



>> PERSPECTIVES_2012

THE FUTURE OF CHEMICAL AND PHARMACEUTICAL
PRODUCTION IN GERMANY

>> A BUSINESS PERSPECTIVE.

THE FUTURE OF VALUE CREATION IN THE GERMAN CHEMICAL & PHARMACEUTICAL INDUSTRY

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The Boston Consulting Group
ACHEMA PERSPECTIVES 2012



The future of value creation in the German chemical and pharmaceutical industry

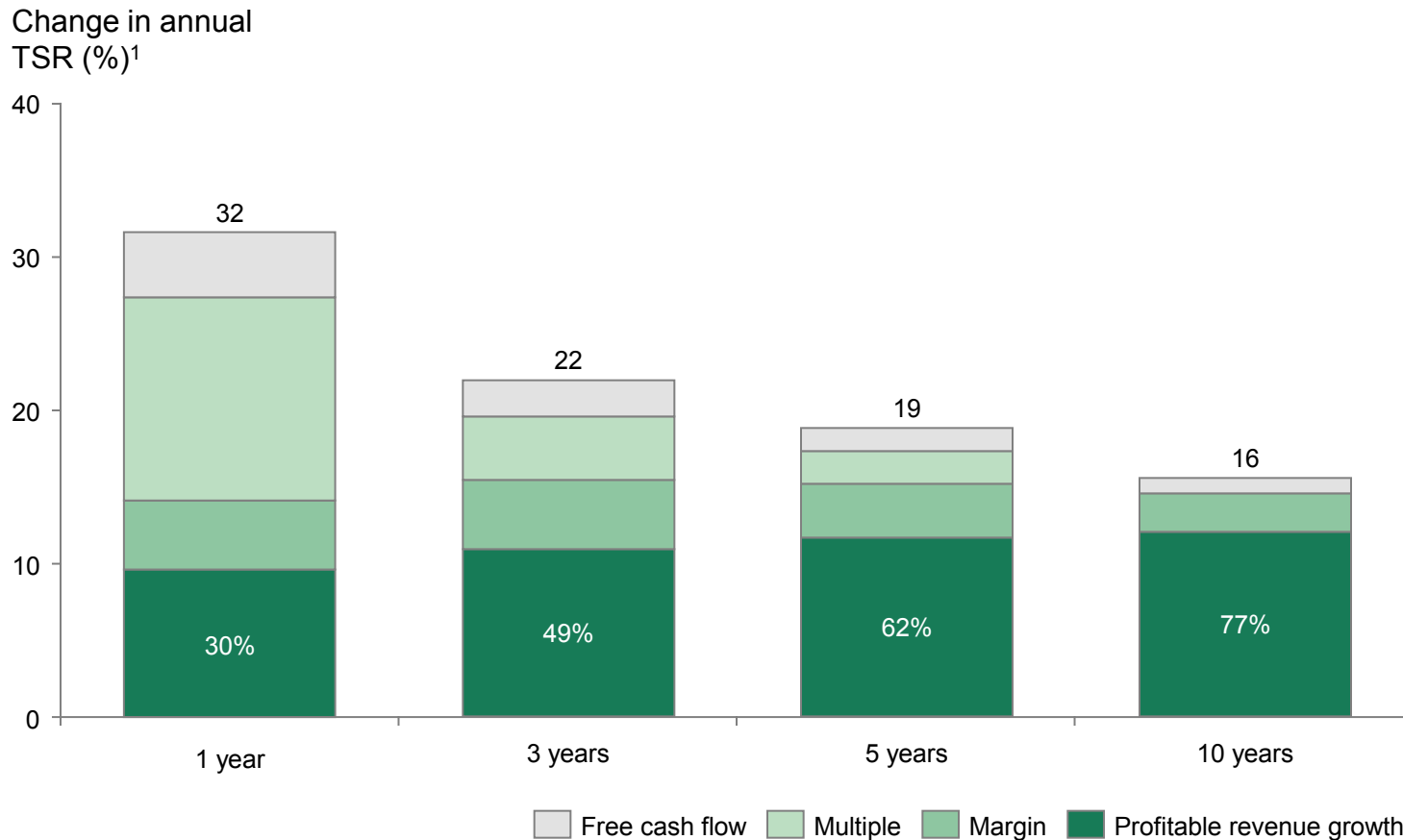
Frankfurt , June 19, 2012

Dr. Udo Jung

THE BOSTON CONSULTING GROUP

Profitable growth: Key lever for sustained value creation in the past and in the future

Sources of value creation of top-quartile performers in S&P 500



1. TSR= Total return of a stock to an investor (capital gain plus dividends); TSR for top-quartile performers (S&P 500, 1992–2011)

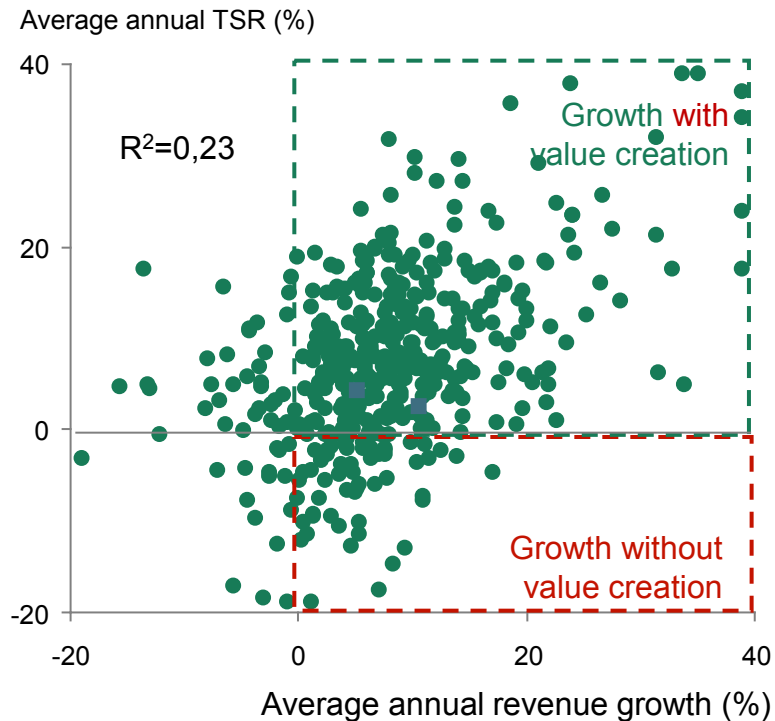
Note: The rolling analysis covers one-, three-, five-, and 10-year time frames from 1992 through 2011. Shows the average of performers in the 75th to 100th percentile to illustrate approximate for the top quartile companies (which would be equivalent to the 88th percentile); analysis excludes financial institutions

Source: Compustat; BCG Value Science Center

However: Growth alone does not automatically create value

Low correlation of growth and TSR¹

(S&P 500, 1992–2011)



Why?

Growth through value-eroding acquisitions

Growth that degrades margins and ROI

Growth that requires too much capital

Growth that increases risk

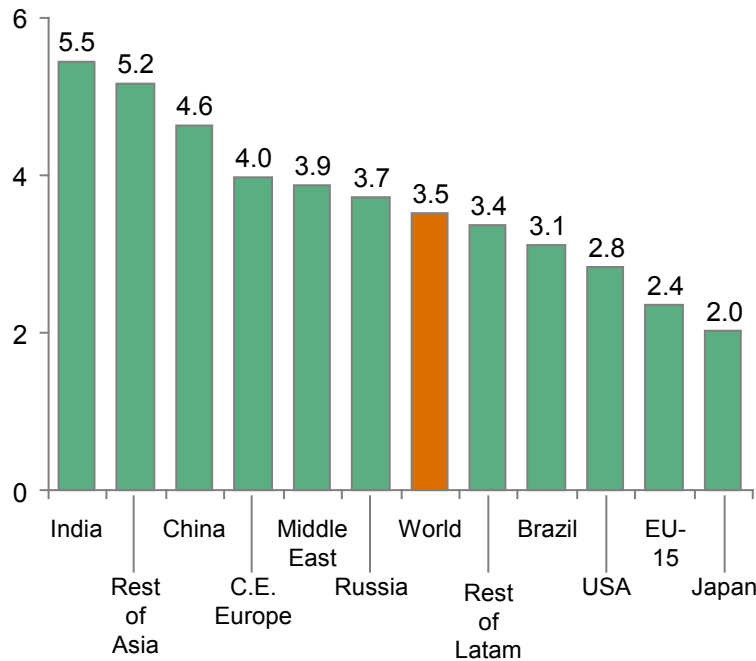
Growth that reduces the P/E

1. TSR: Total return of a stock to an investor (capital gain plus dividends)
Source: Compustat; BCG Value Science Center

We are in a two speed world: Asia expected to contribute 45% of global GDP growth until 2025

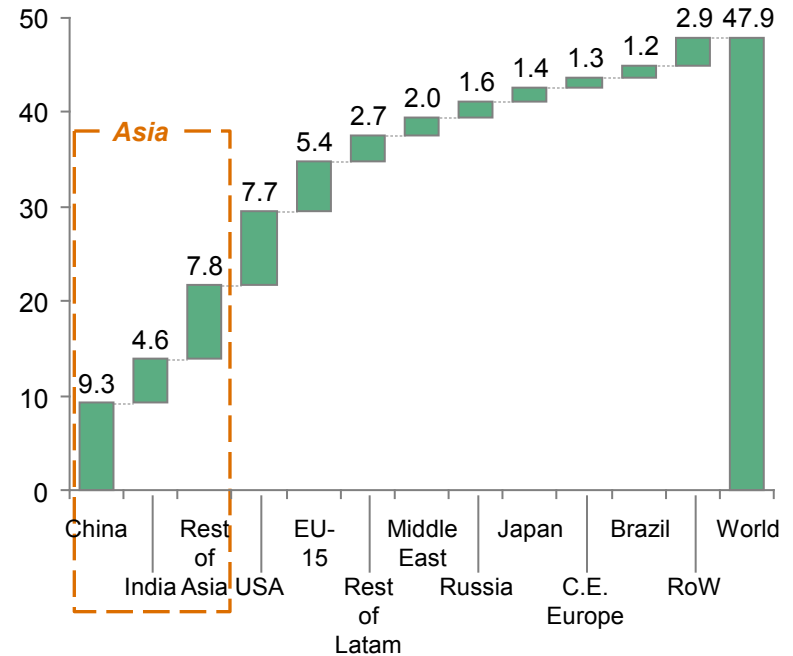
Asian economies growth compensate for OECD countries underperformance

2010–2025, GDP growth (%)



Asia (ex-Japan) accounts for 45% of overall GDP growth until 2025

2010–2025, GDP growth (Trillion US\$)



World GDP (K US\$) 2010 70.6 → 3.5% → 2025 118.5

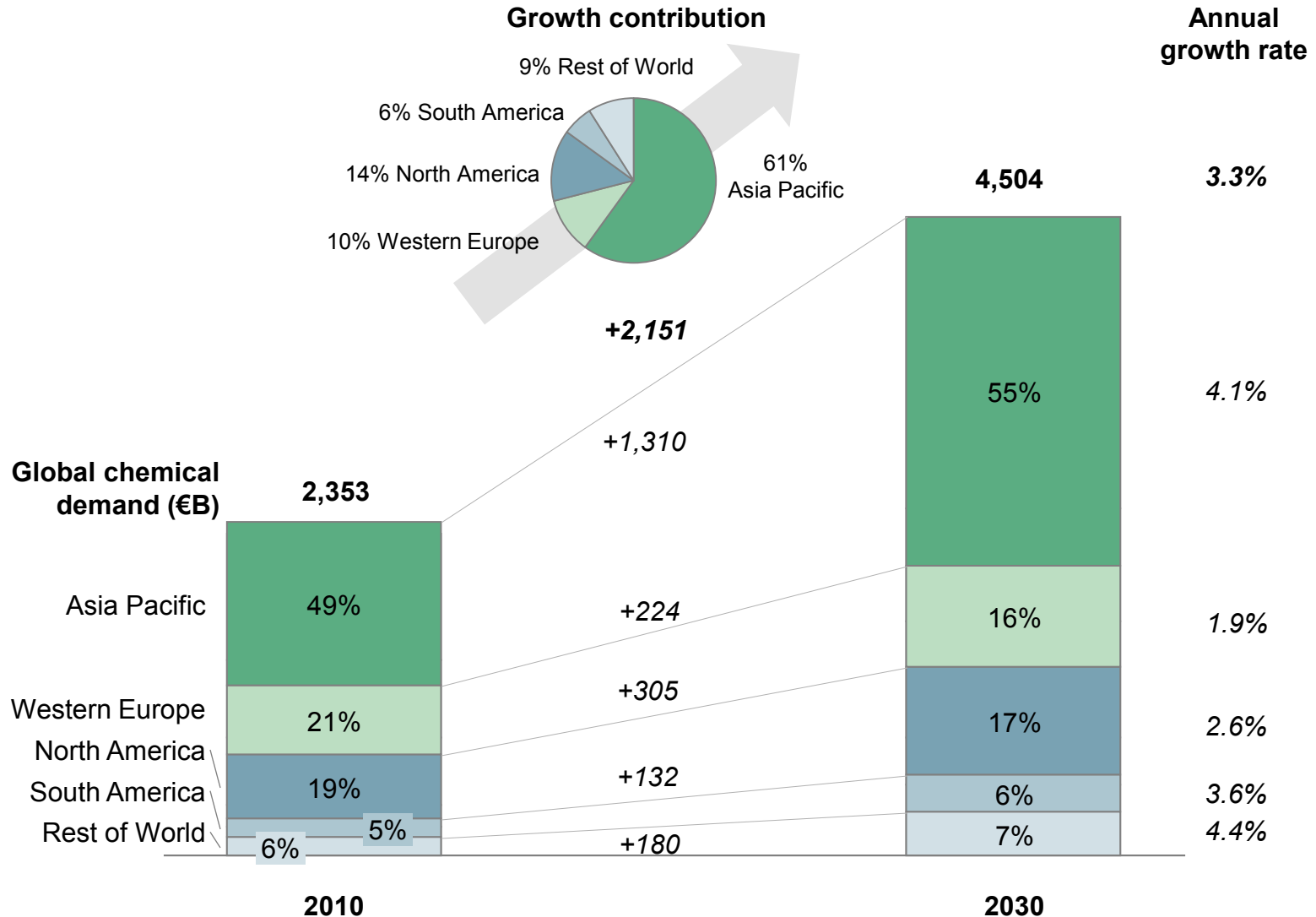
Capturing profitable growth in Asia drives business model changes of German chemical and pharmaceutical companies

x% CAGR

Note: GDP as \$ in Purchasing Power Parity (PPP)
Source: EIU; BCG analysis



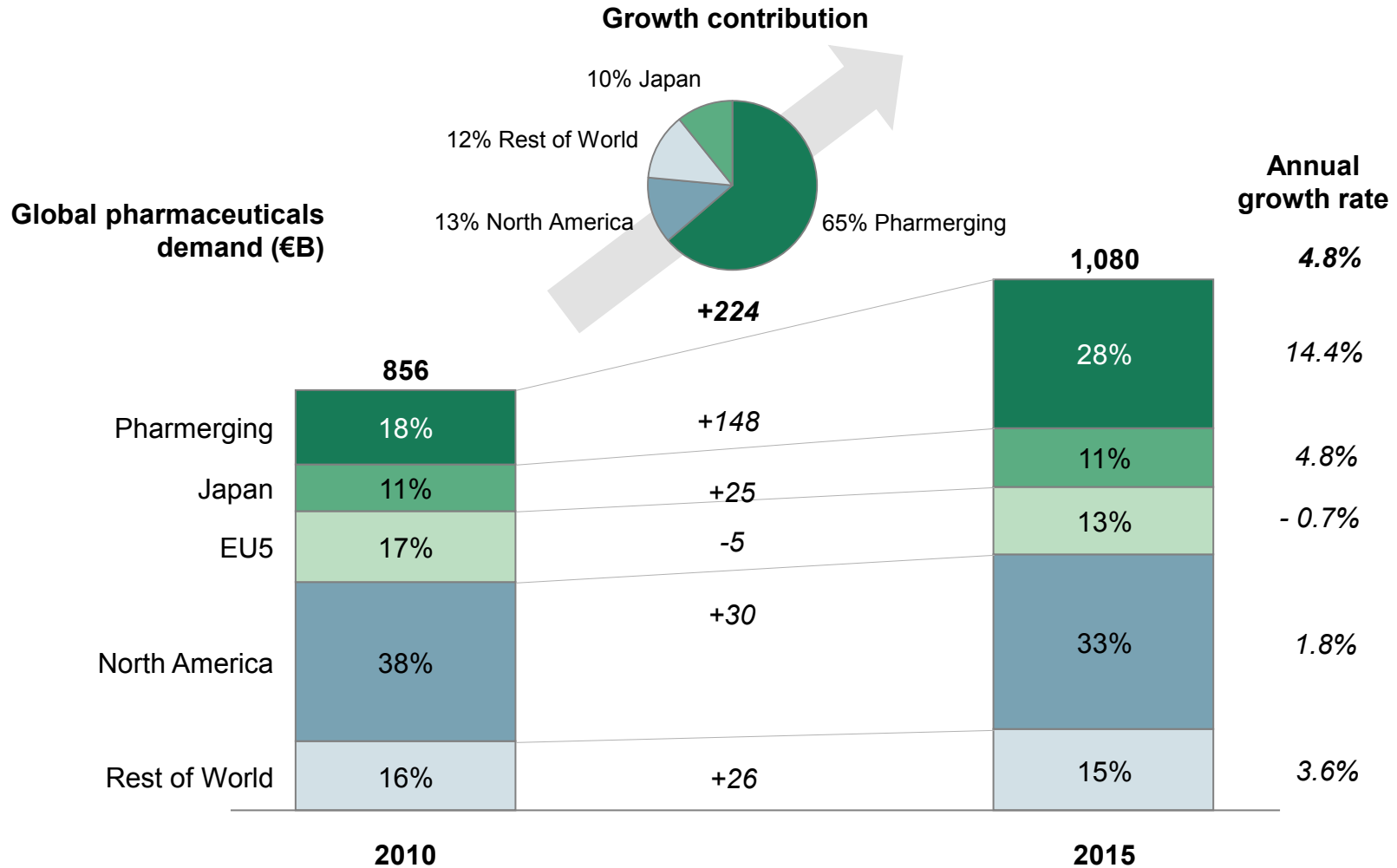
More than 60% of the total global demand growth in chemicals until 2030 contributed by Asia Pacific



Source: CEFIC Fact and Figures 2011; various analyst reports; company presentations; BCG analysis



"Pharmerging": Huge growth differential vs. established markets starting from a low base

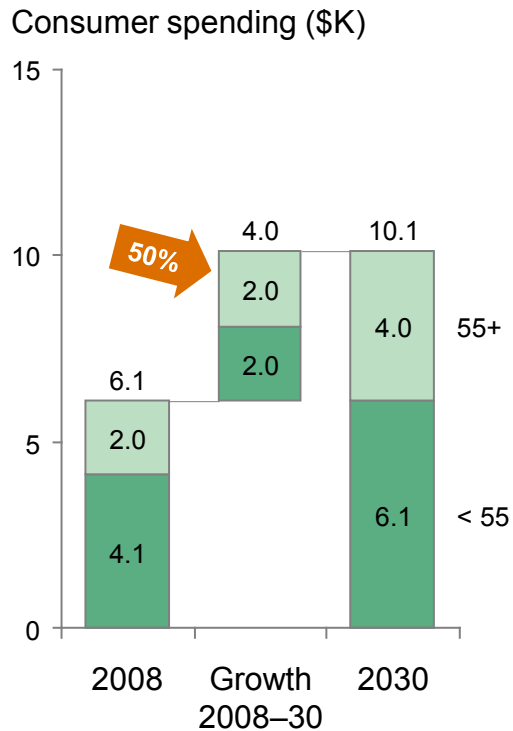


Pharmerging countries: China, India, Brazil, Russia, Mexico, Turkey, Poland, Venezuela, Argentina, Indonesia, South Africa, Thailand, Romania, Egypt, Ukraine, Pakistan and Vietnam
 EU5 countries: Germany, France, Italy, Spain, UK
 North America: USA, Canada
 Source: IMS; analyst reports: BCG analysis

Divergence in demographics: In mature markets 55+ segment drives consumer spending growth until 2030



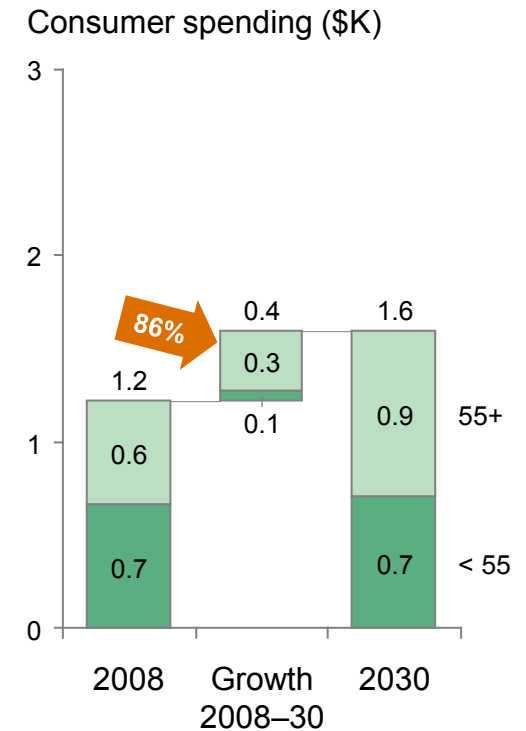
US



Japan¹



Germany²

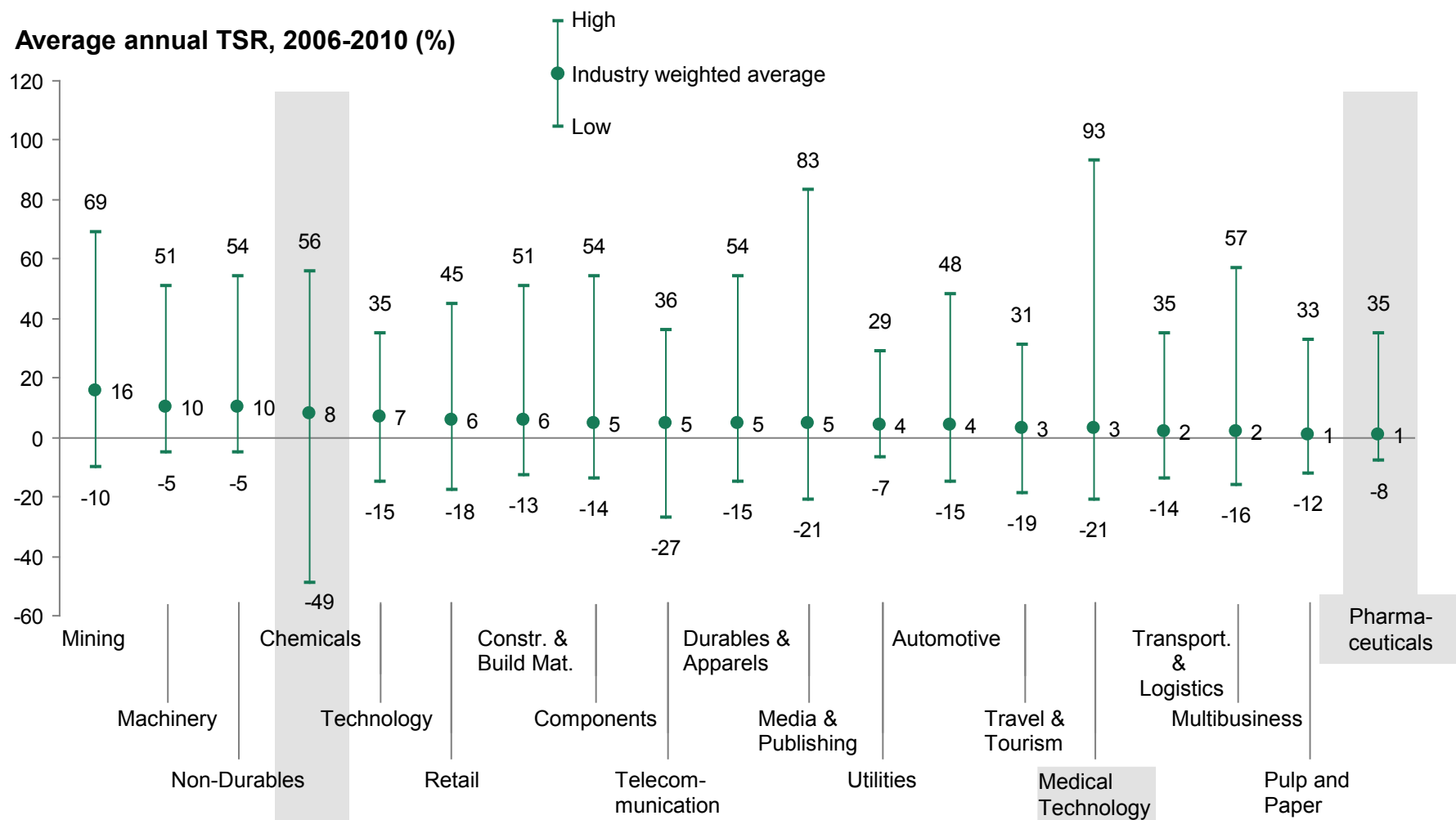


What is the implication for German chemical and pharmaceutical companies?

1. Data of Japan excludes expenditure for households with a single person, due to data availability 2. Data of Germany refers to 2007 (instead of 2008) due to data availability issues
 Note: spending power evolution forecasted based on historic correlation with GDP, not corrected with potential higher relative savings
 Source: Consumer Expenditure Survey Commissioned by AARP, 2008; Consumer Expenditure Survey, 2008; Japan Statistics Bureau & Statistics Center; Statistische Bundesamt



5 Year value creation by industry sector





Value creation of German chemical companies in the global context

5 years (2007–2011)

Rank (n=318)

Quartile TSR (p.a. in %)

10 years (2002–2011)

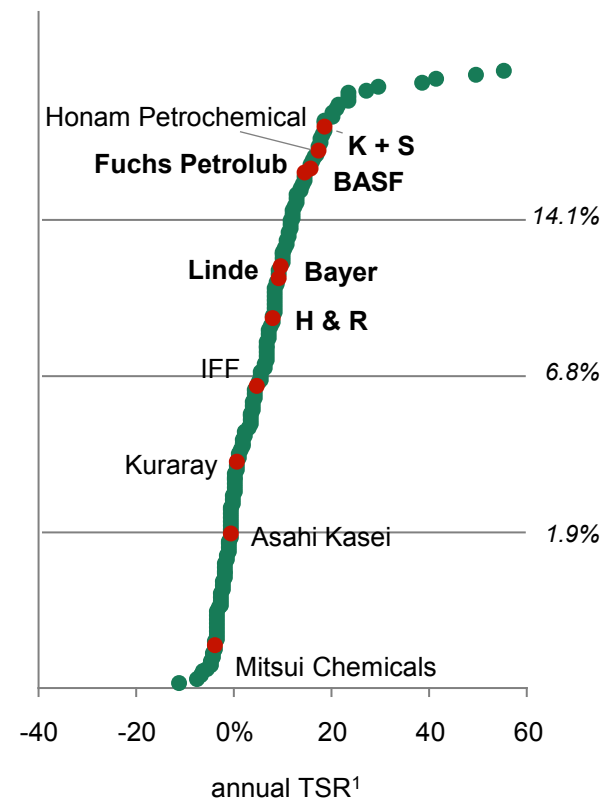
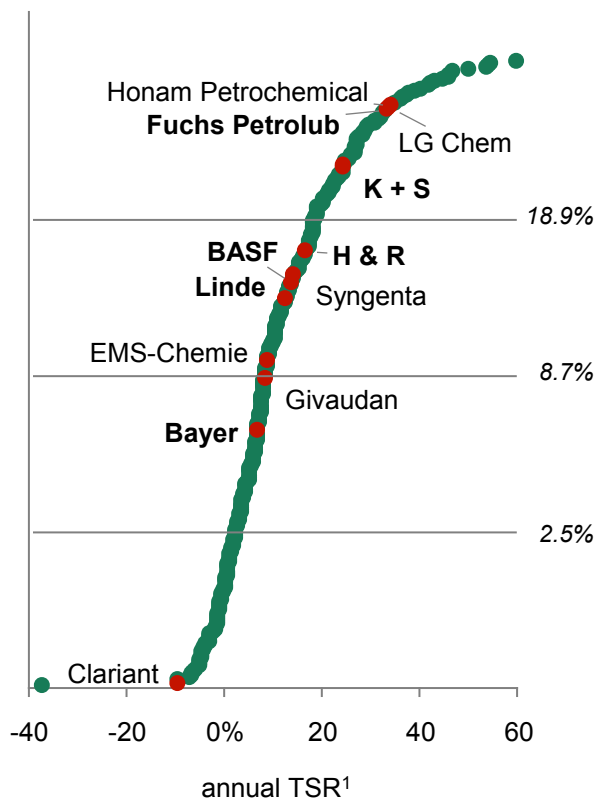
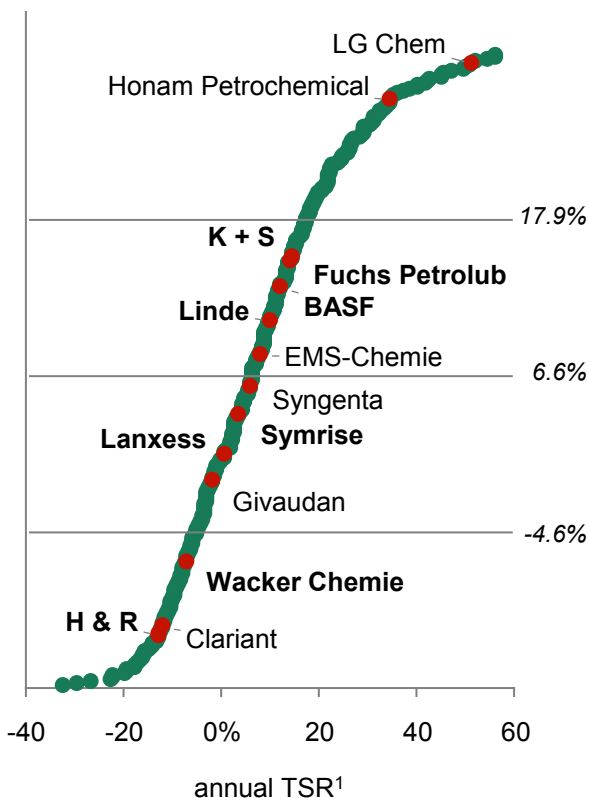
Rank (n=269)

Quartile TSR (p.a. in %)

20 years (1992–2011)

Rank (n=164)

Quartile TSR (p.a. in %)



1. TSR derived from calendar year data in local currency

Note: Worldwide industry sample based on Thomson Reuters DataStream supersector segment excluding firms not continually listed within the respective timeframe

Source: Thomson Reuters DataStream; BCG analysis



Observations in value creation patterns in the global chemical industry in the past 5 years

Observation

- 1 Overall Asian chemical companies lead in value creation—especially in base chemicals
- 2 Agro related chemical businesses with superior value creation
- 3 Japan with specific challenges in value creation
- 4 German & European chemical companies with a good track record in diversified and specialty chemicals business models—driven by the ability to manage differentiated business models



Global energy and geopolitical trends create challenges for the European and German based chemical industry

- 1 Feedstock advantaged countries will continue investing in a scenario of lower gas prices vs. higher naphtha prices**
 - No great expectations for cheap unconventional gas in Europe
 - Shale gas revolution in the US reduces European competitiveness in Chemicals
- 2 Countries will growing Chemicals demand and advantaged feedstock will increasingly drive their own economic development agenda, which includes localization of chemicals supply sources**
 - Increase value added to local economies
 - Reduce imports and increase self sustainability
- 3 For specialty chemicals customer proximity (in emerging markets) provides competitive advantage, thus favoring new capacity in demand centers—successful European chemical companies will have to "localize" their global business models**
- 4 Regulatory pressure on the chemical and adjacent sectors (e.g., power) will lead to increased costs in Europe and a potential reduction of European industry competitiveness**
- 5 Larger and integrated new "megasites" in the Middle East and in Asia copy successful European examples**

Are there unique advantages for European based value add in production, innovation and business management?



Asian and Middle East chemical companies gain importance

Global top 10 chemical companies 1980–2011

Rank	1980	Chemical sales (B\$)	1995	Chemical sales (B\$)	2011	Chemical sales (B\$)
1		14.1		24.2		79.6
2		14.1		22.1		60.0
3		13.8		21.2		58.1
4		13.7		18.0		57.9
5		13.7		17.9		50.6
6		10.6		15.9		50.6
7		10.0		15.3		38.0
8		8.4		15.1		37.3
9		7.6		14.5		33.0
10		7.0		13.3		29.6
			26			6.3

Several new leader are part of national economic agendas
"decision making beyond IIR and quarterly reporting"

Note: Asian and Middle East companies in orange boxes

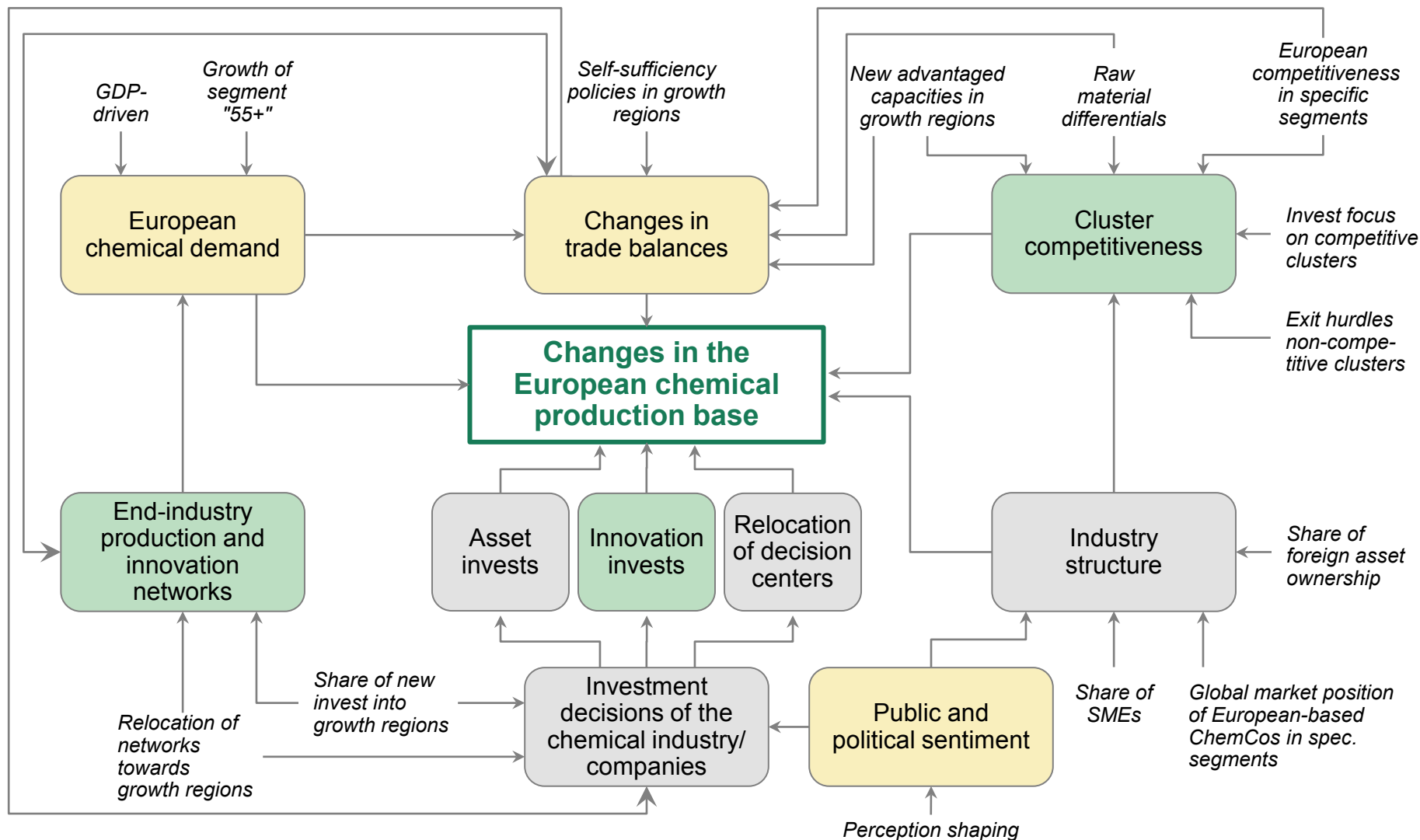
Source: Chemical and Engineering News, ICIS Top 100, Chemical Week; Company websites; BCG analysis

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Many factors influencing the future of the European chemical production base

Overview of most relevant system dynamics

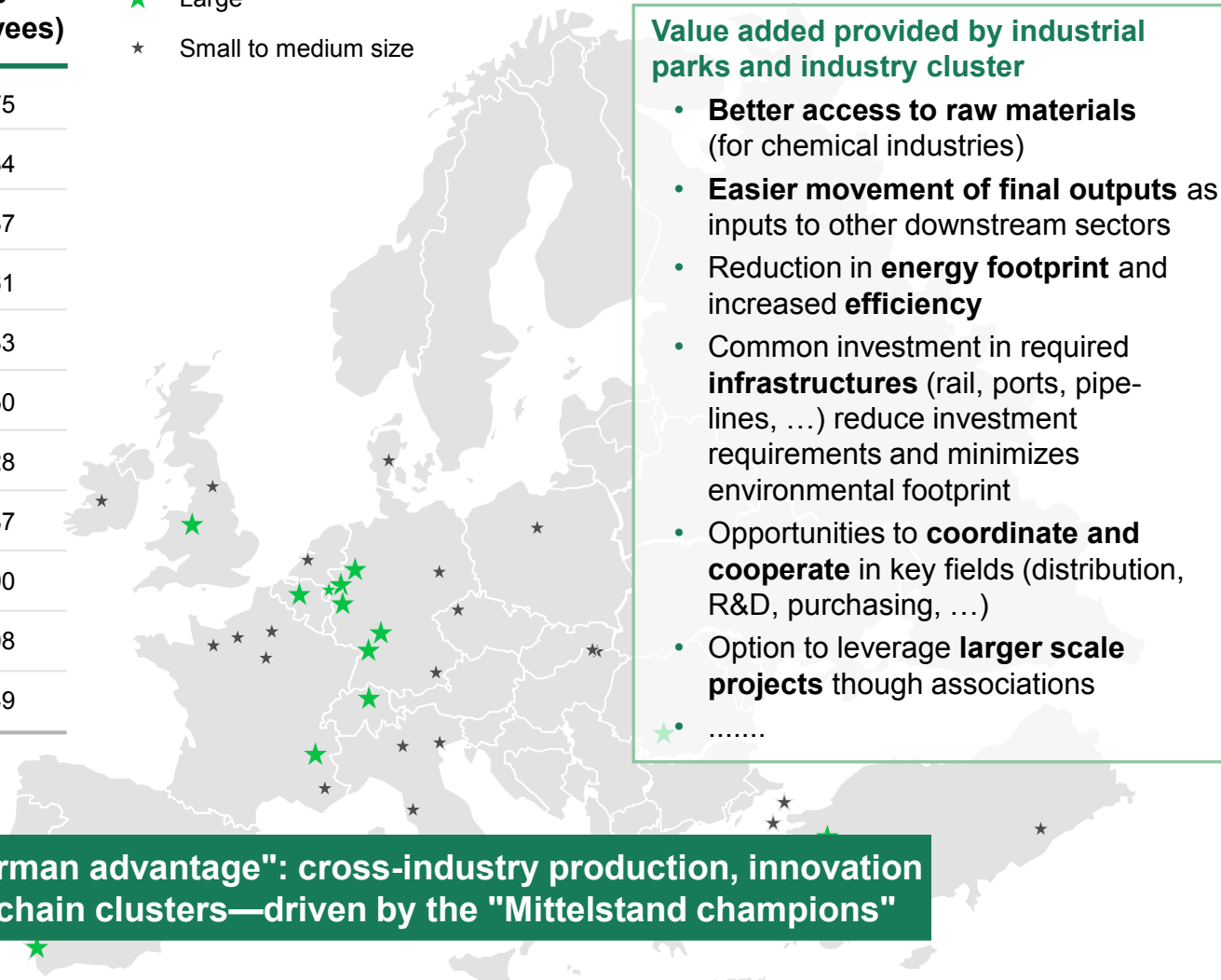




European Advantage (I): The competitiveness of chemical sites and clusters in Europe will become even more decisive

Region	Size (employees)
Rheinland-Pfalz (Mainz), DE	40,075
Düsseldorf, DE	25,284
Vlaams Gewest (Antwerpen), BE	21,937
Rhône-Alpes (Lyon), FR	20,361
Istanbul, TR	18,133
Darmstadt (Frankfurt am Main), DE	16,250
Köln, DE	15,928
Ege (izmir), TR	10,587
Münster, DE	9,590
Cheshire (Chester), UK	9,108
Nordwestschweiz (Basel), CH	8,549

★ Large
 ☆ Small to medium size



Value added provided by industrial parks and industry cluster

- **Better access to raw materials** (for chemical industries)
- **Easier movement of final outputs** as inputs to other downstream sectors
- Reduction in **energy footprint** and increased **efficiency**
- Common investment in required **infrastructures** (rail, ports, pipelines, ...) reduce investment requirements and minimizes environmental footprint
- Opportunities to **coordinate and cooperate** in key fields (distribution, R&D, purchasing, ...)
- Option to leverage **larger scale projects** though associations

★ ☆

A unique "German advantage": cross-industry production, innovation and supply chain clusters—driven by the "Mittelstand champions"



European Advantage (II): Innovation and orchestration of chemical value chains

Selected key topics

Feedstock		Technologies		Products	
Organic/inorganic feedstock		Proven technologies		Low carbon intense products	
Energy		New process technologies		Enabling precursors/products	
1	<p>New feed-stocks based on gas/coal</p> <ul style="list-style-type: none"> Boosted by direct public funding on global level Several technologies with limited yield established 	1	<p>White bio-technology</p> <ul style="list-style-type: none"> Bio-processing unlikely to substantially match traditional chemical processes in terms of volume 	1	<p>Energy storages</p> <ul style="list-style-type: none"> Boosted by new energy initiative Multiple systems, but no proven technology available
2	<p>New feed-stocks based on biomass</p> <ul style="list-style-type: none"> Biomass may become more important, but still unlikely to match 'traditional' capacities by 2020 	2	<p>Biomimetric catalysts</p> <ul style="list-style-type: none"> Resource efficiency driven Selected systems in differ. development stages Limited commercializ. yet 	2	<p>Leight weighted materials</p> <ul style="list-style-type: none"> Driven by enhanced energy efficiency in transportation New high efficient polymers to be commercialized
3	<p>Water scarcity and means of alternative energy input</p> <ul style="list-style-type: none"> Global key challenge, driven by climate change/regulation Proven technology avail. Next gener. to be developed 	3	<p>Improving bio-processing with GMO</p> <ul style="list-style-type: none"> Boosted by demographics Broad R&D topic landscape Different maturity of multiple applications in food and feed 	3	<p>Organo-electronics</p> <ul style="list-style-type: none"> Boosted by CE trends and PV thinfilm application First conducting polymers commerz.in selected applic.
4	<p>CO₂ as new building block</p> <ul style="list-style-type: none"> Key issue thermodynamics CO₂ utilization only with limited potential to solve climate challenge 	4	<p>Methane coupling</p> <ul style="list-style-type: none"> Key driver abundant global gas resources Still unmaturred topic, due to thermodynamic challenge 	4	<p>Chemicals for enhanced oil recovery</p> <ul style="list-style-type: none"> HC availability pattern shift New gen. of perf. chemicals beyond classical surfactants about to be commercialized
5	<p>Noble earth substitution in industrial application</p> <ul style="list-style-type: none"> Rapidly taken up, since key threat across all industries No alternative solutions developed yet 	5	<p>Process intensification</p> <ul style="list-style-type: none"> Energy and raw material efficiency major driver Continuous focus resulting in new process technologies 	5	<p>Active agro ingredients</p> <ul style="list-style-type: none"> Driven by demographics Multiple existing substances Crop industry leaders foster R&D to sustain AI-pipelines

Key R&D topic
 Driver and maturity

Germany has a unique value proposition in cross industry innovation

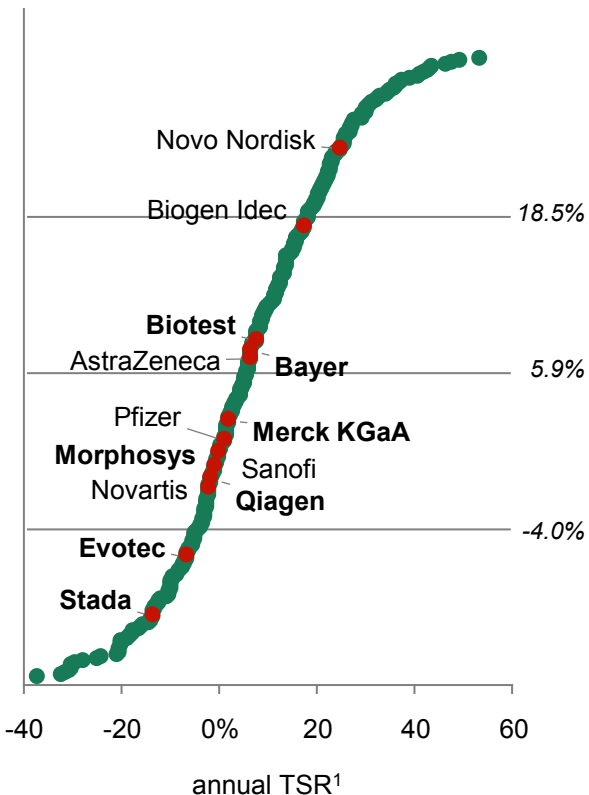


Value creation of German pharmaceutical companies in the global context

5 years (2007–2011)

Rank (n=306)

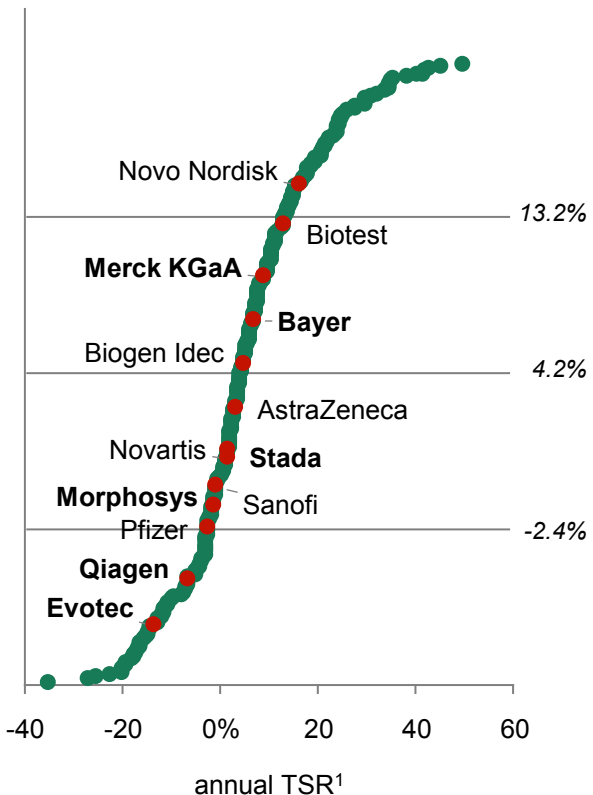
Quartile TSR (p.a. in %)



10 years (2002–2011)

Rank (n=248)

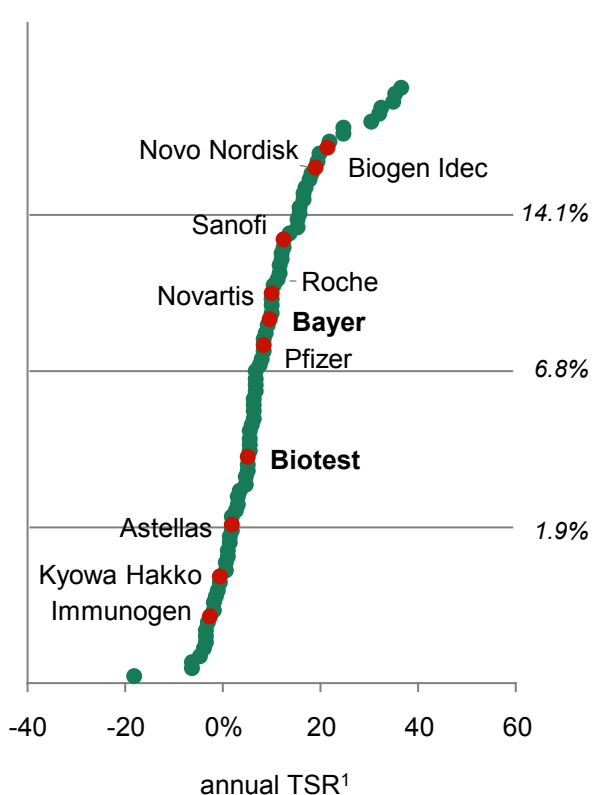
Quartile TSR (p.a. in %)



20 years (1992–2011)

Rank (n=90)

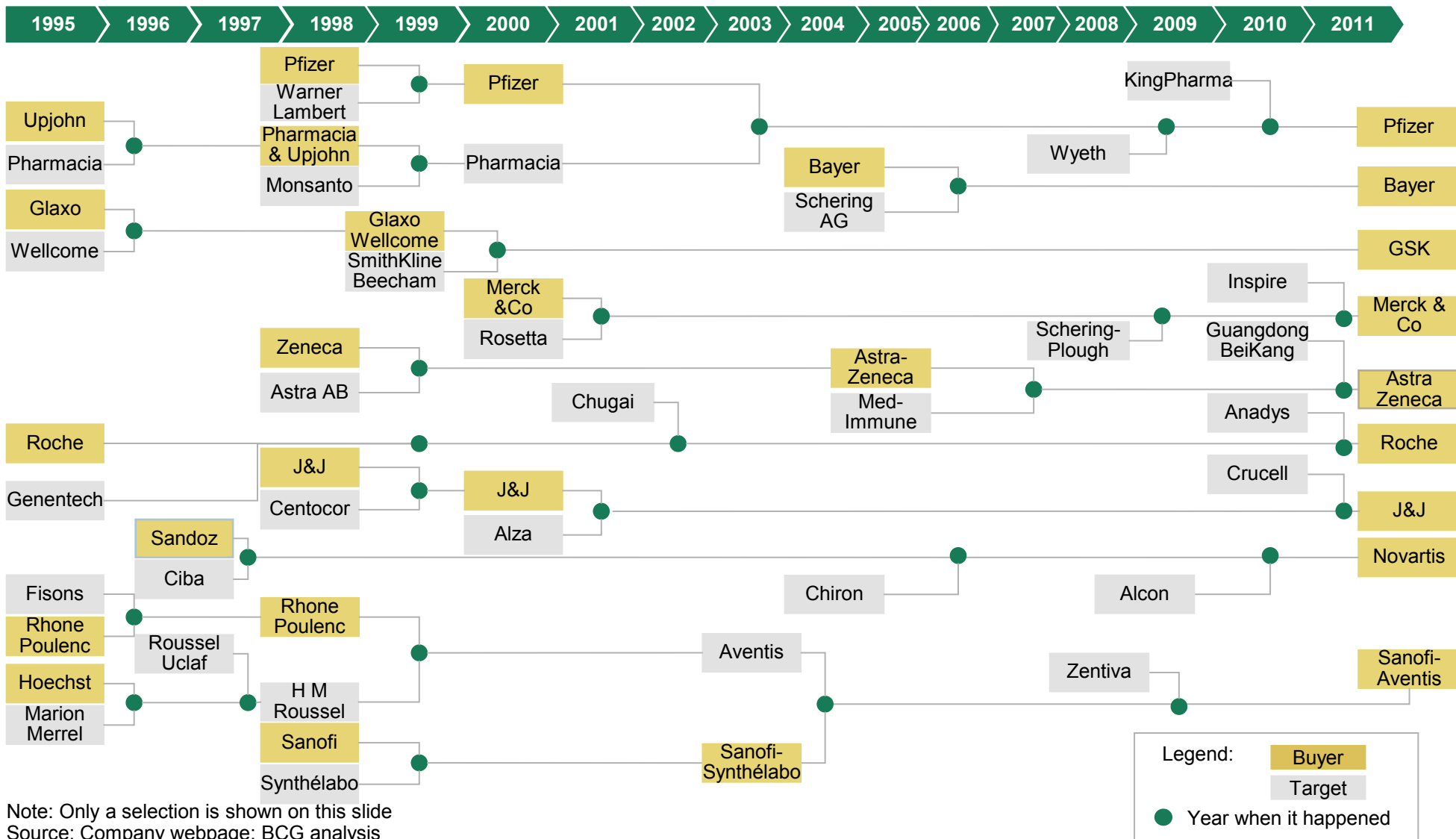
Quartile TSR (p.a. in %)



1. TSR derived from calendar year data in local currency
 Note: Worldwide industry sample based on Thomson Reuters DataStream supersector segment excluding firms not continually listed within the respective timeframe
 Source: Thomson Reuters DataStream; BCG analysis



Leading pharma companies emerged from M&A

























Note: Only a selection is shown on this slide
 Source: Company webpage; BCG analysis



Pharmaceutical market still dominated by US and EU players

Global top 10 pharmaceutical companies 1980–2011

Rank	1980	Pharma sales (B\$)	1995	Pharma sales (B\$)	2011	Pharma sales (B\$)
1		1.6	 NOVARTIS	9.7	 Pfizer	56.3
2		1.4	<i>GlaxoWellcome</i>	9.6	 NOVARTIS	51.5
3	 MSD	1.4	Hoechst	7.8	 MERCK	40.1
4	American Home	1.2	 MERCK	7.7	 SANOFI	39.3
5	 Roche	1.2	 <small>Roche</small> Roche	6.8	AstraZeneca 	37.0
6	Smith Kline	1.1	American Home	6.5	 Roche	34.5
7	 <small>Boehringer</small> Ingelheim	1.0	<i>Johnson-Johnson</i>	6.2	 <small>GSK</small> GlaxoSmithKline	34.3
8	 SANDOZ	1.0	 Pfizer	6.1	<i>Johnson-Johnson</i>	27.6
9	 Pfizer	1.0	 Roche	5.7	 Abbott A Promise for Life	25.8
10	Bristol-Myers	0.9	 SB SmithKline Beecham	5.5	 TEVA	23.9

The future of value creation in the German chemical and pharmaceutical industry



Obviously the global context matters

- 2-speed global economy, the rise of state owned enterprises in chemicals, self-sustainability agenda in pharma and in chemicals in many growth regions

Company perspective

- To grow profitably and to create value European and German based chemical and pharmaceutical companies will continue to globalize their business models—and invest in "localization" in the growth regions (production, R&D, decision center relocation)

Location perspective

- European chemical and pharmaceutical company have proven their ability to create value with differentiated and diverse business model (management of complexity)
- The attractiveness of Europe and Germany as a location for innovation and production is driven by the "integrated attractiveness" (infrastructure, logistics, resource efficiency) of sites and clusters
- Cross-industry innovation and production cluster are largely a unique German advantage driven by the unmatched density of "Mittelstand-champions"