



Globalizing the value chain: The future of R&D in Austria/ Germany

Study

Summary version

Vienna/Stuttgart, October 2007

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A.

Motivation and methodology –
135 companies in Austria and
Germany have been analyzed to
define globalization trends of R&D

The study examines current practices in globalizing R&D – It considers the drivers and organizational models in seven industries

- > **Globalization** of value chains has increased significantly in recent years – The focus of globalization has expanded from manufacturing and assembly to the entire value chain
- > When it comes to **R&D**, however, the process of globalization is still largely unclear – **Various patterns** can be found in practice
- > **Roland Berger**¹⁾ has conducted an **empirical study** to explore the drivers of R&D globalization and its organizational models **across seven industries**
 1. Automotive
 2. Engineered products
 3. Consumer goods
 4. Paper/timber
 5. Chemicals
 6. Pharmaceuticals
 7. Electronics & IT

1) Together with the esb Research Institute and Omniquest

To find out more about the patterns and success factors of R&D globalization, our study set out to answer several guiding questions

Guiding questions

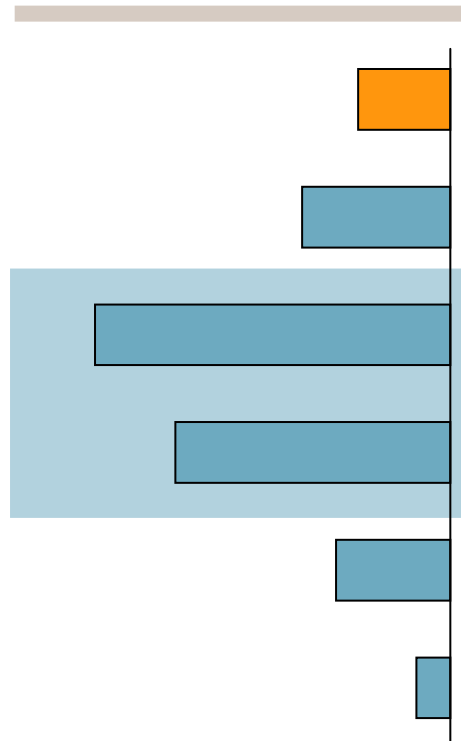
<p>What drives companies in globalizing their R&D?</p>	<ul style="list-style-type: none"> > Are cost savings the main driver? > How important is access to local markets? > What role does access to technology play?
<p>How do companies pick their R&D locations?</p>	<ul style="list-style-type: none"> > What are the main criteria for selecting R&D locations? > What is their global positioning?
<p>How do companies organize their global R&D network?</p>	<ul style="list-style-type: none"> > To what extent do different locations collaborate? > How are external partners included? > How is global R&D best organized?
<p>What tools/methods do companies apply to manage their global R&D process?</p>	<ul style="list-style-type: none"> > What tools are used to achieve different strategic goals? > Are there any differentiating tools and methods?
<p>How do companies communicate and exchange know-how globally?</p>	<ul style="list-style-type: none"> > How is information/know-how exchanged between global R&D organizations?



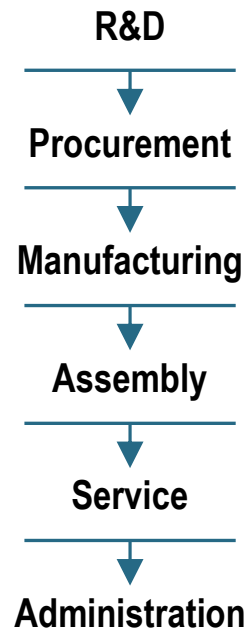
**Differen-
tiation per
industry
and
between
German-
and
Austrian-
based
companies**

Companies drive the globalization process by relocating all parts of the value chain – Including R&D

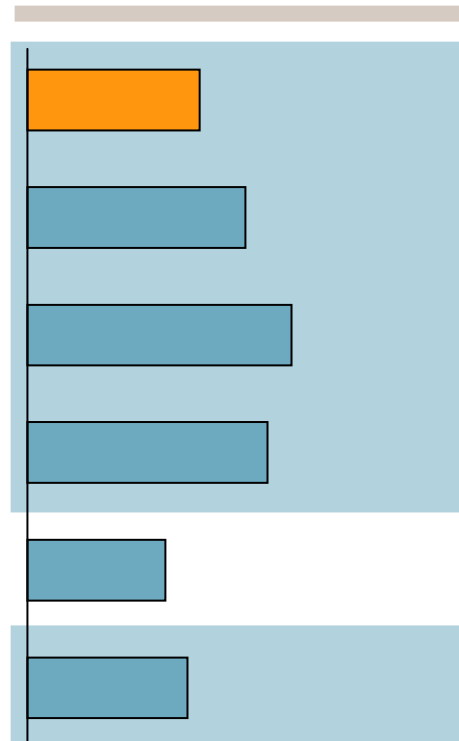
Past relocation focus



Functions



Current relocation focus



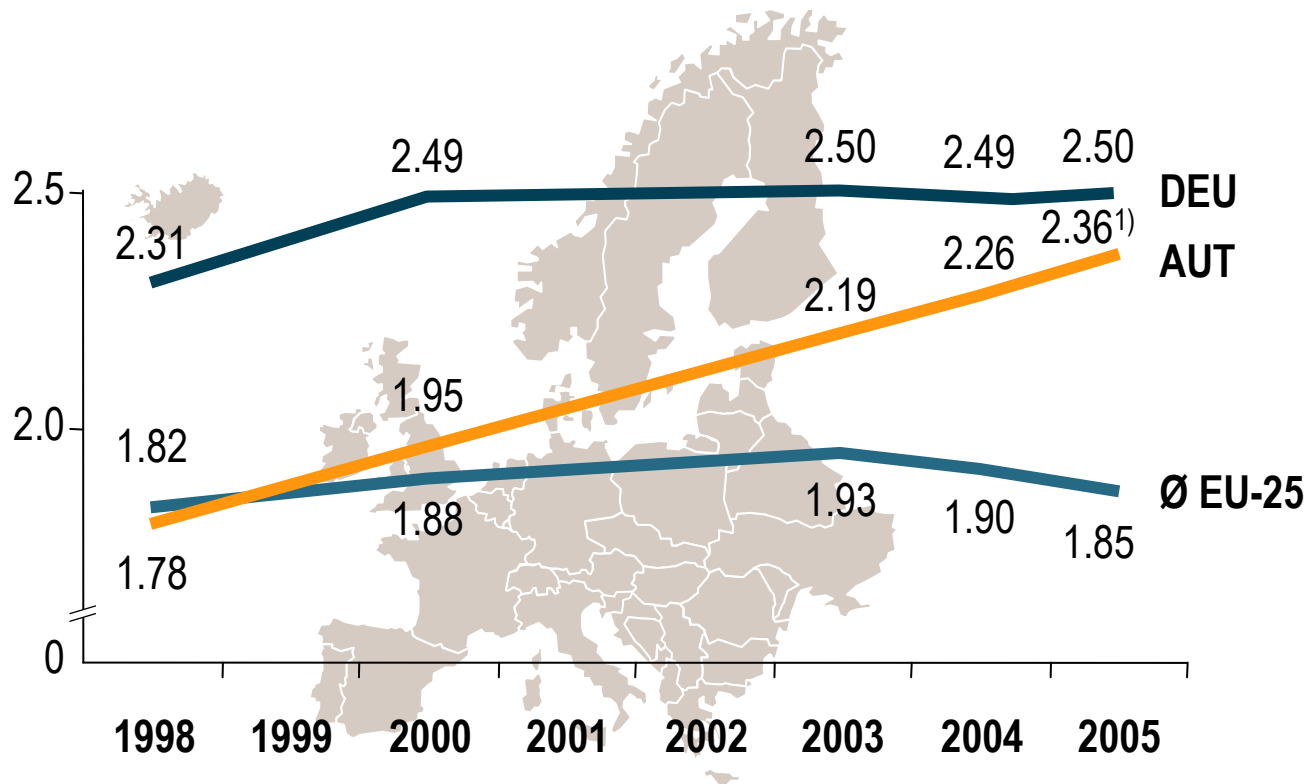
Main issues

- > **Past relocation focus on:**
 - Lower cost, especially for labor
 - Local sourcing
 - Avoiding currency exchange rate risks
- > **Next generation of relocation for establishment of shared service centers:**
 - Bundling of non core business activities
 - Leverage of cheaper service providers (outsourcing and off shoring)
- > **Nowadays nearly the complete value chain is globalized**

Focus then and now

Austria was able to surpass the EU-25 R&D average over the last ten years – Germany is still ahead

National R&D expenditures [% R&D of total GDP]

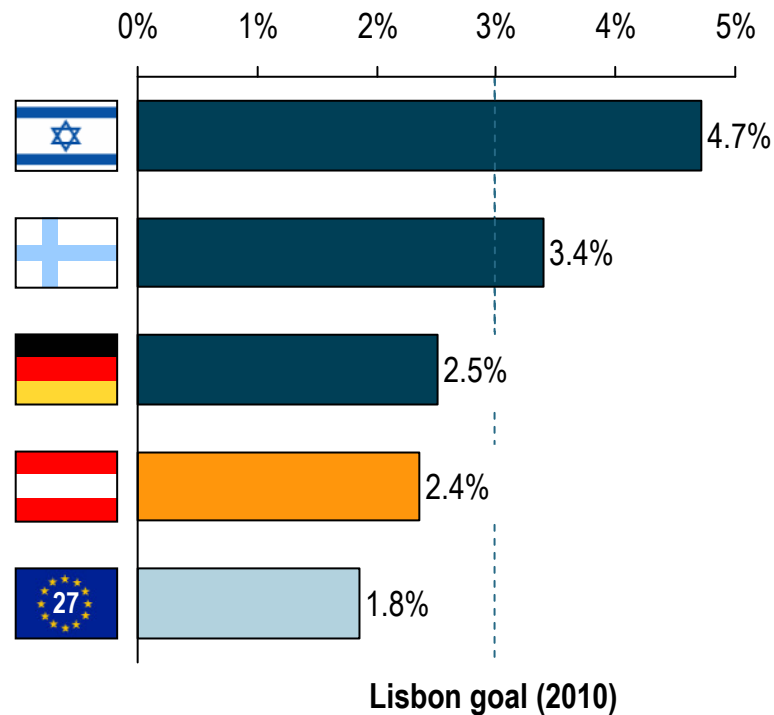


- > Austria surpassed the EU-25 average and increased R&D expenditures from 1.78% in 1998 to 2.36% in 2005
- > Germany's expenditures are even higher with 2.5%
- > Overall EU-25 average is below 2% with a decline over the last years

1) 2007: Planned 2.43%

Still – compared to best in class, Austria has room for improvement

R&D expenditures 2005 [% of total GDP]

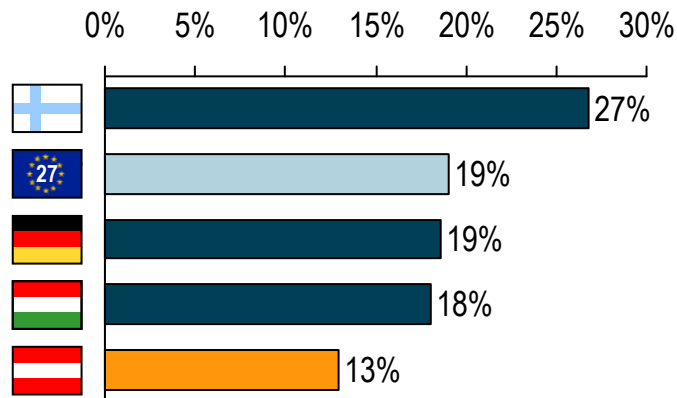


Rationale

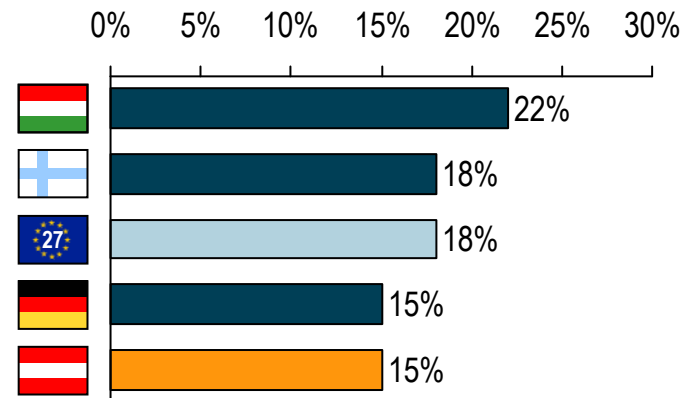
- > R&D expenditures in EU 25 was at 1.85% of total GDP in 2005, which is significantly lower than the Lisbon goal of 3% for 2010
- > Austria is on its way with 2.36% but still below Germany with 2.5% and with substantial room for improvement to reach 3%
- > Emerging markets are catching up quickly. China is supposed to reach the prospected EU average by 2009

Especially the high tech segment is still underrepresented in Austria

Added value through high-tech products in 2003
[% of total value added]



High-tech exports 2004
[% of total exports]

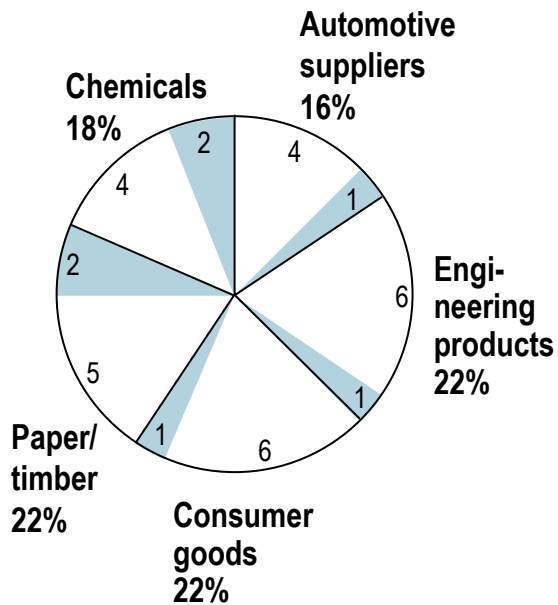


- > Considering its high R&D expenditures, Austria generates only 13% of total value added with high tech products
- > In addition, concurrency from SEE in mid-tech segment increases constantly

Hightech: Medical and optical instruments, pharmaceuticals, etc. **Midtech:** Metal production, Mechanical engineering, Engines buildup etc.

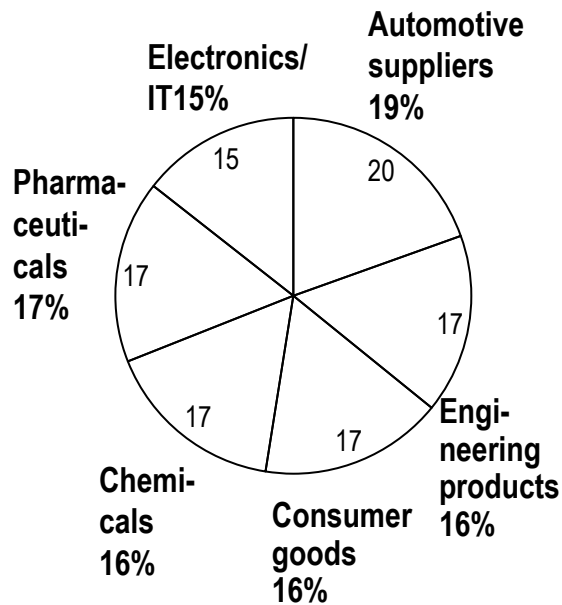
Representatives of 135 companies in seven different industries in Germany and Austria have been interviewed

Austria



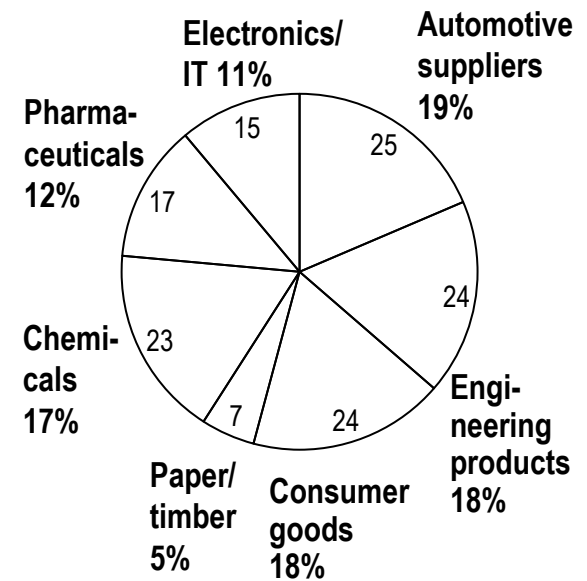
n = 32

Germany



n = 103

Total study



n = 135

□ Headquarter in Austria ■ Headquarter outside Austria

B.

Major findings –
R&D has become an integral part of
globalization with technology and
market access as main drivers for
relocation

R&D has become an integral part of globalization – relocation expected to go on over the next five years

After relocating production and assembly, the complete value chain including R&D is subject to globalization (except services)

- 1 Globalization of R&D** started to develop in the 1990ies on a small scale but has become **significant in recent years**
 - Austria was behind Germany at that time
 - Nowadays, Austria has surpassed Germany in terms of international R&D expenditures as well as in number of R&D locations outside of its home country
 - International companies with major sites in Austria have more global R&D locations than Austrian companies

- 2** Future trends predict **further global R&D activities** in the next five years. Austrian companies have higher expectations than German companies. International companies are again top scorers when it comes to the buildup of additional global R&D locations

Technology and market access as main driver – locations selected on access to qualified personnel and to ‘follow the customer’

3 **Main drivers** for internationalization are **access to technology and markets**. Costs are not the driver for going abroad; clear patterns were found for market and technology dimensions:

- Market dimension: Paper/Timber, Chemicals, Pharmaceuticals and Electronics/IT
- Technology dimension: Engineered products, Automotive suppliers and Consumer goods

International companies operating in Austria show more cost sensitivity than Austrian-based companies

4 Dominant model for R&D organizations is a **global research center** with **local development locations**. Austrian companies still strongly rely on home country

5 Main criteria for selecting an international R&D location is **access to qualified personnel** with "follow-the-customer" and existing production facilities as second and third most important

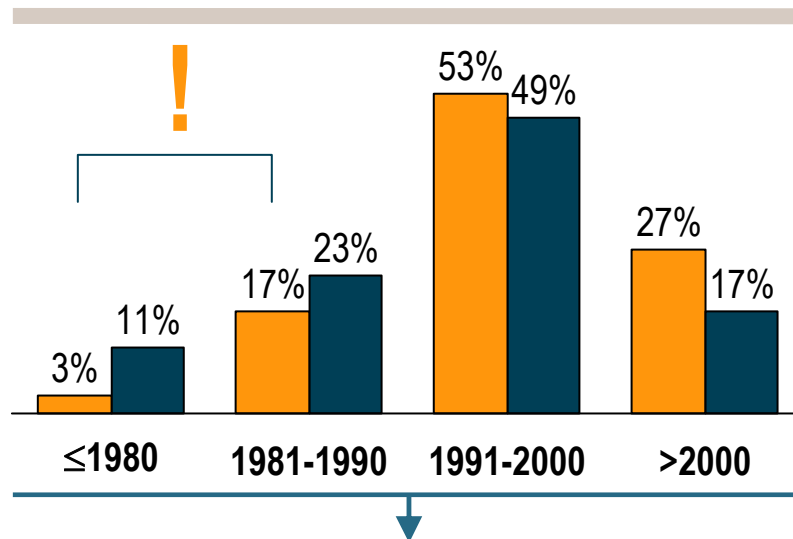
R&D is a people's business, personal interaction is key. Globalization of Development increases

- 6** **Personal interaction and informal communication** is seen as a key success factor for international collaboration
 - Cross functional teams are most important in achieving high level results
 - Early and proactive communication is seen as a success factor in globalizing R&D organizations
- 7** The generally accepted "**grade-of-completion**" metric is used for tracking overall progress of global activities
- 8** The **future of R&D in Austria** is mixed: Research stays in home country while development is being globalized to constantly leverage market and customer affinity
 - Austrian companies retain research in Austria while further relocating development to new markets (esp. Asia)
 - International companies are regularly optimizing their development-footprints. Only highly attractive framework conditions can retain these locations in Austria

Germany started earlier with global R&D activities, but today Austria spends more on global R&D projects

Global R&D experiences and budget spent

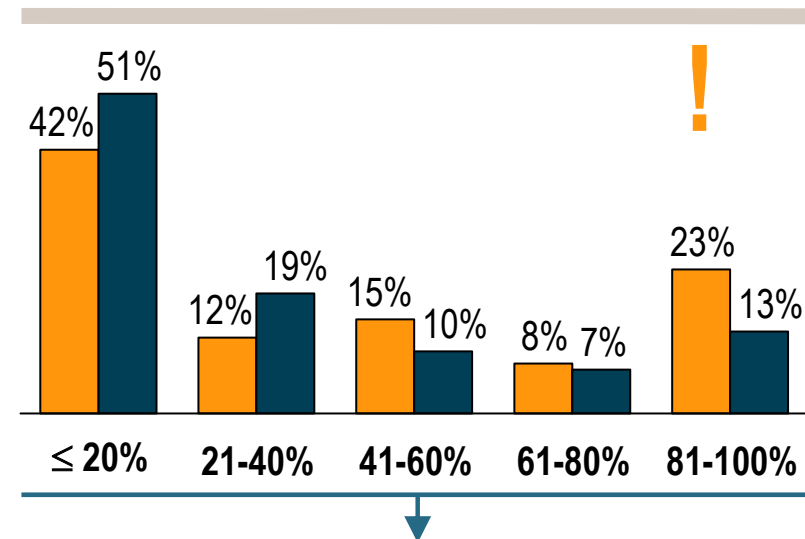
First experience with global R&D activities [%]



> Less than 20% of the surveyed Austrian companies have had experiences with global R&D activities until 1990 (34% of German companies had such experiences in comparison)

AUT DEU

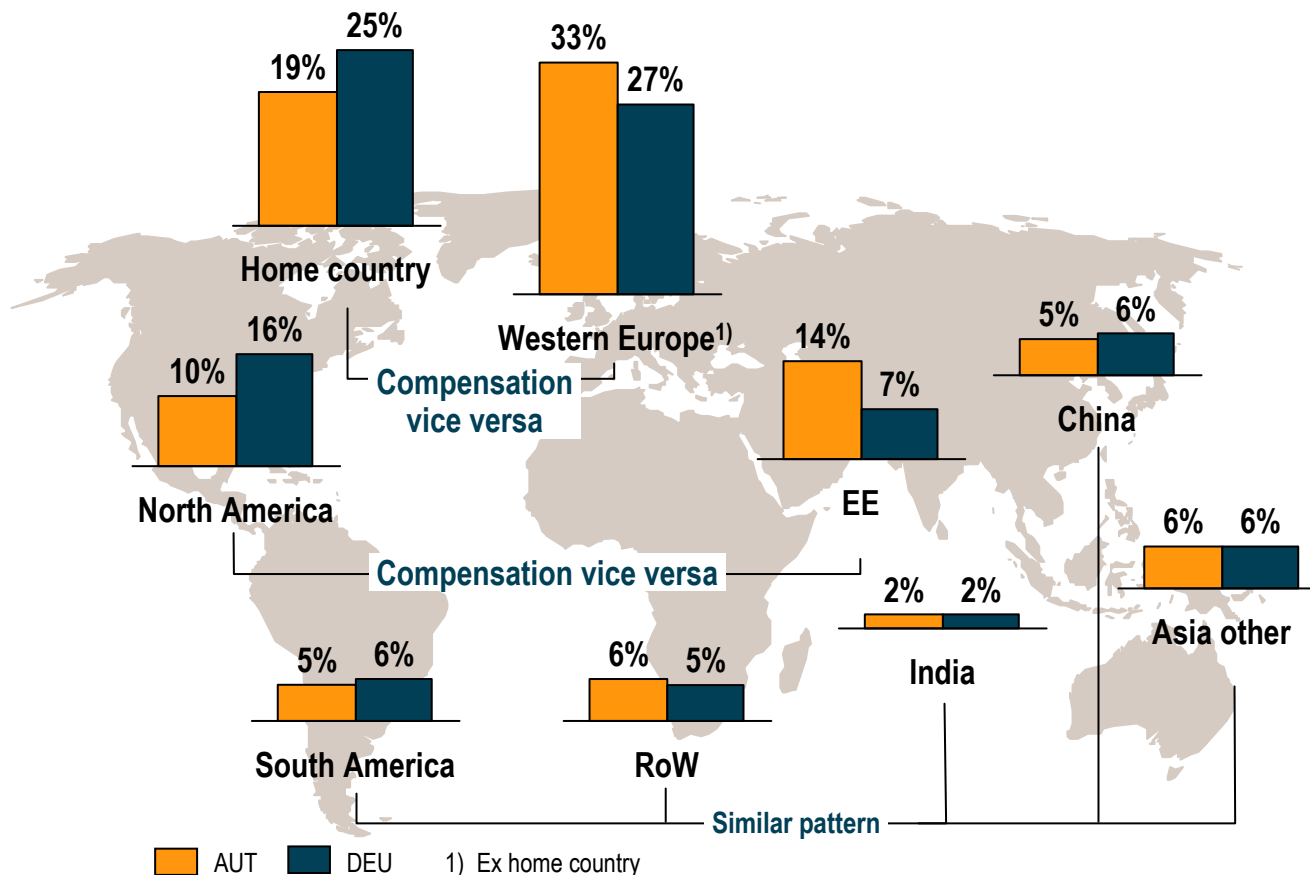
Total R&D budget spent on global R&D projects (2006/07) [%]



> While 23% of the surveyed Austrian companies spend more than 80% of their total R&D budgets on global projects, German companies are reluctant to do so with only 13%.

Western Europe still dominates the landscape of Austrian and German R&D locations

R&D locations by region [%]



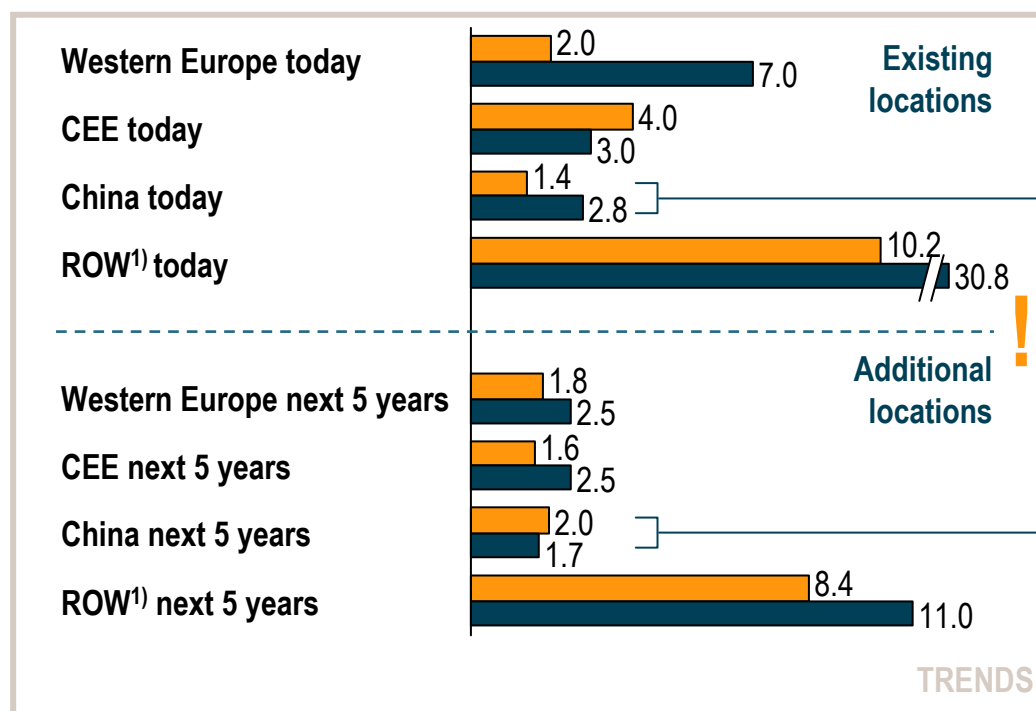
- > Main difference of AUT and DEU compensated in
 - Home country (+6% pts D)
 - Western Europe (+6% pts AUT)

Higher share of R&D outside of home country for AUT
- > Different setup of R&D in CEE and NA for AUT and DEU

Higher concentration of EE-R&D for AUT vs. NA focus for DEU
- > Similar pattern for rest of world

International companies are moving to further globalize R&D – Austrians show higher interests to increase R&D in China only

Average number R&D locations per company



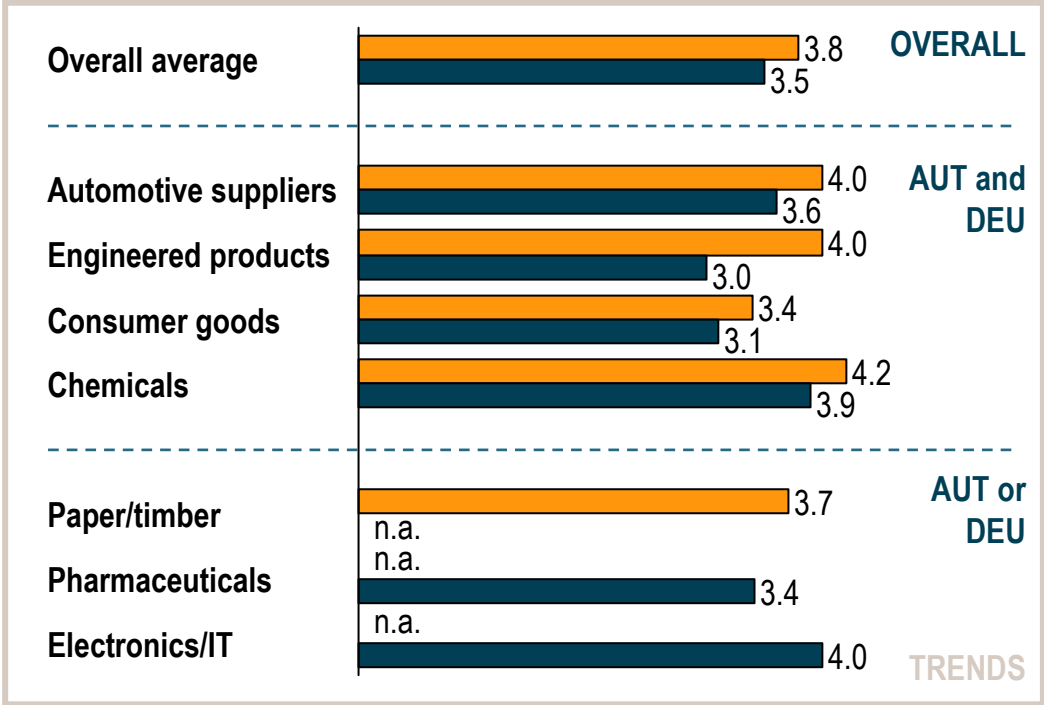
Rationale

- > Overall number of R&D locations of international companies is generally higher compared to Austrian based ones
- > CEE is the exception, where Austrian based companies are represented with more sites than internationals (proximity to markets and cultures)
- > Trend to build up further R&D locations is higher for international companies
- > Exception only in China: Austrian companies are more interested to increase number of R&D locations; possible reason is need to catch up in Asia due to former emphasis on CEE

■ Austrian based companies
 ■ International companies with strong Austrian subsidiary
 1) Rest of world

Austrian companies expect higher tendency for future globalization of R&D than German ones

Future trend of R&D globalization within next 5 years¹⁾



Rationale

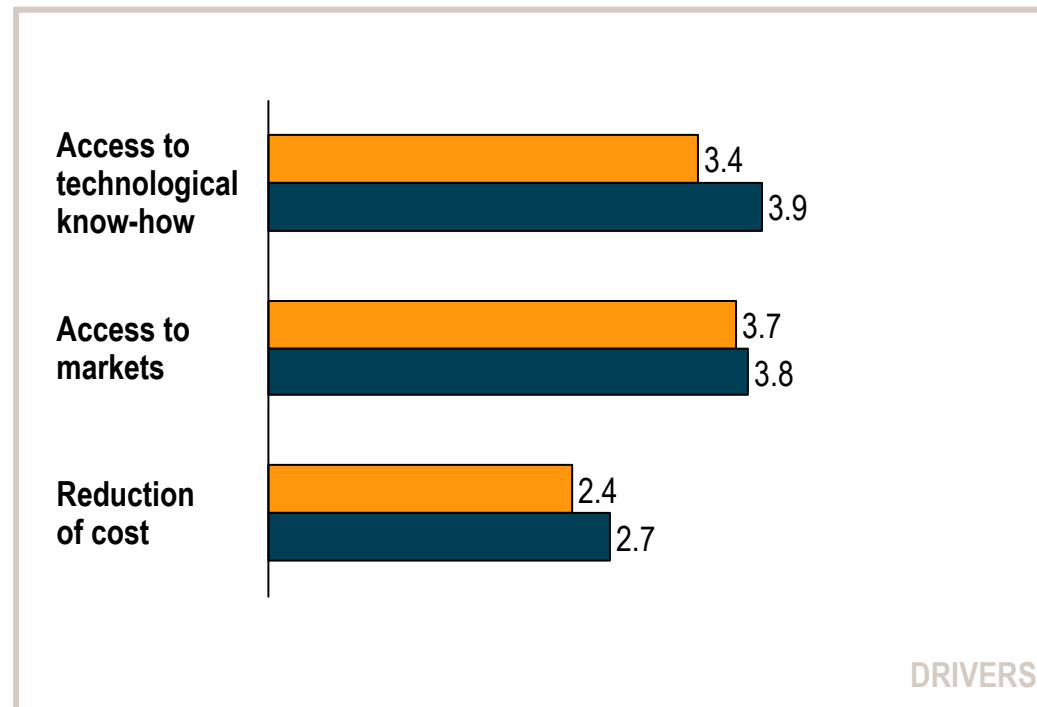
- > **Higher rating for increasing R&D globalization in Austria** compared to Germany
- > **Highest grade in chemicals** with automotive suppliers and engineered products following
- > Possible **correlation** with overall **national R&D expenditures** in Germany and Austria

■ AUT
 ■ DEU

1) Likert scale – importance of driver 1 – no tendency ... 5 – high tendency

Access to technology and markets are more important drivers for R&D globalization than cost issues

Drivers for globalization of R&D¹⁾



■ AUT
 ■ DEU

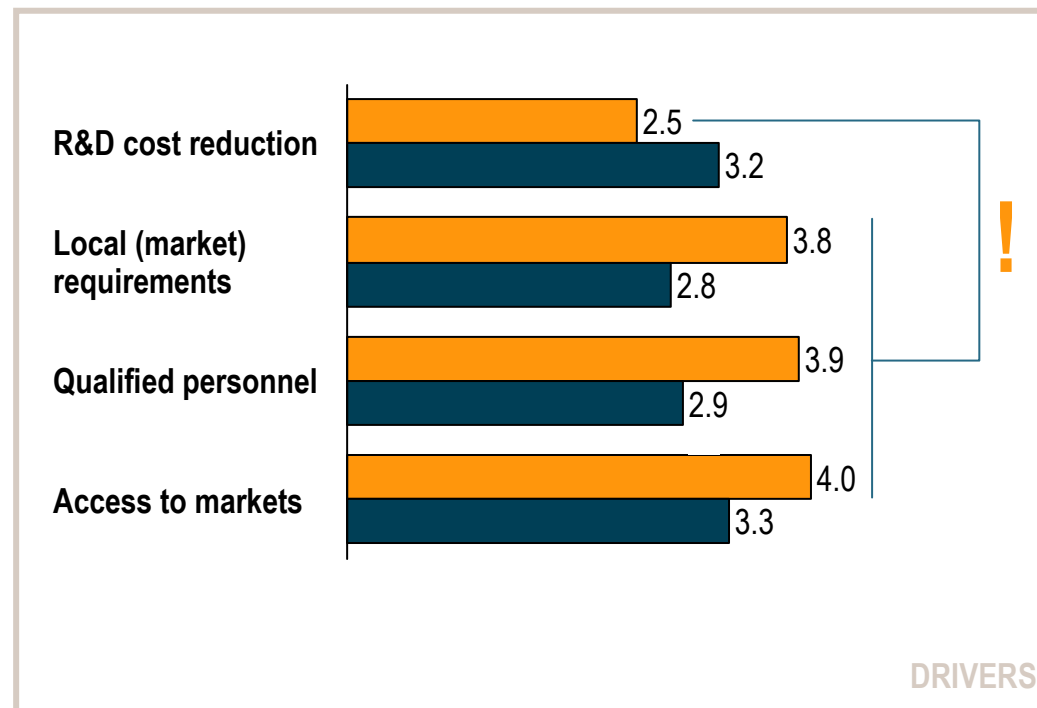
1) Likert scale – importance of driver 1 – low ... 5 – high

Rationale

- > **Access to technology and market** play the most important role in the decision to globalize R&D
- > **Cost considerations** play a role in individual projects, but are generally less important for a strategic globalization decision
- > In addition, **Austrian companies emphasize** the access to technologically **more advanced innovations** and to **qualified R&D staff** as strong drivers for the R&D globalization

International companies with sites in Austria put emphasis on R&D cost reduction – Austrian ones go for qualified personnel and markets

Main drivers for globalizing R&D¹⁾



■ Austrian based companies

■ International companies with strong Austrian subsidiary

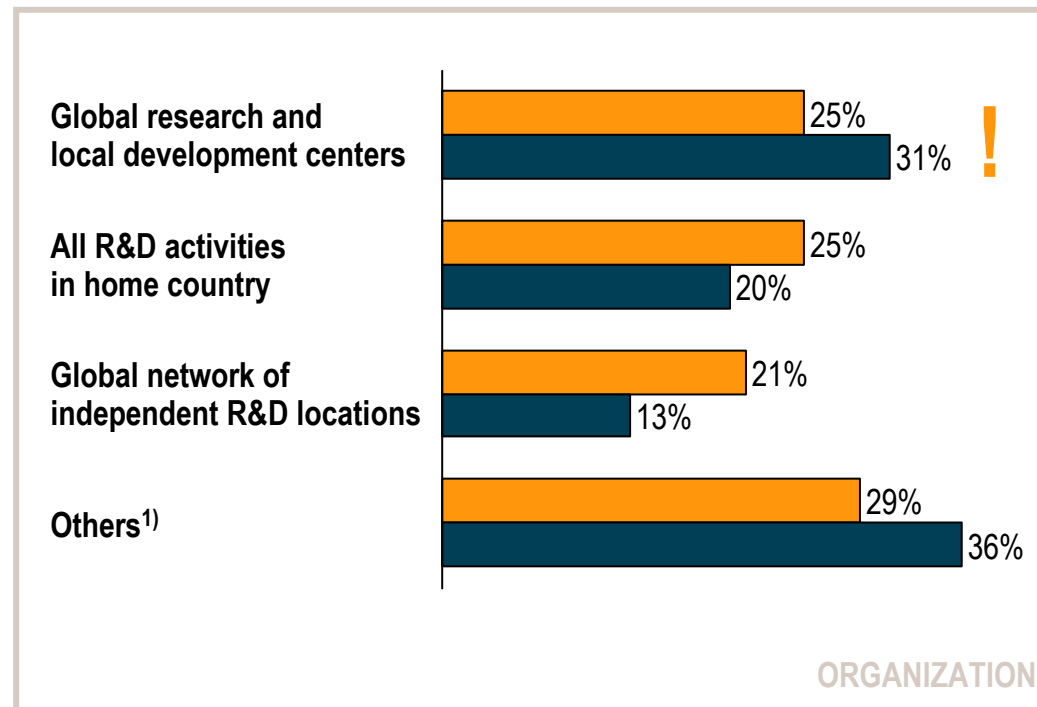
1) Likert scale – importance of driver 1 – low ... 5 – high

Rationale

- > **International companies** located in Austria place **bigger emphasis** on **R&D cost reduction** issues than Austrian based ones
- > Generally, **higher rating** of **Austrian companies** when it comes to **local market requirements** as well as **access to qualified personnel and customers**

German companies deploy global research and local development centers – Austrian companies still strongly rely on home country

Organizing the global R&D network [of 100%]



■ AUT
 ■ DEU

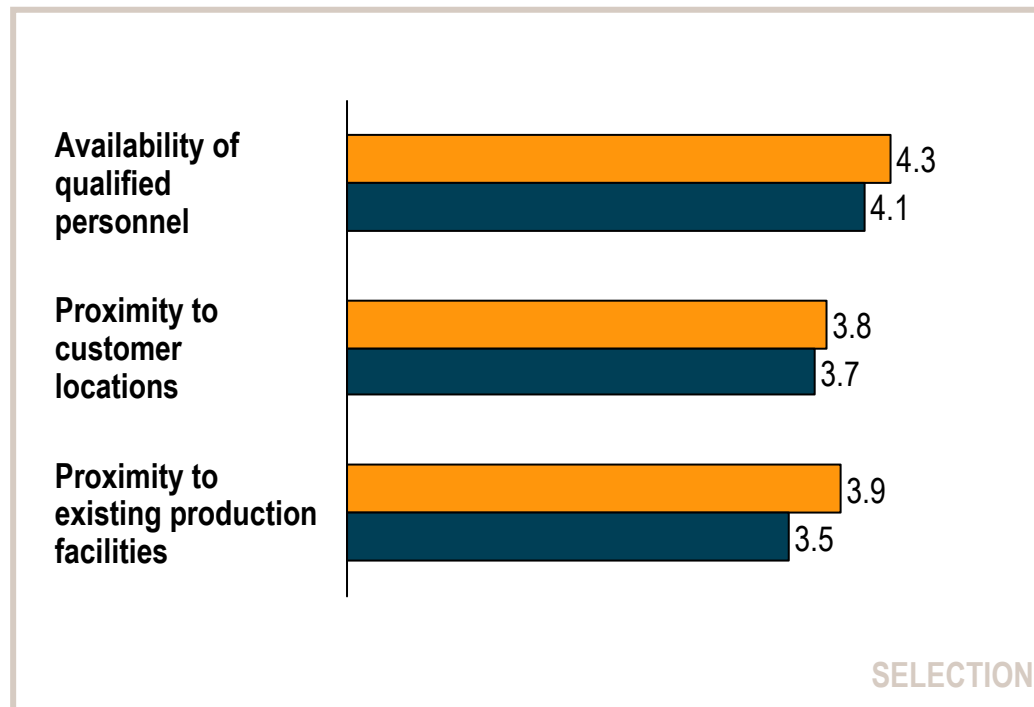
1) Such as globalization of technical competence, etc.

Rationale

- > Most German companies deploy **global research centers** (intellectual property, personnel availability, etc.) and **local development** (market affinity, customer intimacy)
- > **Pure national R&D** models still important for Austrian companies – ranked number two for German ones
- > **De-centralized R&D networks** are the third most important

Access to qualified people is main reason for picking an R&D location – Proximity to customers and existing production rank 2nd and 3rd

Reasons for selecting R&D locations¹⁾



■ AUT
 ■ DEU

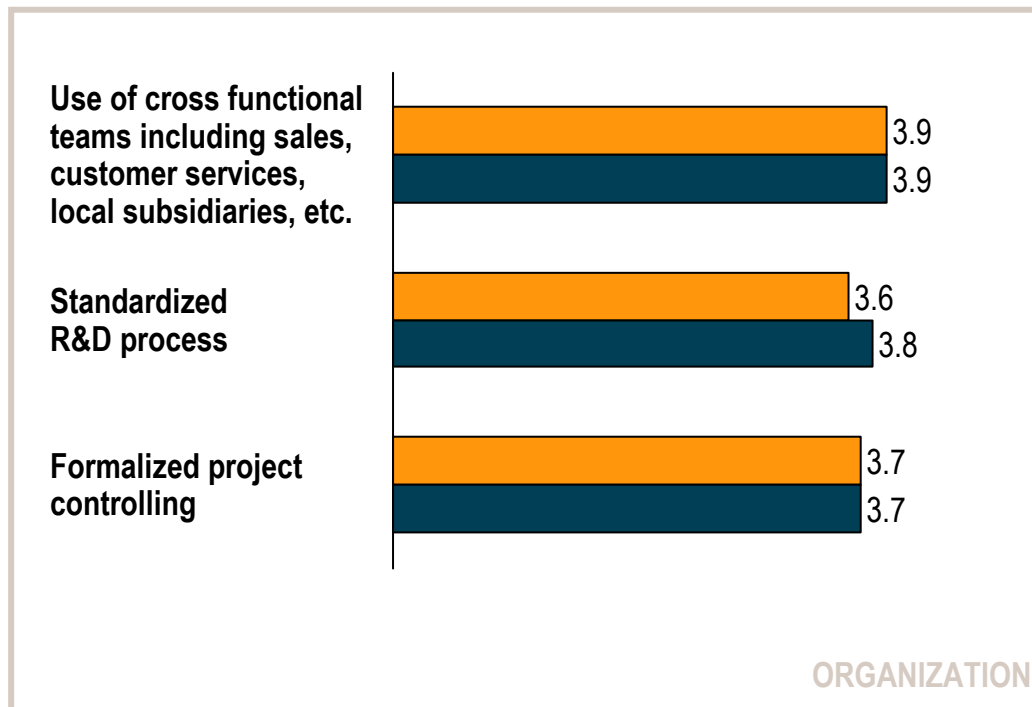
1) Likert scale – importance of driver 1 – low ... 5 – high

Rationale

- > **Personnel** is the main success factor in R&D processes
- > "Follow the customer" is also applicable for R&D: **Proximity** was named as **second most important factor**
- > Historically grown **production facilities** are **3rd most important** for locating a R&D location

No clear distinction in organizing global R&D teams – cross functional approach relatively high

Organizing teams within global R&D networks¹⁾



■ AUT
 ■ DEU

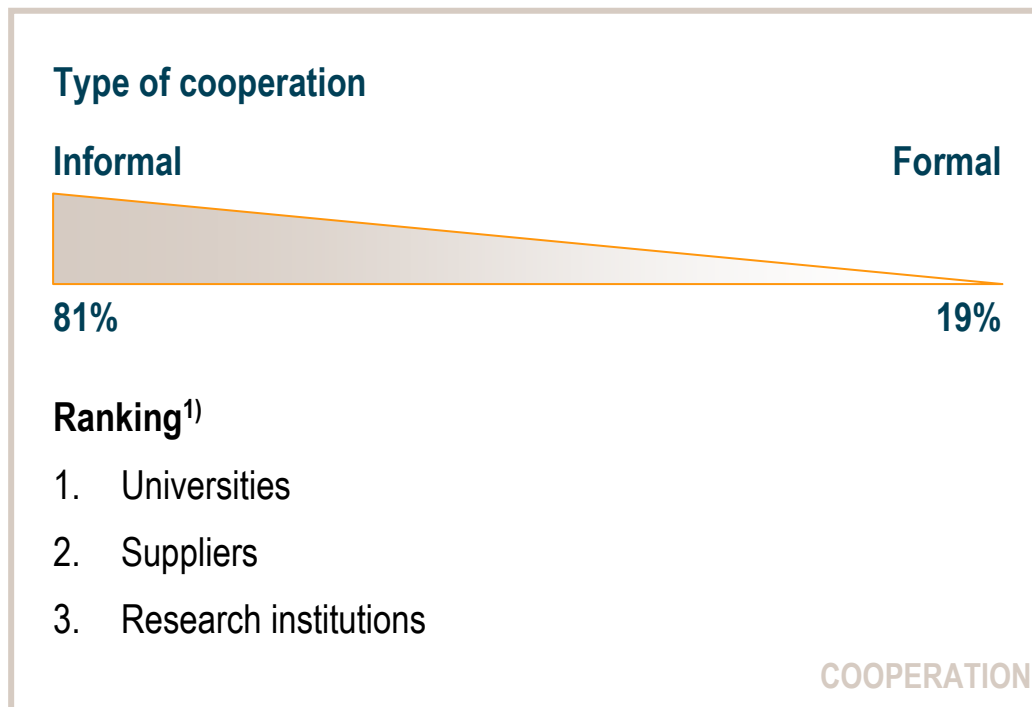
1) Likert scale – importance of driver 1 – low ... 5 – high

Rationale

- > **Personal interaction** within cross functional teams important success factor for international R&D activities
- > **Standardized and formalized process** controlling are ranked as second and third most important without clear distinction

Cooperations work mainly informally with independent institutions like universities or strategic suppliers

Organizing cooperation within global R&D networks



Rationale

- > **Most cooperation** takes place on a **non-structured, informal basis** and on demand
- > **Preferred cooperation** partners are independent, non-competitive and often **public institutions** like universities or research centers
- > **Cooperations with suppliers** in case of **good/strategic relationships**

Trend to separate Research from Development – Research is stable, market conditions determine relocation of development

Conclusions for Austria as economic footprint

Austrian companies with Austrian HQs

- > **Trend:** Research stays in home country. Development will be further globalized – after first wave to CEE countries, Asia is expected to be the next place for future development centers
- > **Drivers:** Market and business development in foreign countries; experience and trust in new markets
- > **Counter measures:**
 - Assure personnel availability for research needs in country (technical and science)
 - None possible for for globalization of development driven by market orientation

Int'l companies with major Austrian location

- > **Trend:** Research stays in home country of international company. Development as part of the Austrian headquarter is under constant review for more efficiency and better demographic boundary conditions
- > **Drivers:** Cost and efficiency reviews of current set up of global footprint; political and economic boundary conditions
- > **Counter measures:**
 - Assure attractiveness of Austria as place for headquarter (e.g. for CEE)
 - Assure availability of highly educated technical and science oriented personnel

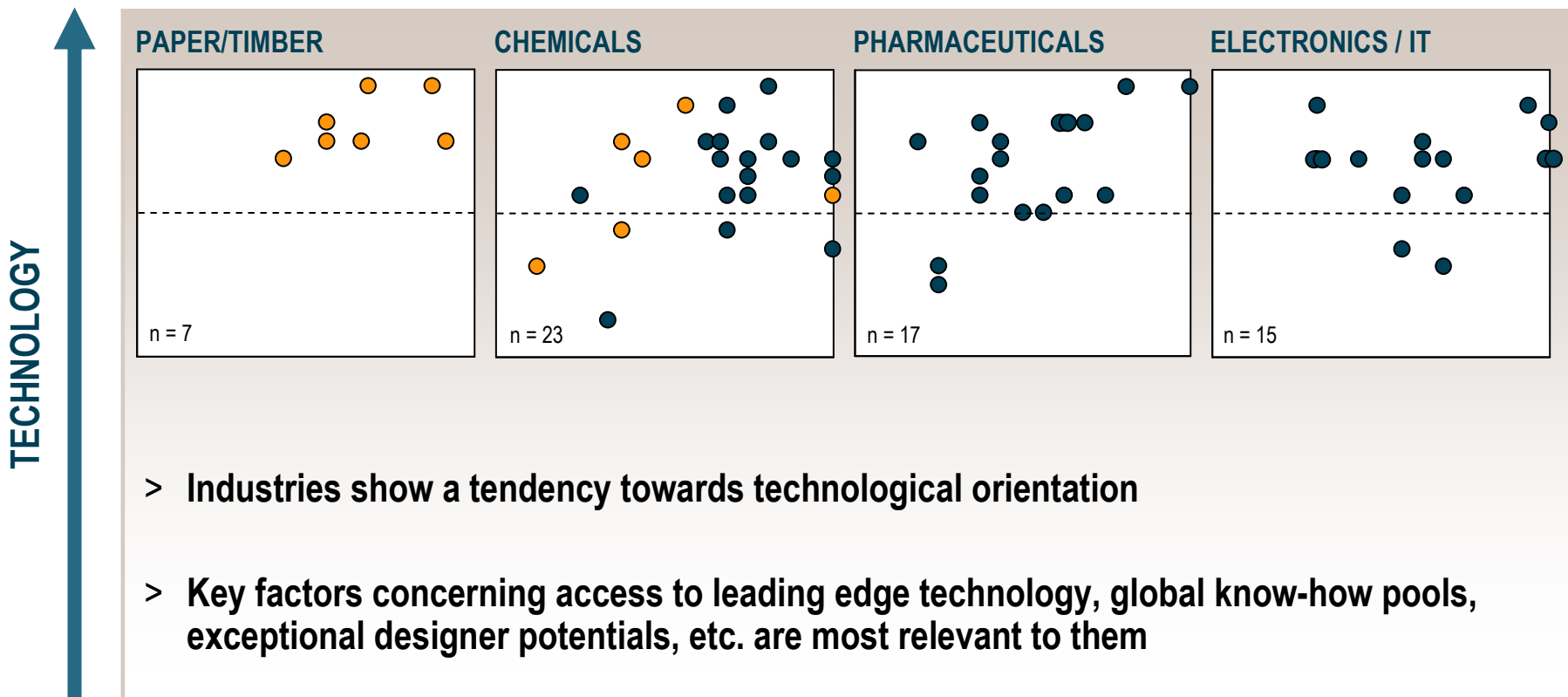
The matrix to cluster all companies per industry is structured along two dimensions: technology and markets



DIMENSIONS

- > **Market oriented** with strong focus on
 - **Access** to new/important markets
 - **Customer intimacy** and proximity
- > **Technology oriented** with strong focus on
 - **Access** to new leading edge know-how and high potential personnel

A clear pattern could be identified per industry – Paper/Timber, Chemicals, Pharmaceuticals and Electronics/IT technology oriented

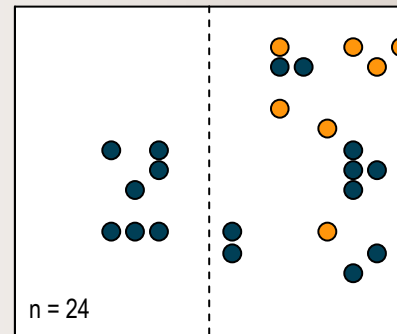


● AUT ● DEU

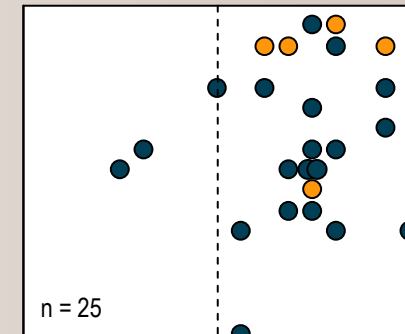
Automotive suppliers and Consumer Goods are clearly market oriented with Engineered Products mainly in this dimension

- > Industries show a tendency towards market orientation
- > Key factors concerning market proximity, customer intimacy, etc. are most relevant to them

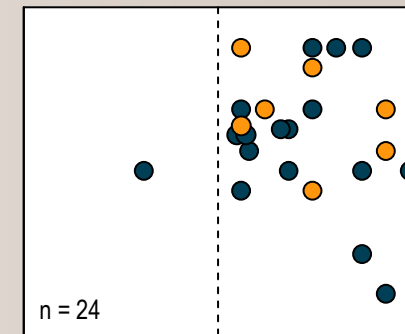
ENGINEERED PRODUCTS



AUTOMOTIVE SUPPLIERS



CONSUMER GOODS



● AUT ● DEU

MARKETS

Austria's research and development activities are well known worldwide

Automotive Suppliers

- > Engine management
- > Power train engineering
- > Instrumentation for automotive applications

Engineered Products

- > Power generation
- > Energy efficiency
- > High performance steel/surfaces

Paper/Timber

- > Laminated timber construction
- > Wooden composite boards
- > Innovative packaging systems

Chemicals

- > High performance fibers
- > Coating supplies
- > Bio-chemical products

E.

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Please contact us in case of any questions



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