Advanced manufacturing & ICT
Third public hearing on advanced manufacturing

How ICT may become more beneficial to the Industry – especially SME’s
Case Leading Edge Clusters in Germany
Günter Korder, CEO It’s OWL Clustermanagement GmbH, July 10th 2014
Internet of Things and Services: Field of Applications
New Challenges and Opportunities in Manufacturing ahead of us

Smart Mobility
Smart Buildings
Smart Products
Internet of Things
Smart Grids
Smart Health
Smart Factory
Smart Logistics

Networked intelligent world

Source: FORSCHUNGSUNION, 2012
Two converging Technologies as Drivers of Innovation
Appropriate Products, Solutions and Business Models for Manufacturing can be developed based on latest ICT Capabilities

Many users, 1 computer

Mainframe

1 user, 1 computer

Data Warehouses, Internet, PC

1 users, many computers

Big Data, Cloud Computing, Smart Devices

Cyber-Physical Systems (CPS)

Internet of data and services

Internet of things

+ IP-capabilities

Imbedded Systems

+ Sensors, actuators
+ Integration enabled high-performance microcomputers

Physical Objects, Equipment, ...

+ Semantic description
+ Networking, Internet (M2M)
+ Wireless communication

Source: FORSCHUNGSUNION UND ACATECH, 2013
OstWestfalenLippe (OWL) started to focus on Industrie 4.0 and Cyber Physical Systems (CPS) early on. Joint regional Vision was a good starting Position.

OstWestfalenLippe belongs to the most competitive and dynamic economy regions in Europe. At a high standard of living.

“Innovation and Knowledge” Initiative
Application for Leading-Edge Cluster Competition was interim Result

Key Elements of regional Development Strategy are integrated

- **Innovation, added value and employment** in the industrial sectors of mechanical engineering, electrical/ electronics and automotive supply industries
- **High-performance research** *(engineering and ICT)* is a prerequisite
- **Innovation leap** from mechatronics to systems with inherent partial intelligence is the target
Leading-Edge Cluster Competition initiated by the Federal Ministry of Education and Research (BMBF)

- Flagship high-tech strategy of Federal Government
- Regional pooling of economy and science along the value chain
- 3 rounds of competition (2007 to 2012)
- 15 leading-edge clusters represent high-tech competence ensuring growth and employment
- Solutions for future areas of focus (climate/energy, health/nutrition, mobility, security, communication)

- Funding: €40m over 5 years for each cluster
- Another €60m are provided by the industry partners
OWL – Outstanding Region for Innovation, Added Value and Employment
SME’s build the economic Backbone to our Region

Mechanical engineering, electrical/electronic and automotive supply industries
Strength: Strong brands, hidden champions, independent family-owned companies
OWL – Outstanding Region for Innovation, Added Value and Employment
High Performance Research Institutions with lots of ICT and Engineering Knowledge build the Base for Innovation

High-Performance Research
Strength: symbiosis of informatics and engineering sciences
174 Cluster Partners - more than 70 % from Industry
Close Co-operation between Industry and Academia drives Innovation Leap

- 22 main industry partners (investment in innovation projects)
- 80 associated companies (co-operation in transfer projects)
- 24 engineering and consulting companies (multipliers)
- 17 universities and research institutes
- 30 economy-oriented organizations

Strategic co-operations with relevant international partners such as FIMECC, BAST (China), Turkey to drive strategic objective e.g. via KIC AVM
Key Objective it`s OWL 2017: Top Position in Intelligent Technical Systems
Measurable KPI's help us to stay focussed

Systems at the Service of Humanity:
- Resource efficiency
- Usability
- Reliability

Key Objective it`s OWL 2017

Strategic objectives:
- 80,000 jobs secured
- 10,000 new jobs
- 50 new companies
- 5 new research institutes
- 500 additional researchers
- 4 new courses of study / 500 enrollments (p.a.)
Intelligent Technical Systems...
Need to incorporate ICT and Engineering from the beginning

... interact with the environment adapting to it autonomously (adaptive)

... manage even unexpected situations not taken into account by the developer in a dynamic environment (robust)

... anticipate on the basis of experiential knowledge future effects of influences and possible states (anticipatory)

... take into account individual user behavior (user-friendly)
Operationalisation by specific Project Structure
Program Structure with dedicated Transfer Projects for SME’s helps Industry to benefit most

Global Market for Intelligent Technical Systems

Subsystems
- Examples
  - Intelligent Sensors
  - Drivetrains
  - Automation components
  founding the basis for systems

Systems
- Examples
  - Manufacturing equipment
  - Household appliances
  - ATMs
  founding the basis for partially geographically dispersed networked systems

Networked Systems
- Examples
  - SmartGrids
  - Production plants
  - Cash management systems
  alterable during course of validity

33 Innovation Projects
of industry partners lead to superior market performance

5 Cross-Section Projects
creating technology platform for innovation projects and transfer

- Self-Optimization
- Human-Machine Interaction
- Intelligent Networking
- Energy-Efficiency
- Systems Engineering

8 Sustainability Measures
creating development dynamics exceeding funding period

- Strategic Foresight
- Technology Transfer
- Market Orientation
- Acceptance
- Prevention of Product Piracy
- Education and Training
- Internationalisation
- Business Start-Ups

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Example for Intelligent Technical System
Combining ICT, Software Tools and Engineering drives Innovation

Energy Management in SmartGrids with Intelligent Household Appliances

The objective is to develop a dryer adapting within seconds to altered electricity rates while yielding excellent results.
In order to comply with the requirements of SmartGrids, the appliances themselves have to be equipped with the necessary intelligence.
The thermal pump dryer should react flexibly on changed margin conditions by adapting of procedures. It communicates with the SmartGrid infrastructure and the remotely accessible user.
Systems Engineering
Challenges and Fields of Action due to lots of Opportunities of not working together from the Beginning

- Consistency among the disciplines
- Modeling of system design during the early stages
- Performance increase using Systems Engineering
Technology transfer leading edge cluster it’s OWL

**Industry**
- Needs of industry
- Request to participate in the cluster
- Project ideas to be prepared

**Academia**
- Range of services offered by scientific institutions in OWL
- Opportunity to validate new methods, tools, technologies, business models in practice

**Ideas for transfer projects based on ...**

**Technology Platform**
- Self-Optimization
- Human-Machine Interaction
- Intelligent Networking
- Energy Efficiency
- Systems Engineering

**Selection procedure**

**Transfer projects**
- In total 40 projects with SME’s
- 100% Funding of Transfer Provider
- Duration per project 5 - 10 Month
- Projects Kick-Offs: July 1st 2014
- **Examples:**
  - Intelligent storage and retrieval system
  - Expert system for the winding wire manufacturing
  - Process-integrated employee support in the assembly
- **Partners:**

**Rules**
- Strategic fit
- Relevance to industry
- Rating of reviewers
- General rules
Organisational Structure Cluster Management
Strong Governance Model allows to achieve ambitious Goals

it’s OWL e.V. (Cluster Partners)

Cluster Board (Board of Directors)

it’s OWL Clustermanagement GmbH

R. Dumitrescu
Head of Strategy, Research and Development

G. Korder
Head of Operations

H. Weber
Head of Marketing

- Strategic Direction
- Overall Technical Conception
- Benchmarking
- Project Evaluation
- Commissioning/Coordination of Sustainability Measures
  - Strategic Foresight
  - Technology Transfer
  - Market Orientation
  - Acceptance
  - Prevention of Product Piracy

- Project Management
- Administration of Funds
- Organization Controlling
- Reporting
- Internationalization
- Coordination of Norming, Standards, Rights Protection

Presentation
it's OWL Conferences
Open Innovation
CoPs
Sustainability Measures
- Education and Training
- Gender, Integration
- Business Start-Ups

Project Office

Projects
(Innovation Projects, Cross-sectional Projects, Sustainability Measures)

Marketing Team
Internationalization Team
Transfer Team
System Architecture Team

advice / support
Summary

- It’s OWL is a **Industry led Cluster** and well prepared to tackle future challenges
- Top results from research institutions build the **technology platform** to which industry partners may have access to
- **Transfer projects** enable SME’s to participate significantly from innovation
- **Strong governance organization** with huge commitment of industry partners (steering board and advisory board) and measurable KPI’s relevant to Industry
- To achieve long term goals we focus on e.g. KIC activities in partnership with relevant international partners with complementary skill set and proven track record (concept based on strength)
- Major objective is **strengthening SME’s** in Europe based on innovation
- Industrie 4.0 requires a lot of **ICT knowledge**
- **ICT is strategically relevant** to develop intelligent technical systems
The Technology-Network: Intelligent Technical Systems OstWestfalenLippe, Germany

it's owl