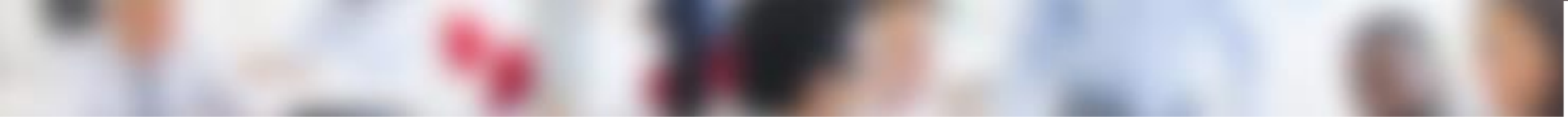
Transforming manufacturing companies towards Factories of the Future

Paul Peeters
sr. expert Advanced Manufacturing
Agoria



.AGORIA

Organization of technologically inspired Belgian companies ...

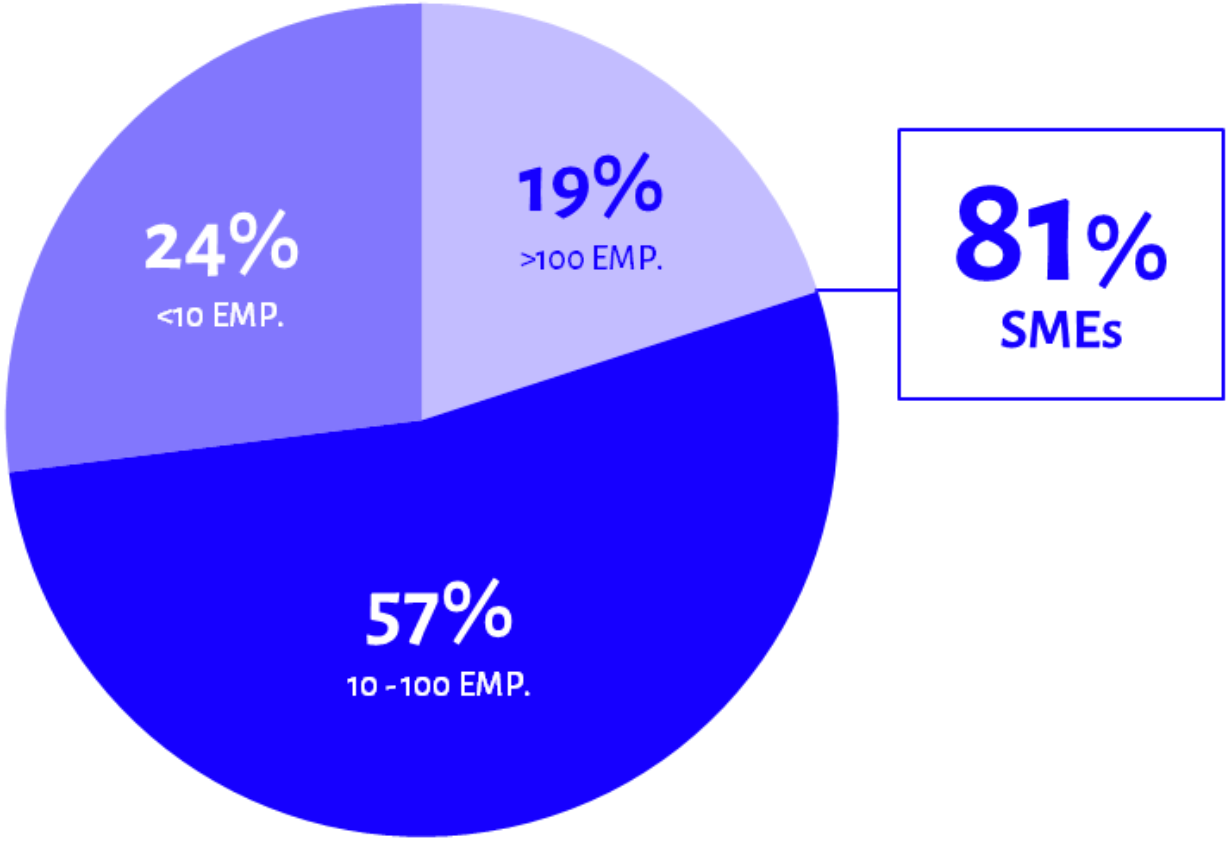
1,900

Member companies
in **6** industries

- Aeronautics, Space, Security & Defence industries
- Building, Contracting & Technical Services industries
- Digital industries
- Manufacturing industries
- Materials industries
- Telecom industries

.AGORIA

... driving our economy.

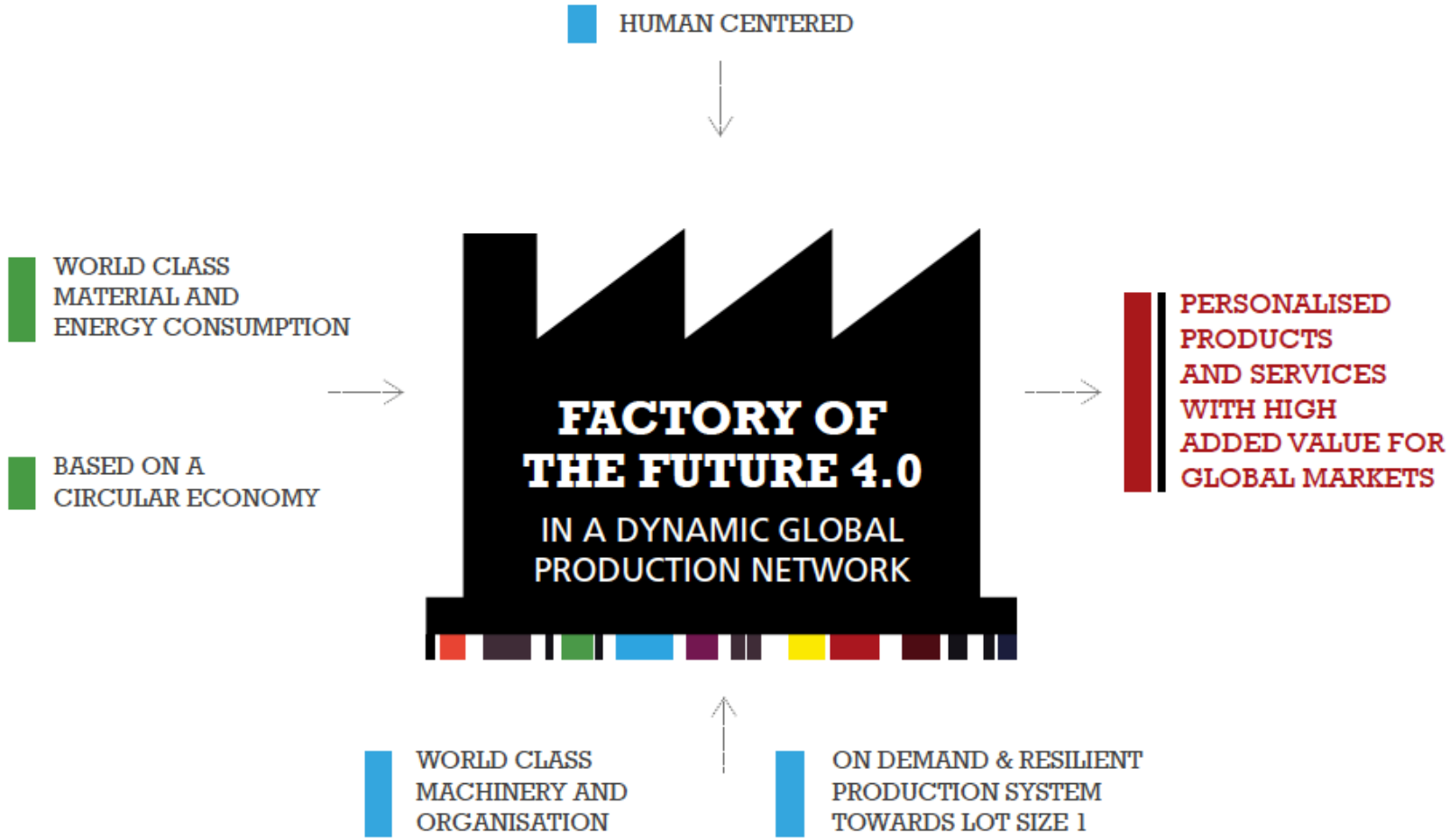


300,000

people

are employed in the technology industry

Factories of the future embrace breakthroughs…



MADE DIFFERENT
ENABLING FACTORIES OF THE FUTURE
CREATED BY sirris & .AGORIA

… and they do create jobs.

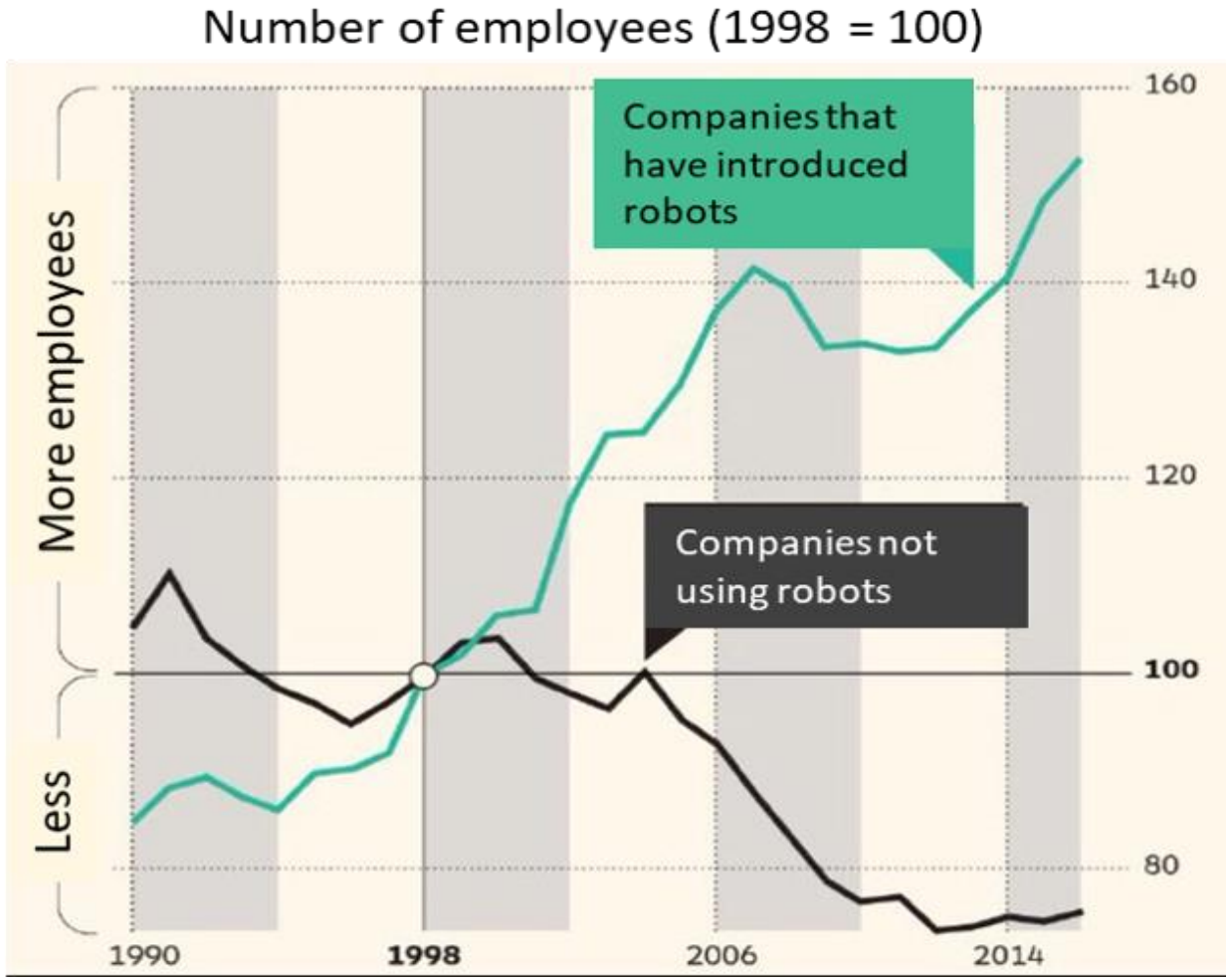
38 Factory of the Future Award Winners

970 Mio € investments (2012-2018)

17% Increase in employment

… and they do create jobs.

1.900 Spanish manufacturing companies active in 20 different industries



CESifo Working Paper nr. 7608

Factory of the Future : what's in a name?

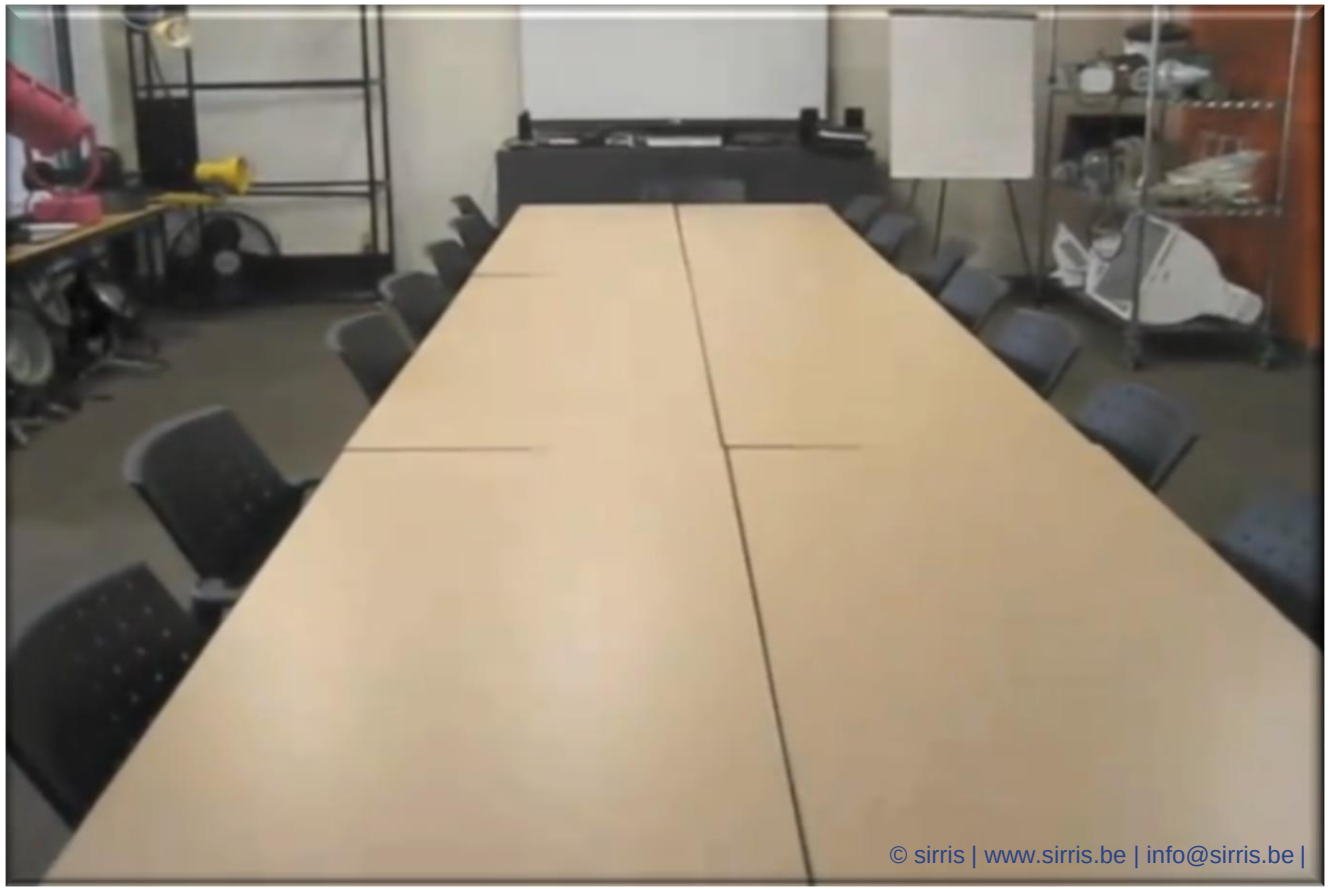
First simplify, then automate/digitize !

Set of "tools" to simplify/optimize current processes (production, logistics, planning, …)

- Lean Manufacturing to standardize processes and reduce waste
- Quick Response Manufacturing (QRM) to reduce lead times
- …

Planning before QRM

Planning after QRM



MADE DIFFERENT
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Richer man-machine work patterns by improving autonomy & self-regulation of tasks

From command & control

to self regulation

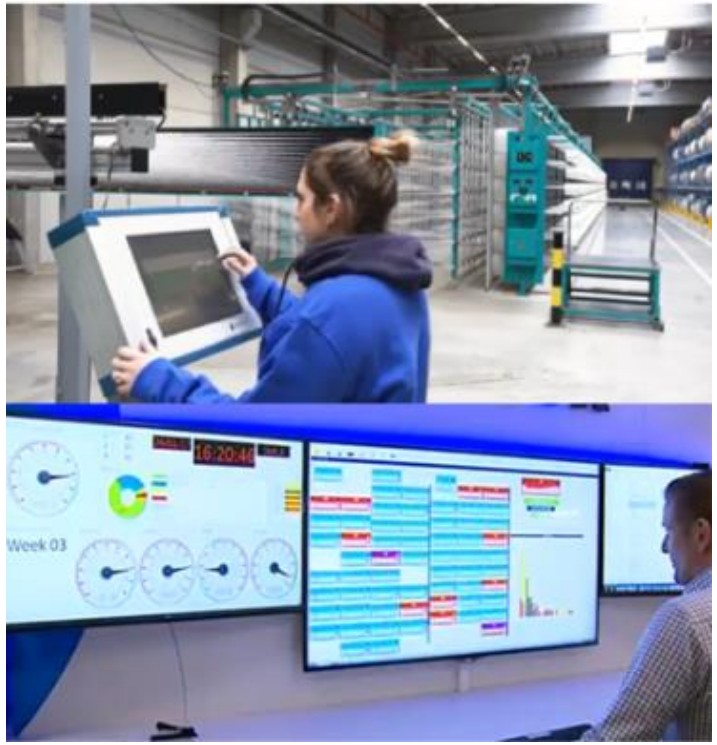
From complex organisations & simple tasks

towards

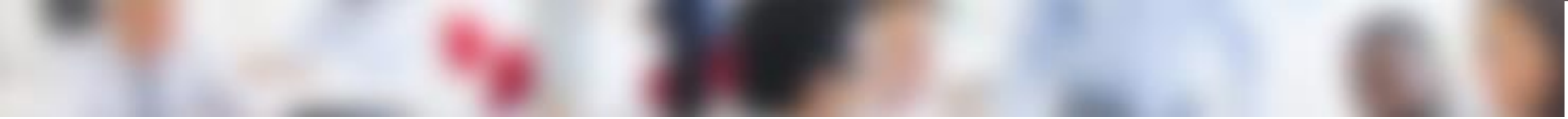
simple organisations & complex tasks

- ✓ Bring control tasks to the lowest possible level
- ✓ Create combined, flow oriented tasks
- ✓ Don’t move information to authority, move authority to information

VERANNEMAN TECHNICAL TEXTILES

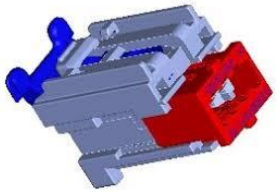


38 Belgian Factories of the Future in 6 years …



… covering different sectors.



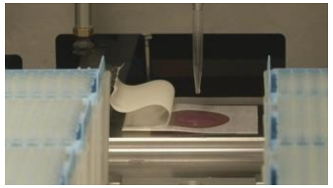
















ADMA initiative

Accompanying manufacturing SME's towards Factories of the Future

EASME/COSME/2017/018
Contract number : 2017/S 152-3140

TOP 10 challenges for SME’s (2019)

- Attract & develop talent - right **qualification** of the workforce & level of (expert) knowledge
  - Attract & develop talent - smart **connection** of employees with technology

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+

strong need for use cases and best practices

ADMA at a glance

www.adma.ec

DIGITAL FACTORY

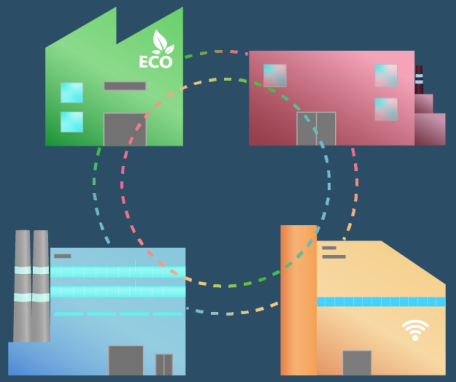
ADVANCED MANUFACTURING TECHNOLOGIES

END-TO-END CUSTOMER FOCUSSED ENGINEERING

HUMAN-CENTRED ORGANISATION

ECO FACTORY

SMART MANUFACTURING



VALUE CHAIN ORIENTED OPEN FACTORY

… each with 5 maturity levels for every subtopic …

e.g. ***End-to-End Customer Focussed Engineering :***

Customer focus & value proposition	**The company speeds up time to market whilst maximizing customer value creation without increasing costs and risks.**				
	1	**2**	**3**	**4**	**5**
*Customer integration **	Market and customer information is systematically gathered, incorporated and documented during the product, process and service development.				
	Input from sales is being used by engineering	Key account requirements are actively incorporated in the engineering of the products.	Requirements of as many customers as possible are actively incorporated into the engineering and manufacturing of the products.	Customer requirements are systematically documented and integrated throughout the engineering, manufacturing and servicing steps of the products.	All customer requirements are continuously kept up-to-date to be used throughout all engineering, manufacturing and servicing processes in order to obtain the highest possible value solution for each individual customer.
Customization	In order to meet individual customer's needs, a modular Design for Manufacturing approach is developed, implemented and documented.				

Smart manufacturing Level 4

PROVAN
Tailor made metal solutions

https://www.youtube.com/watch?v=AO5nbbNjZEw&t=10s

YouTube BE provan factory of the future EN

Provan, a family owned metal components supplier, has one simple goal : **zero inventory**! This means : ever smaller series and a lot of production changes during the day. Provan organized itself to be able to process **3000 orders** a month without having a planning department! Linking office cells with the production dept, a digitally implemented Quick Response Manufacturing systems has made it possible that every production department has become its own planning 'hub'.

It means that every machine operator decides independently what he/she will produce next. Of course an intelligent ICT-system supports him taking the right decisions. As a result, employee involvement is extremely high at Provan. Moreover work-in-progress inventory levels decreased by a factor **9** and assembly throughput times moved down from 4 weeks to **3 days** !

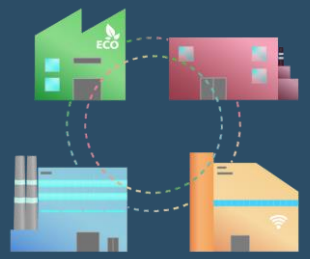
ADMA at a glance

www.adma.ec

ECO FACTORY

ADMA scan

ADVANCED MANUFACTURING TECHNOLOGIES



VALUE CHAIN ORIENTED OPEN FACTORY

Transformation plan

HUMAN-CENTRED ORGANISATION

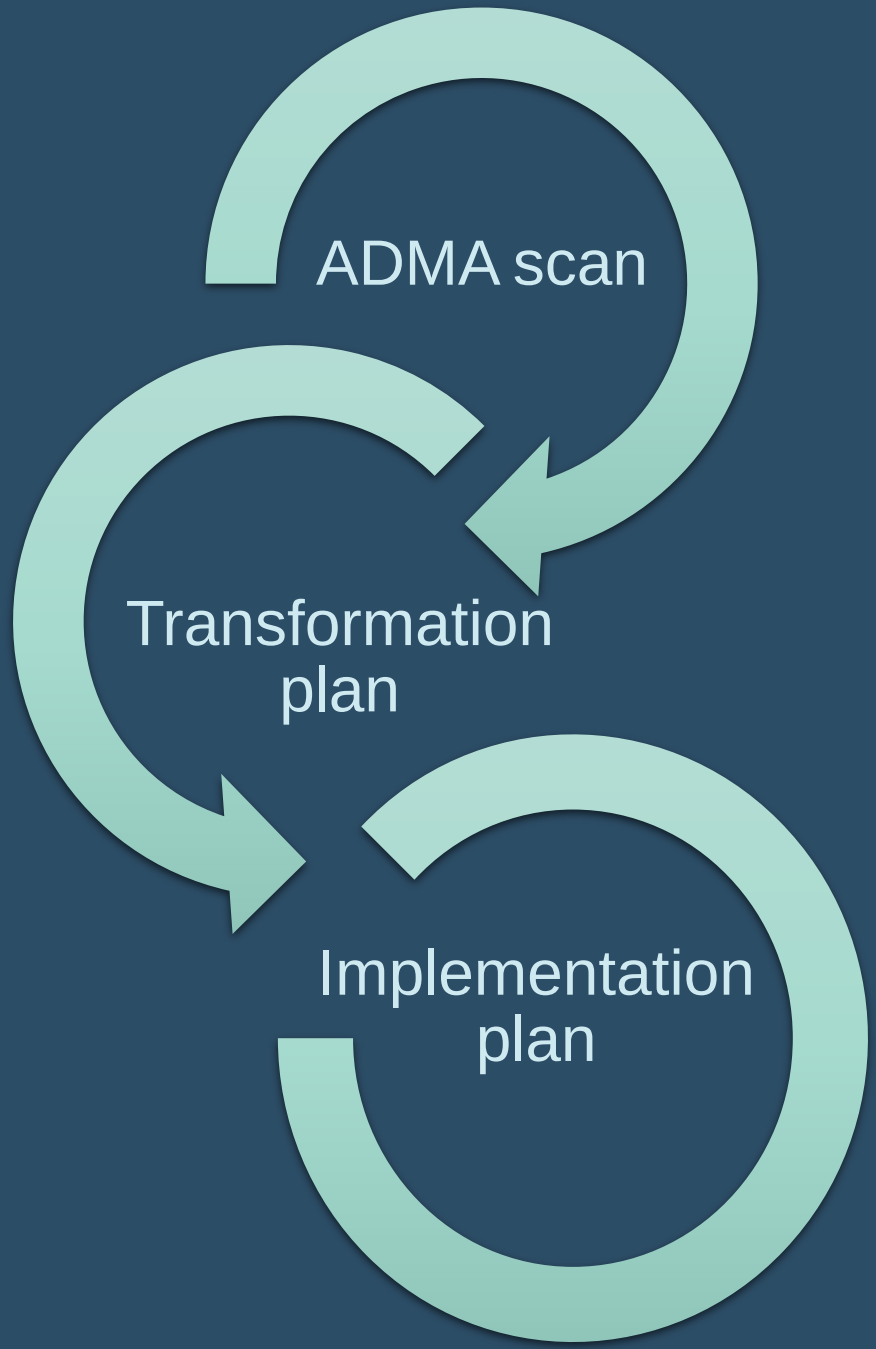
DIGITAL FACTORY

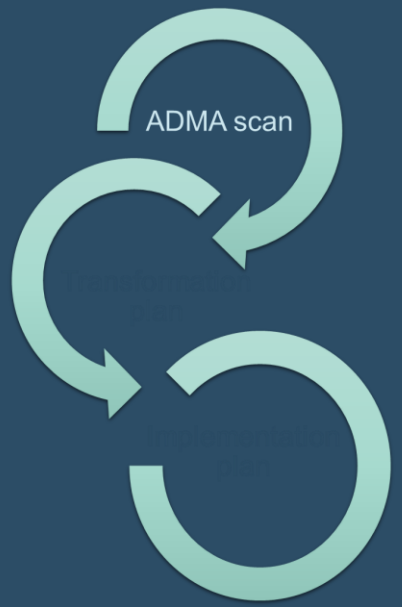
SMART MANUFACTURING

Implementation plan

END-TO-END CUSTOMER FOCUSSED ENGINEERING

highlight the company’s transformation maturity

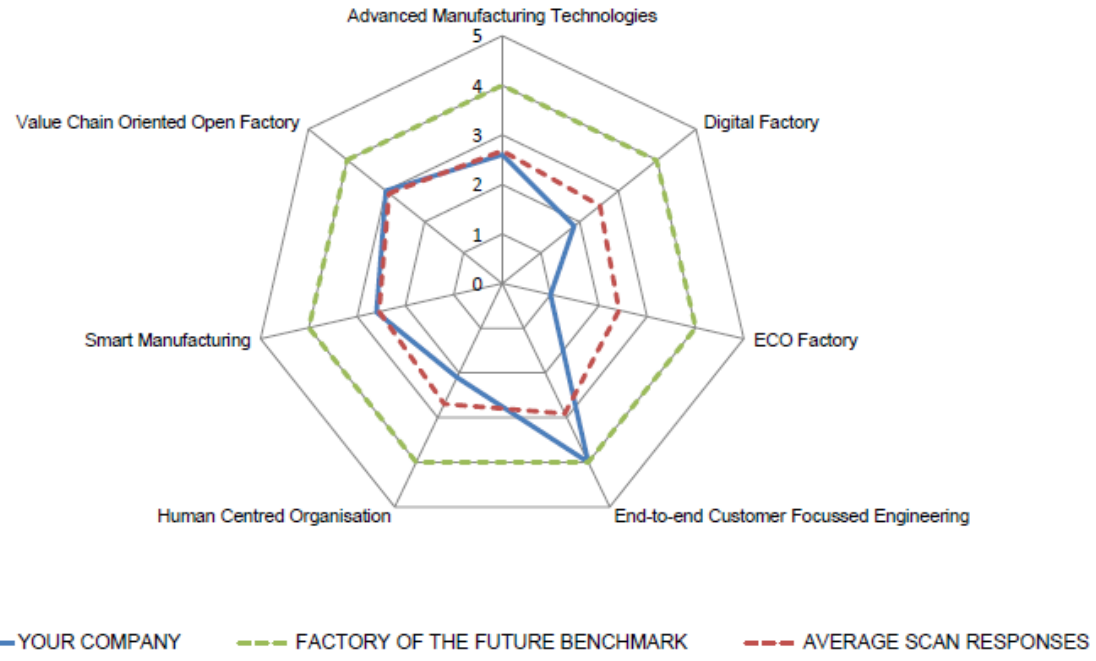




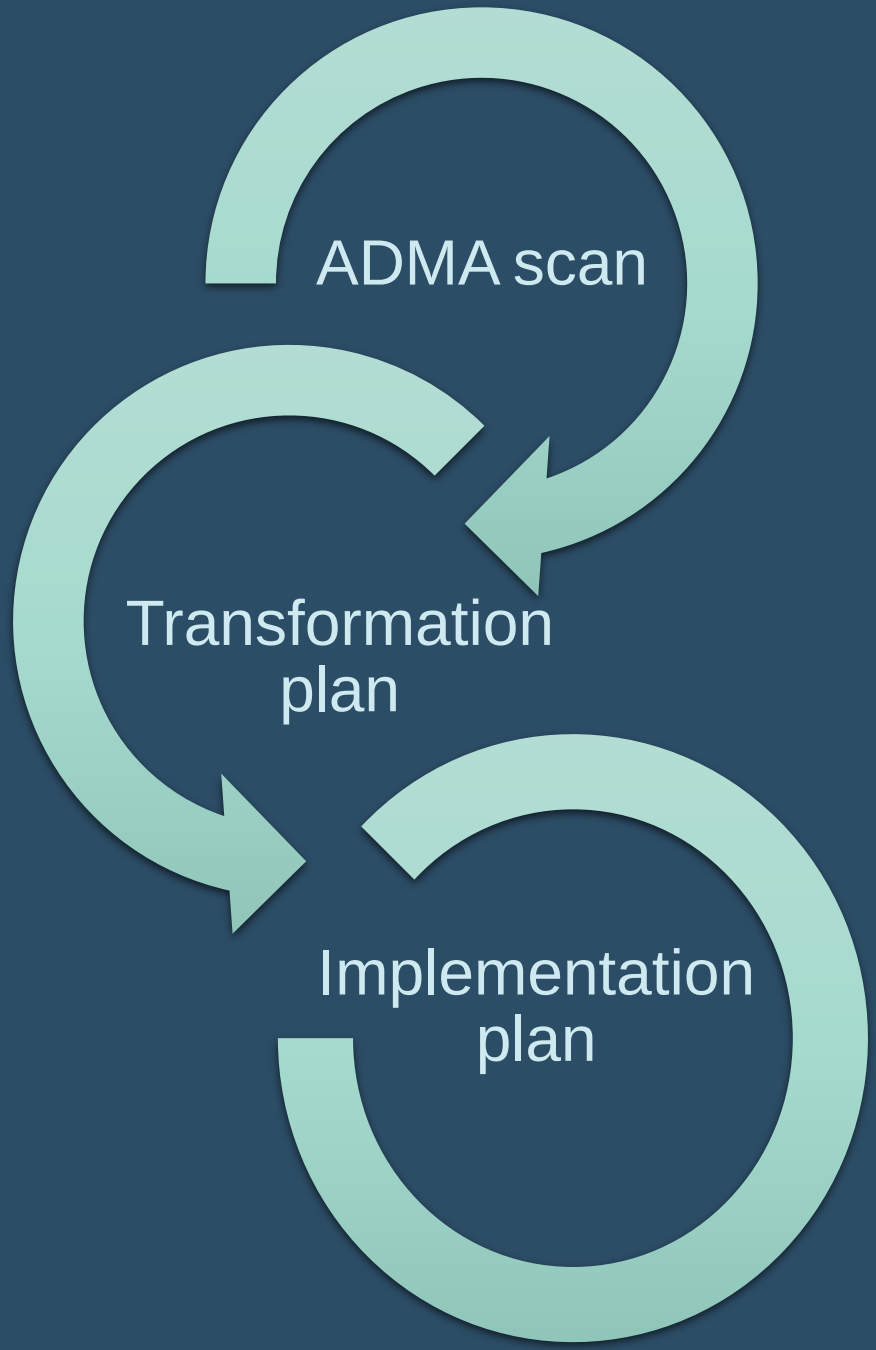
Your individual Factory of the Future Maturity Summary.

Long Scan

Company	Sector	Size	Country	Average Maturity Level
[redacted]	Metals and mineral products	Small	Belgium	2,5
First Name	**Last Name**	**Job Title**	**Email Address**	
Ward	[redacted]	Production engineering & IT	[redacted]	



Identify step change opportunities within selected transformation areas



5. Digital Factory

	Score	FoF level	*Gap*
Advanced Manufacturing Technologies	3,6	4,0	0,4
Digital Factory	**3,1**	**4,0**	**0,9**
ECO Factory	2,4	4,0	1,6
End-to-end Customer Focussed Engineering	3,9	4,0	0,1
Human Centred Organisation	2,7	4,0	0,3
Smart Manufacturing	3,1	4,0	0,9
Value Chain Oriented Open Factory	3,0	4,0	1,0

The following activities for digitizing the manufacturing enviroment take place at XXX:

- Orders are being tracked by use of bar codes
- Operators scan orders to indicate that machining has started/stopped
- A homemade excel sheet gives an overview of machine status
- A strong digital connection has been set up with Atlas Copco for automated orde

During the feedback session the priority of the transformation has been assessed

☒	☐	☐	☐	☐
Critical	High	Medium	Low	No priority

Industry 4.0

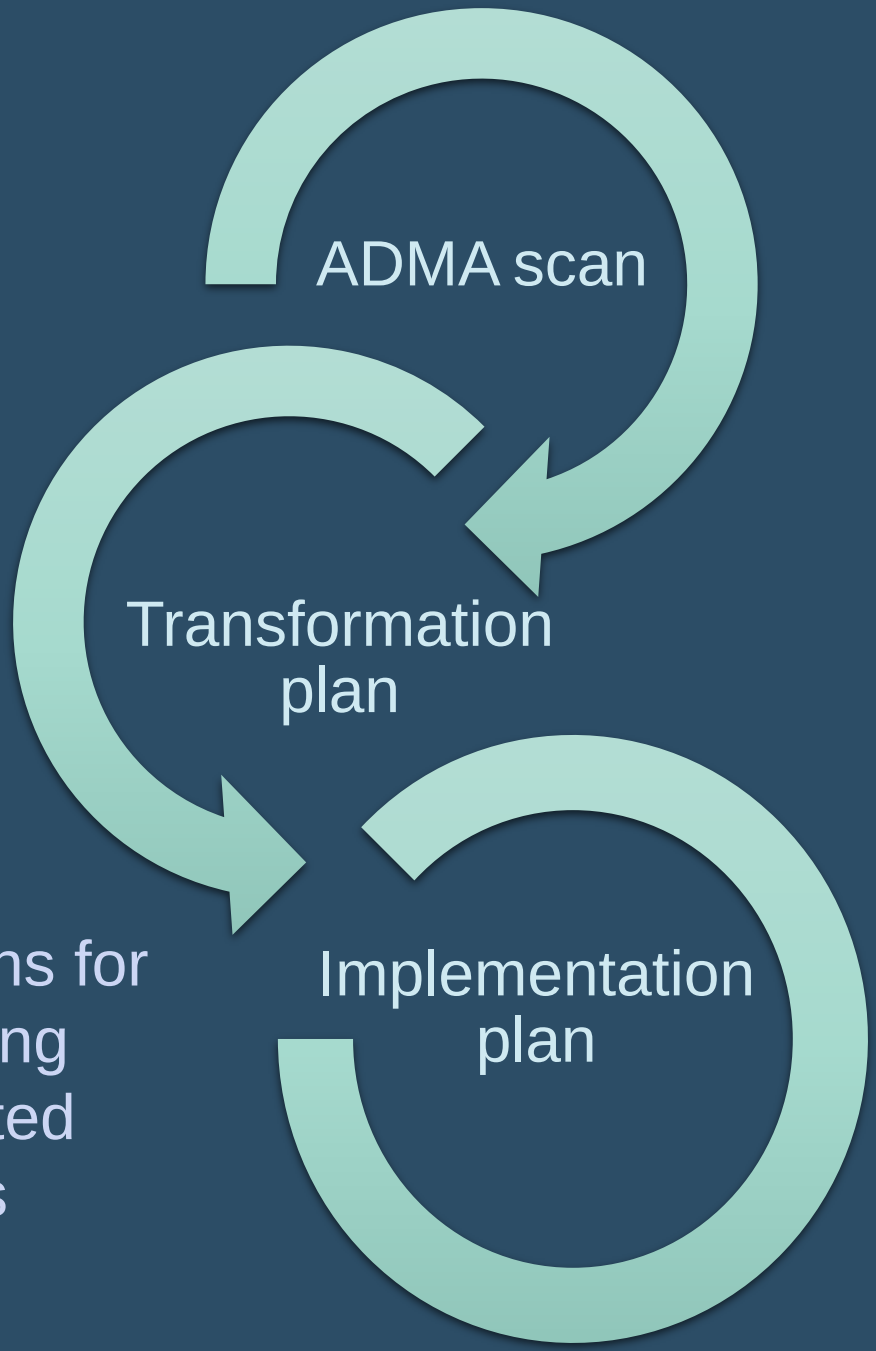
In the current situation machining equipment is not directly connected to a central data platform as machine status tracking depends on manual actions. In the future a direct connection is desired and therefore Buyse Decolletage is currently examining different solutions such as Siemens Mindsphere.

Expert on solutions within the Digital Factory transformation is

Marc Bollen
Sirris

marc.bollen@sirris.be
+32 498 91 93 02

- **Best practices**
  - Duracell
  - Rf Technologies



Identify & analyse solutions for challenges and matching objectives within selected transformation areas

5.1.3 Evaluation

Action, technology, procedure, ...	Investment	Return	Risks	Type of action			Points
				Implementing	Innovation project	Feasibility study	
Challenge 1							
Technology 1.1	◔	■	◑	☒			XX
Technology 1.2	◔	◕	○		☒		XX
Challenge 2							
Technology 2.1	◕	◕	○	☒			XX
Technology 2.2	◔	◕	○		☒		XX

5.1.4 Recommendation

The table beneath makes a recommendation on the order in which technology can be implemented, developed ore researched.

Implementation
XXX
Innovation project
XXX
Feasibility study
XXX

Some practical insights

'Factory of the Future is an integrated optimisation plan that prepares the entire organisation for the future and does not just focus on technology and digitisation.'

'However, managing expectations was the most important success factor; you have to be very selective about what you promise because not all ideas can be realised.'

'We also clearly noticed that as a company we could not close ourselves off too much, that we could open some doors and share things with other companies in confidence.'

'We've also evolved a lot as regards Human Centered Production. For example, we recruited an improvement engineer who works within Operations but is a social worker who is strongly focused on Human Centered Production.'

— Henk Vincke, *Supply Chain Manager, BMT Aerospace*

Thank you for your attention

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