

# **Increasing the interest on Engineering education: the case of Spain**

Pere Brunet

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# **Increasing the interest on Engineering education**

**Economy and Industry in Spain**

**Spanish Universities**

**Universities, Industry and Society**

**Some Conclusions**



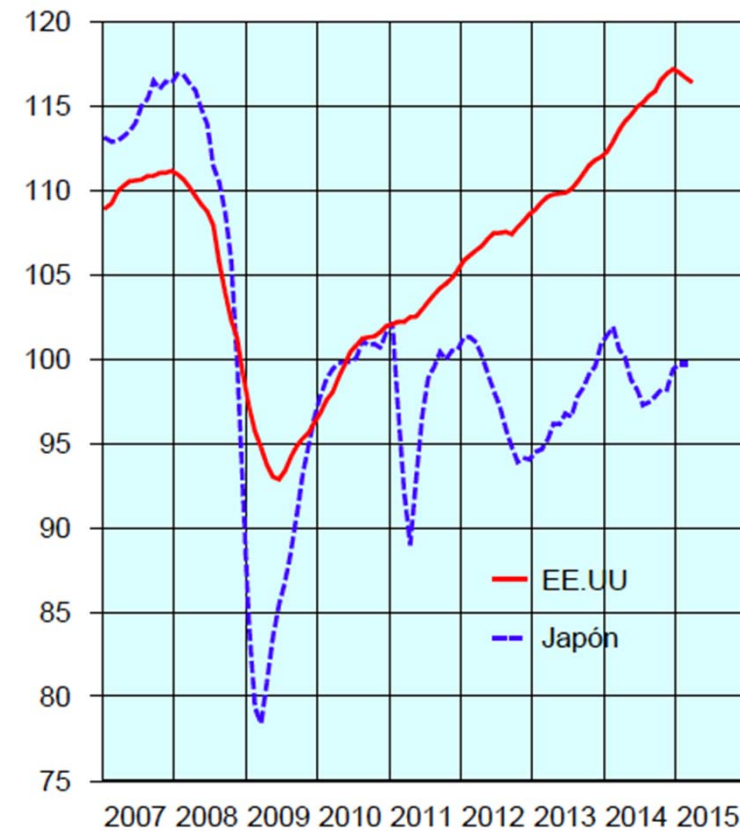
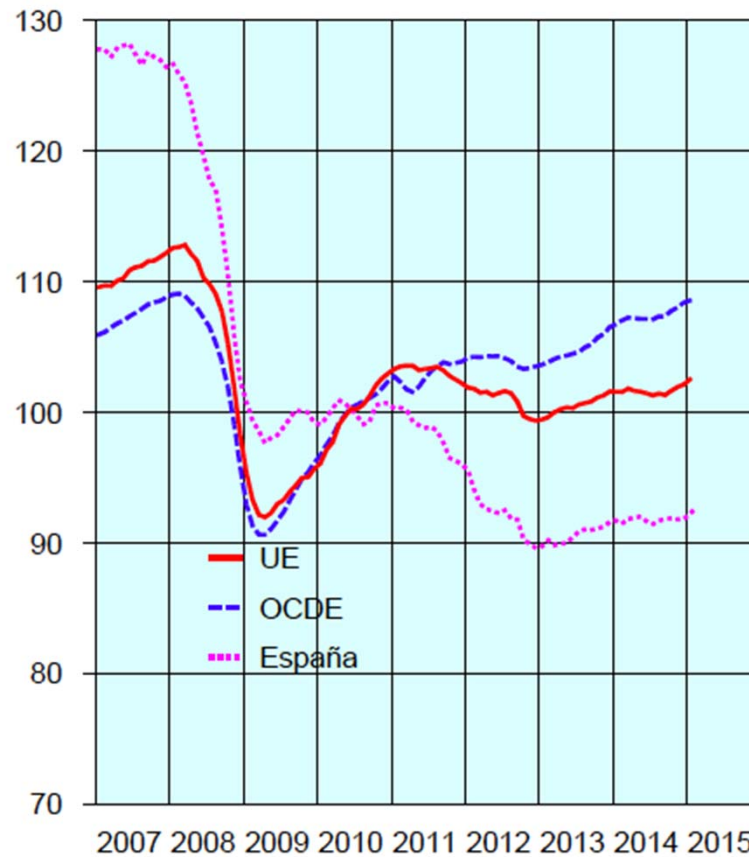
# **Increasing the interest on Engineering education**

## **Economy and Industry in Spain**



# Increasing the interest on Engineering education

## Industry production





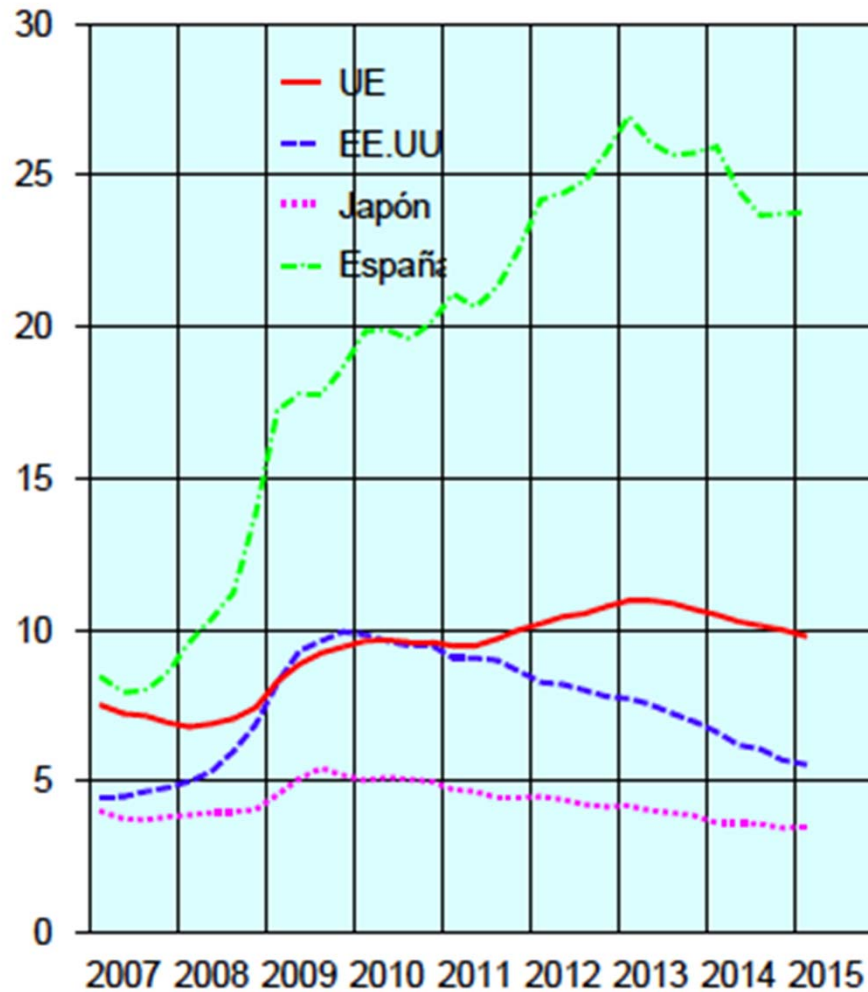
# Increasing the interest on Engineering education

## Jobs distribution in Spain

	Agriculture	Industry	Construction	Services
1970	29,3	25,3	8,9	36,5
1980	18,6	27,2	9,3	44,9
1990	11,5	23,7	9,9	55,0
2000	6,6	20,0	11,2	62,3
2005	5,3	17,3	12,4	65,0
2007	4,6	16,0	13,3	66,3
2009	4,2	14,4	9,7	71,7
2010	4,4	14,2	8,5	72,8
2011	4,5	14,2	7,2	74,1
2012	4,6	14,0	6,4	75,0
2013	4,7	13,6	5,8	75,9



# Increasing the interest on Engineering education



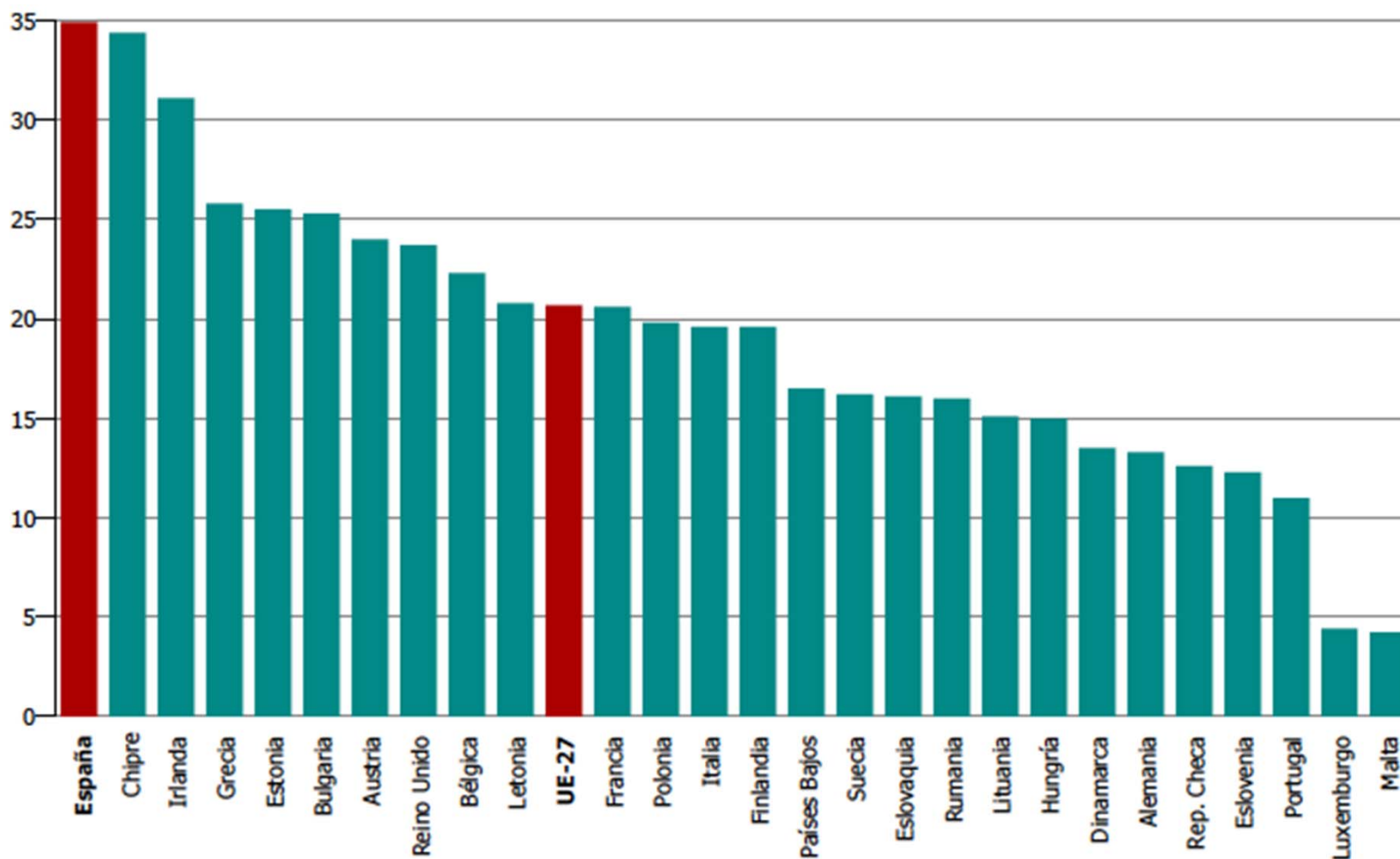
**Unemployment rate**





# Increasing the interest on Engineering education

## Over-qualified Engineers





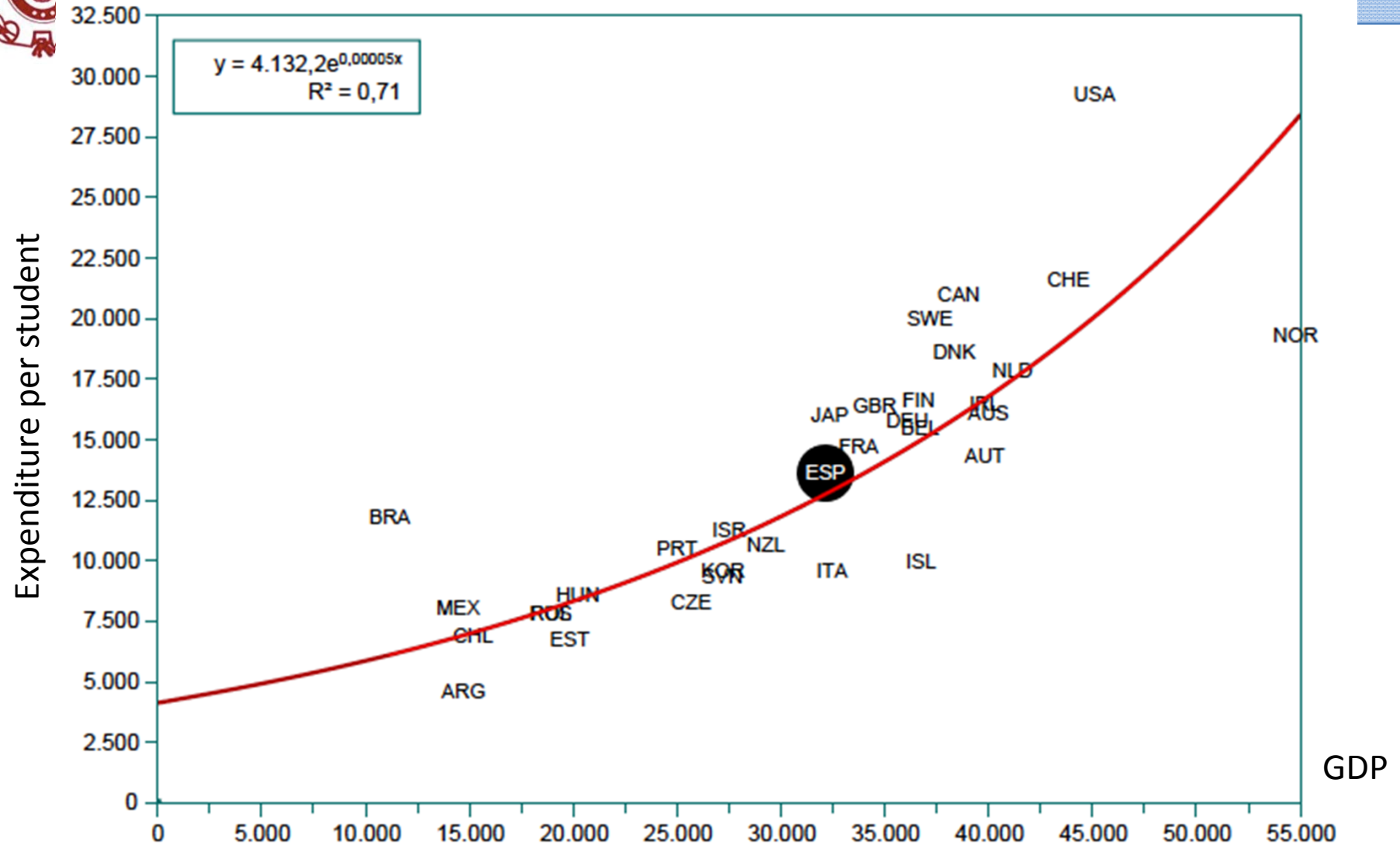
# **Increasing the interest on Engineering education**

## **Universities in Spain**





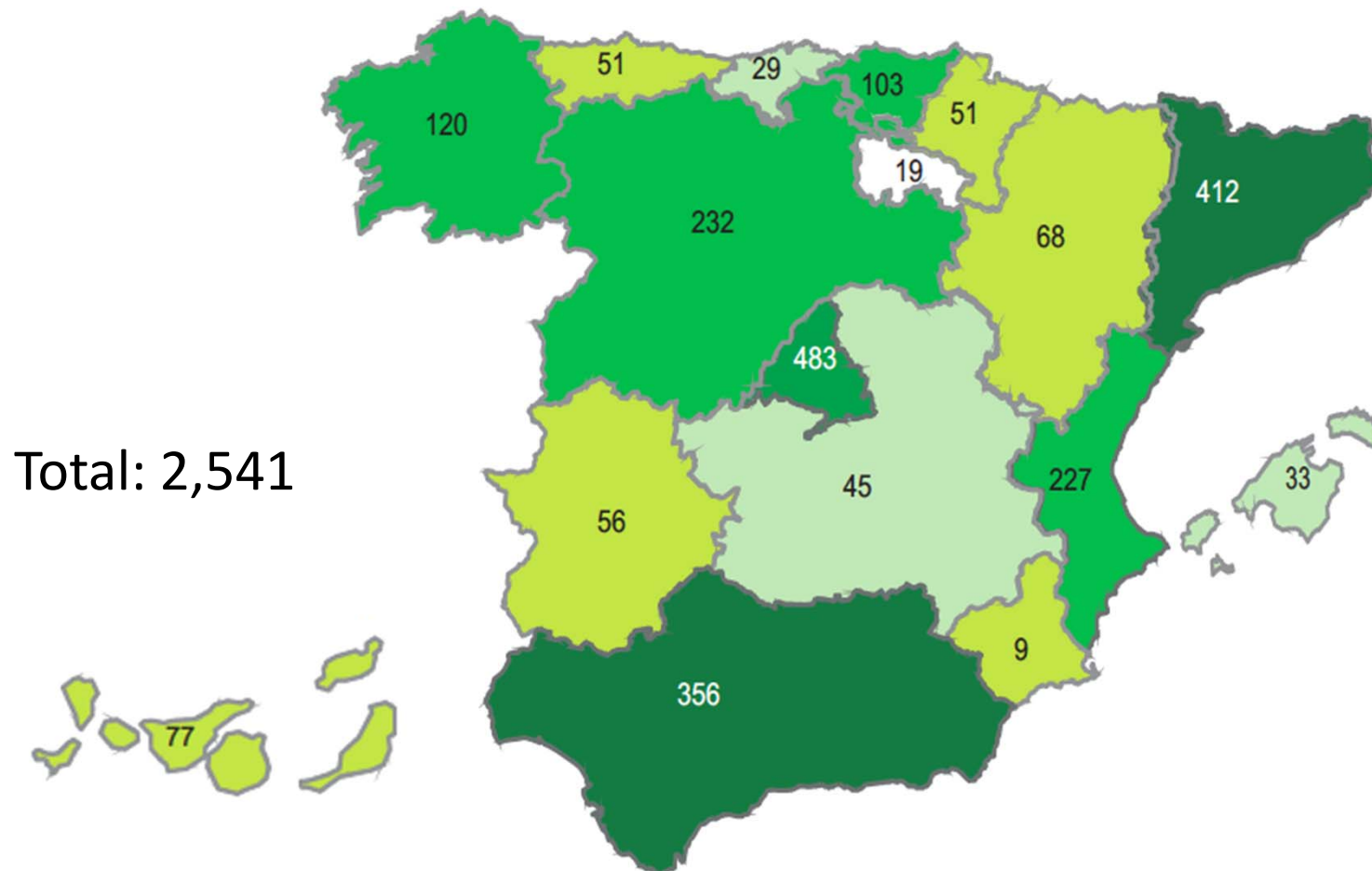
# Increasing the interest on Engineering education





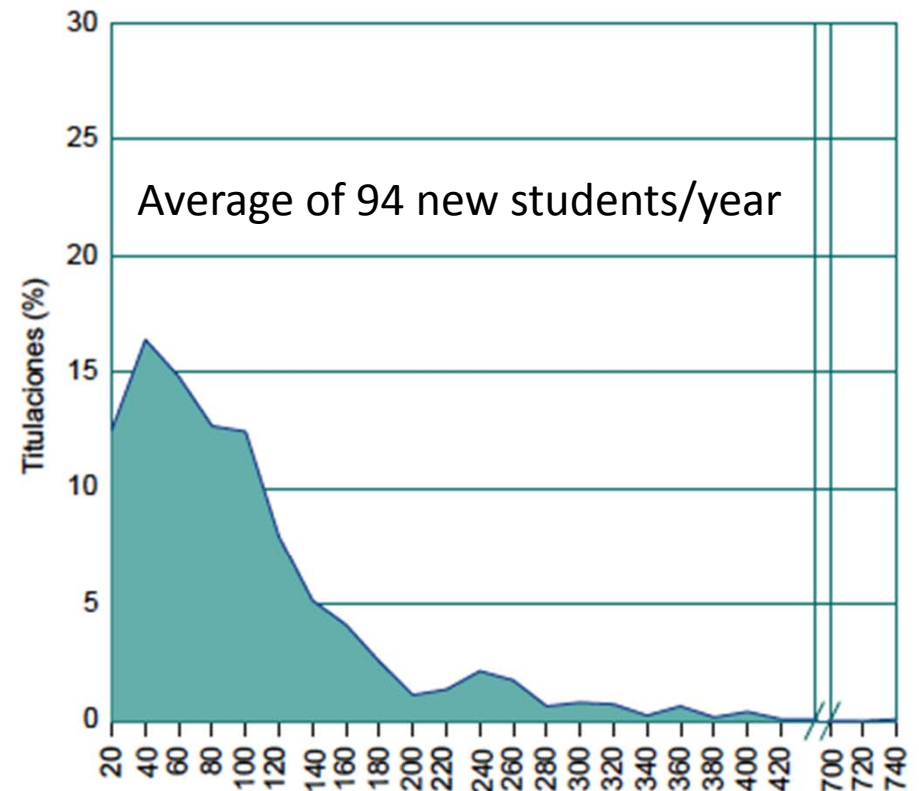
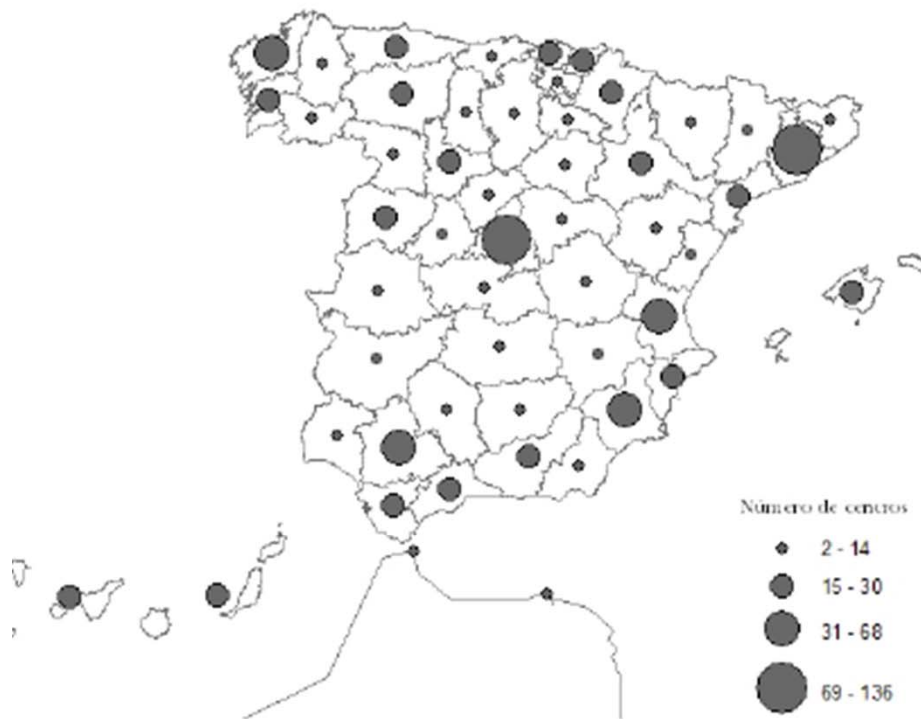
# Increasing the interest on Engineering education

Number of Bachelor Degrees, 2012





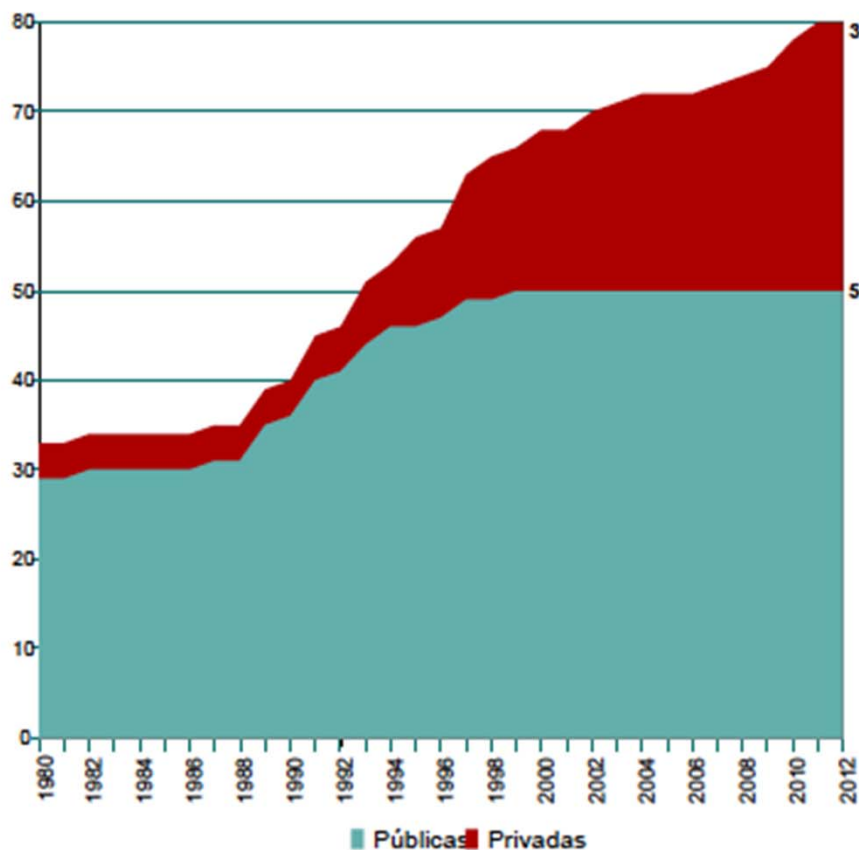
# Increasing the interest on Engineering education



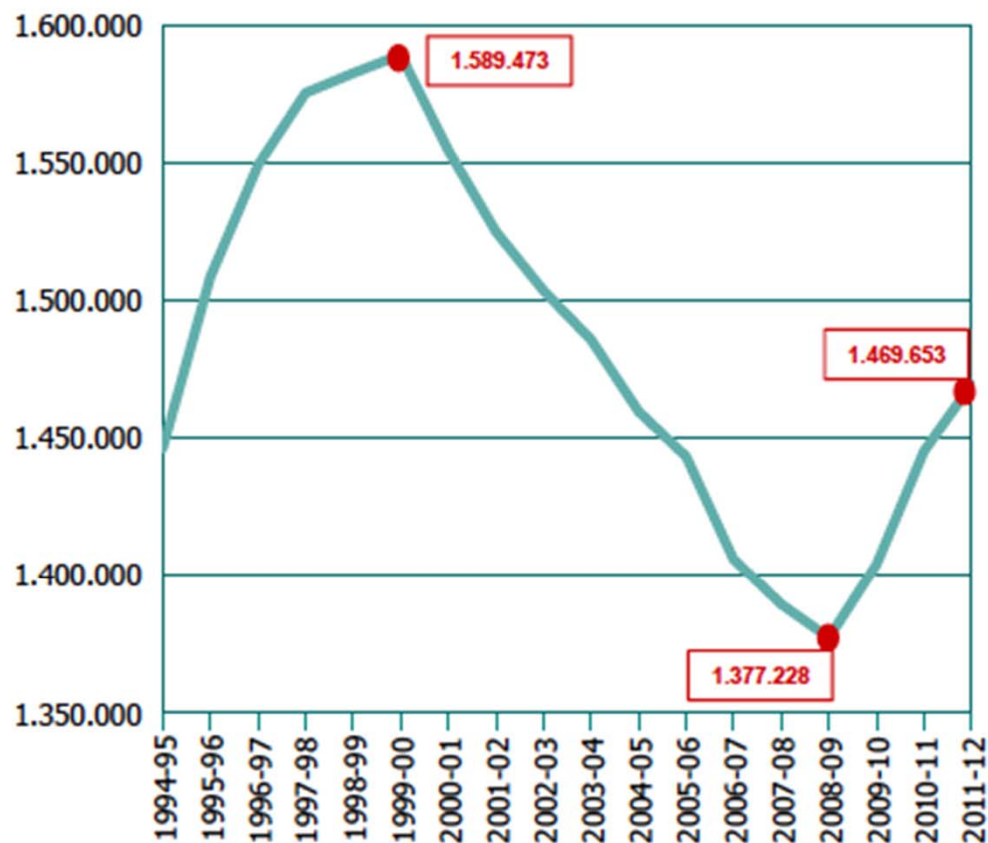


# Increasing the interest on Engineering education

## Number of Universities



## Number of Students





# Increasing the interest on Engineering education

## Universities in Spain

Reasonable budget but inefficient structure

Diversity is not considered

Technology transfer is usually too low

Too few changes and improvements during the last crisis

Not many real opportunities in industries





# Increasing the interest on Engineering education

## Lack of flexibility in Technical Universities

Too high demand

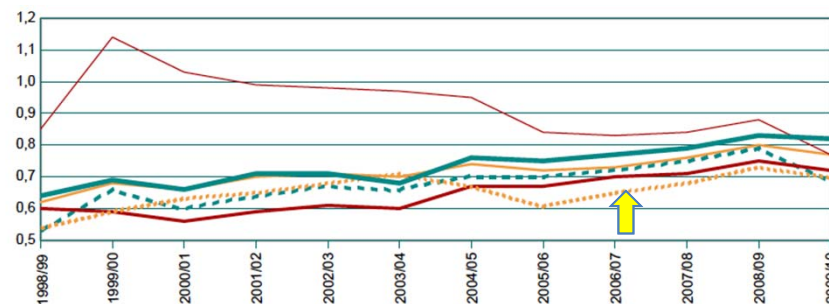
51,3

13,3

Vacants

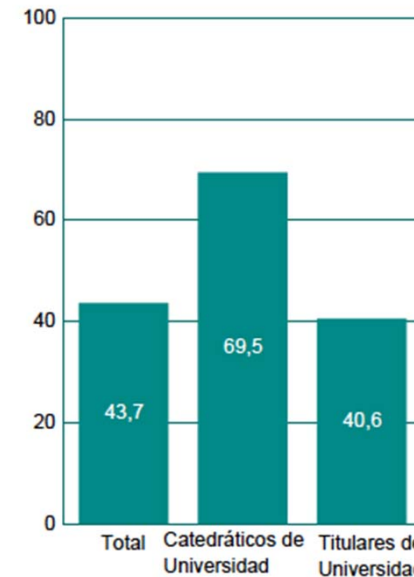
35,4

## Low success rate: Students



50% - 70% of Students graduated in 4 years

## Low research activity: Faculty







# Increasing the interest on Engineering education

## Lack of flexibility in Technical Universities

Too high demand

51,3

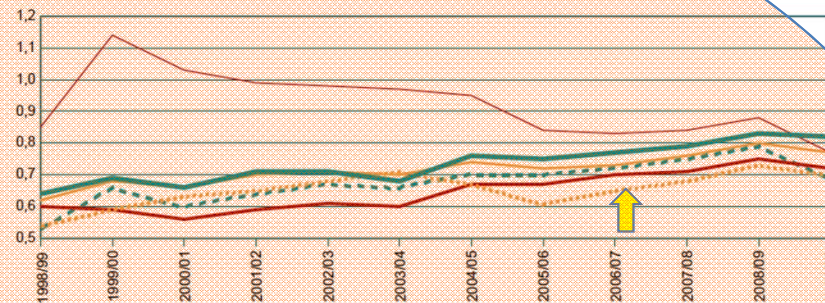
13,3

Vacants

35,4

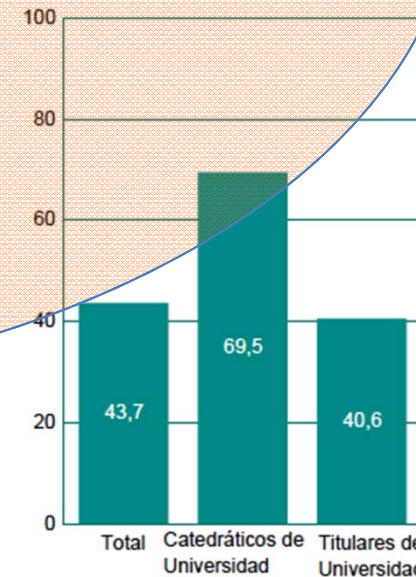
**No efficient correcting mechanisms**

## Low success rate: Students



50% - 70% of Students graduated in 4 years

**Low research activity: Faculty**





# Increasing the interest on Engineering education

**A selective impulse towards International excellence is required**

Pais	Top 100	Top 200	Top 300
Estados Unidos	53	85	109
Reino Unido	9	19	30
Japón	4	9	9
Australia	5	7	9
Alemania	4	14	24
Canadá	4	7	17
Suiza	4	6	7
Francia	3	8	13
Suecia	3	5	7
Israel	3	4	4
Países Bajos	2	8	10
Dinamarca	2	3	4
Bélgica	1	4	6
Noruega	1	1	3
Finlandia	1	1	1
Rusia	1	1	1
China	—	7	15
Italia	—	4	9
Corea del Sur	—	1	4
Austria	—	1	3
Brasil	—	1	2
Nueva Zelanda	—	1	2
Singapur	—	1	2
Argentina	—	1	1
México	—	1	1
<b>España</b>	—	—	<b>3</b>



# **Increasing the interest on Engineering education**

**Universities, Society and Industry**





# Increasing the interest on Engineering education

## Eurobarometer, October 2014 Public Perception of Science, Research and Innovation












28 member states of the EU  
June 2014  
27,910 responders

At least half of the respondents expect that, 15 years from now, **science and technological development** will have a **positive impact** on *health and medical care* (65%), *education and skills* (60%), *transport and transport infrastructure* (59%), *energy supply* (58%), *protection of the environment* (57%), *fight against climate change* (54%) and *quality of housing* (50%).



# Increasing the interest on Engineering education












QB4 Have you ever studied science or technology at school, at university, at college or anywhere else?

	Yes, at school	Yes, at university or college	Yes, somewhere else	No	Don't know	Total 'Yes'
 EU28	44%	16%	3%	43%	1%	56%
 EE	61%	30%	7%	21%	1%	78%
 PL	70%	15%	3%	21%	3%	76%
 UK	60%	22%	2%	28%	1%	71%
 CY	55%	20%	9%	31%	0%	69%
 HR	50%	15%	12%	29%	2%	68%
 FI	48%	15%	5%	35%	0%	64%
 IT	54%	9%	3%	34%	2%	63%
 FR	50%	15%	4%	37%	0%	62%
 SE	32%	33%	5%	37%	0%	62%
 ES	50%	19%	3%	39%	0%	61%



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	HR	50%	15%	12%	29%	2%	68%
	FI	48%	15%	5%	35%	0%	64%
	IT	54%	9%	3%	34%	2%	63%
	FR	50%	15%	4%	37%	0%	62%
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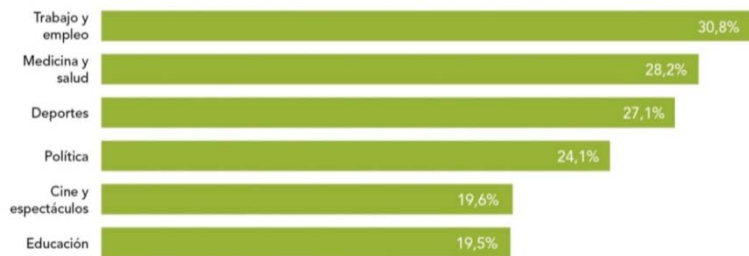
## Public Perception of Science and Technology



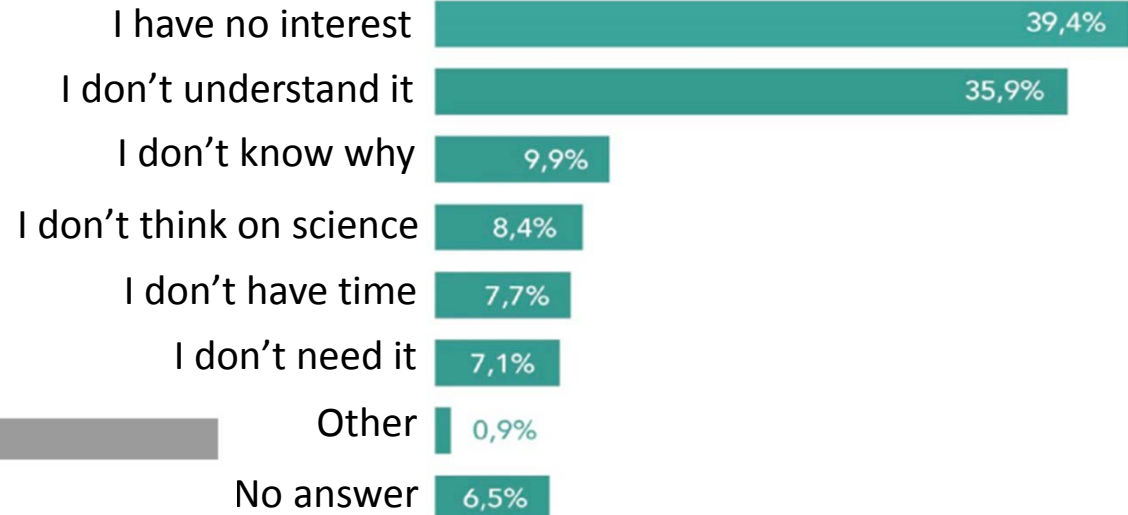
A diario recibimos informaciones y noticias sobre temas muy diversos. Dígame por favor tres temas sobre los que se sienta especialmente interesado/a

(P.1)\*

Base: Total de personas entrevistadas (n=6355)



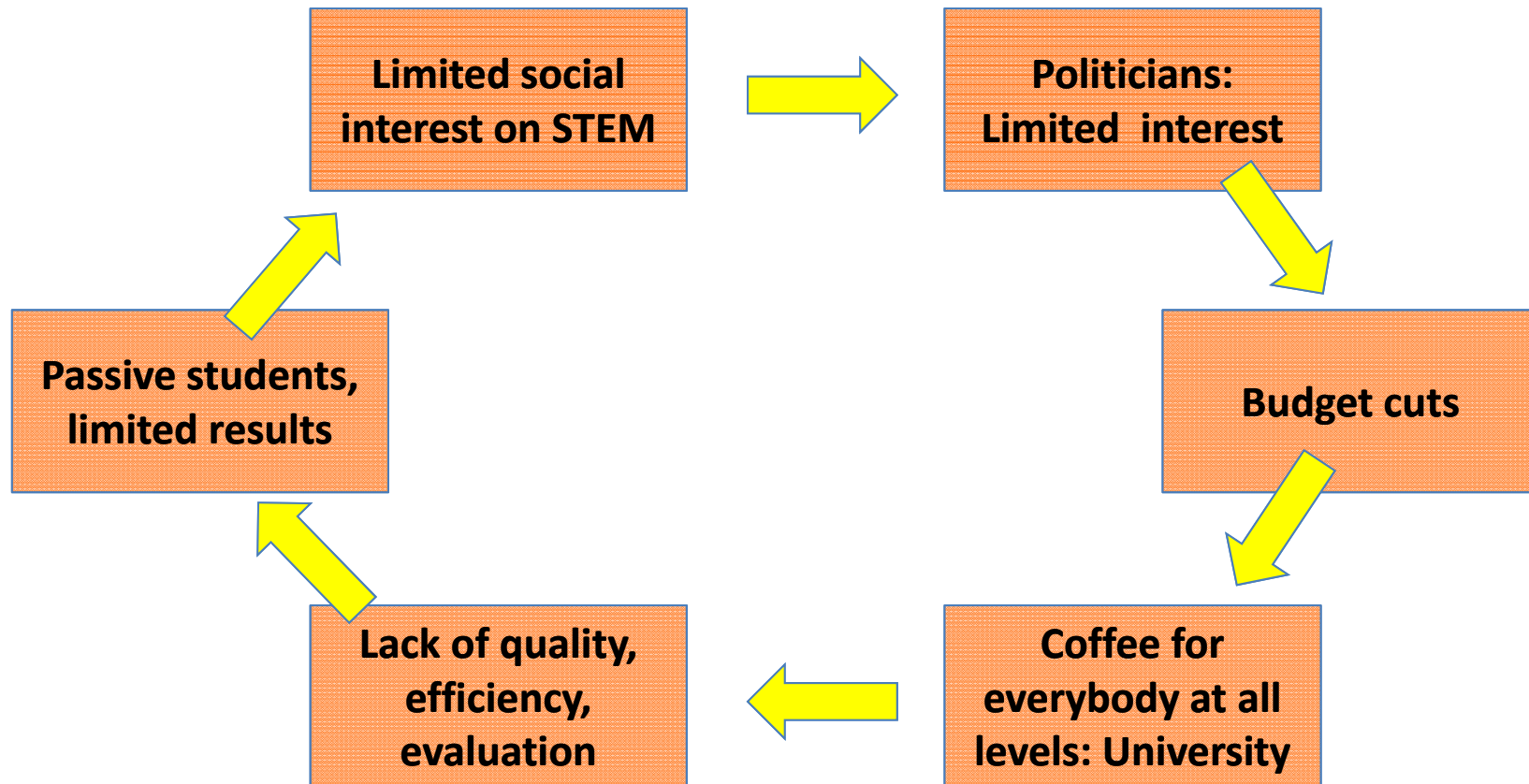
Answers of non-interested people



Spanish survey 2015:  
6355 participants

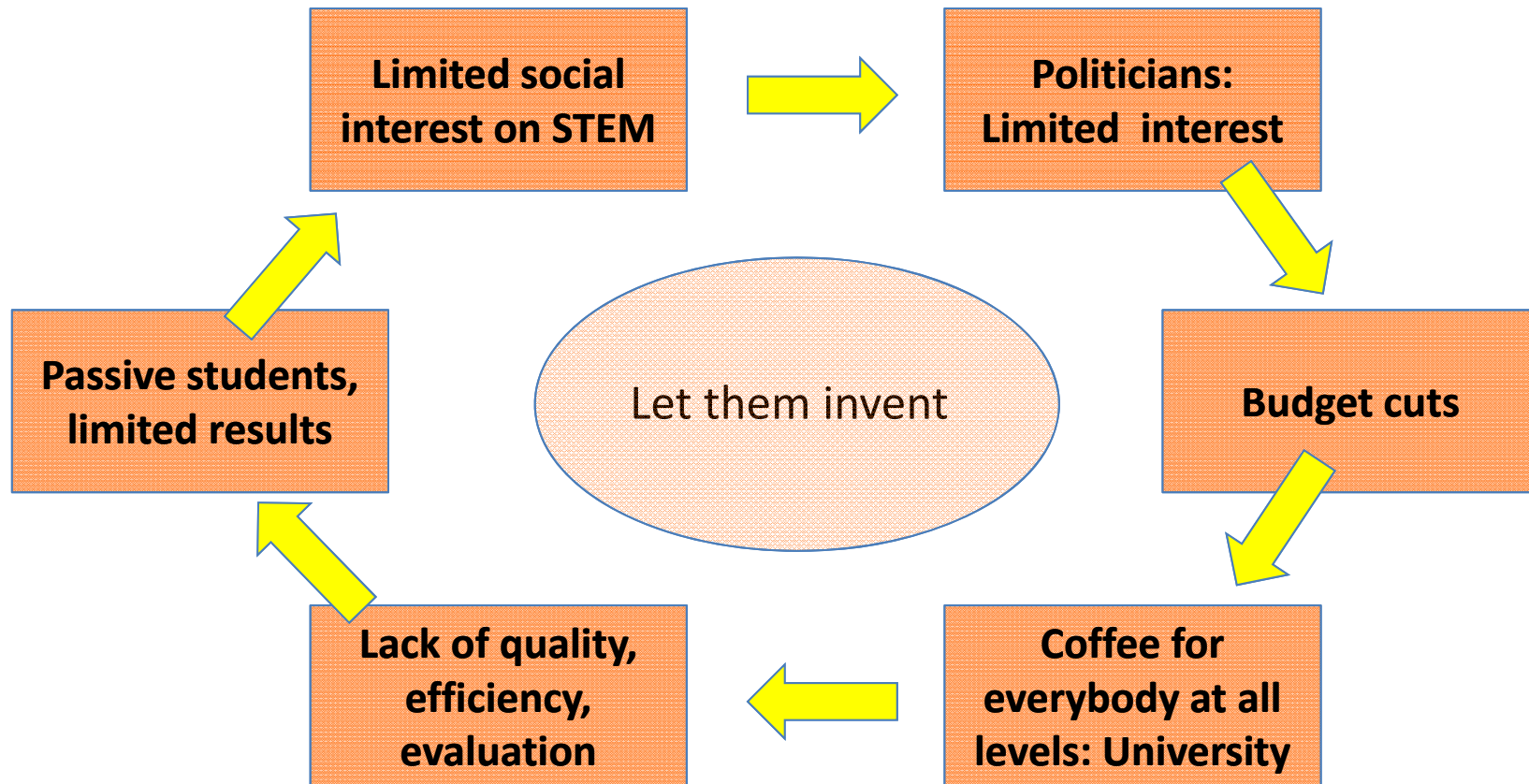


# Increasing the interest on Engineering education





# Increasing the interest on Engineering education







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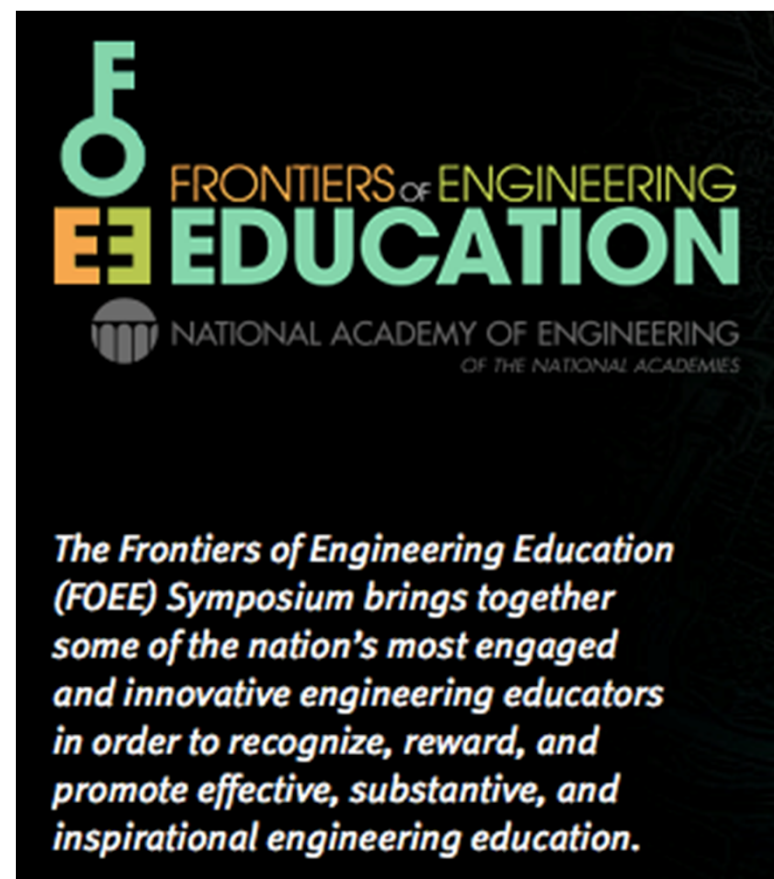
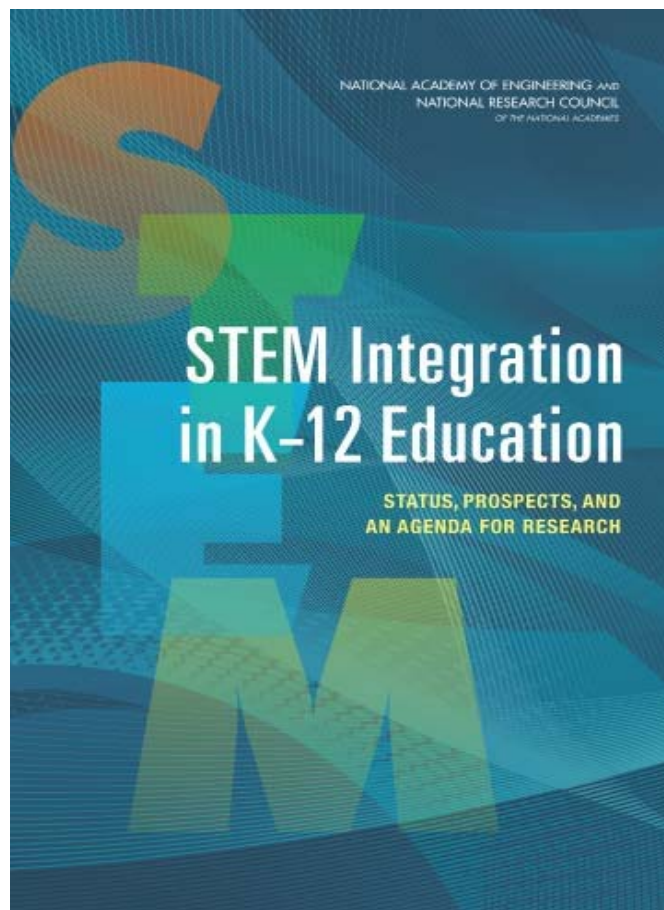
*No profession unleashes the spirit of innovation like engineering. From research to real world applications, engineers constantly discover how to improve our lives by creating bold new solutions that connect science to life in unexpected, forward thinking ways. Few professions turn so many ideas in so many realities.*

*Few have such a direct and positive effect on people's everyday lives. We are counting on engineers and their imaginations to help us meet the needs of the 21st century.*

NAE, Position Statement



# Increasing the interest on Engineering education



NAE



# **Increasing the interest on Engineering education**

## **Spanish Universities**





# Increasing the interest on Engineering education

## Universities in Spain

The University system in Spain is still:

- Too rigid
- Difficulties to change, adapt and close
- Endogamic
- Based on quantity rather than quality
- Has little budget priorities: one size fits all
- Lacks evaluation and feedback



# Increasing the interest on Engineering education

## Some conclusions

Solutions adapted to cultures

- Social perception of STEM
- Face-to-face discussions and presentations
- European evaluation and feedback model

Education: Breadth and Depth

Theoretical basis + practice

Creative problem solvers + public presentation

Specific learning programmes for the best

Cooperation skills, skills for a dynamic world

Specific pre-University and social-oriented actions

International education

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