Supply industry: opportunities and requirements

Magyar Tudományos Akadémia
István Lepsényi

31. January 2014.

Middle EU car industry

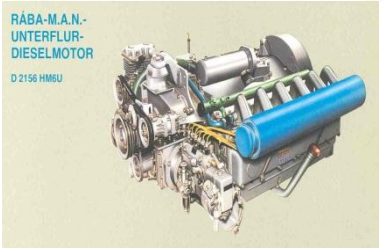
Location of car factories in the new EU countries 2012

				+	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[2]	1,682,814	284,951	n.a.	1,967,765
	GERMANY[2]	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[2]	162,814		n.a.	162,814
	UNITED KINGDOM	1,464,906	94,045	16,289	1,575,240
	EU[1]	**14,611,284**	**1,435,990**	**186,204**	**16,233,478**

Source: ACEA Pocket Guide, 2013

Restructuring of the Hungarian car industry

1983

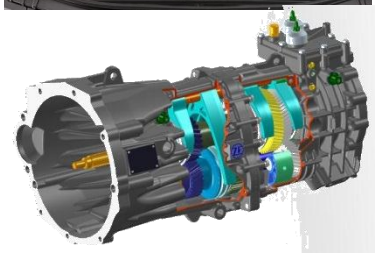


Basically vehicle orientation

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

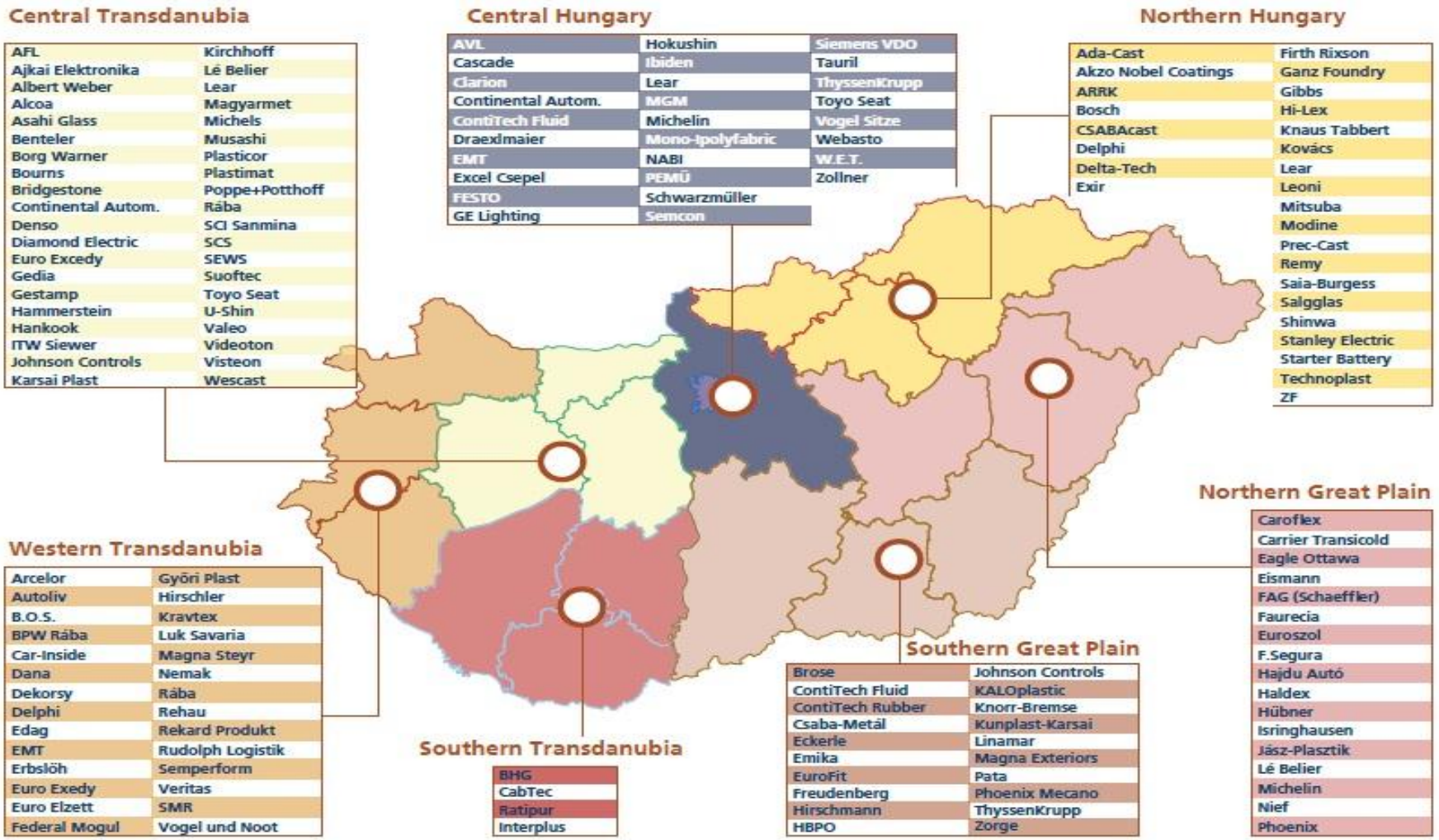
Car industry 2012

- 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 automative industry suppliers in Hungary



Source: NIH, 2012

TOPLIST of the automative 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

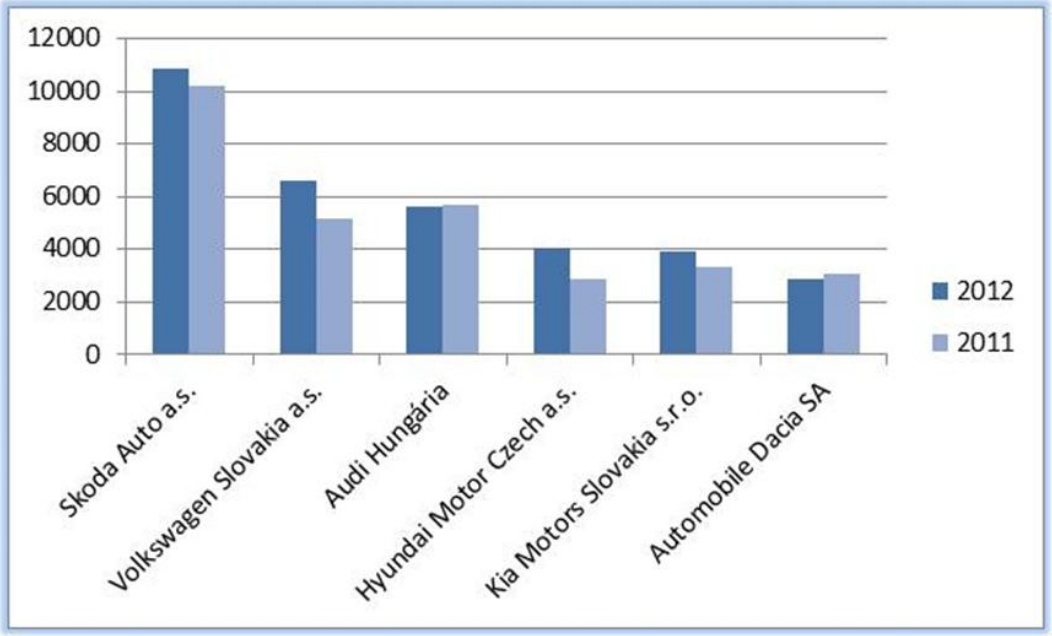
*Source: Figyelő TOP 200 2013.

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.

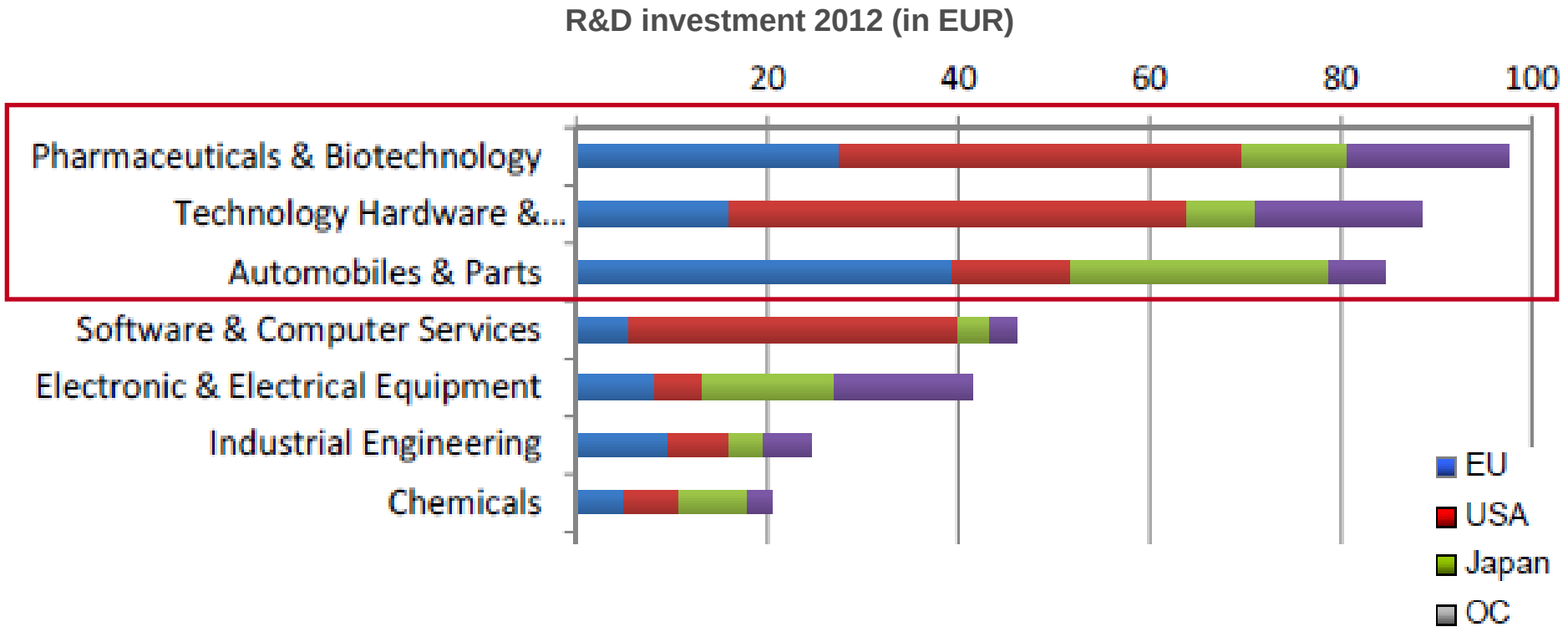
The companies with the highest turnover in car industry in the region in 2011-12. data in mill EUR



Forrás: Creditreform Ágazati elemzés 2012.

Why is R&D important ?

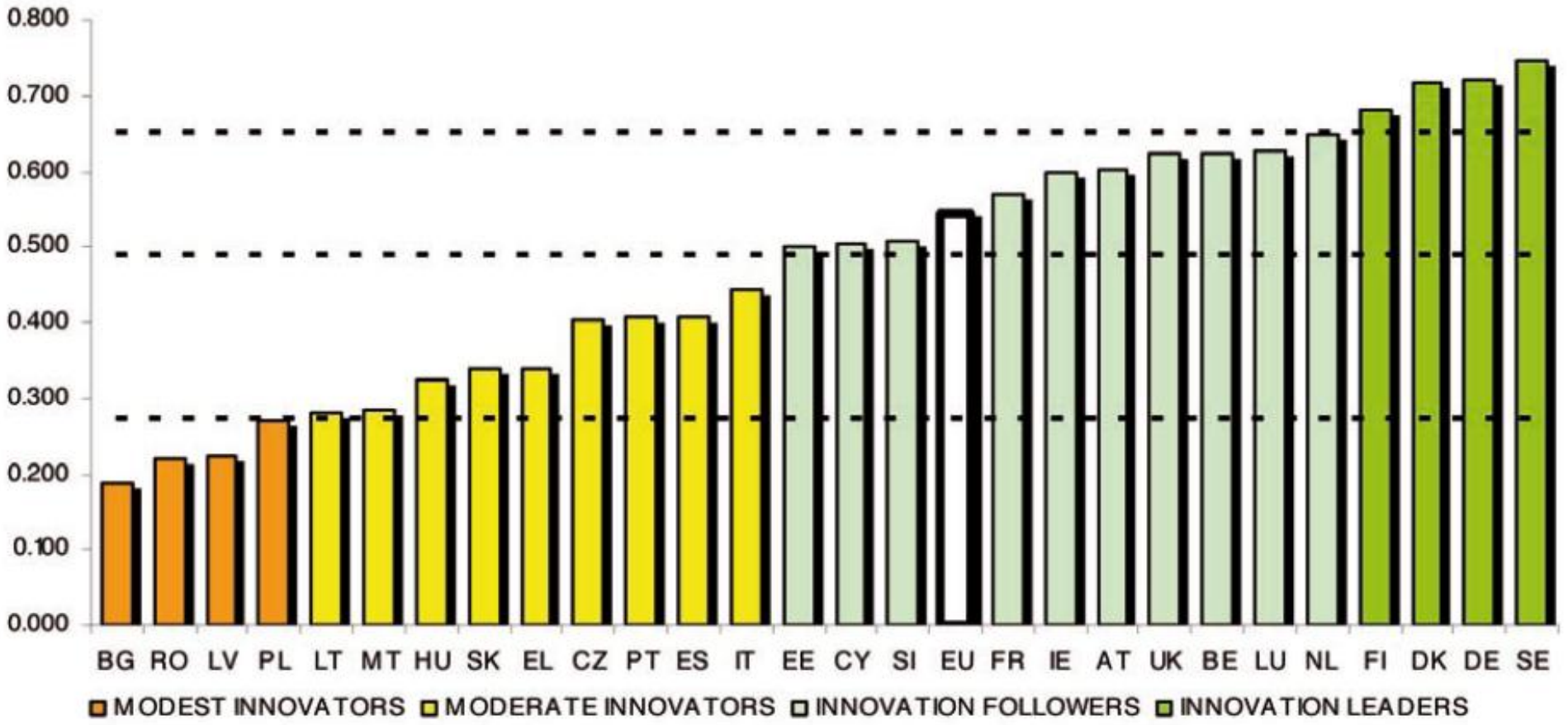
R&D hierarchy in the industry sector and in the main regions of the world



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

Hungary improved one place over last year

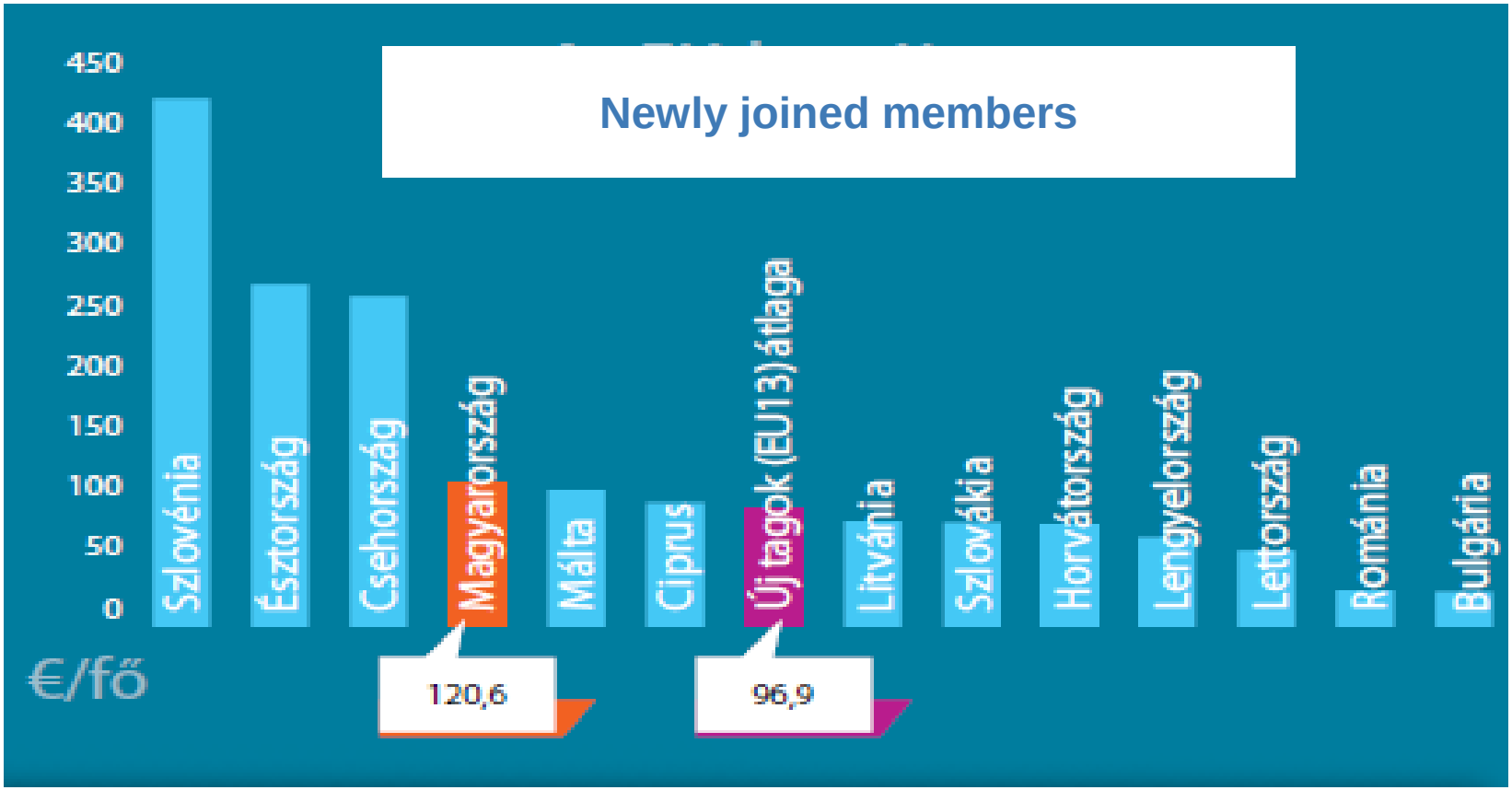
Summary Innovation Index



Source: Innovation Union Scoreboard 2013

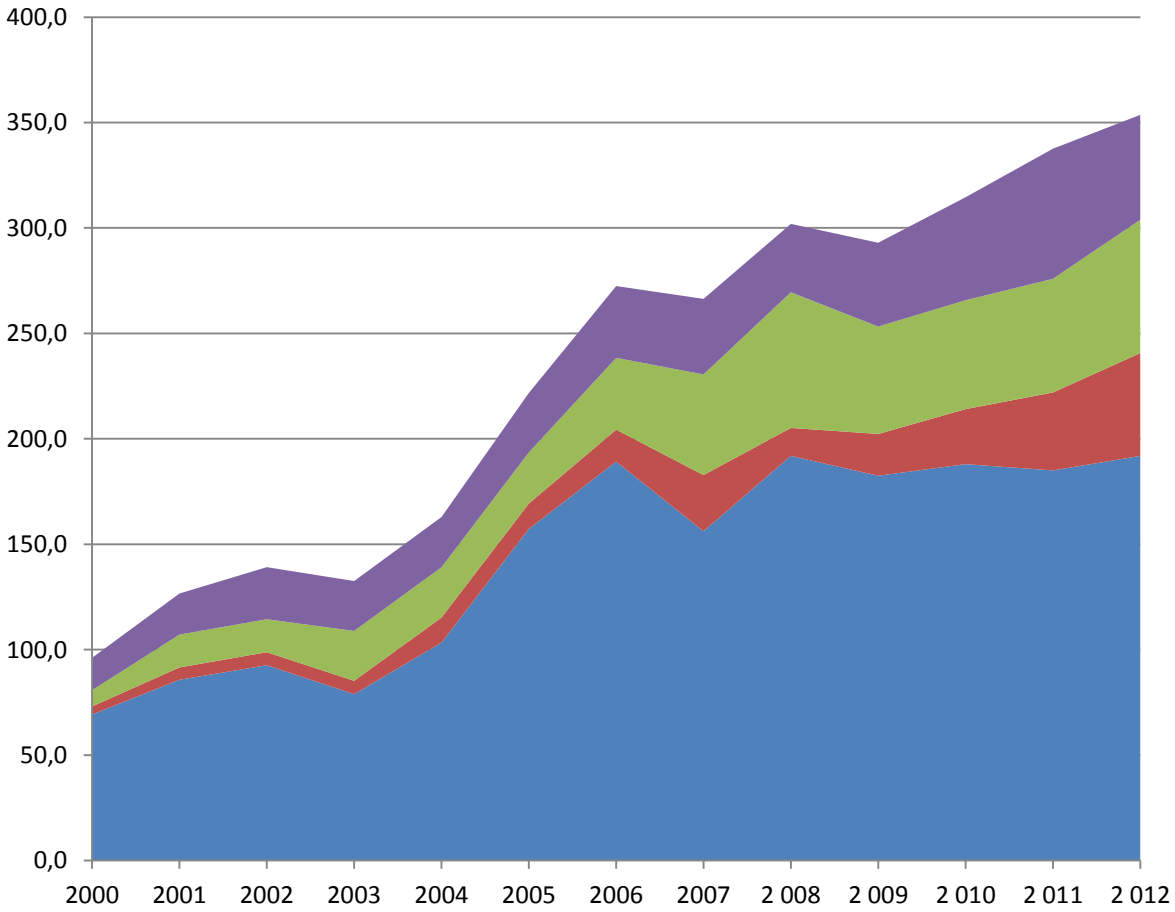
Yearly R&D financial expenses among the newly joined countries to EU

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

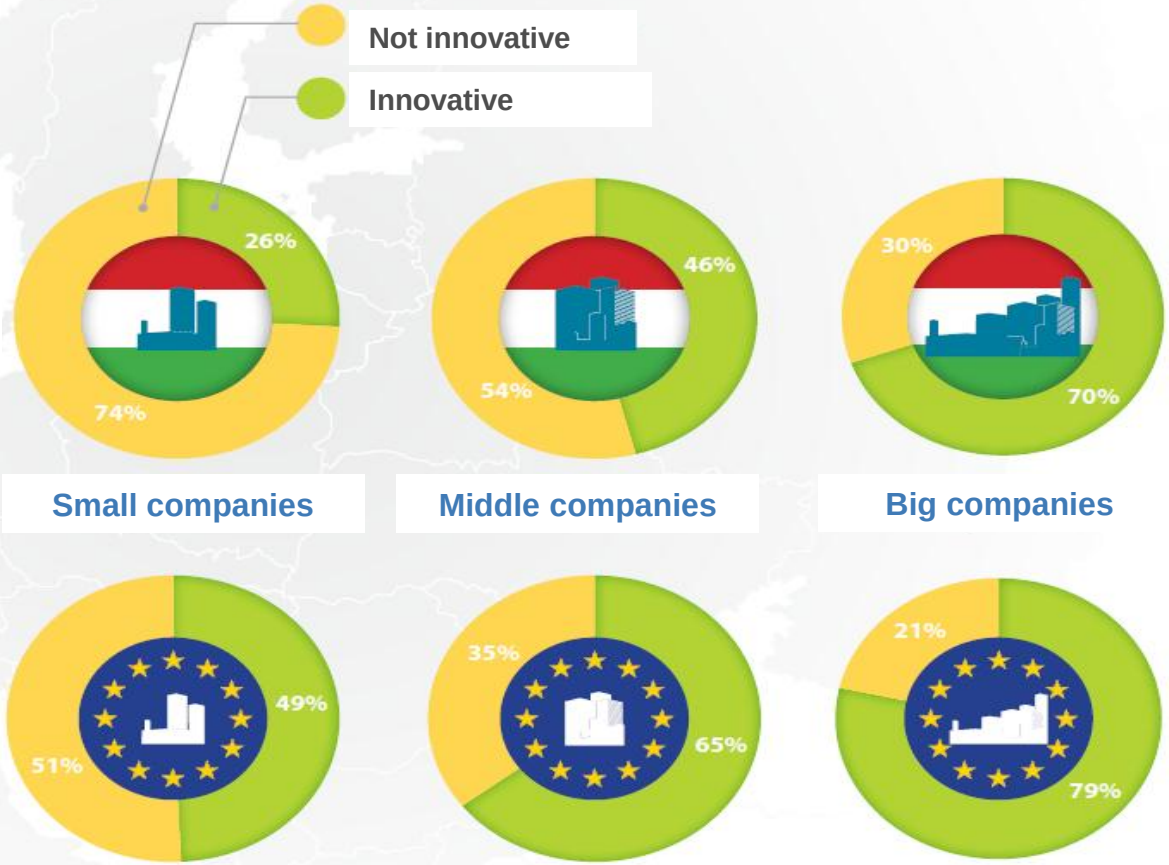
Does innovation depend on the measurement?

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.

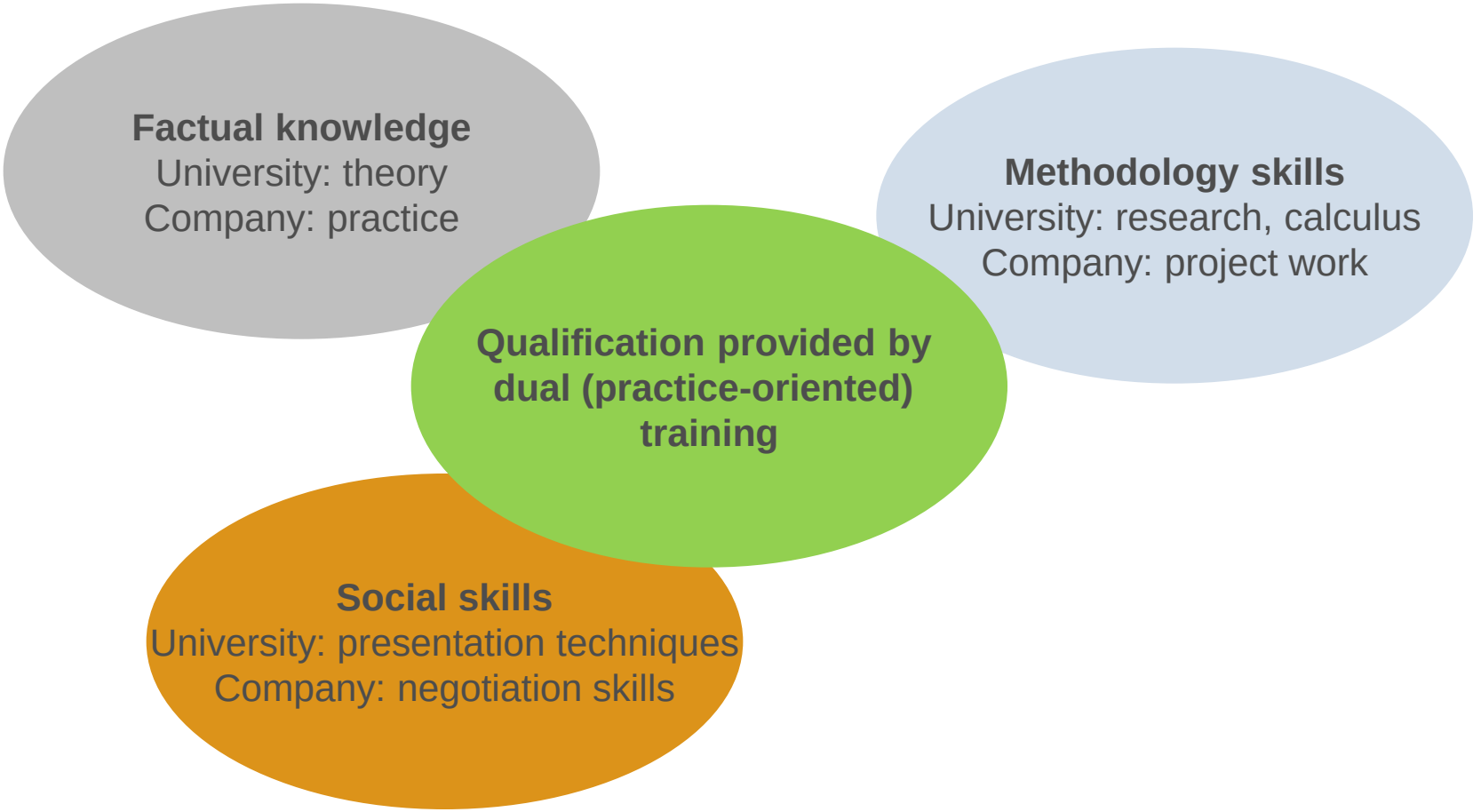
Accepted to higher education number (person) + their distribution in different areas 2011-13.

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
Technical	**13914**	**16**	**13077**	**18**	**11697**	**16**
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

Forrás: www.oktatas.hu 2013

Basic principles of division of work between companies and universities

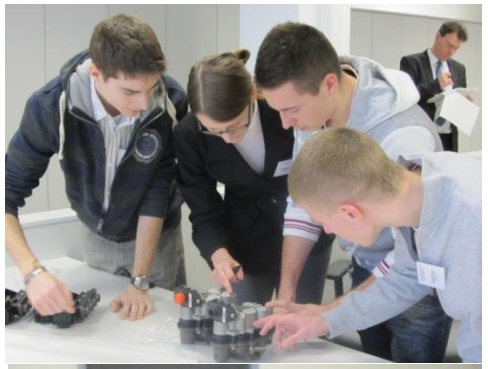
Partnership of academic and corporate players – not only in education



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 capabilites 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



- Number of applicants at the career portal of the company (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

Physics experiment and practice

Practice at R&D lab

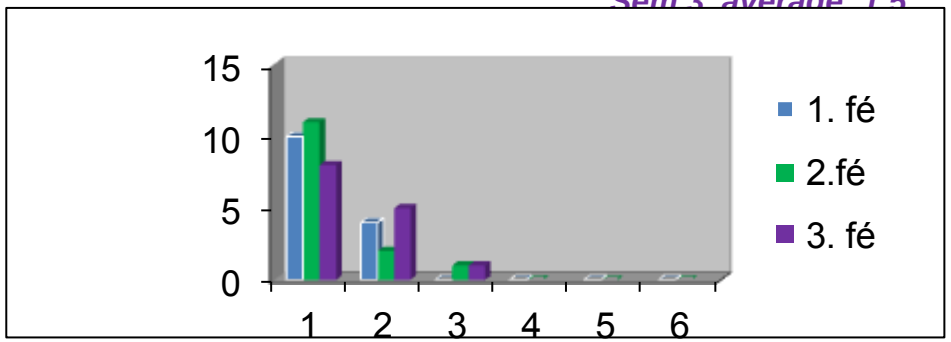
Production practice

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		
Supervisor: Tamás Kádár, István Kalocsa, János Tóth		
Production technology basics, mounting practice: putting sample components in hand and fixing them. Mounting basics, fixing tools.		
		Teamwork.

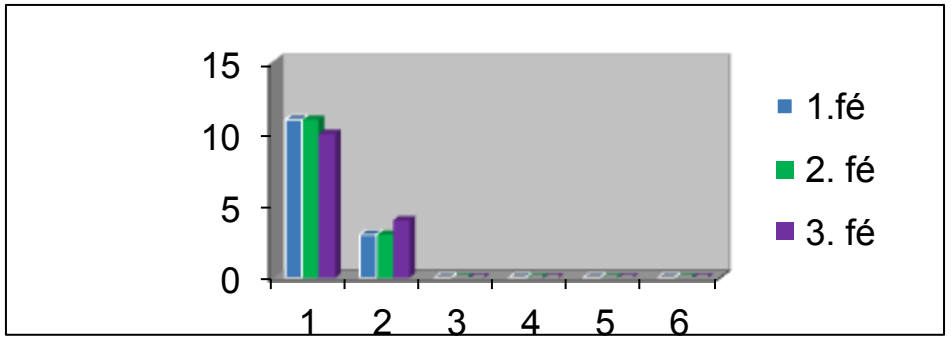
Assessment by students of company practice at dual BSc course of vehicle engineering*

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

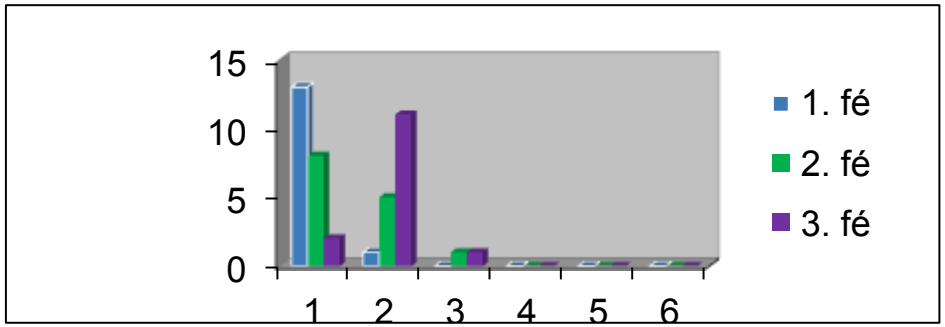
To what extent do you think the professional content of the course is of adequate standards? ***Sem.1, average: 1.28***
Sem.2, average: 1.28
Sem.3, average: 1.5



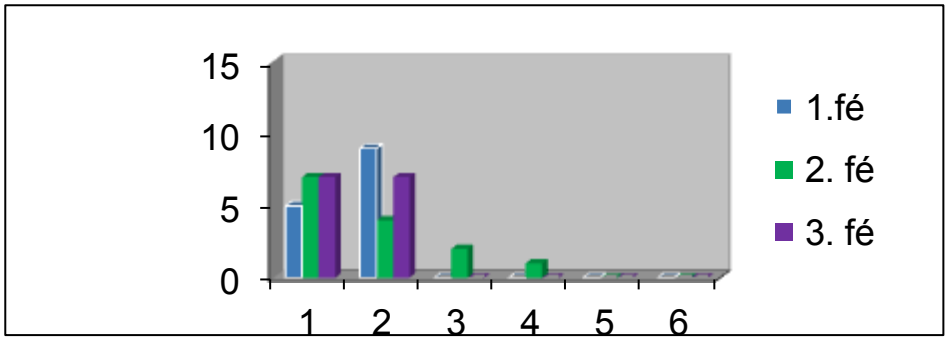
What is your rating of instructors' preparedness?
Sem.1, average: 1.21
Sem.2, average: 1.21
Sem.3, average: 1.28



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

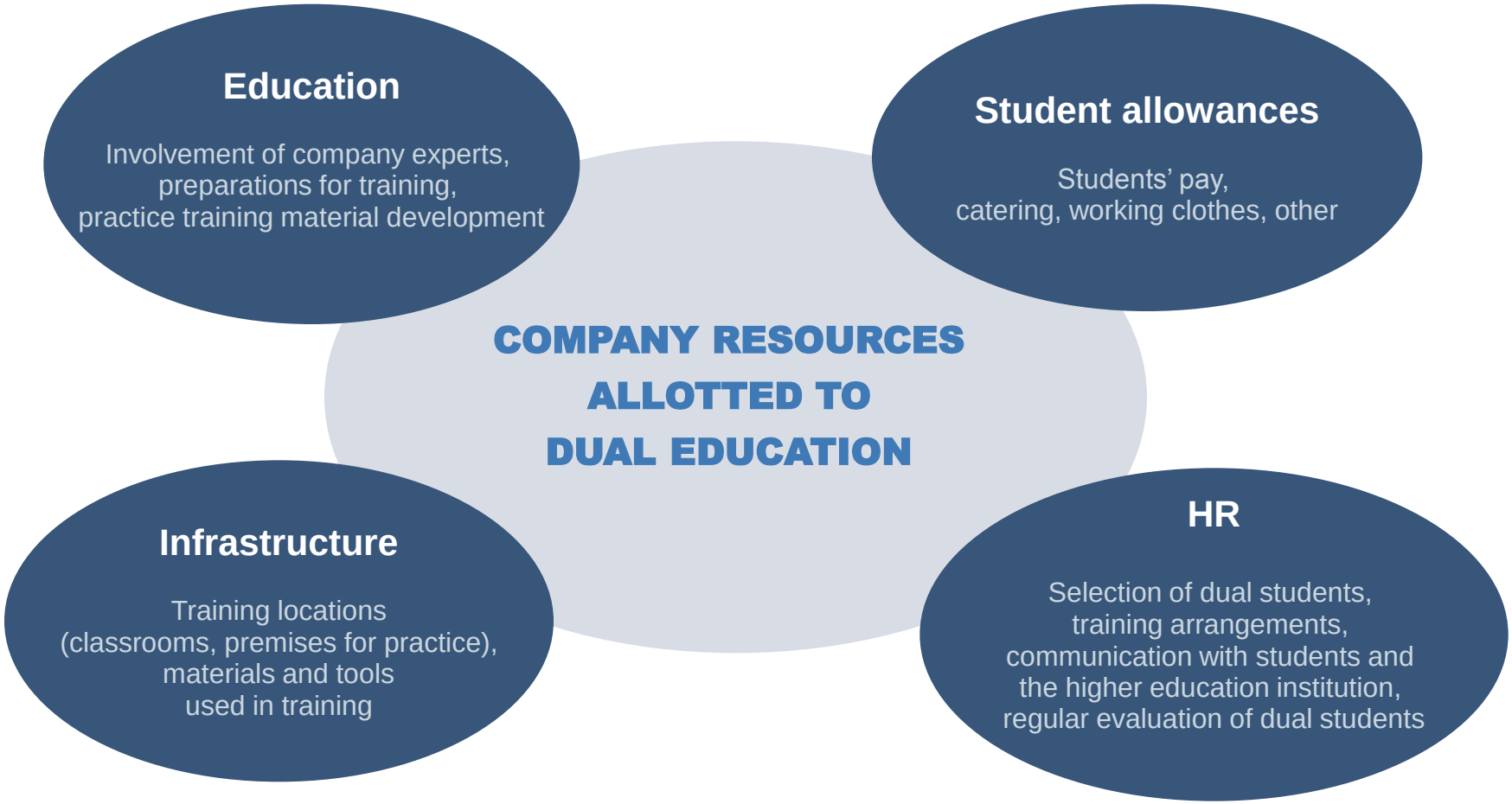


To what extent can you apply what you heard at the course in your future studies?
Sem.1, average: 1.64
Sem.2, average: 1.79
Sem.3, average: 1.5



**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.

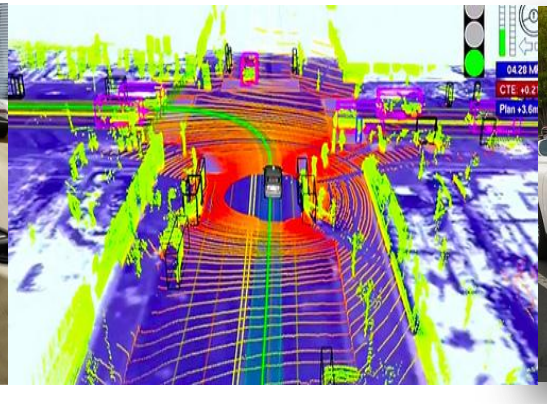
Sustainability criteria

- Handlig 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!

Knorr-Bremse Fékrendszerek Kft
Lepsényi István
Szegedi út 49.
H-6000 Kecskemét, Hungary

Phone: +36 76 511 101
Fax: +36 76 481 363
Email: istvan.lepsenyi@knorr-bremse.com
www.knorr-bremse.com