

**World-class clusters and networks for  
creating new competitive advantages in the EU**

## **Better use of Key Enabling Technologies in the Spotlight of Regional Innovation Policy**

**Dr. Petra Püchner  
Managing Director**

**Steinbeis-Europa-Zentrum of Steinbeis Innovation gGmbH**

## The KETs Communication (9/2009)

- Despite good R&D capacities in KETs, the EU is less successful in capitalising on these results.
  - A more strategic approach is required to deploy these technologies in the EU.
- 
- High level Expert Group on Key enabling technologies / Final Report 6/2011
  - A more strategic approach is required to deploy these technologies in the EU.

# Definition of key enabling technologies (KETs)

- Characteristics:
  - Knowledge-intensive
  - Associated with high R&D intensity
  - Rapid innovation cycles
  - High capital expenditure
  - Highly skilled workforce
- KETs enable process, goods and service innovation across the economy and are of systemic relevance
- KETs are multidisciplinary
- KETs can assist technology leaders in other fields

## Key enabling technologies (KETs)

- Nanotechnology
- Micro –nanoelectronics
- Photonics
- Industrial biotechnology
- Advanced materials
- Advanced manufacturing

plus

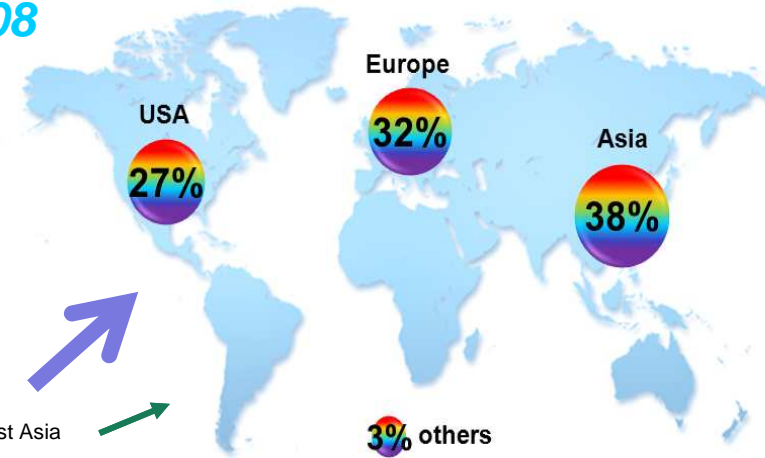
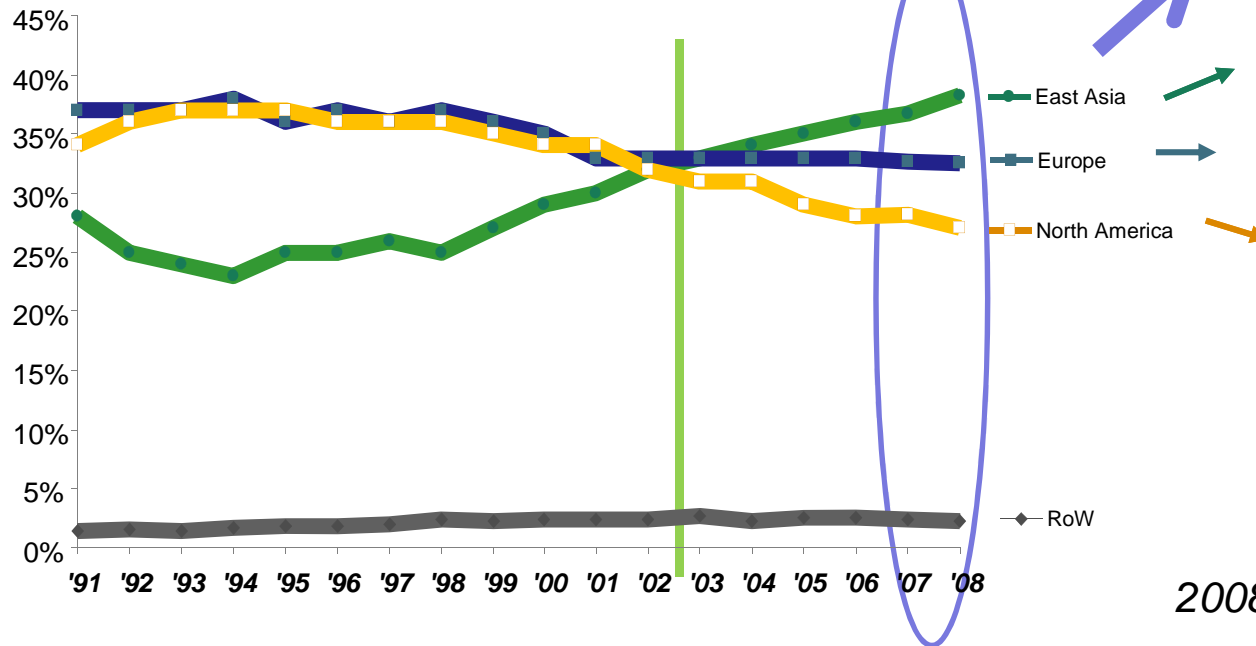
- ICT
- Creative industries
- ...

- . . . .

# Europe is still in the KETs' race: patent activity

2008

Shares of EPO/PCT patents  
by regions (percent)  
All KETs cumulated



2008 priority patents published

Source: European Competitiveness Report 2010, European Competitiveness in Key Enabling Technologies (TNO/ZEW), TKM 2011

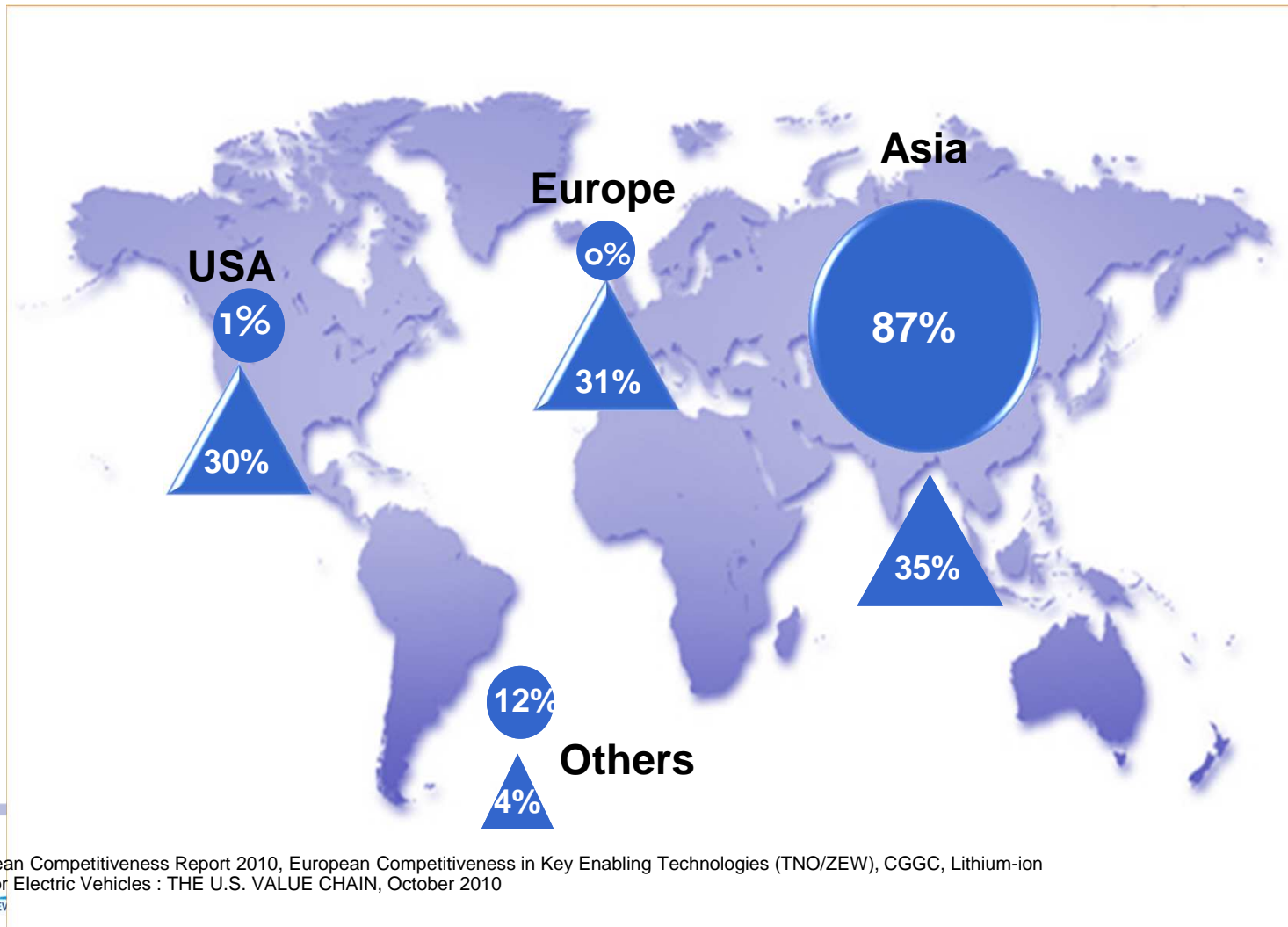
# Disconnection between patents share and manufacturing share Case Study: Li-ion battery production



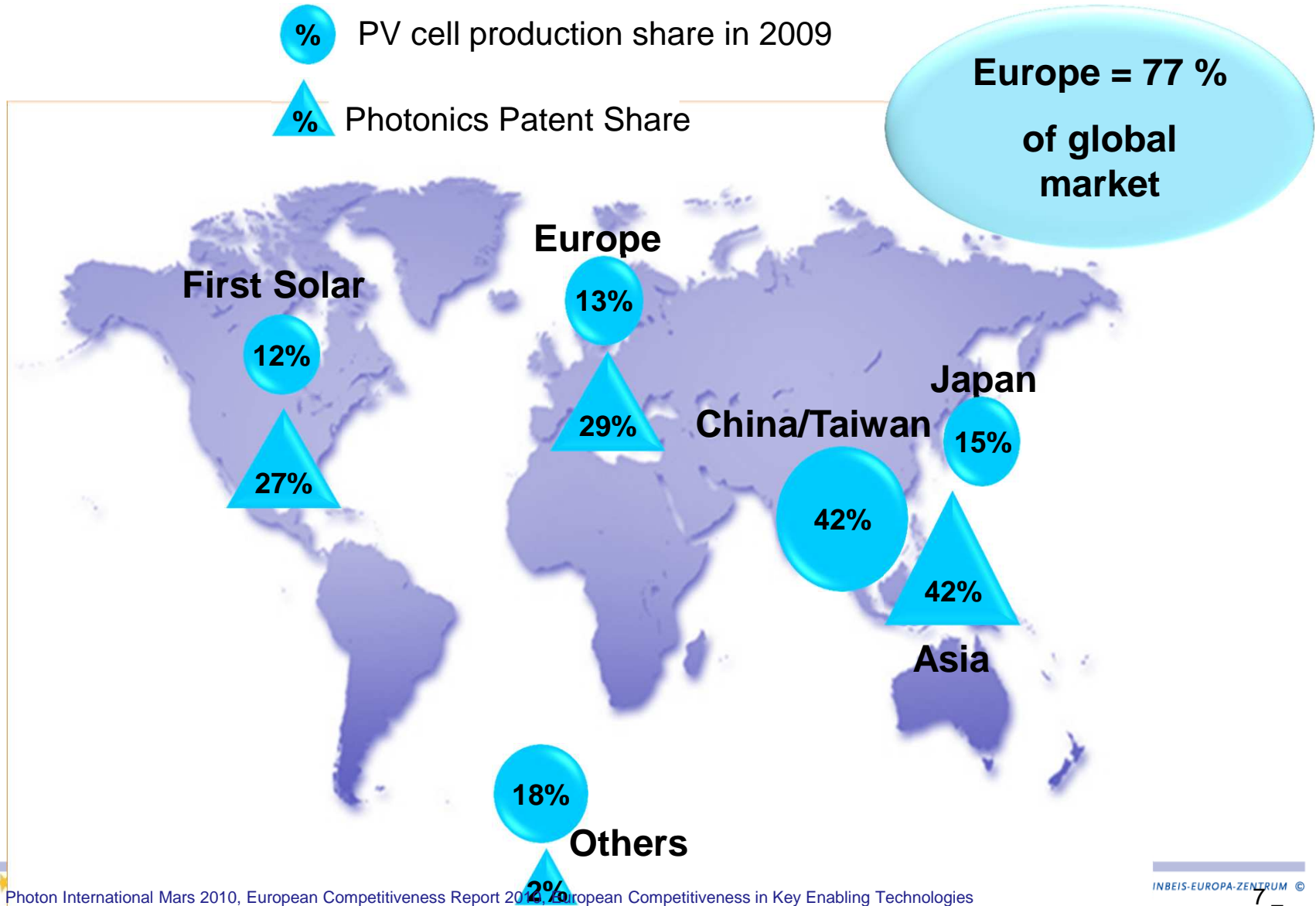
Li-ion battery cell production share in 2008



Advanced Material Patent Share

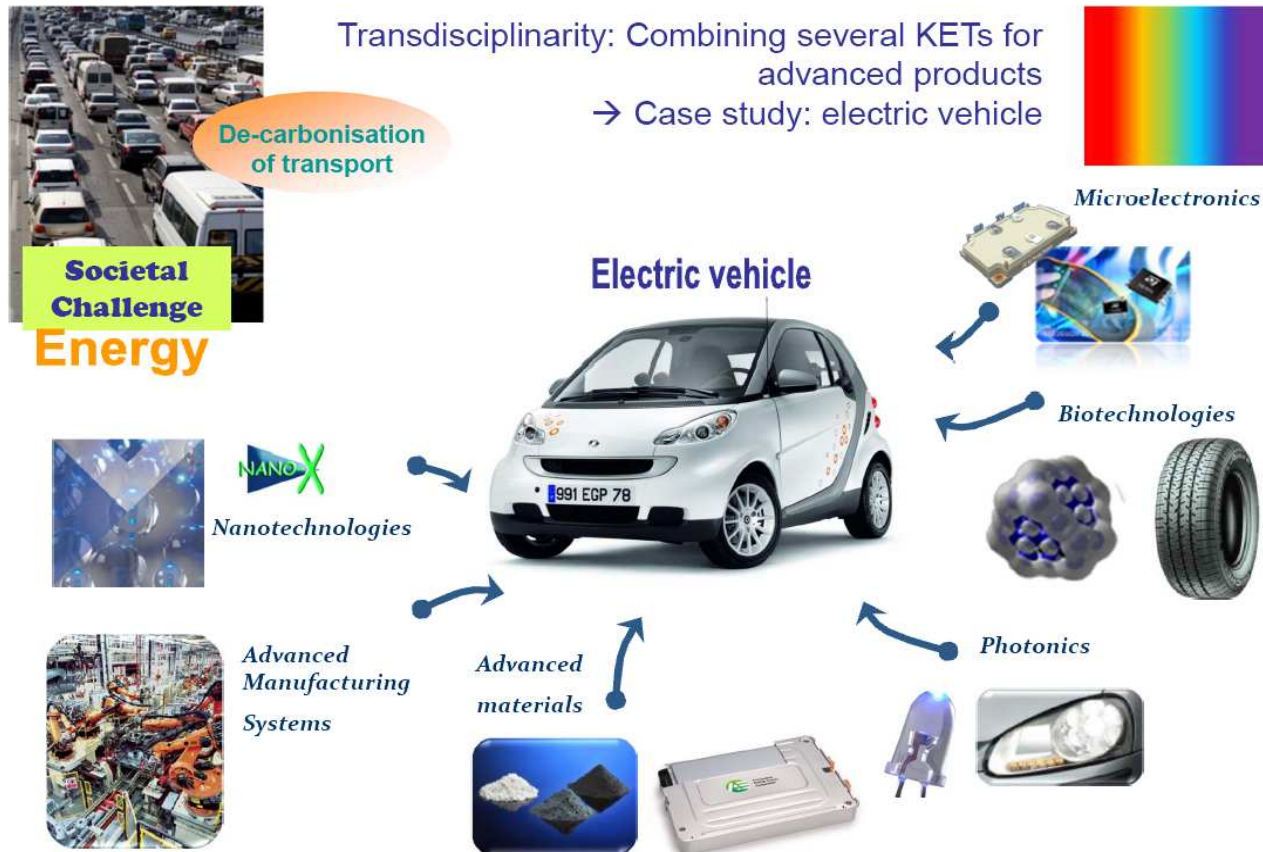


# Disconnection between patents share and manufacturing share Case Study: PV Cell production

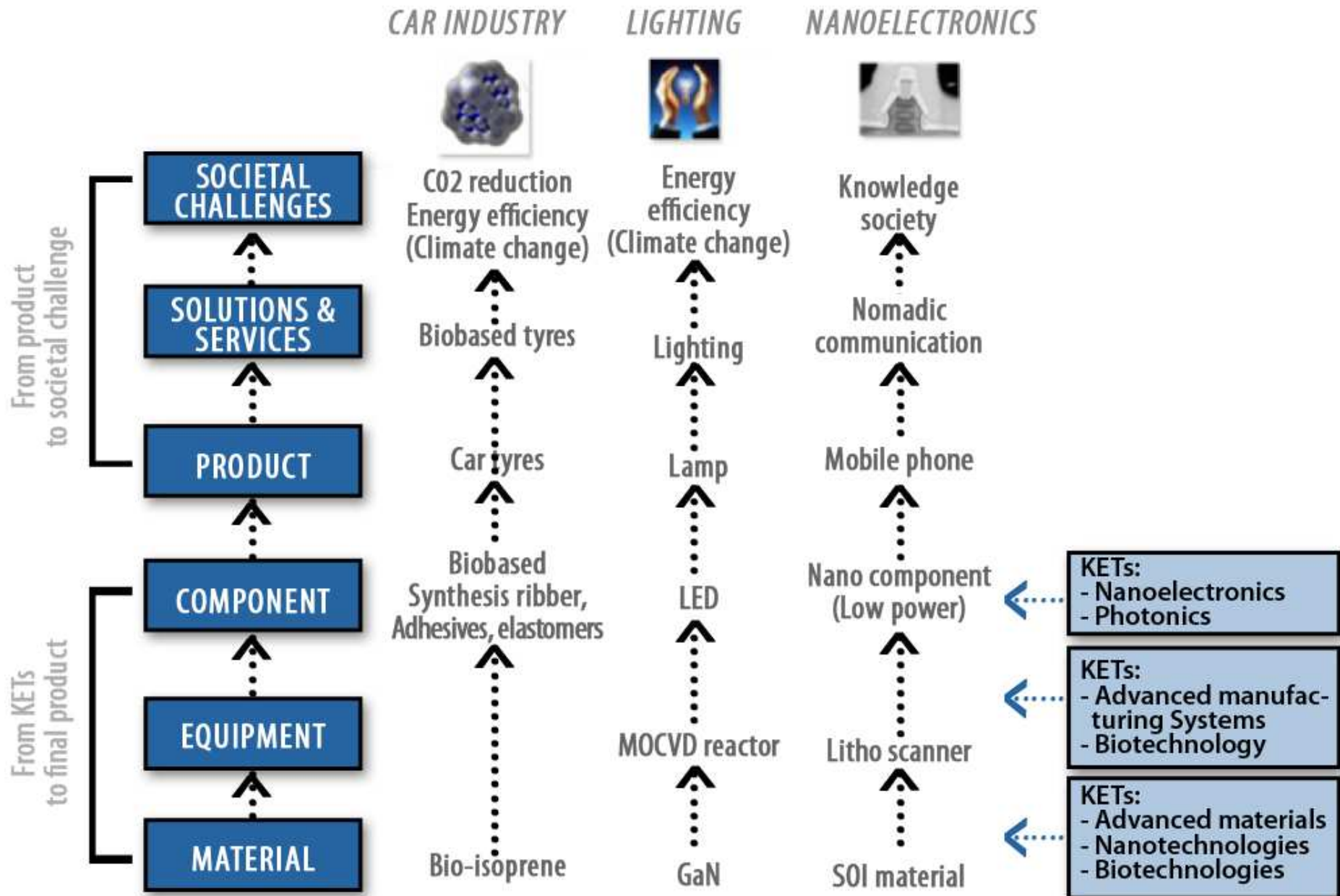


Source: Photon International Mars 2010, European Competitiveness Report 2014, European Competitiveness in Key Enabling Technologies (IHO/ZEW)

# Case example: the electric car







## From Societal Challenges to emerging industry sectors

- **Health, demographic change and wellbeing**

**Well being including Active Aging**

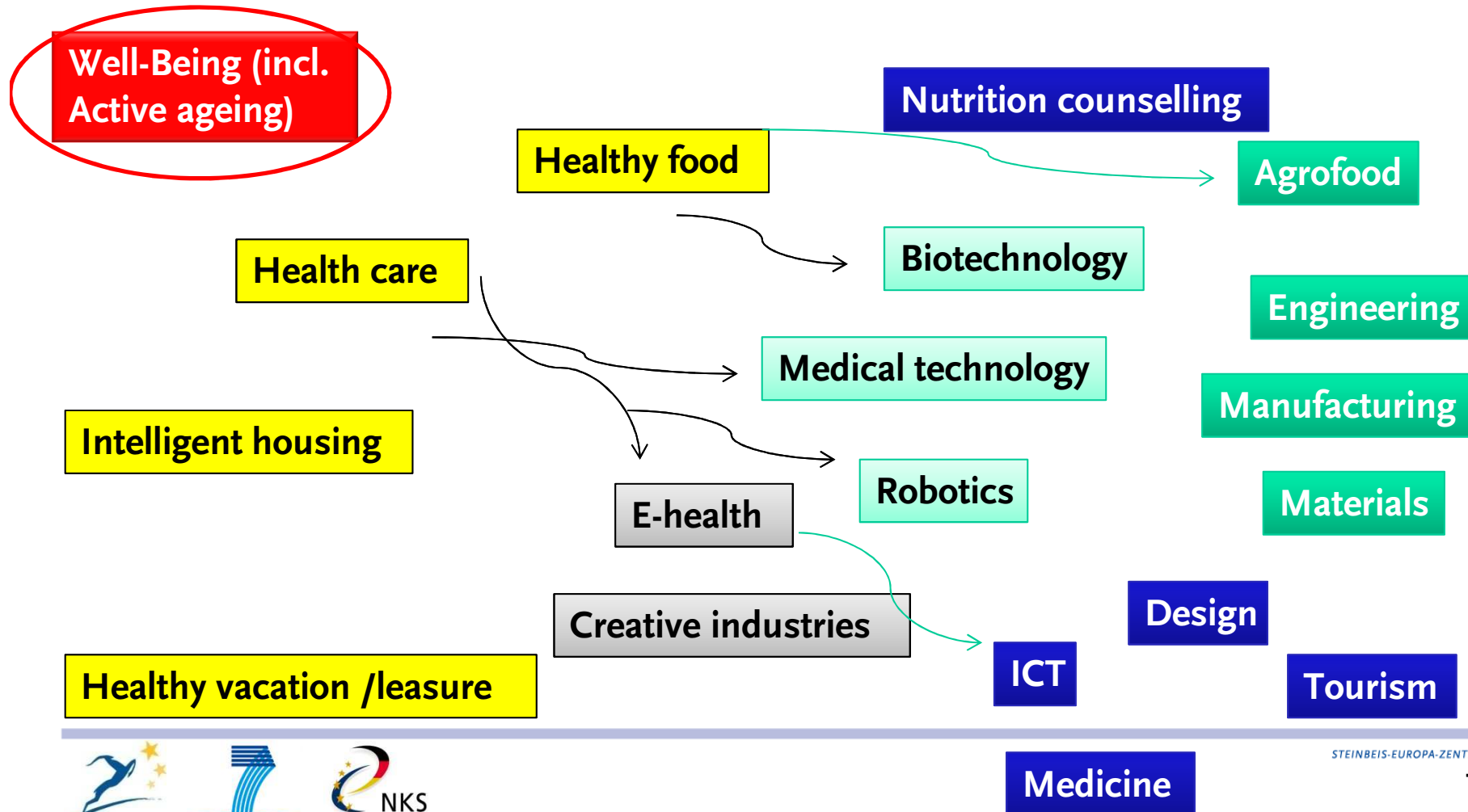
- **Climate action, resource efficiency and raw materials**

**Sustainable development/ green economy**

- **Smart, green and integrated transport**

**Sustainable mobility**

## From emerging industry sectors to **products** and **services**



## Regional innovation policy

Who wants to do Nanotechnology ?



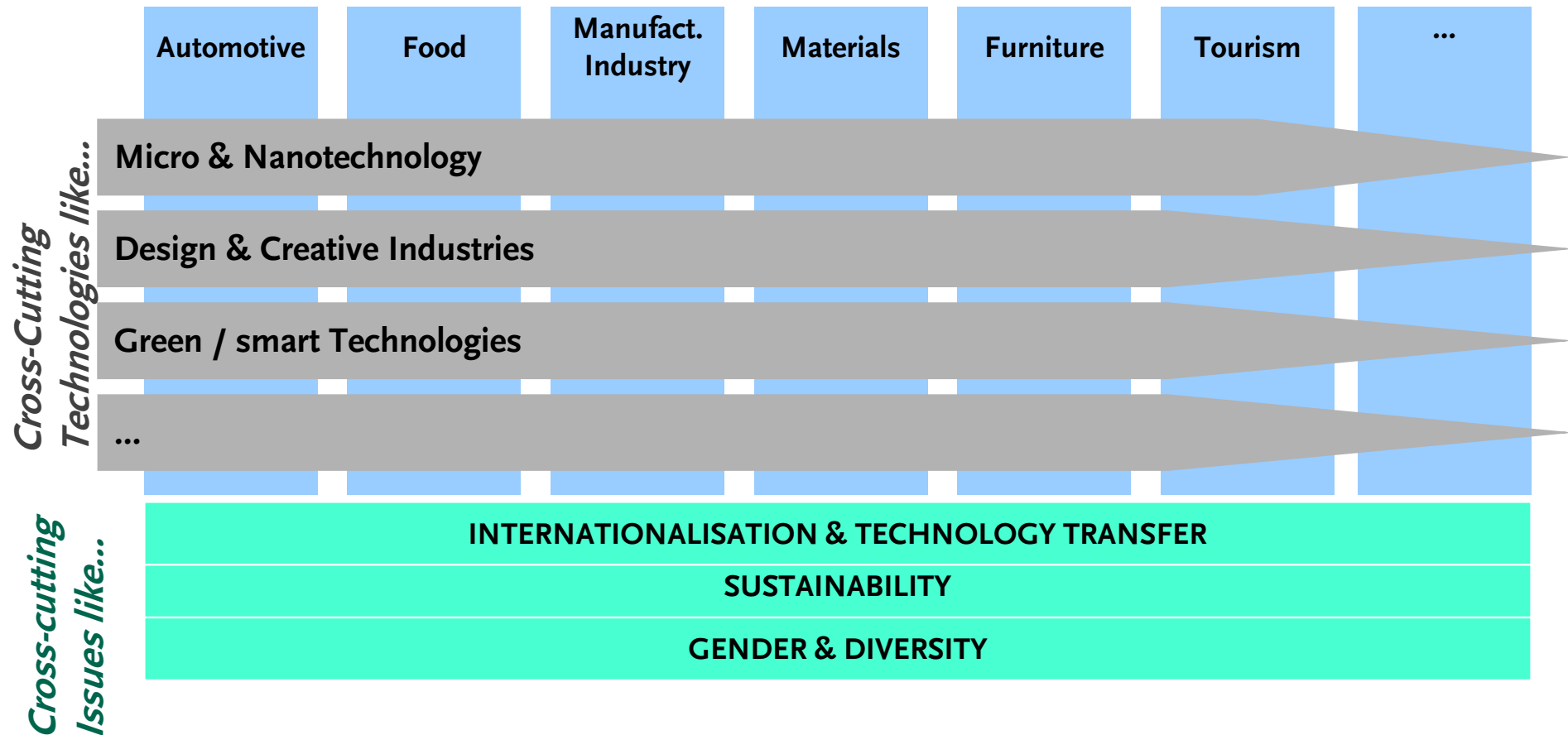
→ This is not smart !

## Who wants to do Nanotechnology ?

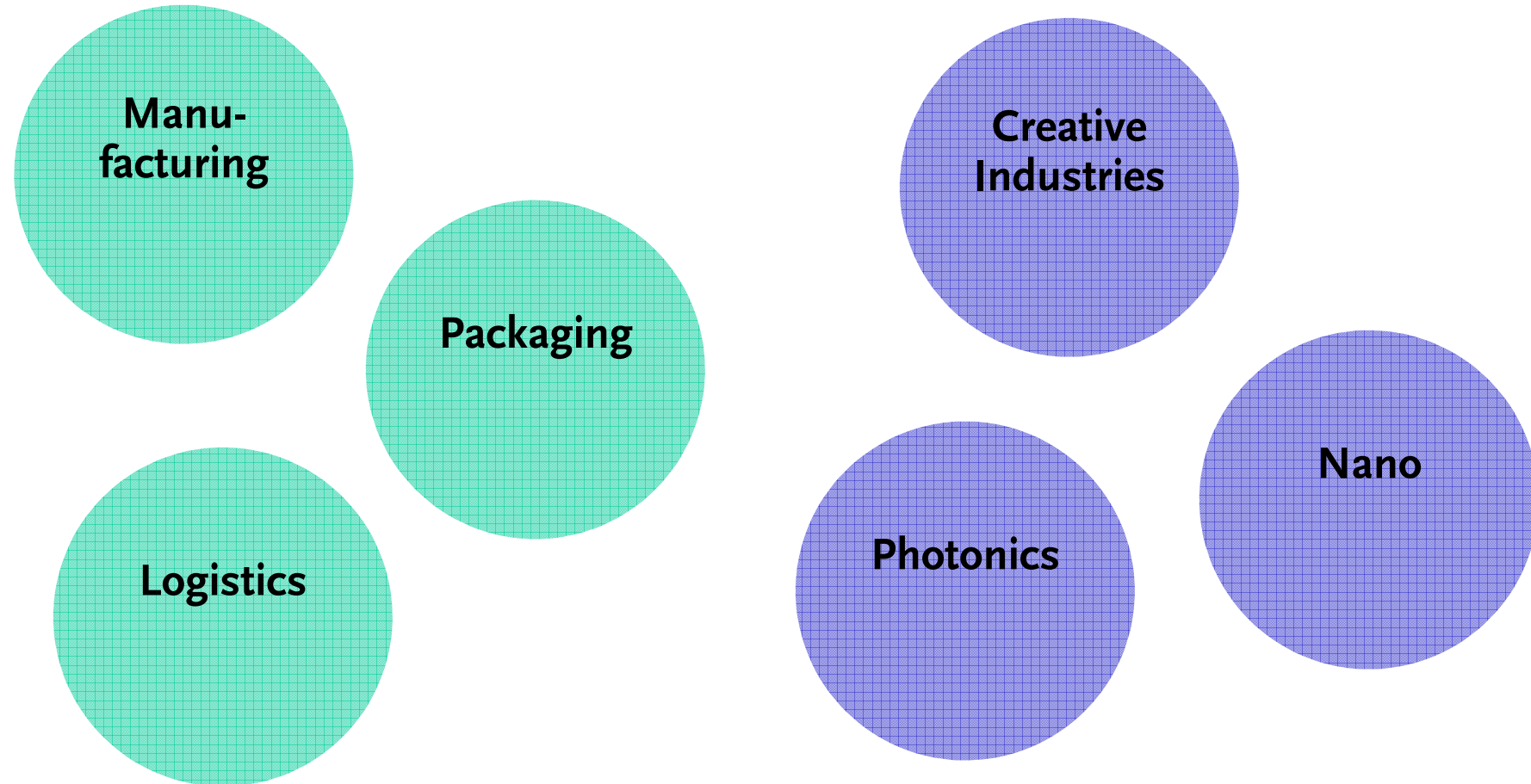


## Boosting innovation through new cluster concepts

*More traditional Clusters like ...*

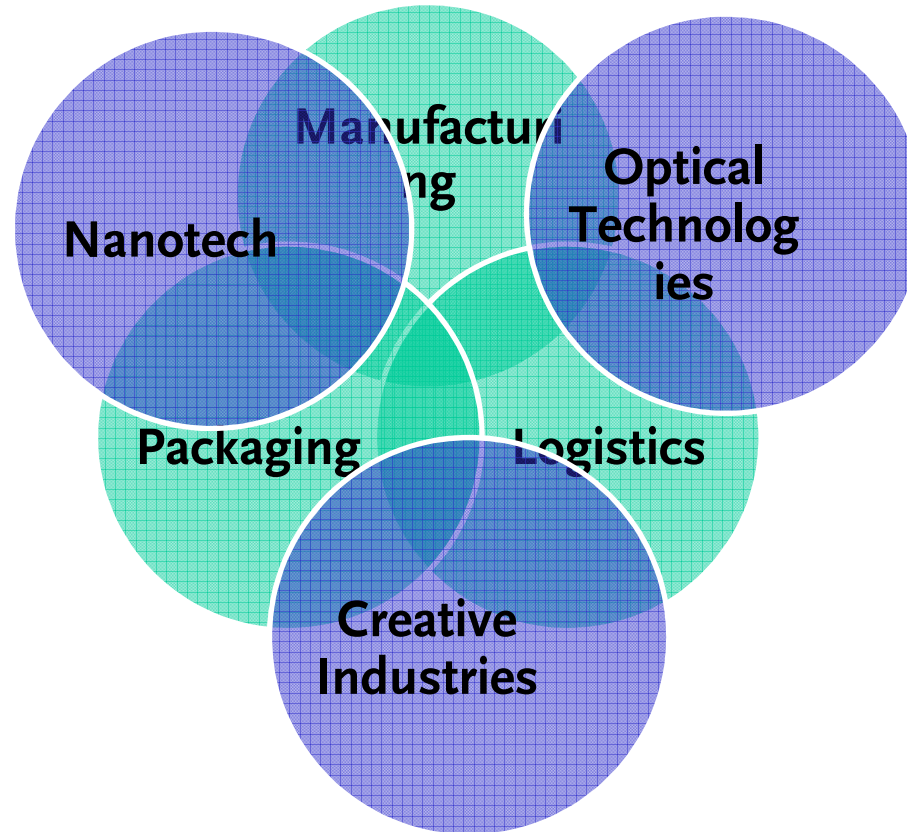


## Traditional sector clusters and emerging techn. clusters





## Traditional sector clusters and emerging techn. clusters



## Cross-fertilizing Impact of KETs

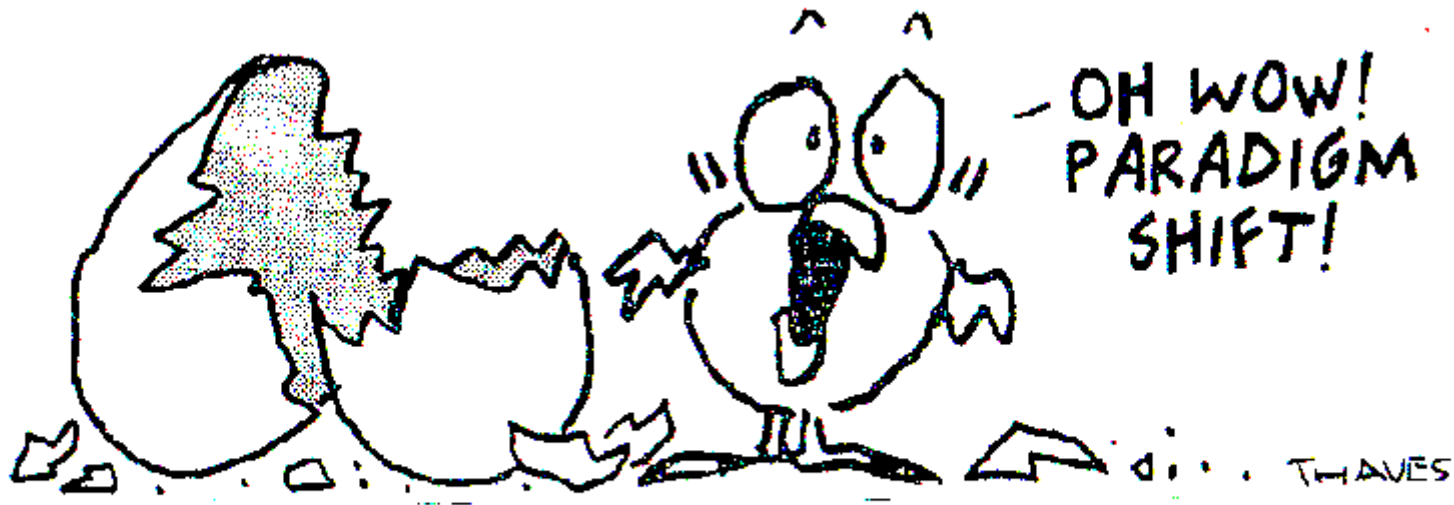
- Impact on **all** industries / companies
  - KETs can make a change for any business
  - Enable companies to exploit market chances
  - Enable companies to answer client requests
  - Bring about ideas – bring change of viewpoint
  - Brings paradigm shift

## Role of Policy – Enabler based on regional potential

- **Enabling cross fertilizing = knowledge and technology transfer = cooperation among those, who would not naturally talk to each other**
- **Enable market driven / solution focused meeting platforms**
- **Investment / funding for KET pilot lines, manufacturing facilities, trials, demonstrations etc to increase the technology readiness**

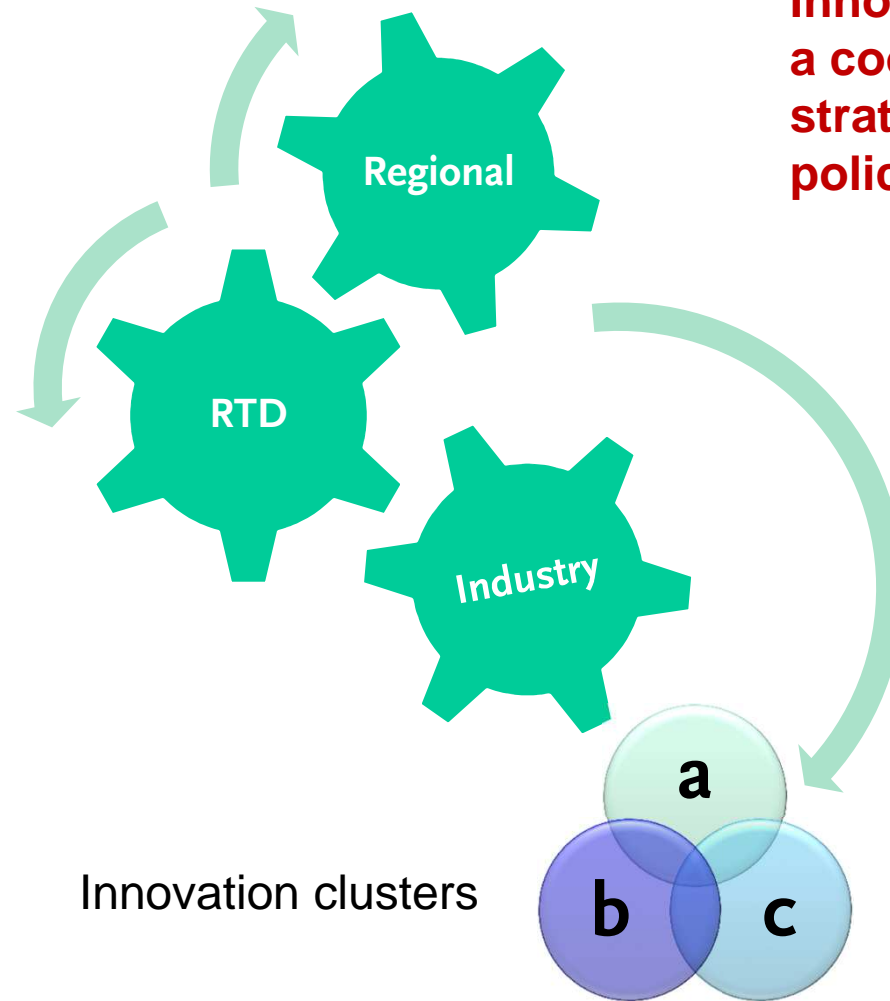
## From being trapped in a shell to completely new opportunities

Frank and Ernest





**What do you see?  
By shifting perspective you might see an  
old woman or a young woman.**



**Innovation policy needs  
a coordinated and  
strategic action of all  
policy levels !**

Innovation clusters

# EU actors at the top of KETs' patent<sup>1</sup> ranking

## Global TOP 10 per KET (1/2)

### Nano- technologies

### Micro and nanoelectronics

### Photonics

## R&D actors

CEA  
Univ. of California  
JSTA  
CNRS  
MIT  
US DoE  
AIST  
NI of Health  
Univ. Texas  
FhG

CEA  
Univ. of California  
IMEC  
FhG  
AIST  
CNRS  
MIT  
JSTA  
IKETR  
Univ. Tohoku

CEA  
FhG  
MIT  
Univ. of California  
US DoE  
CNRS  
AIST  
JSTA  
US gvmt.  
ETRI

## All actors

Samsung  
HP  
Univ. of California  
Canon  
3M  
Agilent  
JSTA  
Hitachi  
Sony  
Matsushita

Infineon  
Tokyo Electron  
Matsushita  
Samsung  
Applied Materials  
Fujitsu  
Nikon  
ST-Microelectronics  
NEC  
IBM

Samsung  
Matsushita  
3M  
Corning  
Fuji Film  
Osram  
Sumitomo  
Sharp  
Kodak  
Sony

# EU actors at the top of KETs' patent<sup>1</sup> ranking

## Global TOP 10 per KET (2/2)

### Biotechnology

### Advanced Materials

### Advanced Manuf. systems

**R&D  
actors**

Univ. of California  
CSIC  
CNRS  
JSTA  
Univ. of Wisconsin  
FhG  
Noth Carolina Univ.  
AIST  
MPI  
John Hopkins

CNRS  
Univ. of California  
CEA  
US DoE  
FhG  
AIST  
JSTA  
MIT  
US gvmt.  
NI of Health

FhG  
CEA  
US DoE  
Univ. of California  
JSTA  
CNRS  
AIST  
DLR  
NI of Health  
TNO

**All  
actors**

BASF  
Novozymes  
Evonik  
Du Pont  
Univ. of California  
Bayer  
Danisco  
Matsushita  
Mitsubishi  
Aplera

BASF  
Du Pont  
Dow  
3M  
Evonik  
Arkema  
Bayer  
Fuji  
GE  
Esso

Siemens  
Bosch  
Continental  
Endress&Hauser  
Fanuc  
Honeywell  
ABB  
GE  
Honda  
Hitachi