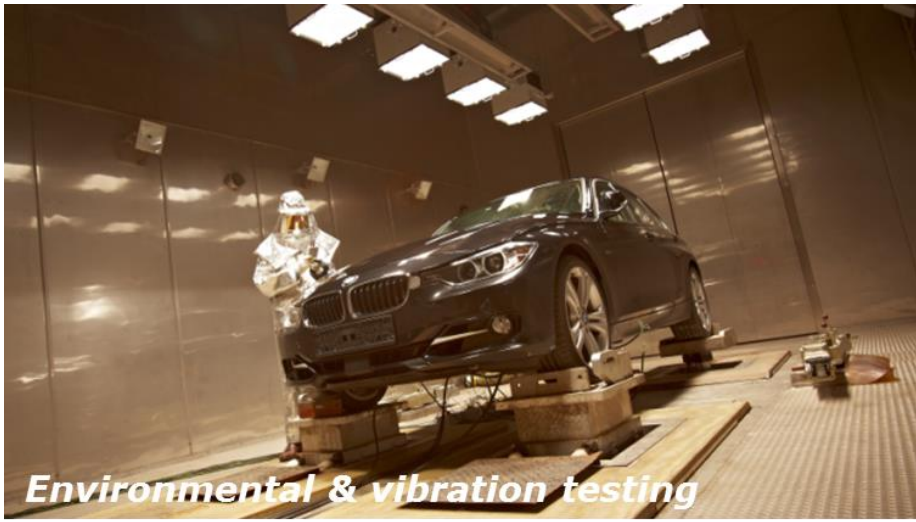




Cooperation possibilities

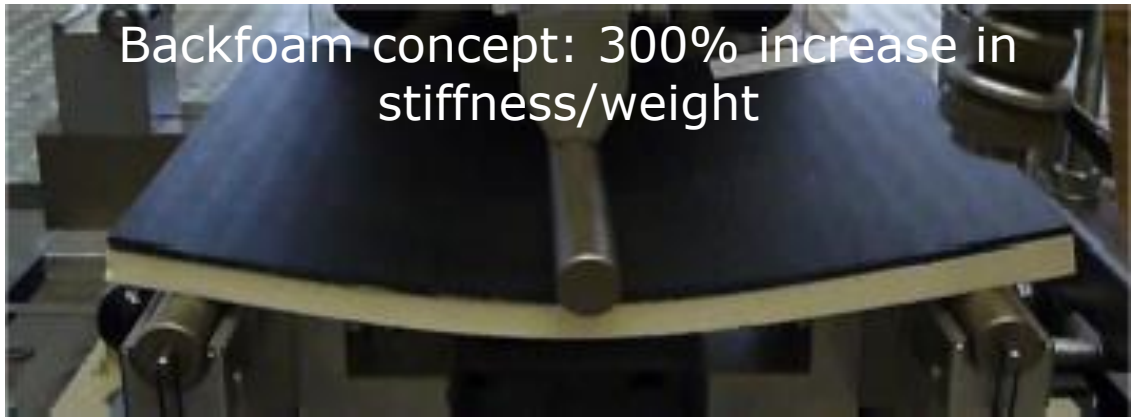
- Bi-lateral contracts with Industry
  - Use of FM infrastructure for testing


Battery testing


Environmental & vibration testing

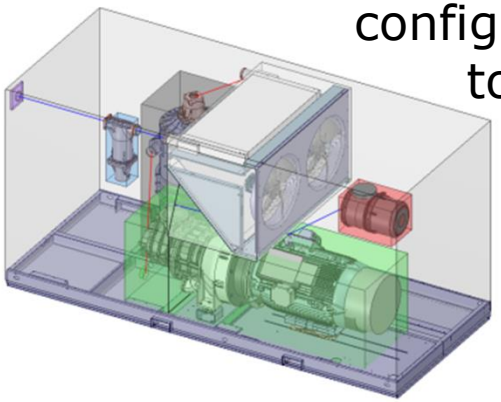
Valorisation results

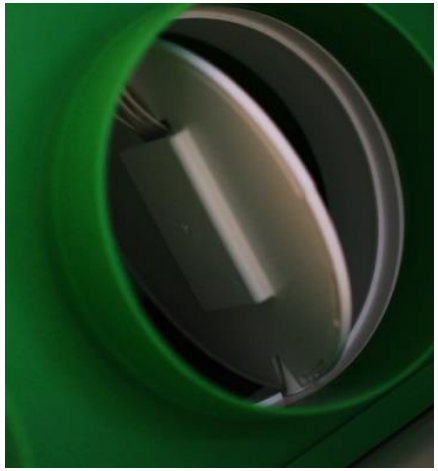
Optimal gearshift control



Valorisation results

Optimal compressor configuration tool

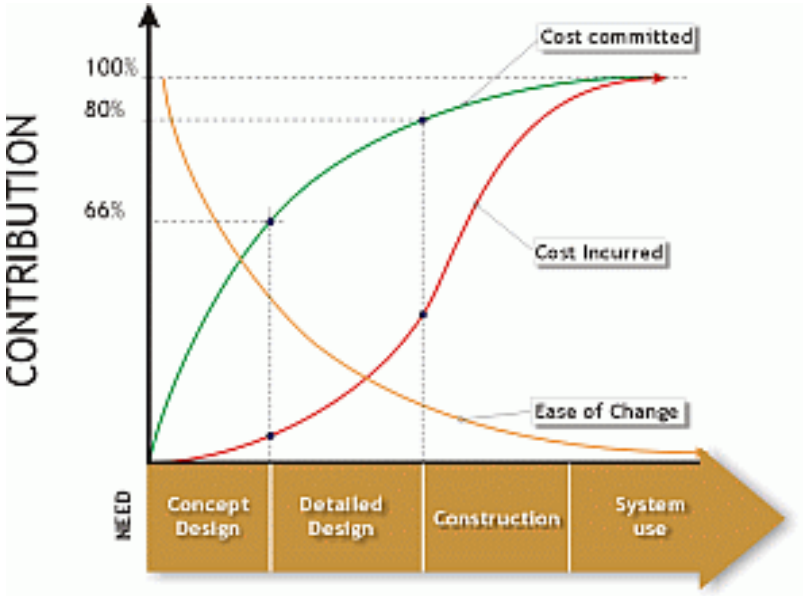


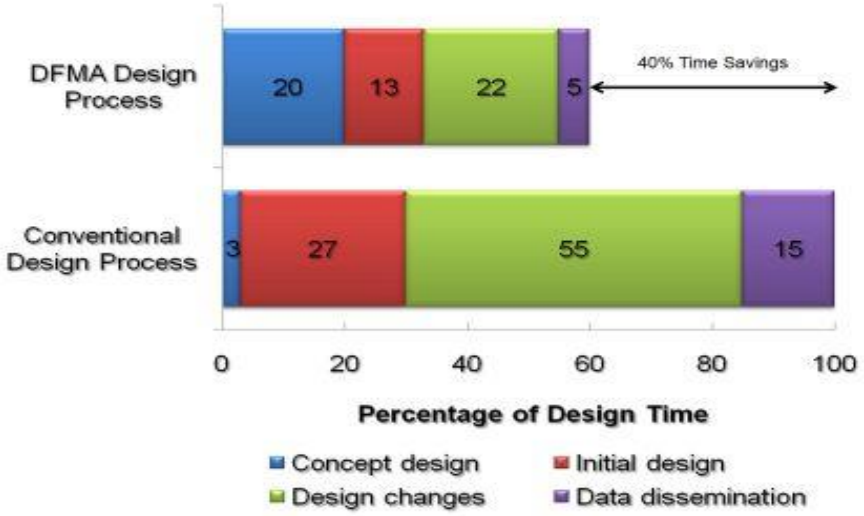


Autarkic valve for air ducts

Design For Manufacturing (production of components) and Assembly (assembly components)

- This allows to:
  - Recognize manufacturability and assembly issues early – during conceptual phase
  - Shorter time to market
  - Reduce costs and improve quality through design leverage

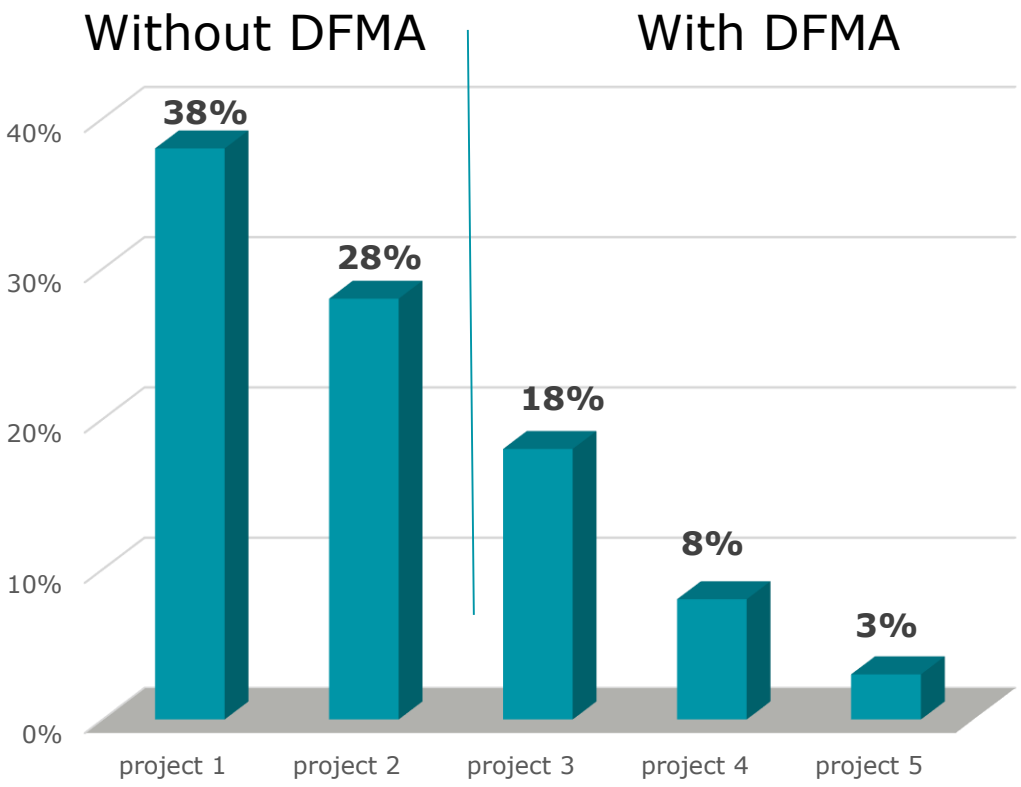




Results: industry case

number of changed drawings after launch related to manufacturing and assembly issues

total number of initial drawings



INDUSTRY 4.0 @ FLANDERS MAKE

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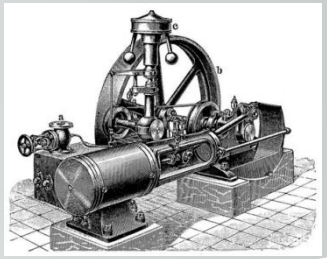
The 4th Industrial Revolution - *„Industry 4.0“*

Drivers

Quality of life
Engineering Sciences

1st

Steam engine



GB

1782

Power generation
Mechanical automation

Mobility

2nd

Conveyor belt

US

1913

Industrialization

µ-electronics

3rd

Computer, NC,PLC

US/EU

1954

Electronic Automation

ICT

4th

Cyber Physical Systems

EU

2015

Smart Automation

Everything gets smart(ER)

Smart phones

Smart Homes

Smart Cars

Smart Factories

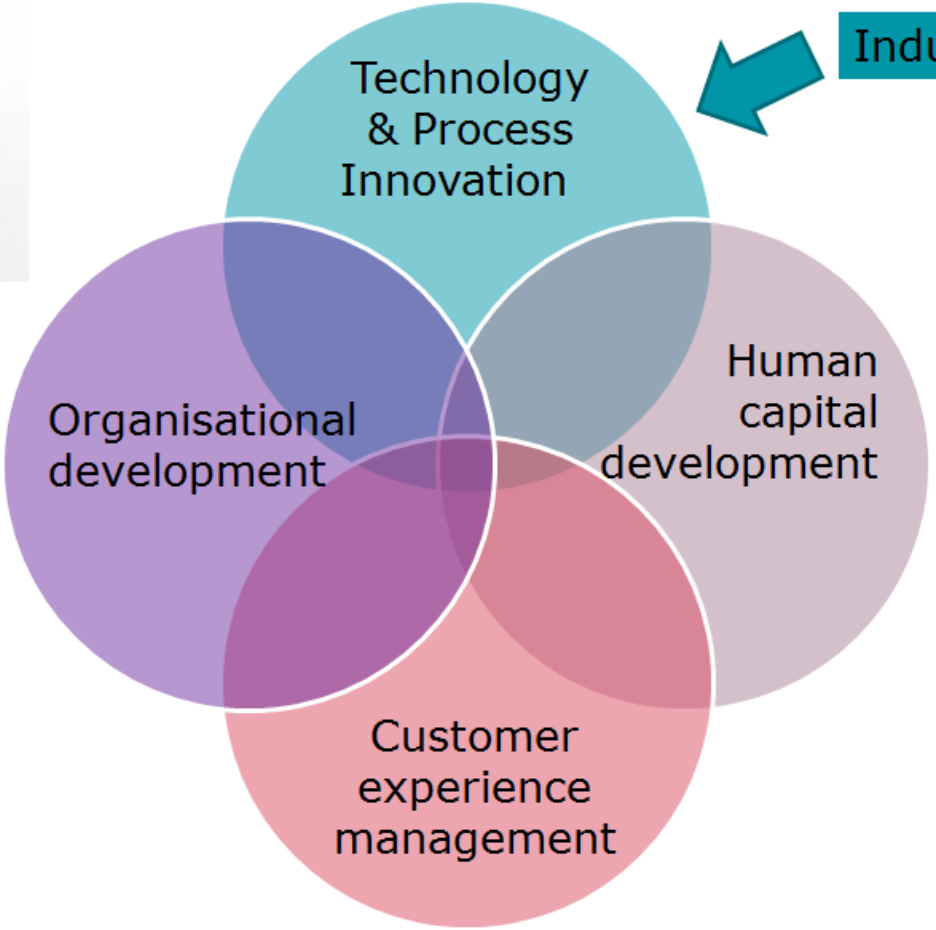
Market Pull

Technology Push

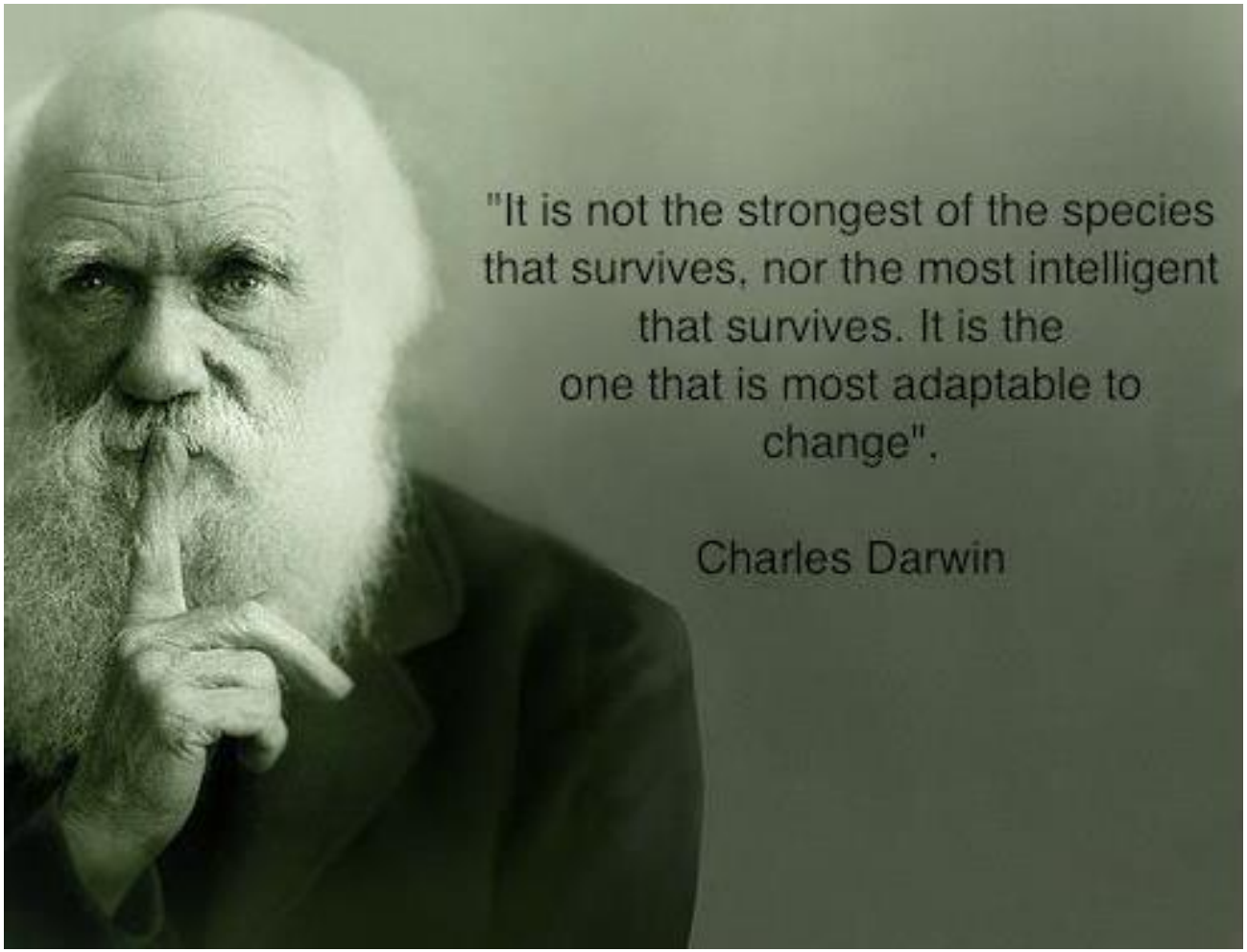
How to cope with trends and challenges? Sustainable growth

Flanders Make

Industry 4.0



Change


"It is not the strongest of the species
that survives, nor the most intelligent
that survives. It is the
one that is most adaptable to
change".
Charles Darwin

FROM INDUSTRY 3.0 TO INDUSTRY 4.0

Industry 3.0: Automatisation

Use of electronics and IT in production environment for further automisation

- Standardized products
- Batch production
- Periodic production planning
- Periodic market perdictions based on high-level data
- Random quality checks and control
- Periodic reprogramming of machines
- Computer Aided Design (CAD) used for the design of factories

Industry 4.0: Digitisation

Autonomous production at the highest level of granularity

- Individual production
- Custom made products
- Continuous adaptation of production
- Real-time prediction based on all available data
- Permanent quality control of all products
- Continuous learning of machines
- Complete virtueal simulation of factories

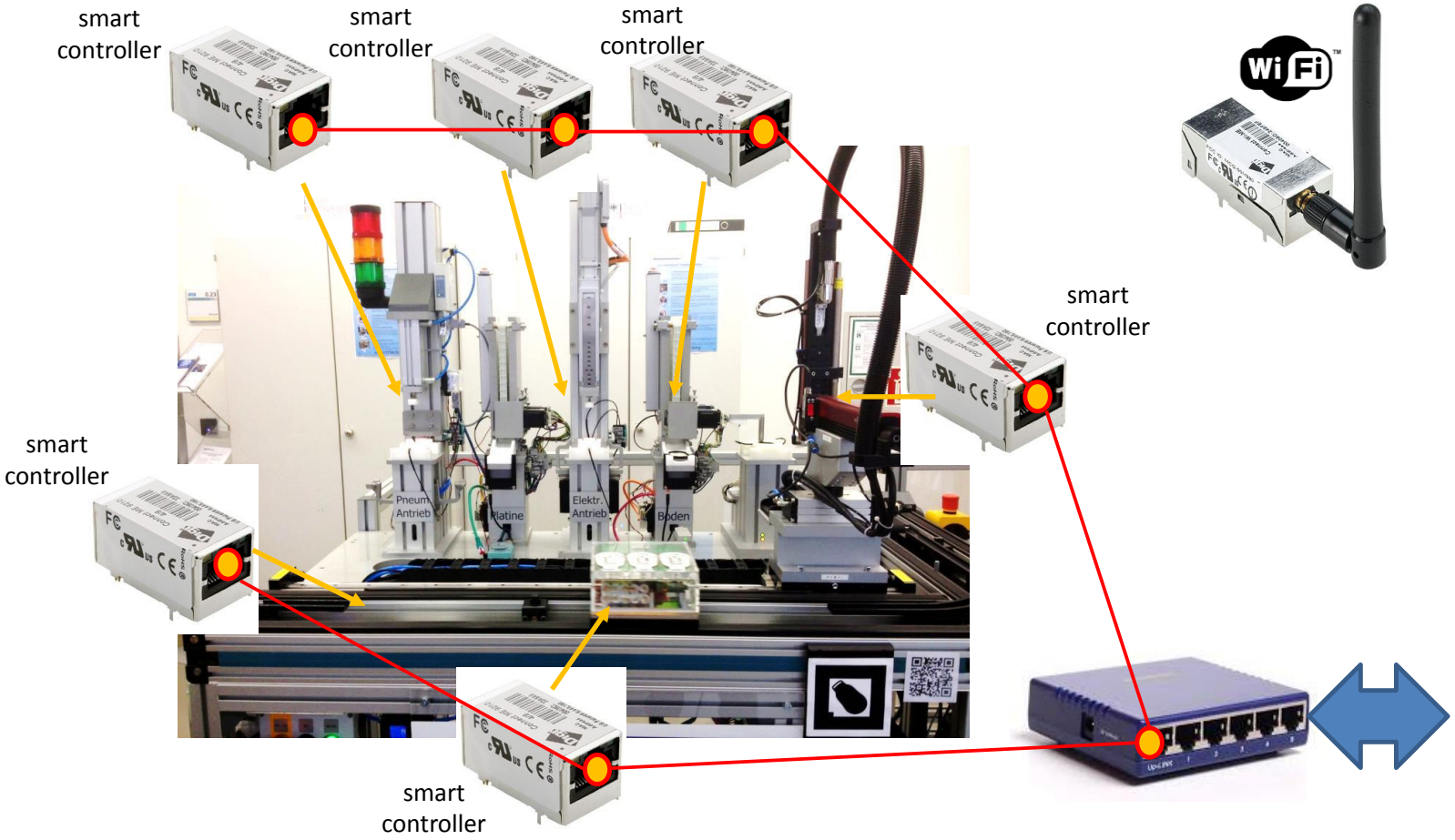
WHY INDUSTRY 4.0? CHALLENGES

- Flexible and efficient, aimed at customer specific manufacturing with lotsize 1 (at series cost)
- More focus on customer requirements
- New revenu form services and new business models
- Flexible cooperation in production networks
- Quality improvement
- Reduction of cost of quality (first time right)
- Shorter leadtimes
- Higher flexibility
- Lower total cost (by elimination/reduction/…)

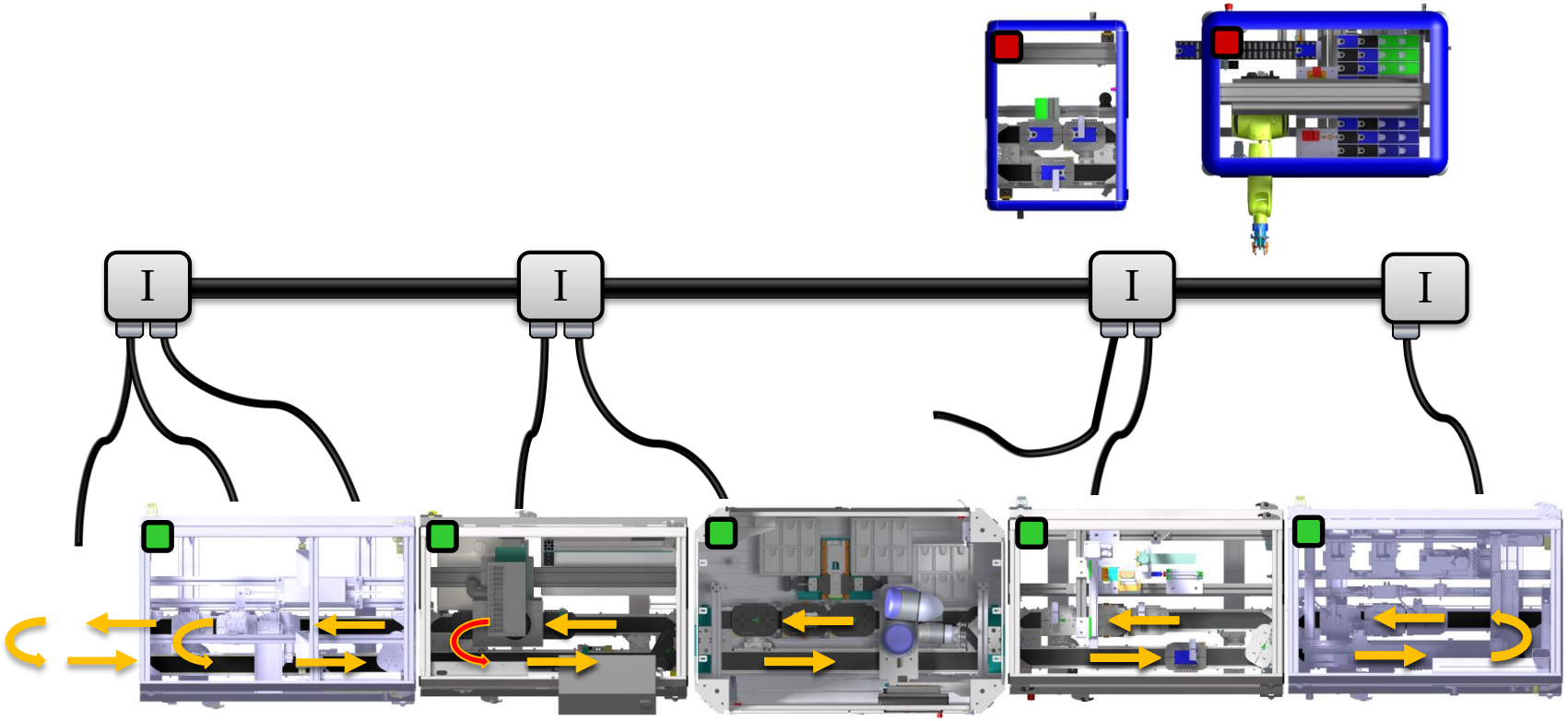
THE TECHNOLOGICAL DRIVERS BEHIND INDUSTRY 4.0

- Cyber Physical Systems
- Internet of things, services and people (IOT)
- Virtualisation

SMART MACHINES

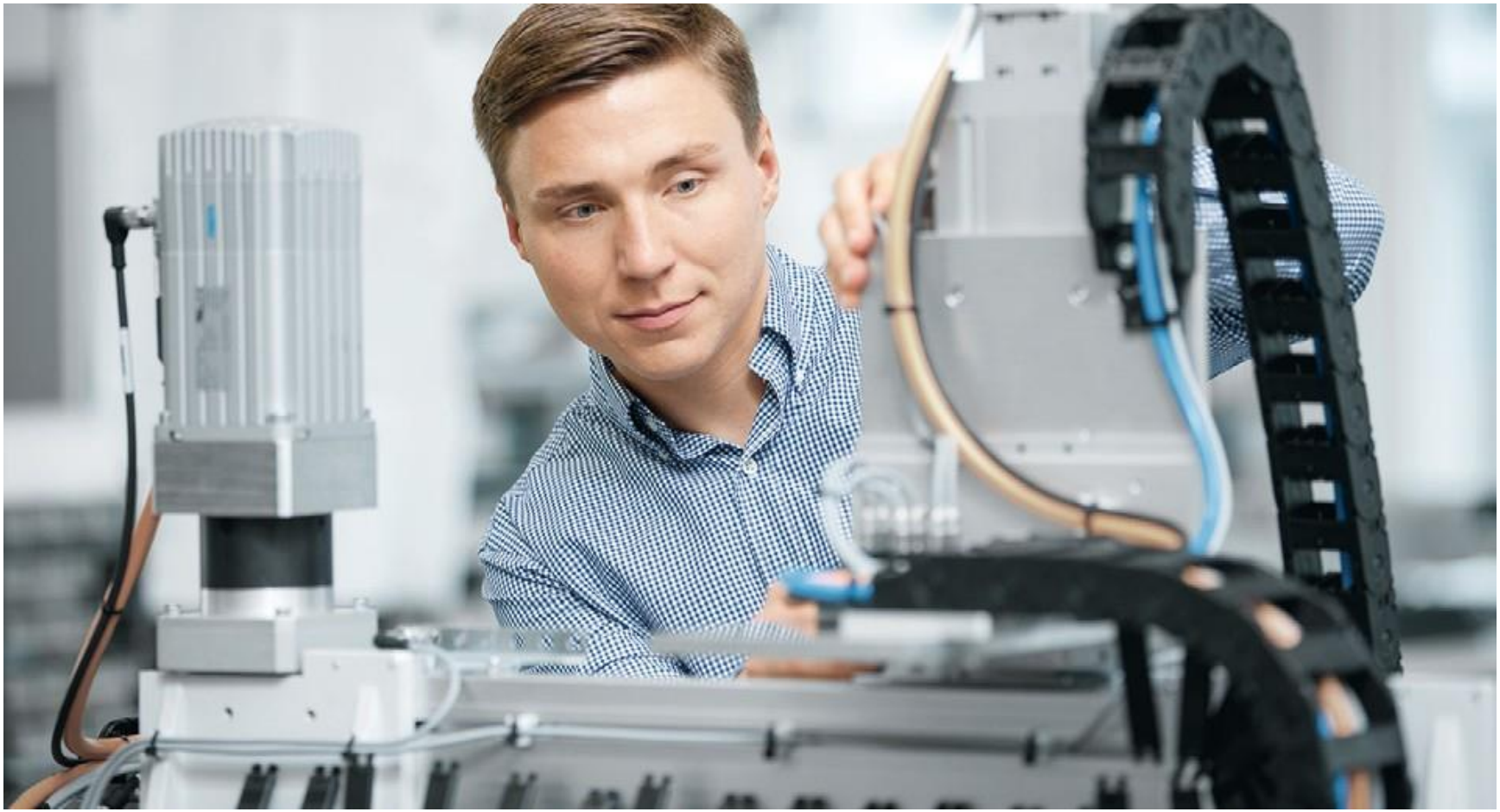


SMART PRODUCTION SYSTEM (PLUG AND PLAY)



No need for upwards communication

WORK 4.0



WORK 4.0

- **Man as CPS** - Human-centered production systems
- **People skills**, life long learning and education (technology acceptance and work design)
- **New employment relations**

CONCLUSION:
THE FUTURE OF MANUFACTURING

- **The manufacturing industry matters!**
- **Flanders Make**, a **catalyst in the transformation** of the manufacturing industry in Flanders
- **The future is in** high specialization, open innovation and becoming smarter, greener, faster and highly interconnected (industry 4.0)
- **Flanders can be world class** in specialised technologies and in innovation-driven B2B niche markets

THANK YOU

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