



MADE

MANUFACTURING ACADEMY OF DENMARK AND THE MADE FAST PROGRAM

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In the beginning of the 2000's:

Danish manufacturing was facing its greatest challenge - *outsourcing*.

Funds, associations, companies and research communities joined forces in a new collaboration:

MADE - Manufacturing Academy of Denmark, launched in 2014.

Vision: ***Denmark as one of the world's leading manufacturing nations based on a strong ecosystem for production in Denmark.***



One-stop-shop for *Advanced Manufacturing*

MADE has 3 tracks



Research

MADE **creates and shares knowledge** based on industrial research into current needs and challenges for Danish companies

New platform: MADE FAST



Innovation

MADE ensures that new **knowledge and technology is widely disseminated** in the Danish industry through open innovation activities and offers targeted at SMEs

National Cluster for Advanced Manufacturing



Education

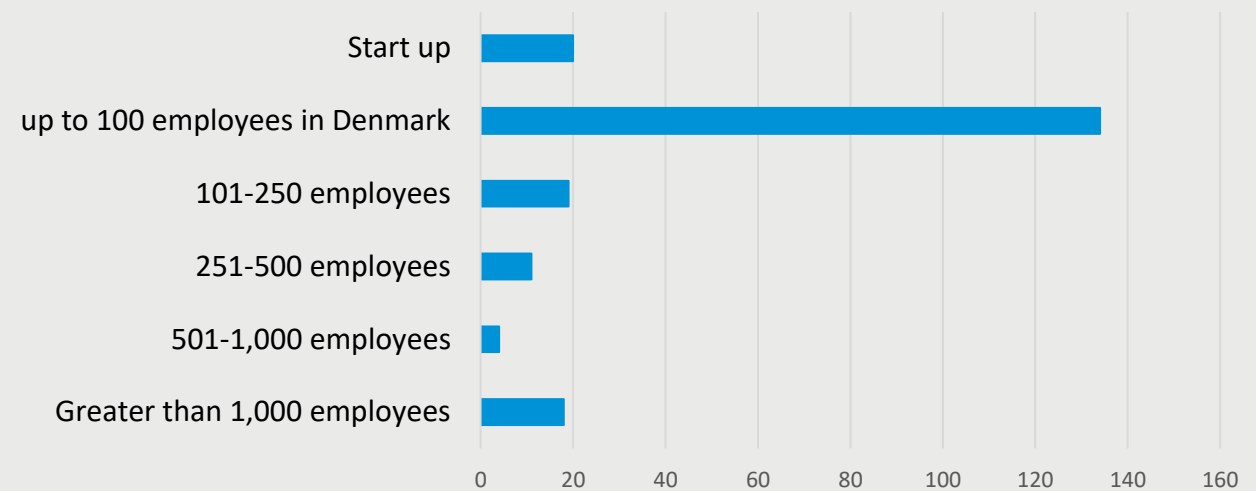
Across educational levels MADE helps to **shape the educations of the future** in production.

New: Learning Factory initiative

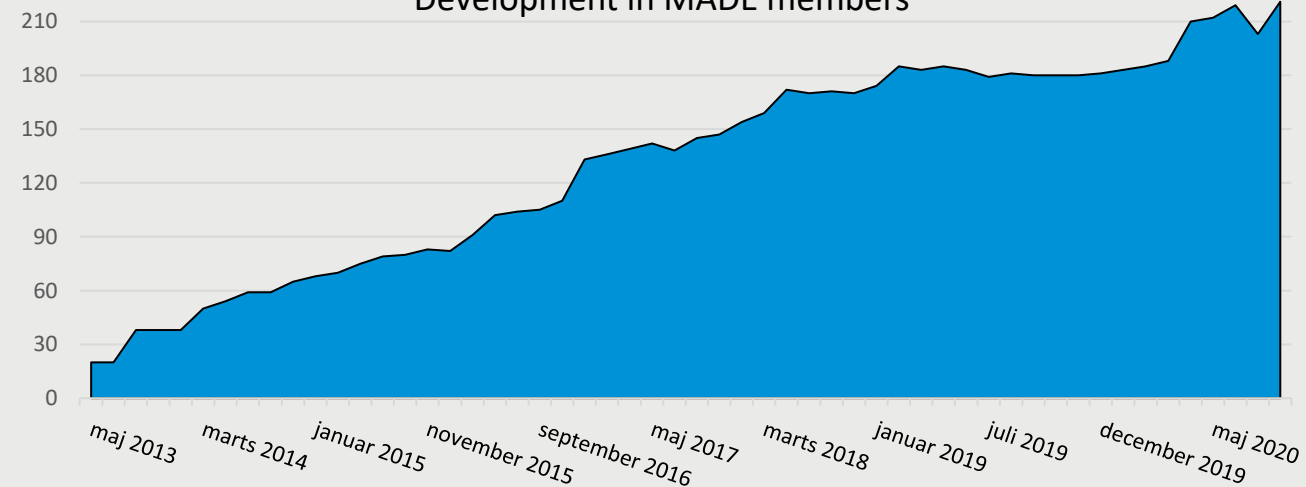
A strong and growing Danish manufacturing ecosystem

- MADE members are:
 - Large and small companies,
 - Universities,
 - RTO's and
 - Educational institutions.
- 206 members are companies – of which 84% SMEs
- Our characteristics are joint & transdisciplinary efforts between industry, academia and innovators.*
MADE has a clear structure and processes that works and have proven to give impact
- MADE is also a platform **that represents Denmark internationally** – participating in EU projects and create matches between needs and solutions

Distribution of industrial members based on number of employees



Development in MADE members



Research and innovation platforms

1. MADE SPIR

Vision: Strengthen the Advanced Manufacturing ecosystem in Denmark
Budget: 184 M dkk.
Periode: 2014 – 2018

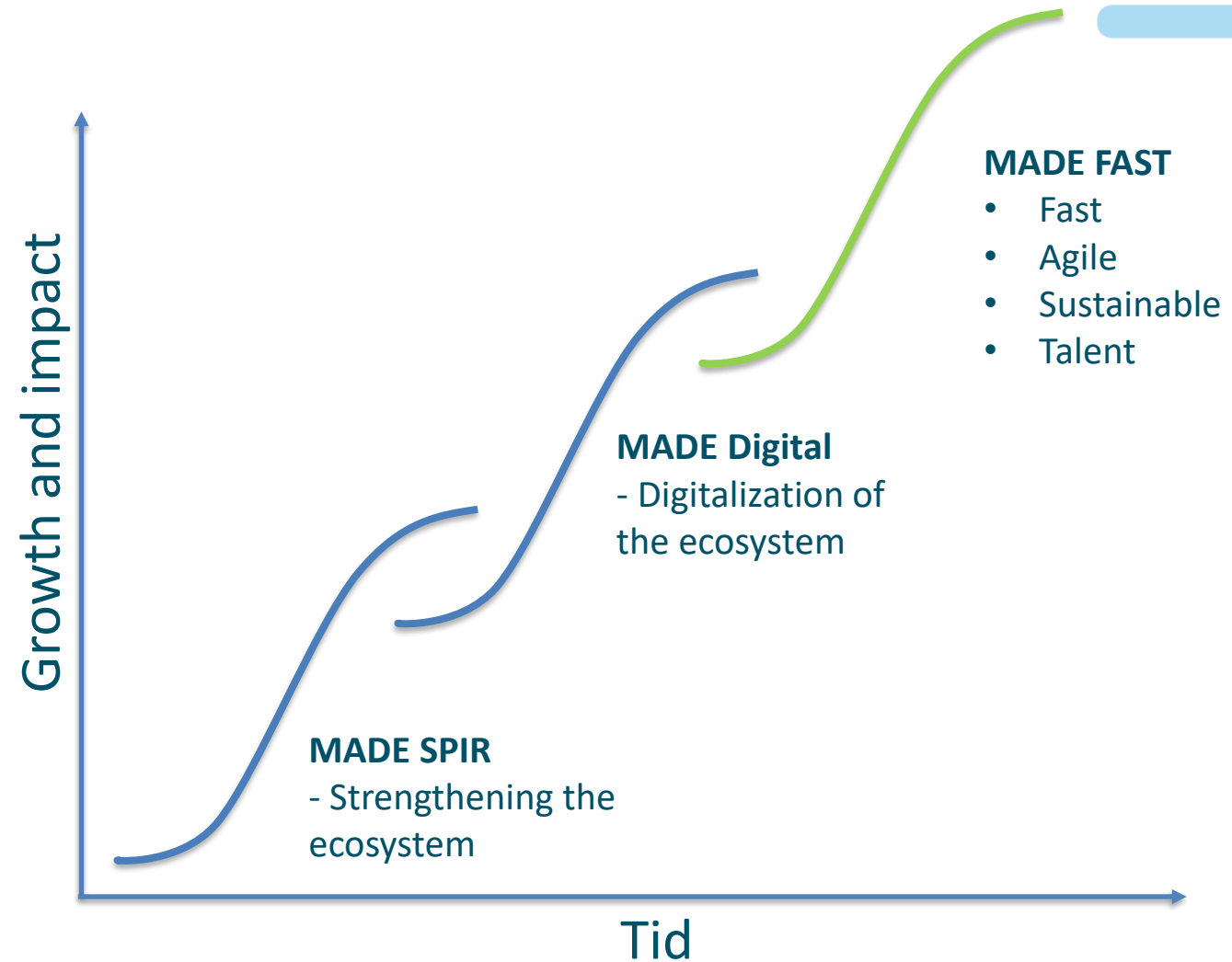
2. MADE DIGITAL

Vision: Development of a Industry 4.0 solution for Danish manufacturing
Budget: 200 M dkk.
Periode: 2017 – 2019

3. MADE FAST

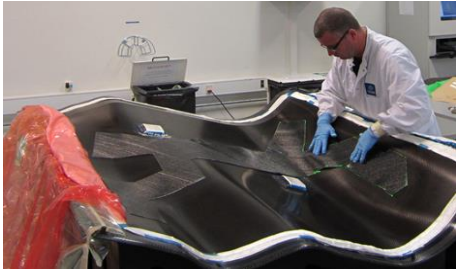
Vision: FLEXIBLE, AGILE, SUSTAINABLE manufacturing enabled by TALENTED employees
Budget: 265 M DKK
Periode: 2020 - 2024

MADE's "S" Curves



Linking Industry, Research and Innovation

Industrial challenges



Research & Innovation



Research



Innovation

Pilot projects



Pilot Project

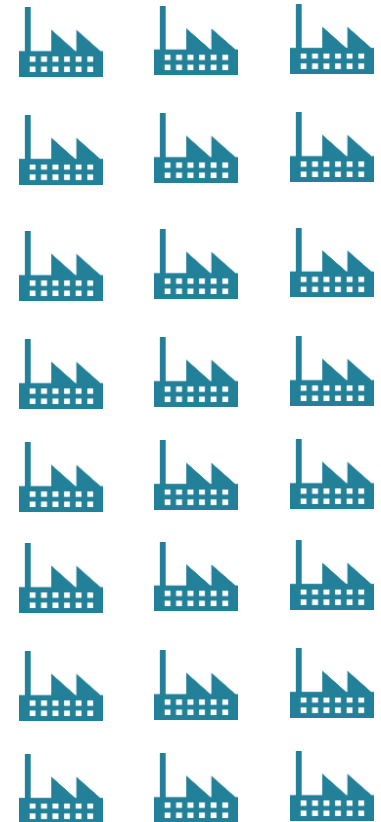


Pilot Project



Pilot Project

Implementation



MADE welcomes *SMEs*

monthly events focusing on a WP theme and smaller projects

Development projects



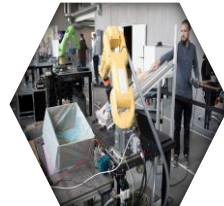
Industrial visits



Open Labs



Demonstration projects (for SMEs)



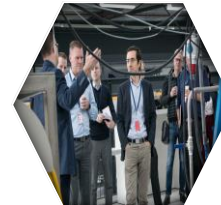
Innovation conferences



Network groups



Study trips



Cluster projects (for SMEs)



Webinars



MADE Annual meeting



MADE General assembly



Research projects



New knowledge and technology is widely shared in Danish industry through innovation activities and the bi-monthly newsletter

674
Companies and
organisations

4824
Participants

Have gained knowledge through
MADEs activities since 2014



From 2021 the cooperation with
Regional Business Hubs is
strengthened – to reach far
more companies



WORKSTREAM 1
SUSTAINABLE MANUFACTURING
BUSINESS MODELS AND
VALUE CHAIN DESIGN



WORKSTREAM 2
VALUE CHAIN EXECUTION
AND OPTIMIZATION



WORKSTREAM 3
AGILE PRODUCTION
SYSTEMS



WORKSTREAM 4
SUSTAINABLE UP-SCALING
THROUGH DIGITALIZATION OF
MANUFACTURING PROCESSES



WORKSTREAM 5
SUSTAINABLE AND
AGILE WORKFORCE

- developing and validating innovative digital solutions in Danish manufacturing companies that aim at increasing **F**lexibility, **A**gility and **S**ustainability while at the same time providing **T**alent.

HOW IS MADE FAST ORGANIZED? One platform – five workstreams

MADE FAST is organized into five thematically focused workstreams.

Each workstream consists of a team of qualified researchers and RTO consultants, who seek to develop innovative solutions to the company's industrial challenges

WORKSTREAM 1

BUSINESS MODELS
AND VALUE CHAIN
DESIGN

Workstream Leader
[Torben Pedersen](#)
Professor - CBS



WORKSTREAM 2

VALUE CHAIN
EXECUTION AND
OPTIMIZATION

Workstream Leader
[Charles Møller](#)
Professor - AAU



WORKSTREAM 3

AGILE
PRODUCTION
SYSTEMS

Workstream Leader
[Henrik Gordon Petersen](#)
Professor - SDU



WORKSTREAM 4

DIGITALIZATION
OF MANUFACTURING
PROCESSES

Workstream Leader
[Jesper Henri Hattel](#)
Professor - DTU



WORKSTREAM 5

SUSTAINABLE &
AGILE WORKFORCE

Workstream Leader
[Kaj Grønbæk](#)
Professor - AU



Sustainable Manufacturing Business Models and Value Chain Design(WS1)

Moonshot:

"By 2025, 20% of the manufacturing in Denmark is based on recycled, reused and/or re-circulated products"

Our journey

Move from resource efficiency
(resource minimization)

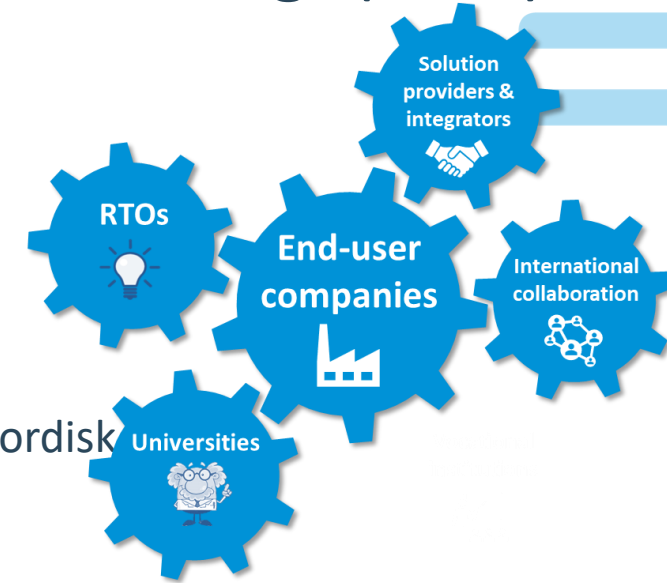
to a resource effective approach
(re-design of activities)

Industrial partners

- | | |
|-----------------|----------------|
| ▪ BB fiberbeton | ▪ Novo Nordisk |
| ▪ Coloplast | ▪ Plastix |
| ▪ Danfoss | ▪ Simon Moss |
| ▪ Danish Crown | ▪ Maskinfabrik |
| ▪ Dynamic Ropes | ▪ Vetaphone |
| ▪ Aalborg | |
| ▪ Glaspartner | ▪ Portland |
| ▪ Grundfos | ▪ Aasted |
| ▪ Hydrflex | |

Academic partner & RTOs

- CBS
- DTU
- SDU
- AAU
- FORCE Tech



WORKSTREAM 1

Research projects (10)



01

SUSTAINABLE MANUFACTURING BUSINESS MODELS AND VALUE CHAIN DESIGN



02

VALUE CHAIN EXECUTION AND OPTIMIZATION



03

AGILE PRODUCTION SYSTEMS



04

SUSTAINABLE UPSCALING THROUGH DIGITALIZATION OF MANUFACTURING PROCESSES



05

SUSTAINABLE AND AGILE WORKFORCE

[Part Project 1.01 - Coloplast dedicated Ph.D. with CBS](#)

[Part Project 1.02 - Novo Nordisk dedicated PhD with CBS](#)

[Part Project 1.03 - Carlsberg dedicated PhD with SDU](#)

[Part Project 1.04 - Aasted dedicated PhD with DTU](#)

[Part Project 1.05 - Grundfos dedicated PhD with DTU](#)

[Part Project 1.06 - Aalborg Portland dedicated Ph.D. with AAU](#)

[Part Project 1.07 - Danish Crown dedicated Ph.D. with AAU](#)

[Part Project 1.08 - Danfoss & Grundfos partner PhD with AAU](#)

[Part Project 1.09 - Grundfos & Danfoss Partner PhD with AAU](#)

[Part Project 1.10 – Novo Nordisk dedicated Ph.D. with DTU](#)

Development projects (with FORCE)

[Part Project 1.10 - Simon Moos](#)

[Part Project 1.11 - Plastix](#)

[Part Project 1.12 - BB fiberbeton](#)

[Part Project 1.13 - Vetaphone](#)

[Part Project 1.14 - Dynamica Ropes](#)

[Part Project 1.15 - Glaspartner](#)

[Part Project 1.16 - Letbek](#)

[Part Project 1.17 - Hydraflex Partner](#)

Synergies across projects:

Take back programs

- How to organize take back programs (incentives, logistics, business case)?
- Develop large scale models and ecosystems that can support it

(Danfoss, Glaspartner, Grundfos, Novo Nordisk, Plastix & Simon Moos)

Value chain design

- Develop partnership models and forecast demand for sustainability
- Align the value chain partners on common goals

(Coloplast, Danish Crown, Aalborg Portland & Aasted)

Aalborg Portland

The goal is to set up a plant that removes CO₂ from the flue gases in cement manufacturing.



- First step: reducing their CO₂ emissions by 30 % compared to 1990.
- requires the development of new technologies, that can capture and store CO₂,
- new business models need to be developed to pave the way for making a good business out of products that *will cost far more than today's conventional methods*
- MADE FAST Ph.D. project will combine the technical and business areas with a focus on sustainability and CO₂.
- *"It is also the strength of MADE, that companies are moving closer together – exchanging ideas and inspiration for new competencies at the academic level too"*

Plastix

Want to develop new circular business models and explore how recycled plastic can be used for food packaging



- Are in the process of creating a completely new market for Green Plastic.
- Use this time of crisis proactively to change self-understanding in relation to the entire value chain.
- “We currently experience our partners being forced to stop and reflect on a sustainable future, - and that is stimulating the new development projects”
- The corporate vision must be long-term, to ensure circular products, and to help solve the climate challenges – looking far far ahead - 500 years
- Plastix and Aalborg Portland are in complete agreement

What we do

We re-imagine, re-engineer and re-apply in cooperation with some of the most passionate and innovative customers and partners in the world

Re-imagining plastics

LETBEK

Standard Letbek Products



TRAFFIC SAFETY



CABLE PROTECTION



CONES, COVER & TOP RINGS

Industries & Market Segments

- Building & Construction
- Design Furniture
- Agriculture
- Industrial Production
- Water Treatment

Customized Solutions & Services



PLANNING & DEVELOPMENT

- Concept development
- Product design & layout
- Cost & Feasibility
- Product engineering
- 3D Printing & prototyping
- Tool development

PRODUCTION

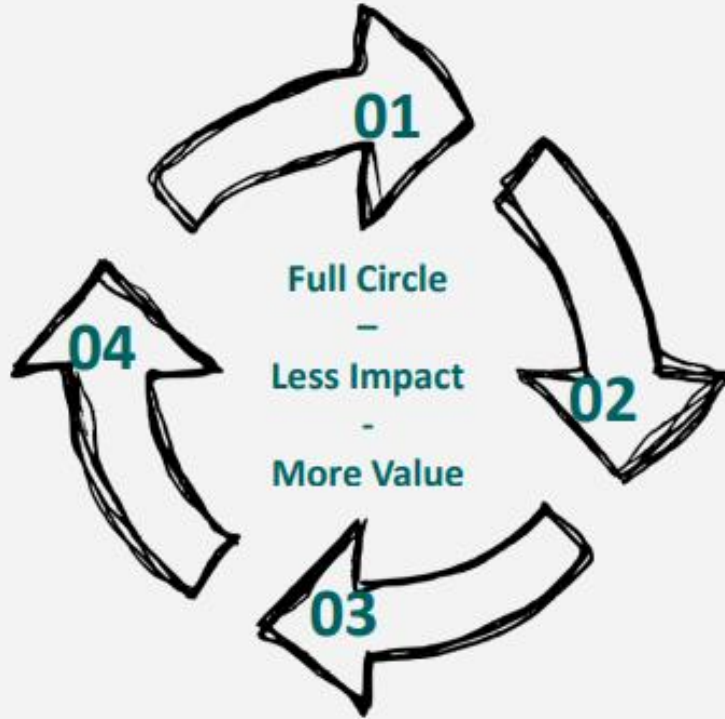
- Pilot production
- Process optimization
- Material design & recombination
- Plastic recycling
- Extrusion
- Injection moulding
- Pressure moulding
- Polyurethane (PUR) moulding
- Material testing and quality assurance

IMPLEMENTATION

- Delivery & Installation
- Training
- Documentation
- Logistic services
- Recycling partnerships
- Waste management systems

Circular thinking

We create value the circular way



01



WASTE MANAGEMENT

02



RE-THINKING
DESIGN

03




PRODUCE TO RE-
PRODUCE

04



SUSTAINABLE
SOLUTIONS



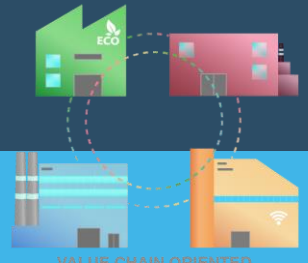
MADeS impact on Danish Manufacturing Industry and SMEs Learning from two DK SMEs

- case examples from the ADMA initiative

...aims to help SMEs assess and adopt advanced manufacturing solutions to transform their organization towards Factories of the Future (FoF) with more competitive, modern and sustainable production

The methodology is building on 7 transformation areas

1. Advanced Manufacturing Technologies
2. Digital Factory
3. ECO Factory
4. End-to-End Customer Focused Engineering
5. Human Centred Organisation
6. Smart Manufacturing
7. Value Chain Oriented Open Factory



Factory Manager, Ib Hauberg, BKI

Introduction to BKI – Virtual factory tour

[Link til BKI film](#)

And read about Eco Factory related breakthroughs at BKI
[link to MADE homepage](#)



Dorte Martinsen, BM Silo Co-owner

Introduction to BM Silo - virtual factory tour

[Link til BM Silo film](#)



Learnings from two DK SMEs in the 2021 environment

- Great unreleased potentials in Dk SMEs
- Be ambitious, have a goal – and dare to make the first step
- Reach out to knowledge providers, expose weaknesses and doubts,
- Engage in dialogue, tests and pilots
- Big similarities between SMEs and big companies
- Being agile is easier when you are small

It's not the technology itself
or tools that matters
it is how you use it

The most
innovative ecosystems
being able to use
digital manufacturing technology
will be dominating in the future

Thank you for listening.....

*to the MADE story about
a vision, the right people, structure, discipline and trust
strengthening the Danish Manufacturing Ecosystem*

and the Danish SMV case stories



You are always welcome to contact me:

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