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Regional Network projects as a way to introduce innovation to SMEs Experience from Norwegian programs

POLISH NORWEGIAN COOPERATION
FOR ENVIRONMENTAL FRIENDLY
AND INNOVATIVE SOLUTIONS
IN SMES - POLNORECO

Leif Estensen, 25th of January 2017





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Contents

- NTNU/SINTEF
- Competence brokering in single company
- Competence brokering and innovation in network
- Experience, results and effects
- Case studies and examples



Active participation and the same understanding

Foto: Solveig Svardal, Telemarksforsking



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Competence transfer and innovation

January 2017

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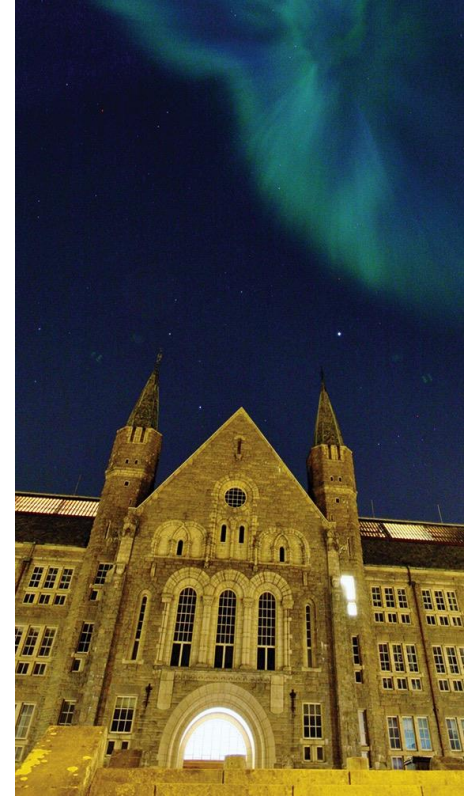


NTNU

**Norwegian University of Science and Technology
Trondheim, Norway**

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- 14 faculties and 70 departments and divisions with a broad selection of programmes and disciplines
- 6700 employees, of which 4053 are in teaching and research
- 39 % are female
- Approx. 39.000 students, of which 3.000 are from abroad
- 44-45 % are female
- Employees and students from more than 90 countries
- 340 – 370 PhD doctoral degrees yearly, of which 41 % are by international students
- Close cooperation with SINTEF (2100 employees), St. Olavs Hospital and NTNU Social Research AS
- Cooperate with more the 200 other universities
- www.ntnu.no



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SINTEF

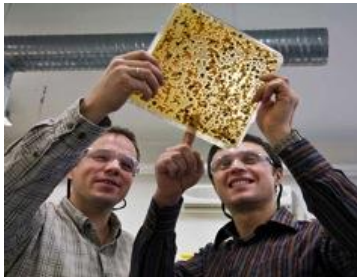
Trondheim, Norway

Applied research, technology and innovation

- 2.000 employees
- 1.400 researchers
- 46 % with PhD degree
- Staff members from 72 countries
- 33 % women
- 7-8.000 projects yearly
- More then 3 billions NOK
- 16 % of the turnover is overseas projects
- Among the most attractive work places in Norway
- www.sintef.no



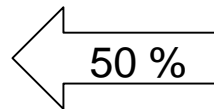
Partnership between NTNU and SINTEF is strategic and operative



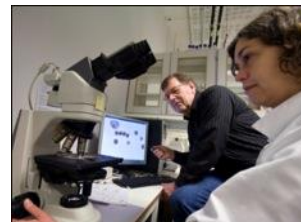
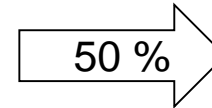
NTNU-staff work on SINTEF-projects



SINTEF-staff teach at NTNU



“The industrial ring”

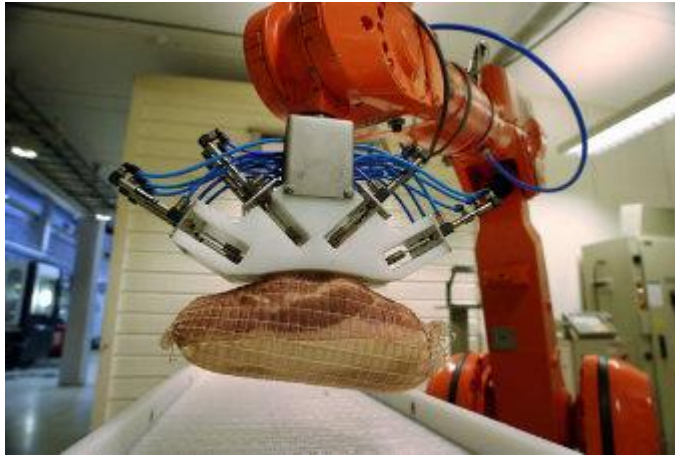


Common use of laboratories and equipment



Collaboration NTNU - SINTEF has been developed through 60 years

Examples of R&D activities



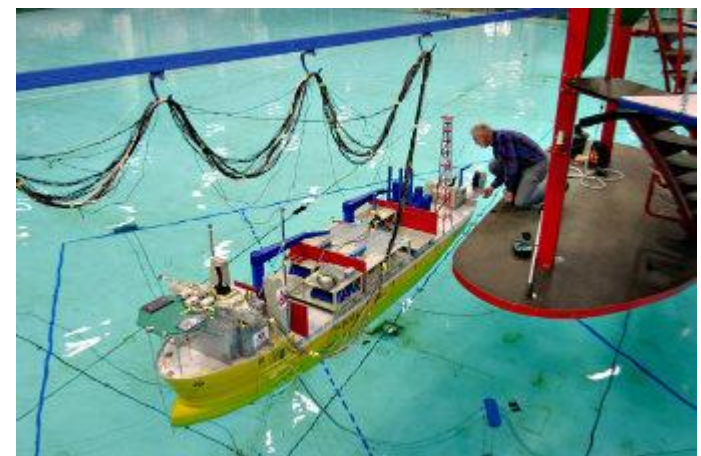
Robotics and gripping technique



Crash testing of light metal profiles



Planning of operation by help of 3D pictures

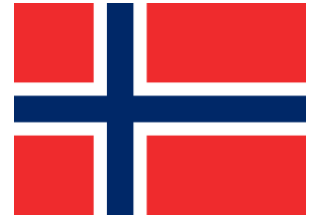


Testing models of new ships and offshore constructions



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Norwegian advantages



- High labor costs
- Short distance between employees and management
- Employees who take responsibility
- Educated people and high competence
- High IT competence in the Norwegian population
- Many SMEs in the Norwegian industry business
- Culture for collaboration within the company - and also between companies
- Strong focus on sharing knowledge and experience





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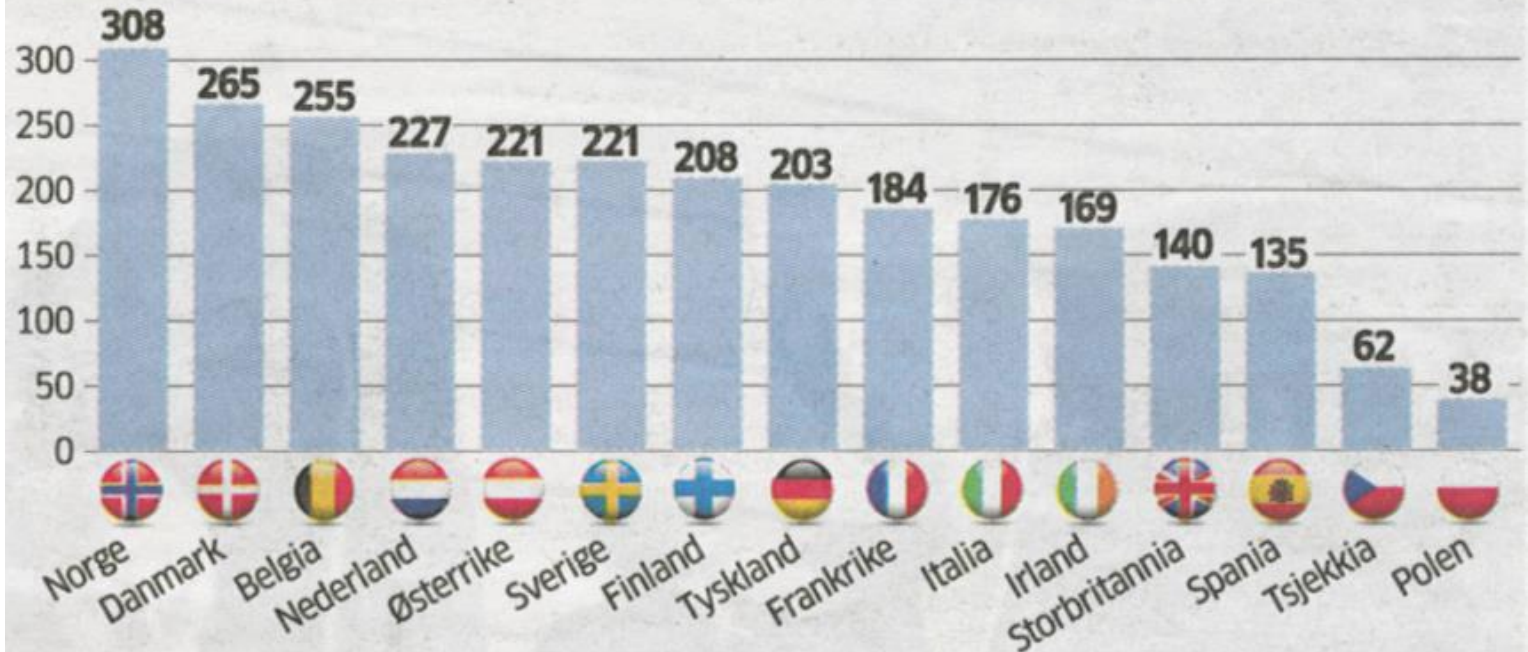
Wage cost for one employee in one hour

Norwegian NOK in 2011

Dette koster én ansatt i én time

Gjennomsnittlige lønnskostnader* pr. time for industriarbeidere. 2011.

Kroner pr. time



*Tar hensyn til forskjeller i sykefravær, lengden på ferien, arbeidsgiveravgift og andre kostnader knyttet til arbeidsforholdet.

Kilde: Teknisk beregningsutvalg for inntektsoppgjørene

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Competence brokering and knowledge transfer to companies participating in single project or in innovation networks?

Competence => Knowledge + Experience

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R&D institutes, universities
Colleges and knowledge environment

Single company



Companies in network





History of Competence Transfer in Norway

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1977-
Meeting places
1982-1984
Regional Pilot
Norway-Sweden
1984-1988
Pilot in one
Norwegian county

1989-1993
DTS-programme
9 of 19 counties
9 brokers
2135 SMEs
1011 projects

1994-2003
TEFT-programme
Nationwide
12 brokers
3732 SMEs
1560 projects

2004-2006
R&D-based
brokering
25-35 brokers

2007-2016
VRI-programme
More SMEs
and business
sectors
> 50 brokers



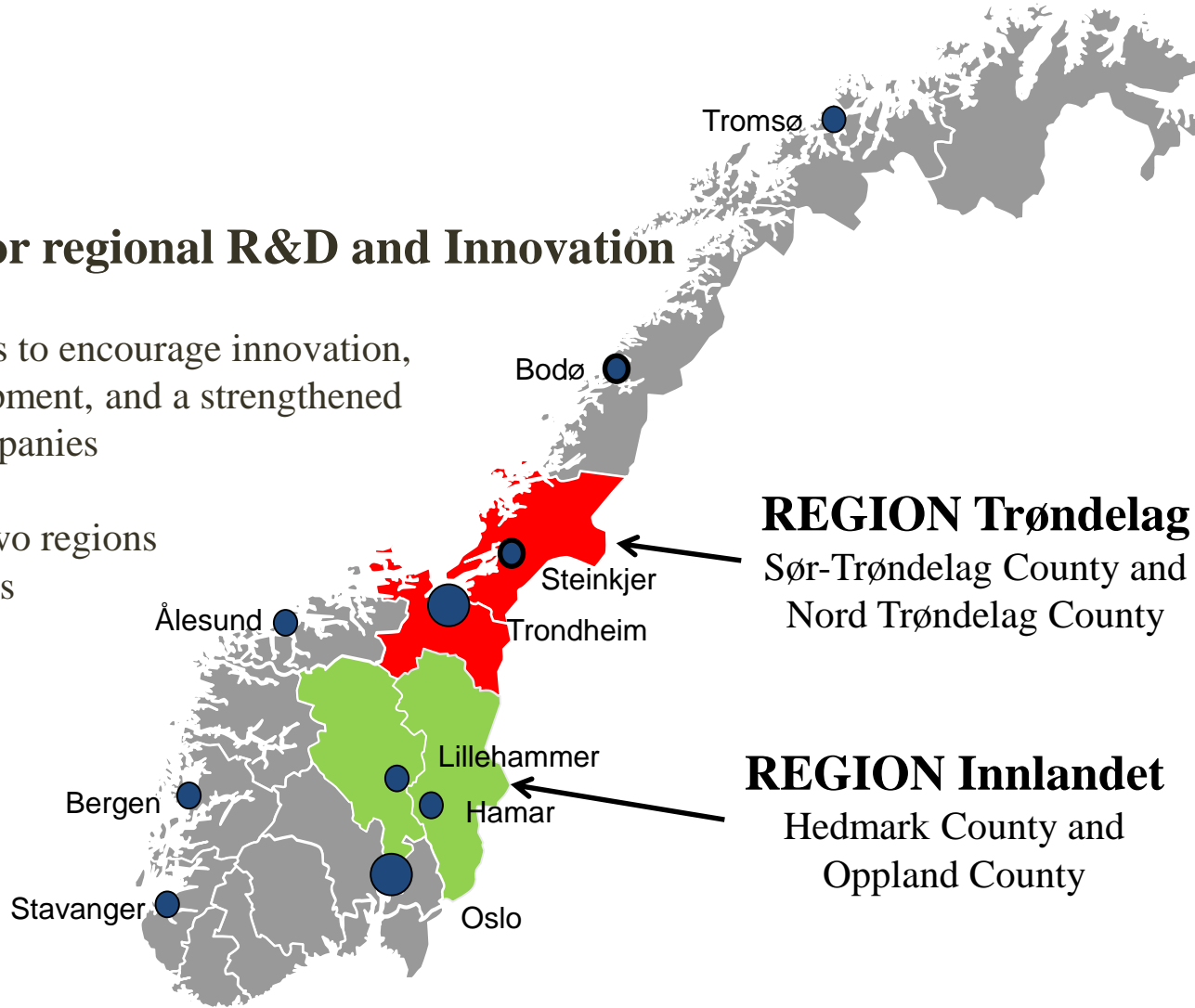


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Instruments for regional R&D and Innovation

The primary goal is to encourage innovation, knowledge development, and a strengthened R&D effort in companies

Experience from two regions
Norway 19 counties

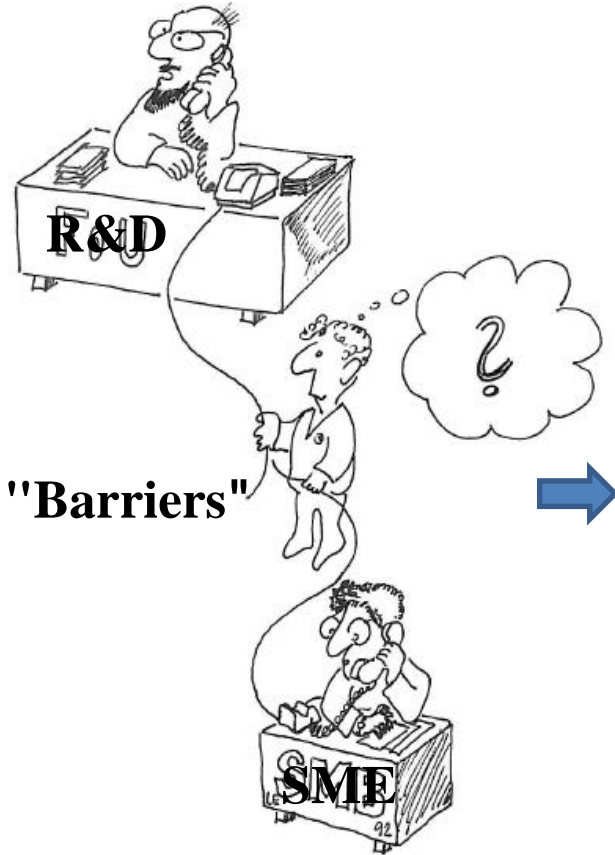




Competence brokering and technology transfer to single company (face to face)

The broker: Good overview of SMEs, R&D and policy instruments

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The broker connects SME and R&D

The scientist explains technology to the company when a student is watching.

Active participation and the same understanding

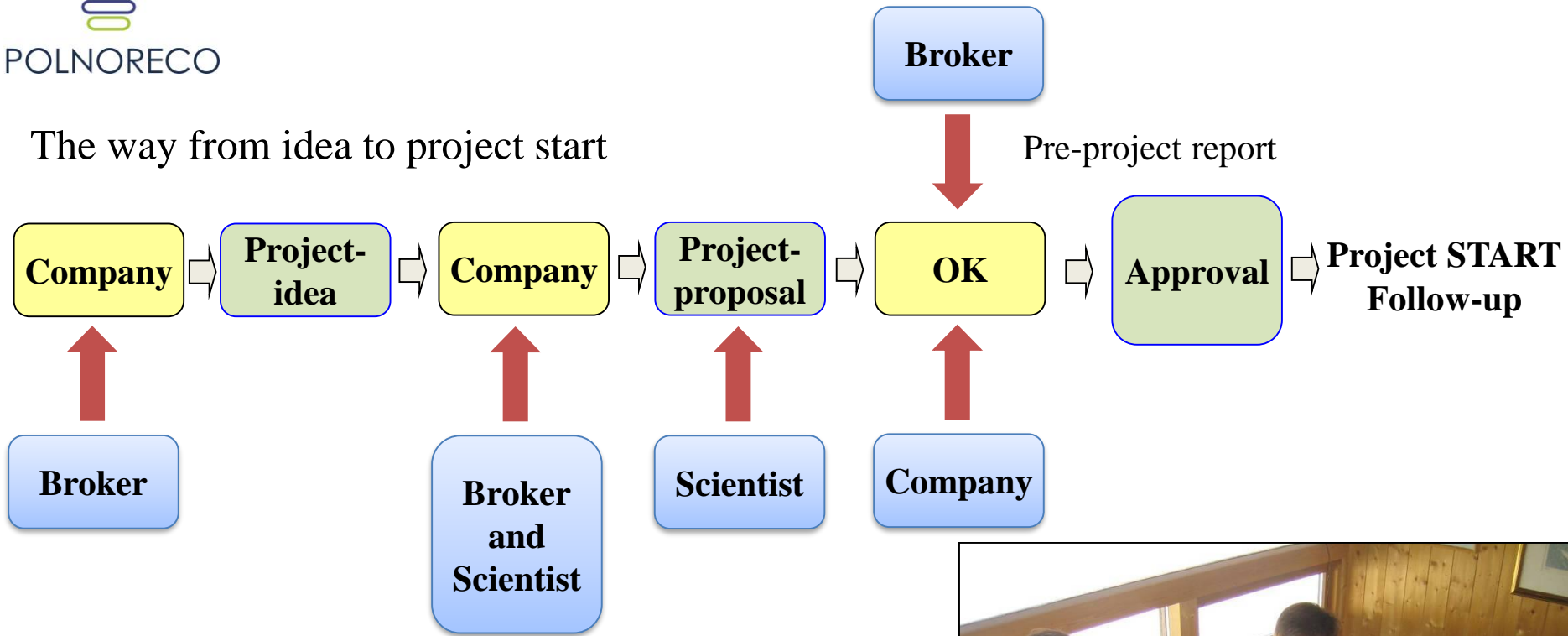




R&D based brokering and project development

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The way from idea to project start



Experience and results from Innlandet

Hedmark county and Oppland county

- ❑ Approx. 1800 SMEs within the manufacturing industry
- ❑ 50 companies are visited yearly
- ❑ About 55-60 % of the company visits are based on initiative of the competence broker
- ❑ New contacts
 - ❑ More and more companies take contact themselves
 - ❑ Suggestions from public regional administrations
 - ❑ Researchers and even students give input
- ❑ The manufacturing industry in Innlandet 2004-2016

❑ Implemented projects	302
❑ Continuing of projects	188
❑ Running projects	15-20



30 % of 291 projects are in the woodworking industry. Product (48 %) and process development (41 %)





27 % of 291 project in mechanical and 12 % in food industry. Only 8 projects in SMEs with more than 100 employees



Concluding remarks

Technology transfer to single companies

- Effects** (case interview after ended project)
 - Change in attitude regarding benefits of cooperating with Universities/R&D
 - Valuable input of knowledge to the company
 - Solving company relevant problems with external knowledge gives rapid and better results
 - Mostly small projects
 - Use of students in the projects are valuable and inexpensive
 - Possibility to recruit and employ educated students
 - The broker is important in project development and finding the right knowledge

- Master studies by students** (in-depth interviews of companies in 2015)
 - There are clear differences between the companies (Yes and No Companies)
 - Education and background affect the basis for collaboration with Universities/R&D
 - Interaction and good communication (face-to-face) affect the collaboration
 - Relations and in-house knowledge are important
 - An active administrative board with external members initiate the “best projects”
 - Attitude and capability to absorb, use and manage the knowledge is vital
 - Use of students are highly welcome



Concept of Innovation in Network

Competence brokering, teamwork and knowledge management
between more companies, Univ./R&D and policy instruments



Companies

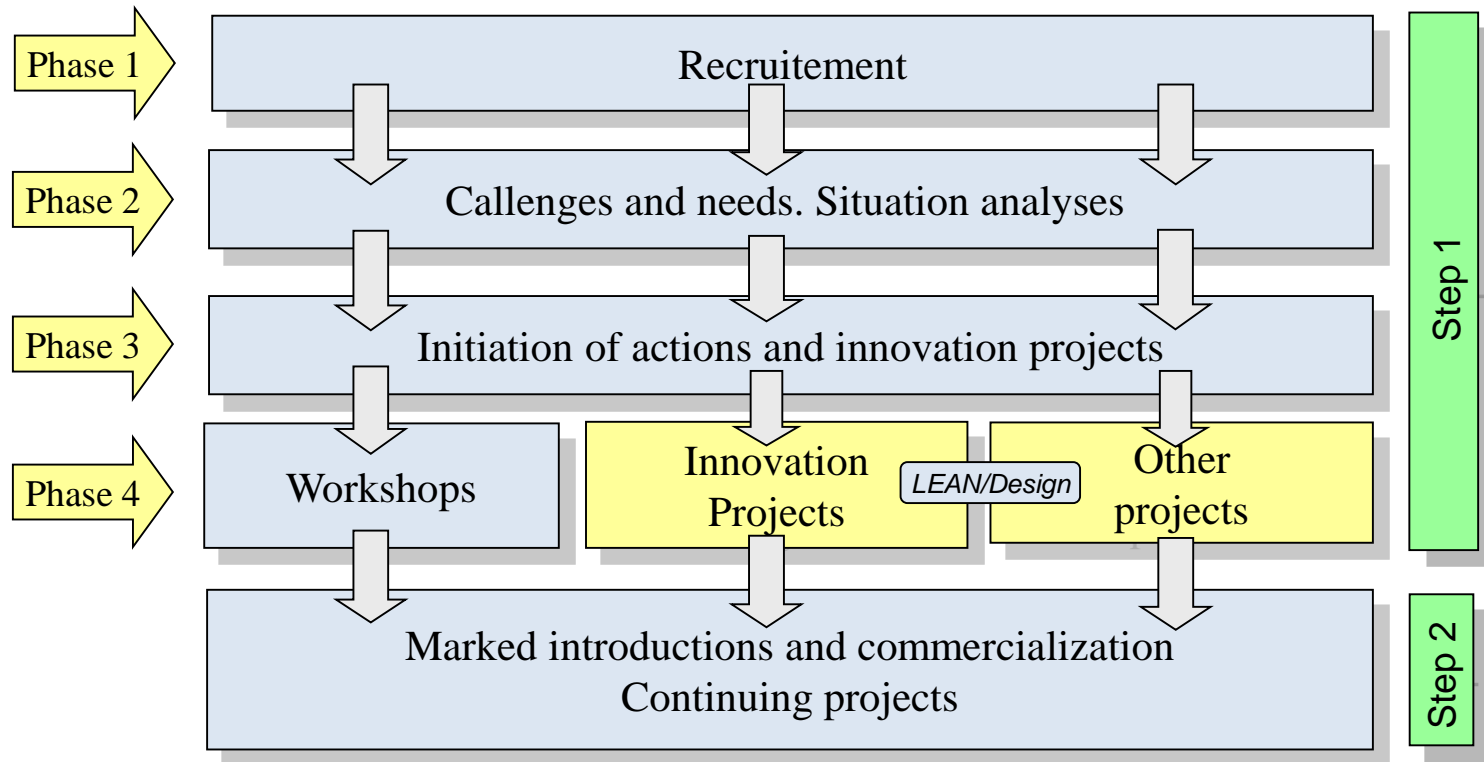
Networking
and
Innovation projects

Universities, R&D and
knowledge communities

Innovation Norway

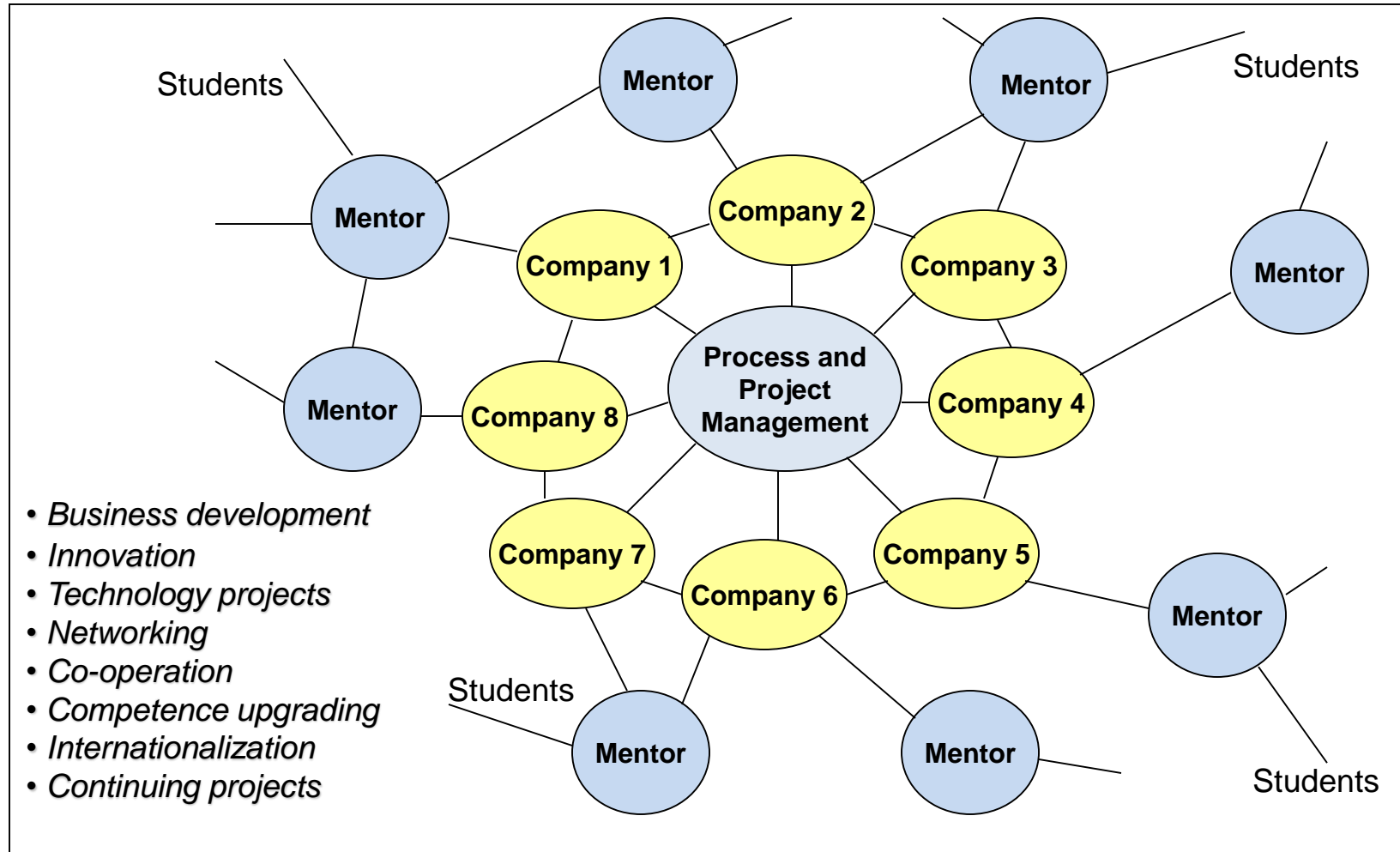


The project model





Innovation in Network





Bring companies and researches together for innovation

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Visits and guided tours in factories



Concluding remarks

Technology transfer to SMEs in Network

- Each company has their own mentor (researcher, professor, etc.) for the whole project period
- The creative environment in networks introduces many new ideas and innovative projects, from 3 to 6 projects for each participating SME
- Mostly big projects
- Established networks last several years
- Use of R&D knowledge for solving specific challenges
- Use of students in bachelor and master's theses/projects
- Increased knowledge in the SME's, and also in the institutes
- Old concepts are still working very well, however evolving over time

Group of students in projects work

The hydropower line at NTNU



Agriculture - Harvesting, processing, packaging and preserving of onion and leek

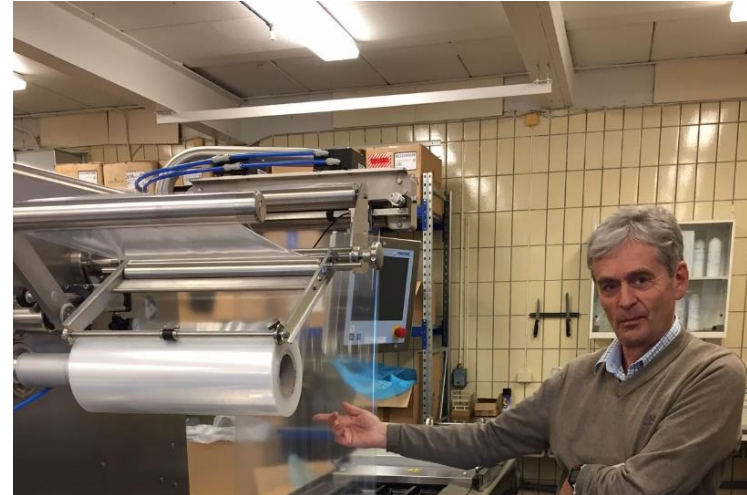




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Visit at NOFIMA

Applied research within the fields of fisheries, aquaculture and food research



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Visit at NMBU by vegetable growers

The Norwegian University of Life Sciences

12th of January 2017



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New technologies in agriculture

Use of robots

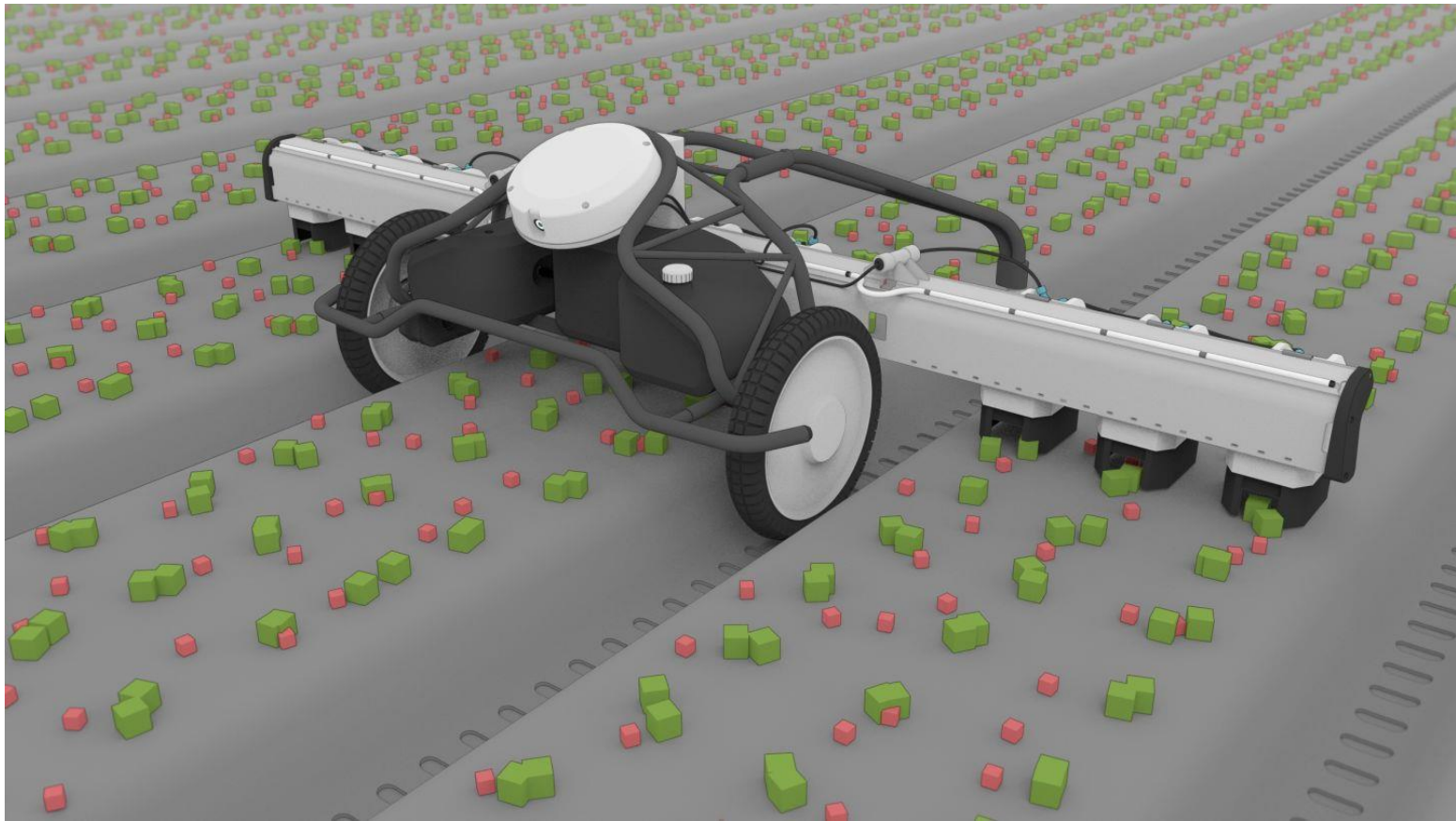


FOTO: Adigo

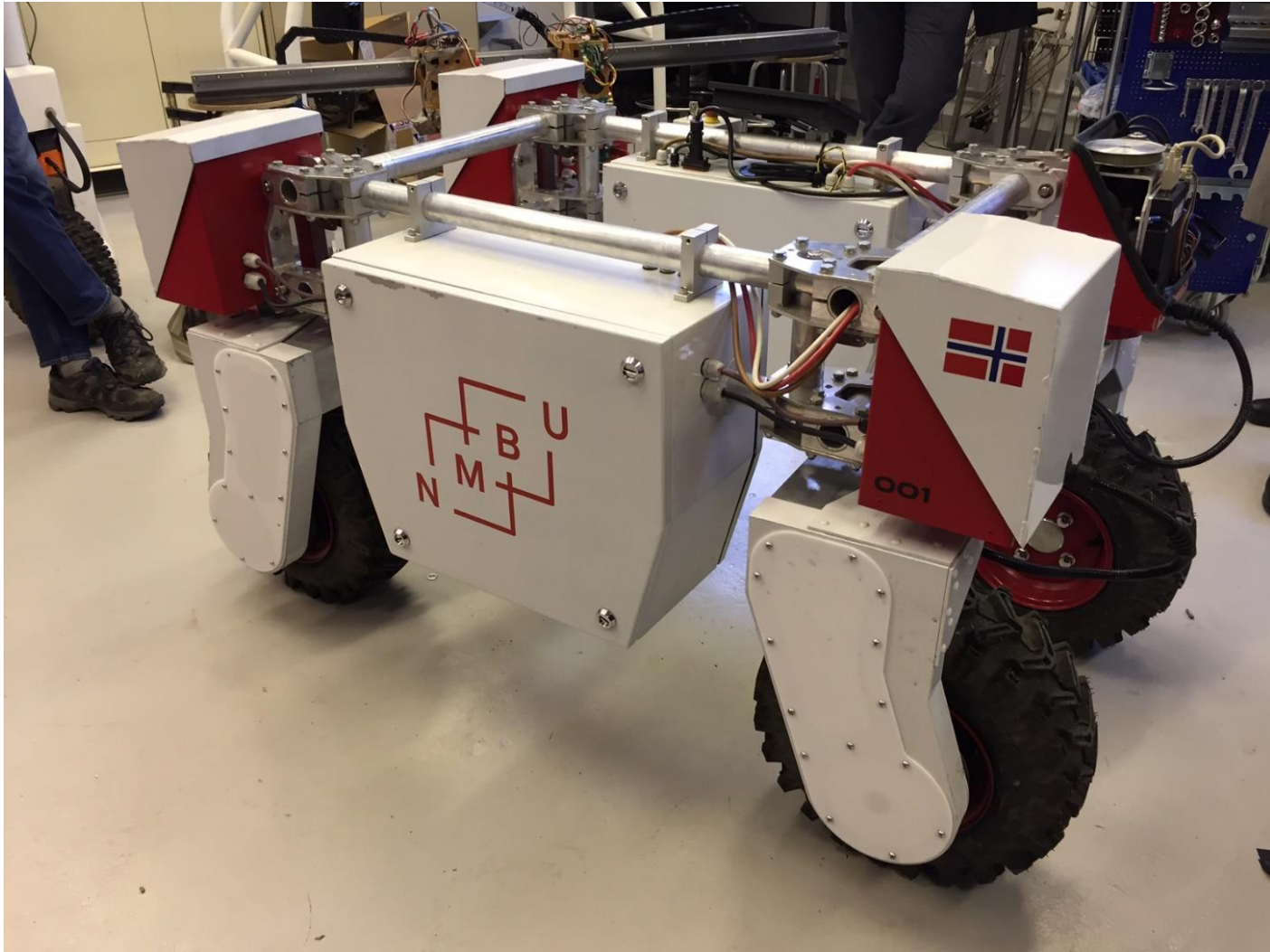
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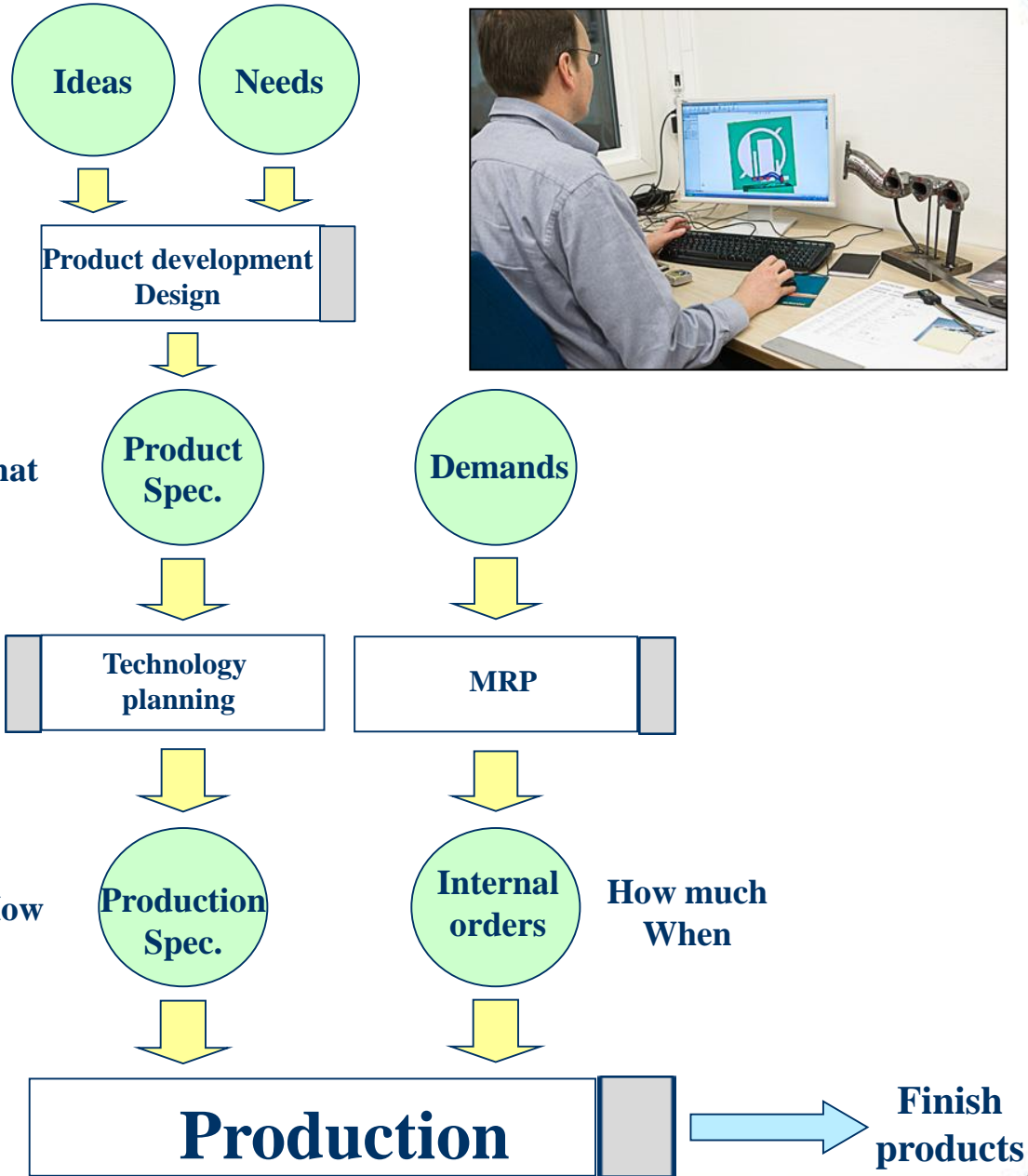
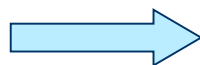
Robots that can revolutionize the world's oldest profession



The Production Process and The Hidden Factory



Raw materials



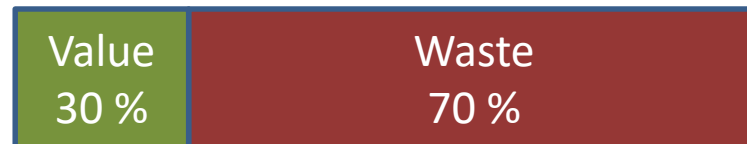
Finish products



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What does it mean to work with Lean?

1. Involvement of employees
2. Focus on quality
3. Reduction of unnecessary work
4. Effective flow of goods and services
5. Systematic and continuous improvement
6. More value with less work
7. Remove waste



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WASTE IN THE FACTORY

	Examples of waste	Definition/or the question is
1	Overproduction	Is it necessary to spend time to produce more than you can sell?
2	Storing	How much do you really need to have in stock? Remember that goods in stock is a cost driver
3	Transportation	How much time is spent on internal transport? (Materials, parts, products, people, etc.?)
4	Over-processing	Is it necessary that the chassis under your car is shiny?
5	Waiting	How much time is spent on waiting?
6	Unnecessary movements	It is used unnecessarily much time to move around? Where are things located?
7	Rework	How much time is spent on correcting mistakes and errors? (Defects, rejects and scrap)
8	Unused creativity	Are the human resources adequately utilized?





What is the 5S and what does they mean?

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Japanese	English	Polish	Meaning
Seiri	Sorting	Sortowanie	Take care off only what you need. Structure, tidiness and order
Seiton	Systematize	Systematyzować	Keep all in order around you. Systematics and availability
Seiso	Shine	Połysk	Provide for good cleaning at the working places
Seiketsu	Standardize	Ujednolicić	Standardize the best work methods. Visibility and well-being
Shitsuke	Sustain Self-discipline	Ponieść	Make it a practice the keep up the 5S. Discipline, work ethic, attitudes

Start with your own workplace!

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Results and concluding remarks

- National study

- 94 % of the participated SMEs would like to cooperate with R&D institutes again (re-purchase)
- 92 % of the participated scientists would like to cooperate with SMEs again
- Company feedback (from case interview)
 - Change in attitude regarding benefits of cooperating with R&D/Universities
 - Valuable input of knowledge
 - Solving company problems with external knowledge gives rapid and better results
 - Broker important in project development and finding the right scientist

- Success criteria and conclusions

- Easy access for SMEs to R&D knowledge
- Broker communicates with and finds SMEs and scientists
- The right scientist for the single project – also national and international R&D (EEN)
- No deadlines for applications and rapidly start of the project
- Financial package and external financing
- Old concepts are still working very well
- Concepts evolving over time
- Need for competence brokering also in public sectors



Thank you for your attention



Nice places to go skiing



Norwegian mountain trout



Chanterelle mushrooms



Cloudberrries