

# Supply industry: opportunities and requirements

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## Middle EU car industry



### Location of car factories in the new EU countries 2012

			 + 	TOTAL
 AUSTRIA	123,602		19,060	142,662
 BELGIUM	507,204		33,890	541,094
 CZECH REPUBLIC	1,171,774		568	1,172,342
 FINLAND	2,900			2,900
 FRANCE <sup>2</sup>	1,682,814	284,951	n.a.	1,967,765
 GERMANY <sup>2</sup>	5,388,456	260,813	n.a.	5,649,269
 HUNGARY	215,440		2,400	217,840
 ITALY	396,817	241,186	33,411	671,414
 NETHERLANDS	28,000		21,800	49,800
 POLAND	540,000	103,923	764	644,687
 PORTUGAL	115,735	43,831	3,990	163,556
 ROMANIA	326,556	11,187	22	337,765
 SLOVAKIA	900,000			900,000
 SLOVENIA	126,836	4,113		130,949
 SPAIN	1,539,680	392,624	46,875	1,979,179
 SWEDEN <sup>2</sup>	162,814		n.a.	162,814
 UNITED KINGDOM	1,464,906	94,045	16,289	1,575,240
 EU <sup>1</sup>	14,611,284	1,435,990	186,204	16,233,478

Source: ACEA Pocket Guide, 2013

# Restructuring of the Hungarian car industry

1983



RABA-M.A.N.-  
UNTERFLUR-  
DIESELMOTOR  
D 2156 HMGU

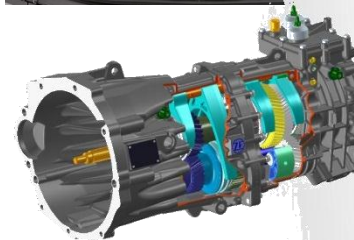


Basically vehicle orientation

Both the main unit and the vehicle

The car industry is 18% of the industrial production, 10% of the export

2013



**OE** – basically car

- Audi, Suzuki, Mercedes, Opel

**Main unit** – significant commercial vehicle deliveries

- Bosch, Continental, Lear, Luk, Delphi, DENSO, Valeo, BPW, ZF etc

## Hungarian car industry

### Car industry 2012

- Sales in the automotive industry: **15 437,7 mill EUR**
- Number of observed organizations : **306**
- Share of car industry from the industrial production: **19,3 %**
- Share of car industry from the domestic sales : **2,5 %**
- Share of car industry from the export: **26,8 %**
- Number of the employees ~ **72 415** (over 50 persons enterprises: 69,9 thousand persons)
- Share of the foreign interests enterprises from the foreign capital in the car industry, 2011: **4,4%**

\*Source: KSH 23 Szept. 2013

## Regions of the Hungarian car industry





# Location of the biggest automotive industry suppliers in Hungary

## Central Transdanubia

AFL	Kirchhoff
Ajkai Elektronika	Lé Belier
Albert Weber	Lear
Alcoa	Magyarmet
Asahi Glass	Michels
Benteler	Musashi
Borg Warner	Plasticor
Bourns	Plastimat
Bridgestone	Poppe+Potthoff
Continental Autom.	Rába
Denso	SCI Sanmina
Diamond Electric	SCS
Euro Excedy	SEWS
Gedia	Suoftec
Gestamp	Toyo Seat
Hammerstein	U-Shin
Hankook	Valeo
ITW Siewer	Videoton
Johnson Controls	Visteon
Karsai Plast	Wescast

## Central Hungary

AVL	Hokushin	Siemens VDO
Cascade	Ibiden	Tauril
Clarion	Lear	ThyssenKrupp
Continental Autom.	MGM	Toyo Seat
ContiTech Fluid	Michelin	Vogel Sitze
Draexmaier	Mono-polyfabric	Webasto
EMT	NABI	W.E.T.
Excel Csepel	PEMÜ	Zollner
FESTO	Schwarz Müller	
GE Lighting	Semcon	

## Northern Hungary

Ada-Cast	Firth Rixson
Akzo Nobel Coatings	Ganz Foundry
ARRK	Gibbs
Bosch	Hi-Lex
CSABAcast	Knaus Tabbert
Delphi	Kovács
Delta-Tech	Lear
Exir	Leoni
	Mitsuba
	Modine
	Prec-Cast
	Remy
	Saia-Burgess
	Salgglass
	Shinwa
	Stanley Electric
	Starter Battery
	Technoplast
	ZF



## Western Transdanubia

Arcelor	Györi Plast
Autoliv	Hirschler
B.O.S.	Kravtex
BPW Rába	Luk Savaria
Car-Inside	Magna Steyr
Dana	Nemak
Dekorsy	Rába
Delphi	Rehau
Edag	Rekard Produkt
EMT	Rudolph Logistik
Erbslöh	Semperform
Euro Excedy	Veritas
Euro Elzett	SMR
Federal Mogul	Vogel und Noot

## Southern Transdanubia

BHG
CabTec
Ratipur
Interplus

## Southern Great Plain

Brose	Johnson Controls
ContiTech Fluid	KALOpastic
ContiTech Rubber	Knorr-Bremse
Csaba-Metál	Kunplast-Karsai
Eckerle	Linamar
Emika	Magna Exteriors
EuroFit	Pata
Freudenberg	Phoenix Mecano
Hirschmann	ThyssenKrupp
HBPO	Zorge

## Northern Great Plain

Caroflex
Carrier Transcold
Eagle Ottawa
Eismann
FAG (Schaeffler)
Faurecia
Euroszol
F.Segura
Hajdu Autó
Haldex
Hübner
Isringhausen
Jász-Plasztik
Lé Belier
Michelin
Nief
Phoenix

Source: NIH, 2012

## TOPLIST of the automotive industry companies 2012

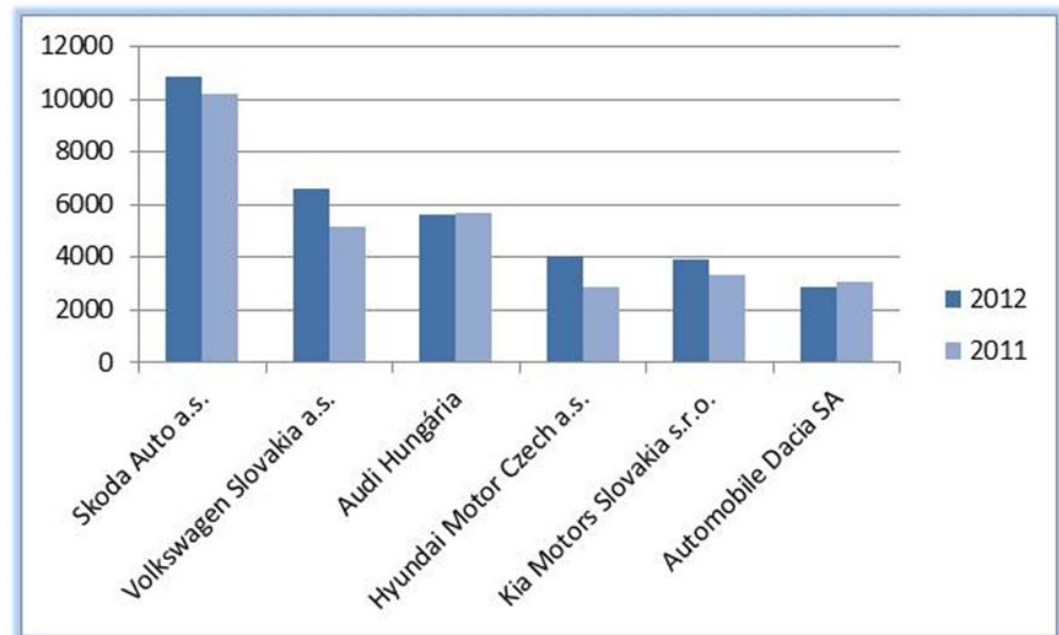
Hierarchy	Name of the companies	Net income (mill HUF)
1	AUDI HUNGARIA MOTOR Kft.	1 612 480
2	Bosch csoport*	580 681
3	Magyar Suzuki Zrt.	409 150
4	Mercedes-Benz Manufacturing Hungary Kft.	267 919
5	Continental Automotive Hungary Kft.	202 494
6	Lear Corporation Hungary Autóipari Gyártó Kft.	156 260
7	LuK Savaria Kuplunggyártó Kft.	141 370
8	Delphi Hungary Autóalkatrész Gyártó Kft.	125 484
9	DENSO Gyártó Magyarország Kft.	118 429
10	BorgWarner Turbo Systems Alkatrészgyártó Kft.	104 766
11	SMR Automotive Mirror Technology Hungary Bt.	80 816
12	HAMMERSTEIN Autórészegységgyártó és Fejlesztő Bt.	75 624
13	Valeo Auto-Electric Magyarország Gépjárműalkatrész-gyártó Kft.	67 790
14	Visteon Hungary Termelő és Értékesítő Kft.	66 000
15	BPW-Hungária Kft.	56 606
16	ZF Hungária Ipari és Kereskedelmi Kft.	55 428
17	Dana Hungary Gyártó Kft.	53 424
18	KNORR-BREMSE Vasúti Jármű Rendszerek Hungária Kft.	47 806
19	RÁBA Járműipari Holding Nyrt.*	42 346
20	Linamar Hungary Autóipari és Gépgyártó Zrt.	40 486

## Situation of Hungarian car industry in Central Europe

### Car industry:

- 1. place: Czech car ind.(Skoda)
- 2. place: Slovakian car ind. (Volkswagen)
- 3. place: Hungarian car ind.
- 4. place: Romanian car ind.

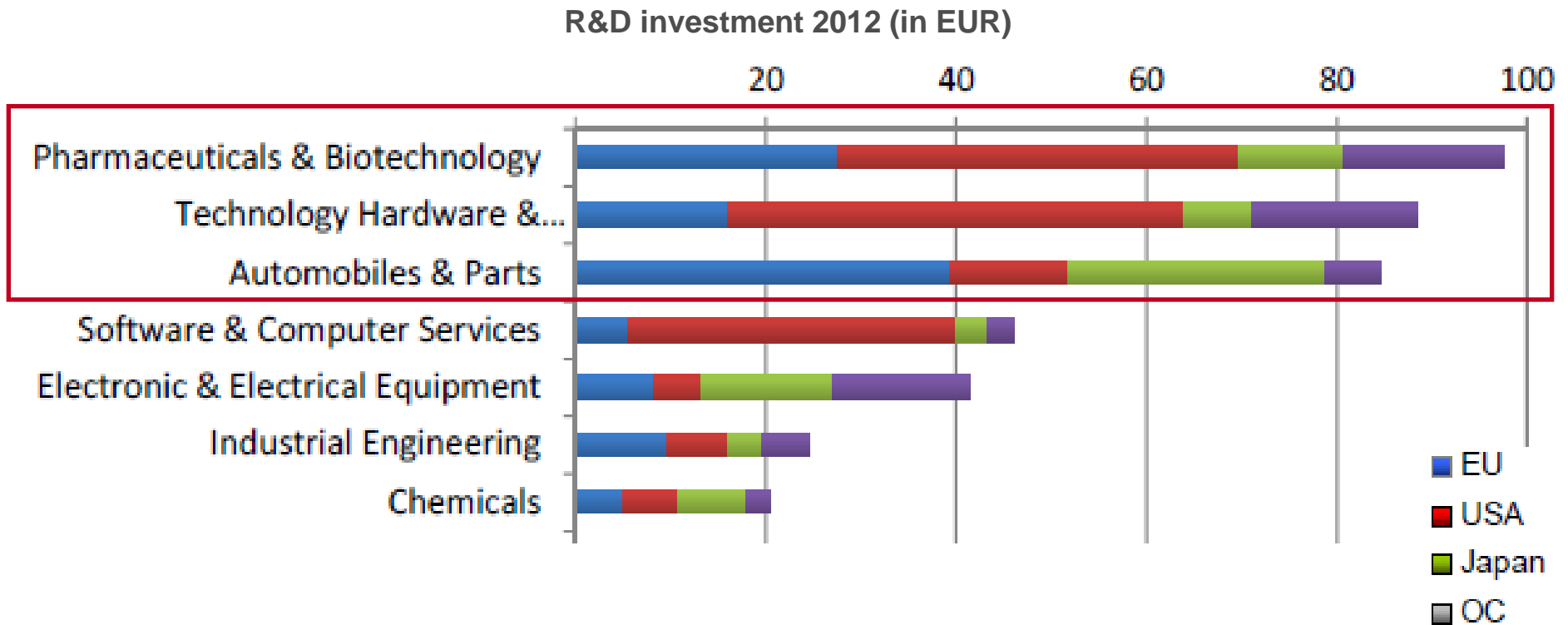
*The companies with the highest turnover in car industry in the region in 2011-12. data in mill EUR*





## Why is R&D important ?

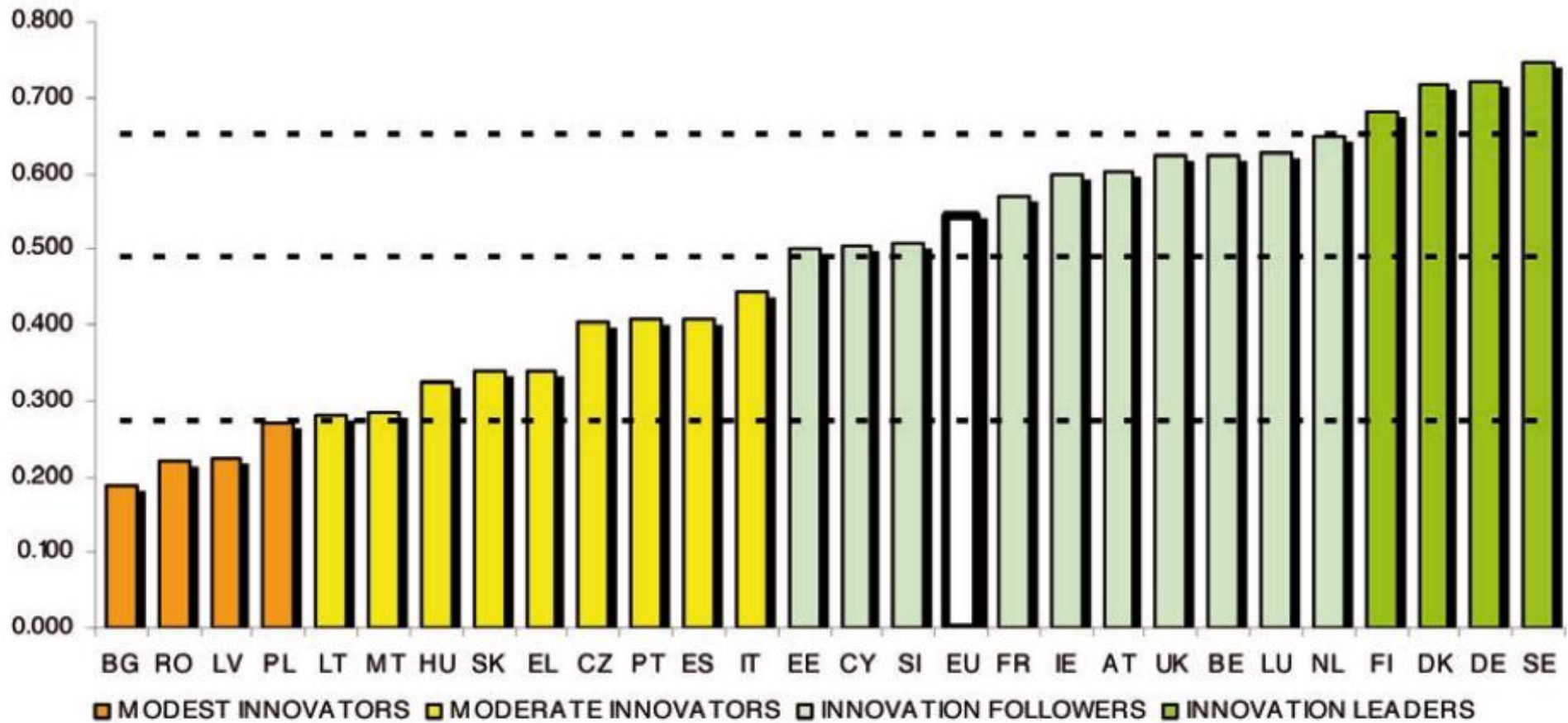
### R&D hierarchy in the industry sector and in the main regions of the world



Source: European commission The 2012 EU Industrial R&D Investment SCOREBOARD 2013

# Hungary improved one place over last year

## Summary Innovation Index



Source: Innovation Union Scoreboard 2013

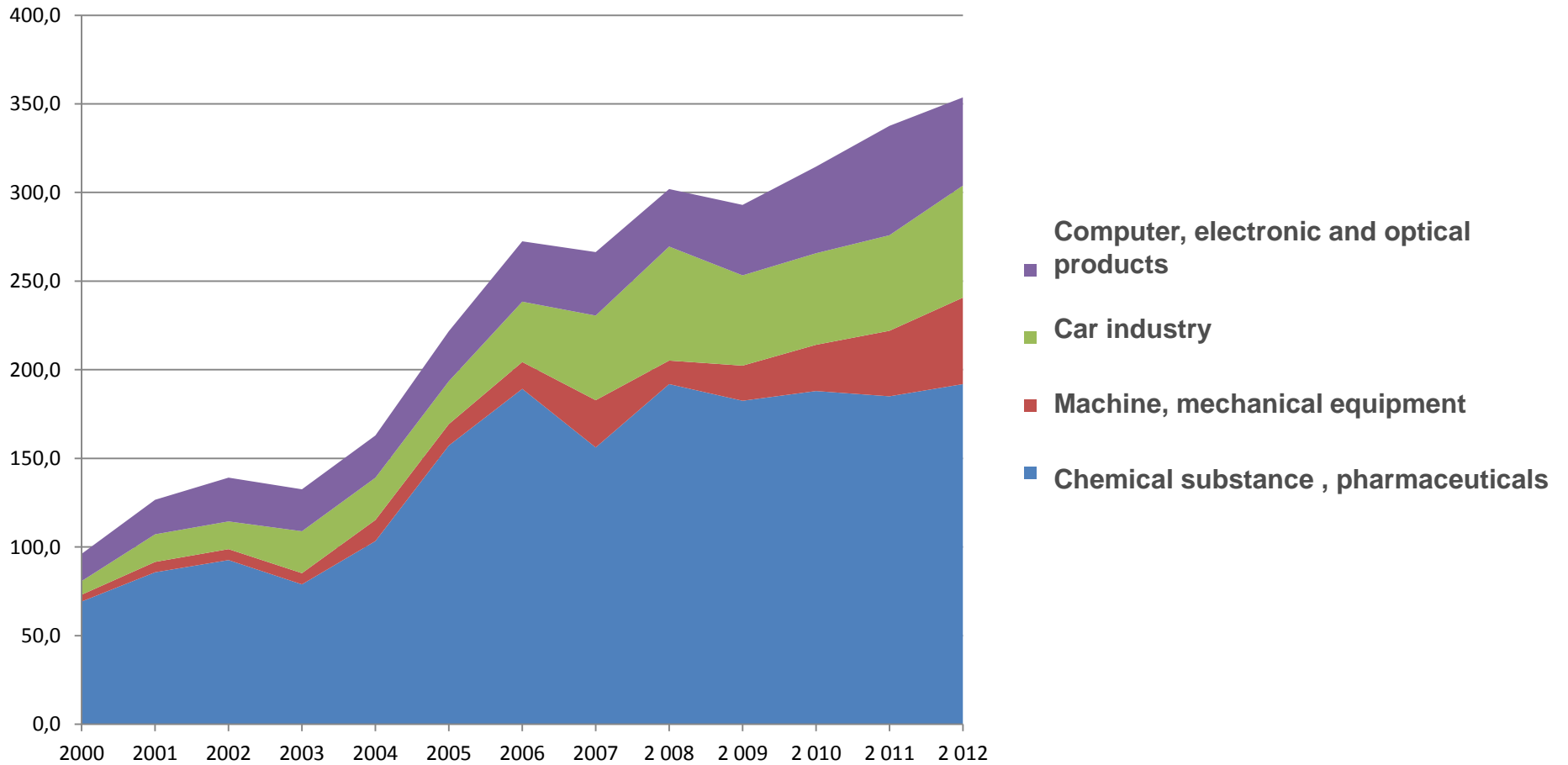
## Yearly R&D financial expenses among the newly joined countries to EU

The yearly R&D financial expenses per capita is 120,6 EUR in Hungary, which is the quarter of the EU average, but exceed the average of countries newly joining to EU.



Source: Kutatás-fejlesztés és Innováció Magyarországon 2013 nih.gov.hu

## The R&D finance expense of companies in some sector (billion EUR)



Source: KSH 2013

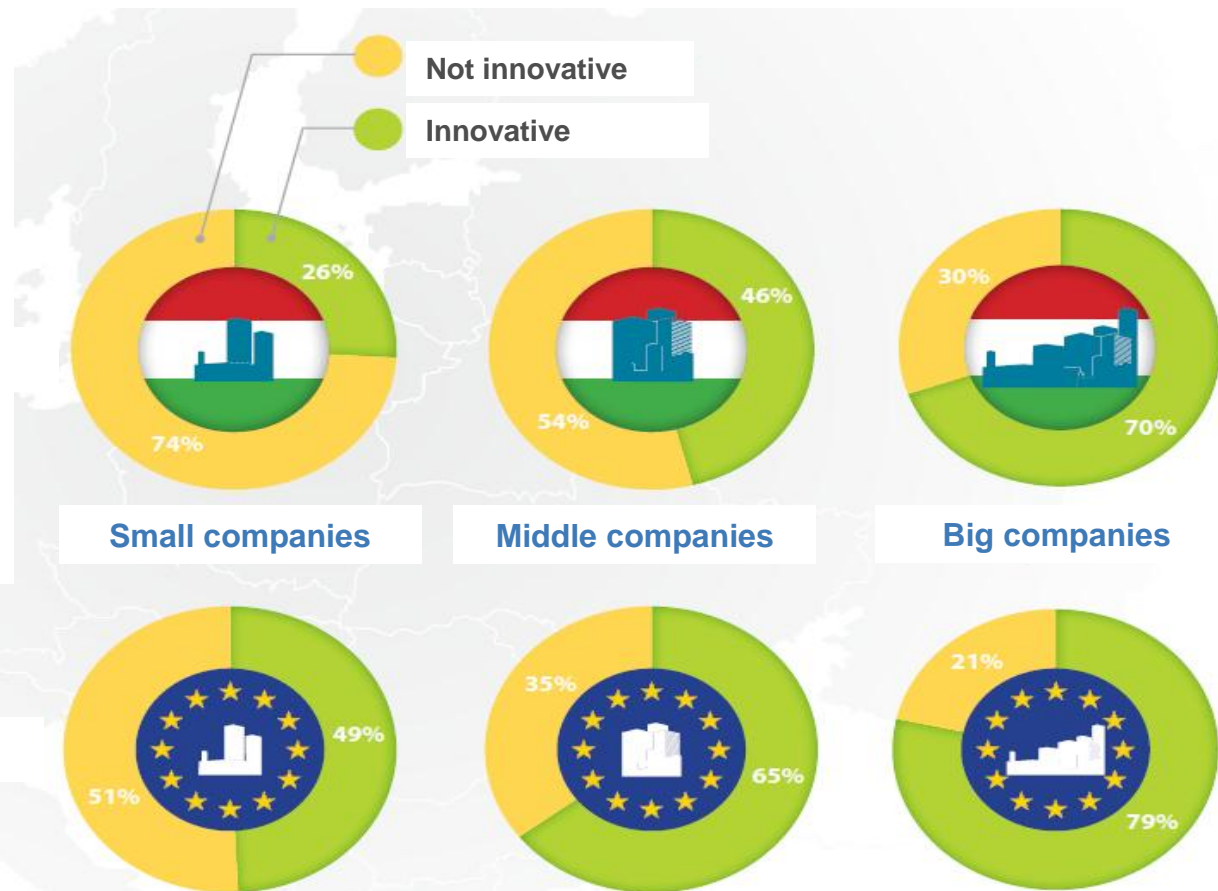
## Does innovation depend on the measurement?

### Rate of innovative companies in Hungary and in the EU by size-category

- The larger the company is the bigger chance is for innovation.
- Quarter of small companies, almost half of the medium companies are innovative.
- However seven of the ten big companies carry out innovative activities.

#### Hungary

- AIPA regional activity as a benchmark



Az adatok 2010-re vonatkoznak.  
 Forrás: Eurostat, CIS, 2012.

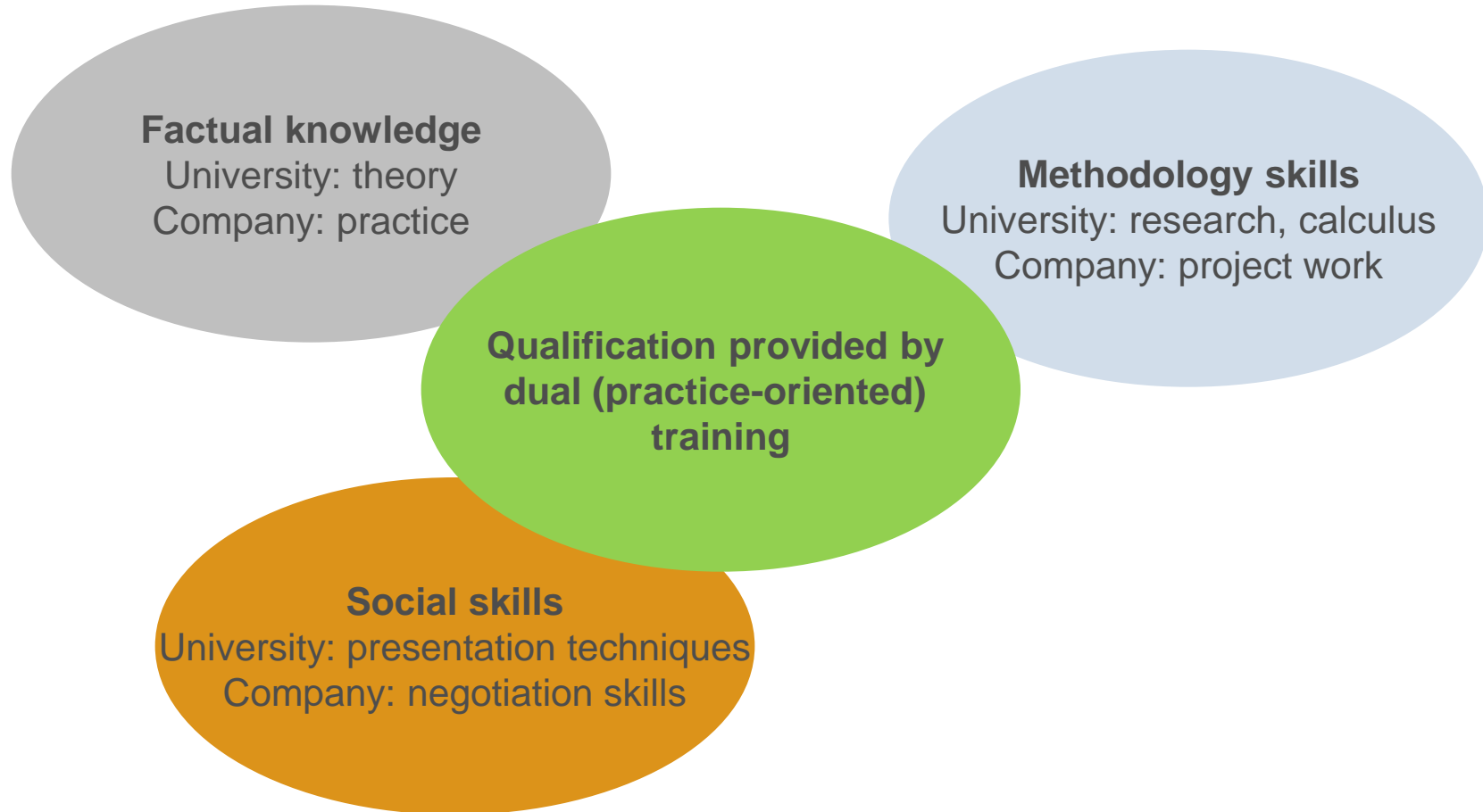


## Accepted to higher education number ( person) + their distribution in different areas 2011-13.

Training area	2011 (per.)	2011 (%)	2012 (per.)	2012 (%)	2013 (per.)	2013 (%)
Agricultural	3626	4	3392	5	4439	6
Master of arts	9655	11	8509	11	6758	9
Economy	16361	19	12567	17	14313	20
Information technology	6170	7	5297	7	5022	7
Law	7117	8	3257	4	3067	4
Civil service, law enforcement, military	581	1	2654	4	2560	4
<b>Technical</b>	<b>13914</b>	<b>16</b>	<b>13077</b>	<b>18</b>	<b>11697</b>	<b>16</b>
Art	1286	1	1506	2	1506	2
Art mediation	539	1	540	1	518	1
Science of medicine and health	5491	6	5387	7	5197	7
Pedagogy	7966	9	6470	9	7832	11
Science of sport	1581	2	1632	2	1856	3
Social science	7118	8	5417	7	4140	6
Natural science	5740	7	4839	6	3766	5

## Basic principles of division of work between companies and universities

**Partnership of academic and corporate players – not only in education**

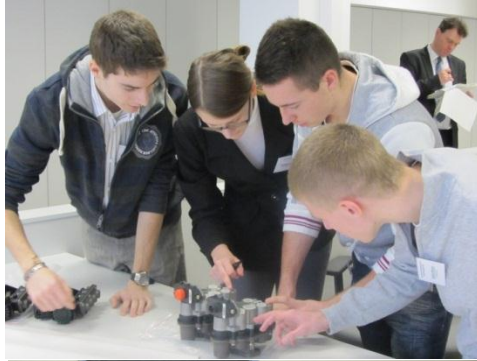


## Practice-oriented - dual training in higher education Career orientation navigated by Kecskemét College, Faculty of Mechanical Engineering and Automation (KF GAMF) and Knorr-Bremse



- Establishment of long-term linkage to the company and its products;
- Security of technical life path and career model planning;
- Varied and intensive practice-oriented curriculum – professional skills based on solid theory skills, to be utilized in practice as well – during the 7-semester training course, 10-12 weeks of theory lessons are followed by 5-8 weeks of practice at the company each semester;
- After commencing their college studies, students enter into a student relationship with the company and are granted pecuniary allowance on a monthly basis;
- Integration of skills and capabilities required by industrial corporation into engineering training
  - cooperation through teamwork
  - communication and presentation skills
  - ownership approach
  - creativity and innovation

# Selection of applicants for practice-oriented tertiary training at Knorr-Bremse



KNORR-BREMSE

**KARRIER PORTÁL**  
*Join us!*

**Jelentkezés duális képzésre**

**Kedves Jelentkező!**

A Kecskeméti Főiskola GANF Kara – együttműködve a Knorr-Bremse Fékrendszerek Kft.-vel és egyéb intézményi partnerekkel – a hazai viszonyokhoz illeszkedő duális rendszerű képzést dolgozott ki, melynek célja, hogy maximálisan megfeleljen a járműipar elvárásainak. Az országosan is újszerű képzésben a hallgatók elméleti tudásukat az iparvállalatnál töltött gyakorlati időszak során „élesben” bővíthetik, ezáltal tapasztalatot szereznek leendő szakmájukban. A kialakított képzési rendszerben olyan versenyképes munkavállaló kerül ki az oktatásból, aki azonnal – több hónapos vagy akár több éves továbbképzés és további anyagi ráfordítás nélkül is – képes belepni a munka világába.

**Hogyan néz ki a duális képzés a gyakorlatban?**

A duális képzésben minden oktatási félév az elméleti részzel kezdődik, 10 -12 hetet fogsz eltölteni a Kecskeméti Főiskola GANF Karán, ahol a Főiskola oktatói minden, a mérnöki munkához szükséges elméleti tudnivalóval megismeretnek. A következő 3-6 héten alapvetően a Knorr-Bremse munkatársai mutatják meg Neked, hogy az egyes tantárgyak elsajátított elméletet hogyan alkalmazza a vállalat a gyakorlatban. A vizsgaidőszakban a Főiskolával közösen fogjuk felmérni, mennyire sikerült megtanulnod a szükséges elméleti és gyakorlati ismereteket. A tavaszi félév a vizsgaidőszakkal azonban nem ér véget a Számodra: június végén és júliusban projekt-feladatokon keresztül, az elméleti ismereteidre támaszkodva a Knorr-Bremse tevékenységével, üzleti folyamataival fogsz megismerkedni és érdekes problémákon fogunk együtt dolgozni.

**Mit fogsz nálunk tanulni?**

A duális képzésben, a vállalatunknál elbottolt idő alatt bemutatjuk Neked termékeinket, a fékrendszerbeli komponensek fejlesztését és gyártásuk folyamatát, az alkalmazott technológiákat, minőségbiztosítási rendszereinket és még sok minden más hasznos dolgot. A fentiek azonban nem egyszerűen elmondjuk Neked, hanem azokat gyakorlod, kipróbálad, részt veszel bennük. Ha valamelyik területen szeretnél jobban elmélyülni – például egy TDK-munka keretében, vagy más érdeklődés miatt – akkor ahhoz is minden erőnkdre

**DUÁLIS KÉPZÉS**

[munkavállalóknak](#)

[duális képzés](#)

[jelentkezés módja](#)

[kiválasztás módja](#)

[mit ajánlunk?](#)

[személyes oldalak](#)

[kapcsolat](#)

**személyes oldalak**

E-mail címe:

Jelzava:

- Number of applicants at the career portal of the company ([www.joinus.hu](http://www.joinus.hu))
  - 91 in 2012
  - 100 in 2013
- Components of selection procedure:
  - capability test, psychology test, stereopsis and drawing skills survey, assessment centre practice,
  - personal interview and foreign language placement test
- In 2012, 26 applicants were invited to the selection day and 14 students qualified
- In 2013, 24 of the applicants to the BSc courses of **vehicle engineering and technical management** were invited and 8 of them qualified



# Model curriculum of dual BSc course of vehicle engineering – Semester 1

## Knorr-Bremse - Basics



Standard presentation by CEO István Lepsényi



Production practice



Practice at R&D lab



Knorr-Bremse - Corporate basics - practice -		
Vocational		Personal competence
Theory	Practice / manual skills	
Supervisor: István Lepsényi	Introduction to Knorr-Bremse	
-----		
Supervisor: Kornél Kántor, Sándor Szőke	Introduction to Knorr-Bremse Fékrendszerek Kft.'s products and R&D lab	
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Supervisor: Tamás Kádár, István Kalocsa, János Tóth	Production technology basics, mounting practice: putting sample components in hand and fixing them. Mounting basics, fixing tools.	
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		Teamwork.

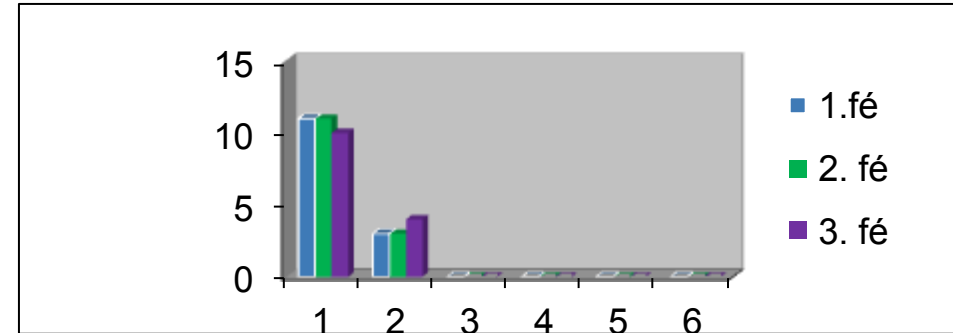
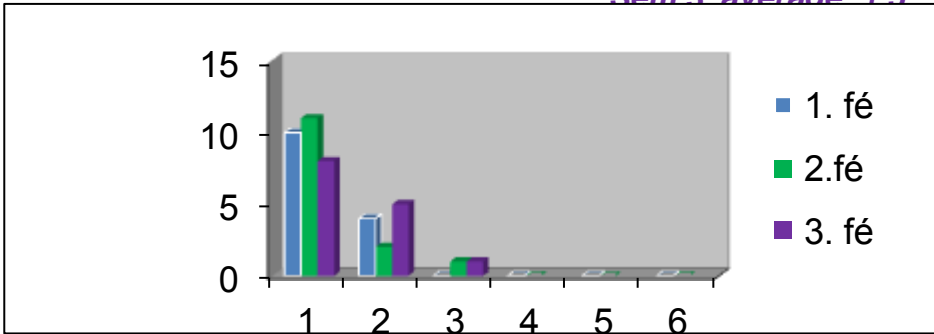


# Assessment by students of company practice at dual BSc course of vehicle engineering\*

Summary of opinions by 14 students:  
(Number 1 is the best in the assessment)

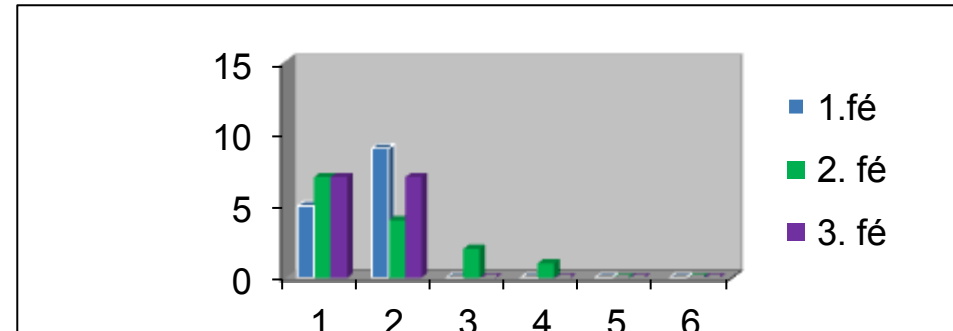
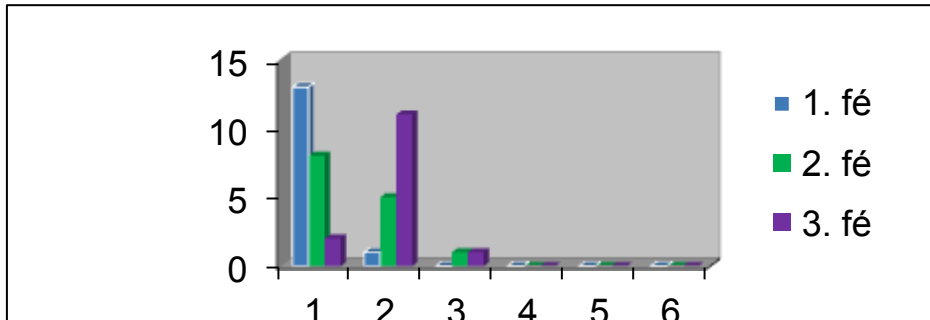
To what extent do you think the professional content of the course is of adequate standards? *Sem.1, average: 1.28*  
*Sem.2, average: 1.28*  
*Sem.3, average: 1.5*

What is your rating of instructors' preparedness? *Sem.1, average: 1.21*  
*Sem.2, average: 1.21*  
*Sem.3, average: 1.28*



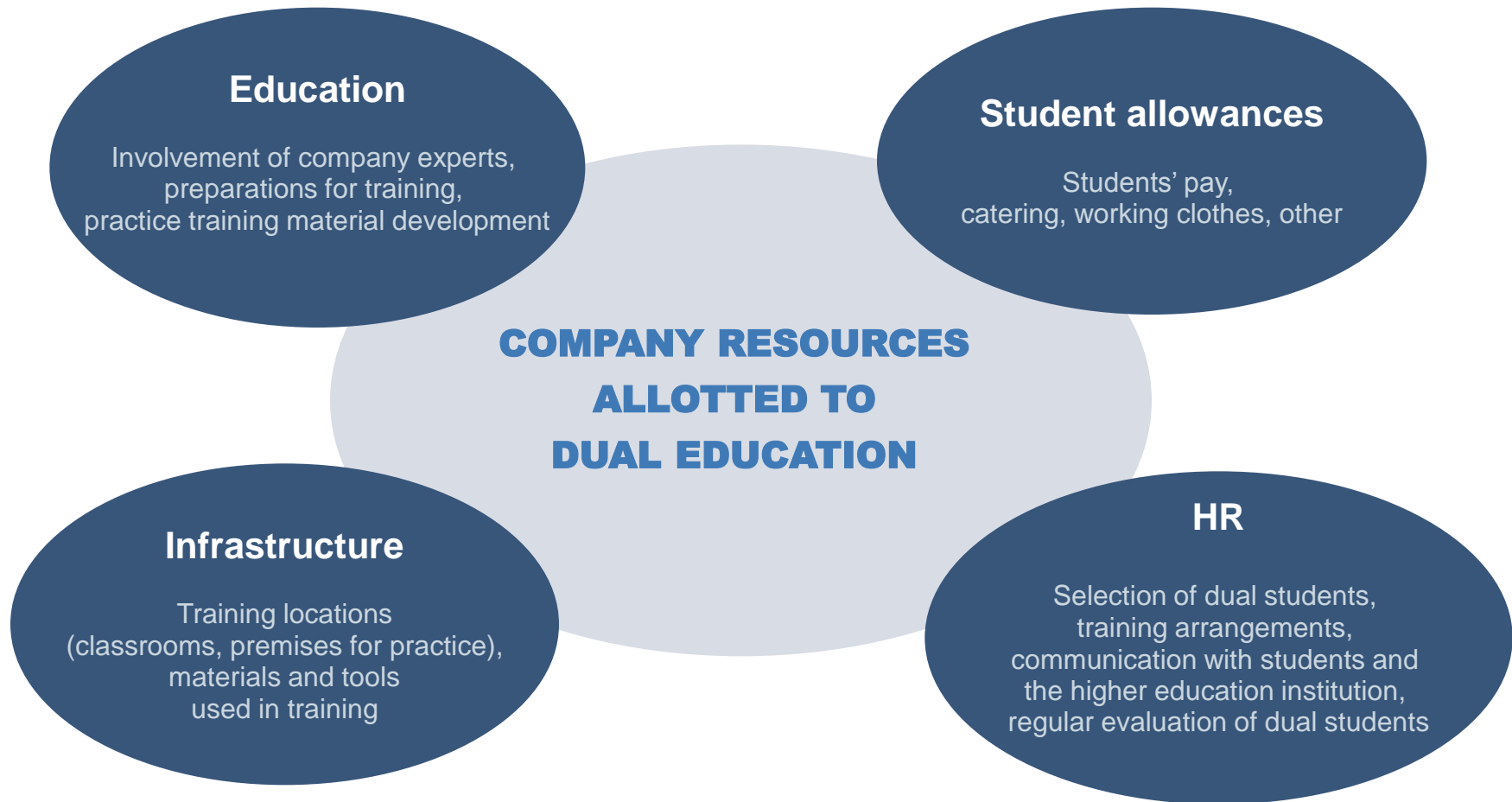
To what extent do you think practice training was understandable? *Sem.1, average: 1.07*  
*Sem.2, average: 1.5*  
*Sem.3, average: 1.9*

To what extent can you apply what you heard at the course in your future studies? *Sem.1, average: 1.64*  
*Sem.2, average: 1.79*  
*Sem.3, average: 1.5*



\*The practice course in Semester 3 finishes on 13 February 2014; the survey was conducted after 50% of practice classes were completed

## Expenses by company involved in dual higher education



## Result

### Professional replacement

- Applicants with competencies required by the labour market are available in the long run.
- The number of career starters graduated from technical training and employed in the industry is increasing.
- Labour market supply and demand of future engineers is supported at national level.

### Cooperation

- Dual higher education courses are based on the concerted close cooperation of higher education institutions and the industrial companies concerned.
- Young engineers are trained to have quality practical experience and skills.

### Extension of dual higher education

- Nationwide extension: involvement of SMEs in dual higher education, fostering their integration by infrastructure development at large corporations and higher education institutions.
- Integration of further higher education specialties and special fields into the training.

### Sustainability criteria

- Handling the model of dual higher education as a high priority in higher education development.
- Availability of funding by tenders to develop and provide, in the long run, company and higher education resources as required for dual higher education.

## Suggestion how to develop the higher education

- Extension of Dual Higher Education

- Harmonization of form and content of practical education

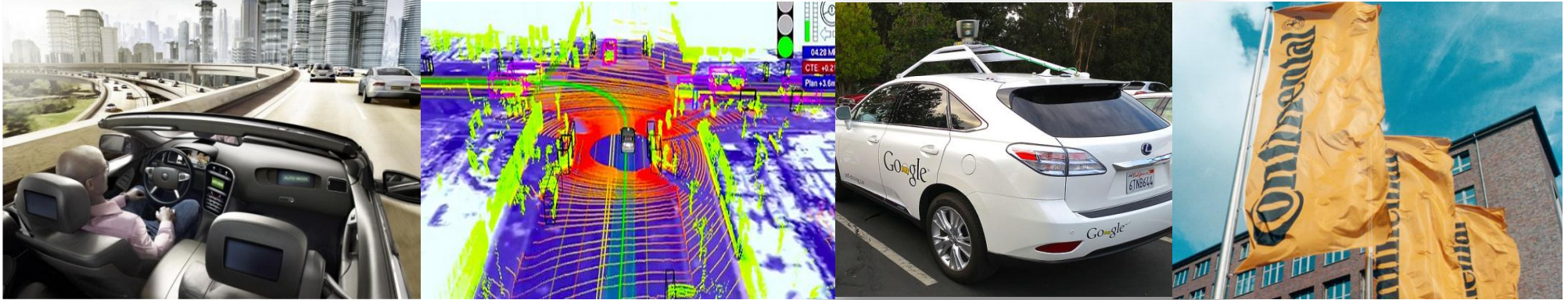
- Providing conditions for practical education

- Reception of guest speakers from the industry at the university; strengthening “interoperability” in general

- Theses and studies based on industrial needs

- Natural science already at primary school; strengthening secondary education

# Google – Continental – Step to future



## Main features:

- Development of driverless car technology. Google project – headed by: Sebastian Thrun, an engineer at Google.
- DARPA Grand Challenge first prize (2005)
- Nevada allowing driverless cars in public road traffic (29.06.2011.), followed by further states (California, Florida Sep 2012)
- Announcement by development team: about a dozen of their autonomous cars run more than 500,000 km (August 2012)
- Google and Continental announce a partnership to further development of robot car tech (Frankfurt Motor Show 2013. 09.12)
- Self-driving cars could be a reality by 2025 - Continental estimated.

## Development focus:

- Sensors
- Radars
- Cameras
- GPS
- Pattern recognition

## Development in Hungary:

- Bosch, Knorr-Bremse, Continental, Takata etc.
- Universities and Academic Research Center



## Conclusions

- Automotive industry is a driver of the economy
- The weight of R&D is growing perceptibly, primarily at large corporations, but in SME areas too
- Continuously increasing tendency in education to ensure an appropriate supply of professionals
- Challenging tasks in Hungary too

**Thank you for your attention!**

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