

**Organisational structures
promoting university-industry
cooperation and innovation**

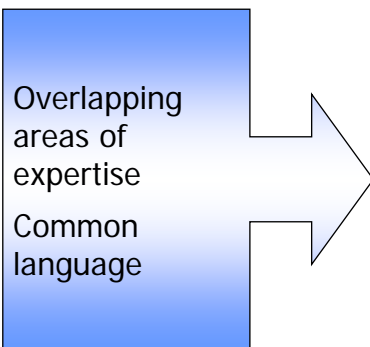
by Torbjørn Digernes
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at the Conference of Rectors and Presidents
of European Universities of Technology
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Overview

- Prerequisites for successful cooperation
- NTNU and its characteristics
- The SINTEF Group and its relationship to NTNU
- Mechanisms for university-industry cooperation
- Innovation mechanisms

Prerequisites for successful cooperation

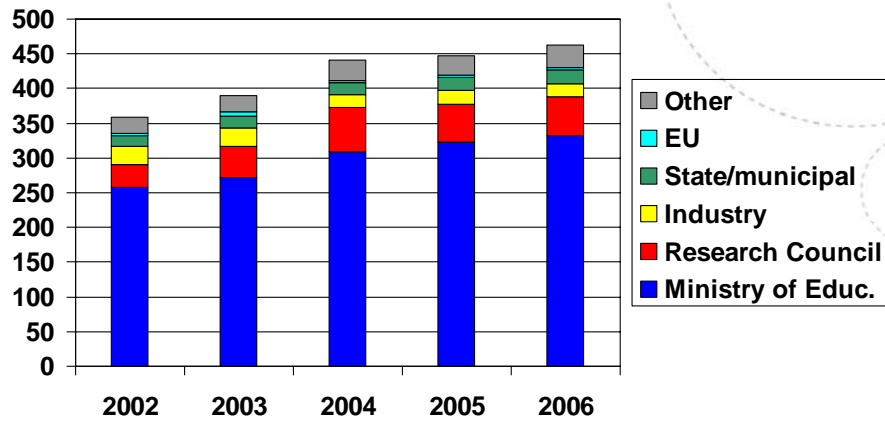


- Academia must have sufficient knowledge and understanding of the industrial partners' situation and challenges
- Long-term relations, extensive and varied networks, mutual trust must be developed
- Industry representatives must have sufficient understanding of the areas of research to be able to participate actively in the development of knowledge

NTNU key figures

- **53** departments in 7 faculties
- **4300** person-years
- **2500** empl. in education and research; **550** professors
- **20 000** registered students, about 50 % in engineering, science and medicine
- **16** study programmes in engineering, delivering abt 80 % of the engineering candidates at master level educated in Norway
- **3000** degrees awarded/year, of these **1430 masters** in engineering, science and medicine
- **251 doctoral degrees** awarded in 2006

Sources of revenue (EUR mill.)



NTNU and industry

- Approx. 680 research projects in cooperation with the industry, public sector and various funds
- EUR 20 mill. to NTNU from industry in 2006
- Many of NTNU's adjunct professors have a background from industry or still work in industry
- Extensive distance, further and continuing education
- NTNU has education and research agreements with:

*Norsk Hydro
Telenor
Aker Kværner
Jotun AS*

*Statoil
Statens vegvesen
Shell
Total*

*Rolls Royce
Det norske Veritas
Elkem
Borregaard*

NTNU's strategic research areas

Objective:

- Creating cross disciplinary/cross faculty research arenas in fields of strength and of national importance
- Encourage research groups to find each other in joint research initiatives

Resources: For networking and positioning, fellowships

Selected areas (4 areas in 1999, 2 later)

1. Energy and Petroleum – Resources and Environment
2. Medical Technology
3. Materials Technology
4. Marine and Maritime Technology
5. Information and Communication Technology
6. Globalization

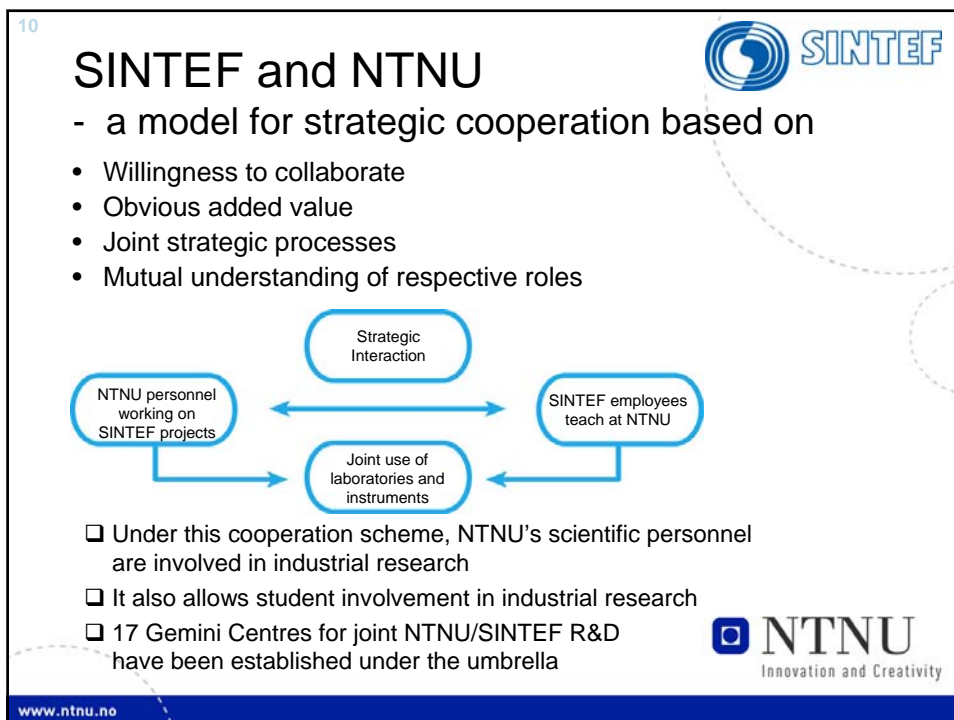
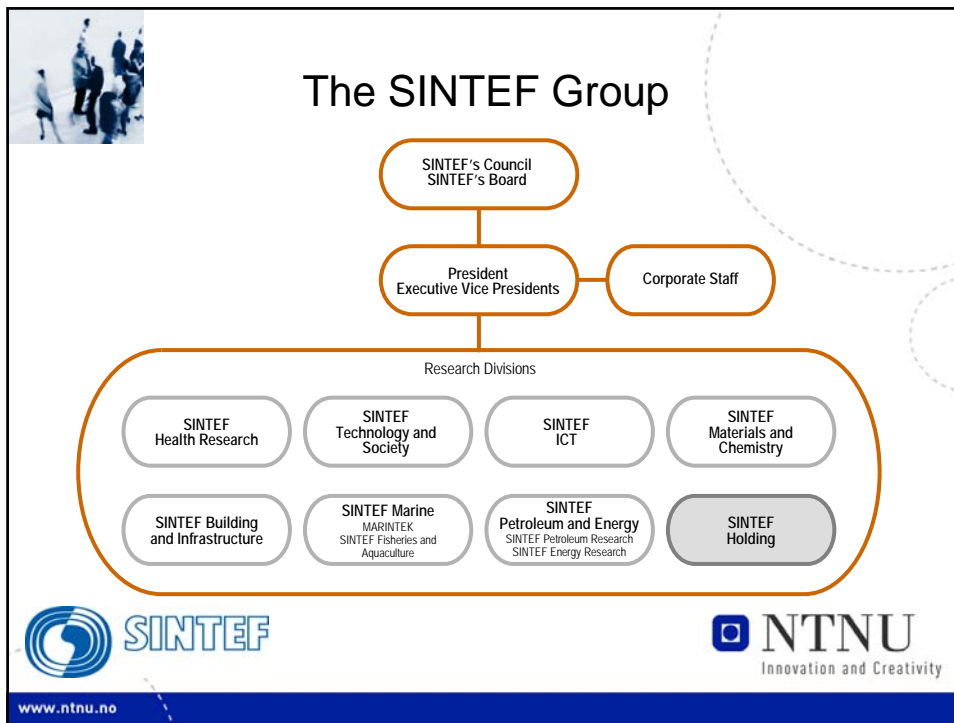


The SINTEF Group



- SINTEF is one of Europe's largest independent research organizations
- Budget: EUR 245 mill./year (2006)
- 1900 staff
- Established in 1950 as the contract research organization of the Norwegian Inst. of Technology
- Contract research in technology, natural sciences, medicine and social sciences
- Colocated on the same campus as NTNU's engineering school, close proximity between SINTEF and NTNU research groups in the same fields, often in the same building





Selected joint strategic areas

- Energy and Petroleum – Resources and Environment
 - Increased Extraction of Oil and Gas
 - Multiphase Flow in Pipelines
 - Liquid Natural Gas Technology
 - Use of gas with CO₂ handling
 - Power Engineering
 - Power System Modelling
 - Renewables: Hydropower, Solar, Wind, Waves
- Health and medicine
 - Medical imaging
 - Health Services
 - Health Informatics
 - Biobanks/Epidemiological Research
 - Medical Microbiology
 - Bionanotechnology
- Materials
 - Aluminum
 - Silicium
 - Functional Oxides
 - Catalysis
 - Characterisation
 - Synthesis
 - Surfaces
 - Modelling: Integrity, Thermodynamics, CFD
- Marine Technology
 - Includes a national Center of Excellence: Ship and Ocean Structures
 - Structural Mechanics
 - Hydroelasticity
 - Sealoads
 - Marine Operations
 - Marine Cybernetics
 - Propulsion and Steering
 - Risers and Umbilicals
 - Pipelines on the sea bed
- Biomarin
 - Aquaculture Technology
 - Feed stuff for Aquaculture
 - Fishing vessel technology
 - Fishing Gear Technology
 - Fish Processing
 - Marine Resource Utilisation
 - Traceability
- ICT
- Globalisation

Norwegian Centres of Expertise (NCE)

Centres of Expertise is a mechanism for providing competence to regional industrial cluster. The centres are governed by their industrial participants.

NTNU participates in all these centers:

- NCE Maritime on the West Coast
- NCE Microsystems in Vestfold (southern Norway)
- NCE Systems Engineering at Kongsberg
- NCE Underwater Technology in the region of Hordaland
- NCE at Raufoss
- Instrumentation hub in the Trøndelag region

Centres for Research-based Innovation - a national mechanism

- A cooperation between industry and research organisations (universities and institutes)
- Strong research focus, with international collaboration
- Several private or public companies must participate, they make out the user partners
- The user partners has a majority in the Board
- The user partners take on a responsibility to turn the research results into useful innovations
- Public funding: 1.25 M€ pr year
- User partners and research partners contribute the same amount
- Duration: 5+3 years

Objectives for Centres of Research-based Innovation

- Encourage enterprises to innovate by placing stronger emphasis on long-term research and by making it attractive for enterprises that work on the international arena to establish R&D activities in Norway.
- Facilitate active alliances between innovative enterprises and prominent research groups.
- Promote the development of industrially oriented research groups that are on the cutting edge of international research and are part of strong international networks.
- Stimulate researcher training in fields of importance to the business community, and encourage the transfer of research-based knowledge and technology.

Awarded Centres for Research-based Innovation (of at total of 14 centers)

- NTNU Host – SINTEF Partner
 - Centre for e-Field and Integrated Operations for Upstream Petroleum Activities
 - Medical Imaging Laboratory for Innovative Future Healthcare
 - Structural Impact Laboratory - SIMLab
- SINTEF Host – NTNU Partner
 - COIN - Concrete Innovation Centre
 - CREATE - Centre for Research-based Innovation in Aquaculture Technology
 - Norwegian Manufacturing Future
- Other hosts – NTNU Research Partner
 - Multiphase Flow Assurance Innovation Centre (Host: IFE)
 - Information Access Disruptions – iAd (Host: Fast ASA)
 - Innovative Natural Gas Processes and products (Host: Univ. of Oslo)
 - Statistics for Innovation (Host: Norwegian Computing Center)



Innovation

- Gløshaugen Innovation Centre (22 companies, April 2007)
- 22 courses related to entrepreneurship
- Centre for Entrepreneurship
- NTNU Technology Transfer AS
 - Help and support for people with business ideas
 - Search for business ideas among academic groups
- *Start* – a student-run organization for innovation



Results 2006:

91 business ideas and 42 patents registered
5 companies formed as spin-offs from NTNU



NTNU Technology Transfer AS

Goal:

Increasing value-added activities in Norway.

Commercial mode of operation:

- Building win-win-relations with external partners
- Internal prospecting, stimulation and support

Volume 2006: 16 man-years and EUR 3 mill.

- Focus on external networks and internal confidence

Cooperation with national and international TTOs

Sharing offices with SINVENT in the SINTEF Group



Innovation in an academic setting

- Scientific ambition
 - must be high, and aim at the international level for
 - selected areas
 - must rely on international network and cooperation
- Research and education hand in hand
 - MSc – provides candidates with knowledge of research front
 - PhD – qualified researchers is a necessary product
 - Continuing education – to updates industry's competence
- Relevant research – subjects selected in dialogue with industry and society, and research conducted in close cooperation
- Flexible organization – comprehensive competence – type II research competence required
- Premise provider for policy on education, research and industrial development



Are there challenges?

- **Basic: Mutual trust and understanding, and respect for each other's roles**
 - Industry must acknowledge the university's need to be ahead in time, and publish results
 - Academia must acknowledge the industry's need for results
 - Similar for the university and institute relationship
 - Answer:
 - Blend the long and the short term carefully
 - Cherish the difference: The cooperation works best when it contributes to make each party better in its specific role
- **Conflicts of interest in IPR handling**
 - Institution vs employee
 - Between institutions
 - Institution vs industry

Thank for your attention!