



# Enhance the Attractiveness of Studies in Science and Technology

**Attract Open Meeting i Lisboa  
November 4<sup>th</sup> 2011**

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# ATTRACT orgin

- It has its origin from a mission given to the CLUSTER university, KTH, from the Swedish government and
- After a completed project in Sweden it was decided to try to initiate a similar discussion on the European level.
- It's within the EU A Lifelong Learning Programme – sub programme KA1 Policy Cooperation and Innovation,

# Via ATTRACT it is our intention

to discuss and conduct development work within four different areas:

- **The attractiveness of being an engineer**
- Formal hinders/barriers
- Attracting students to studies in science and technology /engineering education
- Student retention

# WP 5 Disclaimer

## Challenges and obstacles

- Defining the subareas – what to cover?
- Local, regional, national and international perspective?
- Selections of materials – which sources and references?
- Who can make general conclusions and give advice?
- Different cultures and commitments!

# We have covered the following parts:

- **Defining an Engineer**
- **Perceptions on Engineering in Society**
- **Labor Market for Engineers**
- **Media Coverage**

# Defining an Engineer

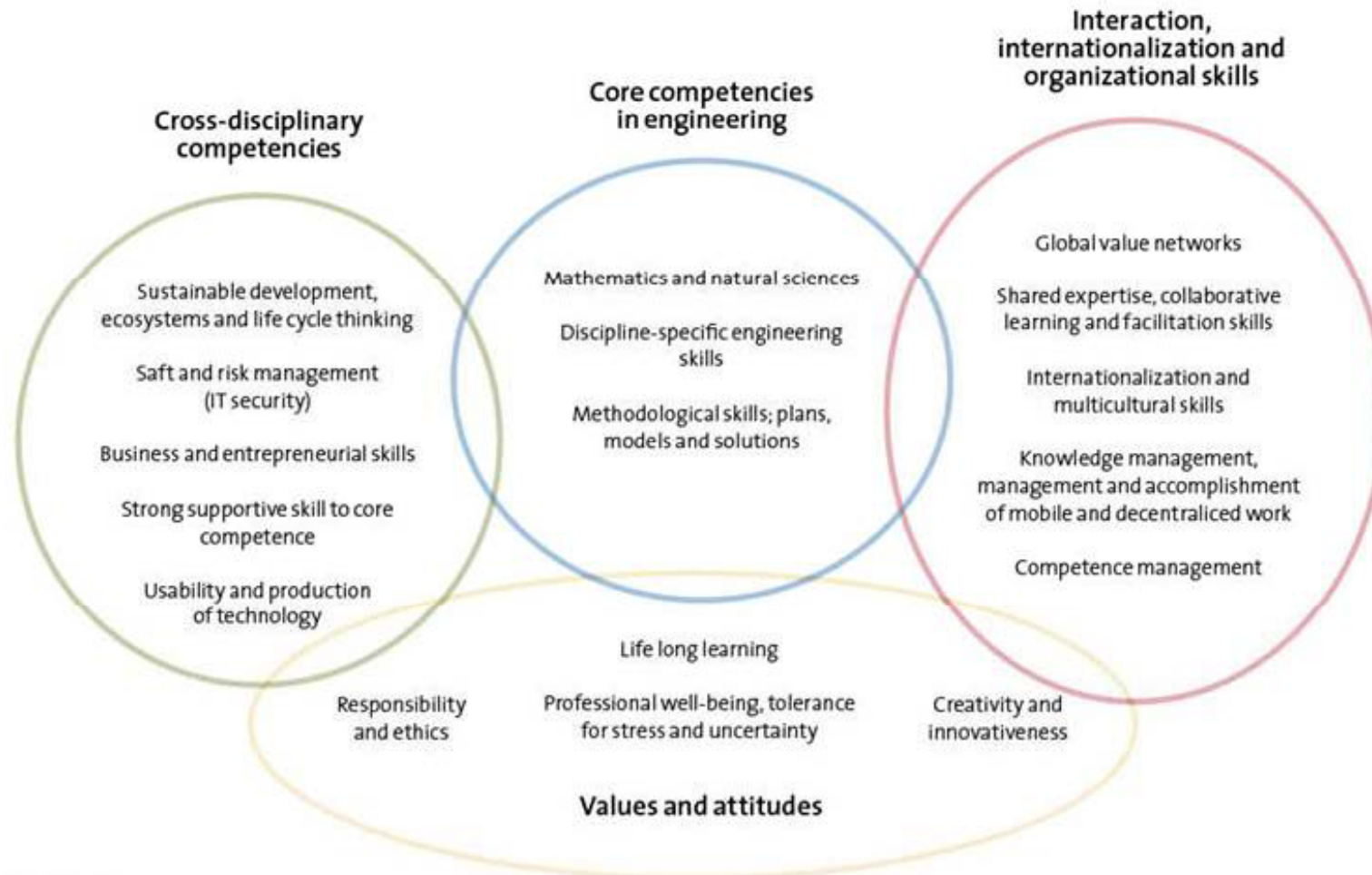
**“professional practitioner of engineering, concerned with applying scientific knowledge, mathematics and ingenuity to develop solutions for technical problems”.**

**Wikipedia**

# Defining an Engineer

- **Formal requirement or certificate to work as an engineer is different from country to country**
- **Common for all engineers in all countries are a deep knowledge of technology and mathematical and scientific competencies**
- **Engineers must complement their engineering skills with non technical competencies such as system problem solving, oral and written communications, teamwork, management, language and leadership skills and so on. Like CDIO ([www.cdio.org](http://www.cdio.org) )**

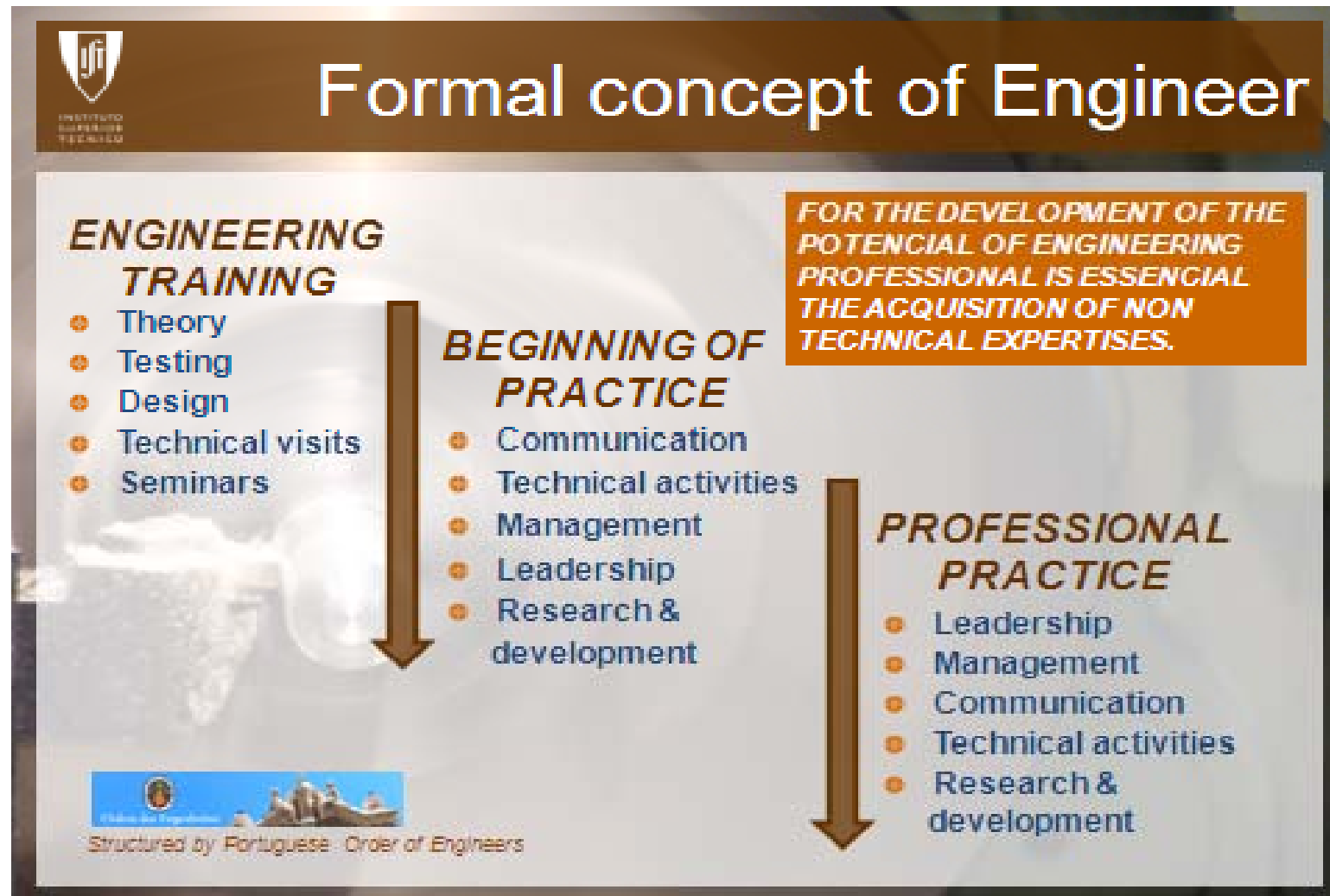
# Competencies and skills of future engineers



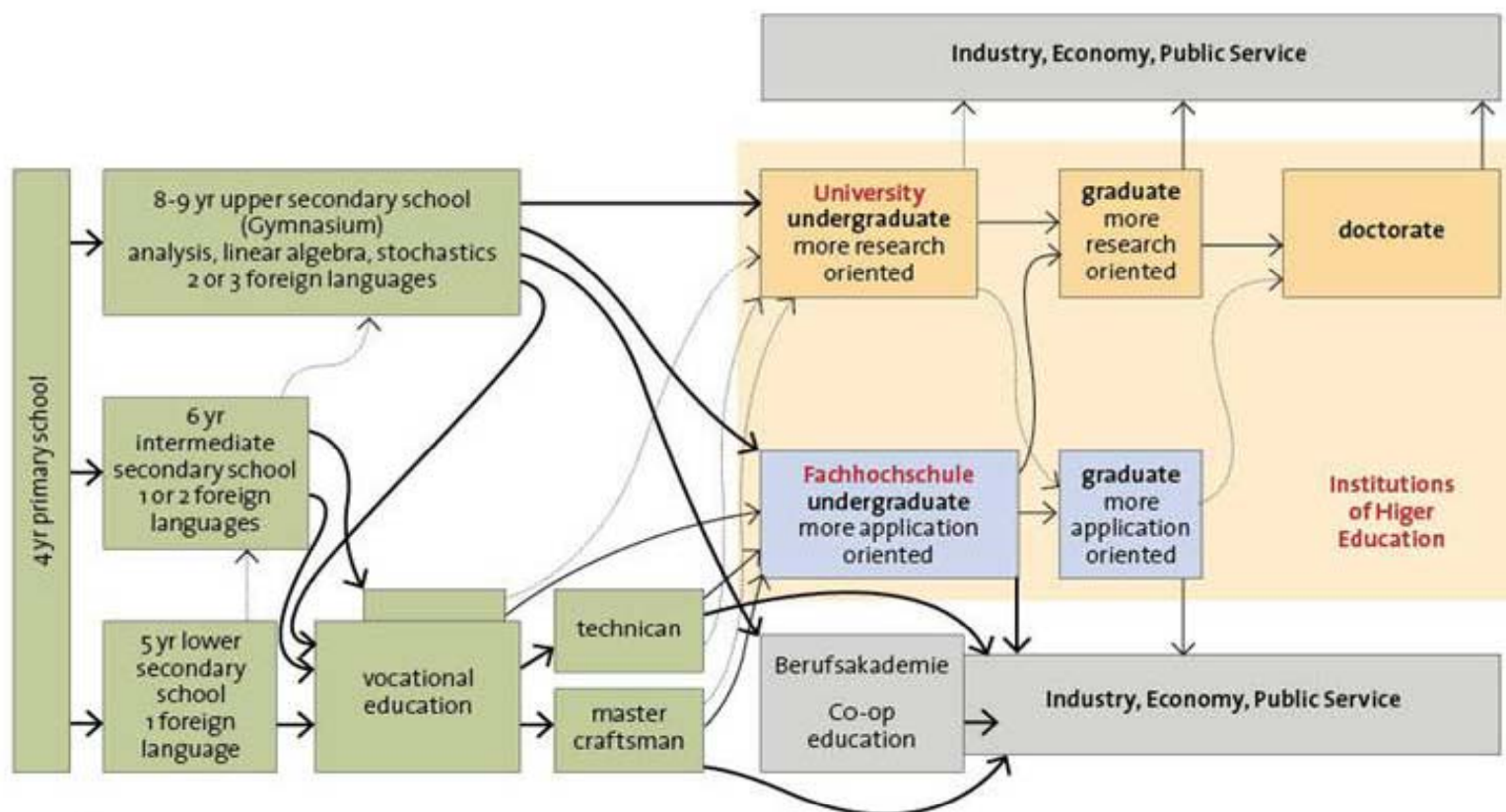
**FIGURE 1.** Competencies and skills of future engineers. Source: Mielityinen 2010.



# Formal of concept structured by Portuguese Order of Engineers, 2010



# Academic and Vocational Engineers by different education



**FIGURE 5.**

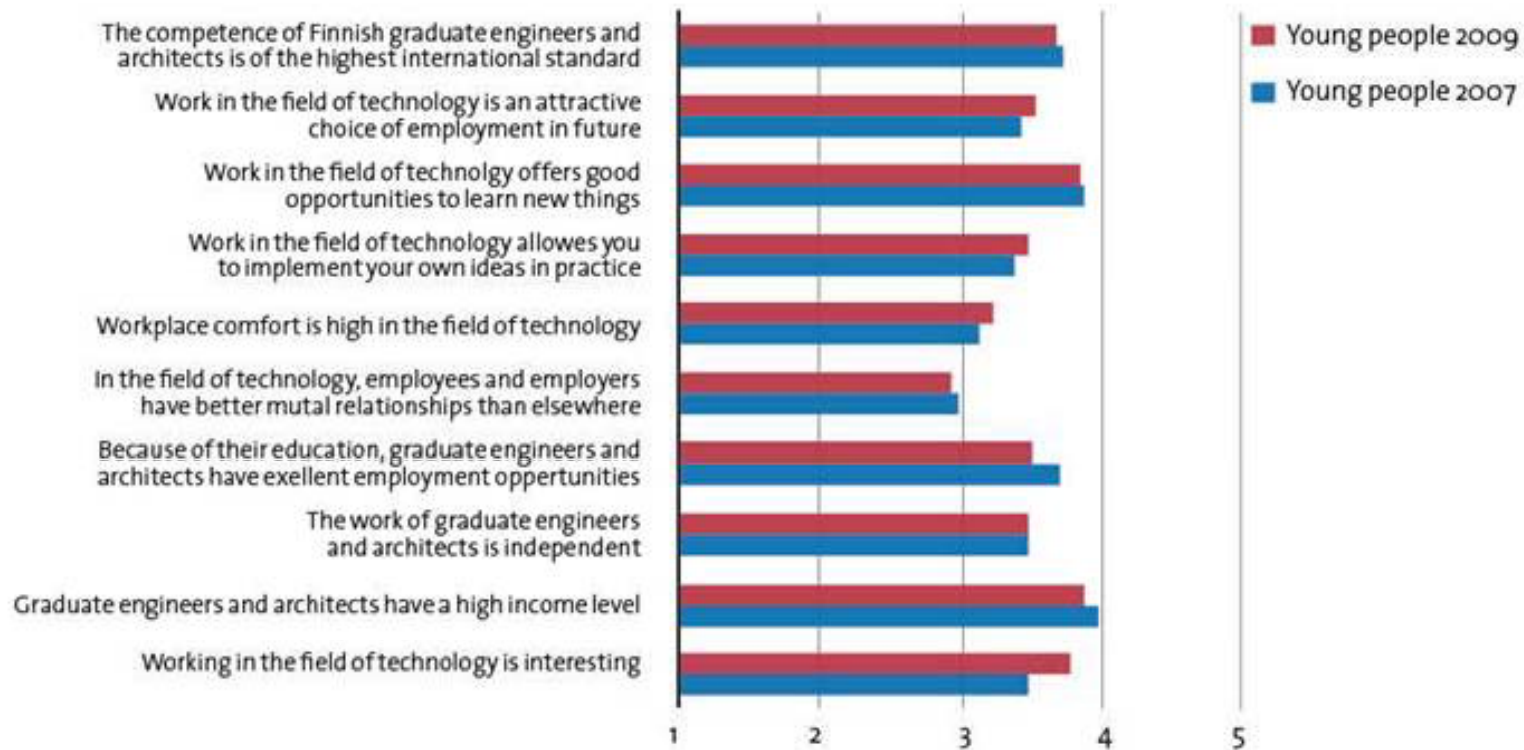
CESAER-Declaration-Picture Unterschied zwischen universitärem und Hochschulstudium. Educational System for engineers in Germany (Hampe, presentation: EU-US Partnerships to Attract Young Talent – The TU Darmstadt – Virginia Tech Example [10].

# Perceptions on Engineering in Society

## some quotes:

- **High income, exciting job and high status are positive thoughts from what young people think about studying engineering**
- **Believe it's a dreamjob - Sweden**
- **High income and opportunities of learning - Finland**
- **Engineers are very important - Portugal**
- **Popular profession and highly respected - Germany**

# Positive Views on Engineering in Finland



**FIGURE 7.**

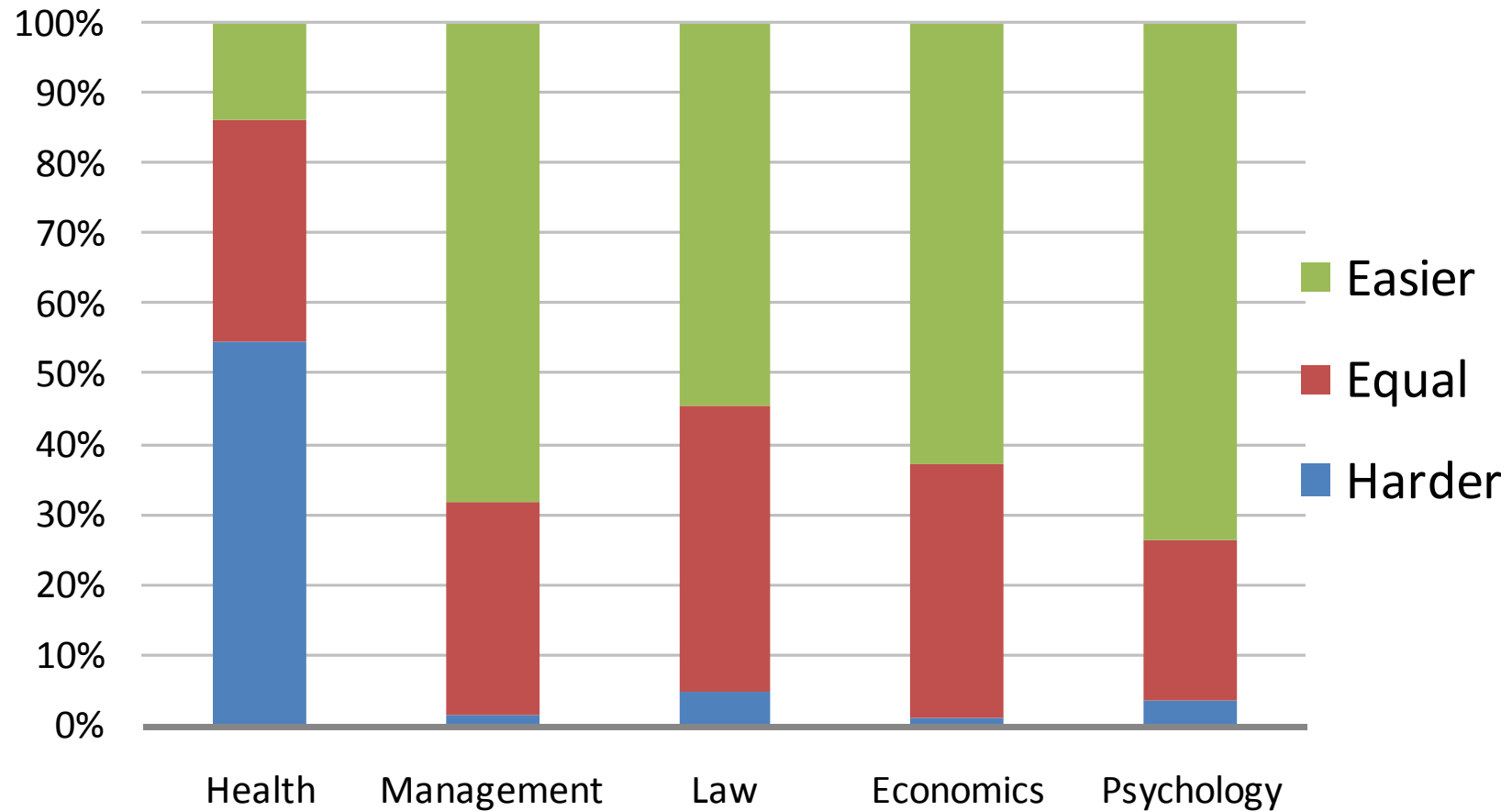
List of statements on working in the field of technology, plus typical features of engineering work (5 = Agree entirely, 4 = Agree by and large, 3 = Difficult to say, 2 = Disagree by and large, 1 = Disagree entirely).

Source: TECHBARO 2010

# Perceptions on Engineering in Society

- **Few women in the profession and at the universities**
- **Reasons not for studying engineering were the picture of something difficult and heavy**

# Engineering and Health is hard to study



# Freshmen and graduates over the years in Germany is increasing but drop out rate high

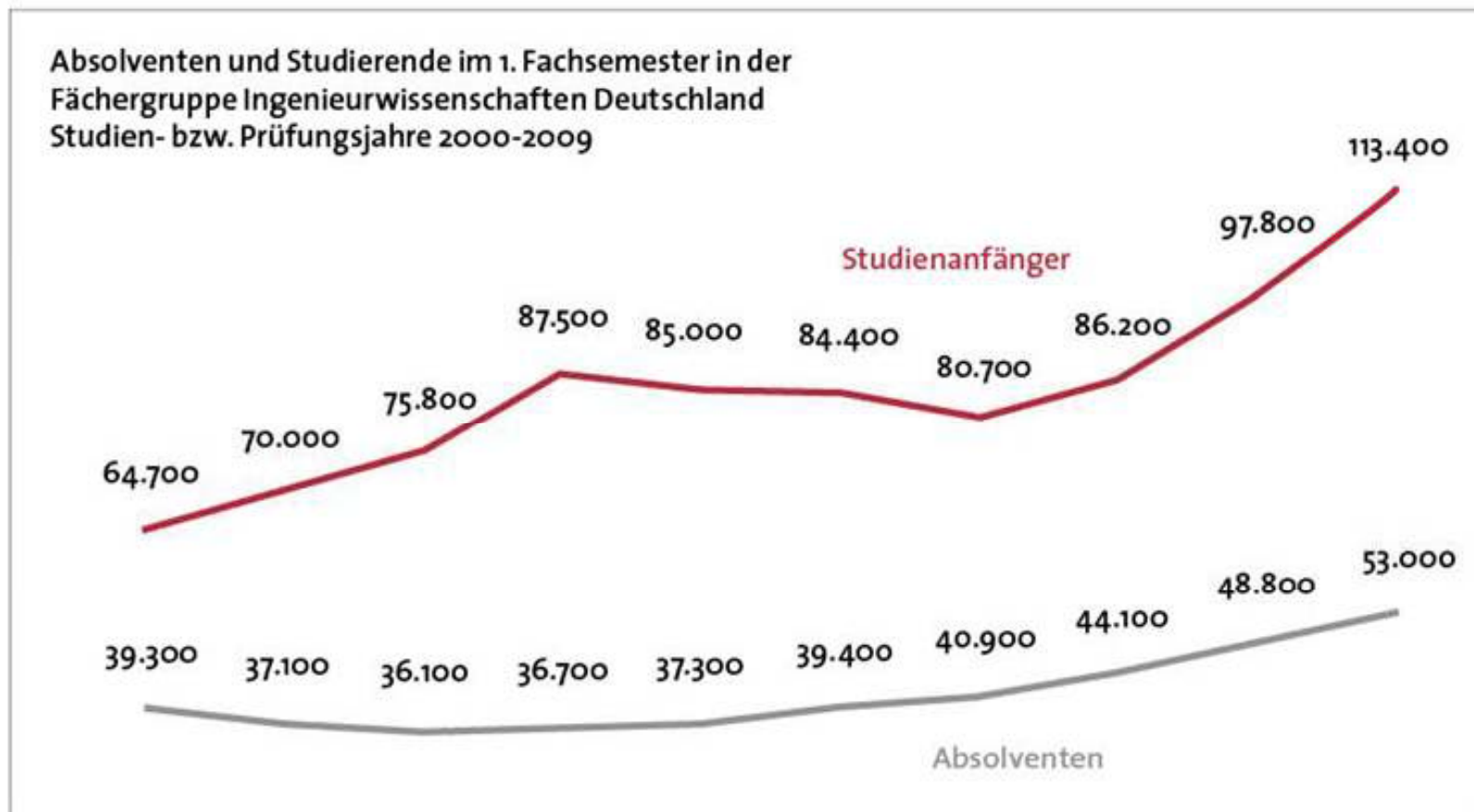


FIGURE 8.

Freshmen and graduates over the years Ref. Studien- bzw Prüfungsjahre 2000-2009

# Labour Market for Engineers

## lessons learned

- One important action point in attracting students to the engineering areas is to show them that it does pay off to be an engineer. Not only in terms of economy capital but also when it comes to social or cultural capital.
- Each country has own characteristics and particular social, economic and political contexts, and therefore has different focus when analysing the labour market. The statistics from respective country has therefore to be compared with a little care.

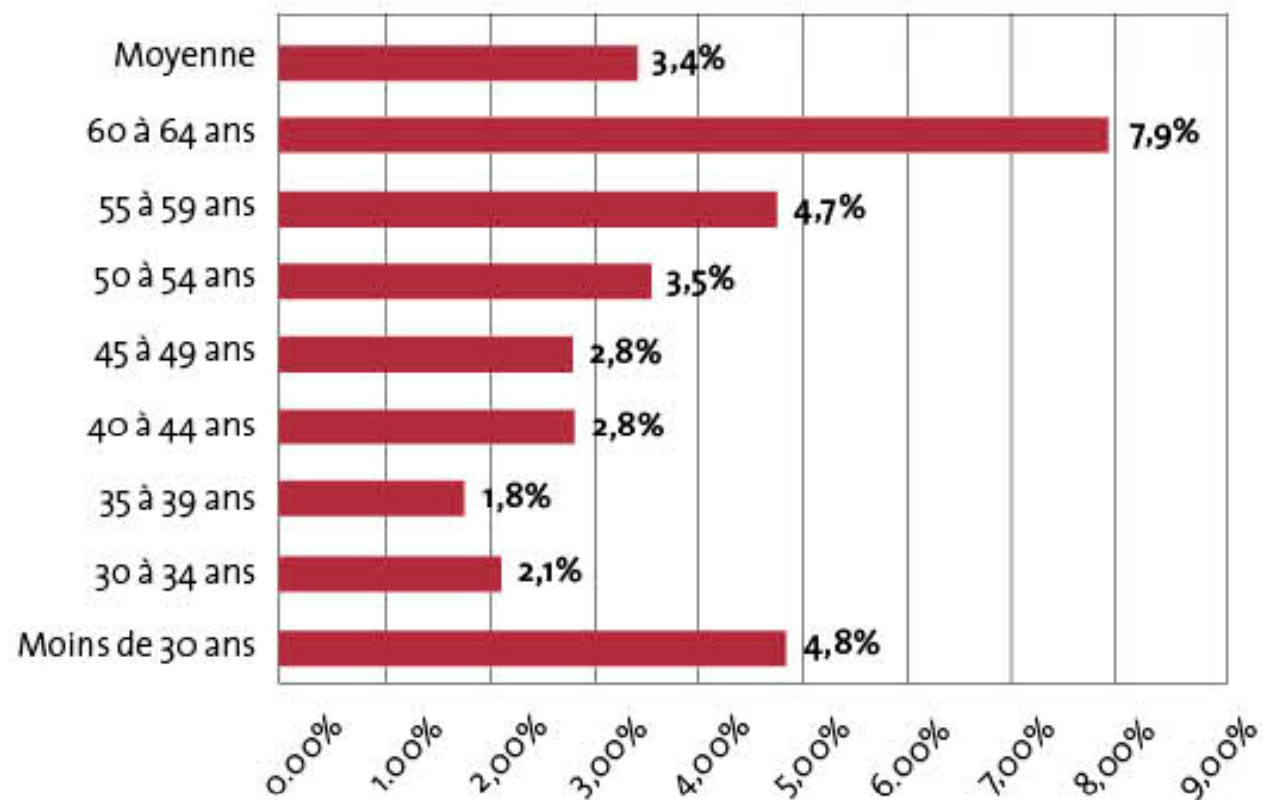


# Labour Market for Engineers

## lessons learned

- There is a shortage of engineers in several fields. So the labour market look good for most countries.

# Breakdown of unemployment rates among engineers (France)

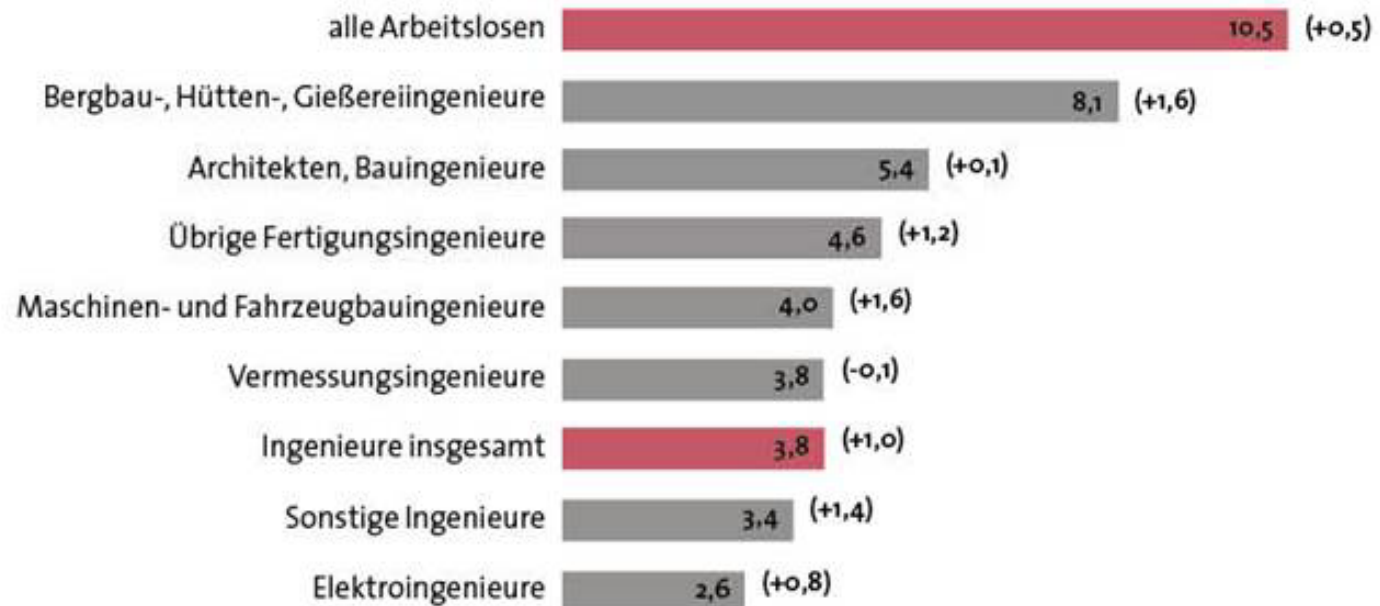


**FIGURE 9.**

Breakdown of unemployment rates among engineers (source: CNISF)

# Unemployment rates Engineers' compared to others

Arbeitslosenquote auf Basis der sozialversicherungspflichtig Beschäftigten,  
in Prozent Veränderung gegenüber Vorjahr in Prozentpunkten in Klammern  
Dezember 2009



**FIGURE 12.**

In comparison to the total employment rate in Germany the unemployment rate is relatively low (2009).

# Example - Media Coverage - Ireland

Media analysed

Media	Frequency	Percentage
Irish Times	54	61.4
Independent	23	26.1
RTÉ	11	12.5
Total	88	100

Breakdown of news items per media type

Valuation of News Items

	Frequency	Percentage
Positive	51	58
Neutral	11	12.5
Negative	26	29.5
Total	88	100

Valuation of representations of engineers and engineering

## *Example - Media coverage - Ireland*

Theme	%
Social and Political Action	33,7
Manufacturing/Industry/Trade /Distribution	18,5
S & IT + Engineering and expert areas	15,2
Safety	9,8
Culture, Arts, Sports and Shows	8,7
Biography	6,5
Renewable Energies & Environment	5,4
International	2,2

The most mentioned news themes covered during the analyzed period

# Media coverage - positive, neutral and negative references (Portugal)

Theme	% of total		
	Posit ive	Neut ral	Negat ive
Biography	3,3	3,3	0
Social and Political action	9,8	16,3	7,6
Manufacturing/Industries; Trade/Distribution	8,7	5,4	4,3
S&IT + Expert Engineering Areas	13	2,2	0
Culture, Arts, and Shows	4,3	3,3	1,1
Safety	2,2	6,5	1,1
International	2,2	0	0
Renewable Energies & Environment	4,3	1,1	0

# Final comments

To recruit more talent and motivated students to engineering education we need to:

- change the perceptions of engineers -> from a nerd to a social, open minded female/male engineer who leads the development to solve global problem for a better world
- encourage students interests for deep knowledge in technology fundamentals in parallel with personal and interpersonal skills.
- tell students that Engineering Education is demanding, fun and give pay back in terms of good job opportunities.
- get more Engineers as “stars” and “role models”.





# Finally a joke or not a joke?!

**En-gineer <-> Brain-gingeer**

**The new area: Braingineering**