

## Hungarian challenge - how to strengthen the role and position of the locally owned SMEs in the R&D arena

I. Lepsenyi, L. Palkovics

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## Agenda

Tendencies and Trends in the Automotive Industry – World, Europe, Opportunities and Challenges for Hungary

- Strategic position of the Eastern-European countries
- Shift of R&D responsibilities within the supply chain
- Competitiveness of the European automotive industry
- Position of the automotive industry in Hungary
- SWOT for human resource development

Importance of the Hungarian suppliers. Where do they stay?

- Competitiveness of the Hungarian suppliers
- Where do they have to improve?

What should be done?

- What is to be expected from established companies?
- Role of the community, expectations
- Co-operation and networking of the universities
- Practice oriented education

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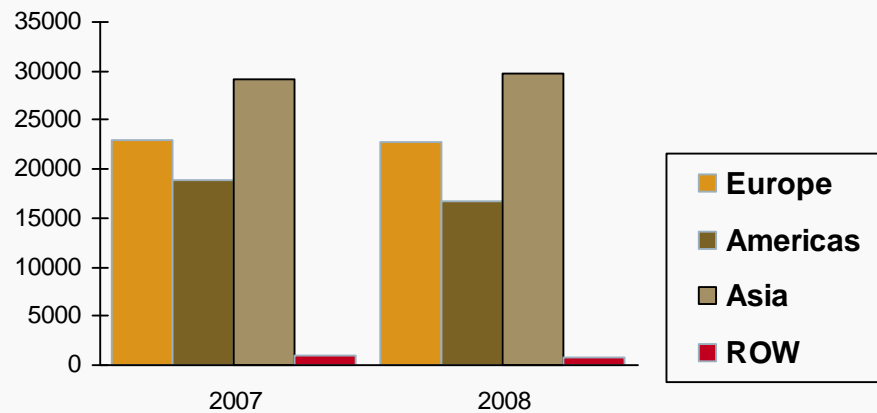
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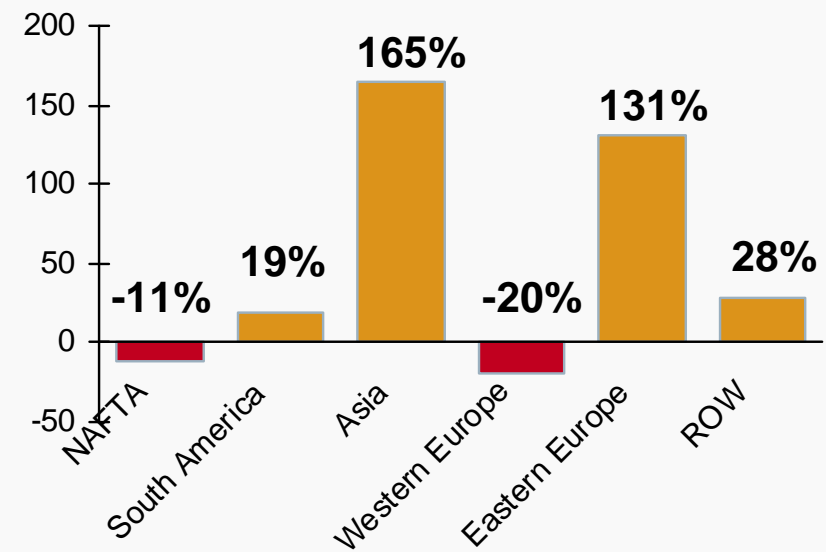


## Global tendencies in the automotive industry – strategic position of the Eastern European Countries

Vehicle Production in Different Regions  
Thousands units



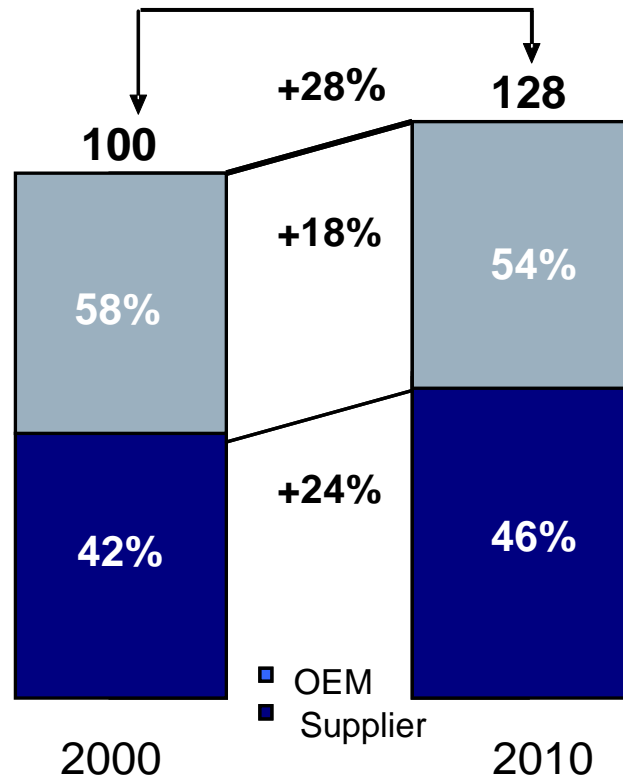
Changes in global supply industry (2003 vs. 2010)  
%



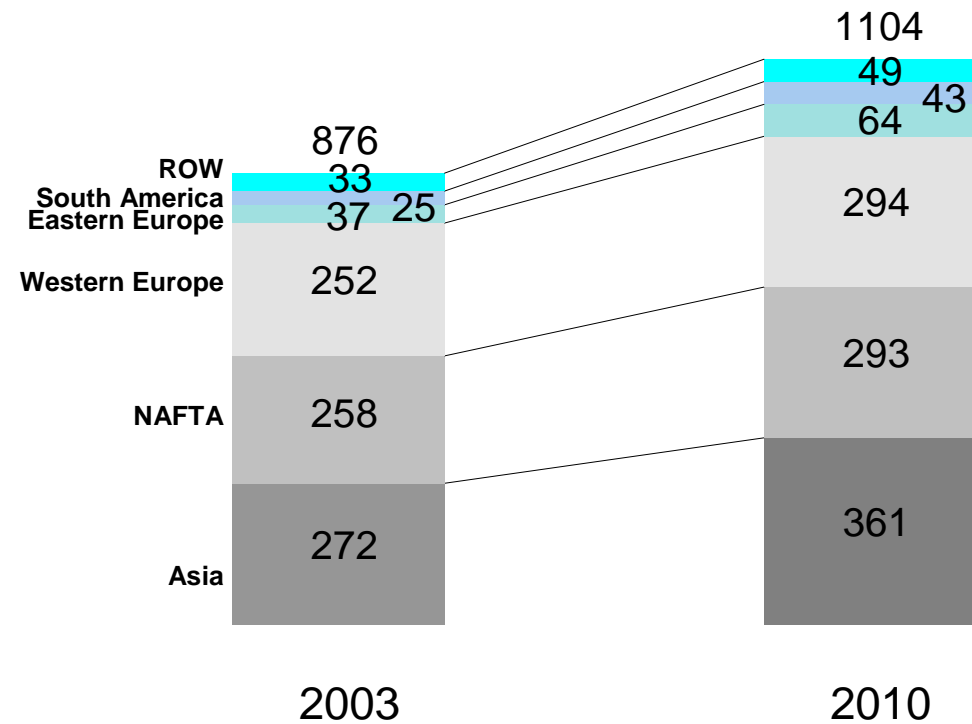
\* Source: VDA, Roland Berger Strategy Consultants

## Modification in responsibility distribution between original equipment manufacturers and suppliers – supplier play more important role in the value chain

Revenue



Revenue of the automotive supply industry  
billions dollar

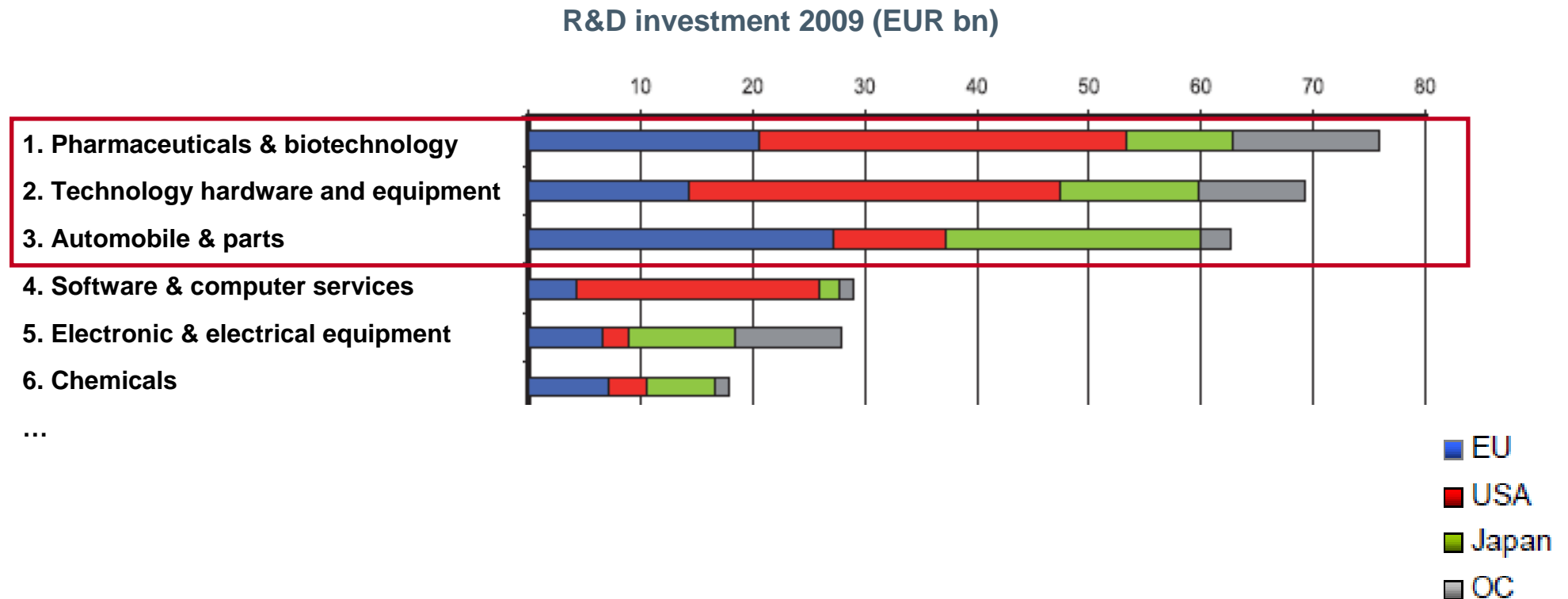


Source: Rölfs Partner CAR, VDA

Source: Roland Berger Strategy Consultants, Wards, Freedonia, JD Power and Associates.

## Reason of competitiveness of the European automotive industry: high R&D investment

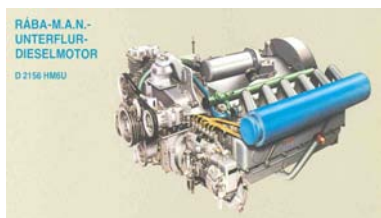
### R&D ranking of industrial sectors and share of main world regions



Source: European commission **The 2010 EU Industrial R&D Investment SCOREBOARD**

## Structural change in the Hungarian Automotive Industry

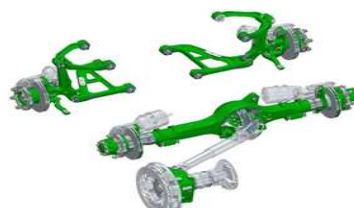
1983



Primarily commercial  
vehicle orientation  
Both vehicle and main parts

Vehicle industry produces  
18% of total industry  
output and 10% of total  
export

2008



OE – primarily  
passanger cars

Suppliers –  
diverse from  
engine to  
electronics

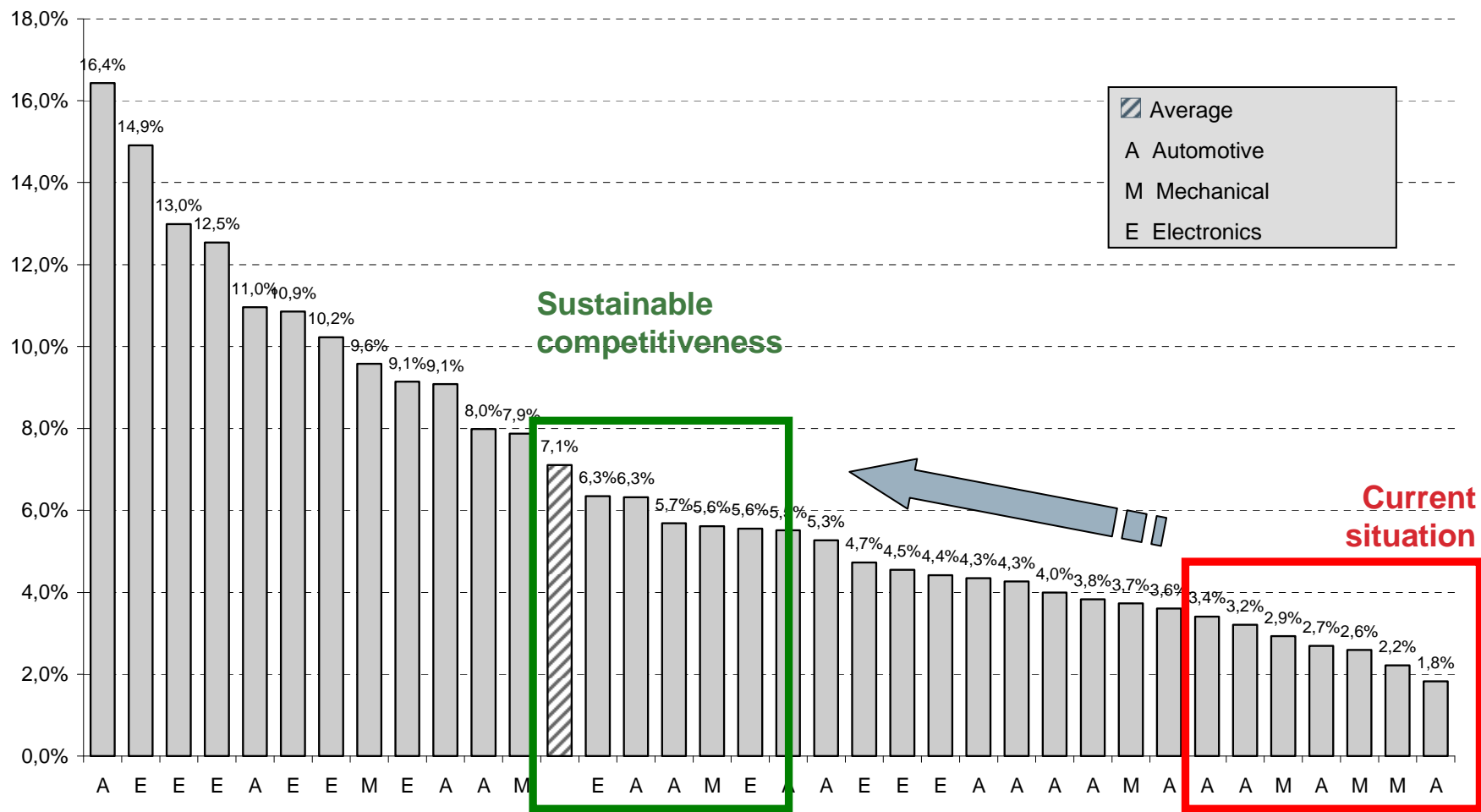
**The Hungarian automotive industry in figures – before the crises in 2008 – New investments (Mercedes, Audi, GM will have strong influence after 2012)**

	2008 statistical values
Total revenue	13,1 billions Euro
Number of companies	330
Participation in total industrial production	16,9%
GDP contribution	3,1%
Gross output contribution	7,5%
Percentige of the domestic sales	3,2%
Participation in the export	24,7%
Number of employees (in companies above 50 empl.)	65 375 fő
R&D expenditure	71,4 mrd (59%)
Domestic suppliers	10-80 %

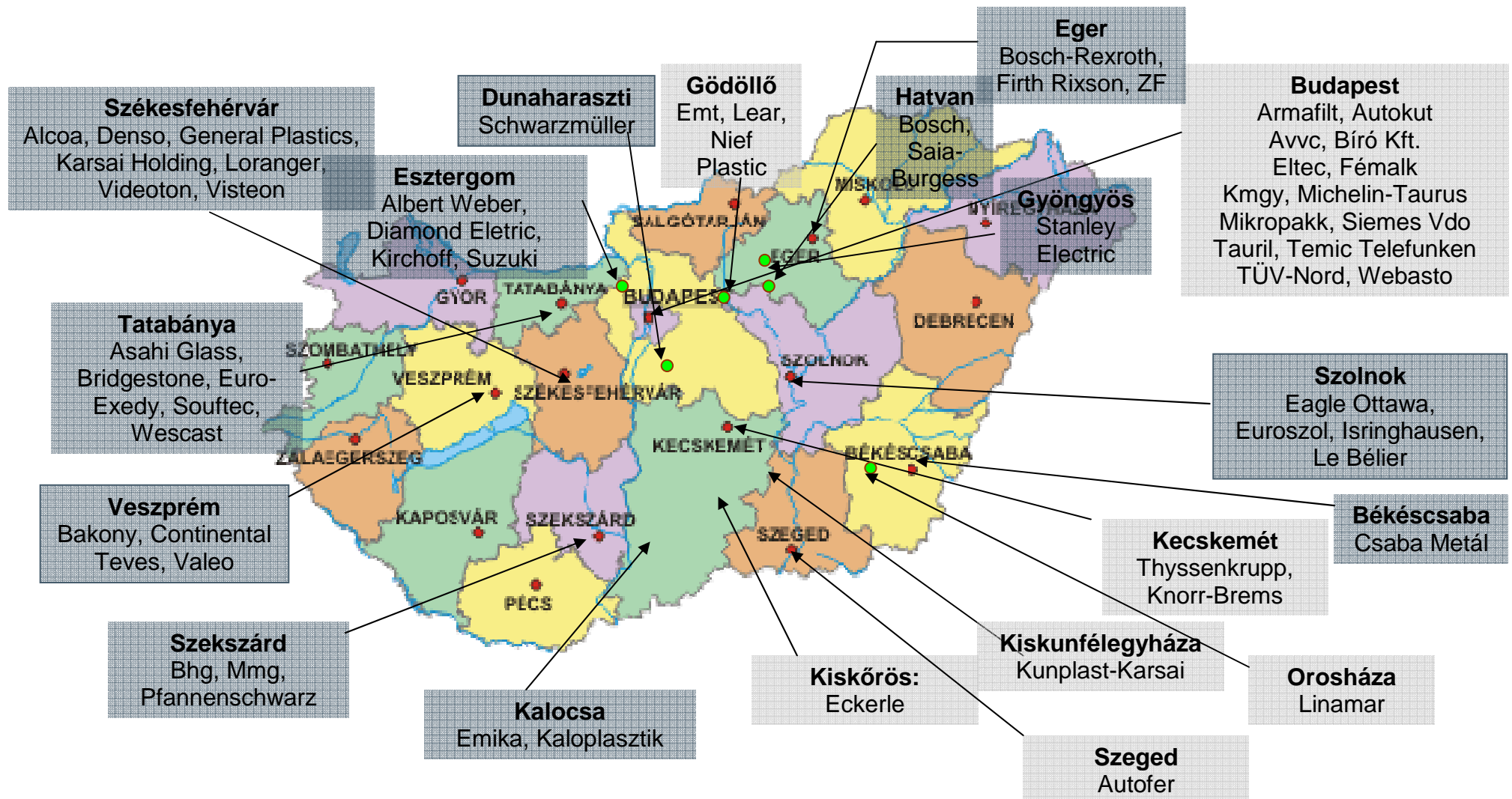
**R&D expenditure vs. revenue is around 2% - automotive industry average typically around 4-5%**



## What does the 2% R&D expenditure vs. revenue mean?

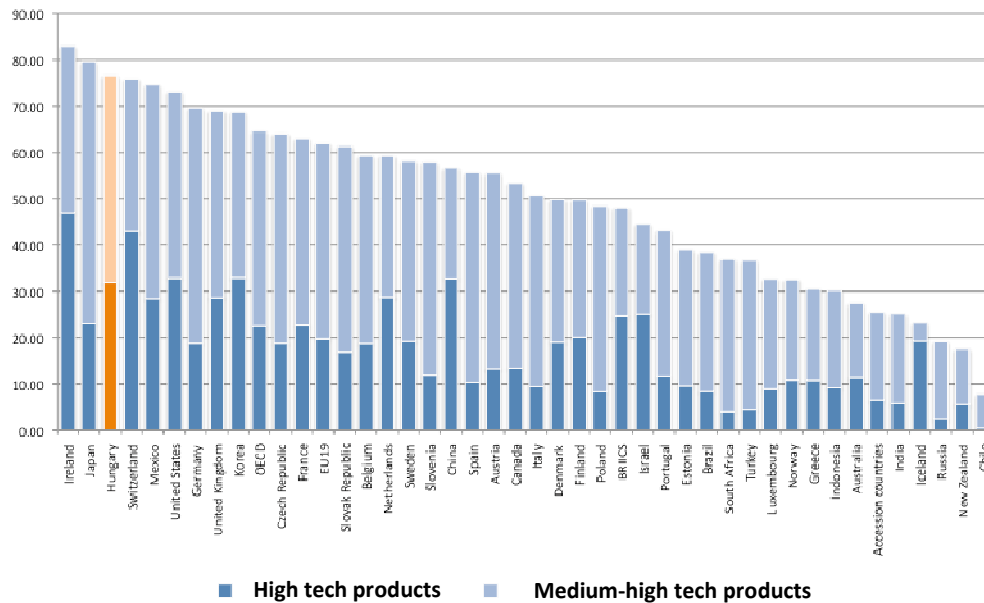


## Important industrial regions for automotive – strong supplier character



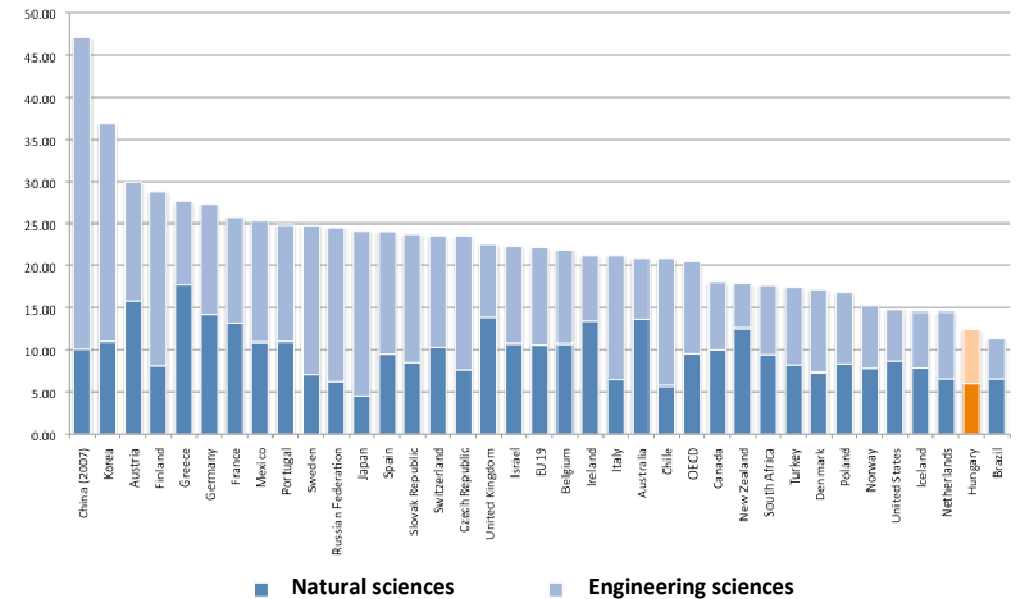
## Contradiction in Hungary – positions in the lists of the OECD countries

Position of Hungary in the list of countries of high tech production



**Hungary takes number 3 position in high-tech production**

Position of Hungary in the list of countries with respect to education in natural and engineering sciences



**... and before last position in number of students in engineering and natural sciences**

## SWOT for Hungary – human resource development is in focus

STRENGTH	<ul style="list-style-type: none"> <li>Blue collar labor is still significantly cheaper than in Western Europe</li> <li>Supply base has shown strong progress in productivity, quality and logistics</li> <li>Road infrastructure (motorway) reaches all important industrial regions</li> <li>University system is able to produce the required highly qualified work force</li> <li>Technological security in Hungary (general in Eastern Europe) is provided</li> </ul>	WEAKNESSES	<ul style="list-style-type: none"> <li>Blue collar efficiency increase was lower than expected</li> <li>Praxis oriented education is on low level, does not cope with the requirements of the industry</li> <li>Low level mobility for blue collar workers</li> <li>Suppliers have low level IP contribution to products, R&amp;D capability is missing</li> <li>Low level of networking on supplier level</li> <li>Other means of transport (waterway, air)</li> </ul>
OPPORTUNITIES	<ul style="list-style-type: none"> <li>Major automotive manufacturers decided for capacity enhancement in Hungary (Mercedes, Audi, GM)</li> <li>Change in supply chain approach: supply base in Hungary is promoted much stronger</li> <li>Transfer of best practices to Hungary: co-operative education forms (secondary and on higher level)</li> </ul>	THREADS	<ul style="list-style-type: none"> <li>Entrepreneurial culture of Hungarian owned companies (mostly SMEs) will not change as requested</li> <li>Old hierarchies and traditions in education system will not be overcome</li> <li>Co-operation among companies and institutions will not develop as required</li> </ul>

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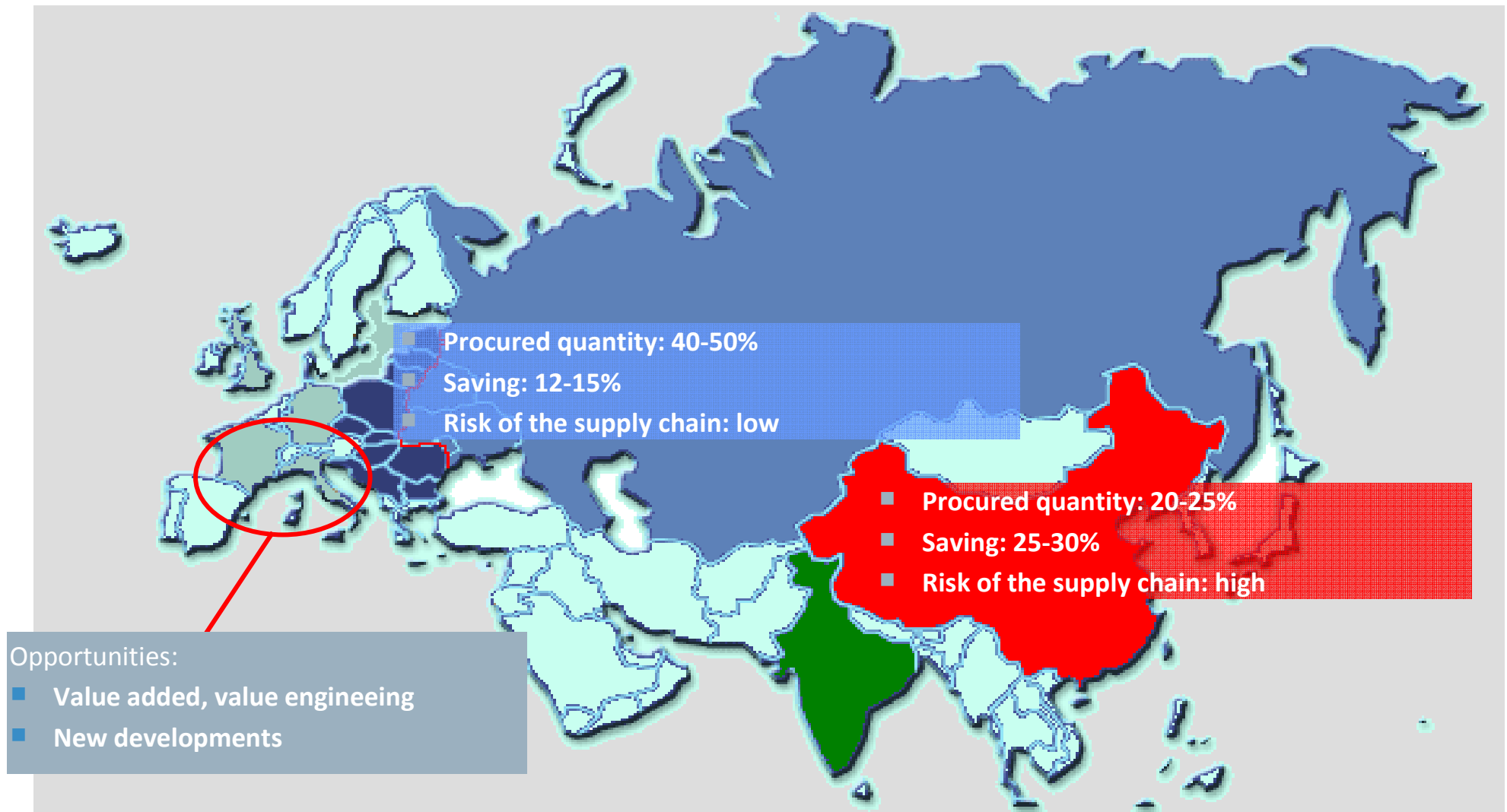
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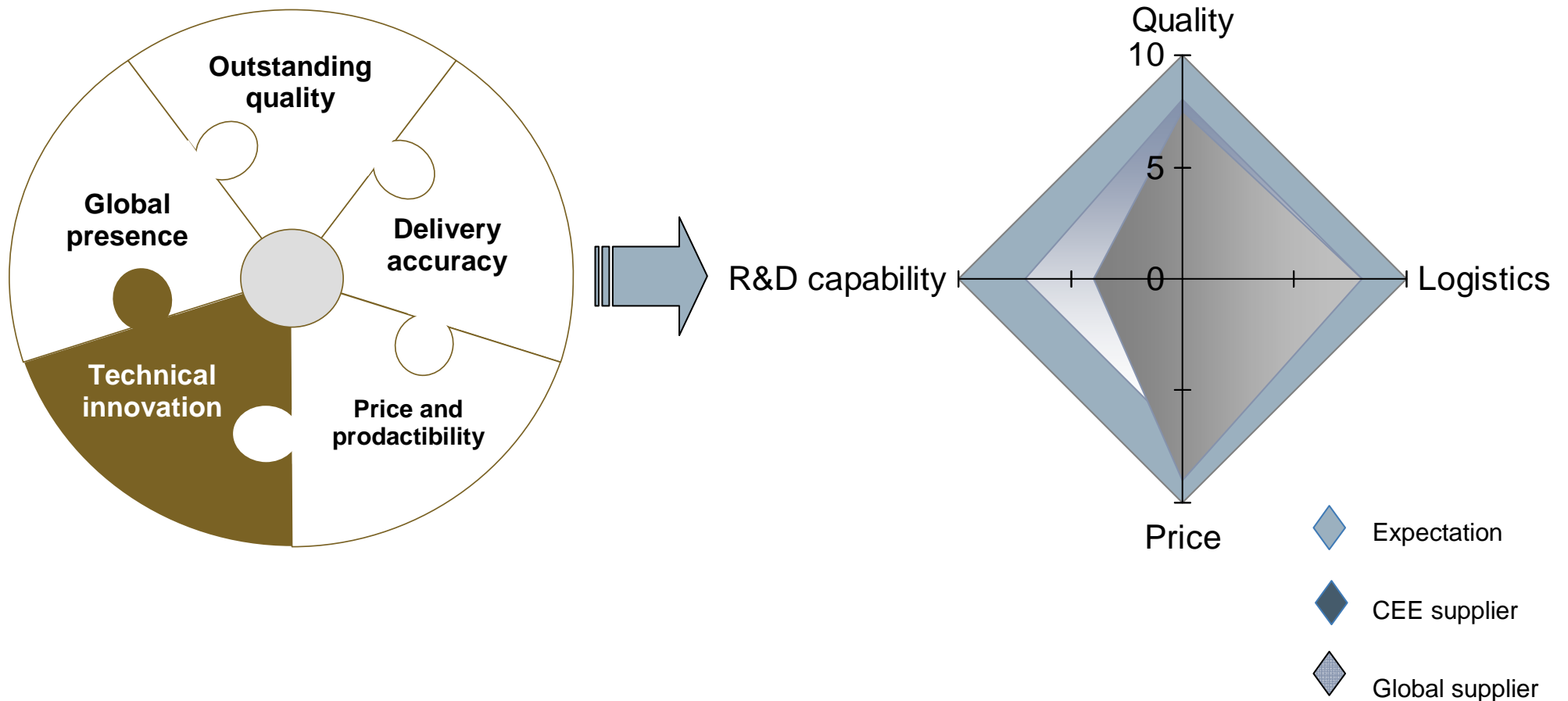
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## Why Eastern Europe? Good opportunities, but should be utilized!



## Requirements for the suppliers and a typical Eastern – European supplier profile



## Experiences in Hungary and Eastern - Europe \*

+

- Highly qualified work force
- Almost all product groups are available
- Experience and knowledge in automotive industry
- Loyal employees, low fluctuation rate
- Importance of training is understood
- Transparent cost structure
- SMEs primarily
- Market determined material prices, no political distortion
- Contractual conditions are understood and met

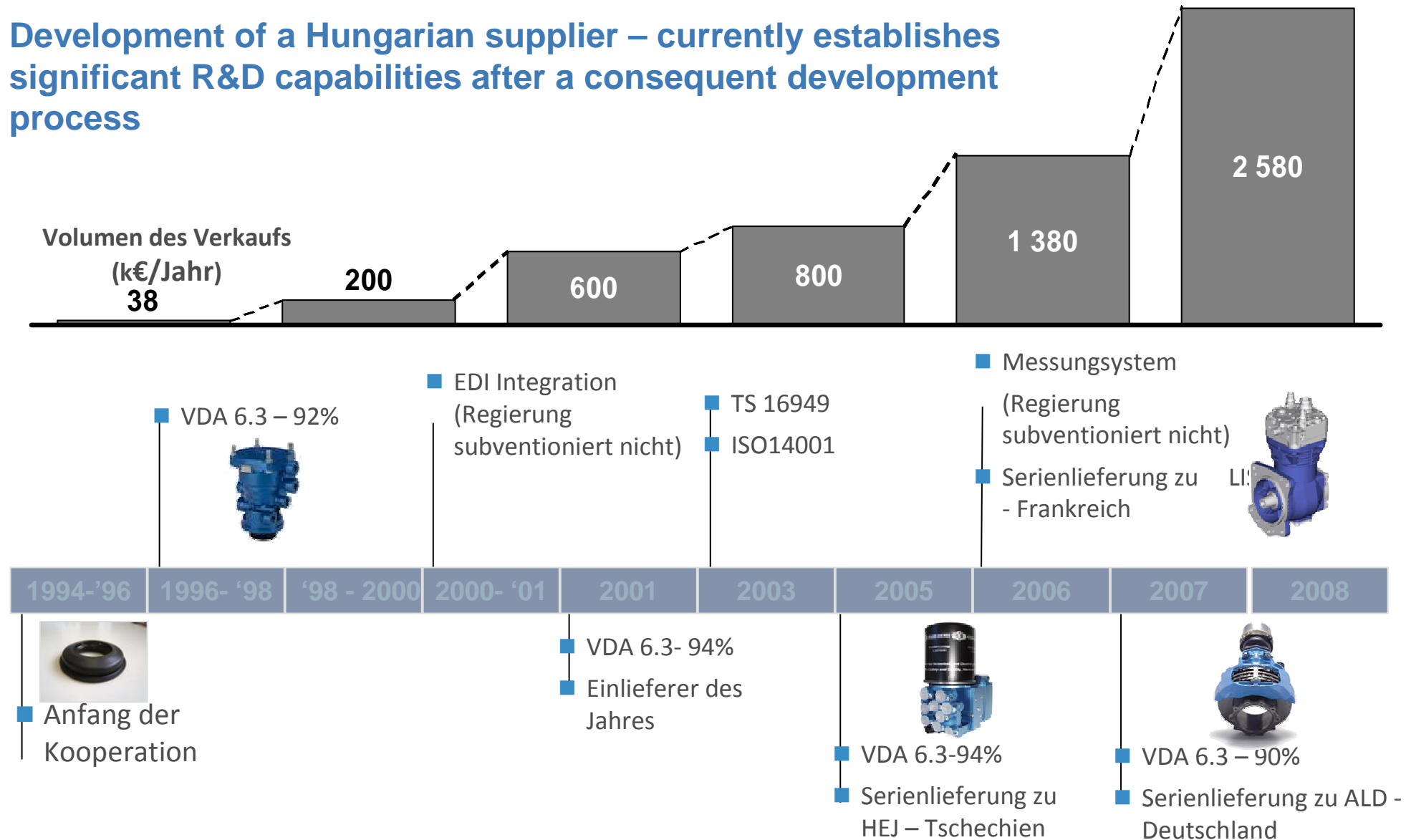
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- Short time vision, no strategic planning
- Entrepreneurial culture is missing
- Payment terms are not strictly followed
- Capital and financing problems
- Small capacity and size companies
- Low or none innovation capability
- Missing project management culture
- Unhealthy management structure – owner –manager is typical without any redundancy
- Sometimes language, getting less problem

\* Without Russia



## Development of a Hungarian supplier – currently establishes significant R&D capabilities after a consequent development process





## Summarizing...

The European automotive industry is competitive because of the high R&D content

The role of the suppliers in the value chain is increasing

Technological security is provided in Central – Eastern Europe, which increases the competitiveness of the region

Most of the Hungarian automotive companies are suppliers

The Hungarian politics strongly supports the SMEs by all means, and viewing them, their development as one of the most important break-out opportunity

Many multi-national companies established large-scale development centers, which are ready to co-operate with Hungarian suppliers

**... which means that the R&D competency has to be established at the SMEs!**

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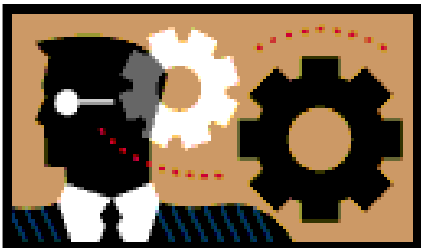
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## R&D activities of multi-national companies in Hungary – good examples

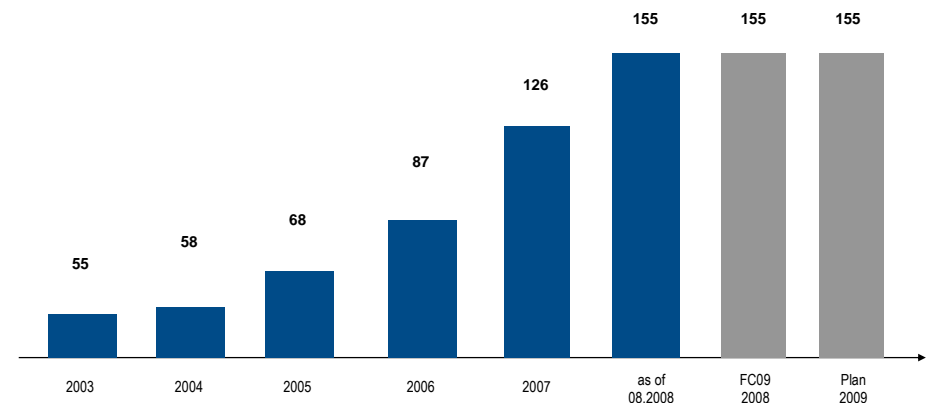
- Those companies who established R&D activities in Hungary also significantly enhanced their production



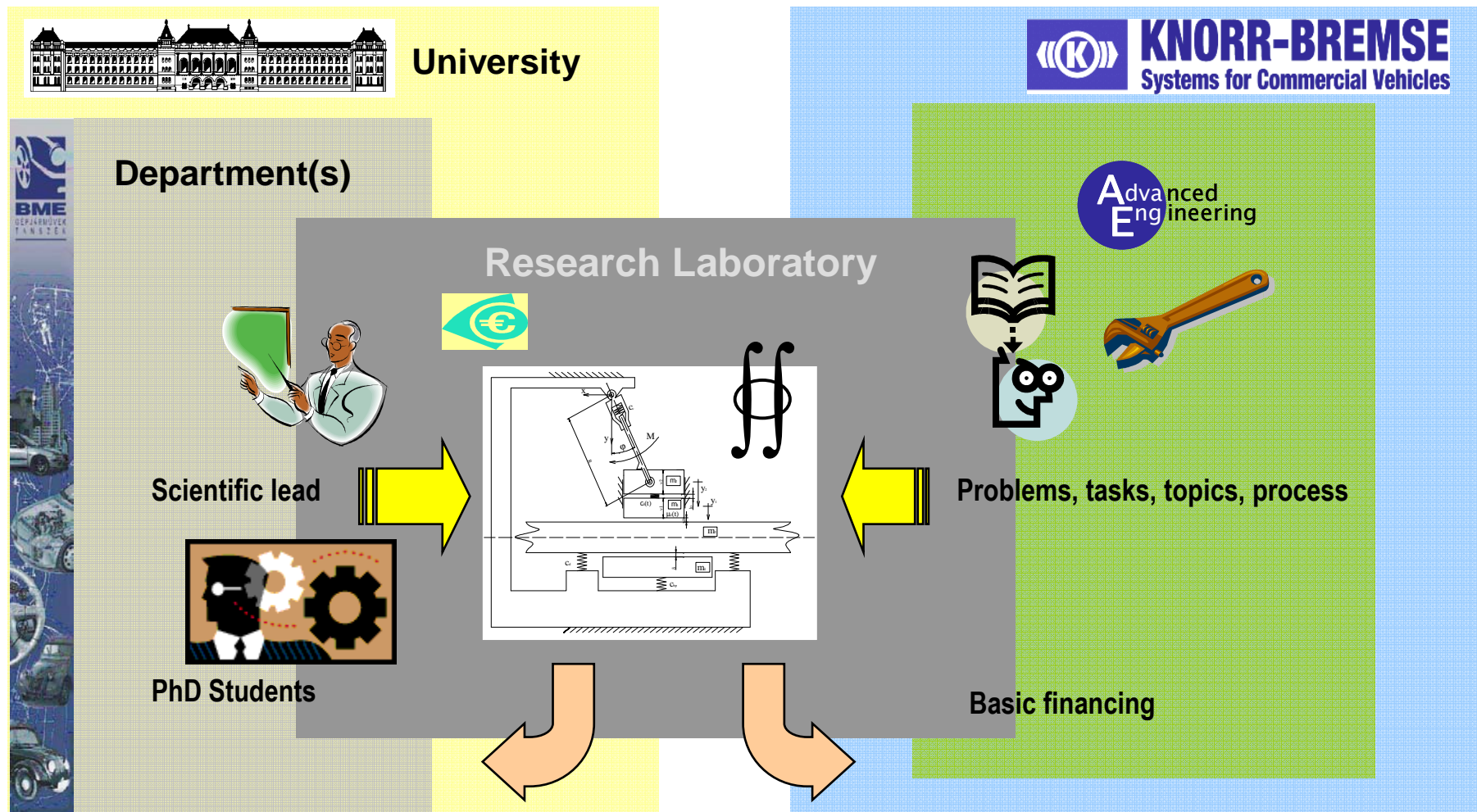
- All these companies are in daily contact with the Hungarian universities in diverse fields (education, research, grants, legislation)
- Even if the crises hit the automotive industry at most, none of these companies reduced the R&D workforce, or modified their strategy in this field
- These companies through their R&D units are starting a deep penetration into the local structure, participating in joint programs, organizing and promoting clustered activities, etc.

## Example – Acceptance of the Knorr Bremse R&D Institute within the world-wide organization

- The institute became an integral part of the KB's world-wide R&D structure – one of the most flexible and dynamic organizations
- Currently the largest R&D location
- Activities and results from Budapest are fully accepted in the organization
- Efficiency of the development engineers is equal to any other location
- No cultural issues
- The Hungarian R&D institute is fully embedded in the local research, development and academic environment, which ensures the high flexibility.
- Strong and close co-operation with the partner universities and research institutes.
- Established R&D network with suppliers



## Good example for the co-operation – Industry financed research lab for safety critical systems at the university





## Knowledge Center – Joining resources for a common goal



External supporters



Participants

Large Companies



Small Ventures

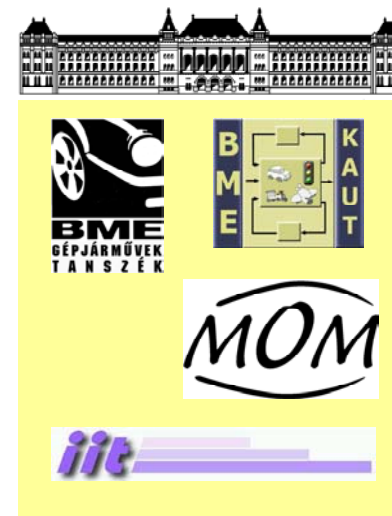


Research Institute



TÜV NORD CSOPORT

Homologation and legislation



University

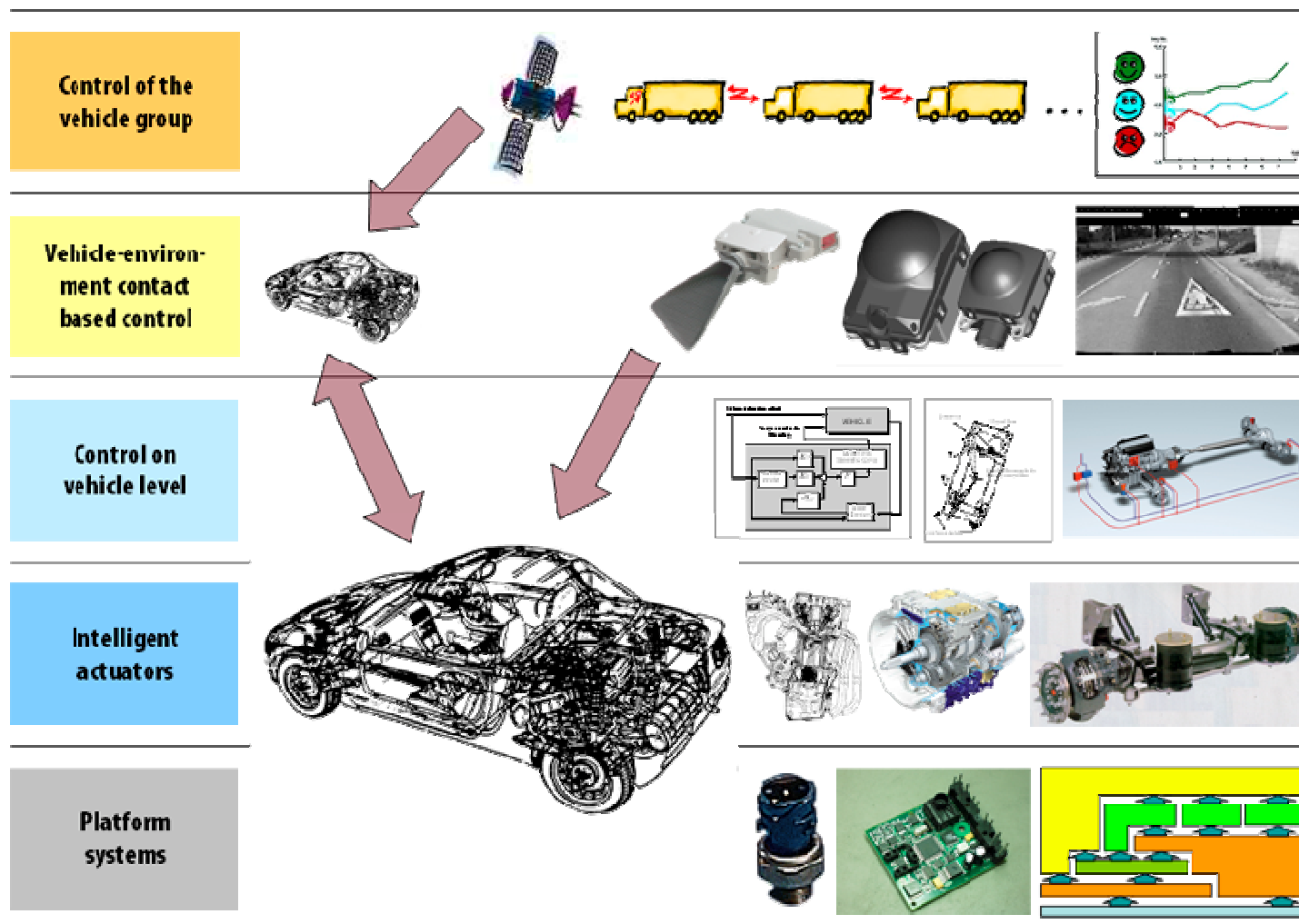


Knorr-Bremse Group





## Intelligent vehicle systems – Structure of the knowledge center







## Actions required from the government and politics

- In order to provide the long term competitiveness of the Hungarian SMEs (high in number, low in economic weight) their R&D expenditure should be significantly increased (target 4 – 5% of their revenues)
- Elaborate solutions (tax based, community funding, etc.) which promotes the collaboration between the SMEs and their customers (primarily larger multi-national companies) in the field of R&D
- Support the involvement of established companies (mostly multi-national) in the co-operation networks, playing the role of integrator in their competency fields
- Develop attractive and supportive environment in the poles of the automotive industry for R&D: strengthen the competencies of the local university, re-locate state owned applied research institute, provide special conditions for clusters (innovation park, incubation houses)
- More active participation in the initiatives of the EU in selected fields. Determine some break-out points in the automotive field which are in line with the EU research directives and Hungarian institutions might have potentially high level contribution.

## Co-operation of the universities – core competency based work distribution and network



**Primary and secondary competencies – alignment with the local industry demand, maximum utilization of the resources, co-operation instead of competition**

	Primary competence	Secondary competence
<b>Budapest University of Technology</b>	<ul style="list-style-type: none"> <li>• Vehicle technology</li> <li>• Electronics and software</li> </ul>	<ul style="list-style-type: none"> <li>• Logistics</li> <li>• Production technologies</li> </ul>
<b>Kecskemét College</b>	<ul style="list-style-type: none"> <li>• Material technology</li> <li>• Production</li> </ul>	<ul style="list-style-type: none"> <li>• Vehicle technology</li> <li>• Alternative drives</li> </ul>
<b>Miskolc University</b>	<ul style="list-style-type: none"> <li>• Vehicle drive systems</li> <li>• Mechatronics</li> </ul>	<ul style="list-style-type: none"> <li>• Logistics</li> <li>• Material sciences</li> </ul>
<b>Óbuda University</b>	<ul style="list-style-type: none"> <li>• Vehicle technology</li> <li>• Electronics</li> </ul>	<ul style="list-style-type: none"> <li>• Software</li> </ul>
<b>Veszprem University</b>	<ul style="list-style-type: none"> <li>• Mechatronics</li> <li>• Fuels and lubricants</li> </ul>	<ul style="list-style-type: none"> <li>• Informatics</li> </ul>
<b>Gyor University</b>	<ul style="list-style-type: none"> <li>• Engine technology</li> <li>• Manufacturing and machining</li> </ul>	<ul style="list-style-type: none"> <li>• Mechatronics</li> </ul>

## Example - Participation of the Hungarian Research Institutes in European 'Green car' Initiatives

### Efficiency improvement of the conventional drive-line



- Reduction of the internal friction of the ICE by means of tribological or constructional measures
- Remove of "parasitic" consumers from the engine and drive them electrically and control electronically (fuel, oil pumps, servo pumps, compressors, etc.)
- Improve gas management solutions (intake air, exhaust gas, etc.)
- New generations of lubricant and materials, material pairs
- Electronic control instead of direct mechanical interface from driver to driveline (gas, brake, transmission, etc.)

### On-board energy management



- Energy recuperation: the platform of the control strategy is derived from the conventional vehicle control systems
- Sensors development for electric drive systems (battery monitoring sensors, e-motor sensor clusters, etc.)
- Energy management system for safety critical and non-safety critical applications in vehicles
- On-board energy storage systems

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### Alternative fuels for vehicular applications



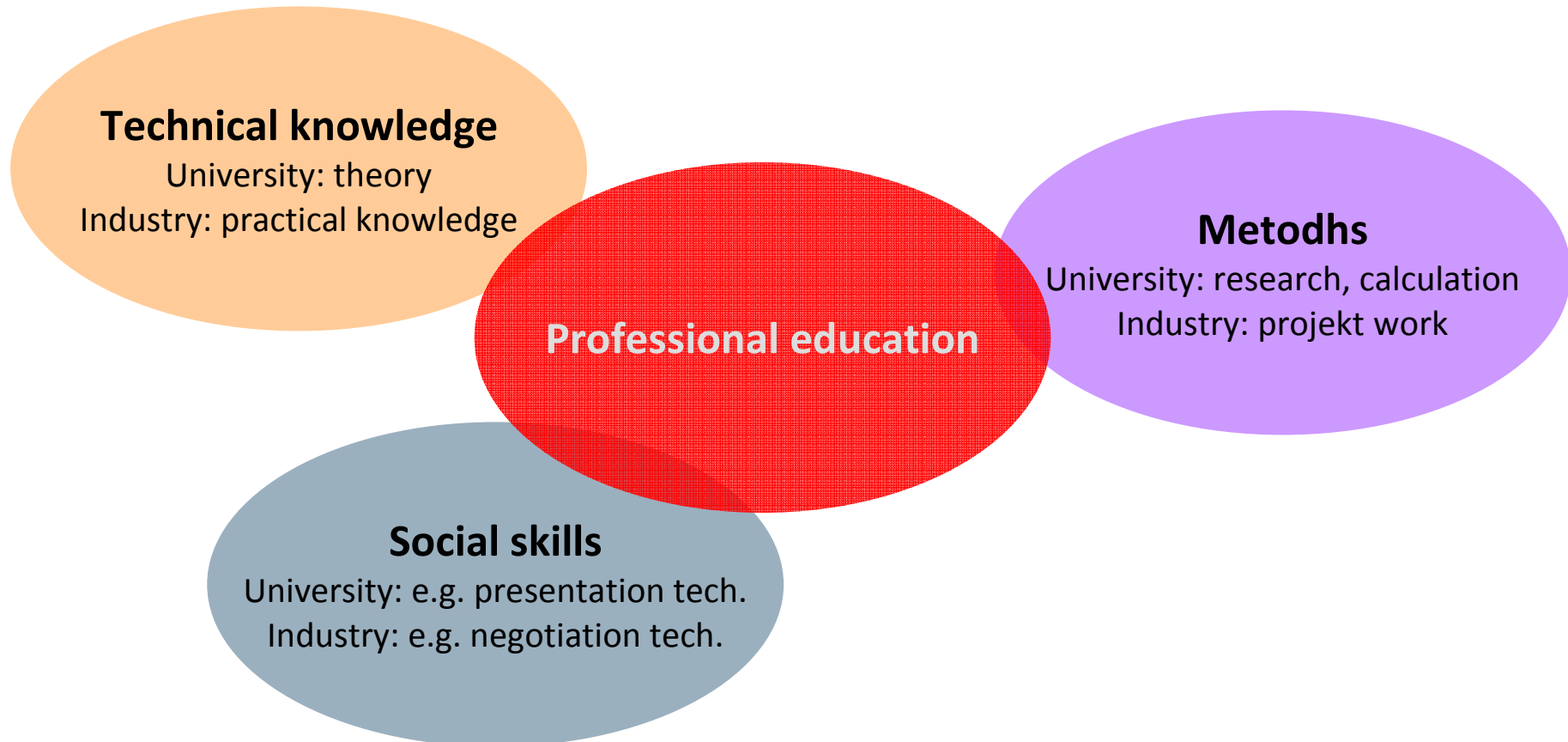
- Agricultural research for identifying and developing the appropriate plant species for bio based fuels
- Technological processes for bio-ethanol and bio-diesel
- Research activities in the field of application of bio-fuels in ICEs, technological research
- Economical research

### Vehicle and road traffic control for improved efficiency and fuel consumption

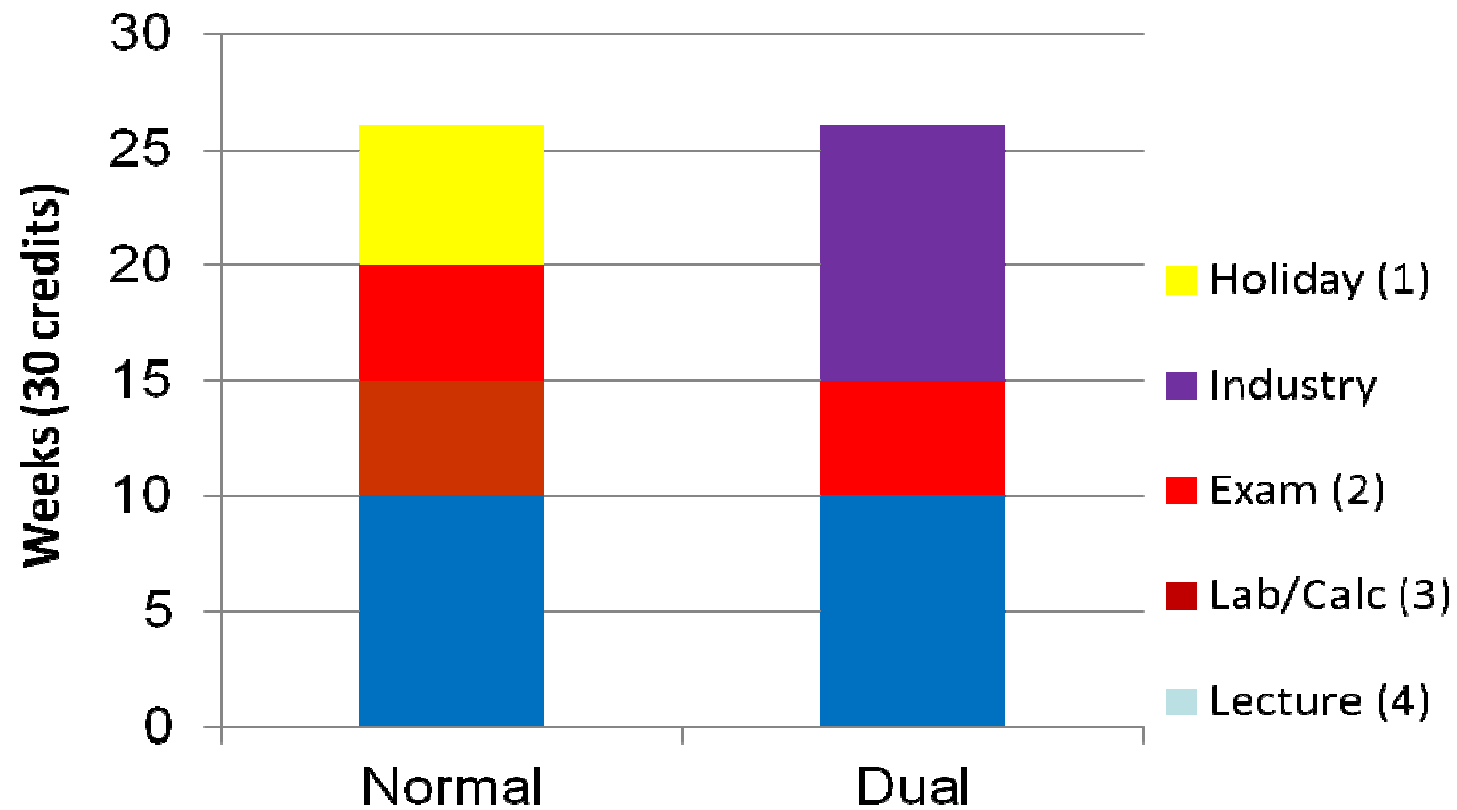


- Control of city traffic in case of high emission load (increase throughput, reduce transient operation modes)
- Intelligent platooning for commercial vehicles on highway in order to reduce the air drag for the preceeding vehicles
- Co-operative vehicle control for improved logistics
- Development of communication platform for V2V and V2I
- Development and industrialization of vehicle sub-systems for autonomous and intelligent control

## Practice oriented higher education - Principles of the responsibility share between academy and industry



Distribution of the work quantity in a given semester – much higher work load with immediate payback







## Summary

- There is a large growth potential for the SMEs working in the automotive industry in Hungary if they will invest into the establishment of own intellectual property and know-how
- There are several problems which hinder this process (cultural issue, education, motivation)
- In order to improve this situation, a concentrated action from the
  - Community
  - Universities and research institutes
  - Large companiesis required.
- There are several “best-practice” examples available to be learned from



Thank you very much for your attention

