



>> PERSPECTIVES_2012

THE FUTURE OF CHEMICAL AND PHARMACEUTICAL
PRODUCTION IN GERMANY

>> A RESEARCH PERSPECTIVE.

STUDY RESULTS: FUTURE OF CHEMICAL AND PHARMACEUTICAL INDUSTRY IN GERMANY

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ACHEMA PERSPECTIVES 2012

The Future of the Chemical and Pharmaceutical Industry in Germany: Megatrends and the need for transformation

Preliminary
Findings from a case study research
initiated by Infracore Höchst and
rhein-main-cluster chemie & pharma

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June, 2012

- 1. Provadis School of International Management and Technology**
- 2. Transformations in the chemical & pharmaceutical industry in Germany**
- 3. Implications**

History matters ...

Work and Science in the 21 st century

The way we work and learn is continuously changing. Provadis offers as successor organization of former Hoechst corporation tailor-made education solutions.

Past

Business



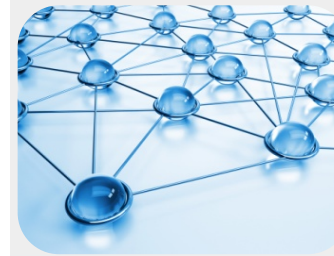
- Hierarchy

Science, education



- monopoly of state owned universities
- in Germany: first initiatives for part time studies in the 1970s

Today



- Globalization
- Networks and clusters
- heterogenous staff structure; demographic change



Provadis-University

- Bologna-Reform
- specialized private universities
- university studies encompassing theories, methods, tools and social skills

Provadis – close links with the chemical and pharmaceutical industry



Industriepark Höchst: 90 companies, 22.000 employees



Business Administration (dual) (2008 / 2011):

- Rhein-Main-Region (No.: 1)
- Germany (Top 3)

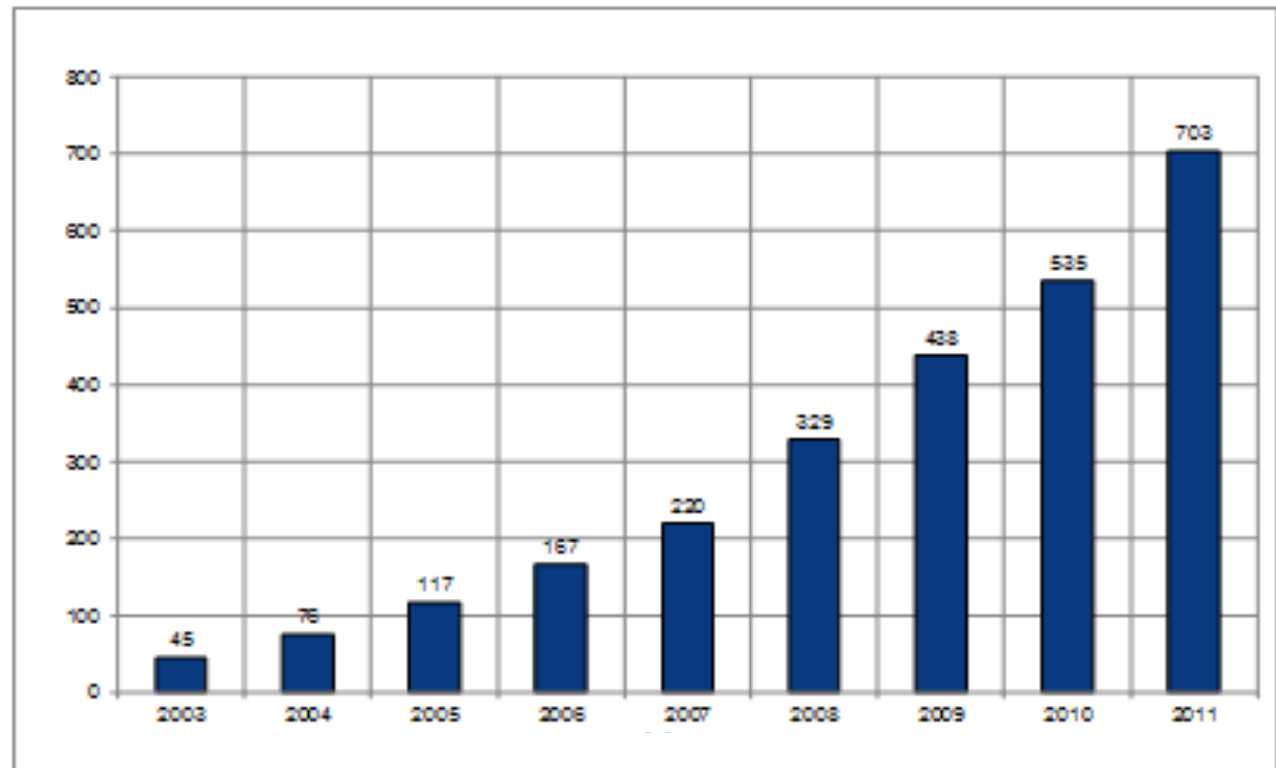
Chemical Engineering (2010):

- Rhein-Main-Region (No.: 1)
- Germany (Top 5)

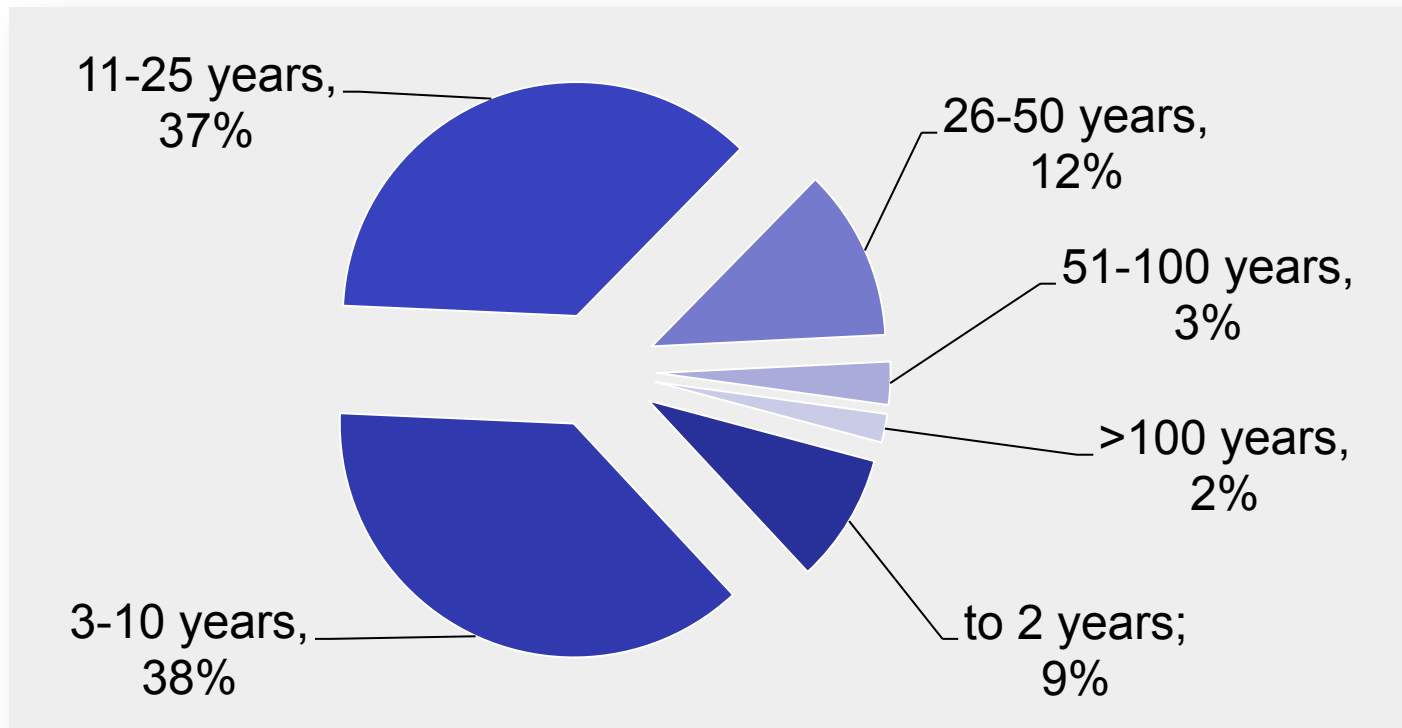
Business Information Management (2011):

- Rhein-Main-Region (Top 2)
- Germany (Top 5)

Number of students



**Different studies highlight: 75% of all companies do not get older than 25 years.
A company's ability to transform itself is therefore a core competency for ongoing success.**



Source: Creditreform 2009 (citation Sattelberger, 2011) and Kiehling 2012



How can we successfully transform companies?

Upcoming transformations

Selected examples



1. Automobile industry:

- Customers increasingly demand mobility services – and less a physical car. How will future business models for car manufacturers look like?
- What will be the future concept for individual mobility?



2. ICT industry

- How will the „internet of things“ change business and society?

3. Aviation industry

- How will the future of aviation industry look like in Germany?
- When are we going to have eco-friendly airplanes (CO₂ and noise)



Green transformation of business and society? When? Where? How?

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History matters ...

Lessons from the past – by Alfred Chandler (Harvard)

To explain the success and failure of market players in industrial settings, Alfred Chandler focuses on a company's capability to transform basic research into commercial products.

General lessons from history	1880-2003	Technological highlights
<p>Strategy:</p> <ul style="list-style-type: none">▪ Build your strategy around the concept of learning <p>Infrastructure in high-tech industries:</p> <ul style="list-style-type: none">▪ Takes 50 years to complete▪ High barrier to entry <p>Learning and growth:</p> <ul style="list-style-type: none">▪ Missing breakthrough innovation: => industry leaders focus on product and process development	<p>Chemical industry</p> <p>Pharma industry</p>	<ul style="list-style-type: none">▪ Two periods of growth: 1880-1920s; 1940s-1950s▪ Since the 1950s, chemical science and engineering have ceased to generate major new product opportunities.▪ limits to learning in the 1960s and 1970s: but biology and related disciplines – microbiology, enzymology, beginnings of molecular biology – provided new opportunities▪ today biotechnology revolution

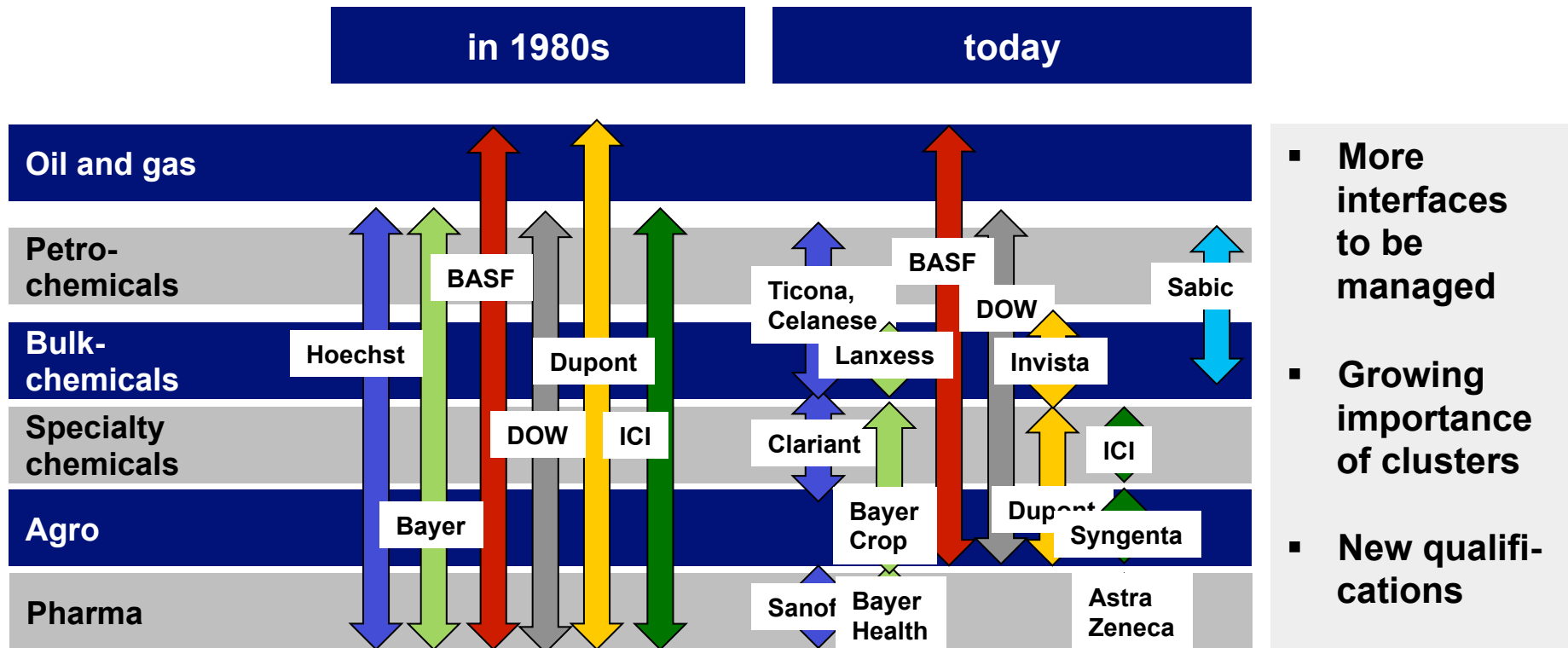
Source: Chandler, 2003.

 **Chandler: Chemical industry** → no longer a high-tech industry
Pharmaceutical industry → still dynamic high-tech industry

Chemical and pharmaceutical industry

Profound restructurings

Companies in the chemical and pharmaceutical industry have redefined their core competencies. Today, more external partners have to be managed.



Source: Wildemann, 2012.

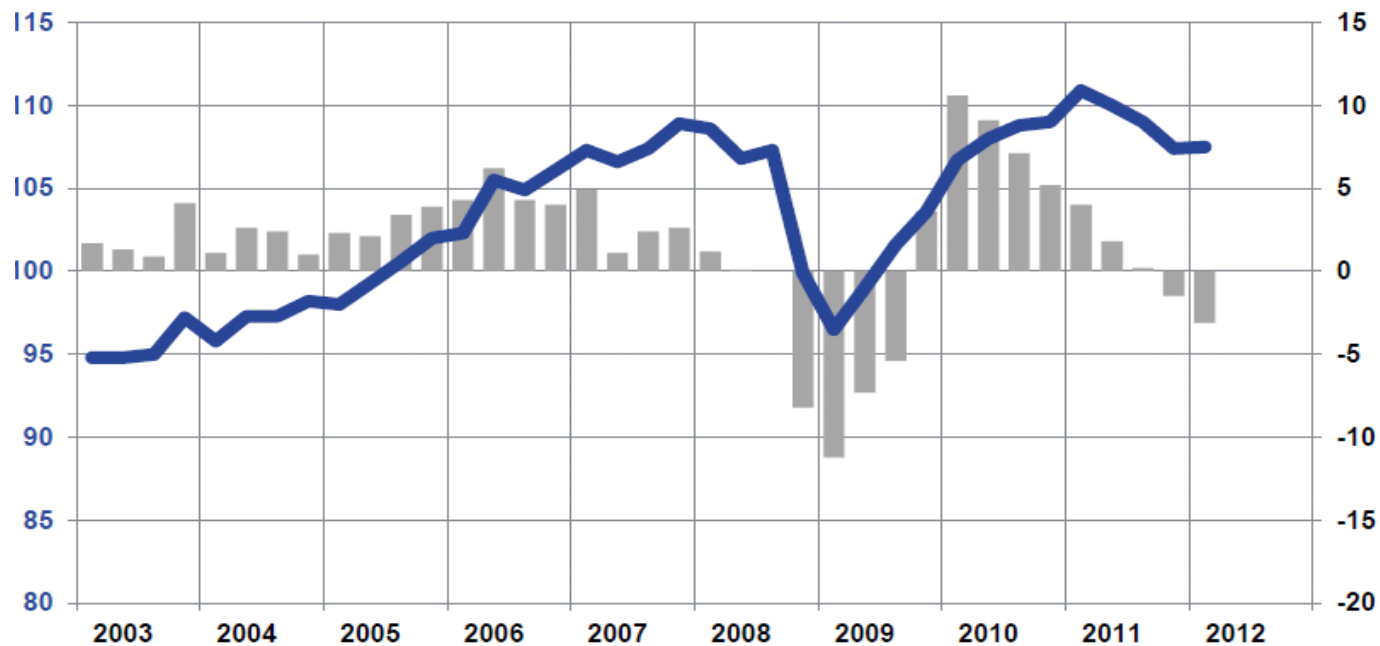
▶ Chemical industry: Track record of transformations

Chemical and Pharmaceutical Industry in Europe 2003-2012

The European chemical and pharmaceutical industry's production is below the pre-crisis years.

Chemical industry (20+21) output (EU 27)

Seasonally adjusted, index 2005=100, yoy in percent

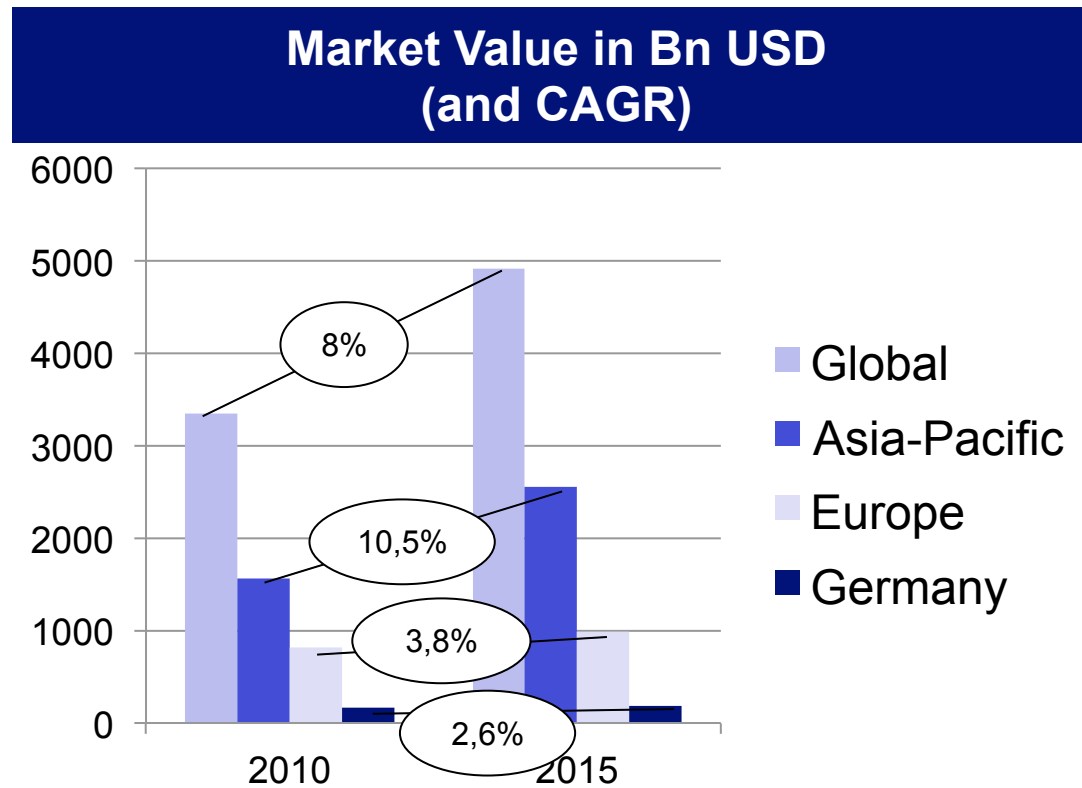


Source: Chemdata, Eurostat; ; presentation. Dr. Meincke, The European Chemical Industry 2012 – another year of stagnation, Milano, May 2012

Chemical & pharmaceutical industry

Outlook 2015

On a global scale, the chemical and pharmaceutical industry is characterized by significant growth (growth driver Asia). Studies predict for the German and European chemical industry moderate growth rates.

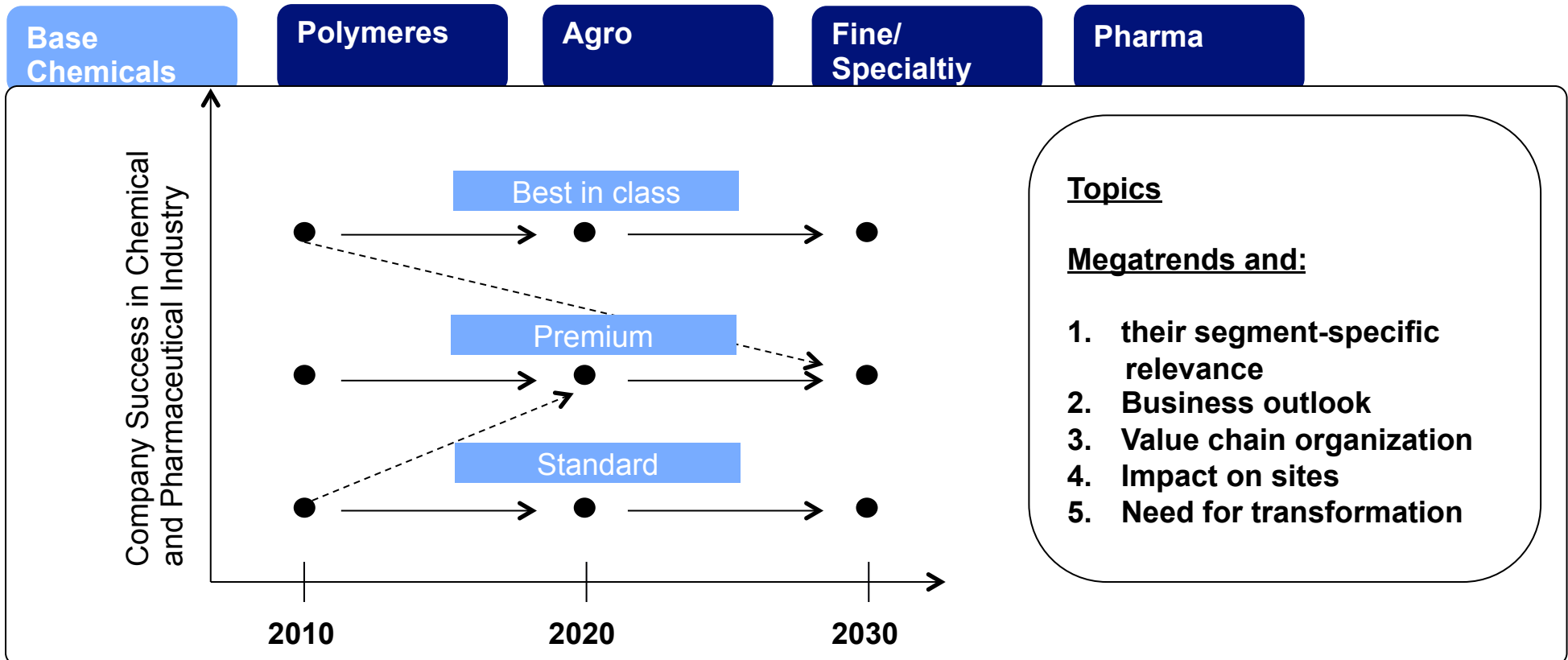


Source: Datamonitor 2011; * „Market value is taken at producer selling price“.

Chemical and Pharmaceutical Future

Provadis Case Studies 2012

To analyze the relevance of megatrends for the chemical and pharmaceutical industry, a case study approach is used.



Explorative approach – preliminary results to be presented

Chemical and pharmaceutical industry

Topics and Megatrends

Seven broad topics and a total of 21 megatrends were investigated.

1. Demographic change

- A Aging and „shrinking“ population in Western countries
- B Population growth in developing countries
- C Shortage of skilled employees in Western countries

2. Globalization & urbanization

- A Shift to Asia (demand, innovation, production)
- B Global strategies with local and regional adaptation
- C Globalized flow of capital
- D Urbanization in developing and emerging countries

3. Innovation & technology

- A Cross-industry cooperations
- B Open innovation processes
- C NBIC-convergence (nano-, bio-, information-, cognition science/ technology)

4. Change in energy & resource supply

- A Use of alternative energy and renewable resources
- B Shortage of strategic resources (e.g. energy, raw materials)

5. New consumption patterns

- A Increasing wealth in developing countries
- B BRIC countries catching up in luxury consumption
- C „Sustainable“ consumption in Western countries

6. Work in Europe

- A Ongoing automation of industrial processes
- B Flexible work models
- C Improved integration of women in business life

7. Dynamic health care market

- A Personalized medicine
- B Enhanced / functional food
- C Convergence food, pharma, cosmetics

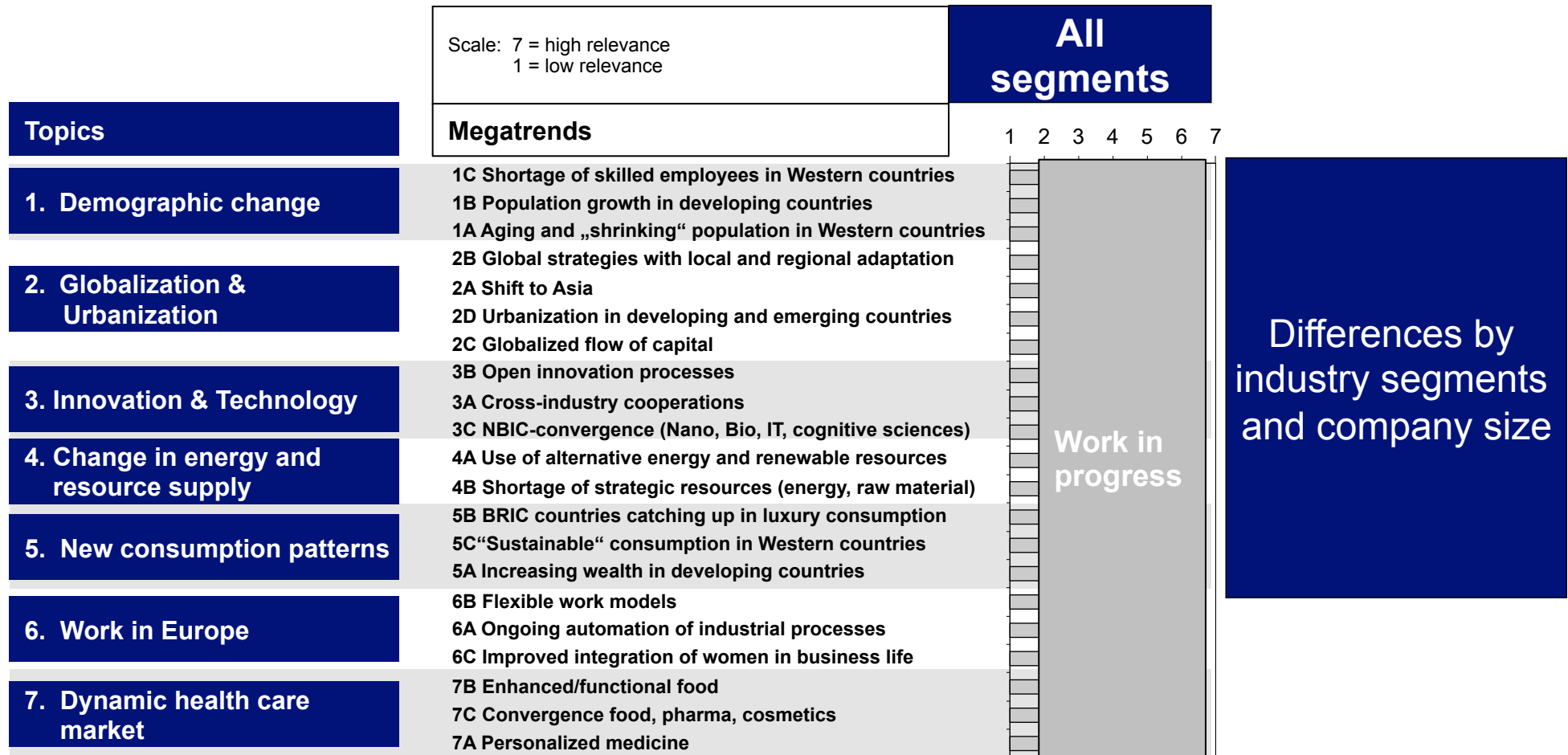
Please evaluate the relevance of the following megatrends for your company activities in the years 2012, 2020 and 2030!

Source: on the basis of BDI and Z-Punkt 2011.

Chemical and pharmaceutical industry

Megatrends: Relevance in the years 2012-2030

Companies in the chemical and pharmaceutical industry have a differentiated view on the relevance of megatrends.



Globalization, innovation and options for improving productivity are the most important megatrends for the chemical and pharmaceutical industry.

Top Megatrends (above average relevance in 2012 and 2020)

1. Globalization: global strategies with local adaptation;
shift to Asia (demand, innovation, production)

2. Innovation: open innovation processes,
cross-industry cooperations

3. Improved productivity: ongoing automation of industrial processes,
dynamic work models;
integration of women in business

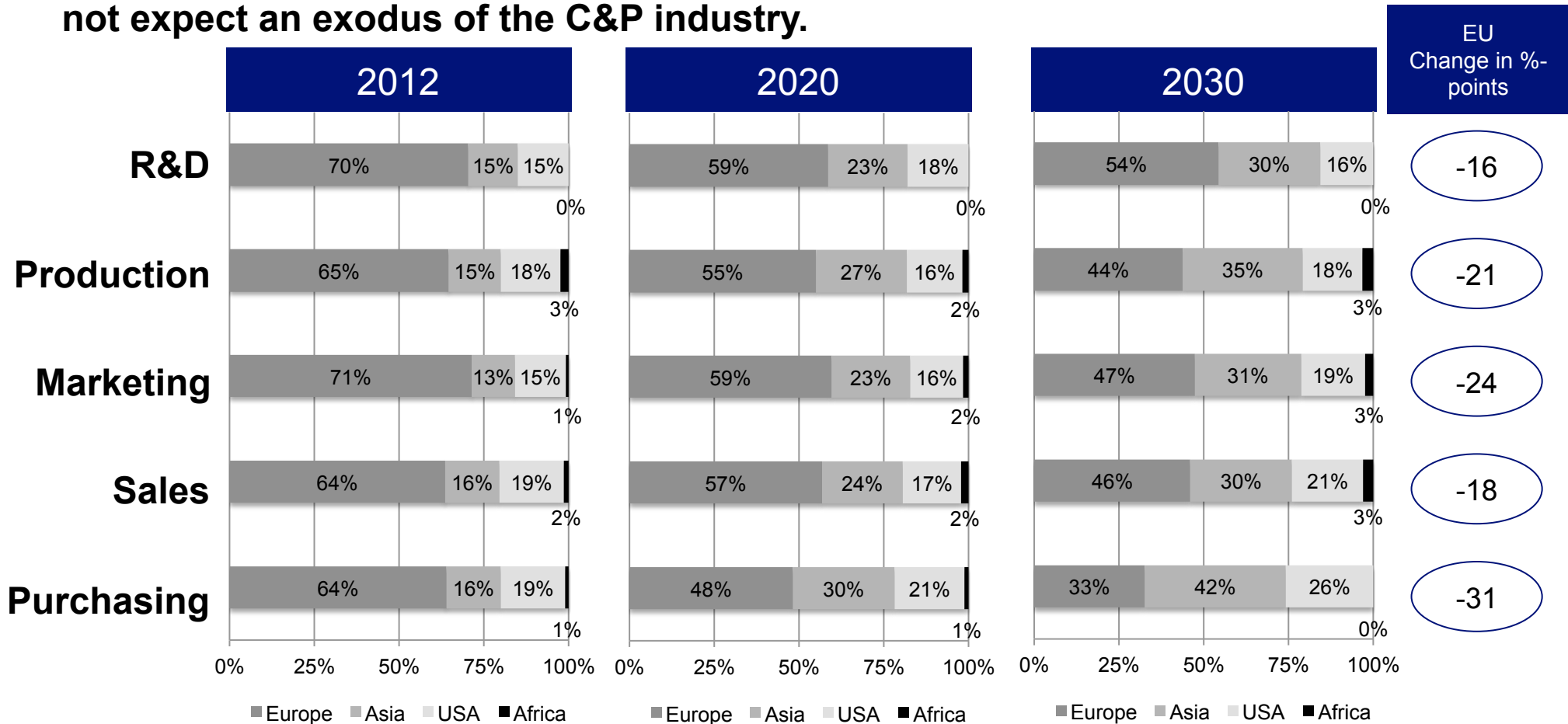
... not „shortage of strategic resources“ (only in 2012 above average relevance)

Chemical and pharmaceutical industry

Value chain organization

Preliminary findings

Asia's relative importance will grow accross all business functions. Companies do not expect an exodus of the C&P industry.



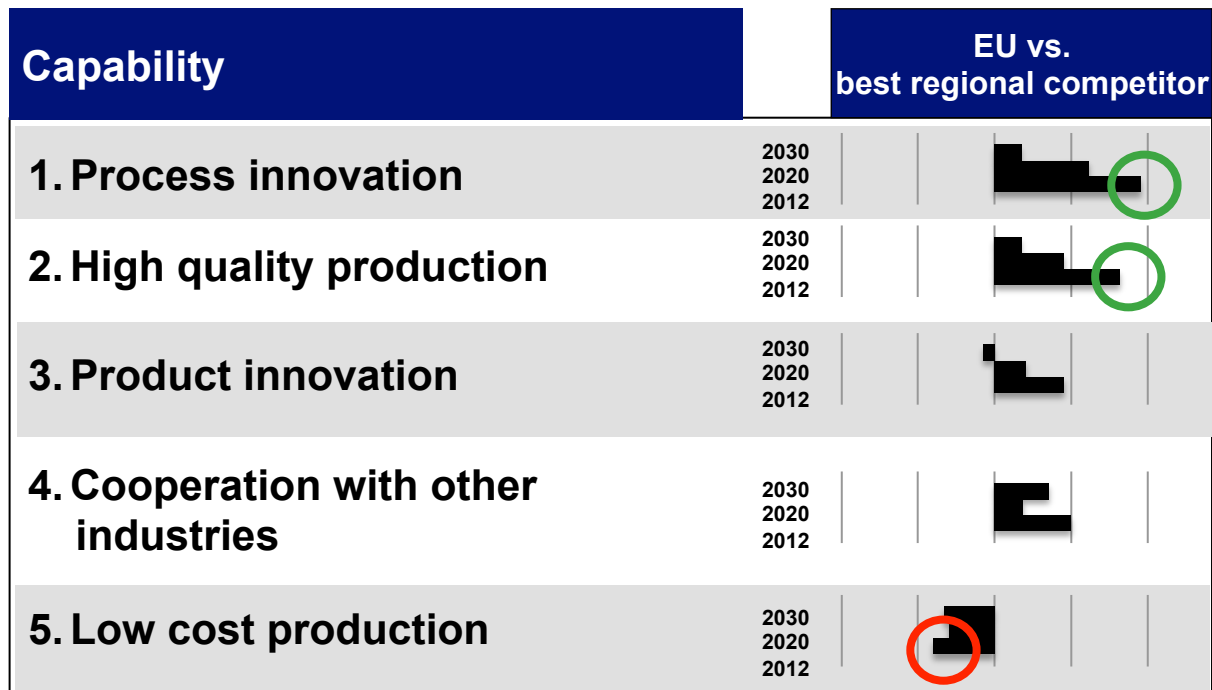
Question: In your company, where is the center of gravity for the following business functions today, in 2020 and 2030? Please distribute 100% per business function on the different regions.

Chemical and pharmaceutical industry

How can we explain Europe's competitive position?

Preliminary findings

Companies see Europe's product and process innovation capabilities combined with its high quality production capability as competitive advantages until the year 2030.



Scale: 7 = Europe is superior to 1 = competitor is superior

2 3 4 5 6

„We are more Siemens than Apple.“

„We are more Switzerland than Silicon valley!“

„In Germany we have all customers and necessary cooperation partners in physical proximity.“

▶ Declining competitive advantages?

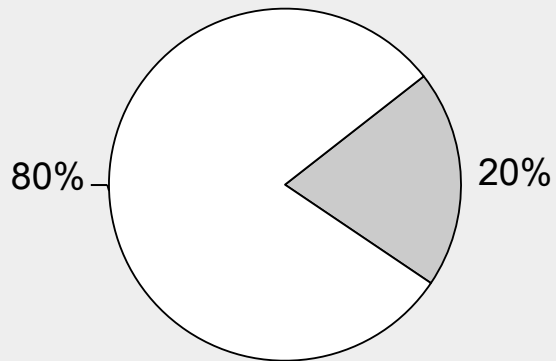
Chemical and pharmaceutical industry

Evolutionary or revolutionary transformation?

Preliminary findings

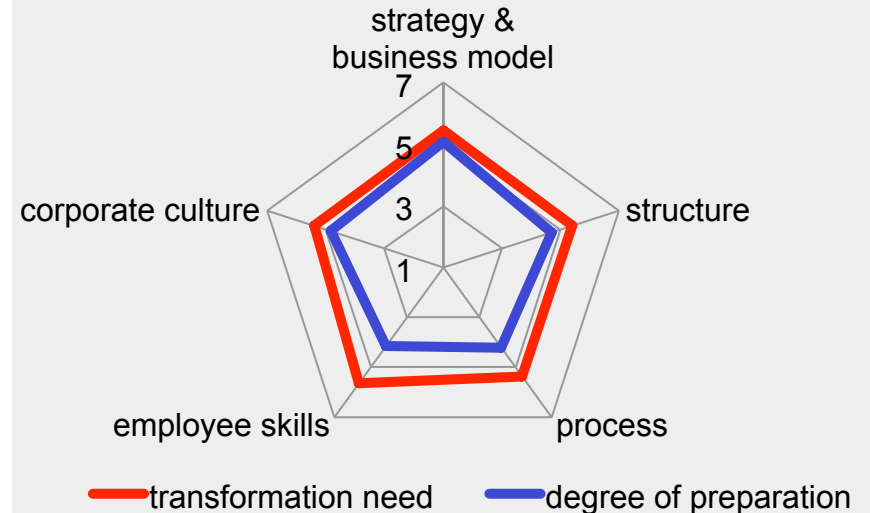
Most companies characterize the needed transformation as „evolutionary“ (except pharma and cost oriented specialty chemicals).

Evolutionary or revolutionary change?



□ revolutionary □ evolutionary

Fields of transformation



Questions:

Do you characterize the transformation need as „profound/revolutionary“ or more „gradual/evolutionary“

After our talk about megatrends: How do you characterize the need for transforming your company activities in the following fields? How is your company prepared for the necessary transformation?

Scale 1 = very low ; 7 = very high (n = 15)



Transformation: largest gap in employee skills and processes

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Success factors for business transformation

1. Think in scenarios – and outside in
2. In-depth knowledge and expertise – still crucial
3. the story of learning: again, and again
4. Cooperate – even with politics and NGOs
5. accept uncertainty, and motivate for continuous change

www.transitionsinpractice.nl

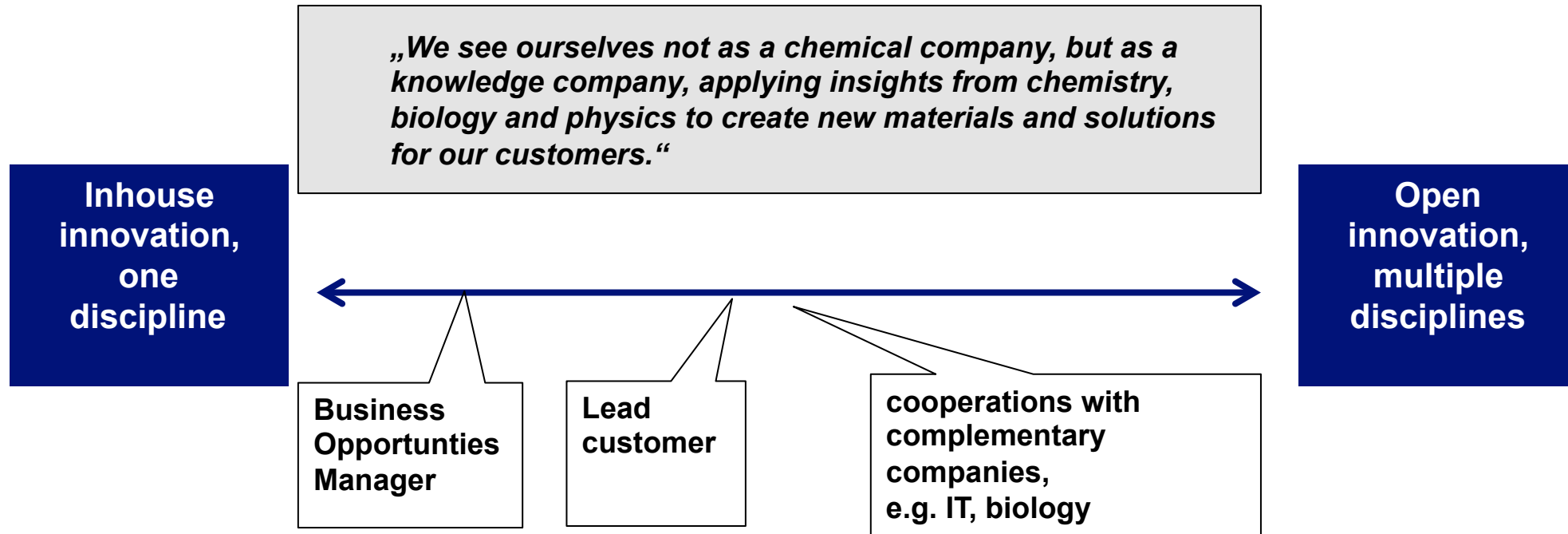


Functional expertise plus transformation capability

Implications

Transform innovation processes

Chemical companies focus their R&D activities on the development of new solutions and not on „new-to-the world“ innovations. All companies think about optimizing their innovation processes.



Challenge: Interdisciplinary innovation and cooperation

Implications

Transform students' preferences!

Chemical and pharmaceutical companies need specialized employees. A recent study on „MINT“-students and employees highlights a structural deficit in Germany in qualifying sufficient MINT talents.

MINT-students and MINT-employees missing*

Germany (2012):

- MINT-Employees: 2,280 Mio.
- MINT-Employees missing: 210 T

Germany (2020):

**300 T MINT employees missing
(structural gap)**

Employer Branding

Chemical companies

- not among top employers

Ranking 2012:

- No. 1: Google
- No. 2: BMW
- ...
- No. 17 BASF

Source:

* Institut der deutschen Wirtschaft, MINT Frühjahrsreport 2012, 23. Mai 2012.

** Trendence Graduate Barometer, 2012 (Young Professionals, Engineering and Business Administration Graduates)

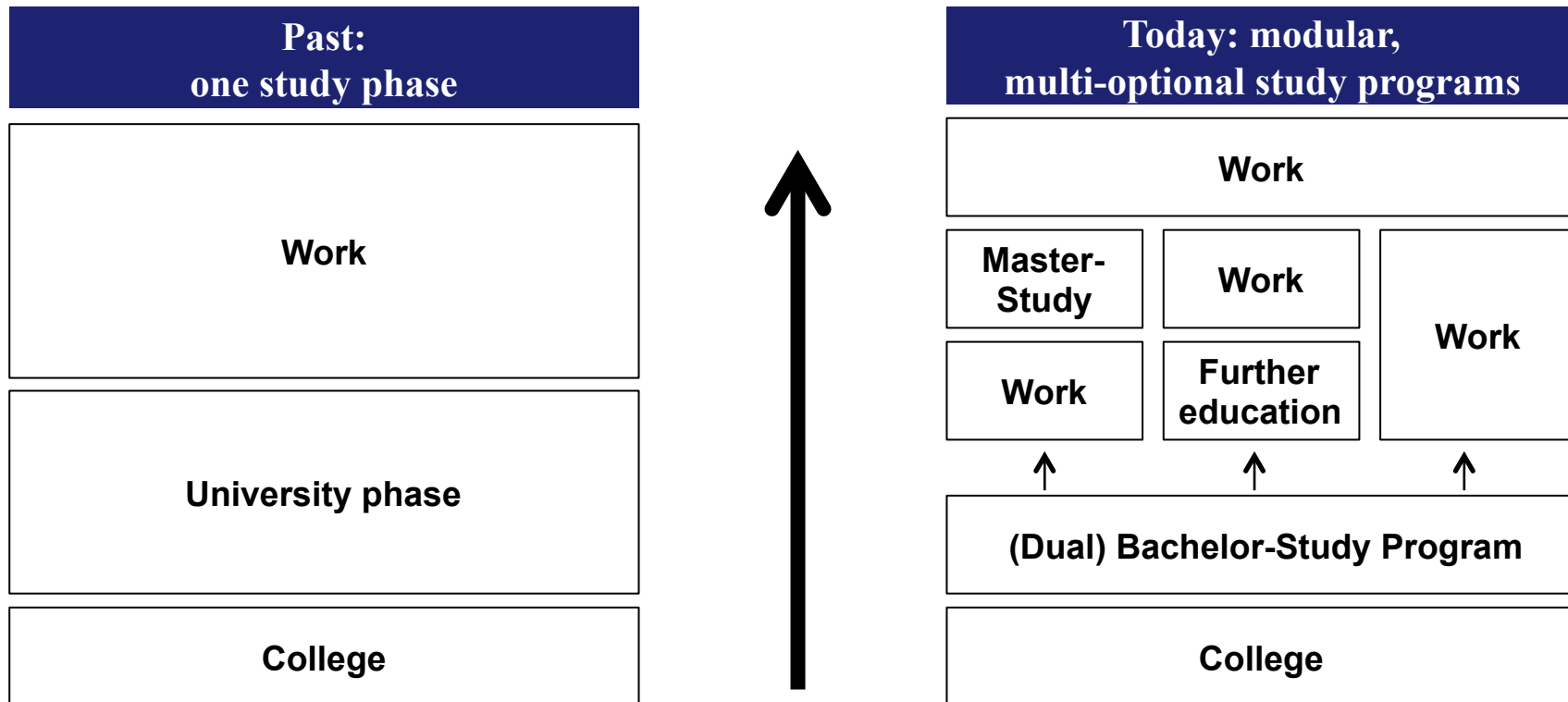


Challenge: talent pipeline

Implications

Transform talent management

The „Bologna reform“ created options for modular, multi-optional study programs. Companies can more easily create tailor-made programs and attract talents.



Source: Based on Telekom 2011



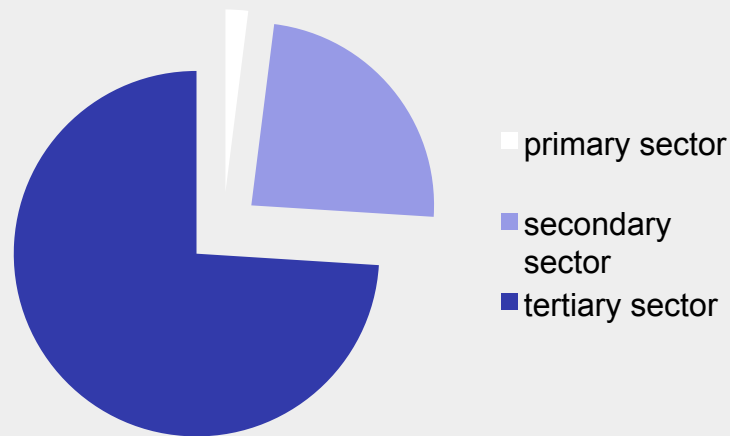
Challenge: Make use of recent Bologna reform

Implications

Communicate „outside-in“ with society

Support for their activities from society and politics is critical for chemical and pharmaceutical companies.

Employee structure Germany % in 2011



Source: Destatis 2012.

Dialogue with society Example



Challenge: How can the chemical and pharmaceutical industry strengthen its bond with society?

- 1. Transformation capability is necessary for the chemical and pharmaceutical industry.**
- 2. Due to insecurities (e.g. insecure China market development, impact of EU crisis, technological breakthroughs) thinking in scenarios is needed.**
- 3. Cooperating with customers and companies from other industries requires in addition to excellence in the established knowledge base interdisciplinary and cooperative capabilities.**
- 4. The biggest transformation challenge is seen in the fields of employee qualification and process optimization.**
- 5. To attract more talents, the chemical and pharmaceutical industry has to intensify its communication efforts with society and should go beyond the established „inside-out“ approach.**

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