GCE | **NODE** | GLOBAL CENTRE OF EXPERTISE
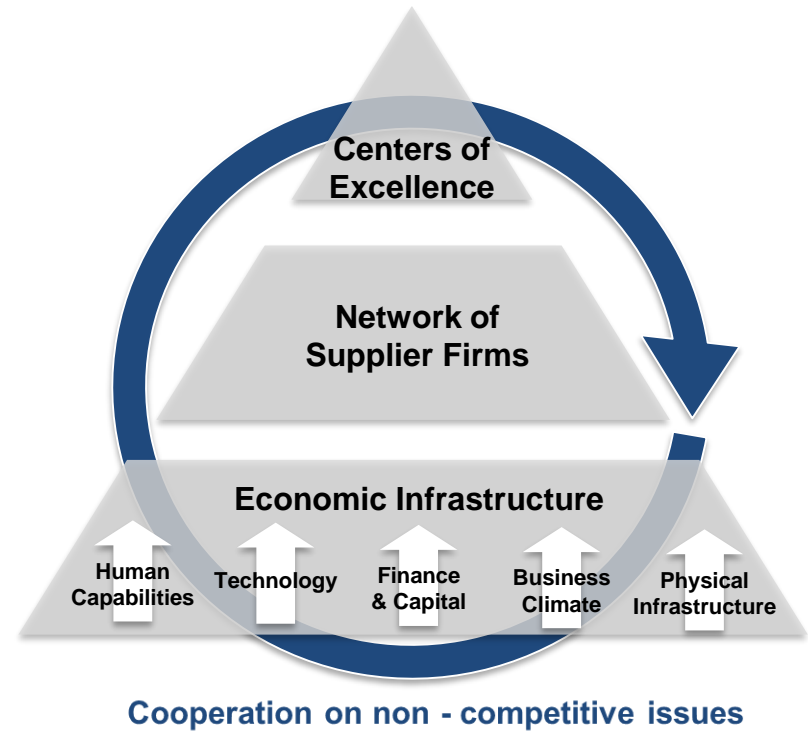
A LEADING GLOBAL TECHNOLOGY CLUSTER

Open information platforms for cost effective and increased sustainability in drilling operations

Anne-Grete Ellingsen, CEO GCE NODE

The Norwegian cluster program
Collaboration on competence building and innovation

- Stronger interaction and collaboration

- Common strategic focus

- Increased innovation and entrepreneurship

- Better access to competence

- Stronger global orientation

- Improved attractiveness

- Increased value creation and competiveness

- Drivers for regional development and investments

Centers of Excellence

Network of Supplier Firms

Economic Infrastructure

Human Capabilities | Technology | Finance & Capital | Business Climate | Physical Infrastructure

Cooperation on non - competitive issues

Short on GCE NODE - Strategic goals

Main focus:

Competence building
- New markets
- Technology
- Business development

R&D
- National
- International partners

Maintain and increase global competitiveness in core markets

Expand competence and technology to new markets

From USD 80/90 → USD 27/35
A common industry effort - Digitalization – Next step

Digitalization
- SFI Offshore Mechatronics
- Data Highway
- NorTex Offshore Data Analytics

Smart Production
- Future Robotics
- Digitalization network
- ICT Security
- 3D Printing
- Network for standardization

Modernize, simplify and harmonize standards and procedures

Sharing of information and standardization/reuse of concepts for design, contraction and operation.

Common strategy on digitalization, automatization and robotization.

Several industrial programs initiated to increase digitalization in the value chain

Integration of suppliers in the value chain
Status today

Integrated operations (IO) - the use of information technology to change work processes to achieve better decisions, remote control of equipment and processes, and to move the functions and personnel onshore.

Stortingsmelding nr. 38 Om petroleumsvirksomheten(2003-2004)

Connected existing fiber network giving fully integration of the teams/sensors on the vessel and onshore. Little remote control.
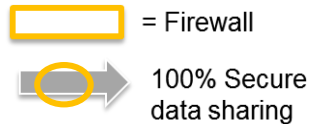
Operatørene har tilgang til rundt 70 000 signaler fra kontrollrommet. Foto: BP

SKARV, BP

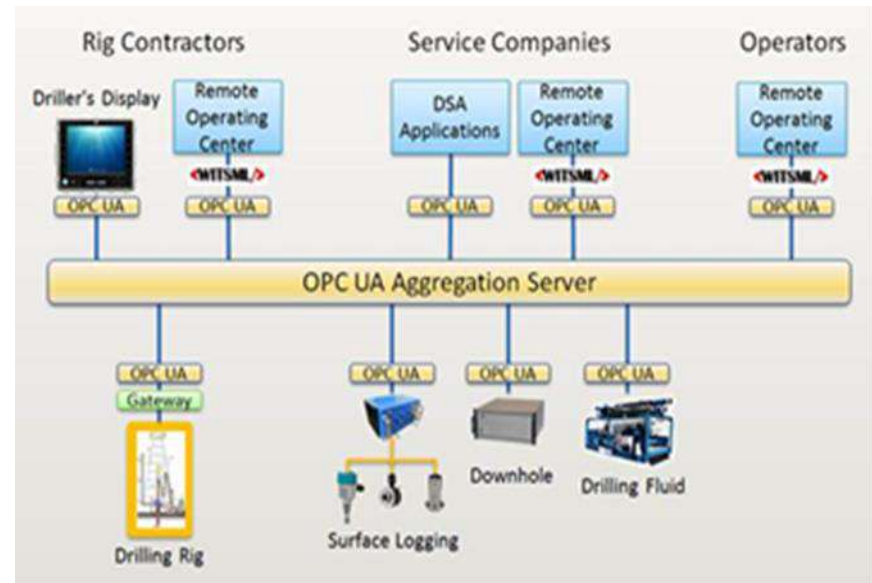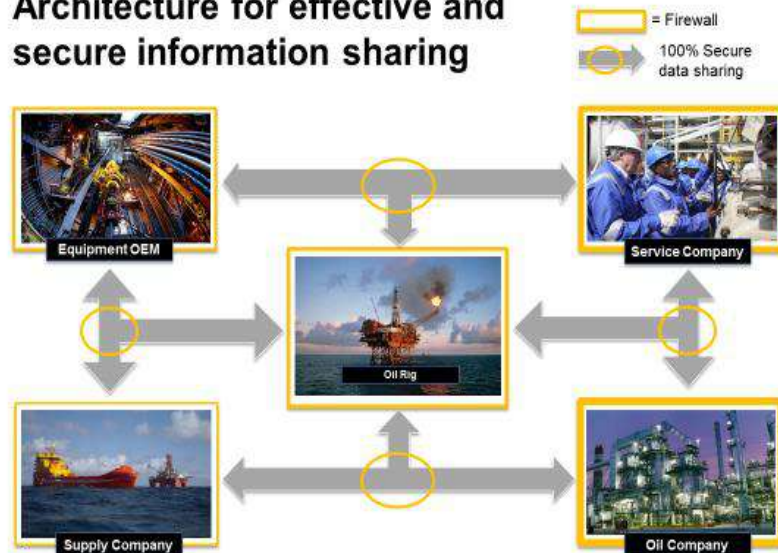# From integrated operations to integrated value chain
Data highway pilot – Interoperability and effective and secure sharing of information in real time
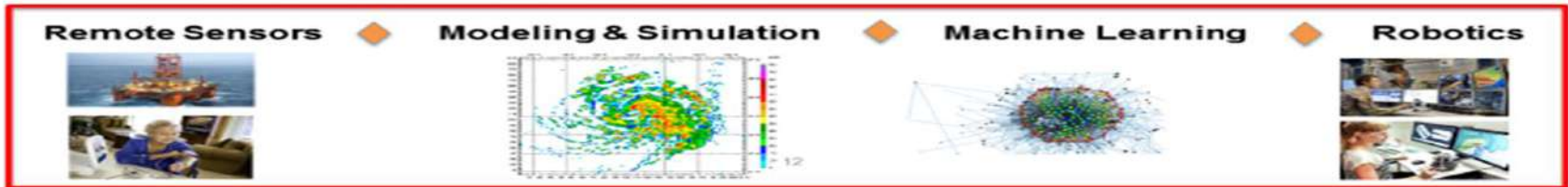
Data Highway participants:
Schlumberger, Baker, Halliburton, Weatherford, GCE NODE, NOV, MHWirth, Cameron, Norwegian Oil and Gas, Iris

From integrated operations to integrated value chain
Interoperability in the value chain

Remote Sensors ◆ **Modeling & Simulation** ◆ **Machine Learning** ◆ **Robotics**
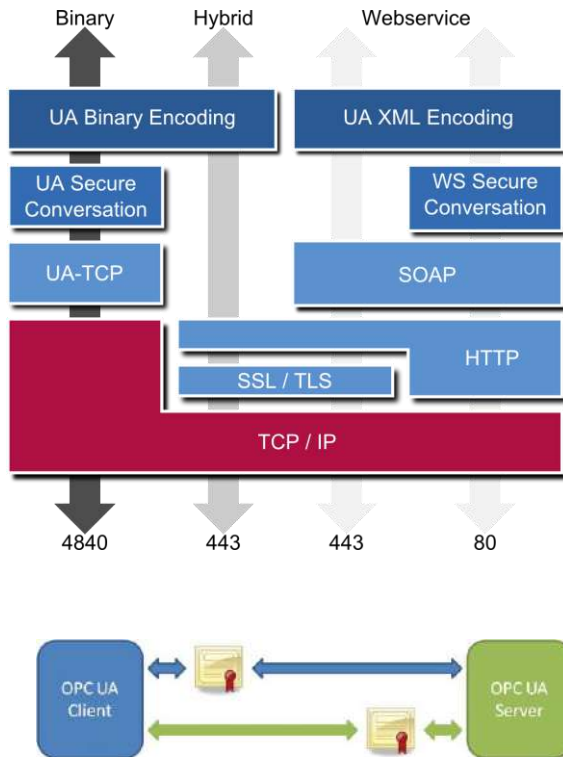
Interoperability is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, in either implementation or access, without any restrictions.


Statoil

Interoperability - OPC Universal Architecture (UA)

- Ultra-fast data transport

- Secure encryption

- Messages are received exactly as they were sent

- Exposure to message attacks are eliminated

- Control over which applications and systems that are permitted to connect

- User control and authentication
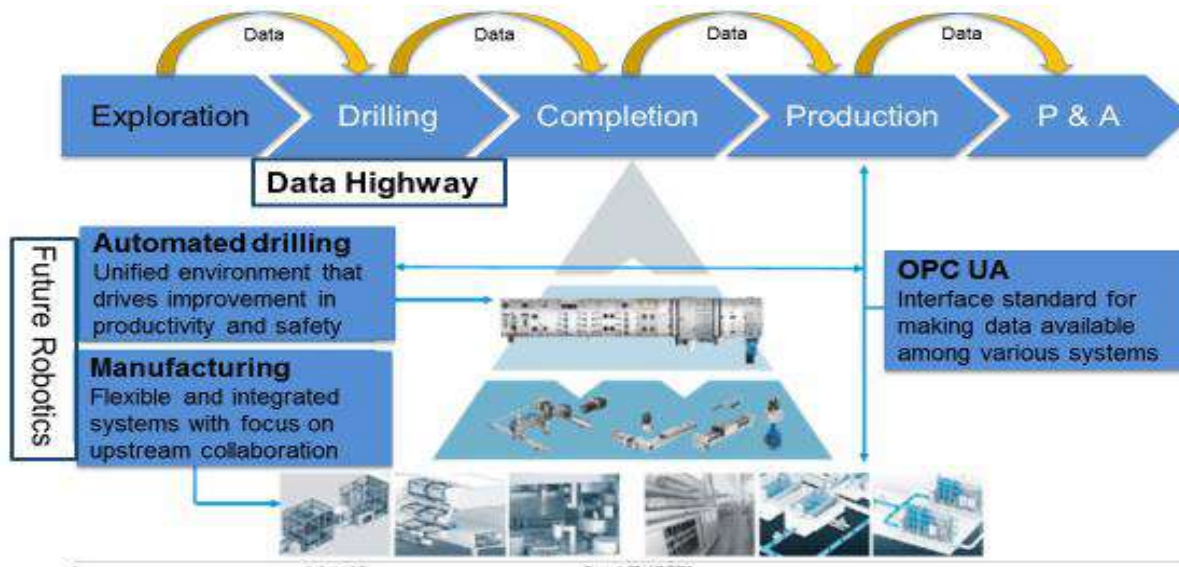
Industrial digital platforms & logic
Interoperability, standardization and scalability
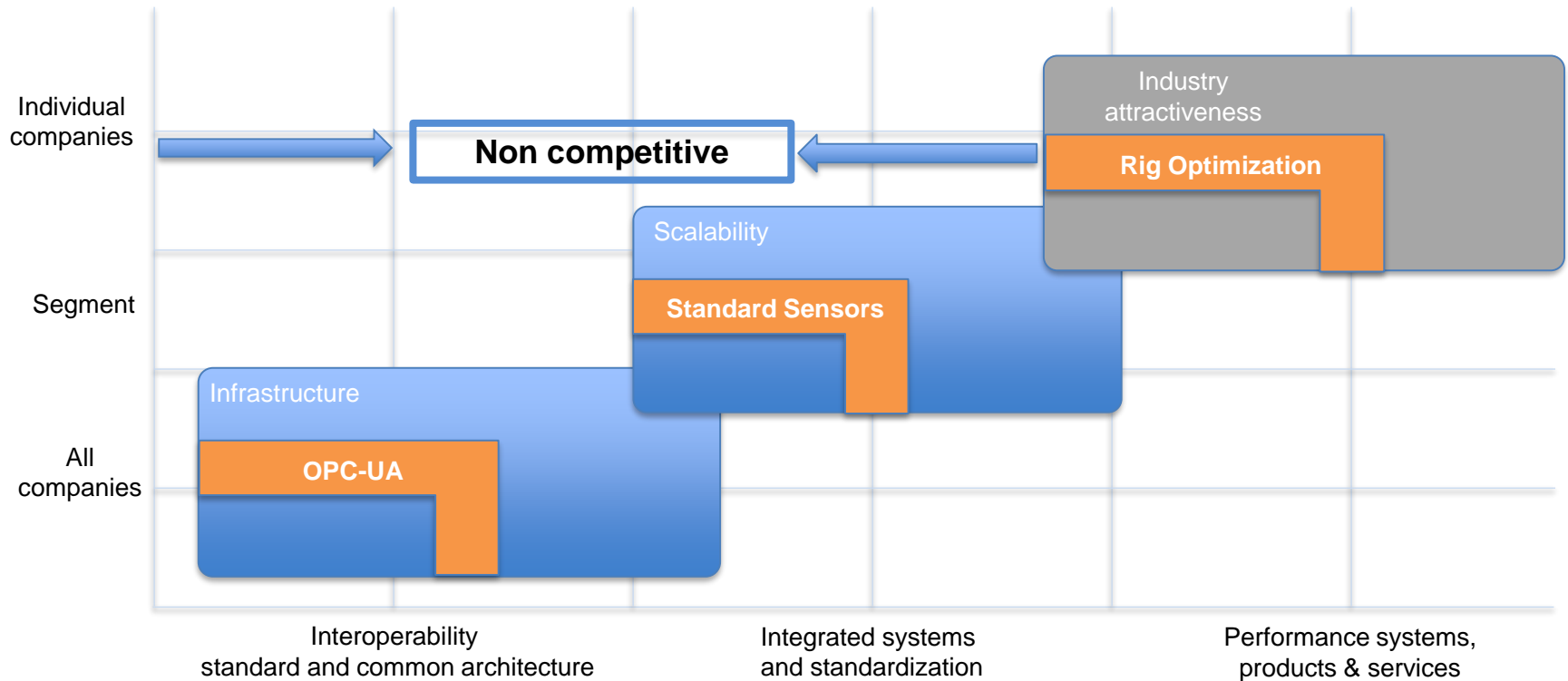
Digitalization and robotization
Integrating the value chain from SME suppliers to end costumers

Intelligent use of data – most important game changer in the industry

Industrie 4.0 – M.A.I Carbon Cluster/Future Robotics

R&D programs with Japan robotization program?

What can be achieved?

- **Decreased opex**

- **Better basis for R&D and operational improvements**

- **Increased competiveness**

- **Increased safety**

- **Lower environmental footprint**

Artificial Intelligence (AI) and blockchain
A basis for new business models and contracts

Distributed databases capable of recording every transaction between participants ("blockchains") set the foundations for a new economic model for creating value.

- **Blockchains** can help us verify, execute and record.

  ➡️

  - **AI** can help us in decision making, assessment, understanding and recognizing.

- **Blockchains** can automate verification of the transactional parts of the process.

  ➡️

  - **AI** can help us find opportunity and improve decision making, smart contracts

- **Blockchains** can help us find whatever one needs to put together.

  ➡️

  - **AI** can help us with to lower the cost of coordination

# Partnerships drive competitiveness

- July 2016 - GE partners with Microsoft to sell its 'Industrial Cloud' platform on Azure

- July 2017 - Aker Solution and Aker BP partners with software company (Cognite) to capitalize on big data, AI and new applications

- August 2017 - Microsoft and Halliburton enter into a strategic alliance to drive digital transformation across the oil and gas industry

- August 2017 - Google partners with Walmart to better compete with Amazon. We have made significant investments in natural language processing and artificial intelligence to deliver a powerful voice shopping experience.
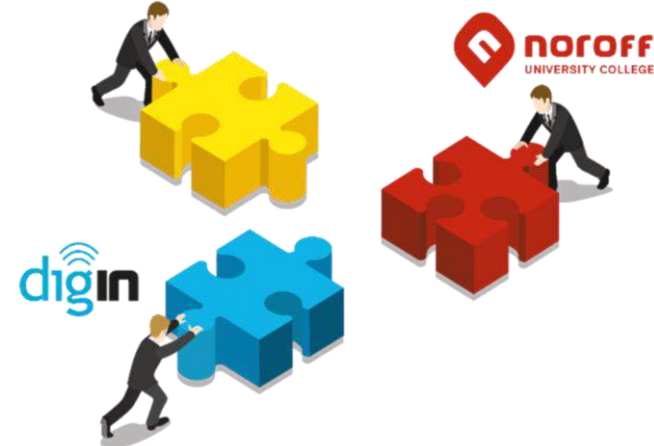
Collaboration boost

business competitiveness

Security – Critical to succeed with digitalization

Increased digitalization and ICT Security
Competence program for the industry in the cluster
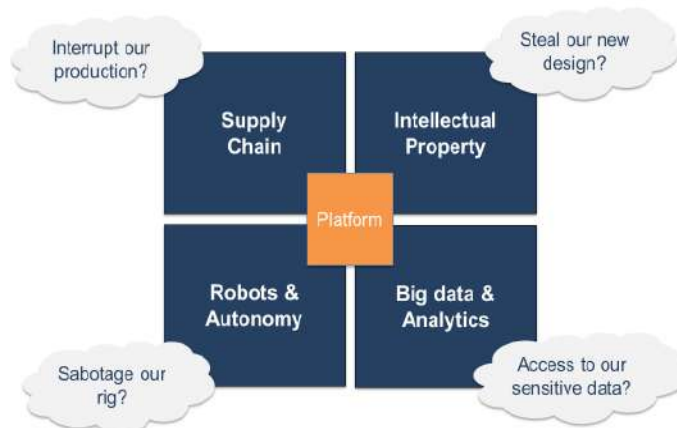
A collaboration program to develop competence program on ICT security

The EU General Data Protection Regulation (GDPR) is the most important change in data privacy regulation in 20 years. To be implemented 25.05.2018. Organizations in non-compliance will face heavy fines.

Data is the "new oil"
Data sharing is a challenge for all industries

1. **Reform the company's data architecture**
   - Data sits at the heart of digital transformation, so the harmonization, integration and interoperability of data platforms are critical.

2. **Deepen collaboration and understanding of sharing-economy platforms**
   - This will allow for sidestepping the potential pitfalls brought by changing customer preferences shaped by the rise of the sharing economy

Getting to the point where oil and gas feel comfortable sharing data in a secure but open eco-system will be critical as we jointly reinvent the industry of today and tomorrow.

Judy Marks, CEO Siemens USA / 2017

Other ocean industries GCE NODE is engaged in
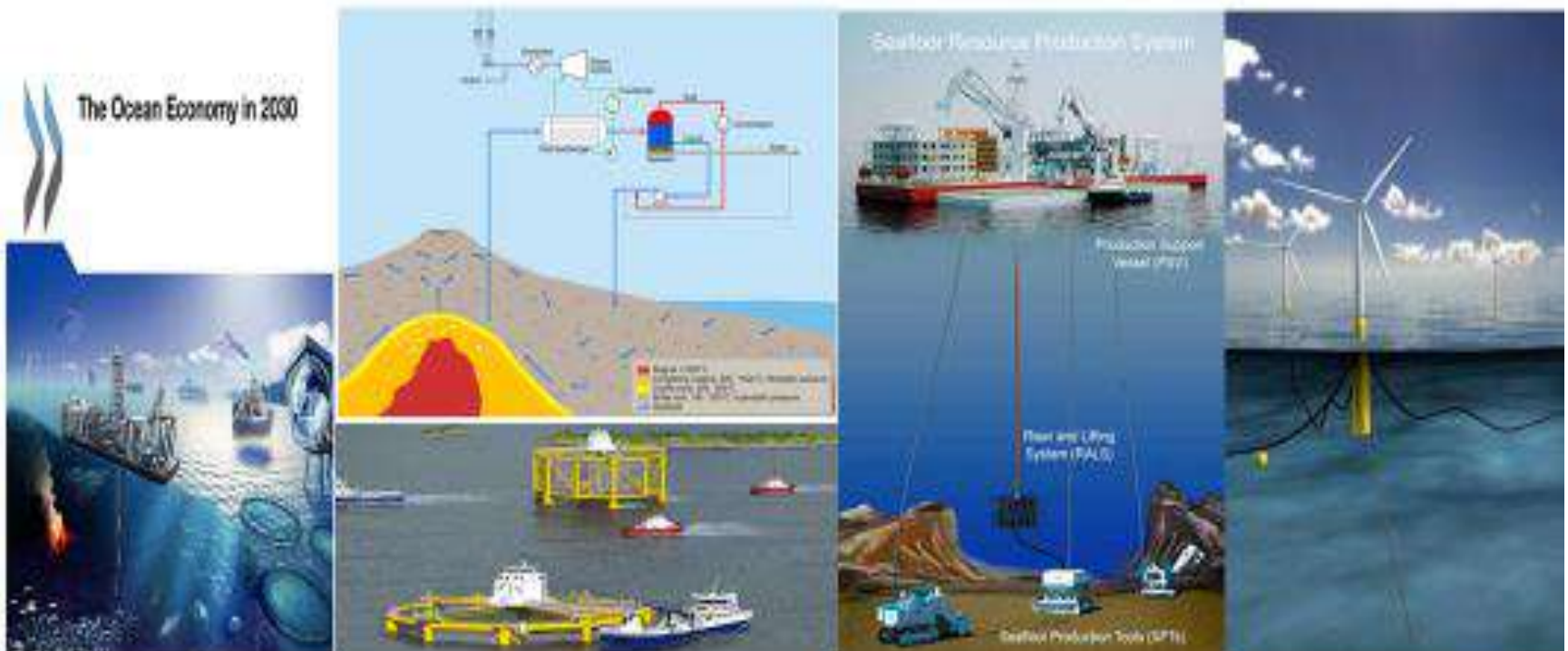
Example of R&D program with national and international partners: Focus on sensors, digitalization and robotization
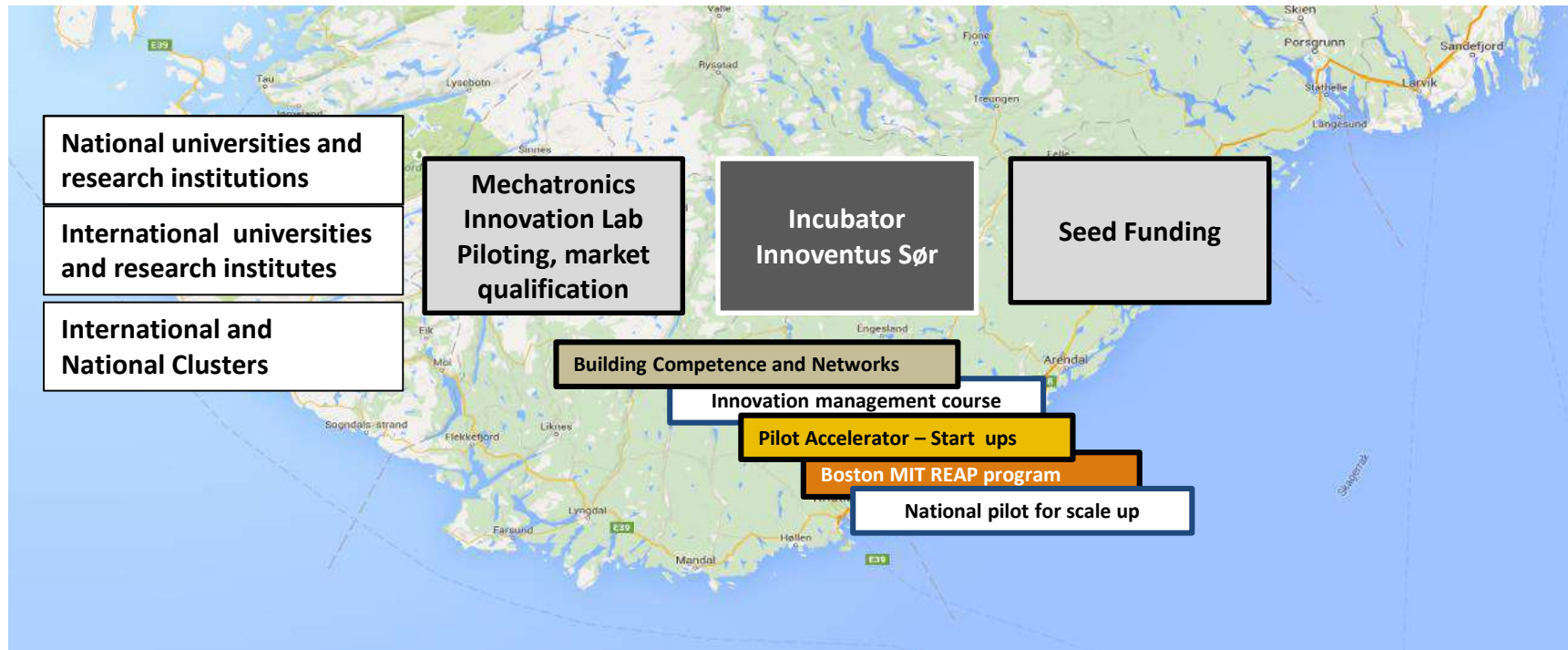
WP 6 **Analysis, IT integration + Big data** UiA				WP 7 **Technology Vision**. GCE NODE	WP 0 **Project Mgt**. UiA
WP 4 **Modelling, simulation & technology qualification** NTNU					Dissemination
					Exploitation
New Offshore Mechatronics					Liason
WP 1 **Hydraulic & Electrical drives**. UiA	WP 2 **Motation compensation**. NTNU	WP 3 **Robotics & automation**. UiA	WP 5 **Monitoring techniques** Teknova		IPR
					Project infrastructure

200 MNOK R&D project hosted by University of Agder (UiA)

SFI OFFSHORE MECHATRONICS

ABB · EGDE · Lundin · NOV · applica · mhwirth · KLÜBER LUBRICATION · MACGREGOR · stepchange · Skeie Technology · RWTH AACHEN UNIVERSITY · CAMERON A Schlumberger Company · UNIVERSITETET I AGDER · teknova · GCE NODE · AALBORG UNIVERSITY DENMARK · Rexroth Bosch Group · NTNU Norwegian University of Science and Technology · IRIS
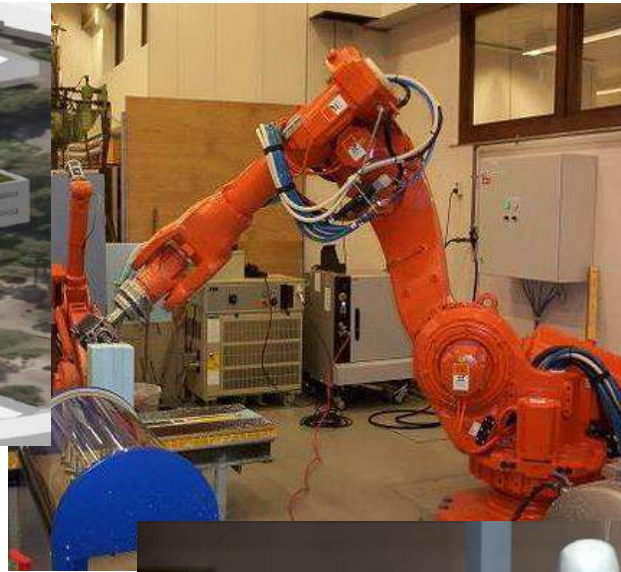
An ecosystem for innovation and testing
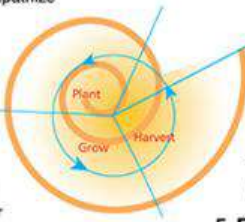## Important to attract investments and develop centers of excellence

National universities and research institutions

International universities and research institutes

International and National Clusters

Mechatronics Innovation Lab Piloting, market qualification

Incubator Innoventus Sør

Seed Funding

Building Competence and Networks

Innovation management course

Pilot Accelerator – Start ups

Boston MIT REAP program

National pilot for scale up

Mechatronics Innovation Lab

A Framework for Design Thinking

The triple energy challenge
Combining digitalization and sustainability

Satisfy demand
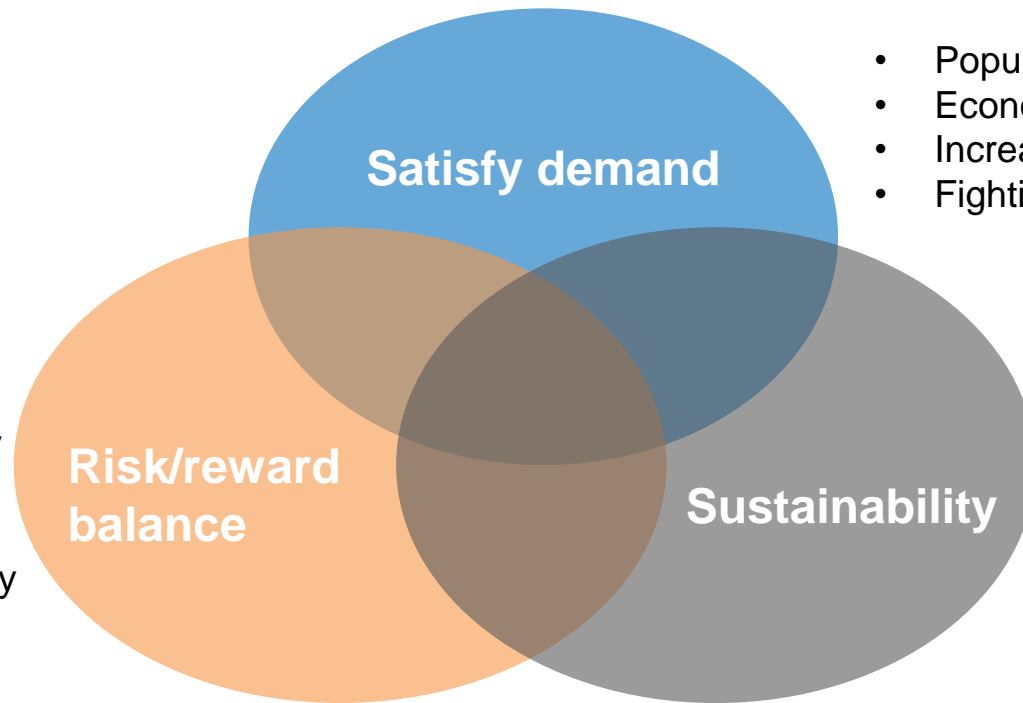
- Population growth
- Economic growth
- Increasing energy demand
- Fighting decline from existing fields

Risk/reward balance

- Price uncertainty
- Cost challenges
- Risks
- Policy uncertainty

Sustainability

- Clean and affordable energy for all
- Limiting greenhouse gas emissions
- Policy gap between targets and measures

Part of the problem – Part of the solution
A business framework for sustainability and CO2 reductions
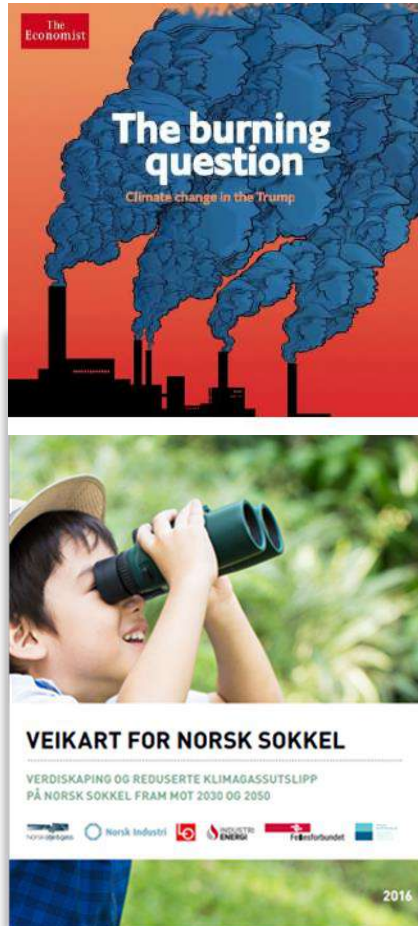
Today:
Strict environmental and safety regulations on NCS = Low average emissions compared to global average

A roadmap for further CO2 reductions adopted for the industry in 2016.

Sustainable technology and services
EcoTrack – a life cycle analysis (LCA) tool

Ecotrack Environmental Analysis Model

- **Environmental scoring of products and services**

- **Includes both impacts and aspects**

- **Highlights areas for improvement and calculates lifecycle cost for mititgating actions**

- **Innovation and product development**

Competency

- **10 credit LCA course fall 2013 UiA, MSc Sustainable Construction**

- **eLearning environmental comptency training course for NODE/partner companies**

- **Develop Environmental MSc course**

Documentation and product differentiation

- **Differentiation of products and services**

- **Contribute to industry standard development**

- **Documentation for reporting, UN Global Compact and Global Reporting Initiative (GRI)**

- Developed together with 40 NODE companies
- 2017 – Competence program «Sustainable business models and sustainable production of goods and services based on Eco Track and Roadmap 2030/2050

www.gcenode.no