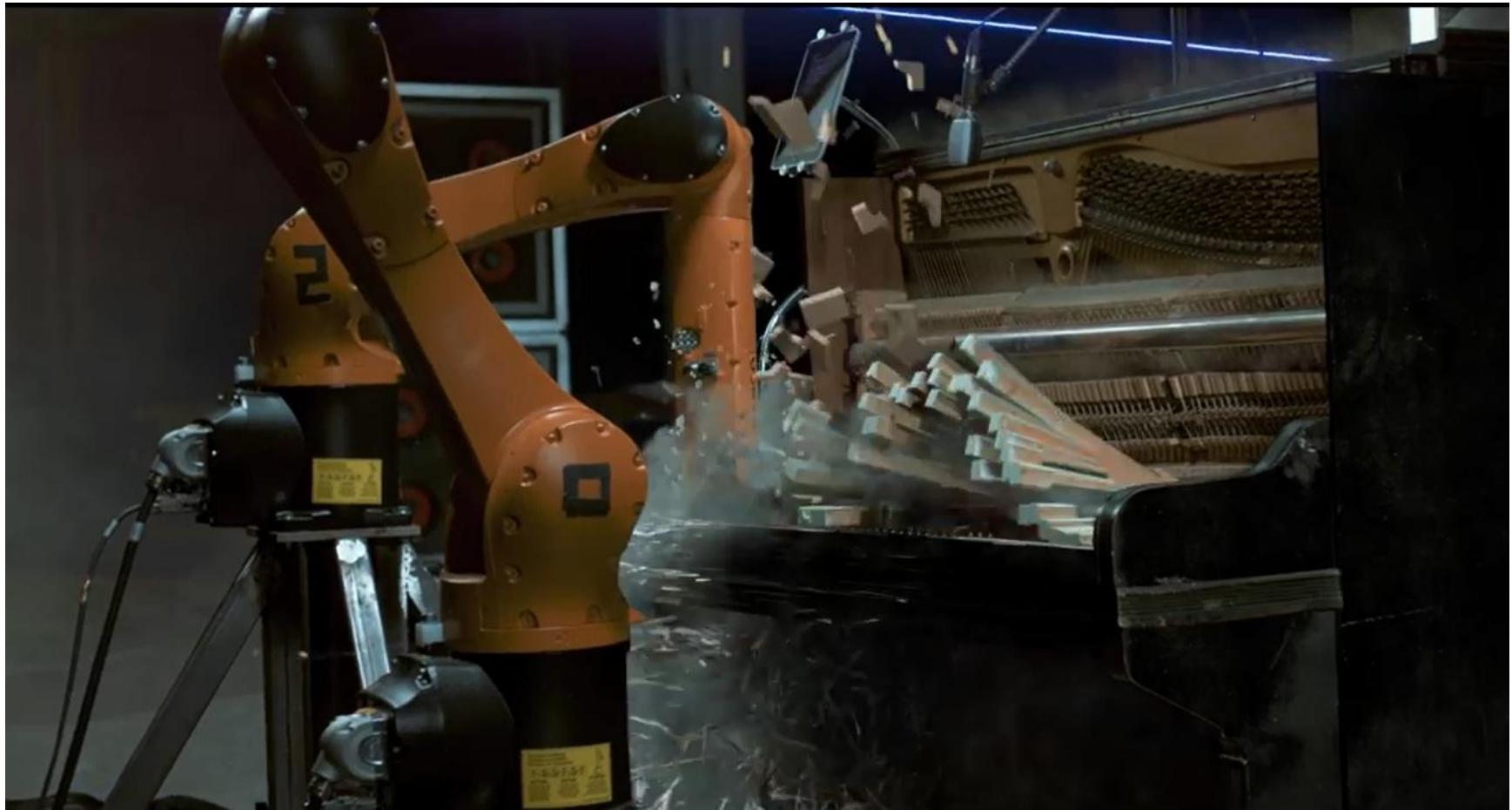


# Robots playing





Innovationsnetværket  
**RoboCluster**

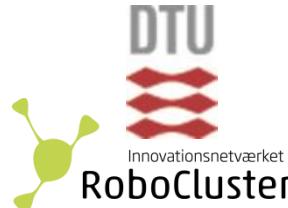
Bringing together Danish expertise in the field of robotics research,  
development and design

# - National Network



## Vision

Denmark as a pioneer country for development and innovative use of robotics and automation where it creates the biggest value for the Danish society and the individual company.



TEKNOLOGISK  
INSTITUT



Uddannelses- og  
Forskningsministeriet  
—  
Styrelsen for Forskning og Innovation

## - From Local to National

2009

National  
Innovation Network

2006  
Regional  
Technology Center

2002  
Local  
Growth Initiative



Innovationsnetværket



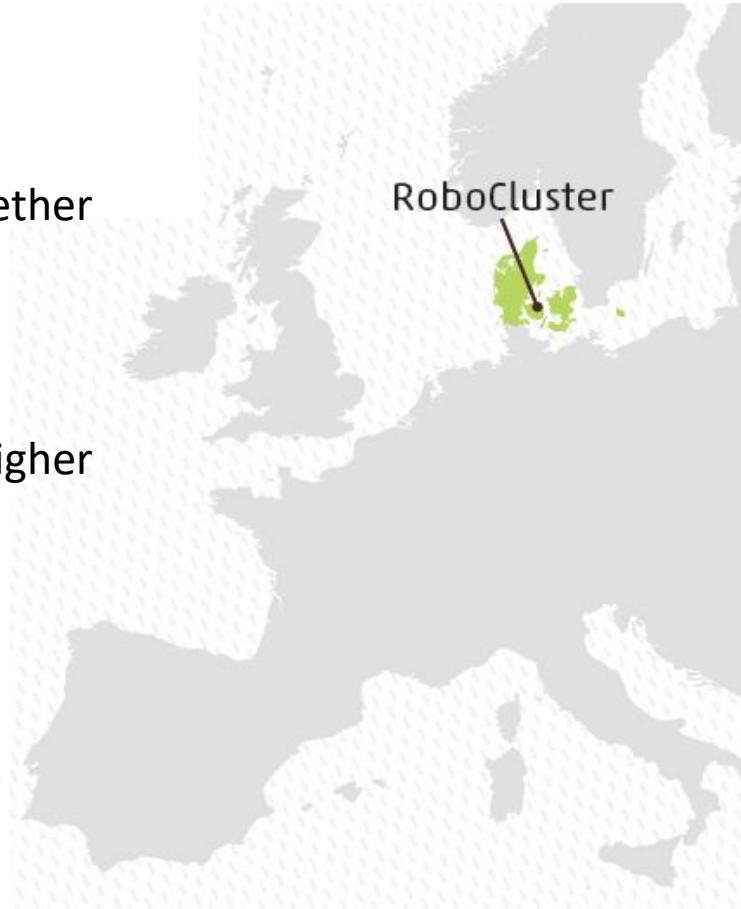
# - RoboCluster

# Innovation Network

RoboCluster is an innovation network that brings together Danish expertise in the field of robotic research, development and design

RoboCluster is supported by the Danish Ministry of Higher Education and Science

We are situated in Odense where there is a large concentration of robotic developers, companies and researchers. But our partners, members and business partners are scattered all over Denmark and abroad.

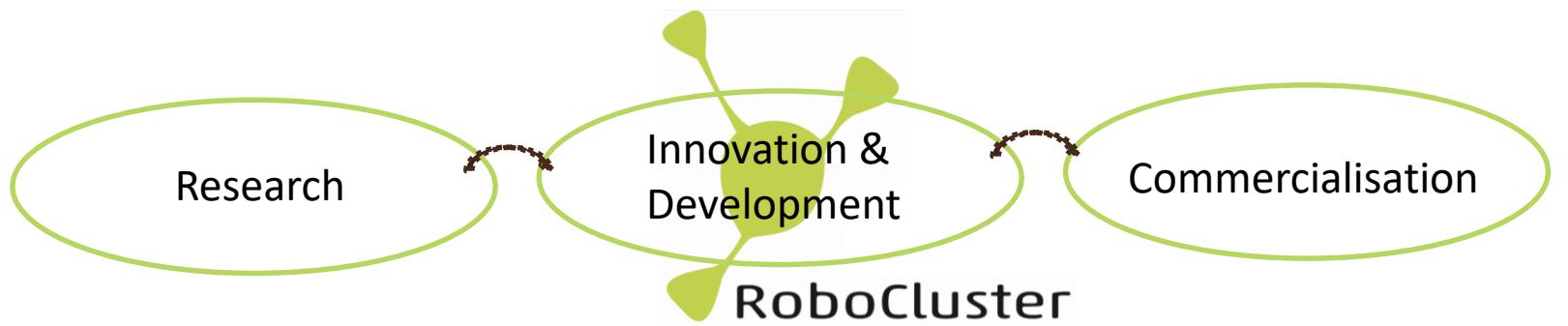


# - RoboCluster

## Purpose

Our purpose is to strengthen interaction and knowledge transfer between research institutions and companies and thereby strengthen innovation and research in Danish companies

In other words, we provide a link between research and industry with the aim of creating innovation and growth in Denmark



# - RoboCluster

## Partners:

Our partners are leading technical universities and organizations from all over Denmark. The partner group count several Danish Technical Universities, industrial organizations and technical sub networks that binds us close to tech businesses.

## Members:

RoboClusters active members are a balanced mix of end-users and tech developers.

Common to all RoboCluster members, is that they all have an interest in robotics and automation and have a desire to develop and innovate in collaboration with leading knowledge institutions.



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# - Danish Research in Robotics



AALBORG UNIVERSITET

- Process and system integration
- Flexible production systems
- Robots and social interaction
- AUV (flying robots)



AARHUS UNIVERSITET

- Play and edutainment
- AUV (flying robots)
- Agricultural robots



- Robot design



- Route planning
- Robot grasping
- Cognitive robots
- Health technology
- Flexible Lean Automation
- Automation systems
- Flexible production



Innovationsnetværket

RoboCluster



TEKNOLOGISK  
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- Industrial robots
- Welfare technologies
- Edutainment technologies



- Robot controlling and – navigation
- Mobile robots
- Sensor fusion
- Human-robot interaction



- Mobile Robots
- Positioning





Udvikling  
**Fyn**  
SAMMEN OM VÆKST



Trade  
Organizations

Innovation  
Agents

Innovation  
Networks

Regional  
Growth and  
Innovation  
Initiatives

**SDU**

TEKNOLOGISK  
INSTITUT

dko

**DTU**

AALBORG UNIVERSITET

**DIRA**  
Dansk Robot Network

**DAU**  
D FORCE  
TECHNOLOGY

D I

ARBEJDSGIVERNE



syddansk  
**vækstforum**

**R**  
Ryslinge Efterskole  
Vi vil lær mere

**LILLEBÆLT**  
ERHVERVSAKADEMIE

**UNIVERSITAT**  
KOBLENZ · LANDAU

**AARHUS UNIVERSITET**

**SYDDANSK  
ERHVERVSSKOLE**

**EA** ERHVERV  
AKADEMI SYDVEST

**UCL**  
UNIVERSITY COLLEGE  
Lillebælt



Higher  
Education  
Institutions

SPIR

Entrepreneurs  
and  
Foundations

Clusters

**CenSec**  
CENTER FOR SIKKERHEDSINDUSTRIEN.DK

**infinit...**  
Innovationsnetværk for it

SERVICE PLATFORM

**INBIOM**  
INNOVATION NETWORK FOR BIOMASS

**DELTA**  
ALEXANDRA  
INSTITUTTET

**FoodNetwork**  
Fødevaresektorens Innovationsnetværk

**AgroTech**

**UAS**  
Denmark  
Unmanned aerial systems

**WelfareTech**  
Business Innovation

**EFFRA**  
EUROPEAN FACTORIES OF THE FUTURE  
RESEARCH ASSOCIATION  
a MANUFUTURE initiative

**INDUSTRIENS  
FOND** FREMMER DANSK  
KONKURRENCEEVNE

DEN EUROPEISKE UNION  
Der Europæiske Fond  
for Regionaludvikling  
Vi investerer i din fremtid

Det  
Strategiske  
Forskningsråd

**euRobotics**  
aisbl

**InvestorLink**

**RoboCluster**  
Innovationsnetværket

## - Our robot definition

- Physical robots and their interaction with the surrounding world
  - Including mobile, flying, sailing and diving units as robots
  - Not IT-robots

A robot is a physical unit that can receive input from sensors, process and then make an output.



Innovationsnetværket

RoboCluster



# - Industri robots

## **How are Robots used**

48% handling, 24% welding, 10% assembly, 18% other

## **Where are Robots used:**

39% car industry, 25% electronics, 12% metal industry, 8% plastic, 16% other

- **Industryrobotter**
  - **Geografic sale - Top 5 - 2015**

China: 68.600 stk.

Korea: 38.800 stk.

Japan: 35.000 stk.

USA: 27.504 stk.

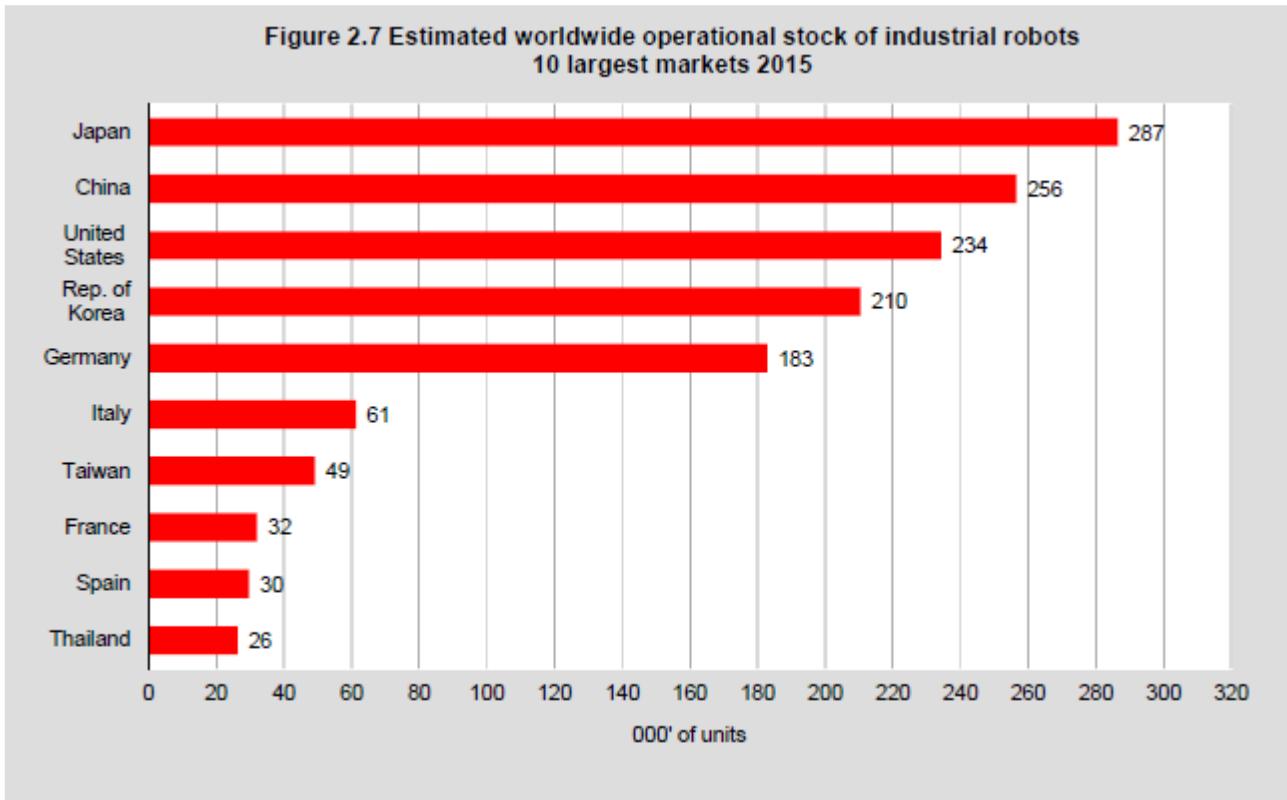
Germany: 20.051 stk.

.

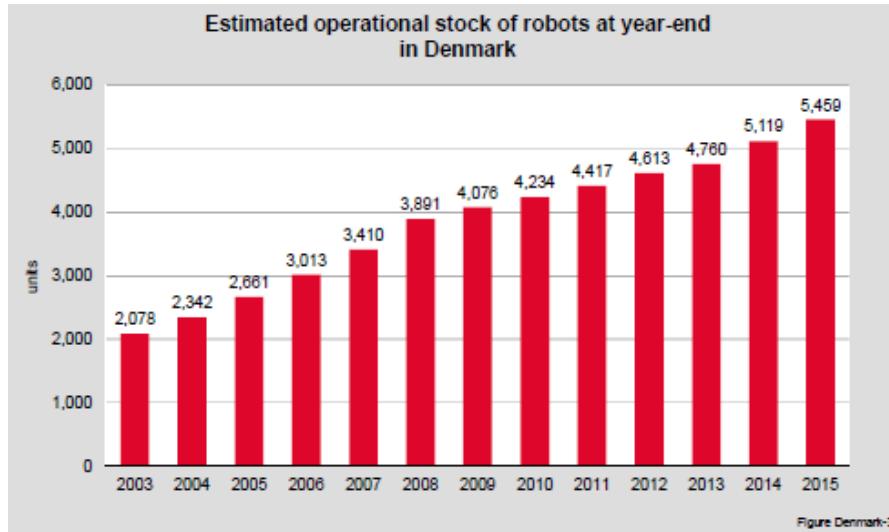
Denmark: 628 stk.

## - Existing robots in use

**Figure 2.7 Estimated worldwide operational stock of industrial robots  
10 largest markets 2015**

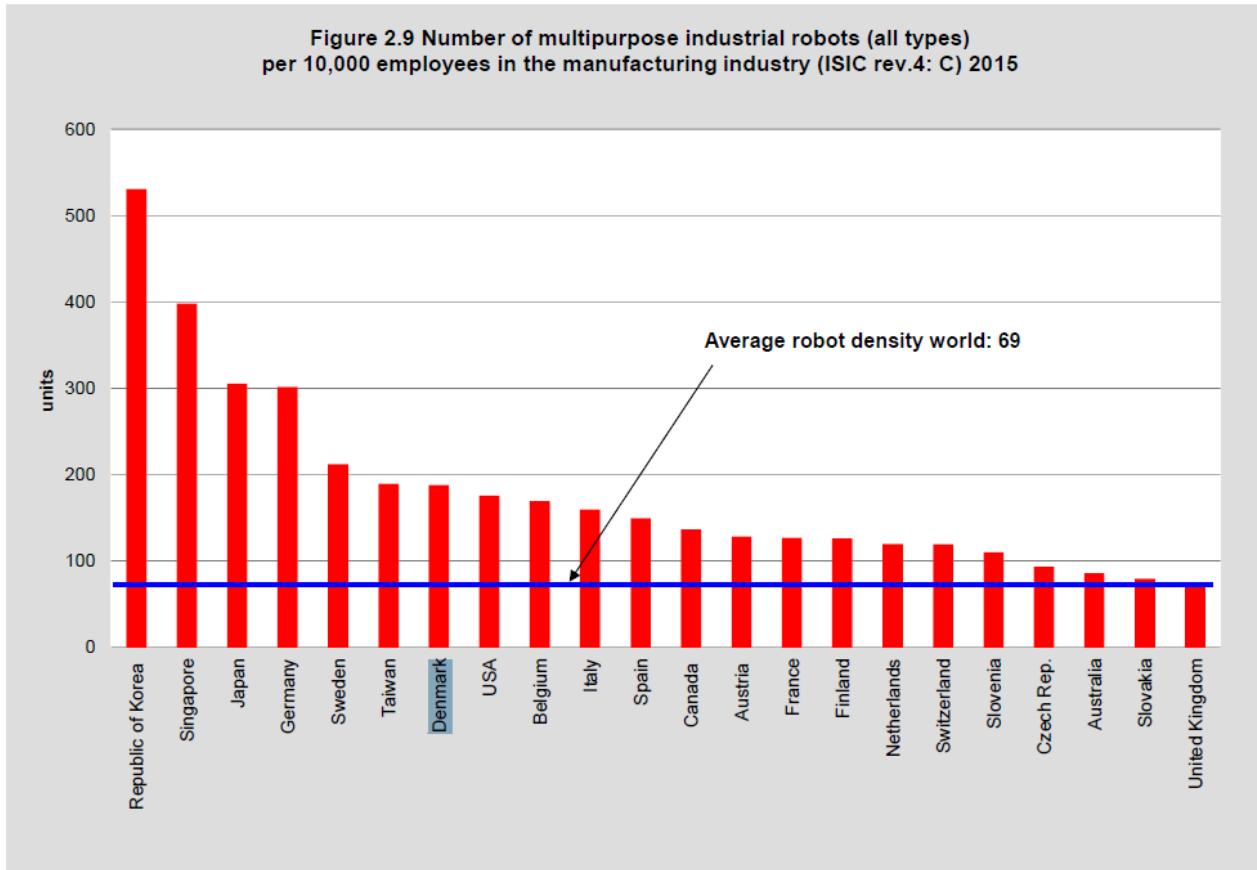


## - Industry robots in Denmark



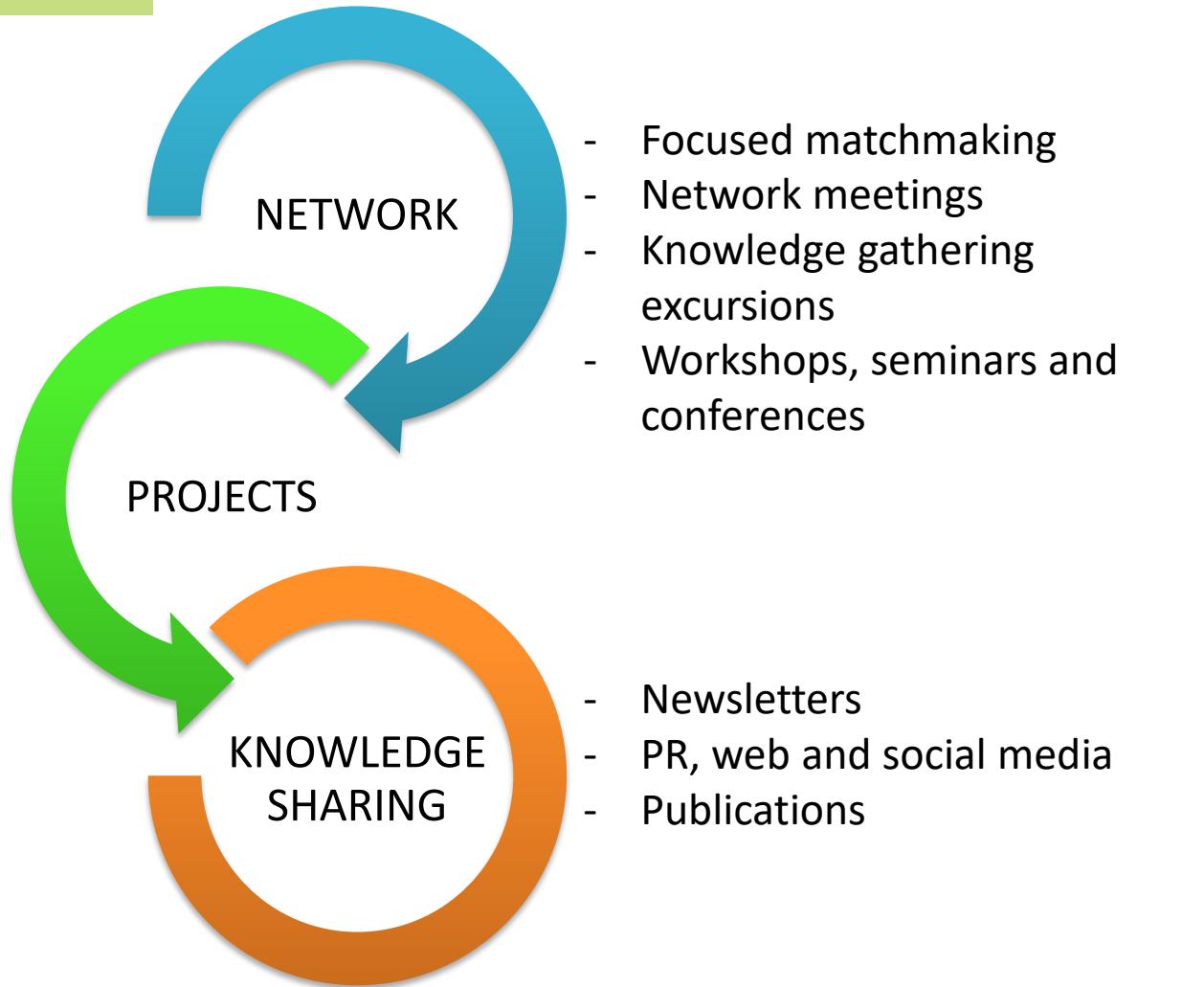
- Danish industry used app 5.500 industrirobotter at then end of 2015
  - Source: IFR: World Robotics – Industrial Robots 2016

- Robots pr. 10.000 employeed



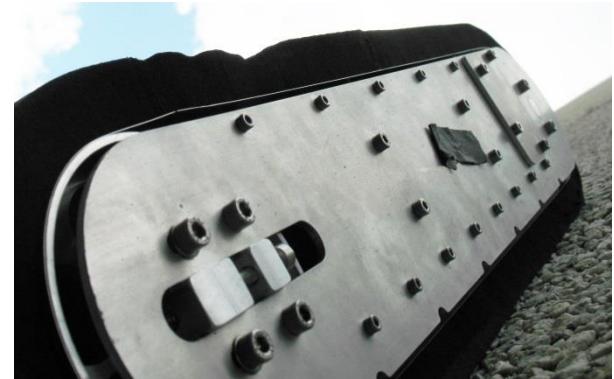
## - The Actual Work

- Innovation projects
  - Technology projects
  - Cluster- and network projects



# Suction-crawler robot for inspection

- Controllable suction-crawler-robot for the inspection of non-magnetic surfaces using a new vacuum concept
  - A demonstration project that makes use of a suction-crawler-robot for the inspection of bridges and wind turbines, constructions, etc.
  - The objective is to document the potential for inspection of bridges or wind turbines in operation.
  - <https://www.robocluster.dk/nyheder/nyheder-2018/positioneringssystemer-til-inspektionsrobotter.aspx>



SIEMENS

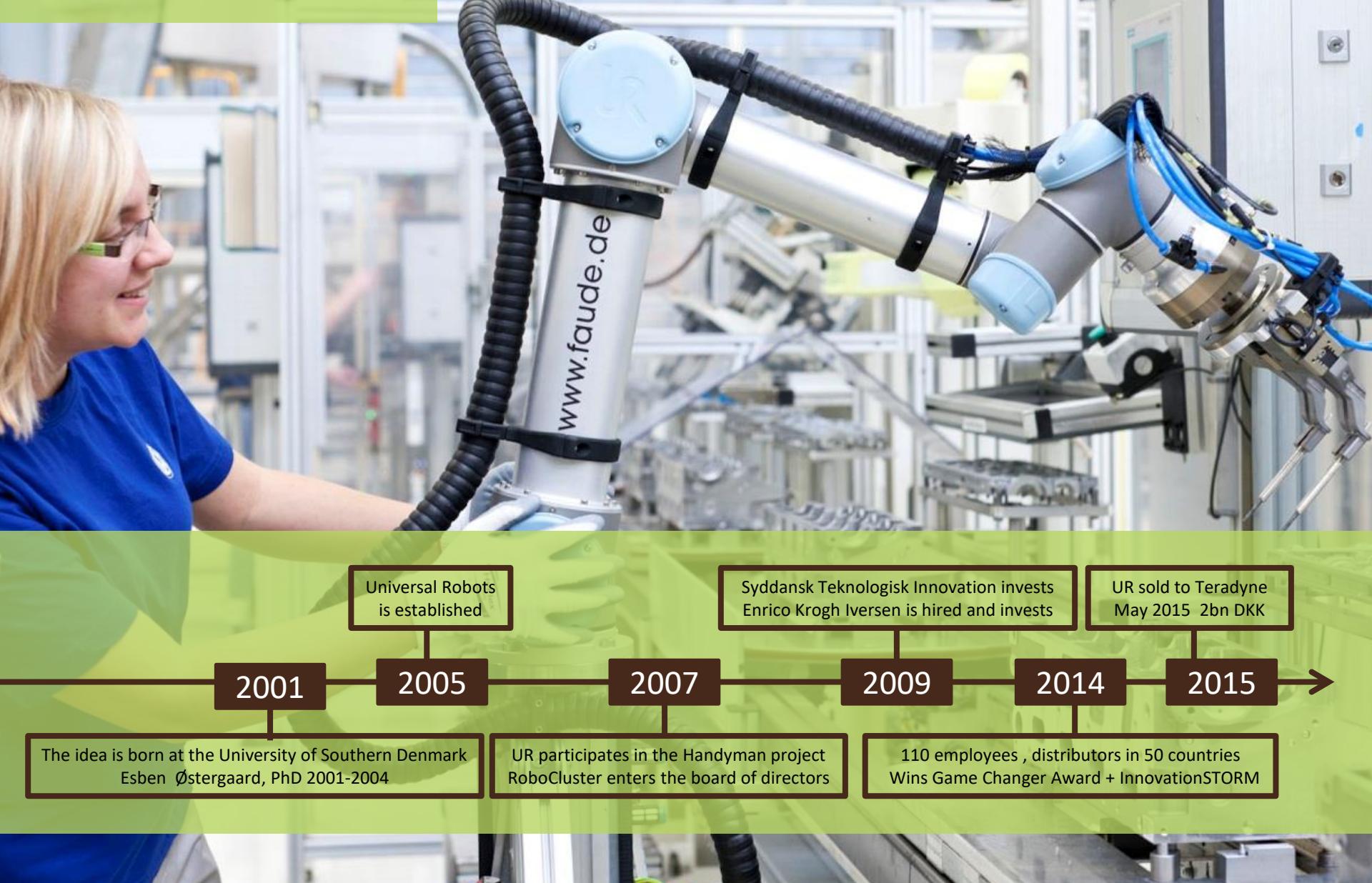
Siemens Wind Power



Storebælt  
Sund Bælt



# - Universal Robots



# Trelleborg Sealing Solutions

- Example of a company that introduced robots and hired more employees
- Trelleborg Sealing Solutions
- 42 new robots over 5 years and from 280 to 330 employees
- <https://www.universal-robots.com/case-stories/trelleborg-sealing-solutions/>

# RoboCluster@AUTOMATICA



## Fakta:

Den 17. - 20. juni 2018  
Begrænset antal pladser

Tilmelding og spørgsmål til:  
[morten.nielsen@robocluster.dk](mailto:morten.nielsen@robocluster.dk)

RoboCluster@AUTOMATICA:

- Fly tur/retur fra Kastrup/Hamburg til München
  - 3x hotel med morgenmad i München
  - 4x frokost inkl. drikkevarer
  - 3x aftensmad inkl. drikkevarer
  - Oktoberfest-arrangement med højt humør ☺
  - 2-dages besøg på **AUTOMATICICA** inkl. entre, og guidet tour
  - Alt i lokal transport
  - **“Zukünftige Roboter”** - Robotkonference med danske og internationale robotekspertes
  - Virksomhedsbesøg hos stor tysk virksomhed
  - Besøg på teknisk universitet i München
  - Netværkspauser med internationale partnere
  - Branchens mest erfarne og engagerede guide.

**ALT DETTE FOR BARE 10.000,-**

Prisen er ekskl. dansk moms

Fra den 1. april. lægge  
2.000 kr. til

2.000,- oven i prisen.

Ændringer vil forekomme  
Version 4.0 - 20180516



Innovationsnetværket

# RoboCluster



# RoboCluster@AUTOMATICA

3-dage med konference, netværk, virksomheds- og messebesøg på Verdens største  
Robotmesse AUTOMATIC!

## 48 participants from Denmark!



AALBORG UNIVERSITET



LUND  
UNIVERSITY



ROBOT NORDIC



NORDIC ALPHA  
PARTNERS



change;

bagger-nielsen  
teknik, viden & produkt i ét

Hannemann Engineering ApS



UNIBAP  
TecNordic  
INDUSTRIAL SOLUTIONS

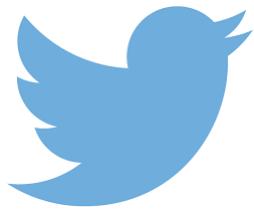
X-drive Robots

Innovationsnetværket  
RoboCluster



# - Where to find us!

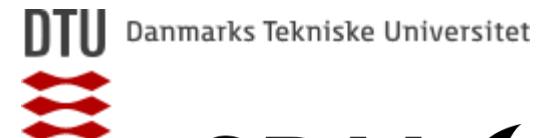
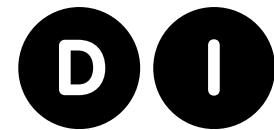
- Web: <http://robocluster.dk>
- Newsletter – subscribe online
- LinkedIn: <https://www.linkedin.com/groups/6955810/profile>
- Twitter: <https://twitter.com/RoboCluster>



A screenshot of the RoboCluster website homepage. The header features the RoboCluster logo and navigation links for Home, Nyheder (News), Aktiviteter (Activities), Projekter (Projects), Nettværk (Network), Yderst (Outreach), Hvad er en robot? (What is a robot?), Om RoboCluster (About RoboCluster), and Kontakt os (Contact us). The main content area includes a banner for a field trial, news items like "Erfaringer med robottegning og automation skal...", "RoboCluster skal fraske høstet raps", and "Tilmeld nyhedsbrev", and a sidebar with a "Det skal du huske, inden du køber robotben" section.



Partnere i Innovationsnetværket RoboCluster



# Innovationsnetværket RoboCluster

Innovationsnetværk for de danske kompetencer inden for  
forskning, udvikling og design af robot- og automationsteknologi



**Uddannelses- og  
Forskningsministeriet**

Innovationsnetværket  
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