Collaborative manufacturing

SME-ticket to Industry 4.0

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INVESTING IN DEVELOPMENT

Challenges:

- Industry 4.0
- Smart Products in Smart Factories
- Collaborative manufacturing

How we deal with these:

- Fieldlab Region of Smart Factories
- Technologies Added – first Smart Factory as shared facility

Your journey to the Region of Smart Factories

Virtual Reality

Regional economic strategy

Smart products in Smart Factories

- Autonomous
- Connected
- Adaptive
- Customized

Products | **Factories**

EU Sociatel Challenges

Statement 1

The Smart Factory concept refers to autonomous (self learning) manufacturing ecosystems, based on data science (modeling and artificial intelligence) in engineering, manufacturing and logistics and advanced manufacturing techniques (robotics, 3D printing, circular)

Statement 2

Smart manufacturing opens the door to real customized manufacturing, with less negative impact on the environment. Almost ‘everything’ can be produced and reproduced, instead of nearly nothing nowadays. So it will have a large impact on all aspects of the economy. The rise of Smart Manufacturing will deeply change the geography of manufacturing. Cost levels will no longer determine the worldwide distribution of manufacturing, but innovation, education and access to consumers for example. Low wage countries will no longer be the ‘factory of the world’

How to deal with Industry 4.0? Two examples

NORTHERN NETHERLANDS REGION OF SMARTFACTORIES

TECHNOLOGIES added

How to deal with Industry 4.0?

First example

NORTHERN NETHERLANDS REGION OF SMARTFACTORIES

This project is cofunded by:

SNN Northern Netherlands Provinces · provincie Groningen · provincie Drenthe · provinsje Fryslân provincie Fryslân · Drachten Smallingerland · Ministerie van Economische Zaken

Fieldlab Region of Smart Factories

NORTHERN NETHERLANDS REGION OF
SMARTFACTORIES

- Joined transition towards Industry 4.0
- 40 partners, budget 30 mio Euro
- Action lines:
  - 10 pilot projects
  - Smart Ecostructure
  - Business development

Flexible Automatio Shaver | Feed forward control Fuel Cel | Pilot factory wearables | Modelbased Engineering Shaver | Intergation CAD/CAM & PDM | 3D Bending Shipbuilding | Customized Lenses in flow | Personalized Healttech IoT | Personalized Vision technology | Self Sailing boats

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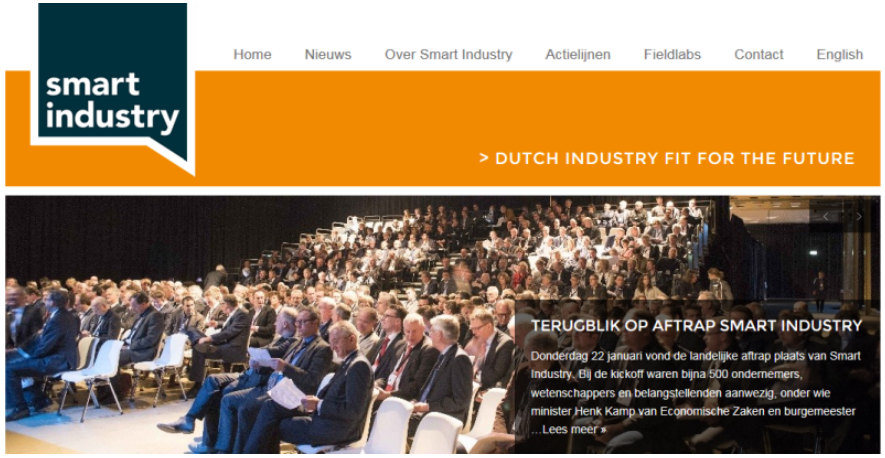
Largest Fieldlab @ the Dutch Smart Industry Agenda



NORTHERN NETHERLANDS REGION OF
SMARTFACTORIES

We create 10 Smart Factories

Flexible Automation Shaver

Feed forward control Fuel Cel

Pilot factory wearables

Modelbased Engineering Shaver

Integration CAD/CAM & PDM

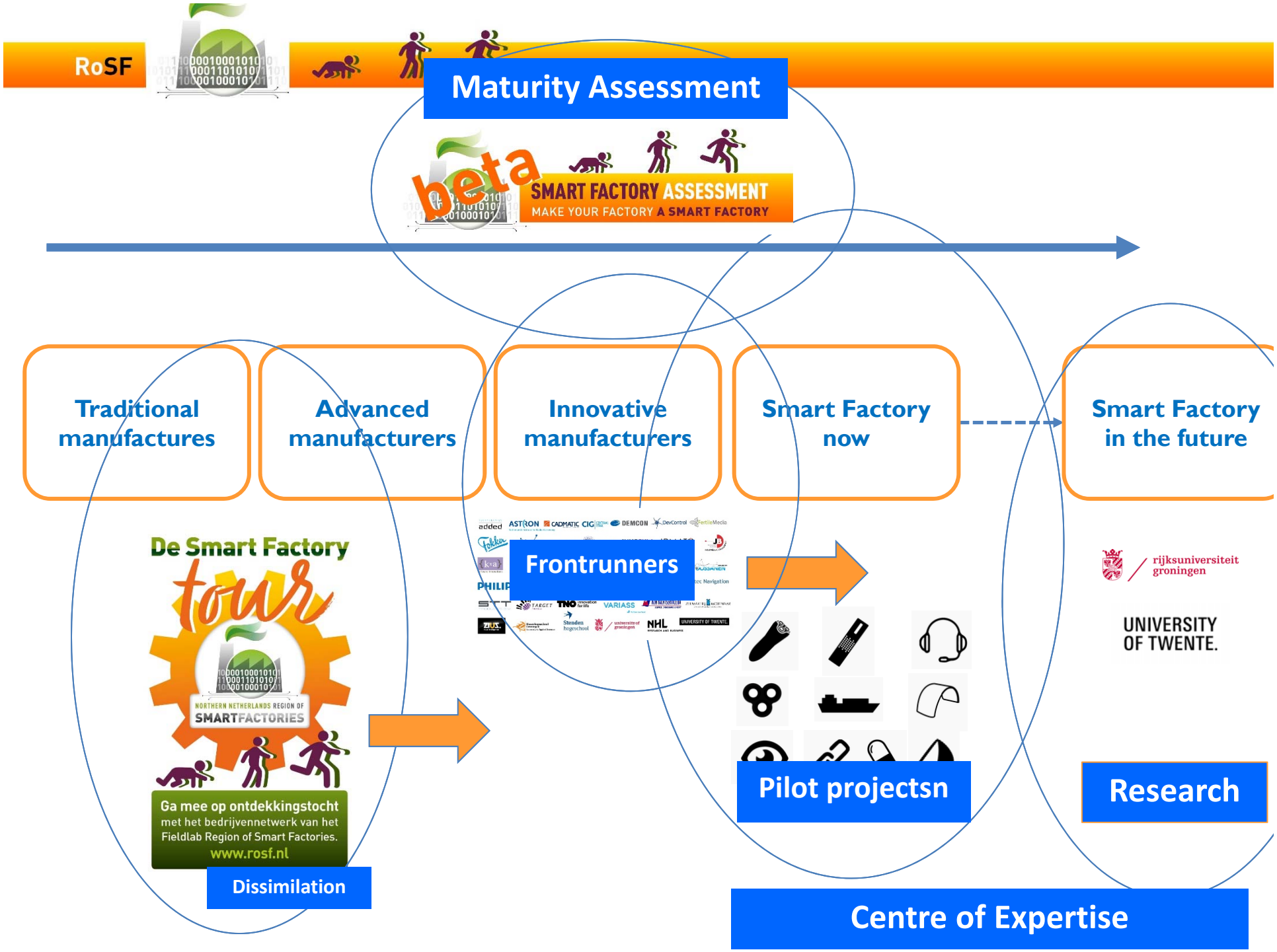
3D Bending Shipbuilding

Customized Lenses in flow

Personalized Health tech IoT

Personalized Vision technology

Self Sailing boats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SMART FACTORY ASSESSMENT
MAKE YOUR FACTORY A SMART FACTORY
Traditional manufactures
Advanced manufacturers
Innovative manufacturers
Smart Factory now
Smart Factory in the future
De Smart Factory tour
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SMART FACTORY ASSESSMENT

Make your factory a Smart Factory

Fase ▶ / Competence ▼	Traditional manufacturing	Advanced manufacturing	Innovative manufacturing	Smart Factory now	Smart Factory in the future
Business model	Sell & leave. Customer pays for your product and pays separately for support (repairs, adjustments etc.).	Sell & care. Customer buys your product for a fixed price, including service level agreement based on availability.	Sell & share. Although the product is owned by the customer, its performance is a shared responsibility.	Product as a service. Product is owned by you and the customer pays for the use of it (e.g. operational lease).	Function as a service. Customer pays for functionality, where the interpretation depends on the technology roadmap.
Product 'smartness'	Stand-alone product. Not adjustable: One size fits all.	Product can be adjusted, but only by the user and locally (not via internet).	Product operation can be adjusted via internet, but the user has to take the initiative.	Intelligent product: product operation will be automatically adjusted to the situation/ requirements via internet.	Learning product: performance improves due to past experiences.
Product development	Incident-driven (complaints, or a good idea) and based on trial & error. Not really organized.	Ad-hoc (not programmed), still trial & error, but professionally organized, e.g. use of product models.	Continual process. Still empirical/step by step, but supported by advanced IT tools.	Continual process and fully digitalized. 'First time right' by Model Based System Engineering. Empirical validation of models still needed.	Development based on self-learning products. Cutting edge IT, e.g. self-validating models.
Connectivity	Indirect functions (planning, engineering, admin.) are connected, but not completely.	All key processes (planning and workshop) are connected, but are often "islands of automation".	Paperless organization. All man & machines are internally connected.	Integrated supply chain, but leading company is in charge (hierarchic).	All actors operating in the Cyber Physical System.
Agility	Processes set in stone. Adjustments not worth the cost.	Rigid system. Modifications are complex and have to be performed manually by (external) specialists.	Modifications are guided by control systems, and can be done by operators with some aid of specialists.	Freedom in process setup. Process modifications are automatically rolled out.	Self-learning, organic production system. No limits.
Operations	Shoot & forget, therefore unpredictable. Major surprises and deviations are daily practice.	Plan-based and reliable, but limited flexibility due to lack of realtime information.	Highly reliable and flexible, through realtime operations management. But still dependent on human intervention.	Highly reliable and flexible with realtime, autonomous operations management systems (WMS/PMS/TMS).	Realtime, autonomous and self-adapting operations management in entire supply chain.
Quality	Subsequent offline or end of line quality control.	Sample-based, inline quality control with SPC.	Partial in-process control, corrections applied to following product/batch.	Full in-process control, corrections applied to running product/batch.	Feed forward, model-based and in-process quality control (zero defect).
Maintenance	Corrective maintenance (repairs).	Preventive maintenance, based on fixed intervals and Service Level Agreements.	Condition-based maintenance on mission critical processes/ machines.	Condition-based preventive maintenance with full realtime condition monitoring.	Predictive maintenance (zero downtime).

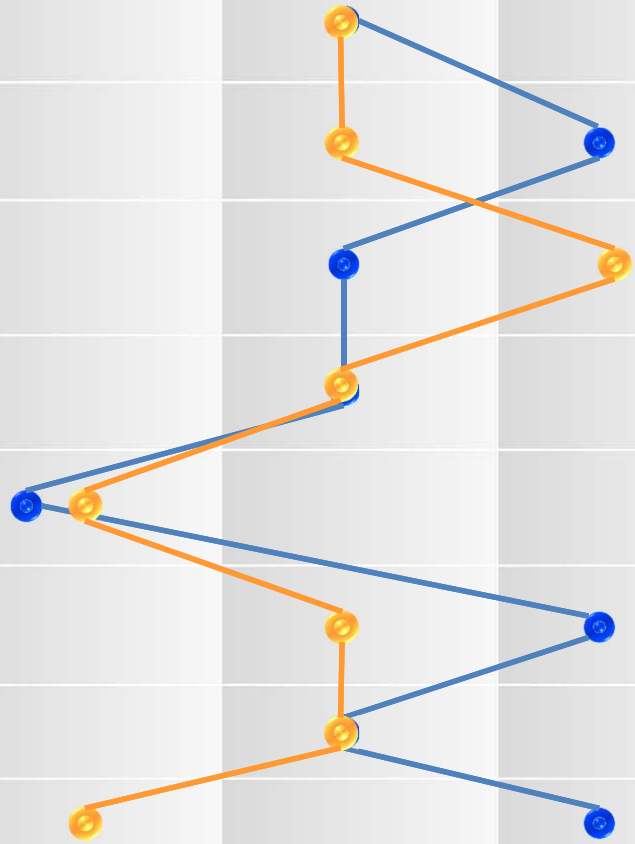
Version 2

NORTHERN NETHERLANDS REGION OF SMARTFACTORIES

SMART FACTORY ASSESSMENT

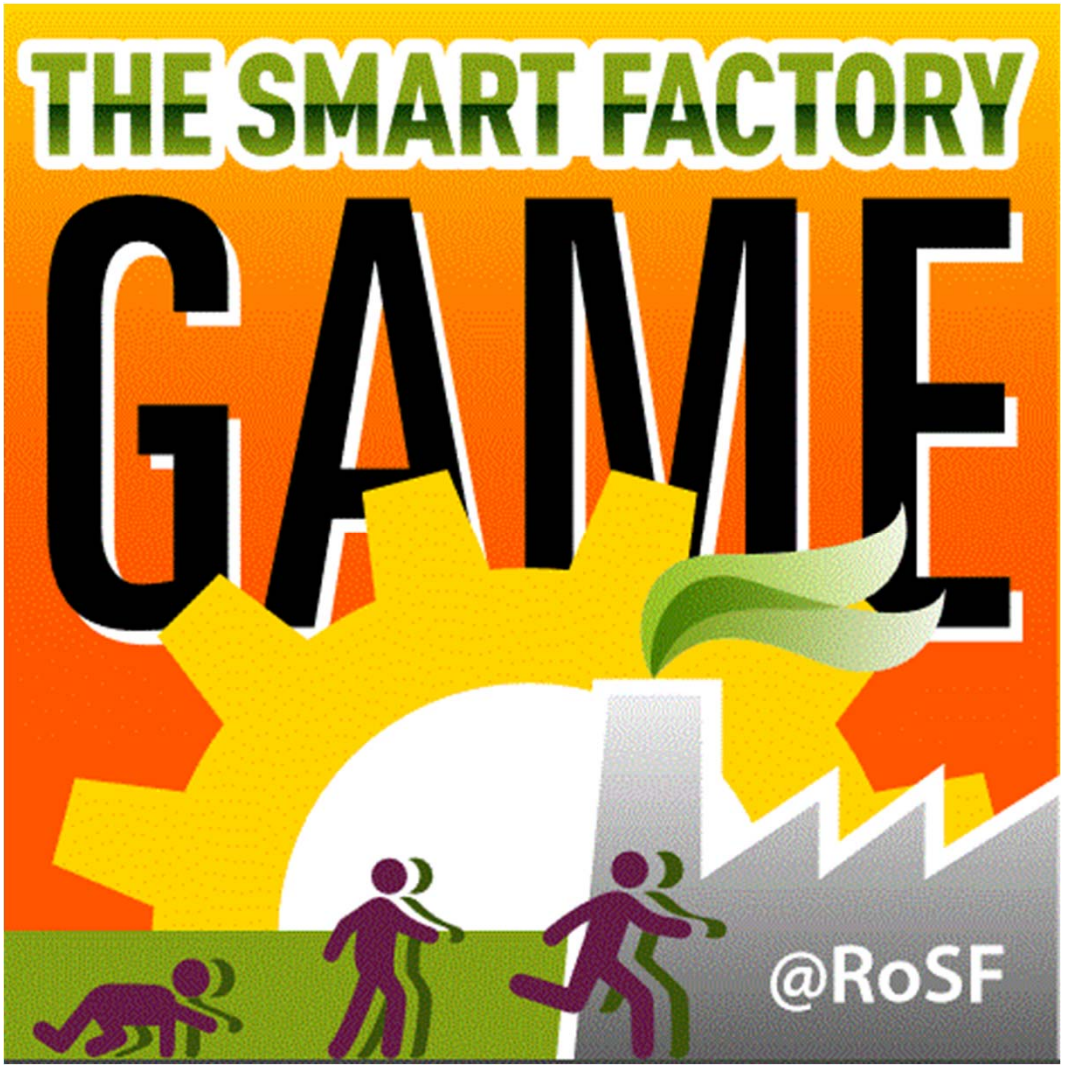
Make your factory a Smart Factory

Fase ▶ / Competence ▼	Traditional manufacturing	Advanced manufacturing	Innovative manufacturing	Smart Factory now	Smart Factory in the future
Business model					
Product 'smartness'					
Product development					
Connectivity					
Agility					
Operations					
Quality					
Maintenance					



Version 2

https://www.smartfactorygame.com/



Towards a smart ecostructure

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NORTHERN NETHERLANDS REGION OF
SMART MANUFACTURING

Economie & Politiek 11

ROBOTISERING SCHEERAPPARATEN

De mens ontwerpt, de robot zet in elkaar

Discussie over robotisering komt nu pas op gang

Bij Fokker moet jaarlijks de kostprijs omlaag

DAGBLAD NOORDEN

Slimme route naar werk i

De Smart Factory tour

NORTHERN NETHERLANDS REGION OF SMARTFACTORIES

Ga mee op ontdekkingstocht
met het bedrijvennetwerk van het
Fieldlab Region of Smart Factories.
www.rosf.nl

HANNOVER MESSE

How to deal with Industry 4.0?

Second example

TECHNOLOGIES

added

>’90

In-House Manufacturing

’90-’20

Subcontractors

Collaborative manufacturing

TECHNOLOGIES
added

Statement 3

Due to the high barriers (investments; expertise) only larger companies can afford their own ‘smart factory’, but SME’s can’t. They need to cooperate in shared facilities to profit from the endless opportunities of the next industrial decade.

Collaborative manufacturing means sharing investments between independent companies (mainly in non-critical areas) to achieve economies of scale. Access to shared facilities become more and more important to stay in business in the era of Industry 4.0.

The first shared Smart Factory in the world

TECHNOLOGIES

added

Concept ✓

Team ✓

Funding ✓

Economy ✓

TECHNOLOGIES

added

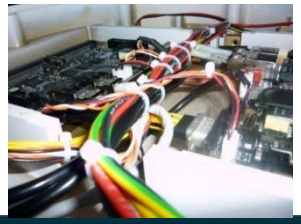
It will feel like your own factory, but it works as a shared facility

TECHNOLOGIES

added

TECHNOLOGIES

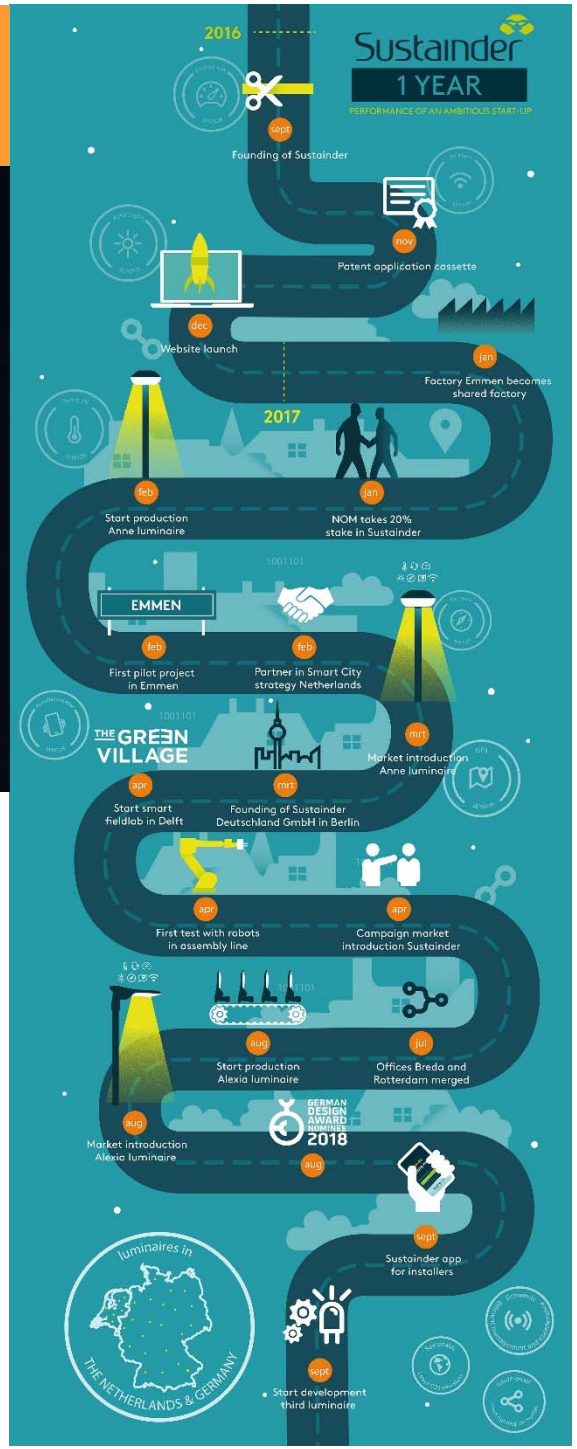
added



Products & markets

- Equipment for smart cities, outdoor, domestic, urban and rural applications
- Environmental monitoring equipment
- Products with LED-technology (outdoor & indoor)
- Equipment for smart homes & offices
- Medical products & personalized health
- Wireless sensor monitoring & communication systems
- Equipment for data centers & (tele-)communication
- Professional test & measuring equipment
- Products for e-mobility (i.e. charging poles and personal e-transporters)
- Professional equipment for leisure industry

Launching customer



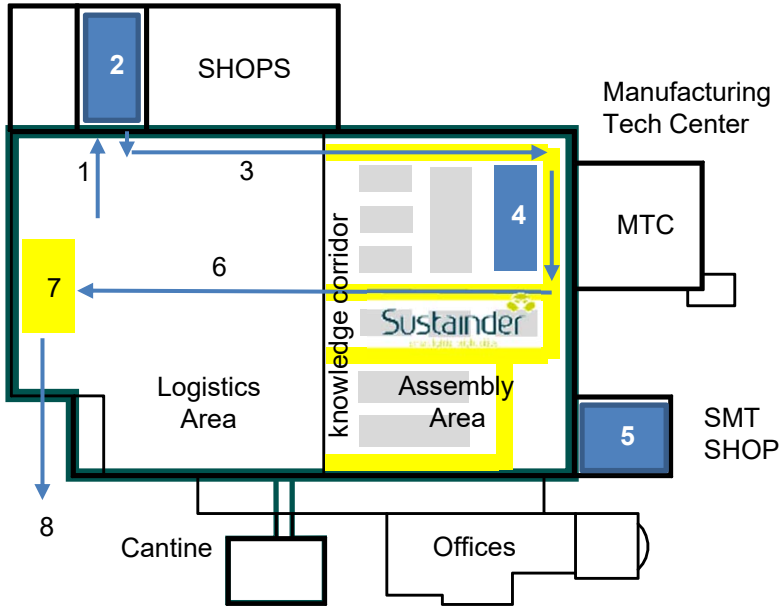
TECHNOLOGIES

added

Zero defect

First time right

Custo-mized



Bring manufacturing back home

TECHNOLOGIES

added

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Thank you for listening. Very open for international cooperation

Hans Praat, Northern Netherlands Investment and Development Agency, NOM.

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TECHNOLOGIES added