

FLANDERS
MAKE

DRIVING INNOVATION IN MANUFACTURING

**RESEARCH
CENTRE FOR THE
MANUFACTURING
INDUSTRY**

1

FLANDERS
MAKE



**Innovation challenges in Industry 4.0
: a practitioner's view**

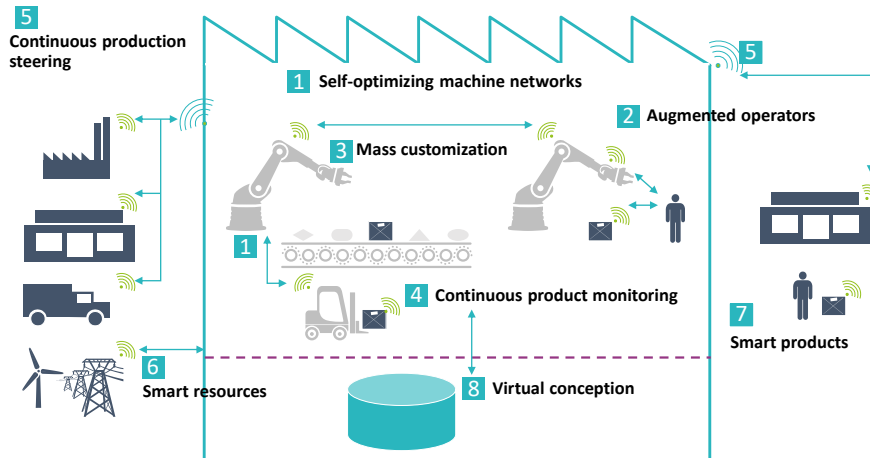
**dr.ir. Dirk Torfs,
Flanders Make & EARTO
May 17, 2019, 2nd Gloria Workshop**

2



INDUSTRY 4.0 IS COMBINATION OF EIGHT DISTINCT FUNCTIONAL LEVERS IN THE MANUFACTURING CHAIN

Industry 4.0 functional characteristics

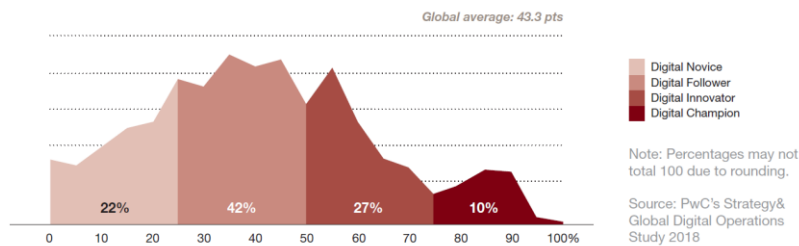


Source: Roland Berger, 2015

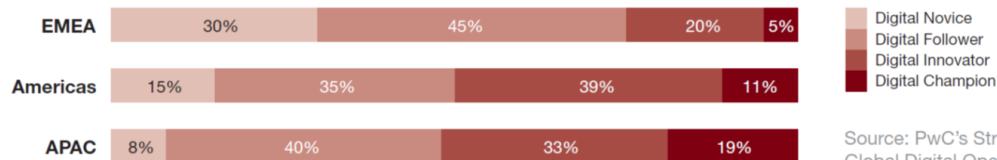
3

Industrial Challenges: maturity

Distribution of digital maturity levels



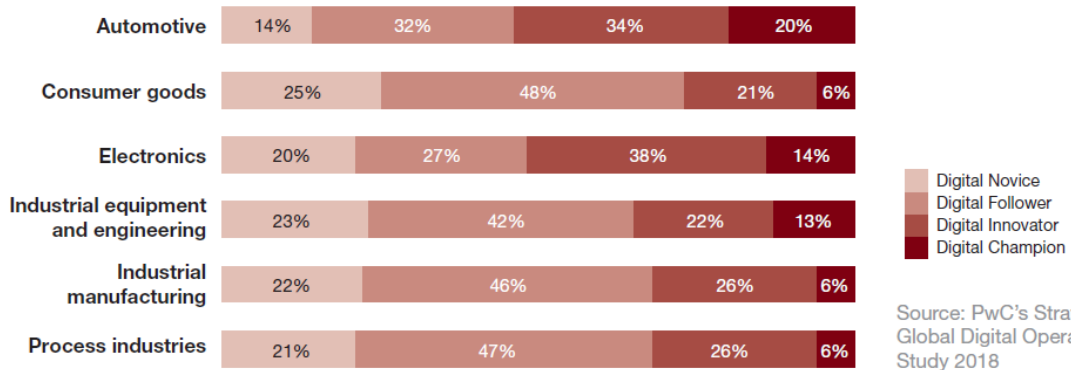
Levels of digital maturity by geographic region



4

Industrial Challenges: revenue transformations

Levels of digital maturity by industry

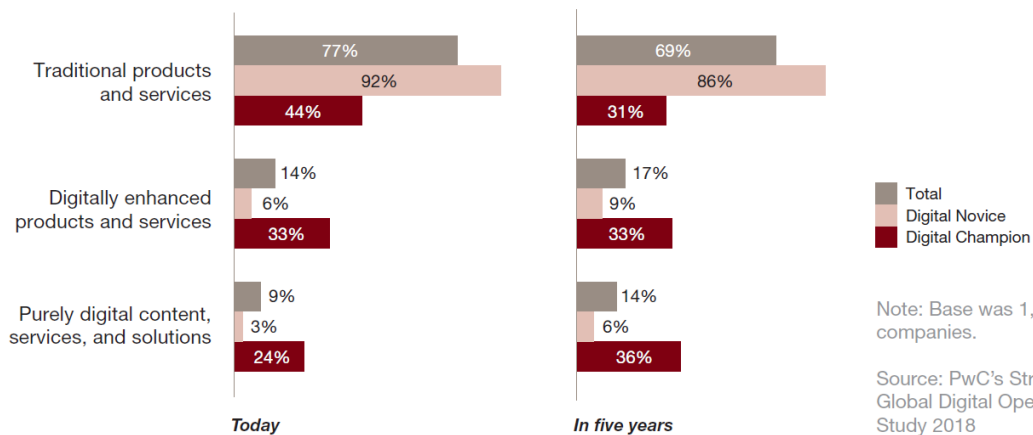


5

Industrial Challenges: sector maturity

Digital Champions achieve high revenues with digital products and services

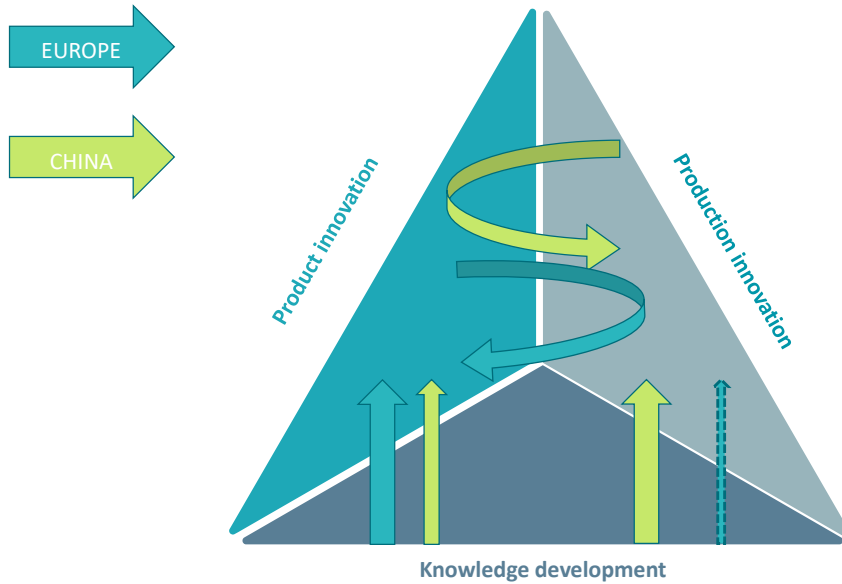
What is the composition of your revenue today and in five years?



6

EUROPE AND CHINA APPROACH TO PRODUCT AND PRODUCTION INNOVATION

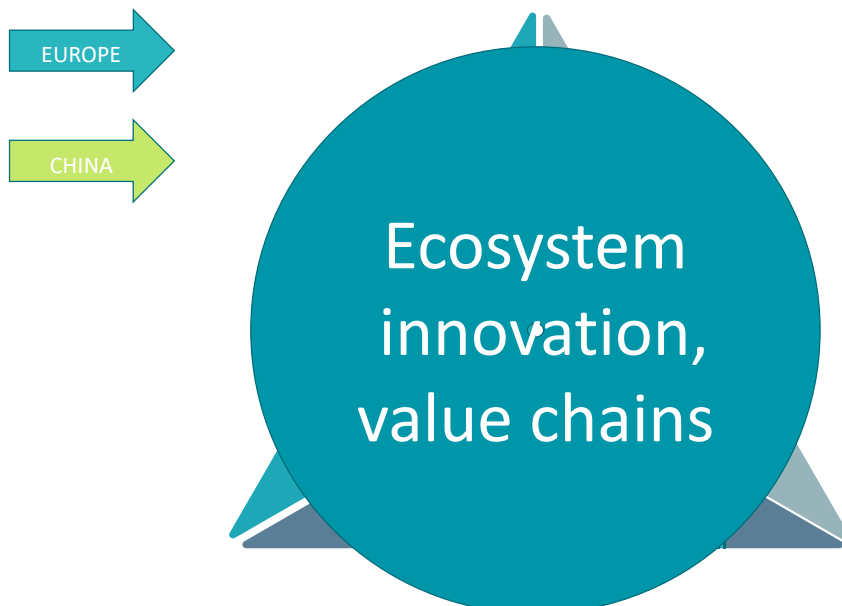
FLANDERS
MAKE



7

EUROPE AND CHINA APPROACH TO PRODUCT AND PRODUCTION INNOVATION

FLANDERS
MAKE



8

Industrial Challenges



9

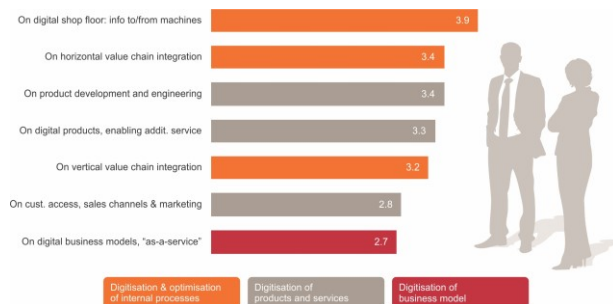
Flanders Make – PWC study: Hype or reality?

FLANDERS
MAKE
DRIVING INNOVATION IN MANUFACTURING



The potential to drive significant performance improvements, and we've not seen it all yet

Figure 6. Where do you see the biggest potential for digitisation and integration to improve your processes?

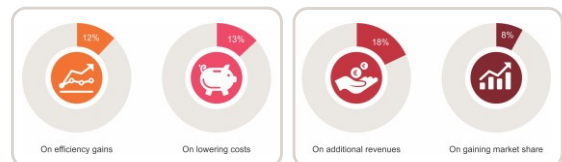


On a scale from 1 to 5 (1 = low and 5 = very high)

Figure 5. What cumulated benefits from digitisation do you expect in the next five years (cumulated percentage)?

Expected benefits
Bottom line potential
Overall consensus amongst participants

Application area's
Top line potential
2 distinct groups:
• low to no expectations
• Very high expectations > 30%



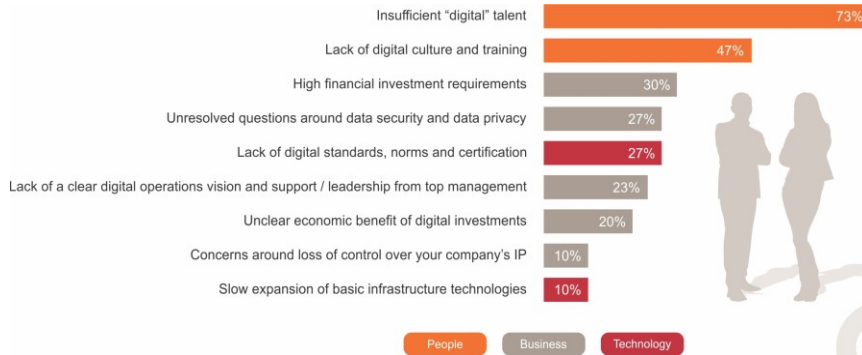
Flanders Make – PWC study: Hype or reality?

FLANDERS
MAKE
DRIVING INNOVATION IN MANUFACTURING

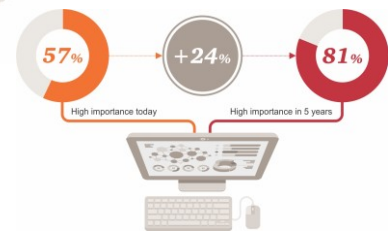


People & data unlock the value of transformation

Industry 4.0 challenges & inhibitors



Importance of data



11

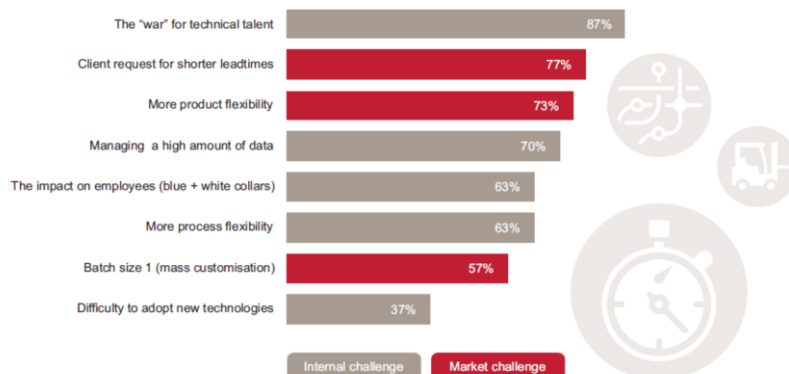
Flanders Make – PWC study: Hype or reality?

FLANDERS
MAKE
DRIVING INNOVATION IN MANUFACTURING

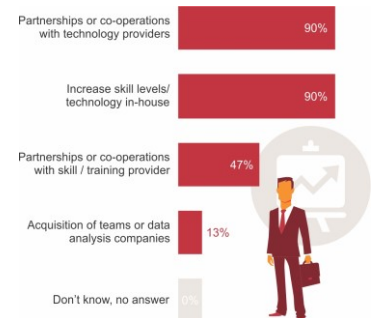


Meeting increasing consumer demands & partnerships

Figure 1. Which challenges do you see for your (manufacturing) processes in your industry?



Building capabilities

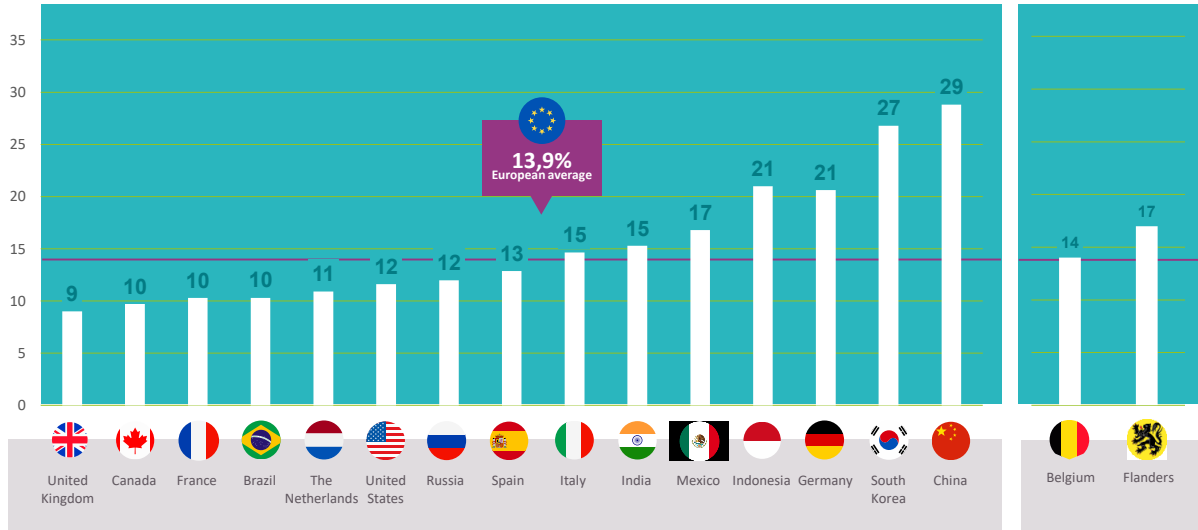


12

SHARE OF THE MANUFACTURING INDUSTRY

FLANDERS
MAKE

GDP of top manufacturing nations



13

FLANDERS MAKE

FLANDERS
MAKE

Top technological research driven by 3 transforming market trends



Smart, interconnected
products & production
systems



Customised products
at the price of
serial production

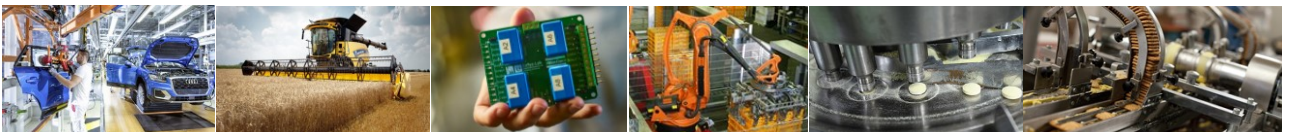


Sustainable,
human-centred
production



OUR AIM

Boosting the long-term competitiveness of top
high-tech companies and other innovation-driven companies



14

FLANDERS MAKE MEMBER NETWORK

FLANDERS
MAKE

2014:
#56

NUMBER OF
MEMBERS

2019:
#128



15

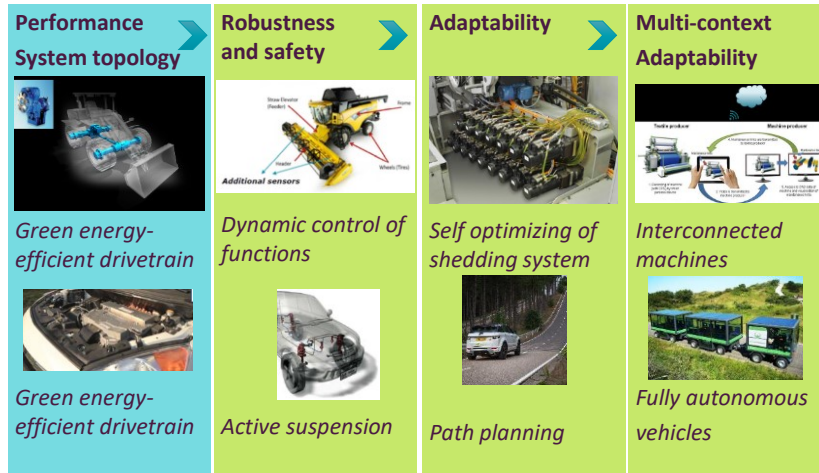
Industrial Challenges



16

Flanders make focus: machine (machines/vehicles) / product research

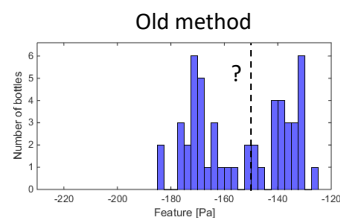
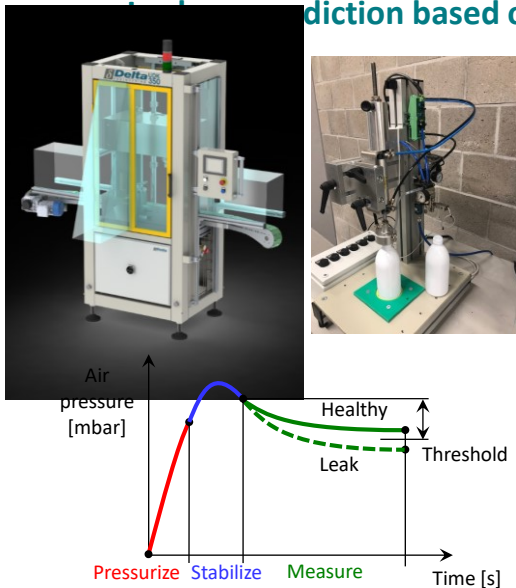
Systems with increasing smartness and interconnectivity



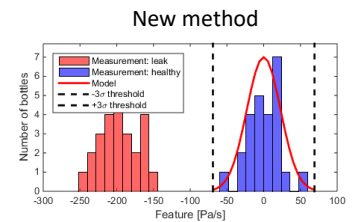
17

Predictive systems, no added sensors!

Prediction based on big data analysis



No clear classification
(simple feature + manually set threshold)



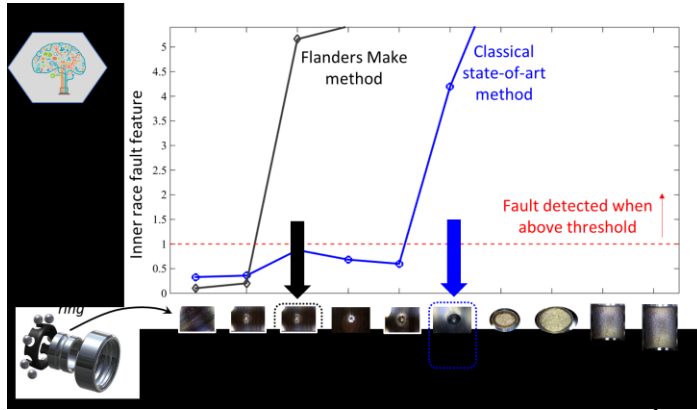
Clear classification
(advanced feature + trained threshold)

- 15 to 30% shorter cycle time
- Simplified commissioning from 7 to 4 parameters
- Minor hardware changes needed

18

Predictive maintenance with vibration monitoring system

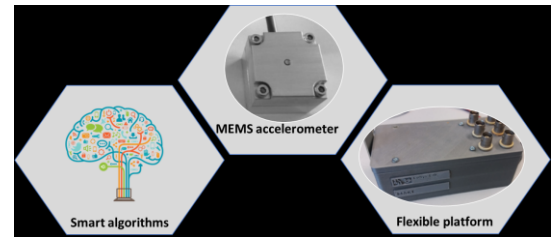
Detection 3 weeks before the failure



Algorithm diagnostic performance

- Low cost sensor
- Simple hardware for data exchange
- Robust smart algorithm to match performance of high end system

Building blocks



19

Industry 4.0 : Smart, Interconnected Products



20

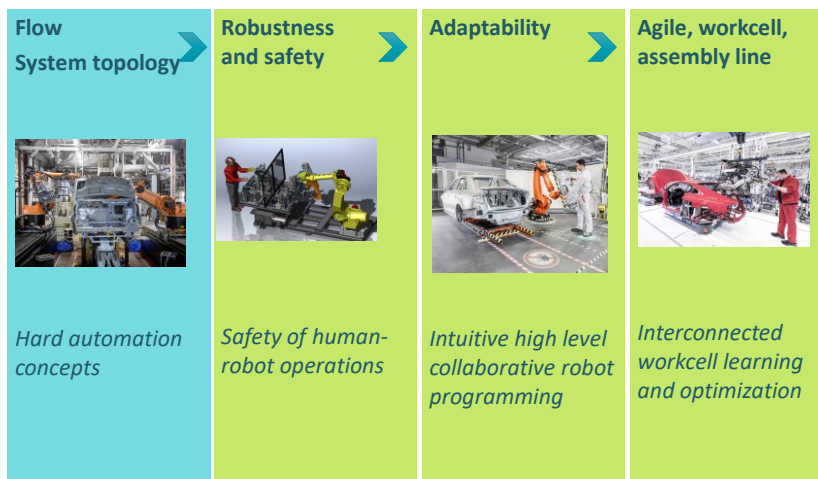
Industrial Challenges



21

Flanders make focus: assembly of complex products

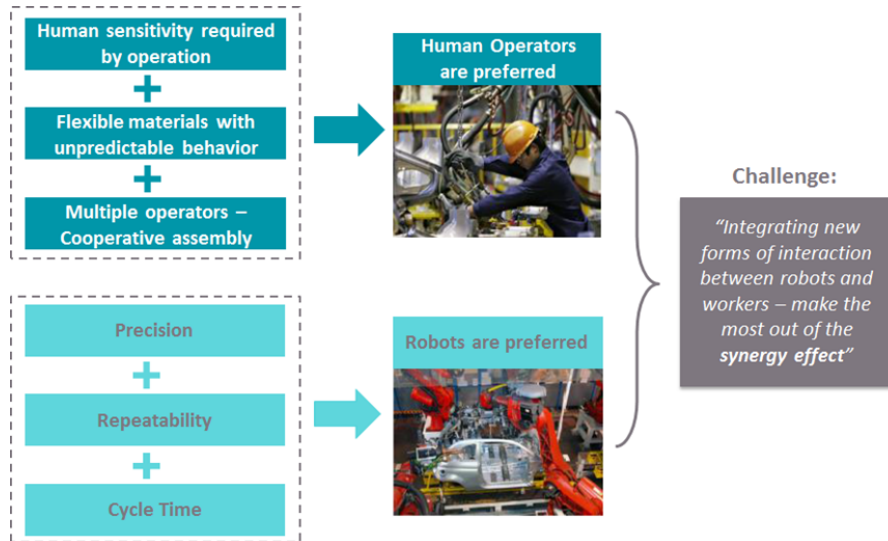
Systems with increasing smartness and interconnectivity



22

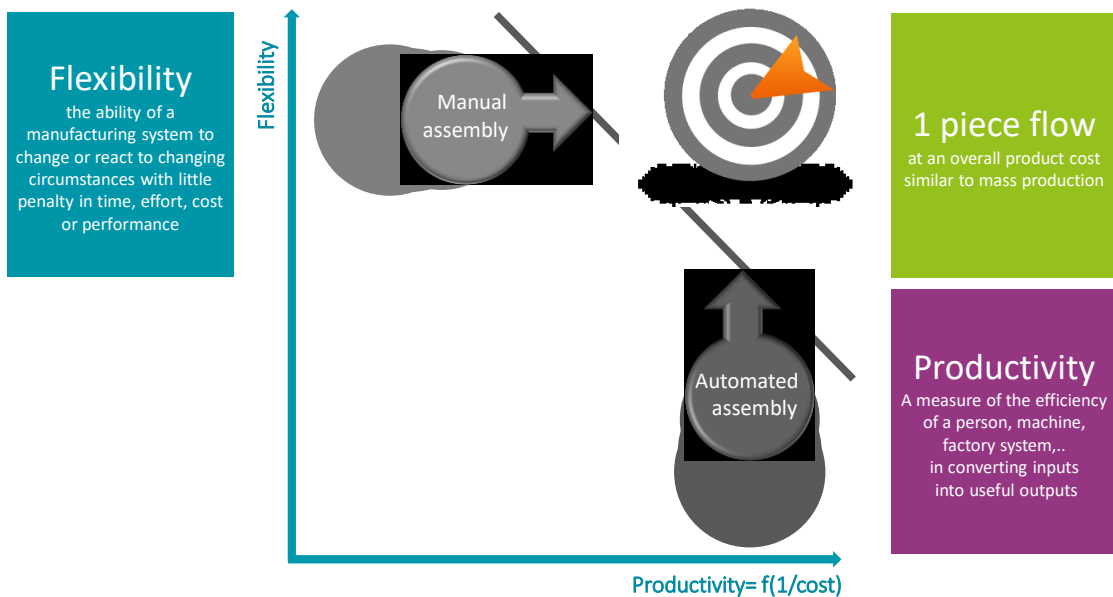
Flanders make focus: assembly of complex products

Creating flexibility, agility



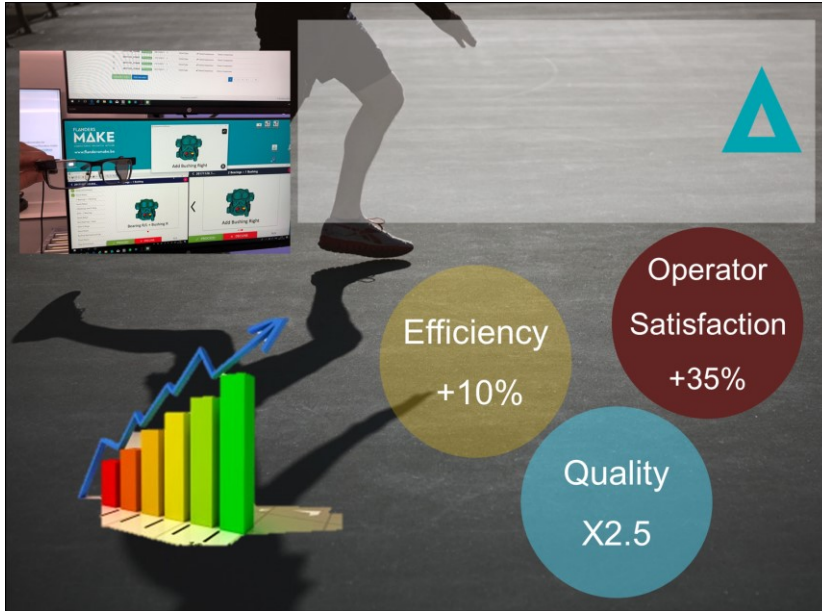
23

Flexible Assembly – Main Current challenge



24

Impact of digital instructions on the workflow



26



27



28

Social entrepreneurship : making use of technology

Augmented reality for operator support



Better workplace: more abilities by technology
Organisational: productivity & efficiency
Customer intimacy: quality, reliability, trust

**Sustainable
employment**

29

Industrial Challenges



30

Industry 4.0 : Product as a service



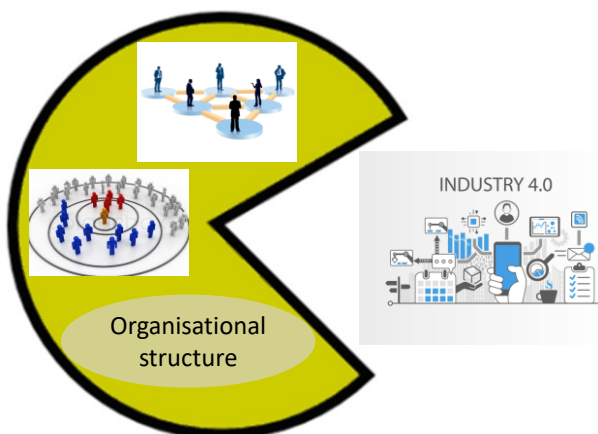
31

Industrial Challenges



32

Organisational structure eats Industry 4.0 for breakfast



Organic internal organisation

- Agile management
- Project teams
- Autonomy
- Accountabilities

Dynamic collaboration in value networks

- Focus on customer needs & benefits
- Cooperation within the value network (industry & knowledge)

From : Acatech study

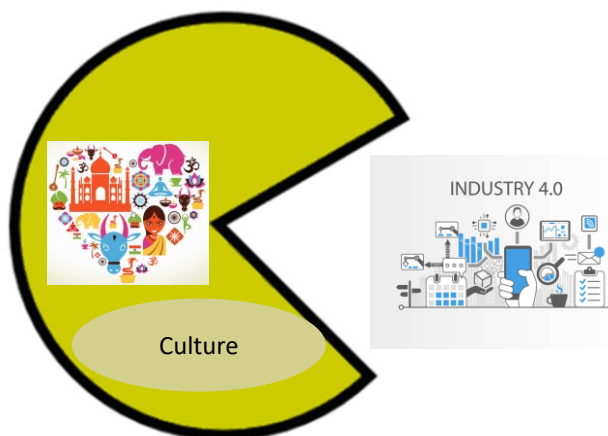
33

Industrial Challenges



34

Culture eats Industry 4.0 for breakfast



Willingness to change

- Accepting mistakes, but learning from it
- Openness to innovation
- Data-based learning and decision-making
- Lifelong learning
- Shaping change

Social collaboration

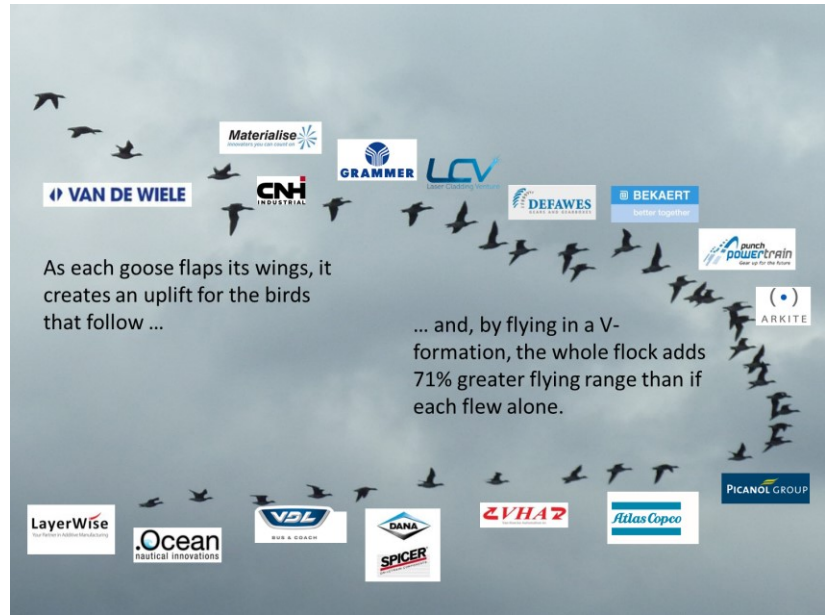
- Democratic leadership style
- Open communication
- Confidence in processes and information systems

From : Acatech study

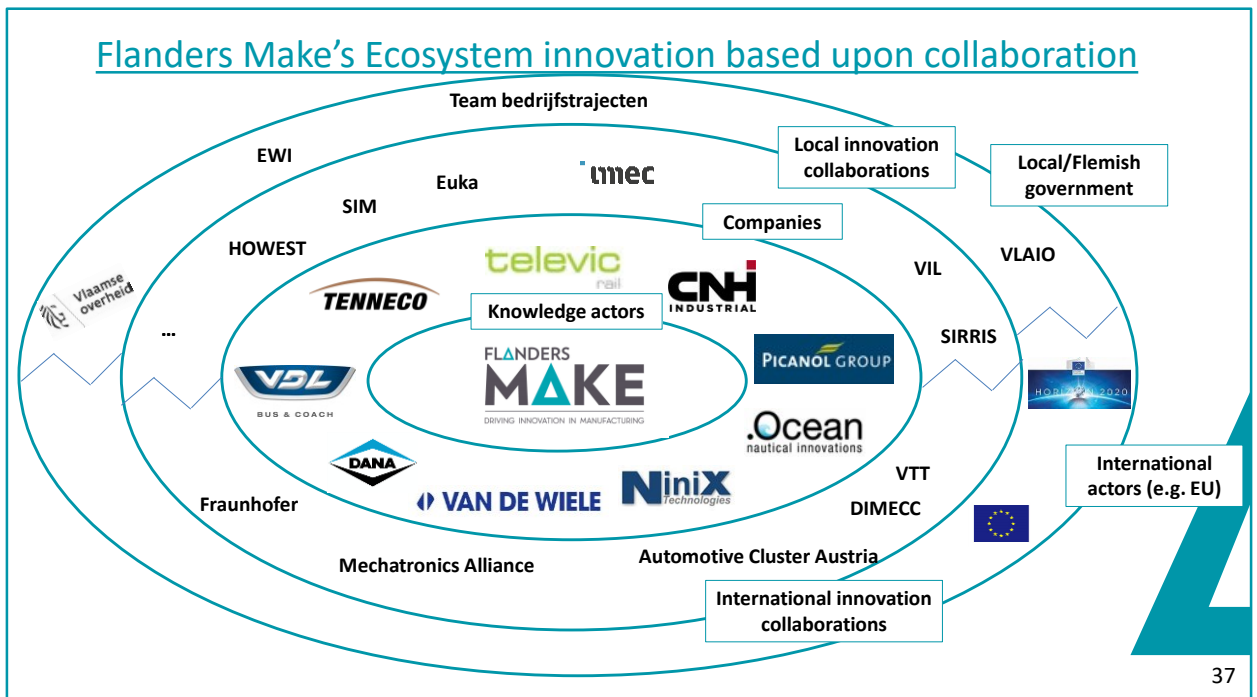
35

TEAM

T Together
E Everyone
A Achieves
M More



36



37

37

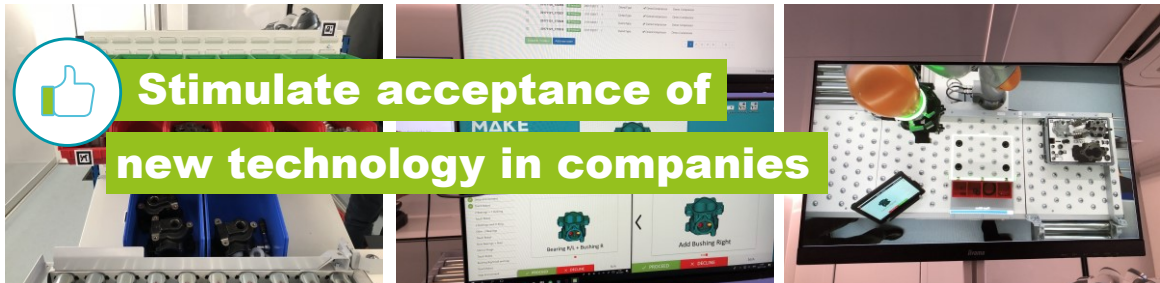
Industrial Challenges




38

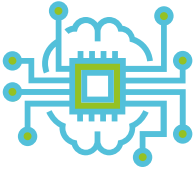
Acceptance of technology on the workflow

Mobile Make Lab




39






Industry 4.0 is becoming reality, need for boosting implementations



Collaboration is key for executing the digital transformation



People unlock the digital transformation

40



FLANDERS MAKE

making the industry stronger and more competitive with

Top infrastructure

500 specialised researchers

A strong ecosystem of partners





41