

Nanotech
Finland





FinNano

Nanotech Finland - The Finnish Innovation Environment and Opportunities for Cooperation

- Spinverse – Your Emerging Technology Partner
- Tekes – the Finnish Funding Agency for Technology and Innovation
 - Tekes Programmes on Nanotechnology and Functional Materials
 - International cooperation and opportunities for foreign companies

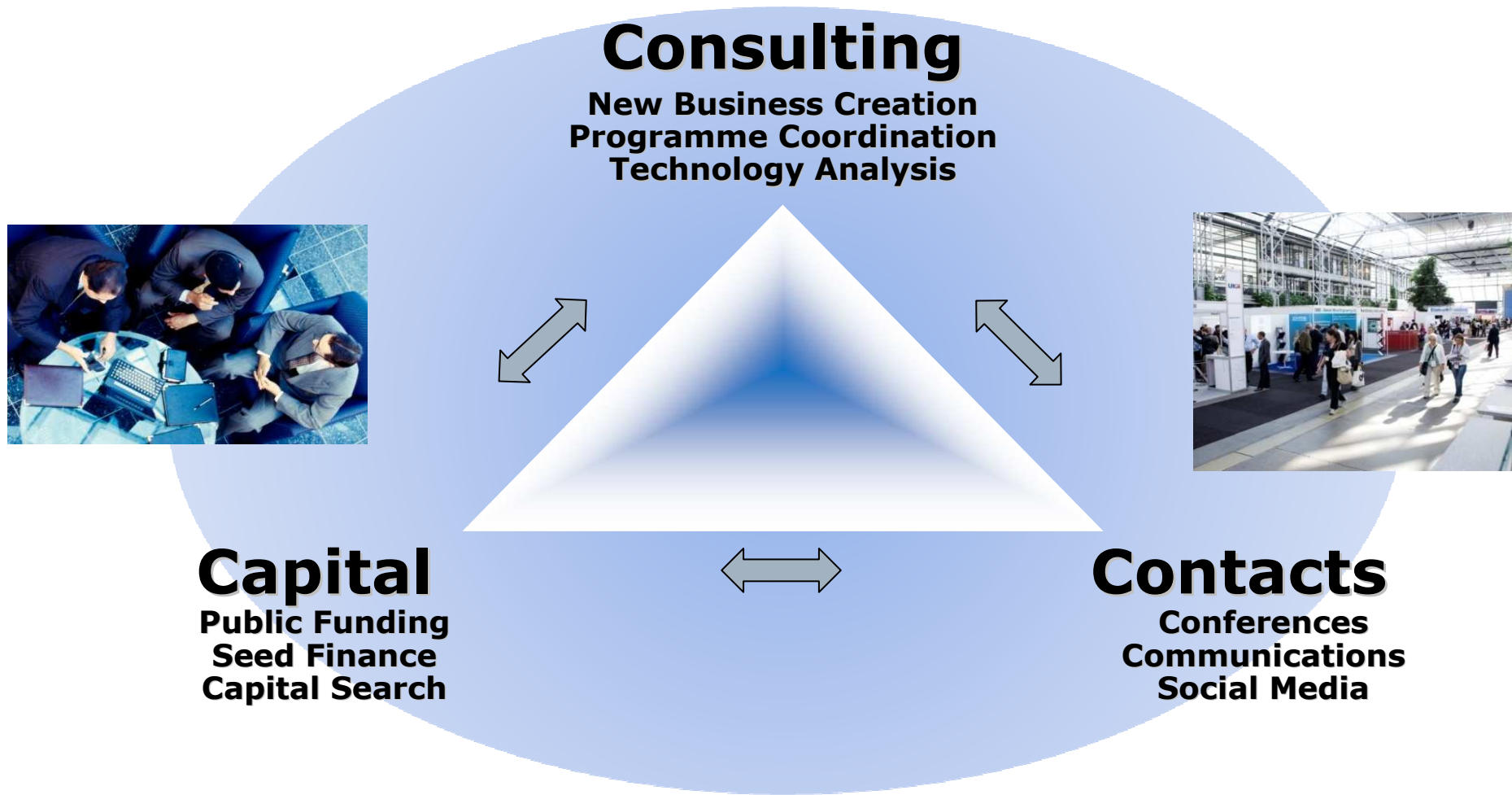


Tekes

SPINVERSE

Capital & Consulting

Spinverse commercialises emerging technologies through consulting, contacts and capital services



Tekes - Finnish Funding Agency for Technology and Innovation

Creating networks for innovations

Our services

- funding for innovative R&D and business
- networking Finnish and global companies and researchers

Customers

- Finnish and foreign companies located in Finland
- universities, research institutes, hospitals etc.

Resources

- budget: 600 million euros annually
- personnel: 360 in Finland and abroad
- public organisation under the Ministry of Employment and the Economy



What is special in the Finnish innovation environment?

Innovation policy has been consistent for the past 20 years

- growing investments in R&D – public and private

Dynamic and transparent innovation ecosystem

- active, continuous and successful dialogue on all levels
- involves companies, research institutes and public sector

Broad interpretation of innovation

- technology – society
- products – services – processes
- environment – user – design



”

There's a pragmatic, productive and can-do attitude that goes along with research in Finland.

Also, in my view there's less of paperwork and red tape to do, which makes research quicker.



Andreas Hefner

Head of Research

Ciba Specialty Chemicals

Demand-based and international approach basis of new strategy

New innovation strategy

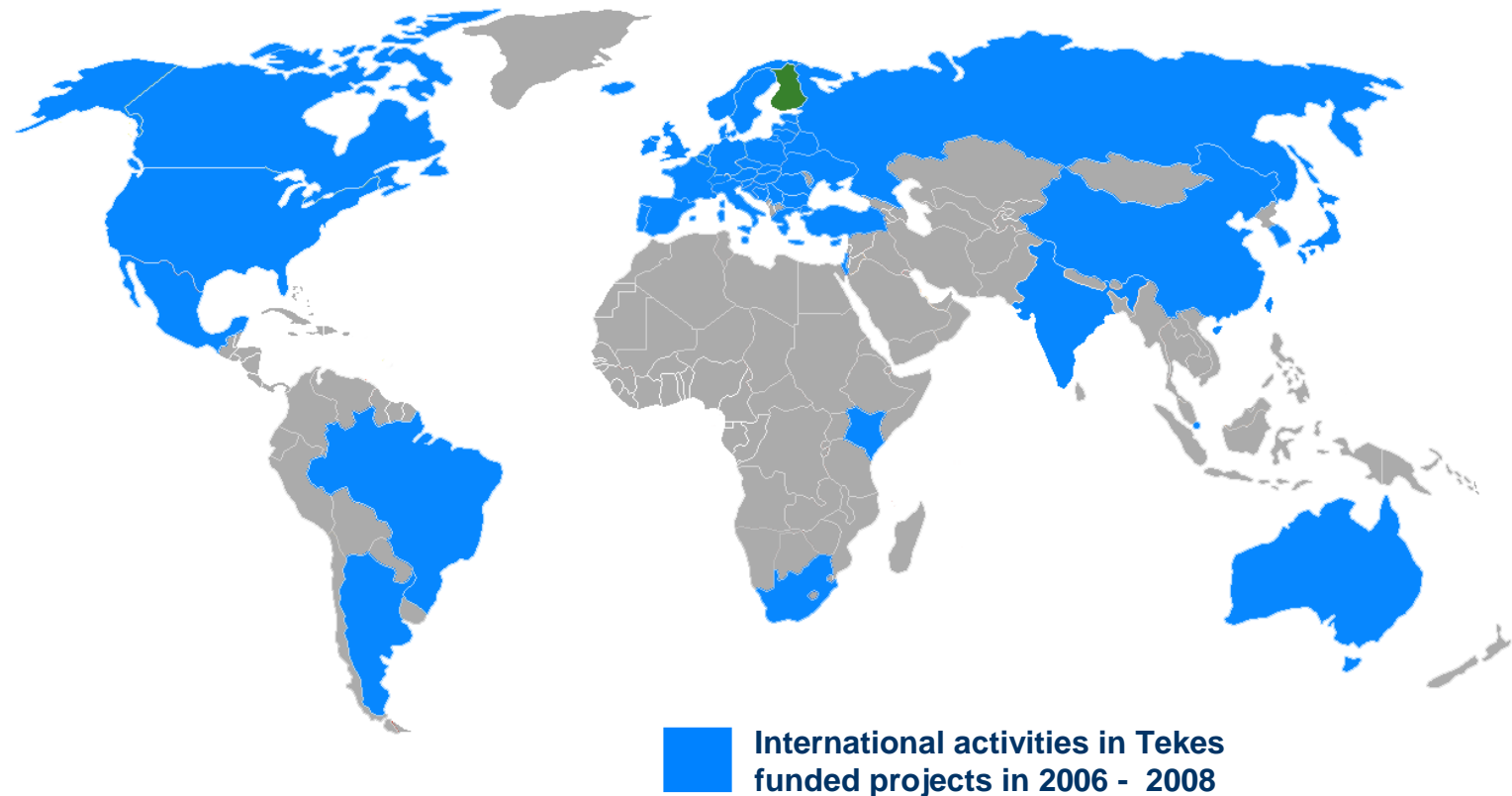
- Demand-based innovations
- Innovative individuals and communities
- International networking and cooperation
- Systemic approach



Strategic Centres for Science, Technology and Innovation

- Forestcluster Ltd
- Information and communication industry and services (TIVIT Ltd)
- Energy and environment (CLEEN Ltd)
- Metal products and mechanical engineering (FIMECC Ltd)
- Health and well-being
- Real estate and construction (RYM SHOK Ltd)

Half of Tekes funded projects are internationally networked

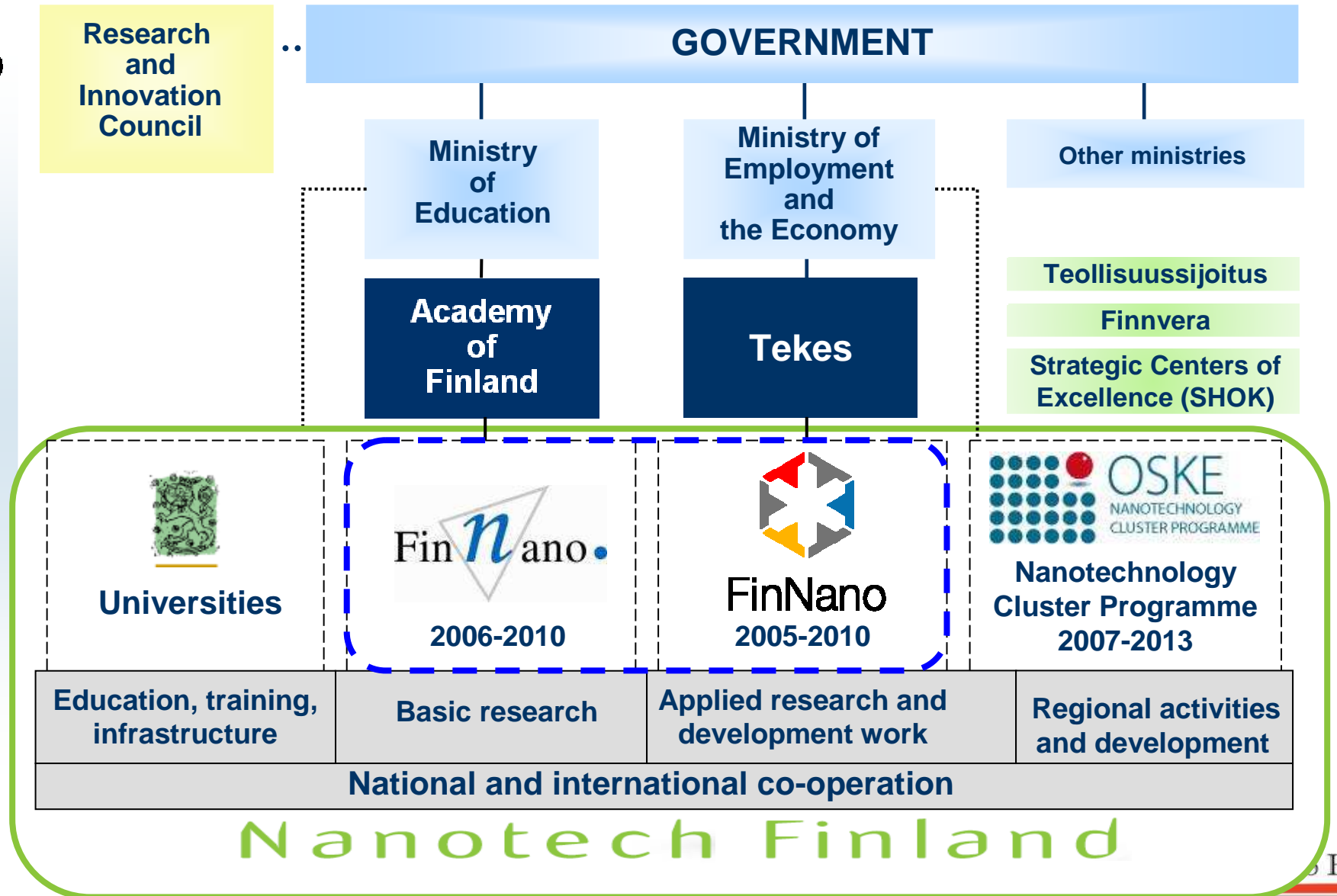


Any international company located in Finland is eligible for Tekes' funding, regardless of ownership.



FinNano

Nanotechnology in the Finnish innovation system

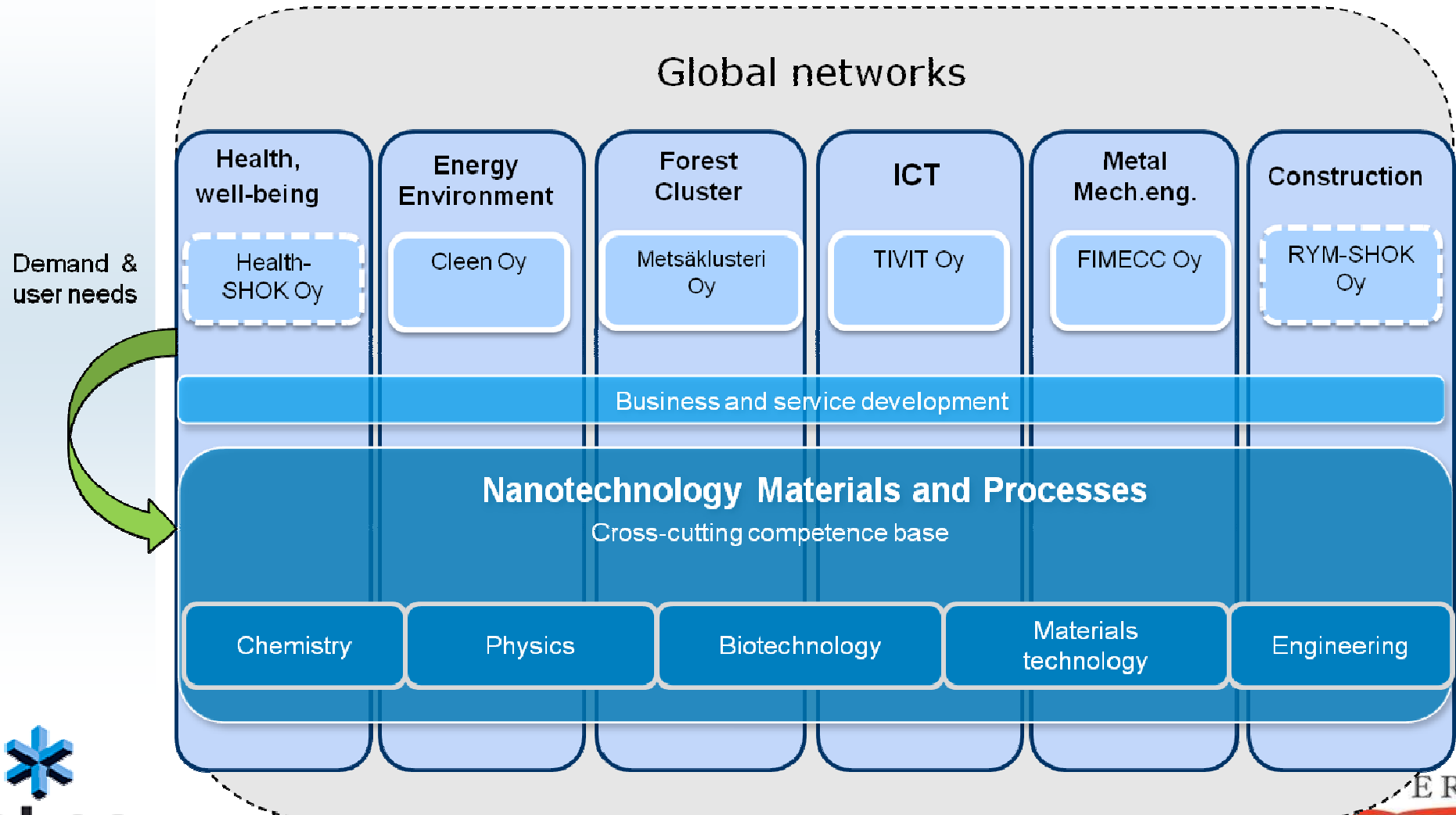


Tekes



FinNano

Nanotechnology is a cross-cutting competence area that enables innovation in all key clusters of Finnish industry



Tekes



Nanotechnology is in central role driving innovation and renewal in all Finnish industrial sectors

FinNano

ICT:

Nanotechnology will enable ICT sector future growth



- Photonics
- Mobile devices
- Integrated sensor systems
- Printed technologies
- Environment monitoring

Metals industry:

Nanoscale materials and processes enable innovations in opportunity areas



- Breakthrough materials for light construction
- Intelligent solutions for products and automation

Forest Cluster

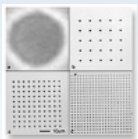
Renewal through improved profitability, new markets and new growth areas



- Nano enhanced production technologies
- Wood-based materials using nanotechnology
- Smart customer solutions

Health, Well-Being:

Opportunities in convergence of biotech, materials and ICT



- Nanoparticles etc for diagnostics'
- Biomaterials for regenerative medicine
- Drug discovery and targeted delivery

Energy and Environment:

Cleaner and more efficient solutions



- Environmentally benign materials
- Solar cells, fuel cells for portable devices
- Energy -efficient solutions

Construction:

The sector is expected to be an important beneficiary of new nanomaterials



- Concrete and steel with tailored properties
- Anti-fouling, self-healing, self-cleaning surfaces
- Intelligent windows

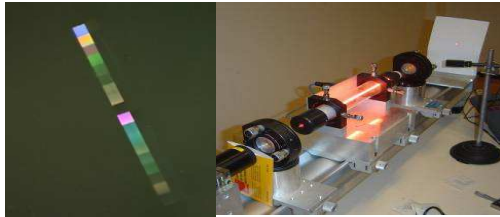
Chemicals and Materials:

Nanotechnology enables targeted solutions for key customer sectors



FinNano

Finnish ICT sector has several existing clusters to build on



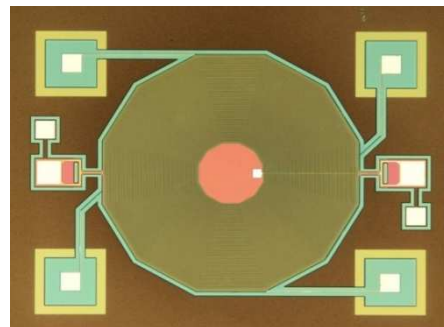
Photonics



Mobile Devices



Printed technologies



Integrated Sensor Systems



Environment monitoring



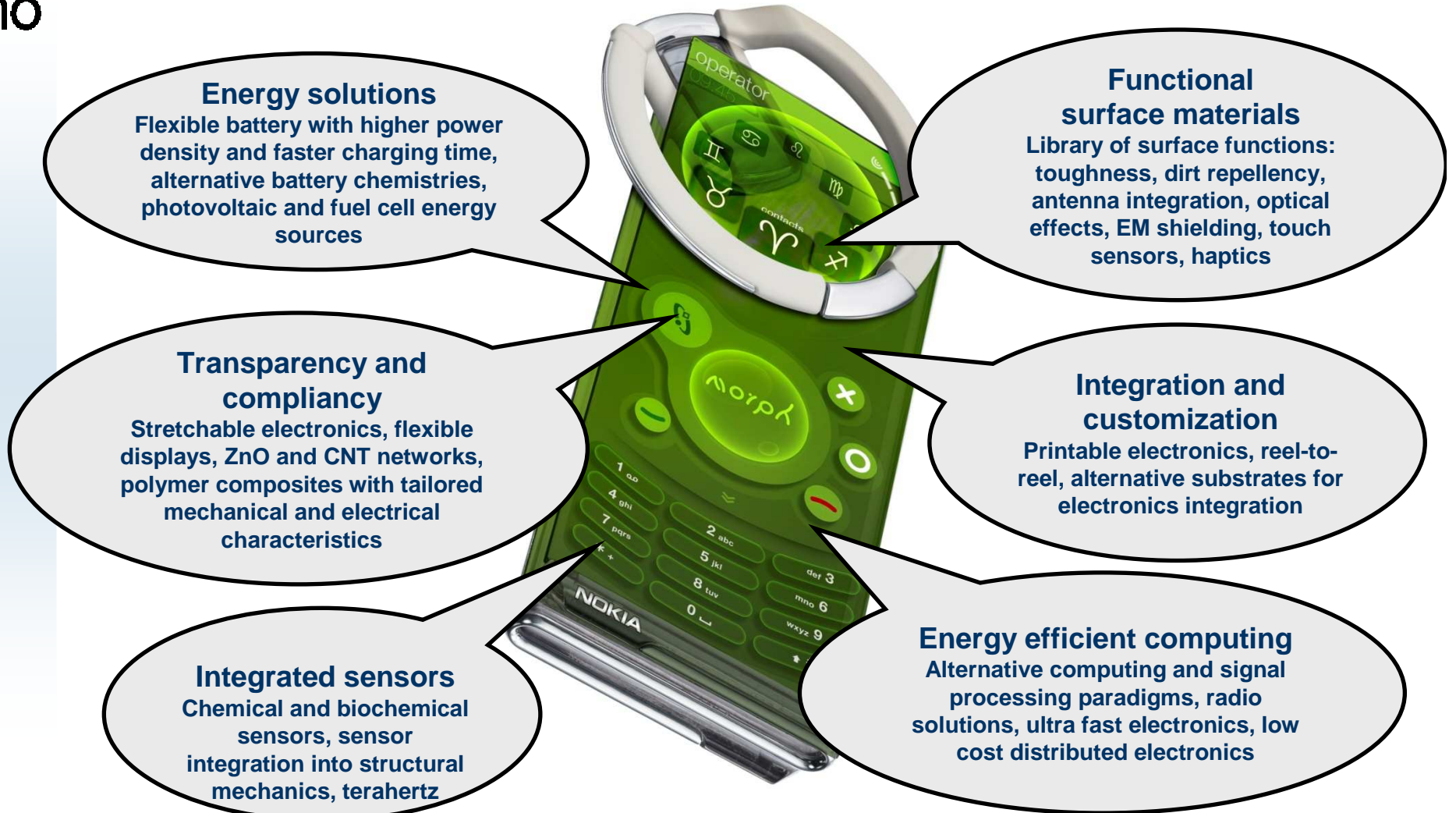
Tekes

SPINVERSE
Capital & Consulting



FinNano

Most mobile device technology subsystems benefit from nanotechnology



Source: Nokia

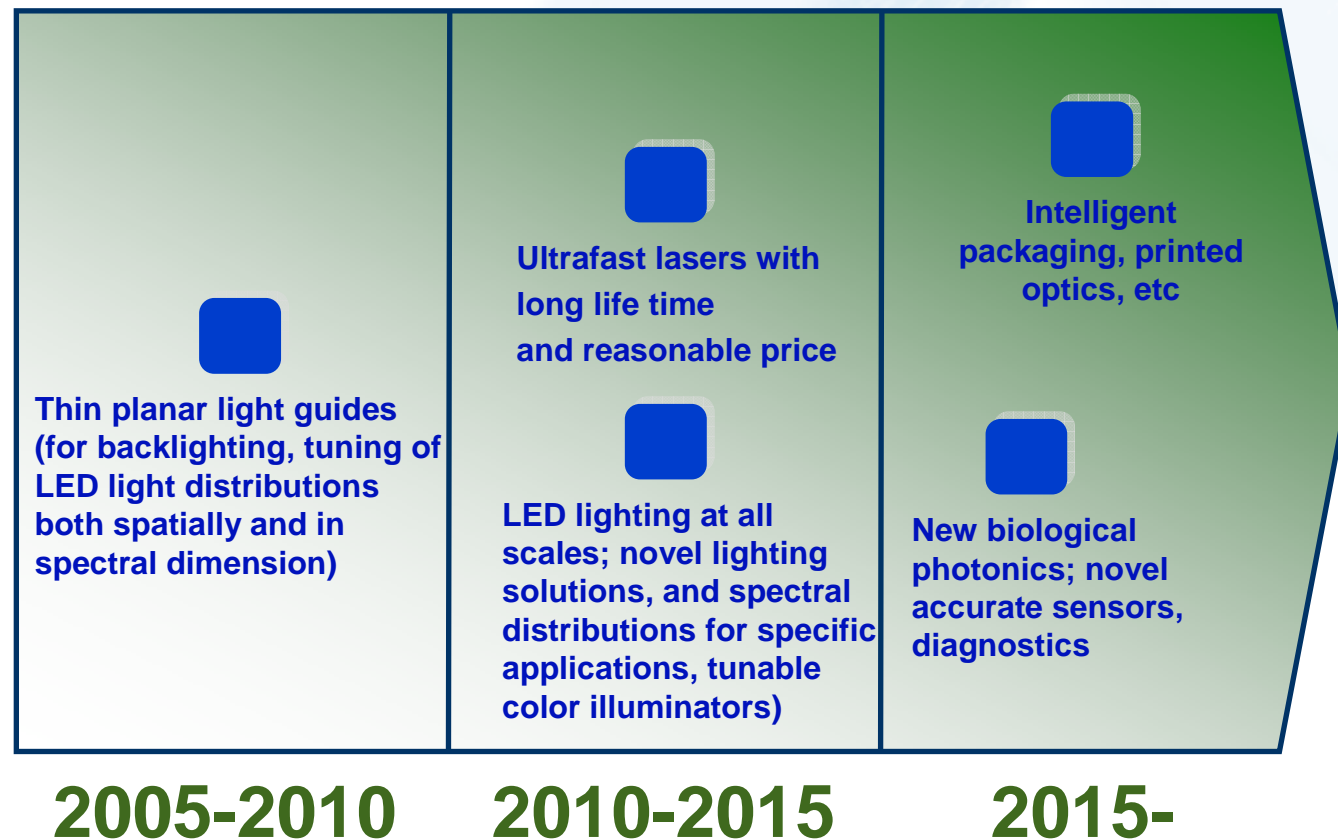


Tekes



FinNano

Photonics driven ICT solutions in the Finnish Industry

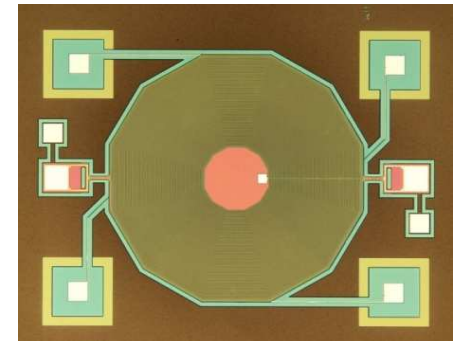




FinNano

Finnish strengths in Integrated Sensor Systems

- **MEMS Know-how**
 - Processing technologies and materials, including nanoscale properties and control
 - Future materials – carbon nanotubes, graphene, printable electronics, piezoelectric/ferroelectric magnetic thin films, layer transfer technologies
- **Photonic devices** – micro structured optical fibers, solid-state light sources, photonic switches
- **ALD technology** – strong cluster and expertise
- Strong expertise in **RFID and embedded sensor applications** e.g. machinery, process control
- **Heterogeneous integration of photonics, electronics and MEMS**



Tekes



FinNano

Integrated sensor system key applications in the Finnish industry

- **Sensor Technology Applications**
 - Solid state sensors for chemical sensing
 - MEMS-devices for chemical sensing
 - Microstructured optical fiber sensors
 - Single-molecule sensing (plasmonic, photonic devices).
- **Health and Well-being applications: diagnostics, and bio&medical sensors**
 - Wireless point of care diagnostics e.g. monitoring heart functions
 - Medical imaging (including x-ray detectors)
 - Bio and medical sensors e.g. lab on a chip
 - Research devices: DNA manipulation on fluidic chips, protein assay chips, drug analysis devices
 - Systems biology software
- **Automotive Industry**
 - Tyre pressure sensor systems, inertial sensors, magnetometer (Finnish companies already in the subcontracting chains)
- **Energy and Environment Applications**
 - Air quality indoors and outdoors, emission monitoring, gas sensors for industry, water quality, drinking water safety, ubiquitous sensing



● Prove It TM - Point of care diagnostics



Tekes



FinNano

Finland has world-class expertise in Atomic Layer Deposition (ALD)

- Ability to apply ultra-thin films to substrates (with complex features)
- Technology
 - Alternating pulses of reactants
 - Self-limiting
- Business Model
 - Production of equipment which can then be used in industrial processes



Image Source: Beneq



Tekes



**Functional
Materials**

Tekes Functional Materials Programme (2007-2013)

Focus areas

1. Biomaterials

Focus on tissue regeneration, implants and controlled drug release

2. Low-cost mass manufacturing of intelligent structures

Printed functionalities/intelligence, thin film deposition techniques

Smart objects, smart environment, simple diagnostics for health and food

3. Active materials and structures

Functionality at material level - sensing, actuating, adaptive, externally controllable

Materials enabling new solutions e.g in electronics, optics, consumer products

4. New energy technology materials

Focus on materials for solar energy, novel batteries, energy autonomous solutions
(energy harvesting)

5. Environmentally sustainable material solutions

Material based solutions providing positive EHS* impact

Renewable/biobased materials,
material and energy effective solutions

* *EHS = Environment, Health and Safety*



FinNano

Contacts and further information

Tekes



Dr Markku Lämsä – Programme Manager

Tel. +358 10 605 5793

Mob. +358 50 5577 793

markku.lamsa@tekes.fi

Spinverse Ltd



Dr Laura Juvonen – Programme Coordinator

Mob. +358 40 589 6263

laura.juvonen@spinverse.com

Further information: www.tekes.fi/finnano

