Chemical Entrepreneurship - New Business Development in der Industrie

Beispiel Evonik Chemicals

Prof. Michael Dröscher
Head Innovation Management Chemicals

EVONIK INDUSTRIES

Agenda

1. Evonik
2. Basic strategic considerations
3. Core competences are the base of successful businesses
4. Open Innovation builds new business
5. Creavis, Science to Business Center, Project Houses and Internal Start-ups
6. Create an innovative culture

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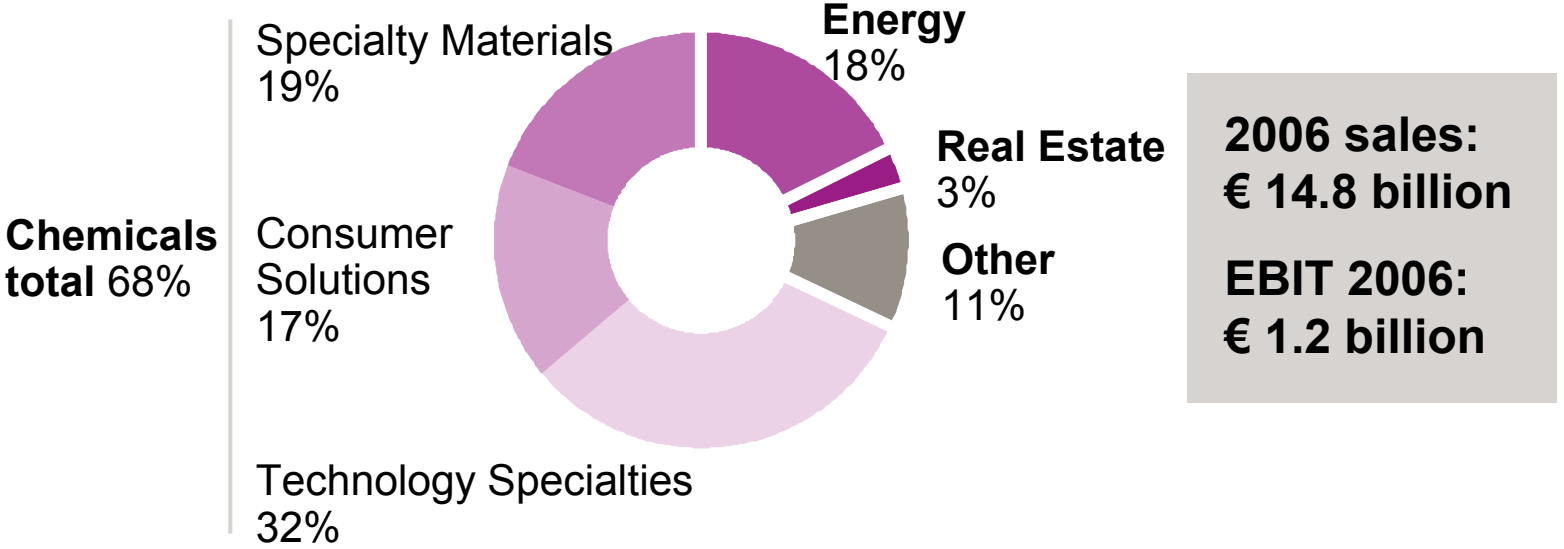
Evonik business areas and sales

Chemicals

Energy

Real Estate

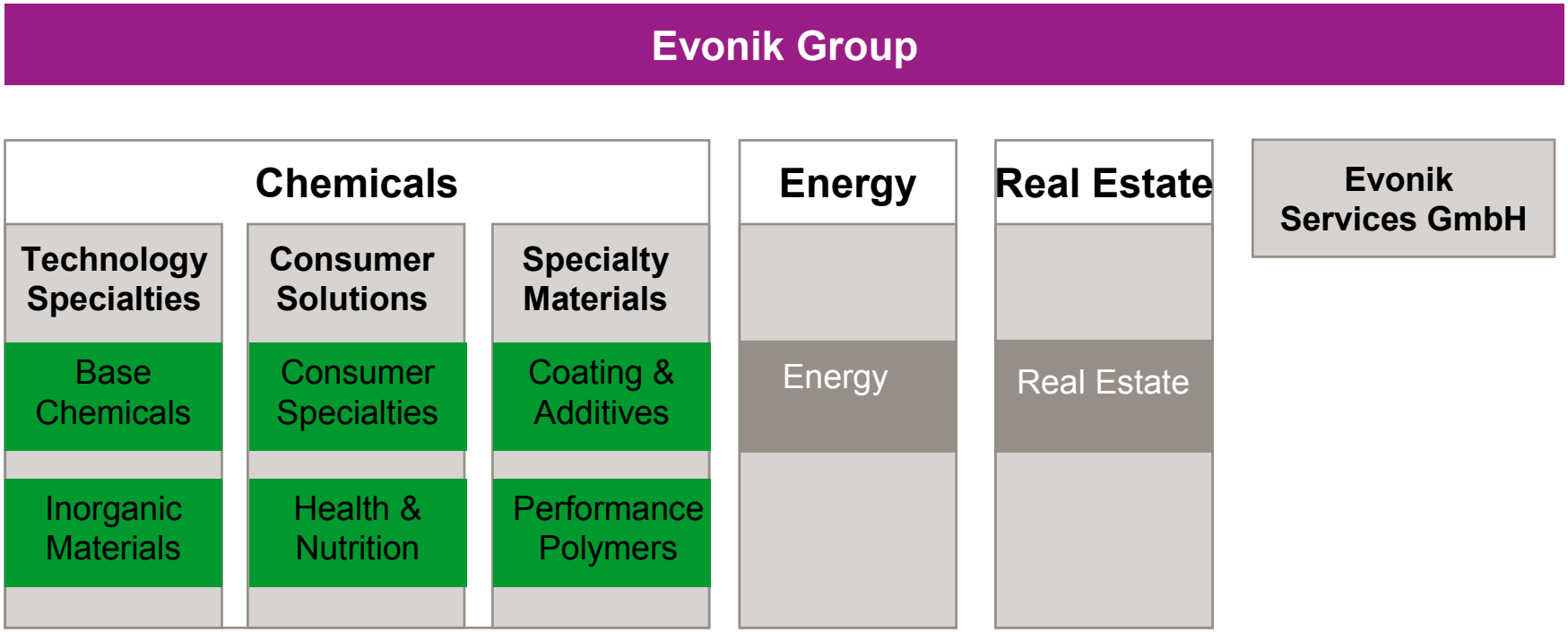


Chemicals total 68%

2006 sales:
€ 14.8 billion

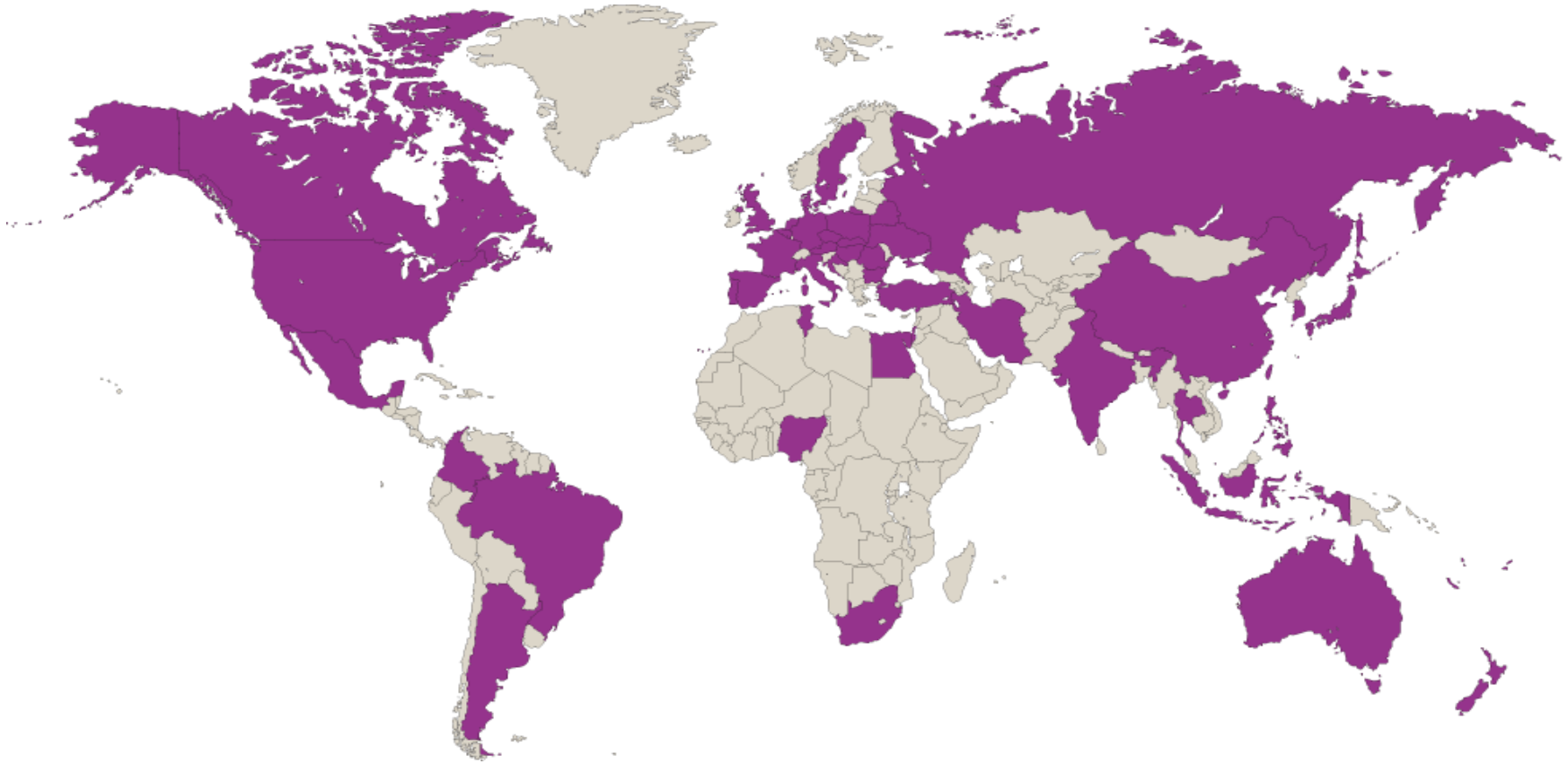
EBIT 2006:
€ 1.2 billion

The business units



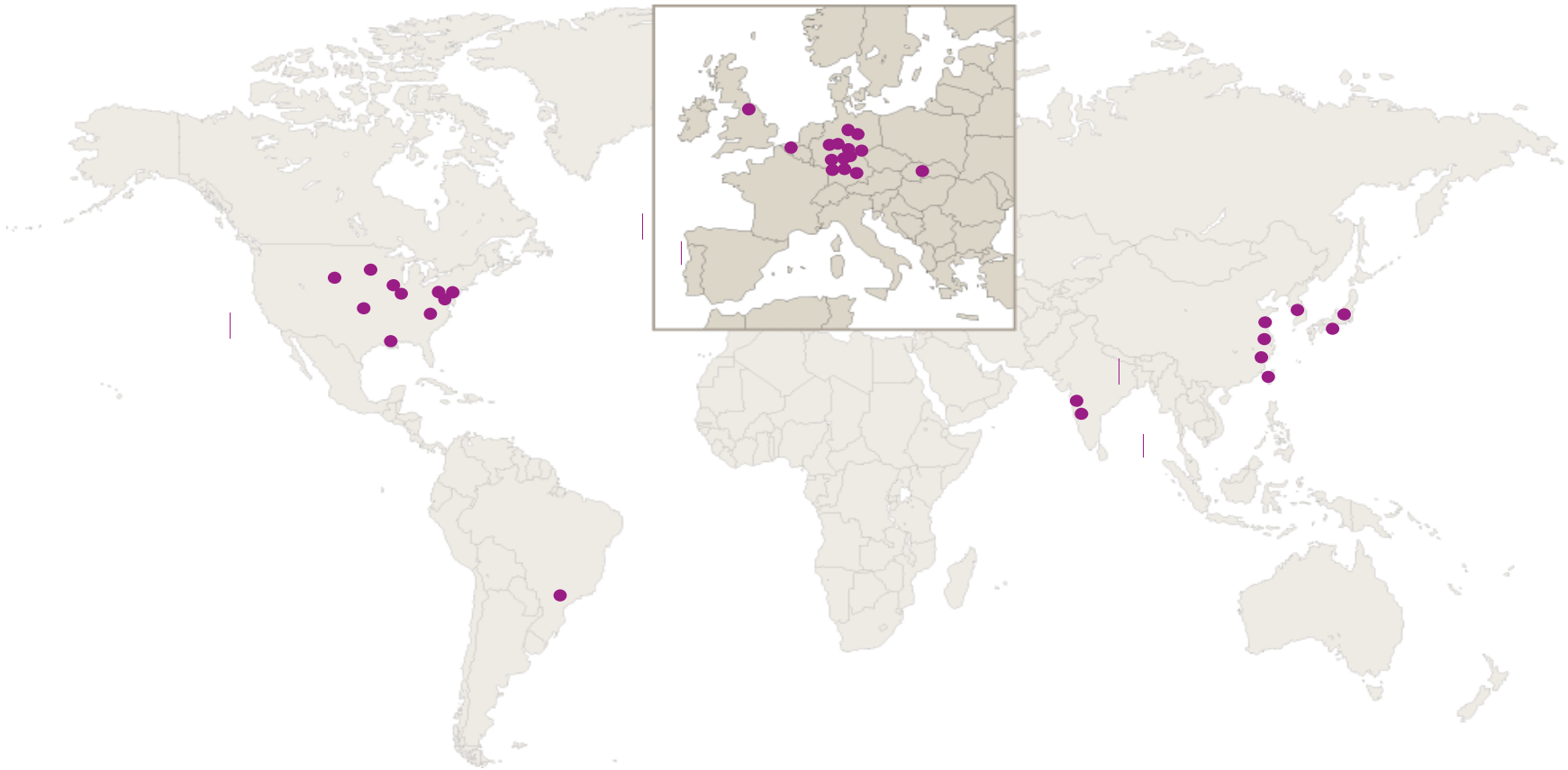
Evonik around the globe

Evonik has production and distribution sites in 52 countries around the globe and operates in more than 100 countries.



Research & Development

Evonik chemical business area operates at 35 sites R&D and tech centers with about 2300 employees
Expenditures for R&D were 304 mio Euro in 2006



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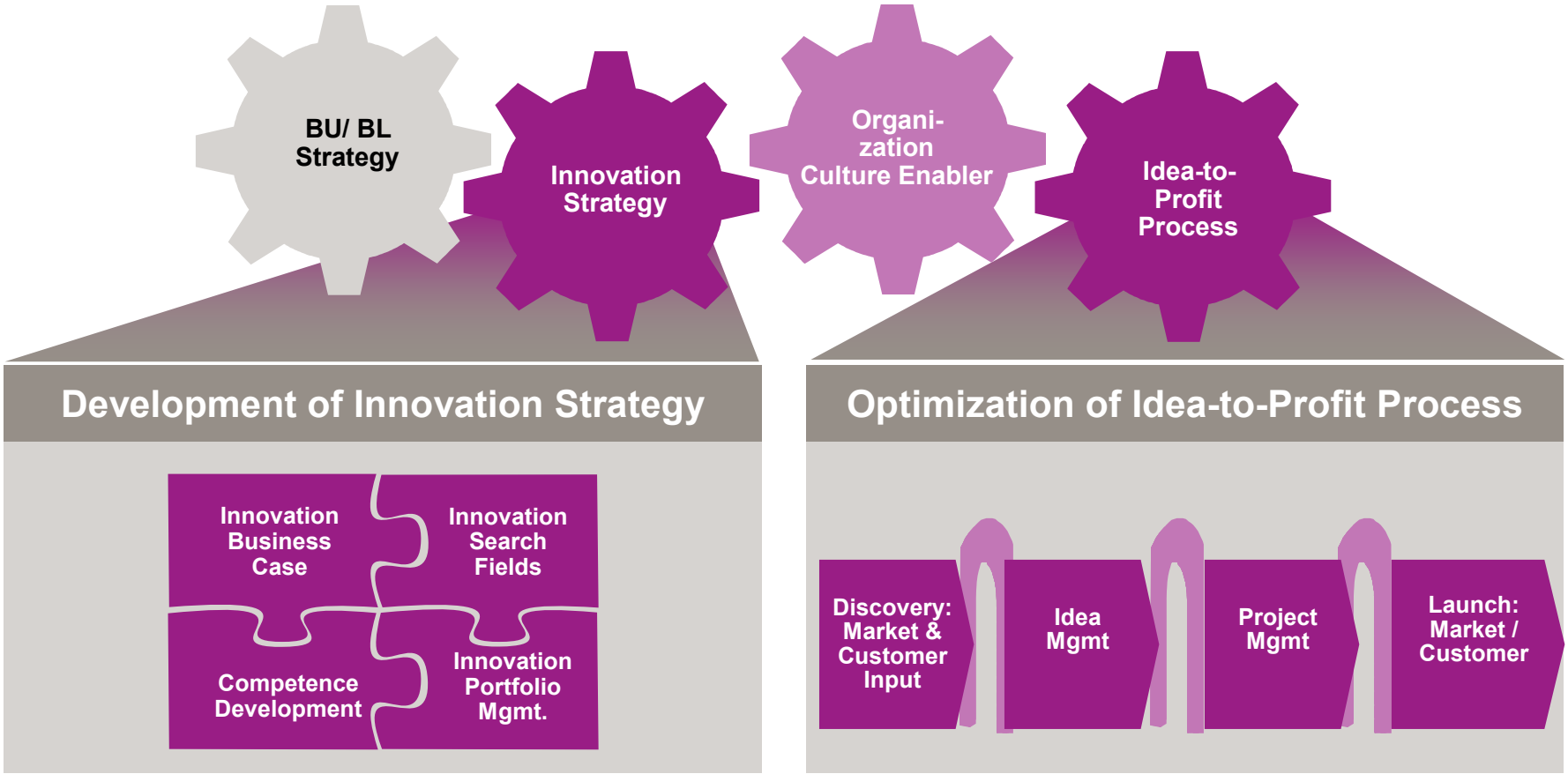
It is a must to ask the right questions today to develop a profitable future!

Horizon year 2017….

- Will business model change and what is the impact on the BU/BLs innovation activities?
- What are the right markets to focus on and how will these markets change in long term future?
- How can evolving customer requirements be better addressed by the businesses?
- Is the right market view taken and what are customer requirements of tomorrow?
- Where must resources be focused on and how could efficiency of BU/BLs be enhanced?

Source: Evonik MSI Academy – Innovation Module (December 2007)

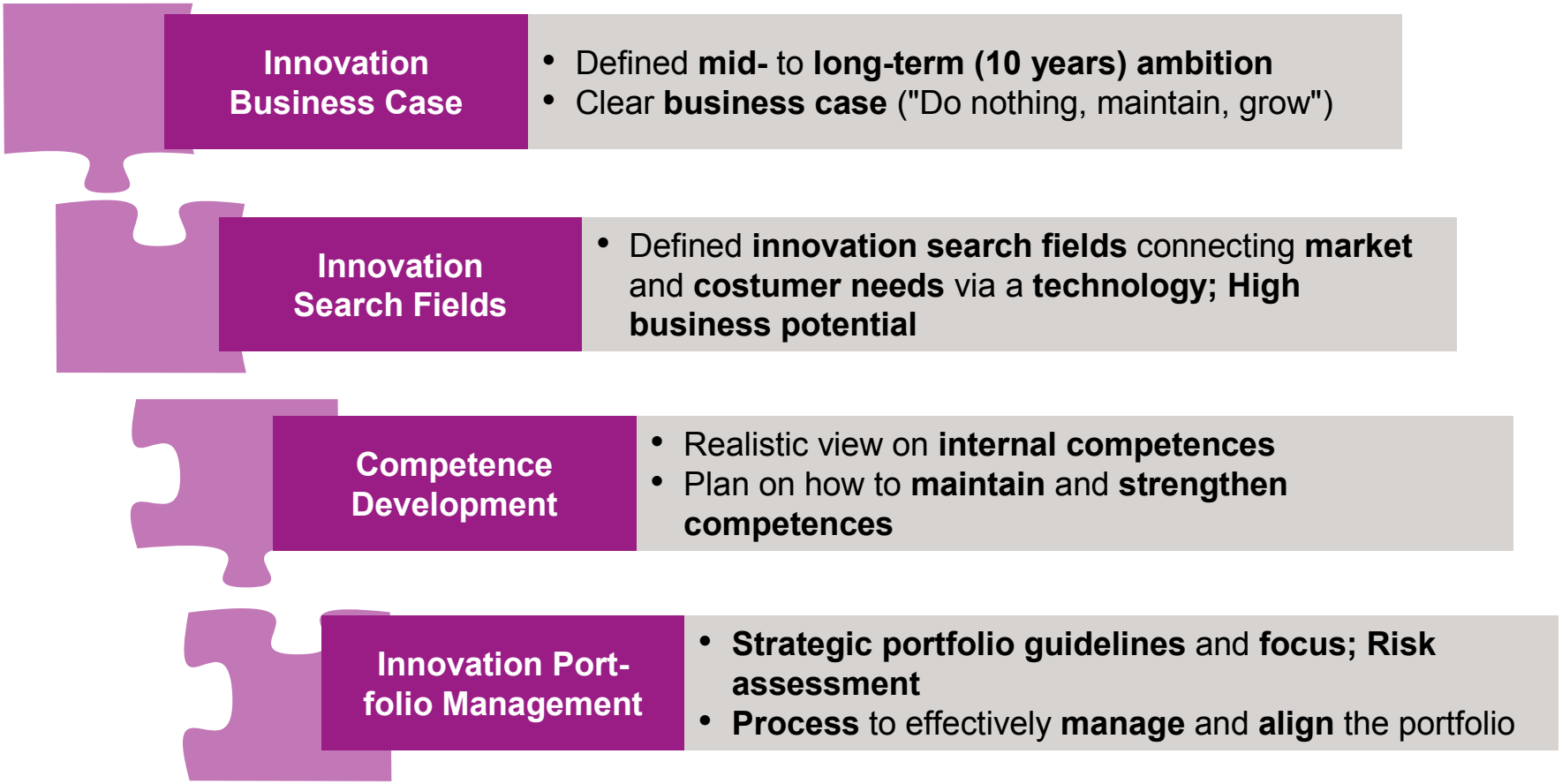
Good innovators drive an advanced innovation management



Source: Evonik MSI Academy – Innovation Module (December 2007)

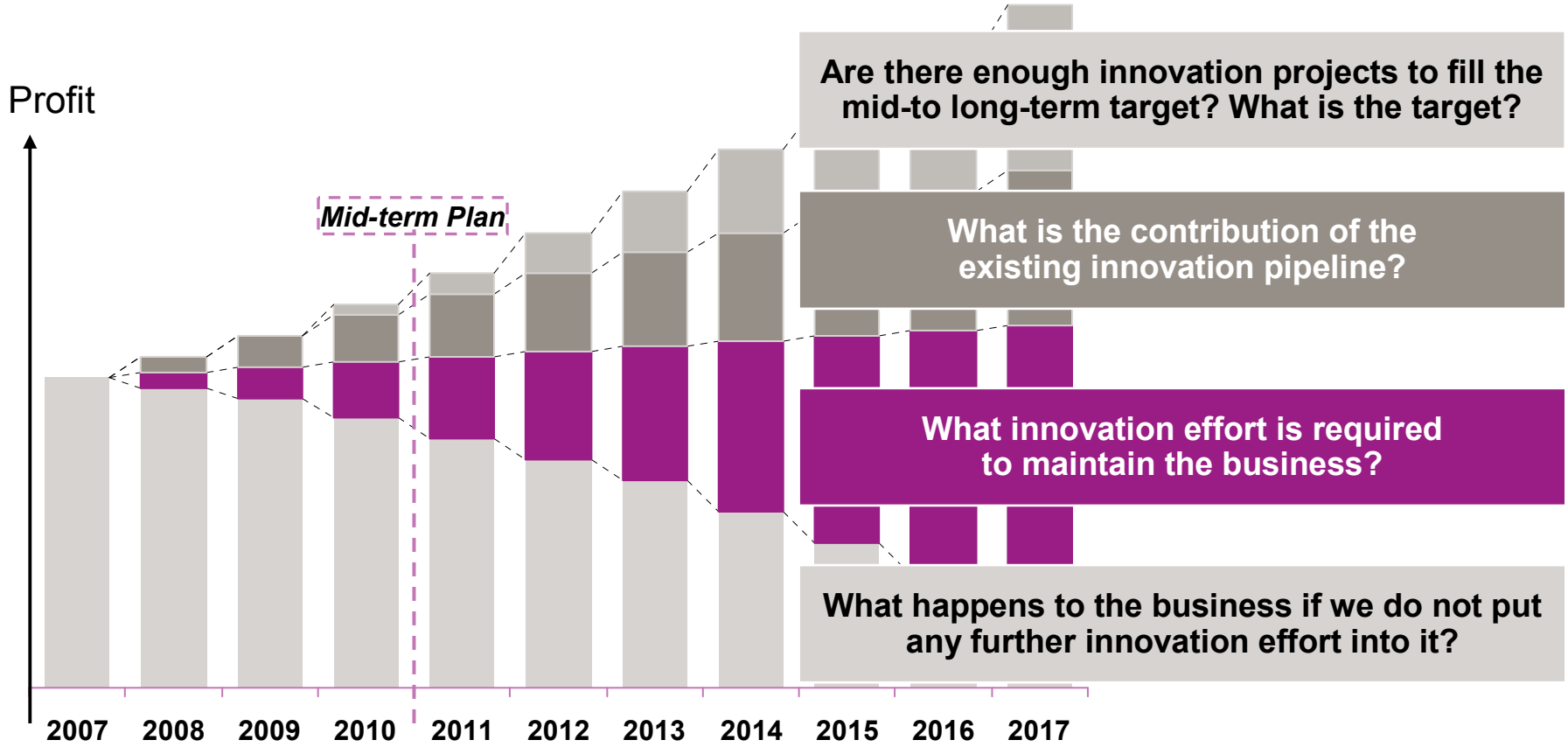
"Good Practice Innovation Strategies" are based on four key elements

Minimum Elements for an Innovation Strategy



Source: Evonik MSI Academy – Innovation Module (December 2007)

Innovation Strategy: Good innovators have answers to their innovation business case

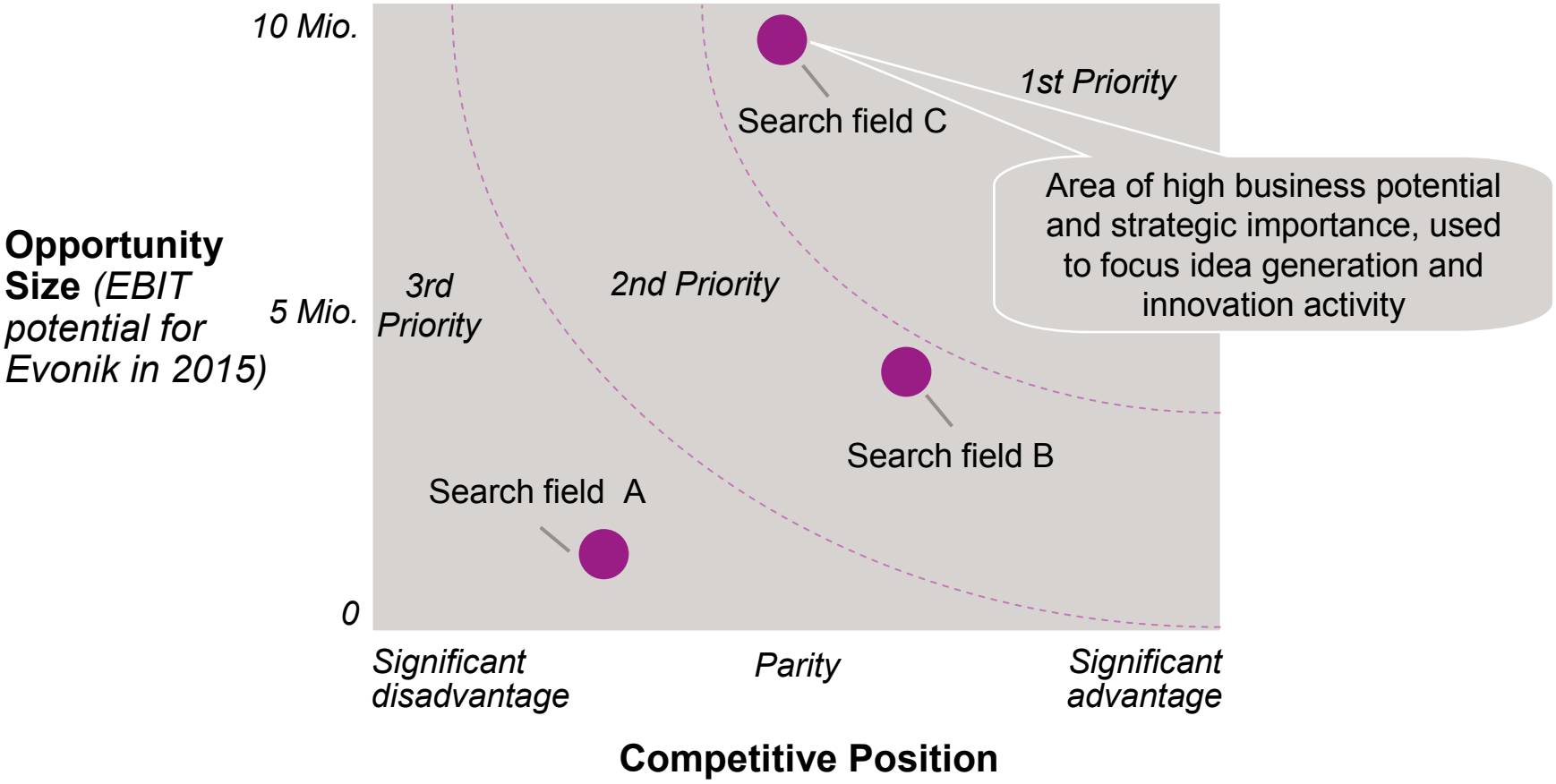


Source: Evonik MSI Academy – Innovation Module (December 2007)

Innovation strategy: Innovation search fields are setting up the strategic frame

Illustrative Industry Results

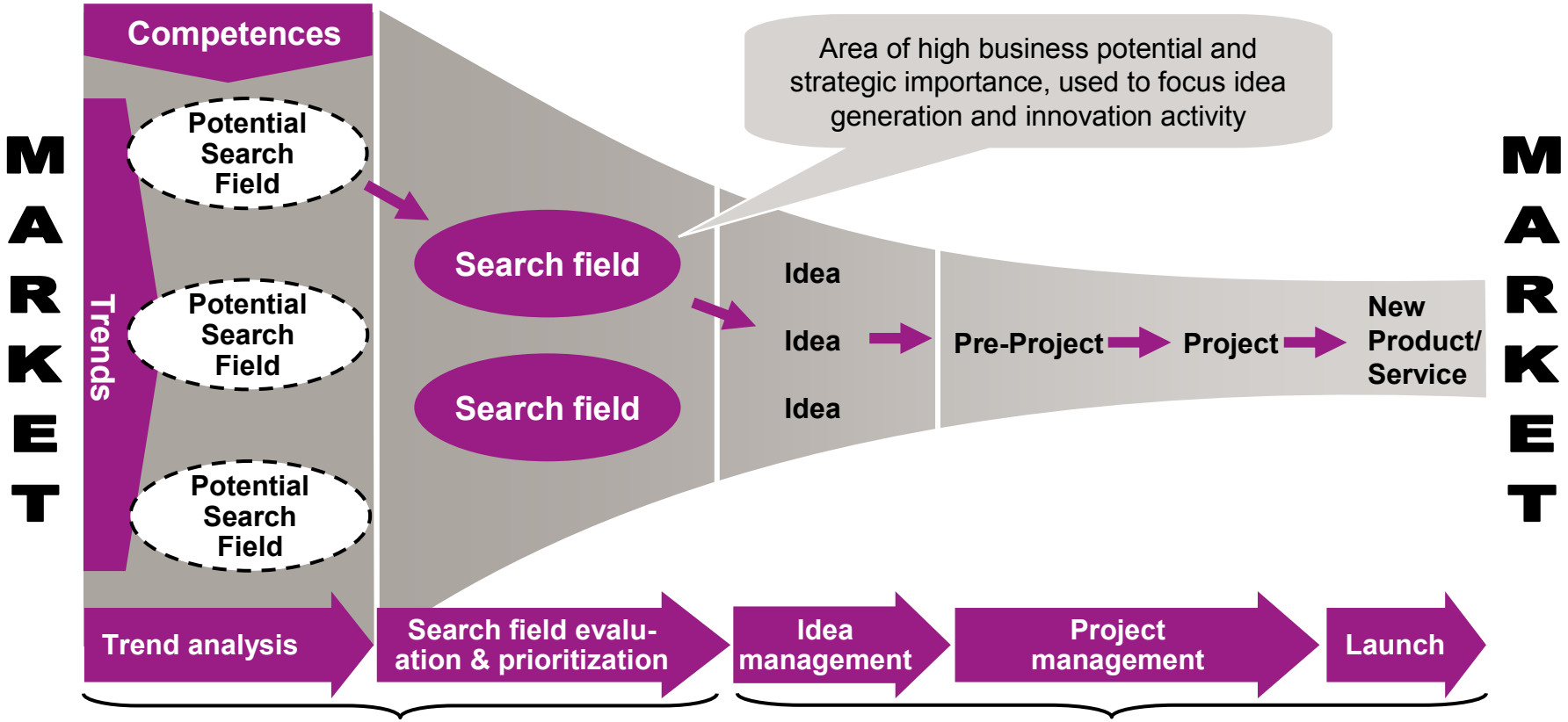
Innovation Search Field Prioritization



Source: Evonik MSI Academy – Module Innovation (September 2007)

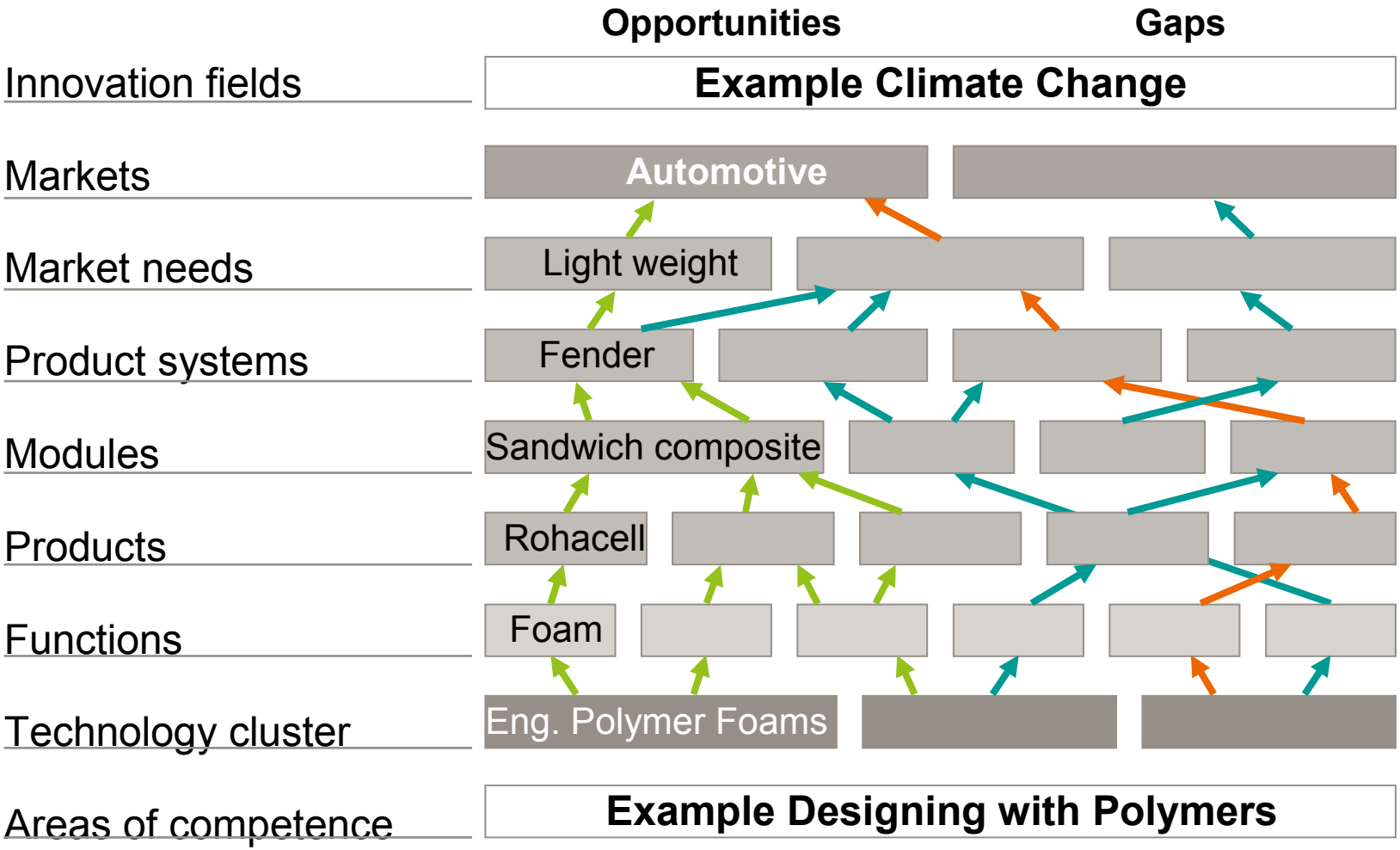
Combine innovation strategy and process – this leads to an advanced innovation mgmt

Advanced Innovation Management from Market to Market



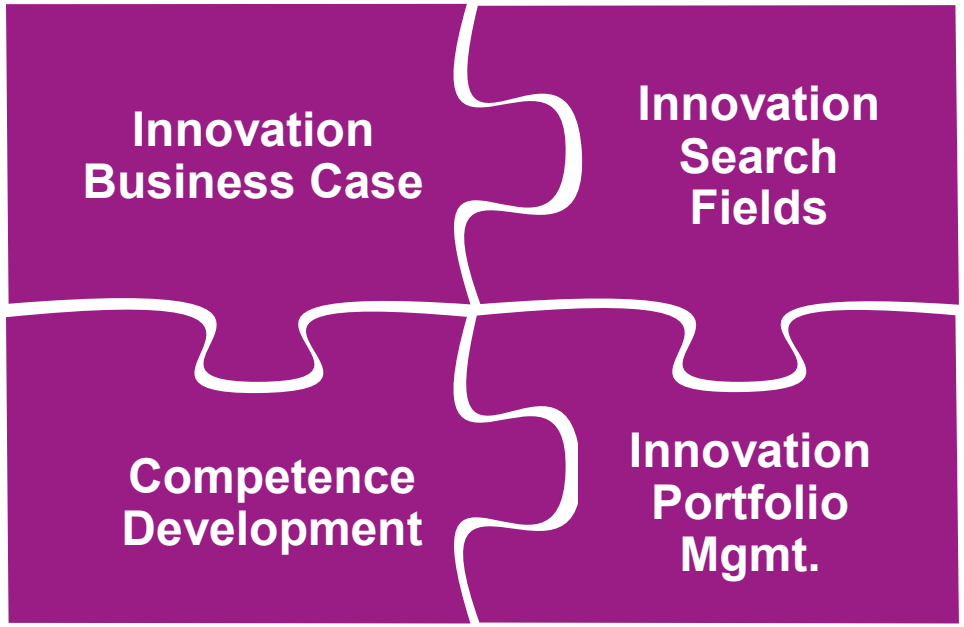
Source: Evonik MSI Academy – Innovation Module (December2007)

Innovation strategy: Competences open opportunities, but there are also gaps to fill…

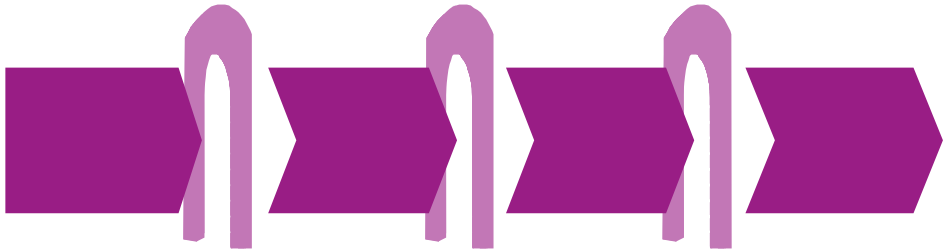


To summarize:
Key success factors in innovation management are...

best practice innovation strategy



best practice Idea-to-Profit Process



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Definition of Core Competence

"A Core Competence is a bundle of skills and technologies that enable a company to provide a particular benefit to customers. It is a well-performed internal activity that is central (not peripheral or incidental) to a company's competitiveness and profitability".

Hamel & Prahalad (1994)

"Competing for the Future"

Competence Management: Our objectives

Profiling Evonik to differentiate from competitors

Guiding Strategy to create strength and opportunities for growth and value creation

Identifying business opportunities

Creating solutions

Core Competences:
The roots of new business

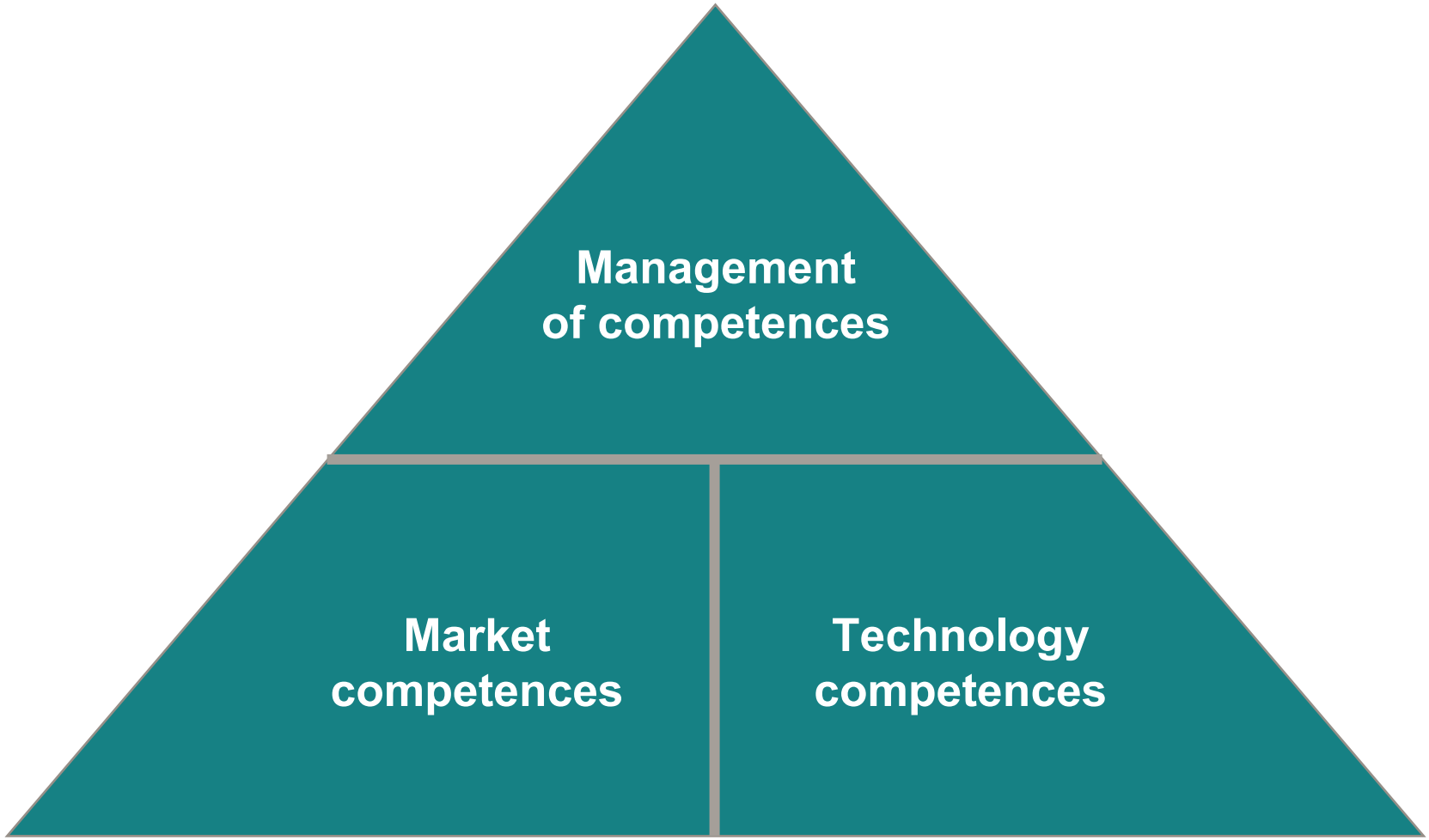
Leaves
Products

Branches
Business Lines

Trunks
Core Product Groups

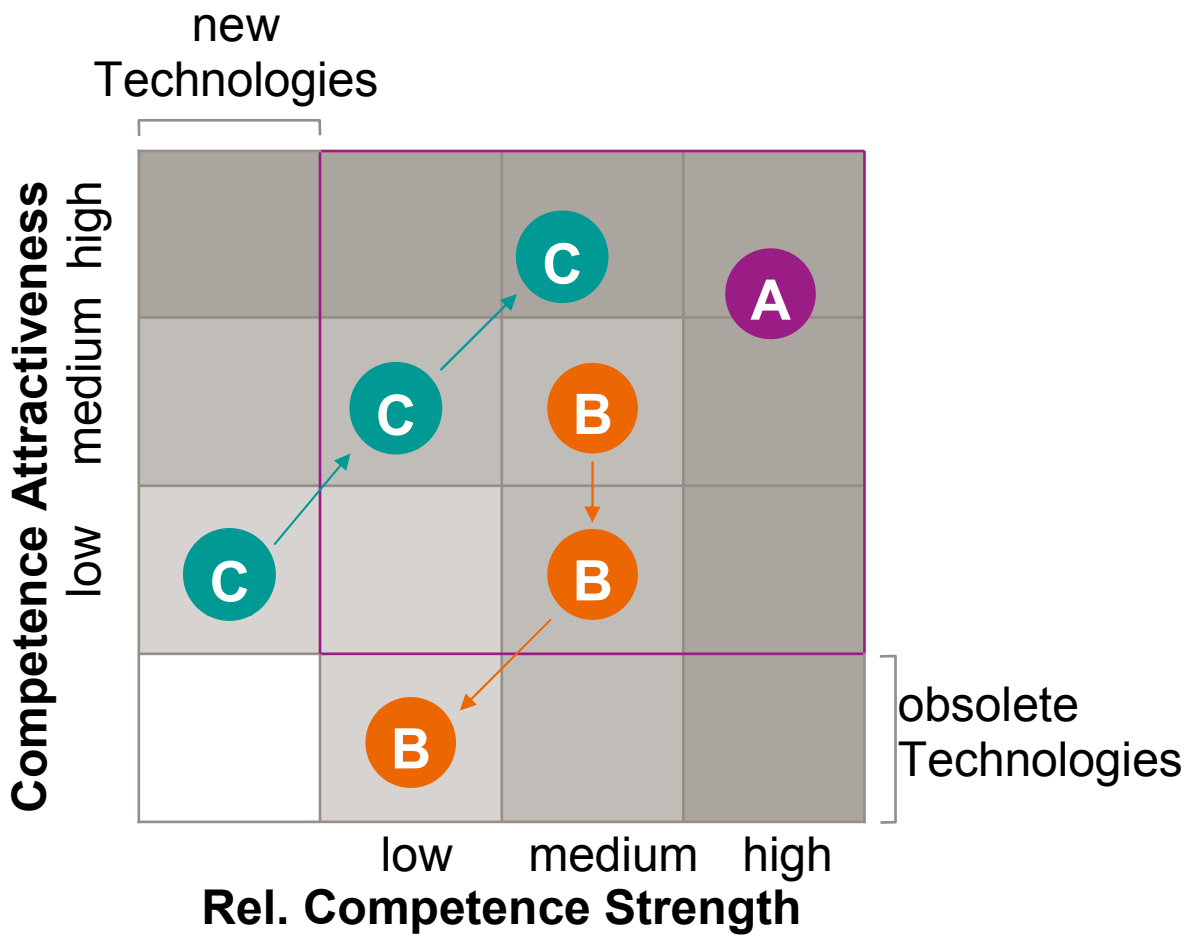
Roots
Core Competences

Competence Management: A cross functional approach

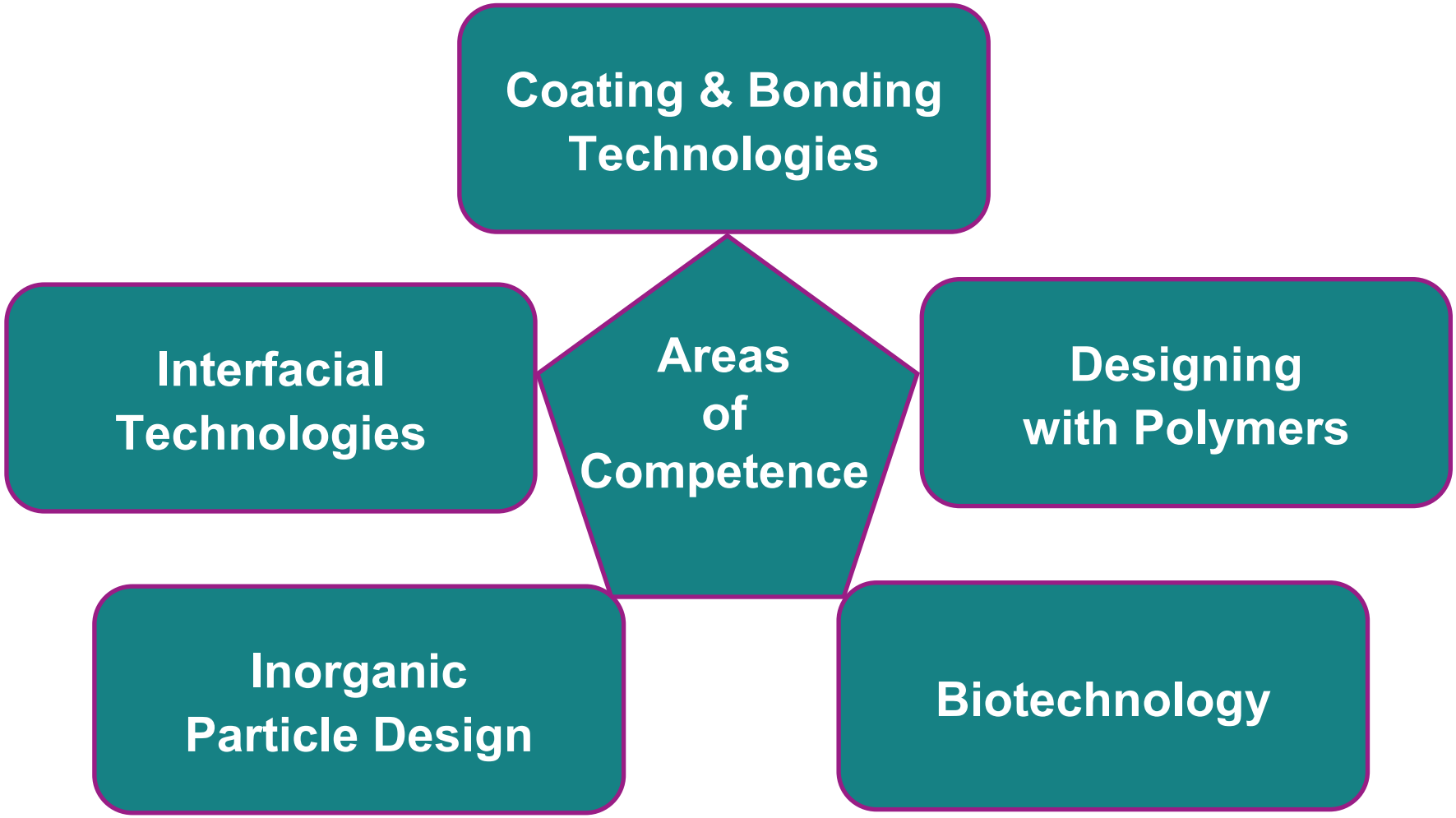


Competence portfolios are dynamic

Some competences get more important, others obsolete



Evonik Chemicals' Areas of Competence (AoC)



Example Coating & Bonding Techn. Applications for lightfast polyurethanes

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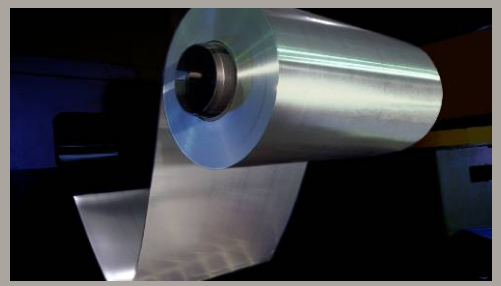
Large-Vehicle Coatings

Automotive Coatings

Aviation Coatings

Coil-Coating



Automotive Interiors

Plastic Finishes

Example Interfacial Technologies
Encapsulation technology creates value in different markets

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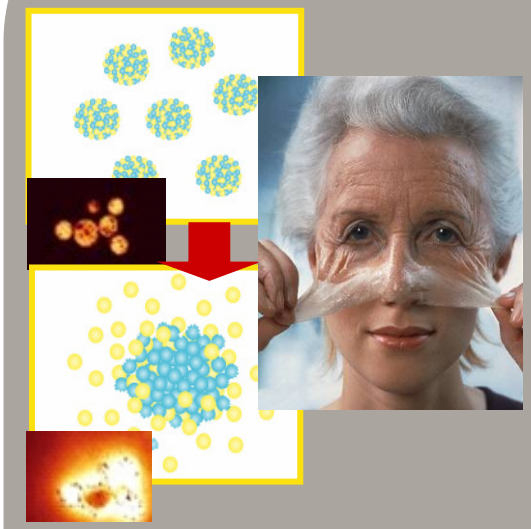
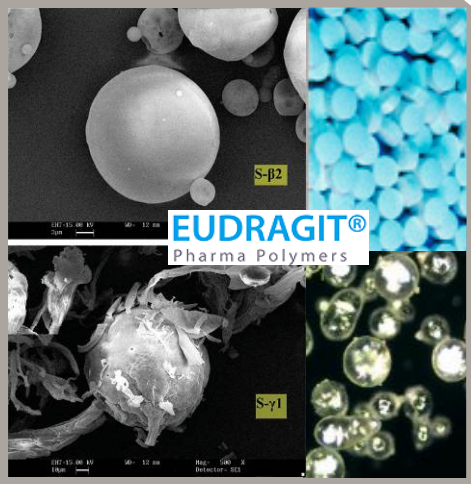


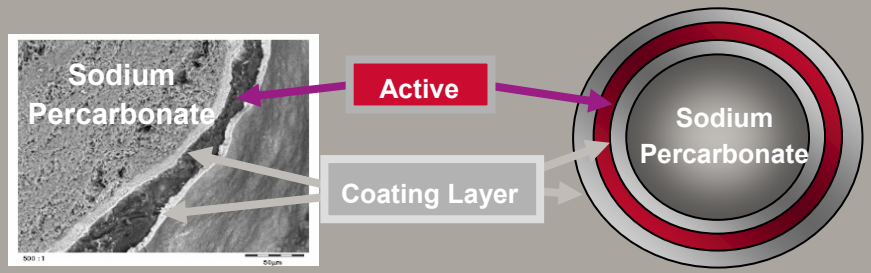
Actives for Cosmetics

Eudragit® not only for Pharma



Encapsulation

Bleaching agents for laundry / dish-wash



Example Inorganic Particle Design Evonik Chemicals' manufacturing capabilities for nanoparticles

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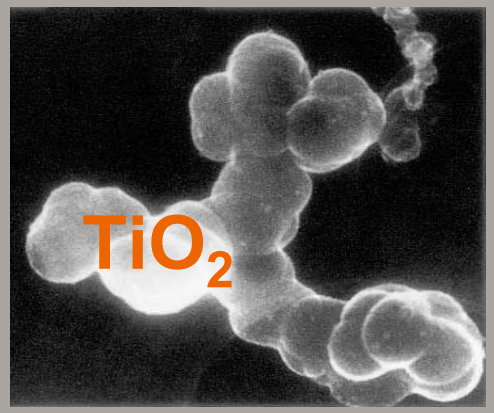

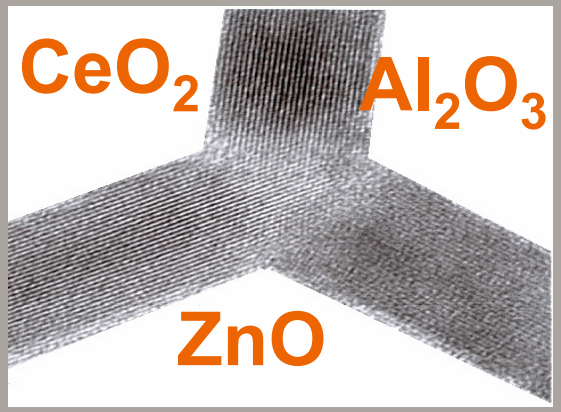

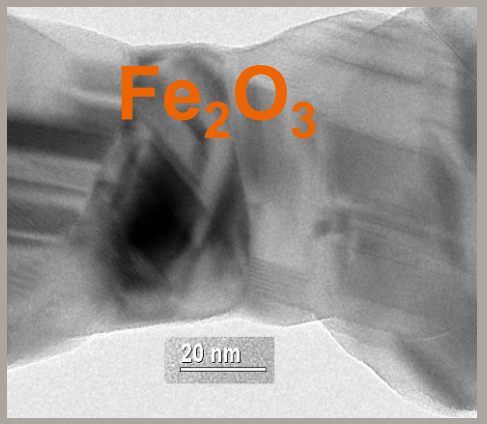

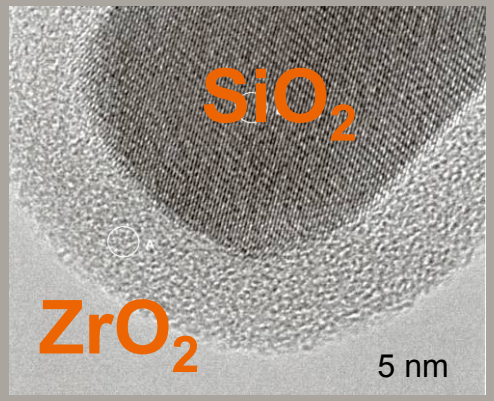

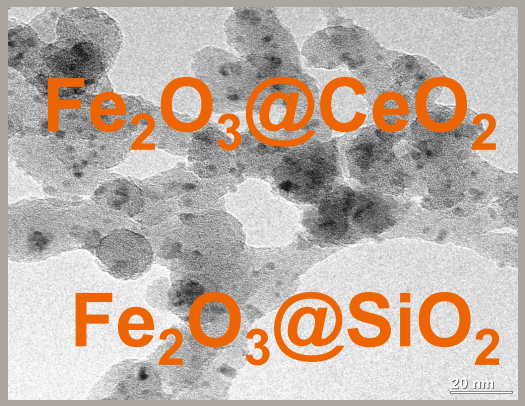

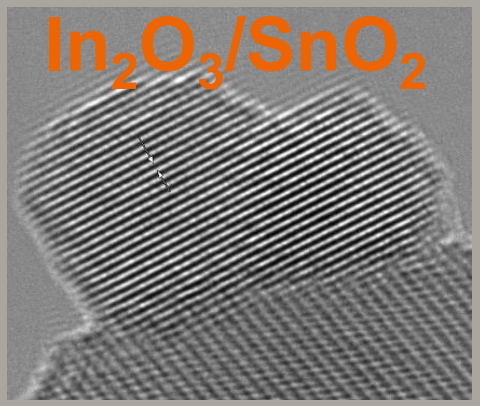

Inorganic Particles: a plethora of applications …..

- **Zinc Oxide**: for the protection of UV-sensitive materials
- **Indium Tin Oxide**: for transparent and antistatic coatings, or IR absorption
- **MagSilica®**: heating and curing polymeric materials from the inside
- **Fumed Zirconia**: for technical ceramics and wear protection

Example Biotechnology Evonik Chemicals' products by fermentation

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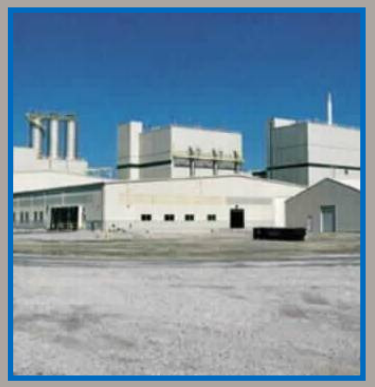
Products:

- L-Lysine
- L-Threonine
- L-Tryptophane
- L-Valine
- L-Isoleucine
- L-Proline

- Sphingolipids



Example Biotechnology
Evonik Chemicals'
Products by Biocatalysis

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Products

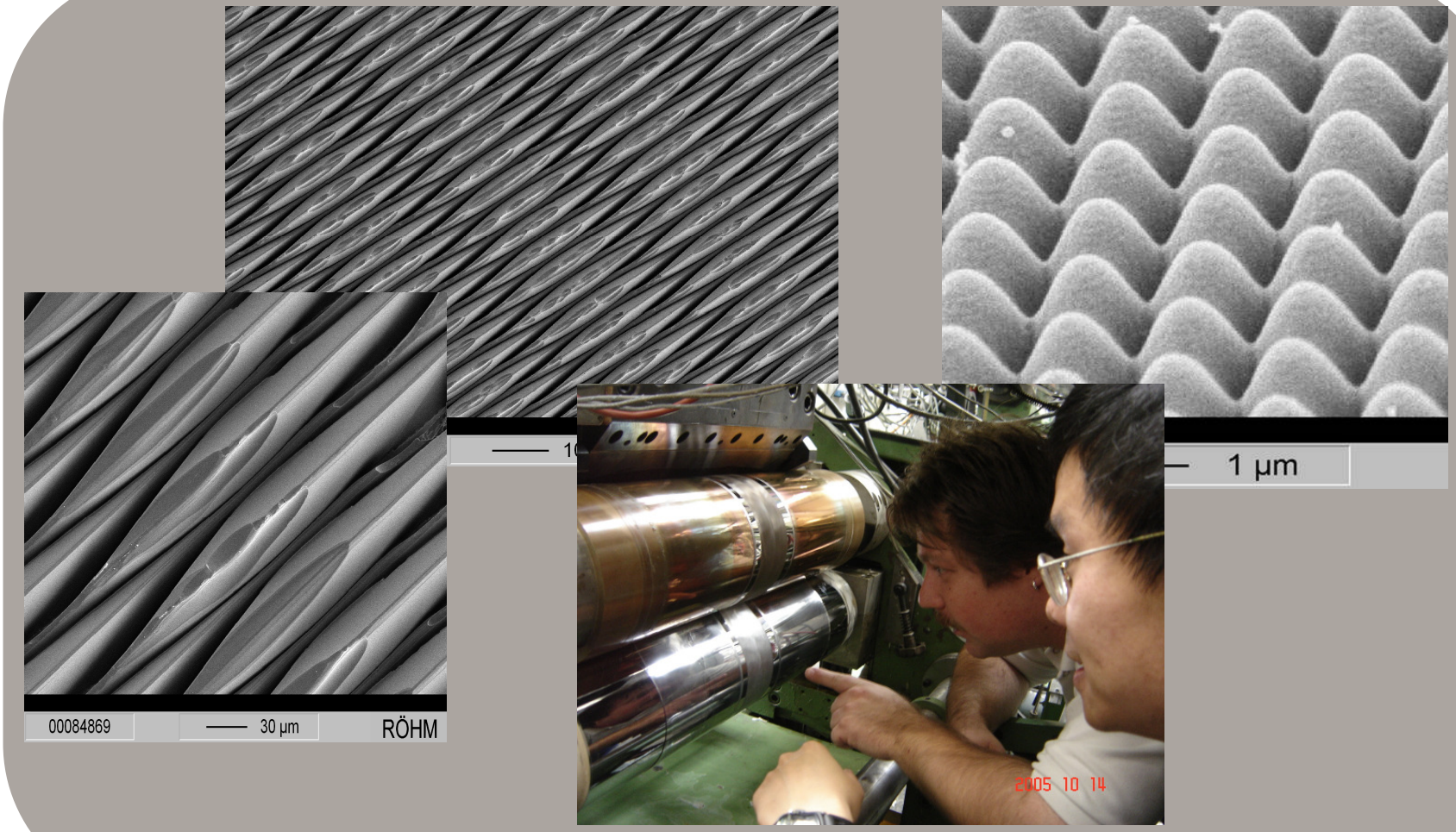
- L-Methionine
- L-tert-Leucine
- L-Aspartic Acid
- L-Alanine

- Chiral Alcohols
- -Amino Acids
- Pharma Intermediates

- Lipases
- Emmolient Esters

- Acrylamide

Example Designing with Polymers Surface Structured Polymer Sheets and Films via Extrusion Processes



Surface Structured Polymer Sheets and Films with Moth-eye Effect

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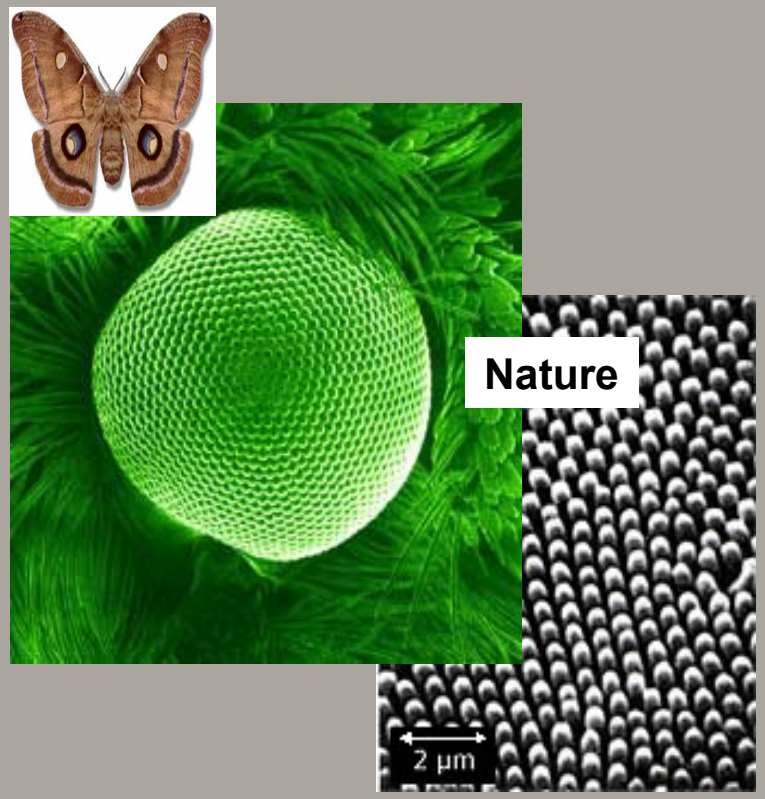
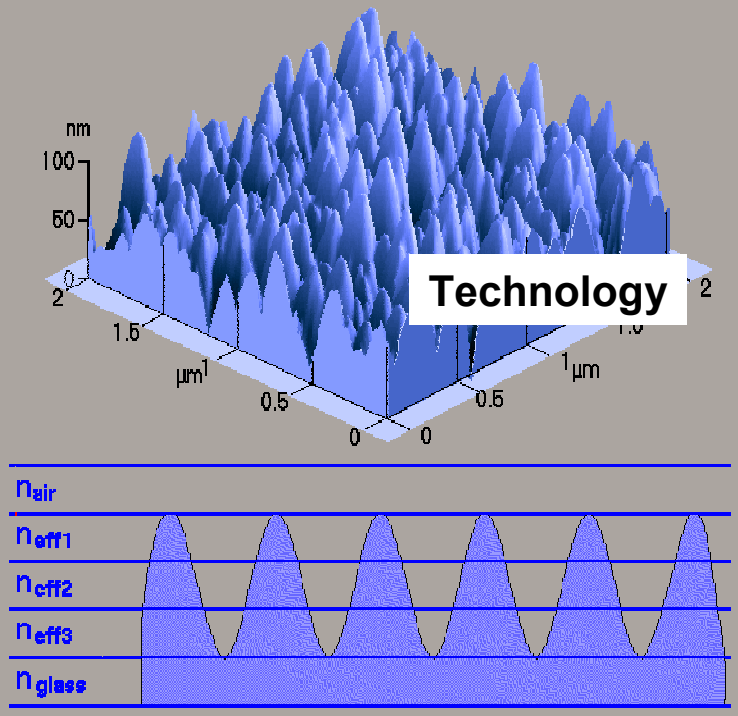
Micro- & Nanostructured Surfaces or „How to Learn from Nature“





Competences

Deep and healthy competence roots make a strong tree

Thus, roots have to be nurtured and must always grow with the tree

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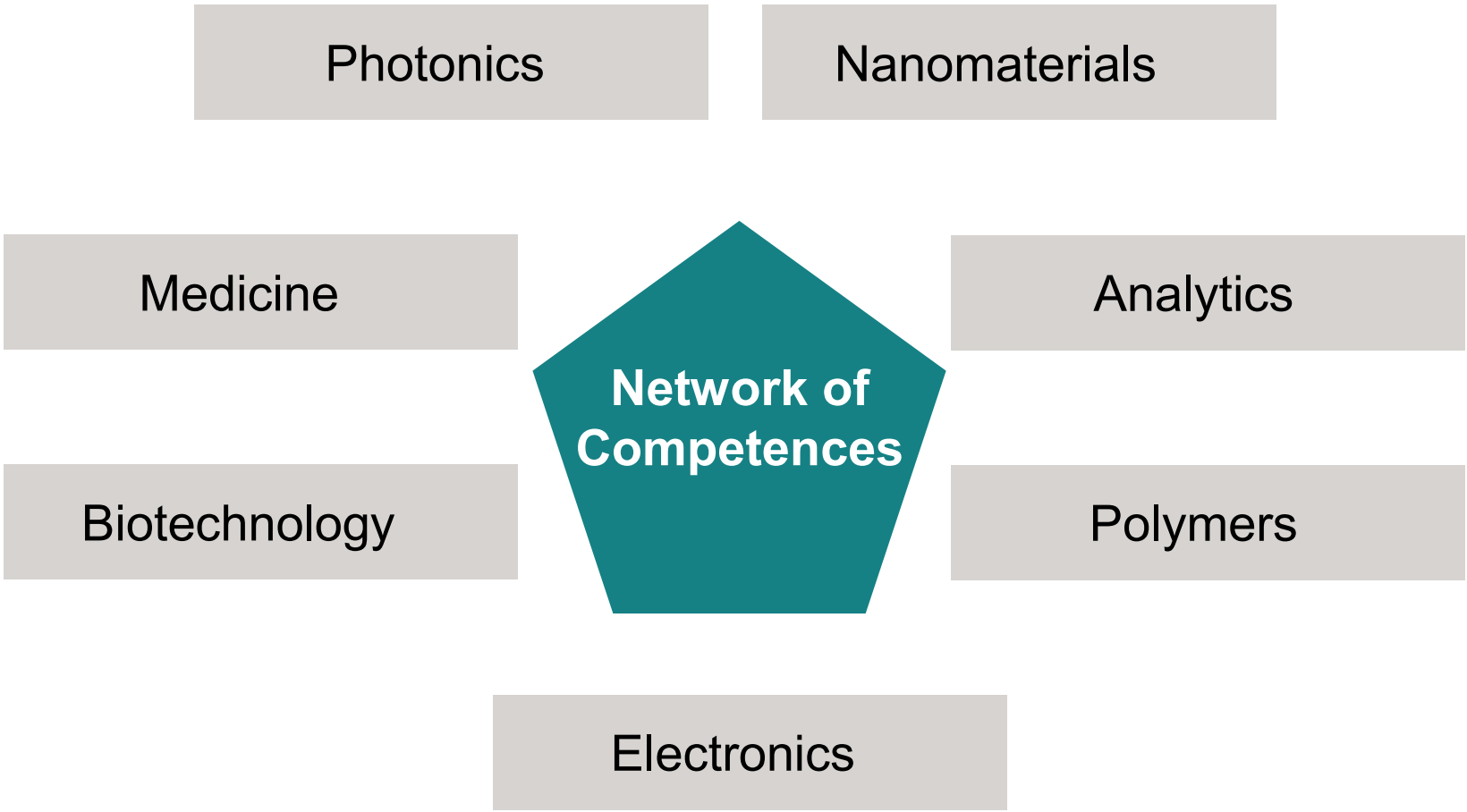
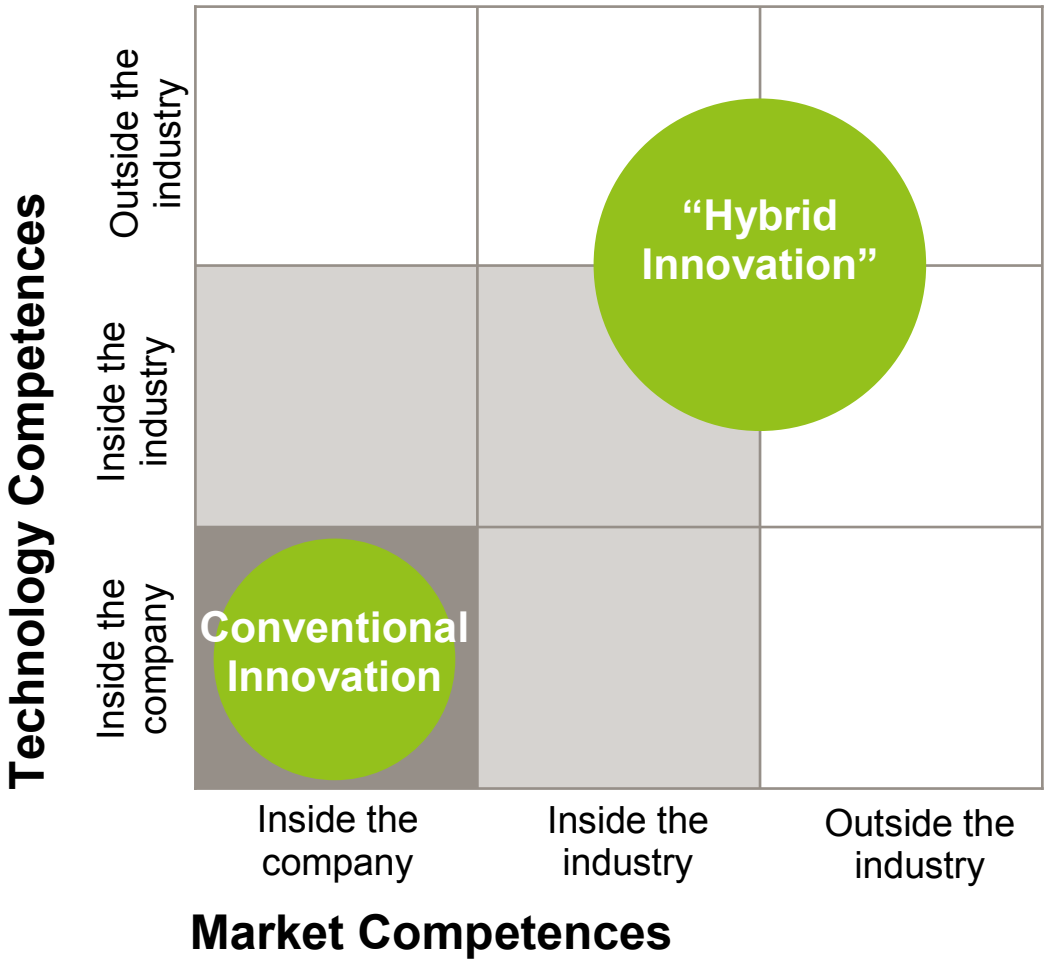
Today breakthrough innovations happen at interfaces



Convergent industries: No company has all competences

Example: Nanotronics



Convergence of Nanotechnology + Electronics
= **„Hybrid Innovation“**

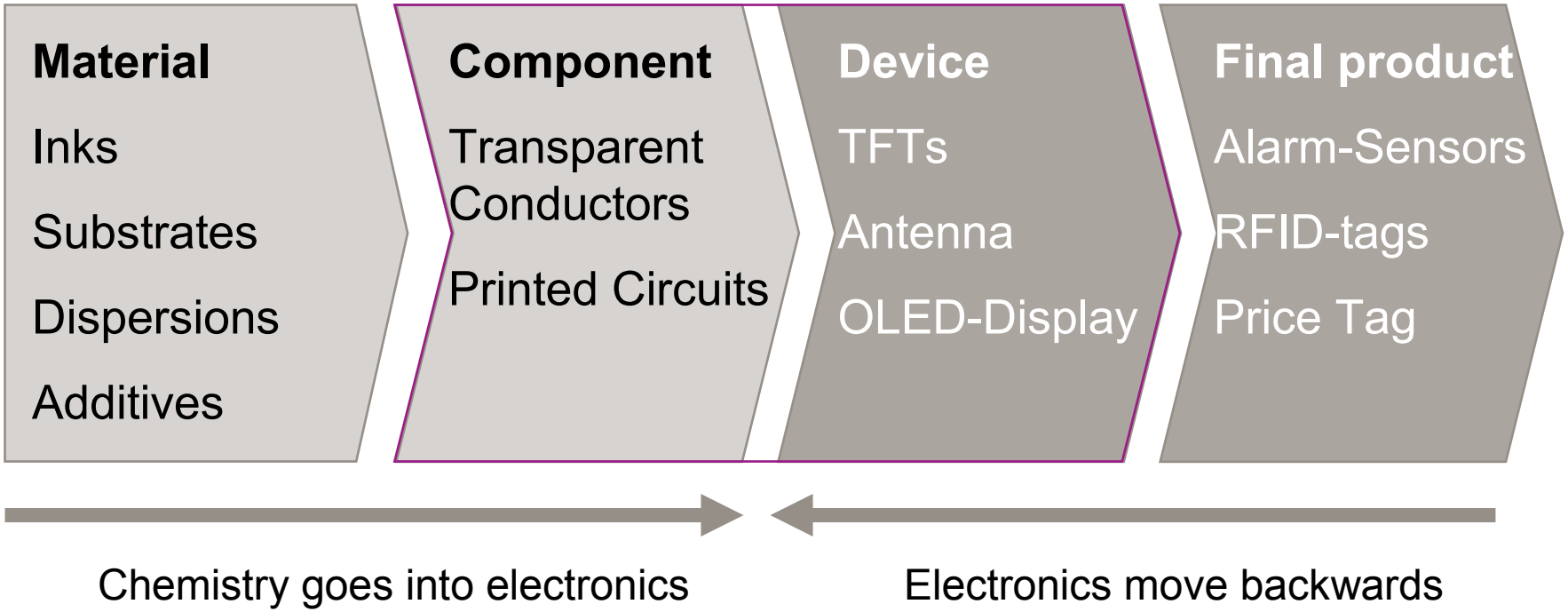
Material companies benefit from:

- materials competence
- printing competence
- …

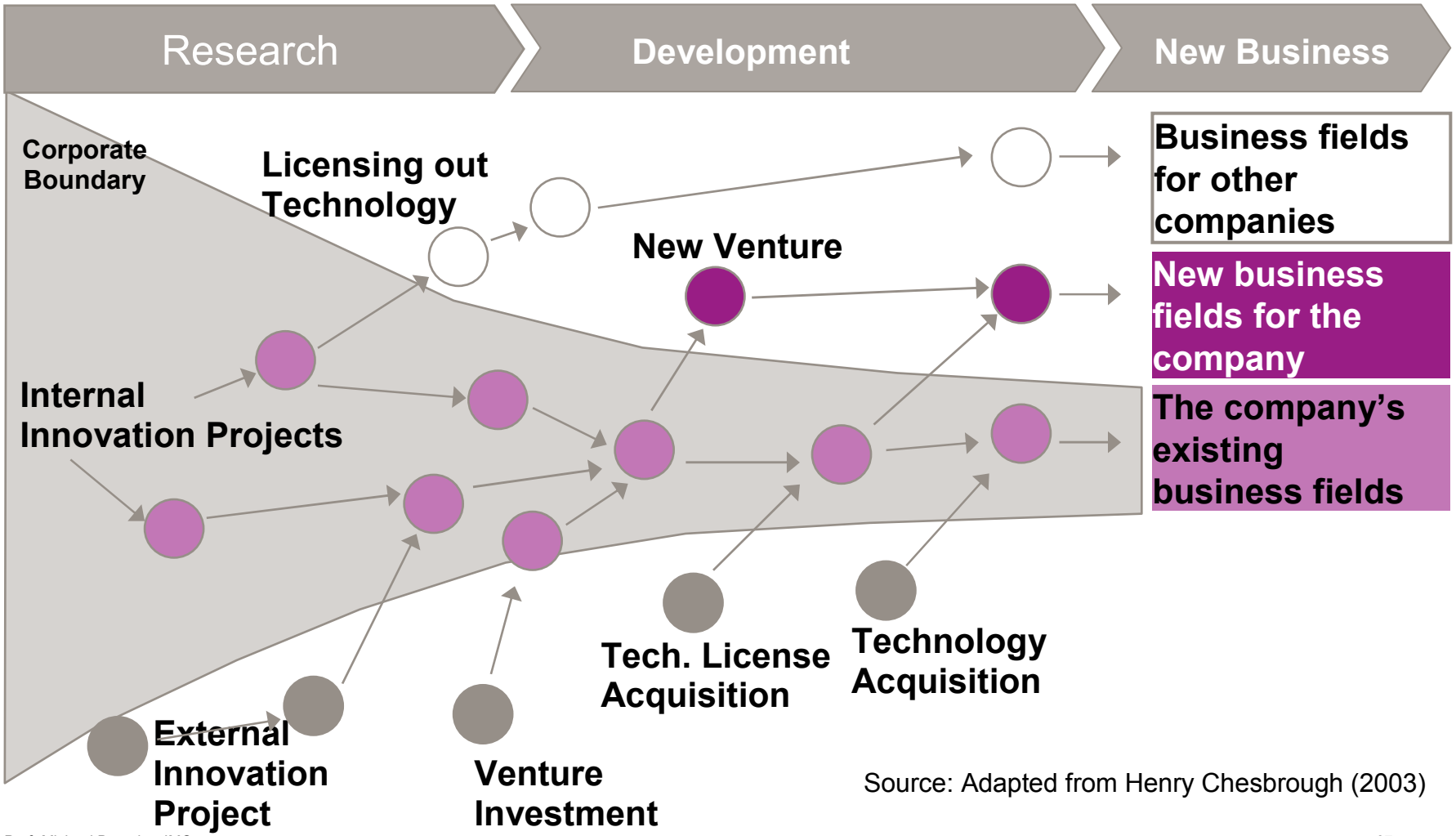
But face competence gaps regarding:

- market competencies
- system knowledge

Open Innovation: An answer to converging value chains



Open Innovation: Integration of internal and external competences



Source: Adapted from Henry Chesbrough (2003)

Open Innovation needs Private Public Partnerships

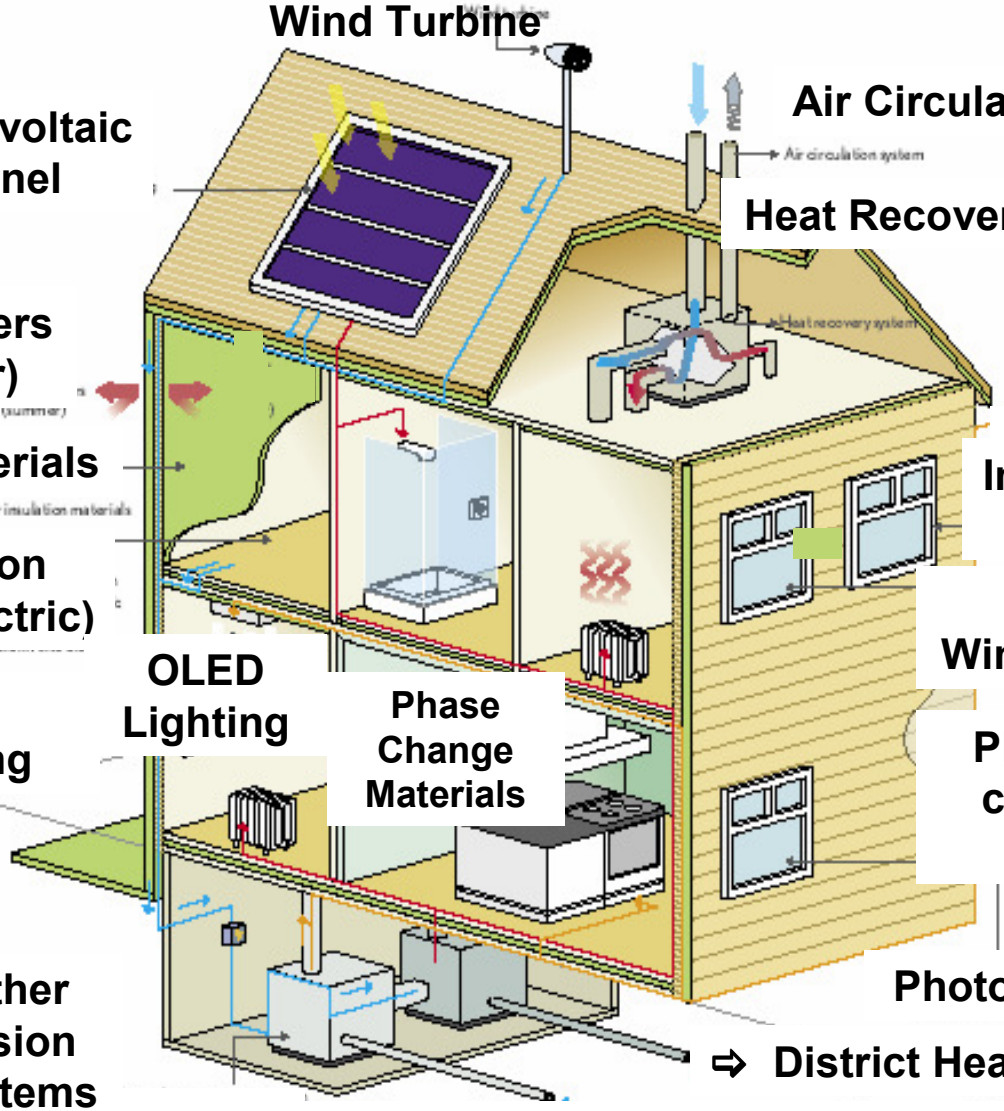
Example 7th Framework Programme of the EU for a more competitive European Industry …

… the technology platform SusChem is the initiative to give (bio) chemical research a higher priority, started by industry and academia with a strong backing from the European Commission

Smart Energy Home

SusChem
European Technology Platform For
SUSTAINABLE CHEMISTRY

EVONIK INDUSTRIES



Wind Turbine

Photovoltaic Panel

Air Circulation System

Heat Recovery System

⇨ Electrical Grid

Radiant Heat Barriers (Summer / Winter)

New Insulation Materials

Improved Window Insulation

Energy Transformation Systems (kinetic ⇨ electric)

Self-cleaning Windows &Coatings

OLED Lighting

Phase Change Materials

Sensors for Lighting & Heating

PhotovoltaicSelf-cleaning Facade Paints

Photovoltaic Windows

Fuel Cells or other Energy Conversion and Storage Systems

⇨ District Heating

Hydrogen or other Energy Supply

Source: SusChem SRA

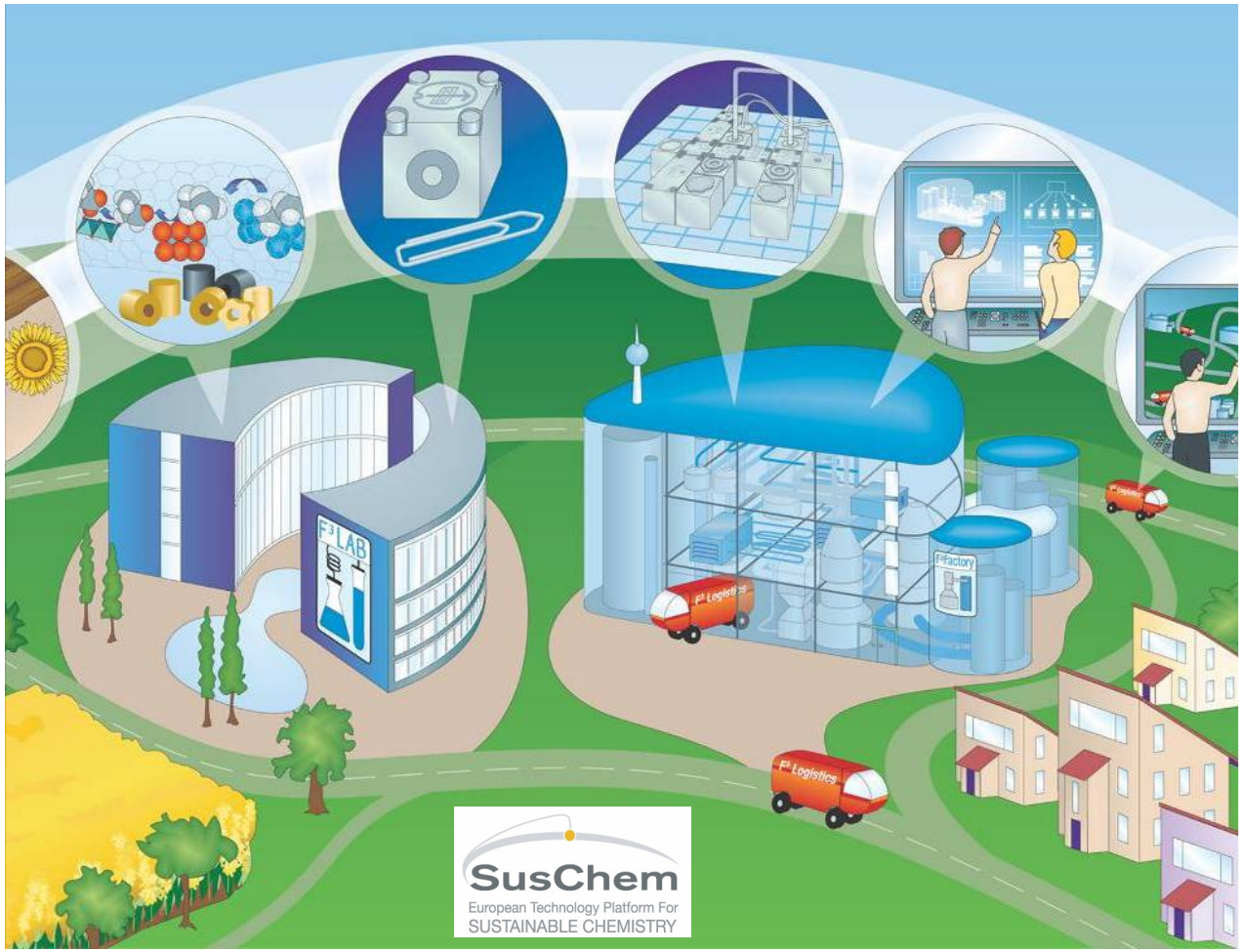
F³ Factory: Fast, Future, Flexible Technology driven development

Including

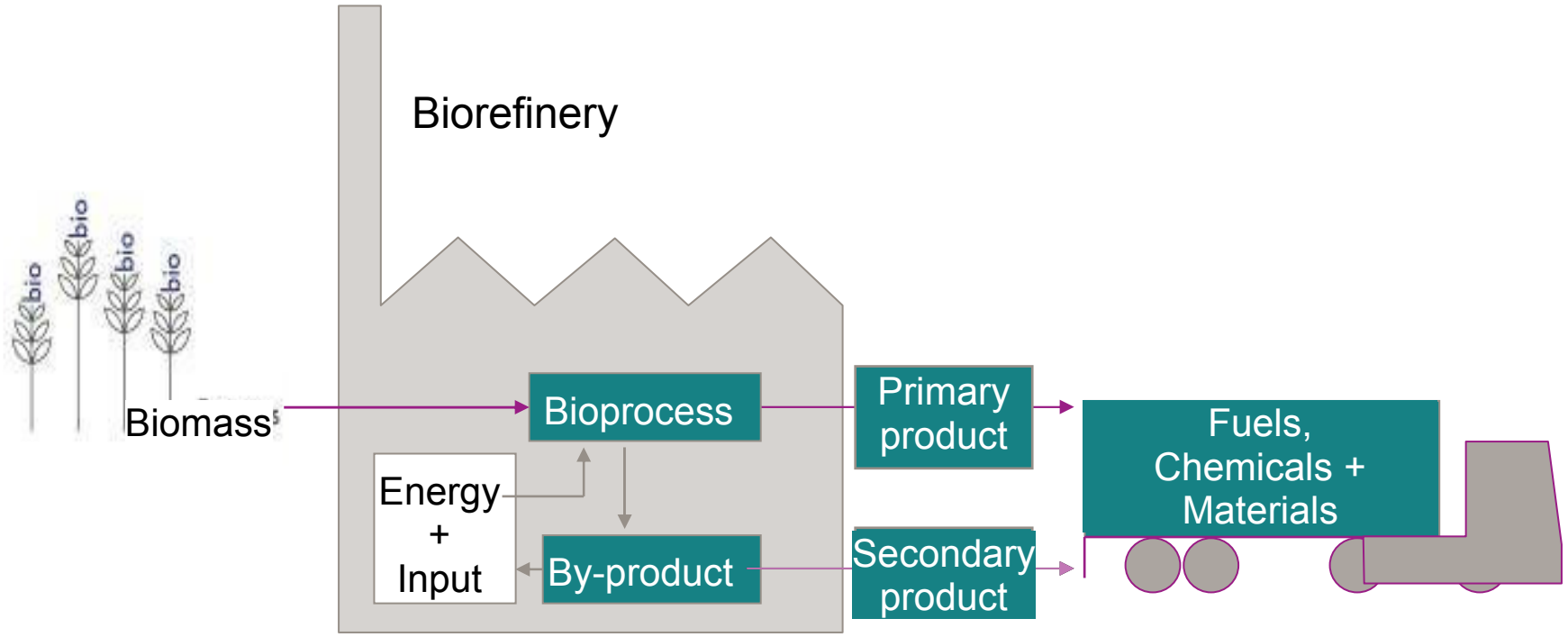
- Environmentally benign processes
- Modular production
- Integrated logistics

High relevance for future production in Europe

Status: Concept phase



SusChem: Biorefineries will produce the base materials for bio-based products



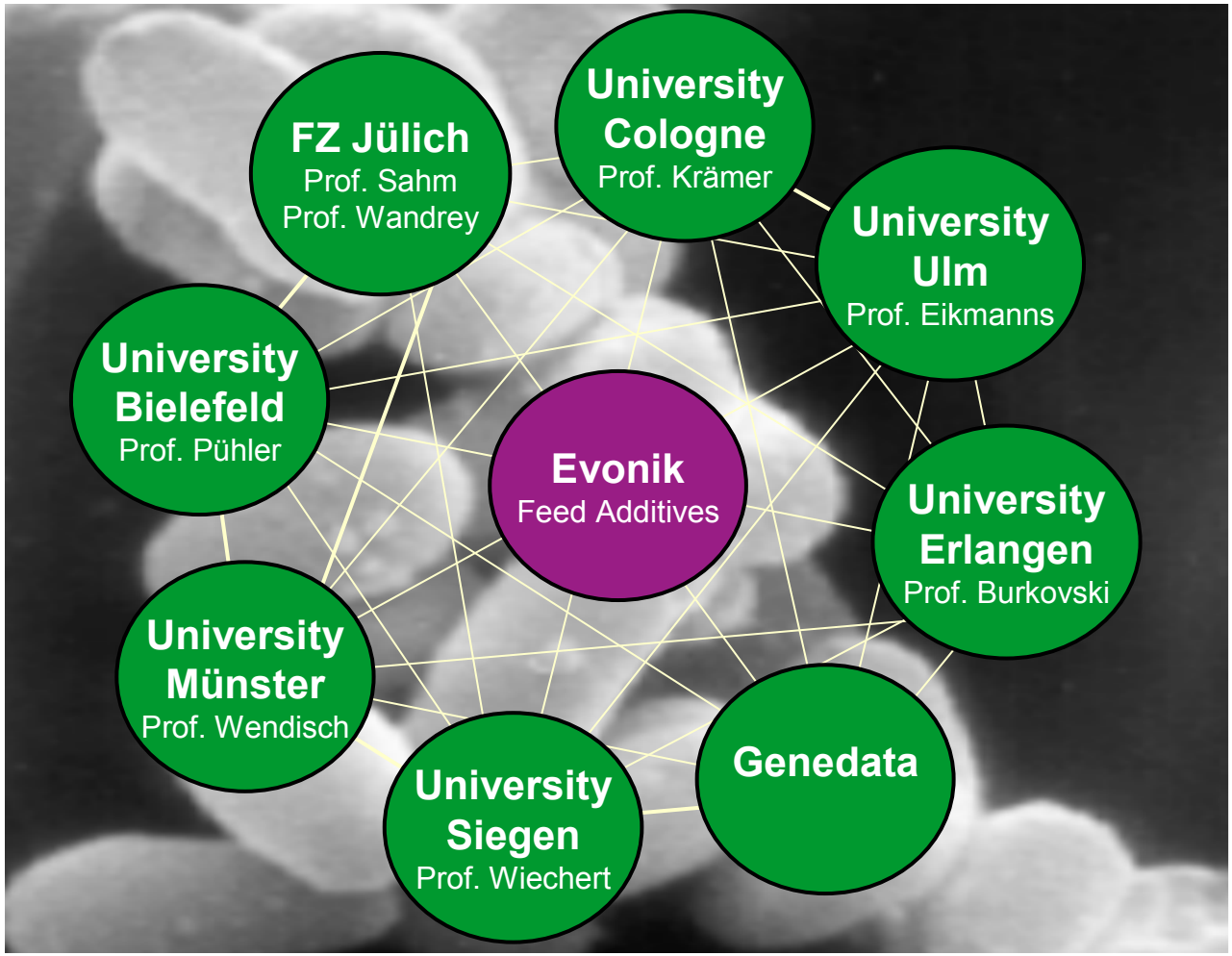
Example for cooperative research Systems biology for amino acid fermentation

SysMap “Systems Biology on Microbial Amino Acid Producers” (BMBF)

Start 2005

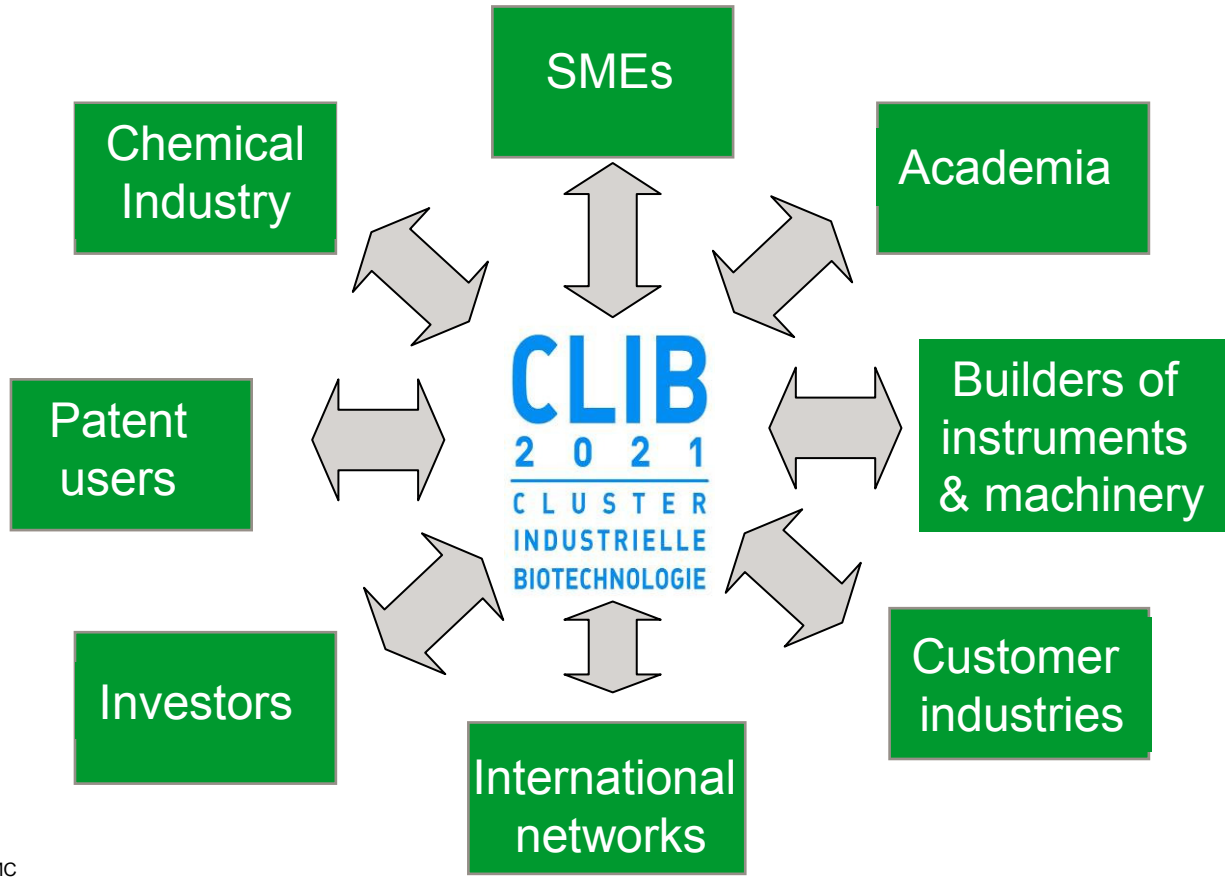
Focus Corynebacterium glutamicum:

- Understanding of metabolic regulation
- Predictive modifications to optimize fermentation



Cluster Industrielle Biotechnologie CLIB^{2021}

Strategic networks across the value chain with strong commitment of the chemical industry



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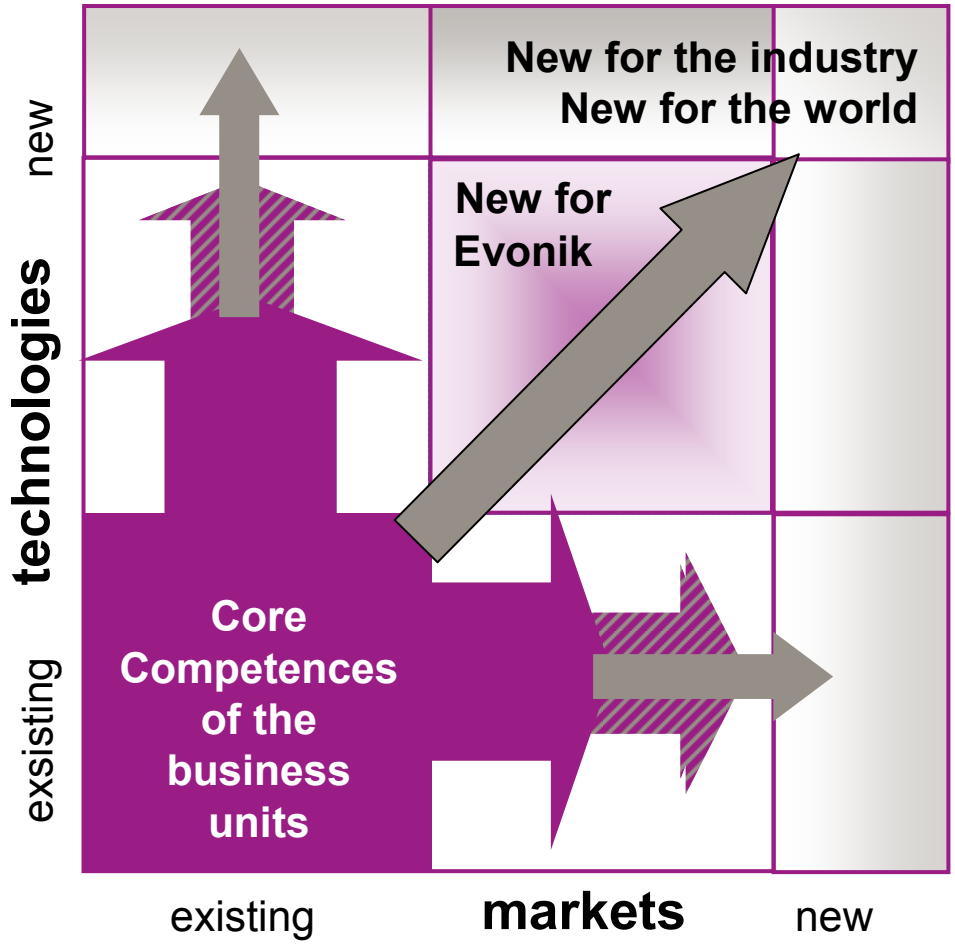
Evonik's R&D targets strategic growth



15 % of R&D budget

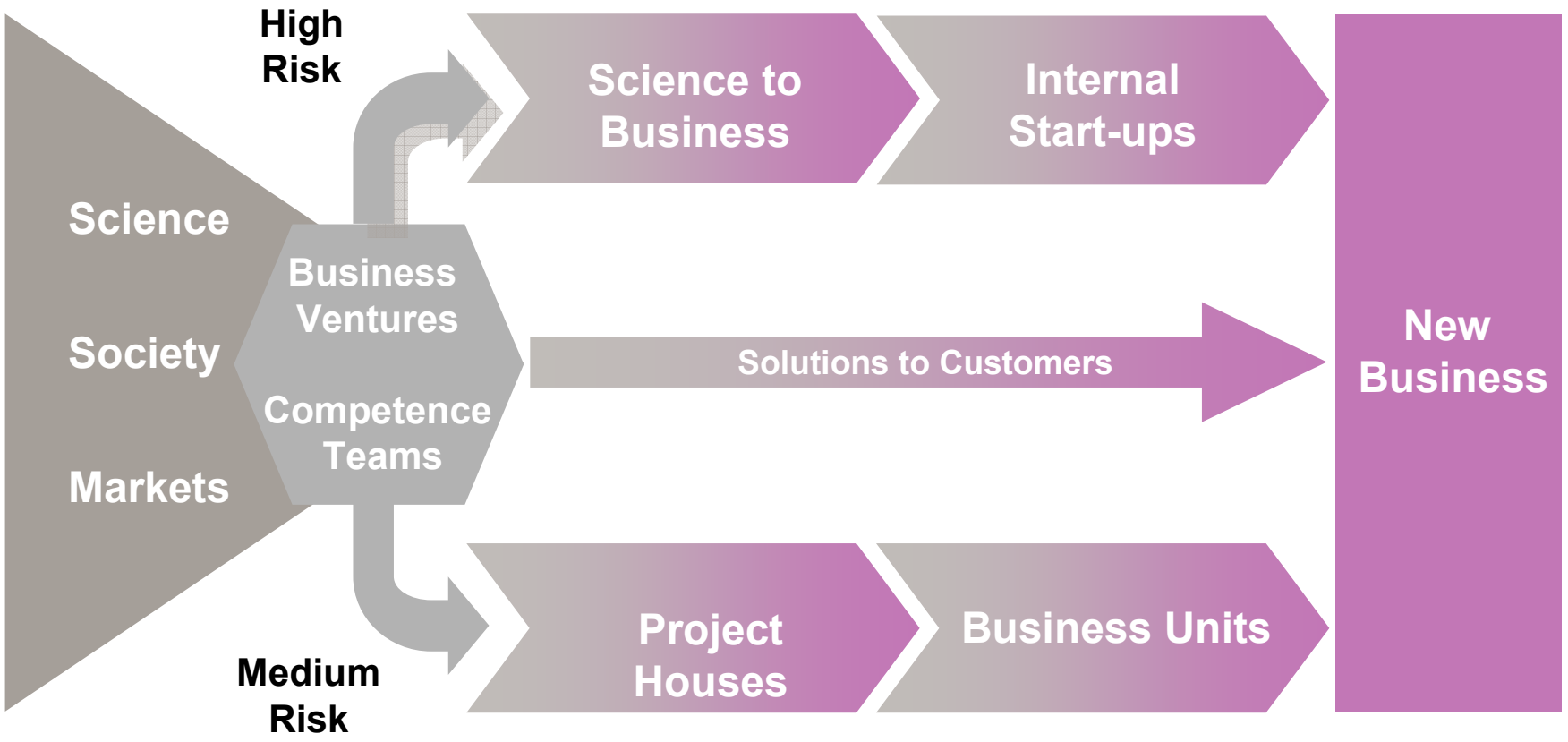
Science to Business Center
Internal start-ups
100 % corporate funded

Project houses
Corporate funded projects
Financing
50% corporate / 50% BUs

R&D activities
Business Units
100% BU-financing

85% of R&D budget

Creavis: Our process for high risk projects



Creating New Business for Evonik Degussa

Creavis creates profitable and sustainable new business for Evonik Degussa

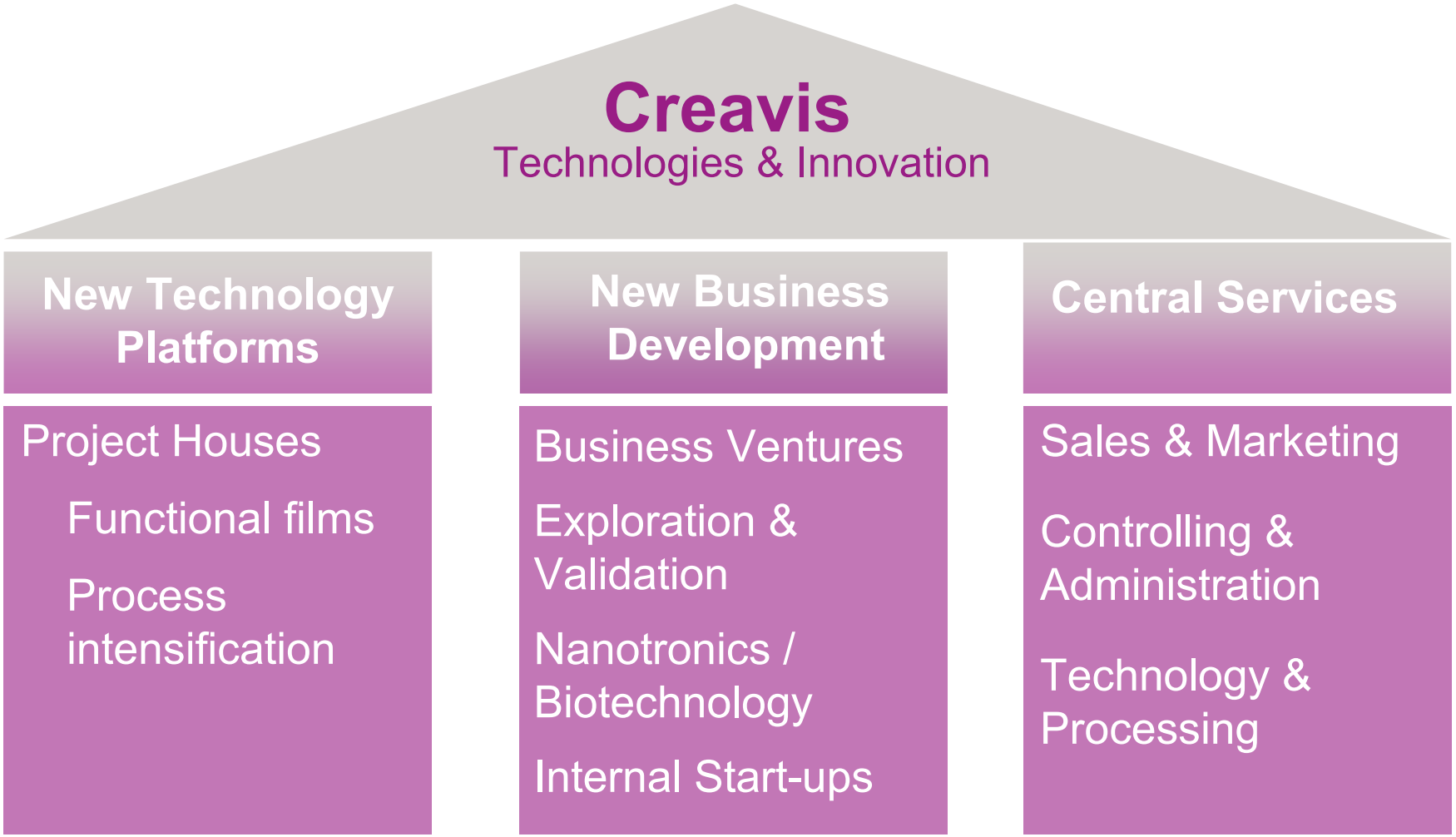
Enhance Evonik Degussa‘s portfolio by building high-value business in specialty chemistry

Enter technologies and markets new to the world

Seamlessly integrate know-how from the fundamental sciences and materials development through internal and external partners

Develop solutions that will be of considerable value to our customers

Creavis Structure



Business Venture concept

Opportunity generator

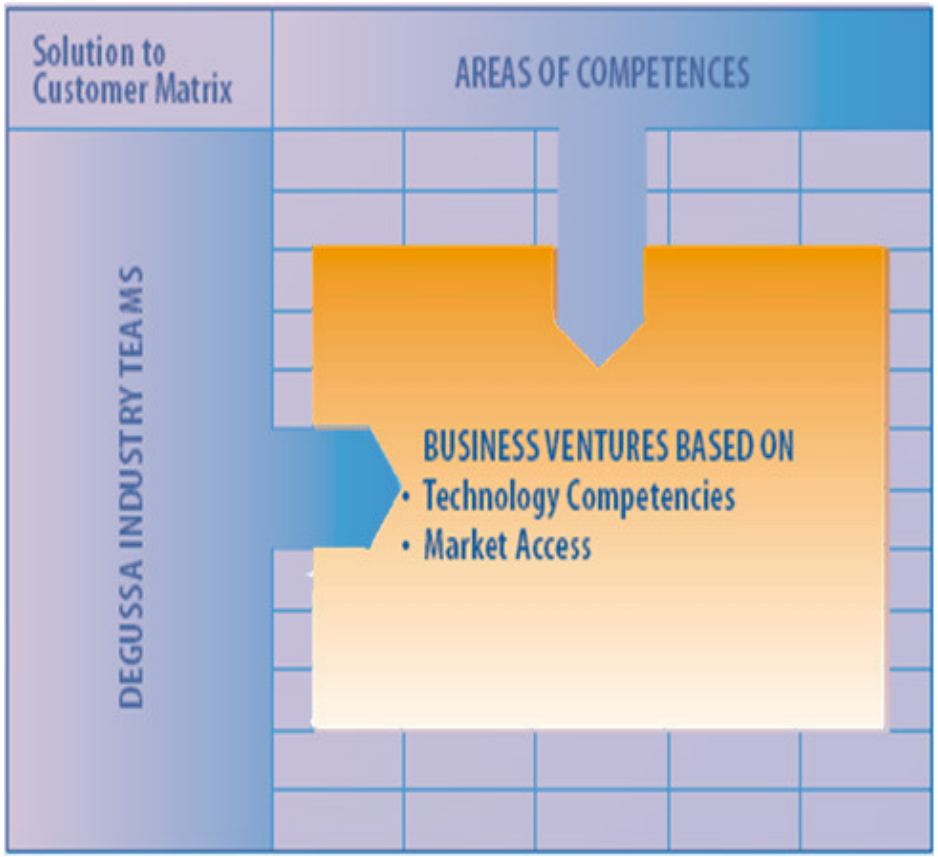
Identification of new R&D venturing opportunities by analysis of global technology push and market pull dynamics

Compile and measure detailed knowledge about end markets and technologies on a global scale

Holistic design of strategy, business model and business plan

Supports the creation of new business through its entire life-cycle

Corporate-wide network and acceptance to generate new opportunities



Our Science to Business Concept

Rapidly create new businesses and technologies from knowledge in the fundamentals of science all the way through to the production and commercialization of the final solution

Worldwide tight cooperation's with external research institutes, universities, small and midsize companies

Vertical integration of all R&D activities along the value chain with academic, research and industrial partners

All activities from fundamental R&D to product development located under one roof

Other concepts are continuously considered for their relevance and contribution

Science to Business Center Nanotronics

Focus on success in future electronics markets through Evonik Degussa‘s nanotechnology platform

Joint development and systems integration between Evonik Degussa and partners under one roof

Start of operation in April 2005

Co-funded by Evonik Degussa and the German and EU governments and their agencies

Exploration & Validation Nanotronics

Competences of our core scientific group

Nanomaterials

Semiconductors

Polymer Chemistry

Ceramic Chemistry

Sol-Gel Technology

Material Formulation

Electronic Characterization of Materials

Scale-Up & Production

Exploration & Validation Nanotronics

Current strategic projects

Printable Electronics

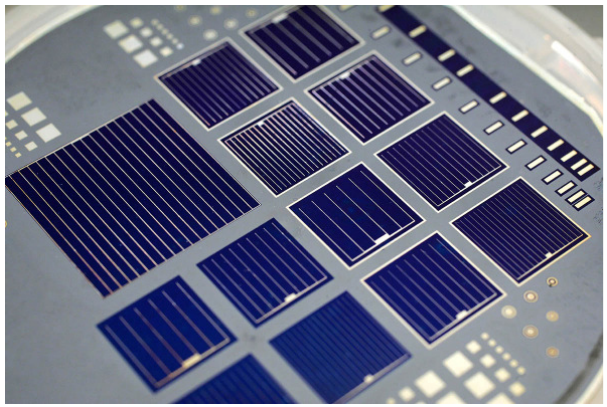
- Material systems for low-cost electronic devices

Low-Cost Displays

- Cost reduction of key electrode materials in displays

Ultra Low-Cost Flexible Solar Cells

- New materials and processes for low-cost flexible solar cells



Science to Business Center Bio

Focus on sustainable production processes – fermentation and biocatalysis - mainly based on renewable feedstock

Development of new and highly competitive routes to established products as well as innovative biomaterials and functional products for life science and skin & hair care markets

Start of operation in January 2007
Co-funded by Evonik Degussa and the German and EU governments and their agencies

This project is co-financed by the European Union and is financially supported by the state of North-Rhine Westphalia.

Exploration & Validation Biotechnology

Our project clusters

Raw Material & Energy

Polyols

Intermediates

Health

Performance Materials

Personal Care

Project Houses:
R&D Excellence for Evonik Degussa

Enhance Cross-BU Technologies and Product Competences in all relevant Fields

Characteristics

Interdisciplinary team of 20-30 FTE from different BUs

Uses and accumulates know-how of participating BUs

Steered by Top Management and Business Managers

Three-year time limit, 50:50 cost share of BU and Corp.

Team members return with new know-how and products to BUs

Commercialization in BUs or spin off in start-ups

Evonik Degussa Project Houses

Nanomaterials
2000/01 – 2002/12

Catalysis
2001/07 - 2004/06

Biotechnology
2001/01 – 2003/12

Functional Polymers
2003/10 – 2006/09

ProFerm
2004/01 - 2006/12

Process Intensification
2005/01 - 2007/12

Functional Films
2007/01 – 2009/12

Project Houses

Innovation in a Container!

Process Intensification
Development of highly active catalysts, functional materials and disperse systems to integrate in process intensifying technologies

Functional Films
Development of mono-/multilayered high performance films and sheets based on polymers providing new and enhanced functionalities

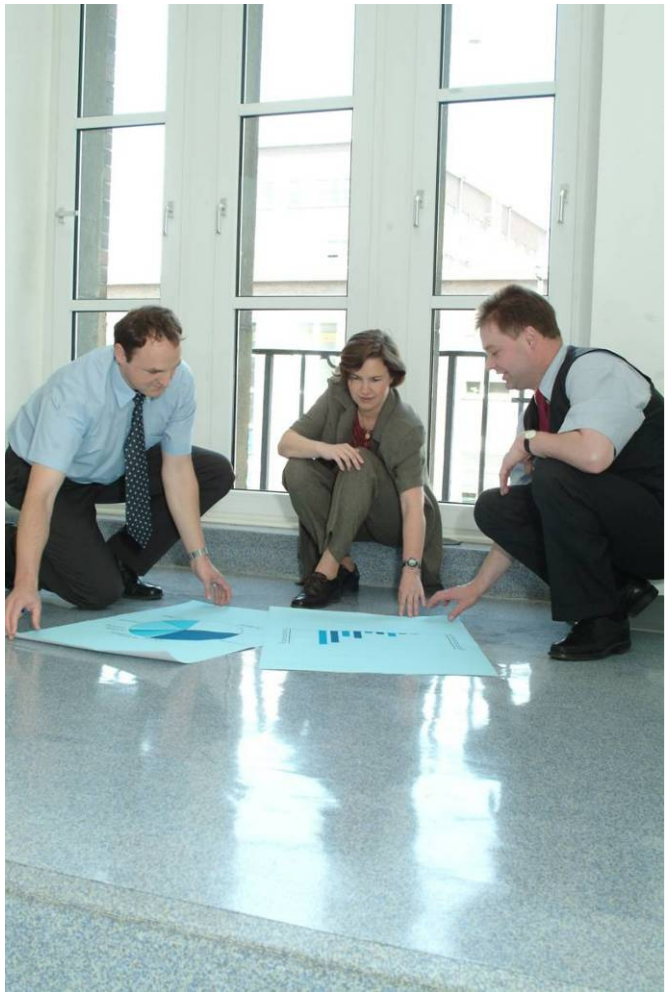
Internal Start-ups

Evonik Degussa‘s new business incubator

Turns promising projects from exploration & Validation and the project houses into profitable and sustainable new businesses

Develops and executes upon highly effective business strategies through excellent understanding of the commercial environment, cooperation and partnering

Each start-up is challenged to deliver excellent financial performance and optimal resource allocation



Internal Start-ups

CREASORB

Superabsorbent polymers for new high value applications such as

prevention of water penetration for power and communications cables

soaker pads for food packaging, storage and transport

heat absorbing gels for fire fighting

hydrogels for water and nutrient retention in soils for arid lands

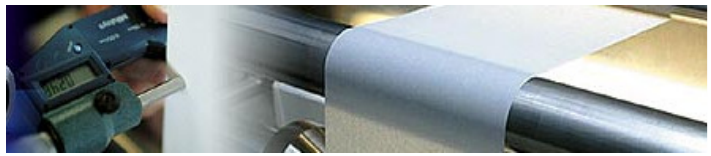
Lithium-Ion Technology

EVONIK INDUSTRIES

Advanced ceramic separators and electrodes for large-format rechargeable Lithium-ion batteries

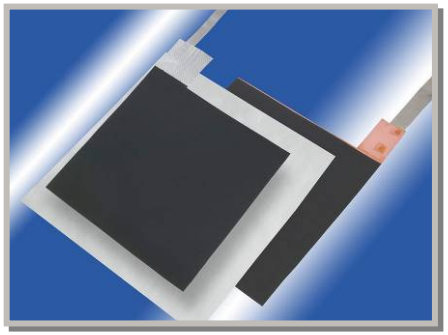
SEPARION® - Safety through ceramics

LITARION™ - Electrodes ready to use

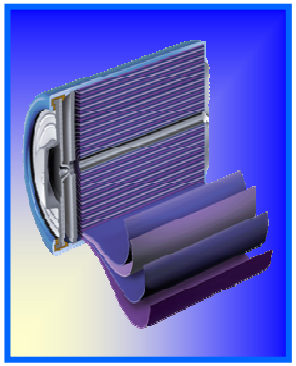


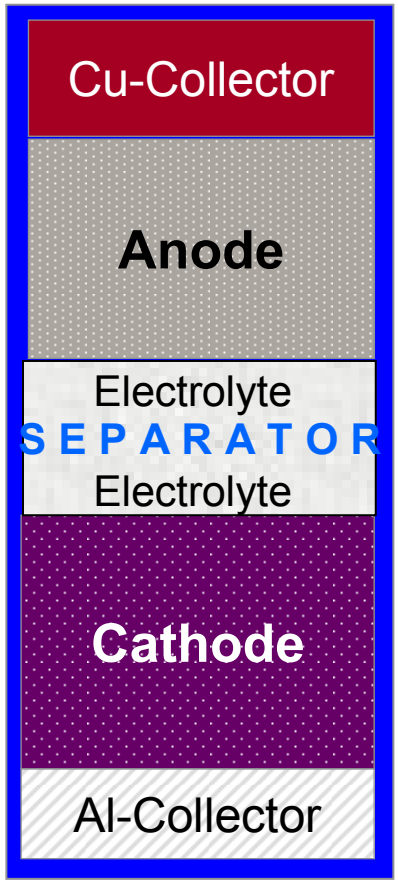
Lithium-Ion-Battery technology

Stacked Cells



Cylindrical Cells





Evonik´s Lithium-Ion Battery Materials

LITARION A

SEPARION

LITARION C

Example for automotive solutions: Cooperation with Red Motorsport

Evonik Technologies & Solutions

- Lightweight Li-Ion Battery
- Lightweight scratch resistant Wind Screen
- Composite Body Parts
- Parts from Rapid Prototyping
- Friction reduced Lubricants

ccflex –
The Flexible Ceramic Wallcovering

Flexible non-woven supported ceramic composite

Applications

Sanitary facilities, interior decoration, furniture surfaces / door surfaces, office equipment, surface refinement / lightweight construction, customized

Attributes

Easy to install, Scratch and shock resistant, water resistant, easy to clean / dirt repellent, acid / caustic proof, stain resistant, flame resistant (B1/A2*), UV resistant, free choice of design, free of halogens

*with special enhancement and other properties

No success without intellectual property

Patents, Know-how,

are the base for a good business opportunity

are strategic weapons in a competitive world

But,

a patent is only a right to block competitors, not a right to produce per se, only if nobody else can block you

Many patents wait years to become valuable, most will never be used

It costs a lot to maintain a patent portfolio

Agenda

1. Evonik
2. Basic strategic considerations
3. Core competences are the base of successful businesses
4. Open Innovation builds new business
5. Creavis, Science to Business Center, Project Houses and Internal Start-ups
6. Create an innovative culture

Cultural change: Innovation is more than R&D

…production, marketing, logistics….

also contribute to innovation

Create an innovative culture: Innovation Awards

Each year three awards are given for developments of:

- new products
- new processes
- new applications

The awards have a value of € 40 000 for each of the winning teams

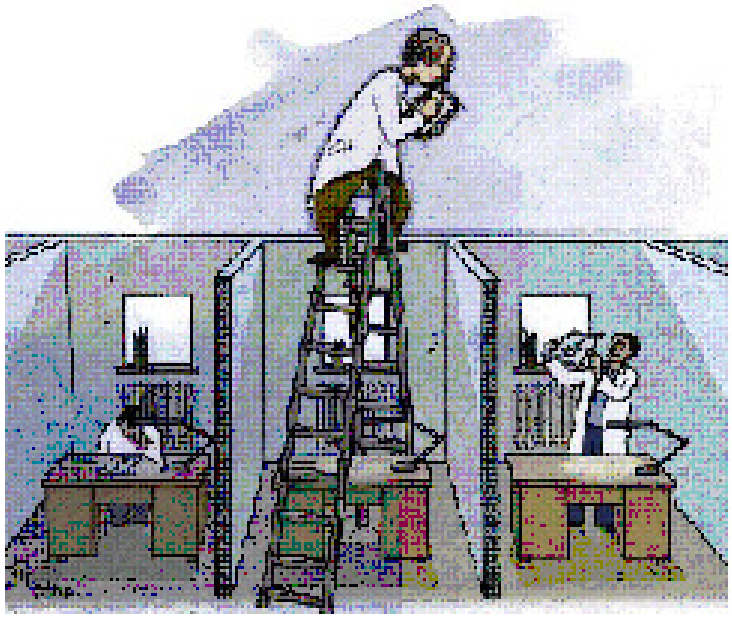
Create an innovative culture: Evonik Not Invented Here Award

Goal:
Enhancement of the internal knowledge exchange

Target groups:
All employees of Evonik

Categories:
Best Technical Knowledge Transfer
Best Management Knowledge Transfer
Best Day-to-day Knowledge Transfer

Price:
In total € 75,000 plus team event

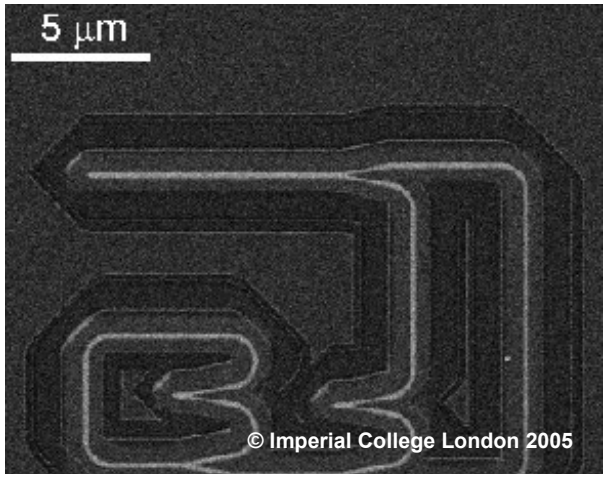


Create an innovative culture: Europ. Science-to-Business Award

For a discovery of young scientists with potential to become a successful product.

Winner 2006: Prof. Russell Cowburn Chair in Nanotechnology Imperial College London

For magnetic domain wall logic: a new way of high density data storage



Create an innovative culture: Europ. Science-to-Business Award

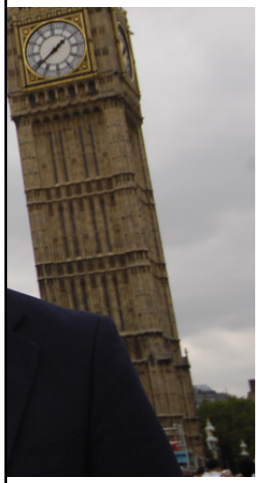
For a dis
potential

Winner 2
Chair in
London

For mag
of high c

Evonik European Science-to-Business Award 2008 “Biotechnology”

Launched October 17th



Create an innovative culture: Evonik Meets Science

Every two years Evonik invites academia for the

Evonik Meets Science

event to exchange ideas and discuss emerging areas of applied science

To summarize:
Success factors for new business

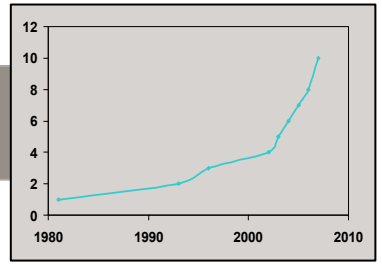
EVONIK INDUSTRIES

IP

Cutting-edge science & technology

Solid intellectual property

Relevant future markets



SEVENTH FRAMEWORK PROGRAMME

Partnering excellence

Evonik European Science-to-Business Award

EVONIK

Best brains with entrepreneurial spirit

…but, the most important success factors for innovation are people

EVONIK INDUSTRIES


EVONIK
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