



CONSIGLIO NAZIONALE INGEGNERI



World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'Ingénieurs



CENTROSTUDI
CONSIGLIO NAZIONALE INGEGNERI

Committee on Women in Engineering (WIE)

Engineering Strategic Indicators

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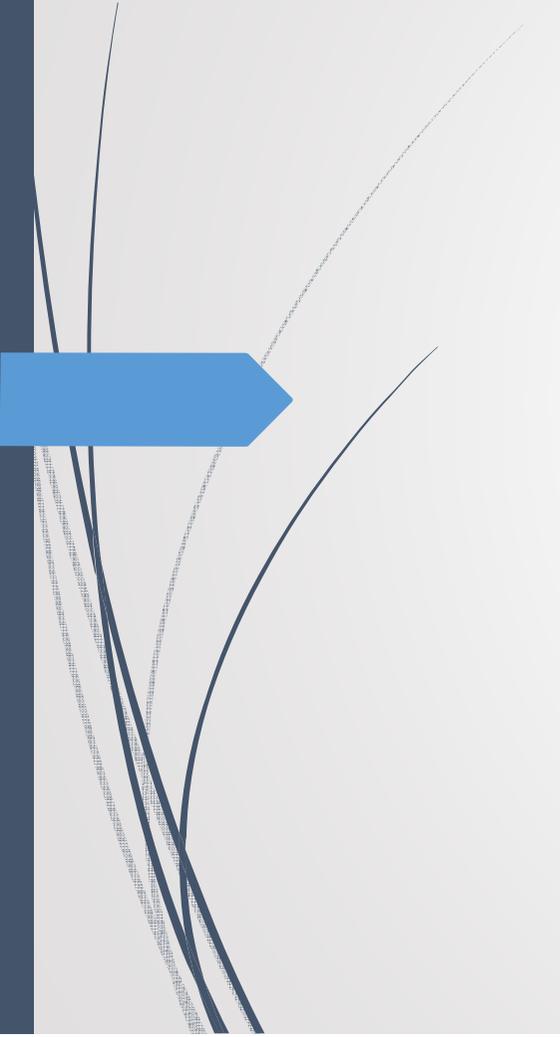
Lima, December 2016



Topic Overview

The main aim of this session is to focus on statistics and databases on women in engineering and opportunities in the job market.

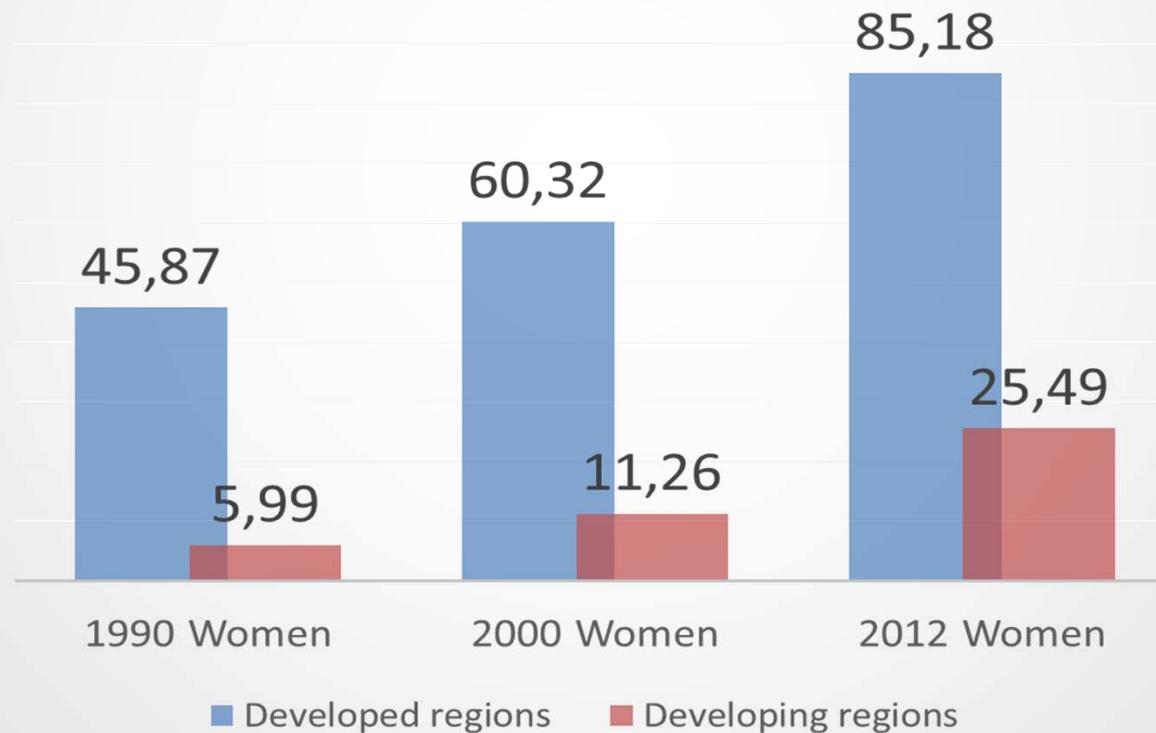
A persisting **gender gap** is unfortunately the *fil rouge* affecting women both in studies activities and job.



World data on women in engineering

Unesco underlines that large improvements in enrolment at all levels, among girls and women, have been done in the last years both in developing and developed regions

Tertiary gross enrolment ratios for women, 1990-2000-2012

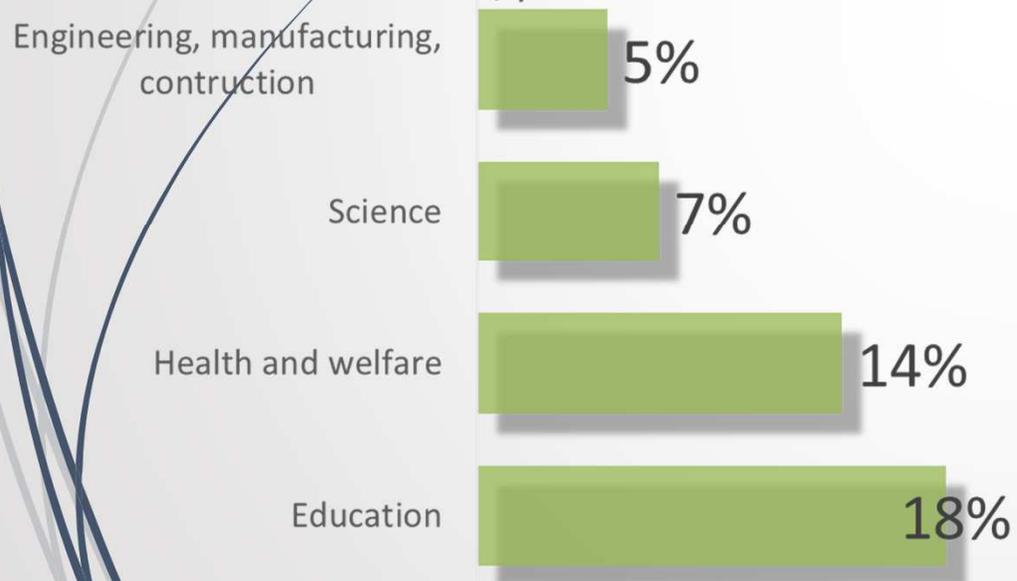


Gross enrolment ratios: Number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education. For the tertiary level, the population used is the 5-year age group starting from the official secondary school graduation age.

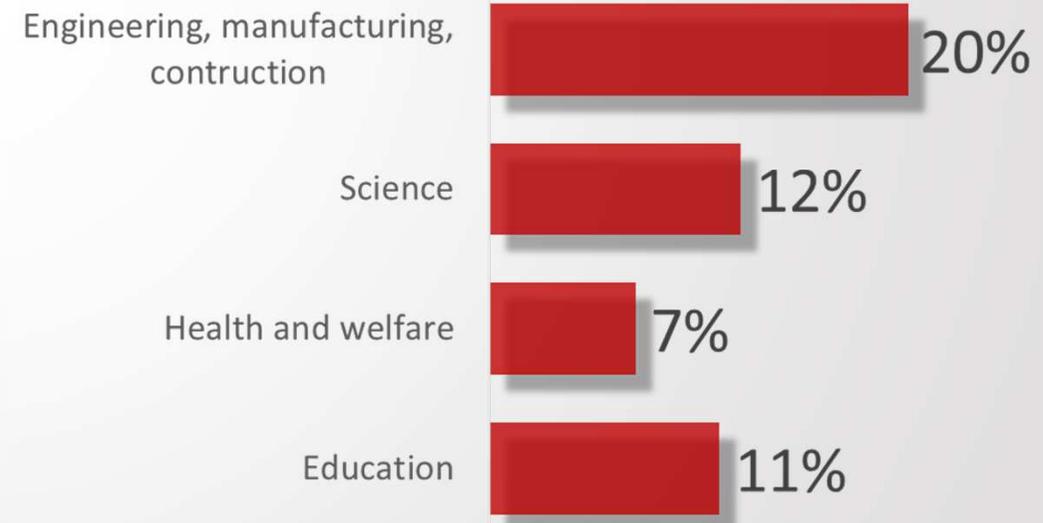
Source: Unesco data processed by Centro Studi CNI

Nevertheless, women are still underrepresented in tertiary field of studies related to science and engineering, a heavy condition for an effective future presence of women engineers in the job market

% of **female** tertiary graduates in specific fields of education, out of total **women** graduated in the world, year 2014



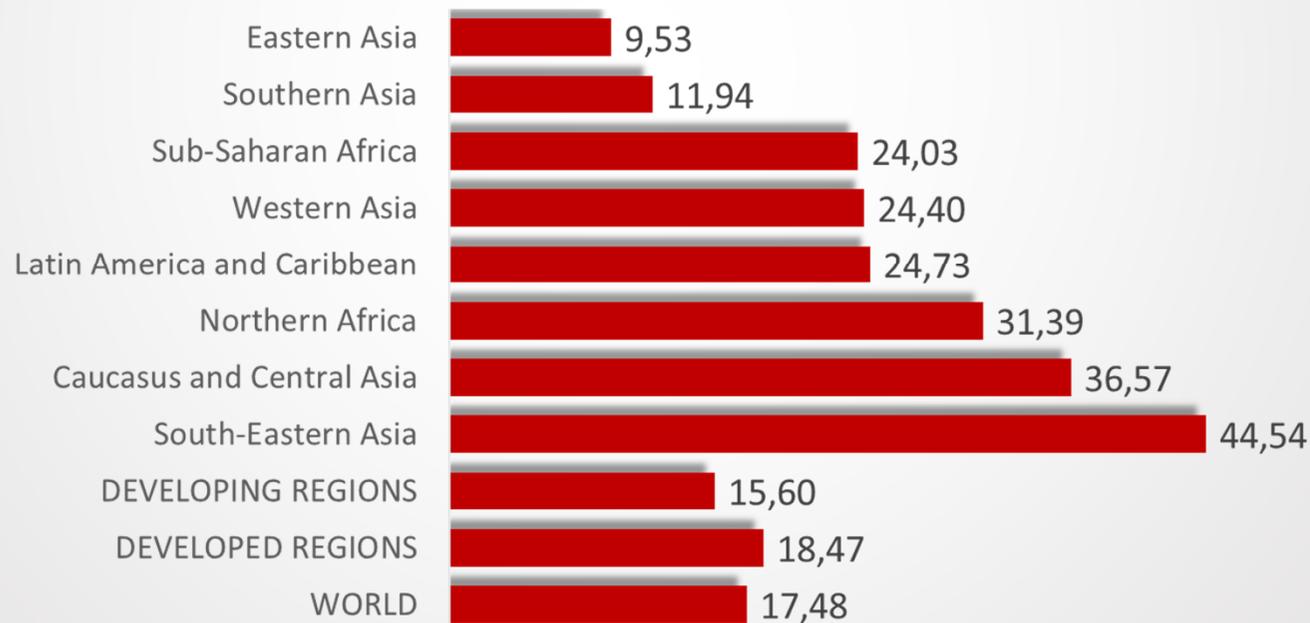
% of **male** tertiary graduates in specific fields of education, out of total **men** graduated in the world, year 2014



Source: Unesco data processed by Centro Studi CNI

Among researchers in the field of engineering, women are still a minority, with some exception like in South East Asia and Central Asia

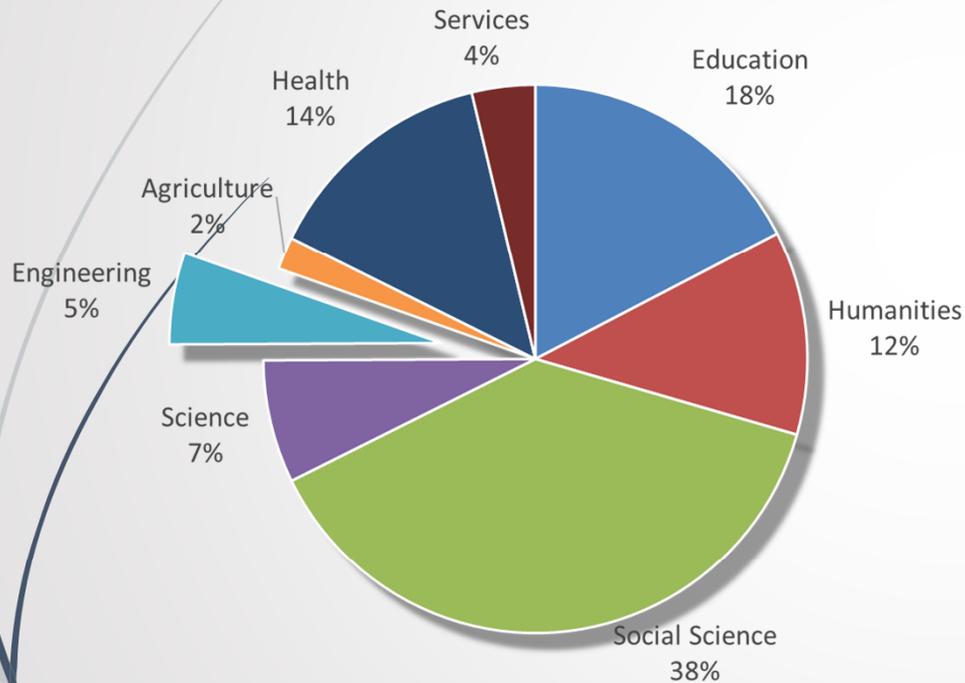
Share (%) of women among researchers in the fields of engineering and technology by region, 2011



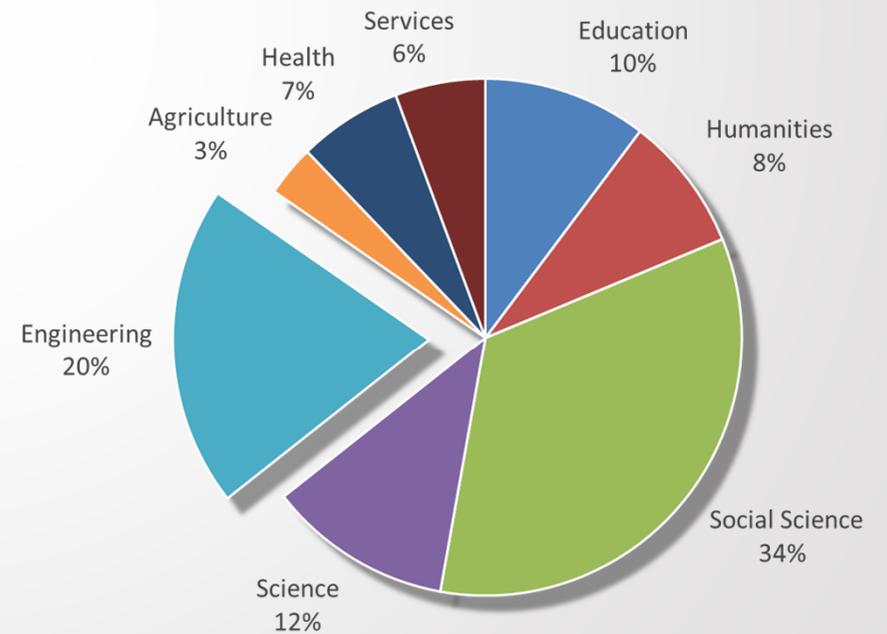
Source: Unesco data processed by Centro Studi CNI

Unesco statistics counts that female graduates in engineering (data referred to 111 countries) are 5% of total female graduates. Men graduated in engineering are 20% of male graduates

Share of **female** graduates by field of studies (average 2005-2012)



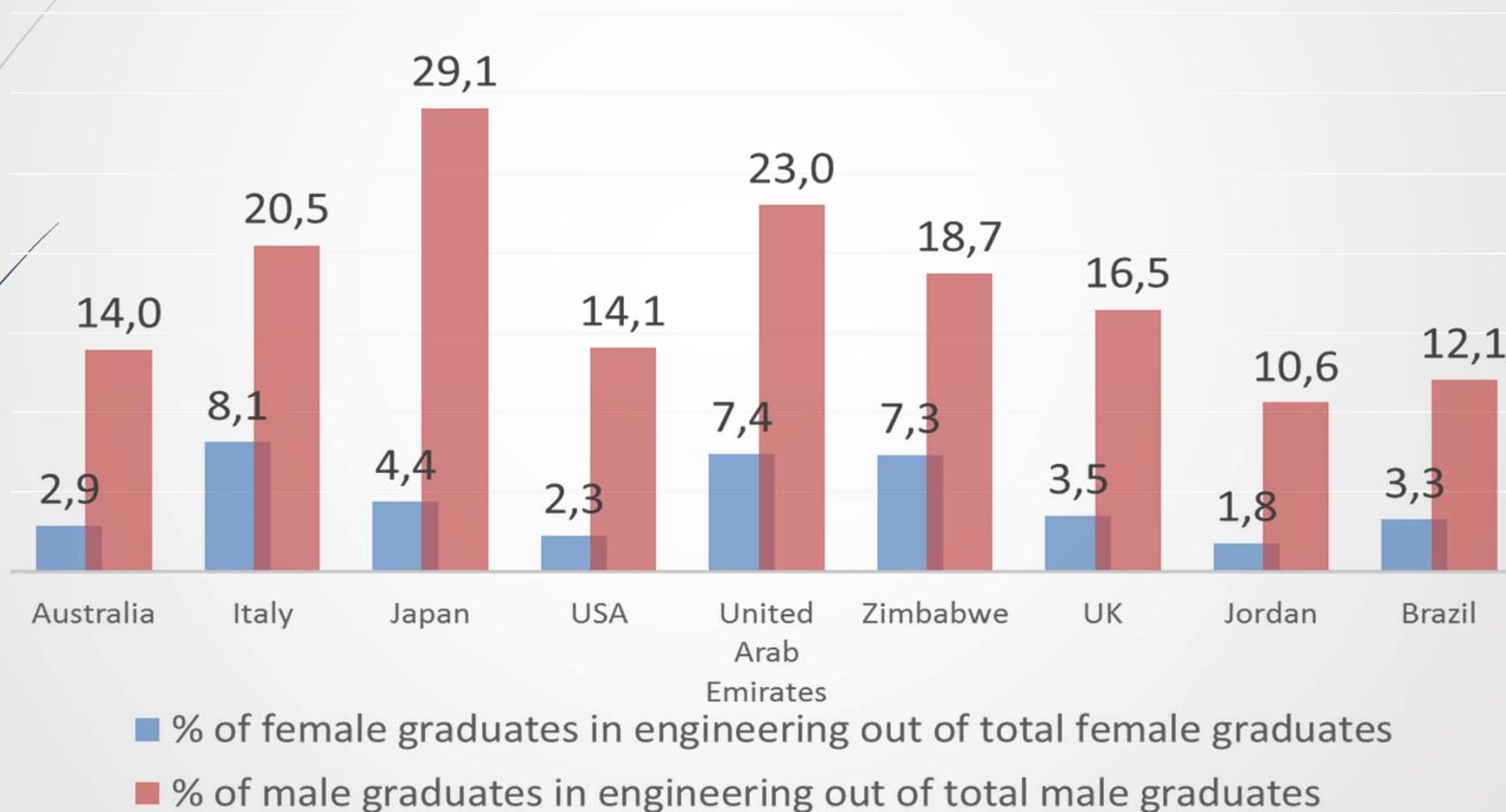
Share of **male** graduates by field of studies (average 2005-2012)



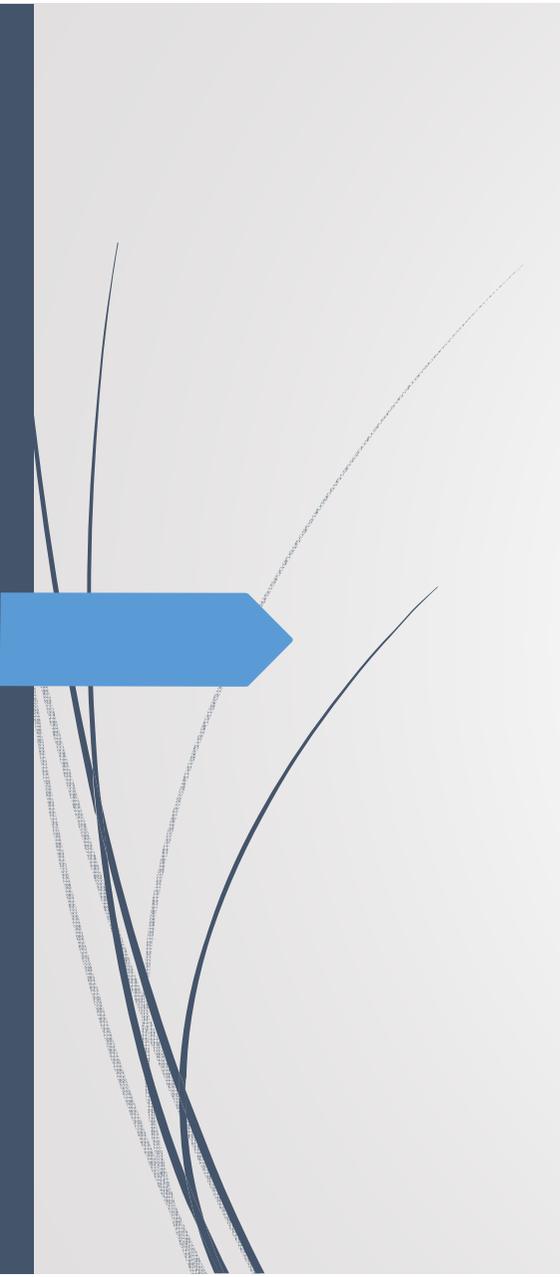
Source: Unesco data processed by Centro Studi CNI

Unesco data on female graduates in engineering referring to some countries taking part to the present WFEO working group meeting

(average 2005-2012)



Source: Unesco data processed by Centro Studi CNI

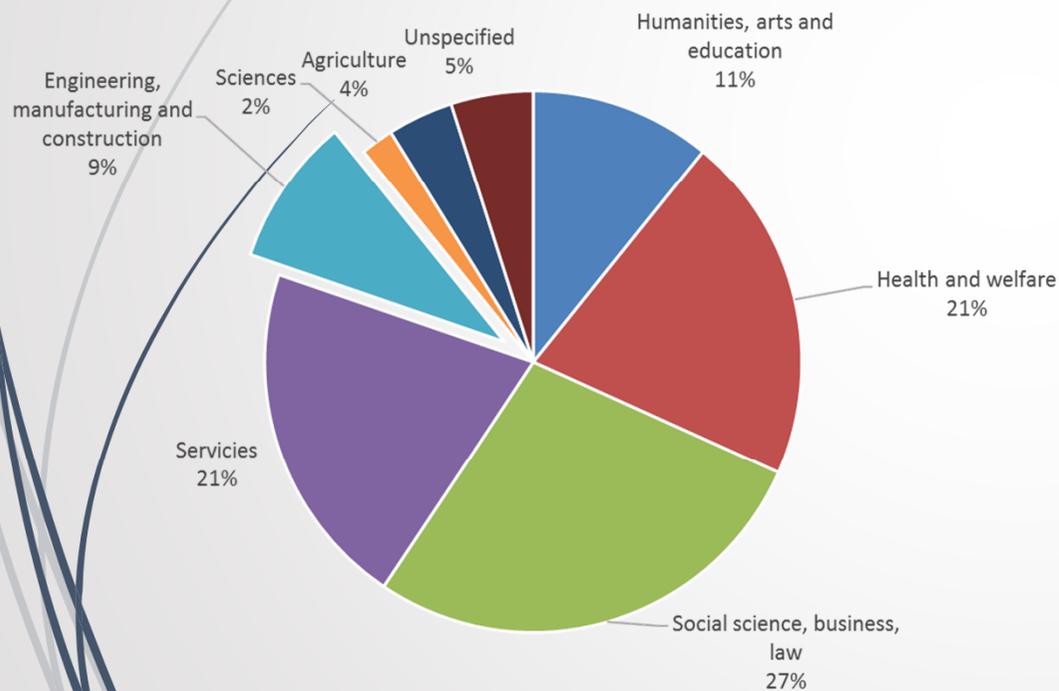


OECD Data on women in engineering

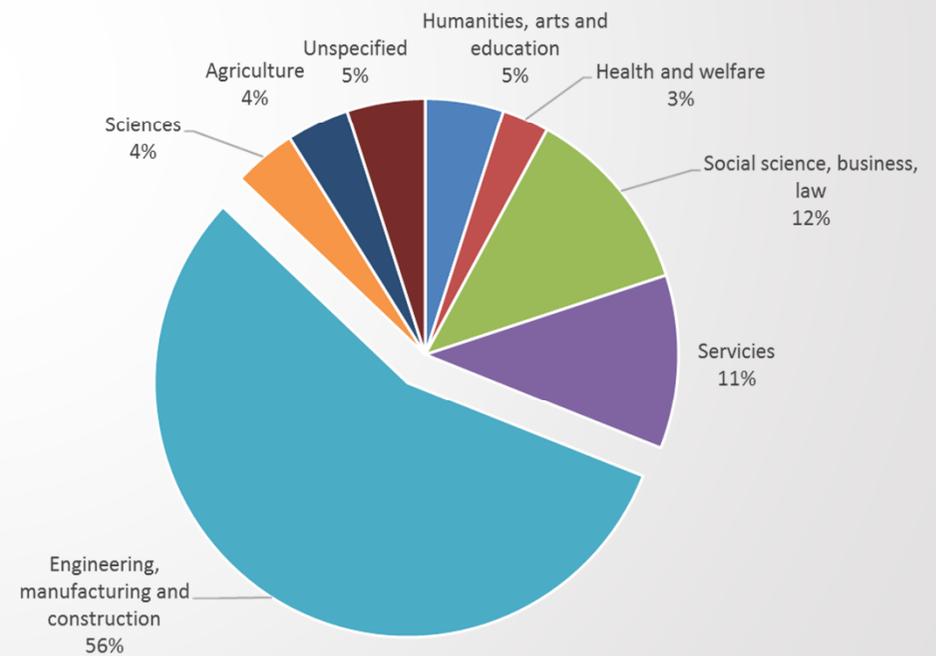
(the organization includes 35 member States)

Data on OECD countries confirm a severe gender gap in engineering graduation

Female graduates in the OECD, by field - Average 2010

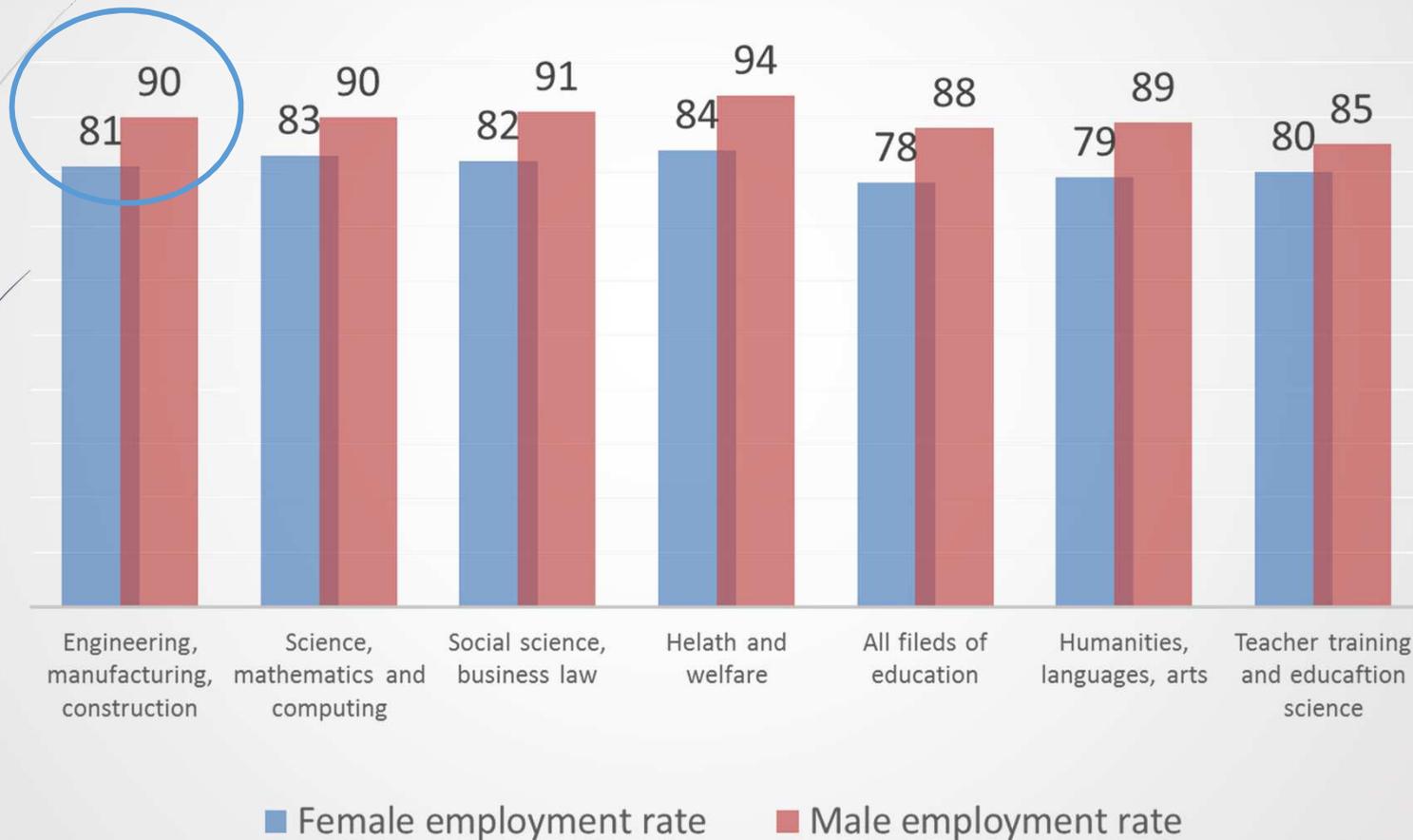


Male graduates in the OECD, by field - Average 2010



Source: OECD data processed by Centro Studi CNI

Gap in employment rate (%) among OECD countries – (2012 or 2015)



Source: OECD data processed by Centro Studi CNI



Some aspects on statistics concerning women in engineering

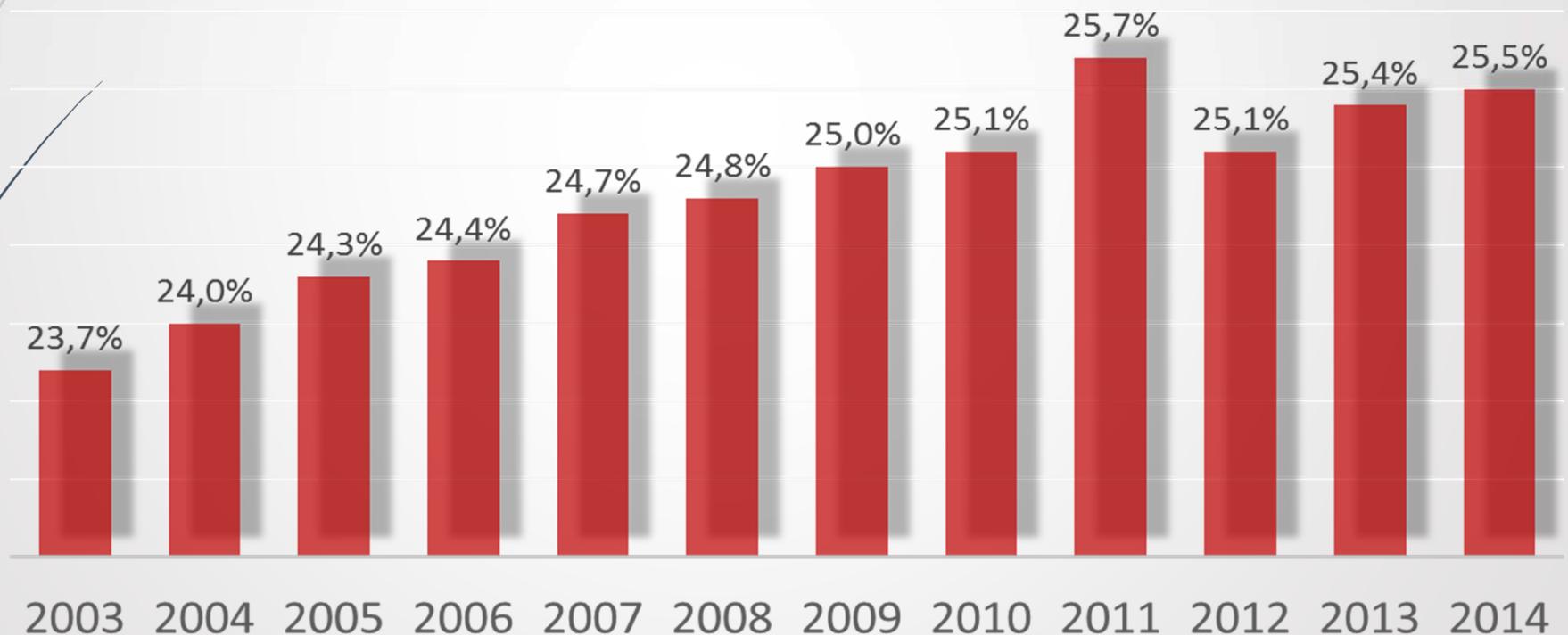
- ▶ Data of quite a large number of countries concerning the flows of women enrolled and graduated in engineering are easily available (Unesco, OECD, ILO);
- ▶ Unesco and OECD statistics on University enrolment and graduation (in engineering and other fields of studies) are not always updated
- ▶ Data on women in engineering in some relevant countries, like India or Nigeria are not easily available on international database, like Unesco database
- ▶ Extensive database on women (and men) working as freelance engineers (independent workers) are not easy to find



Data on women in engineering in the European Union databases

Data mining and analysis on women in engineering is easier at a *European scale*

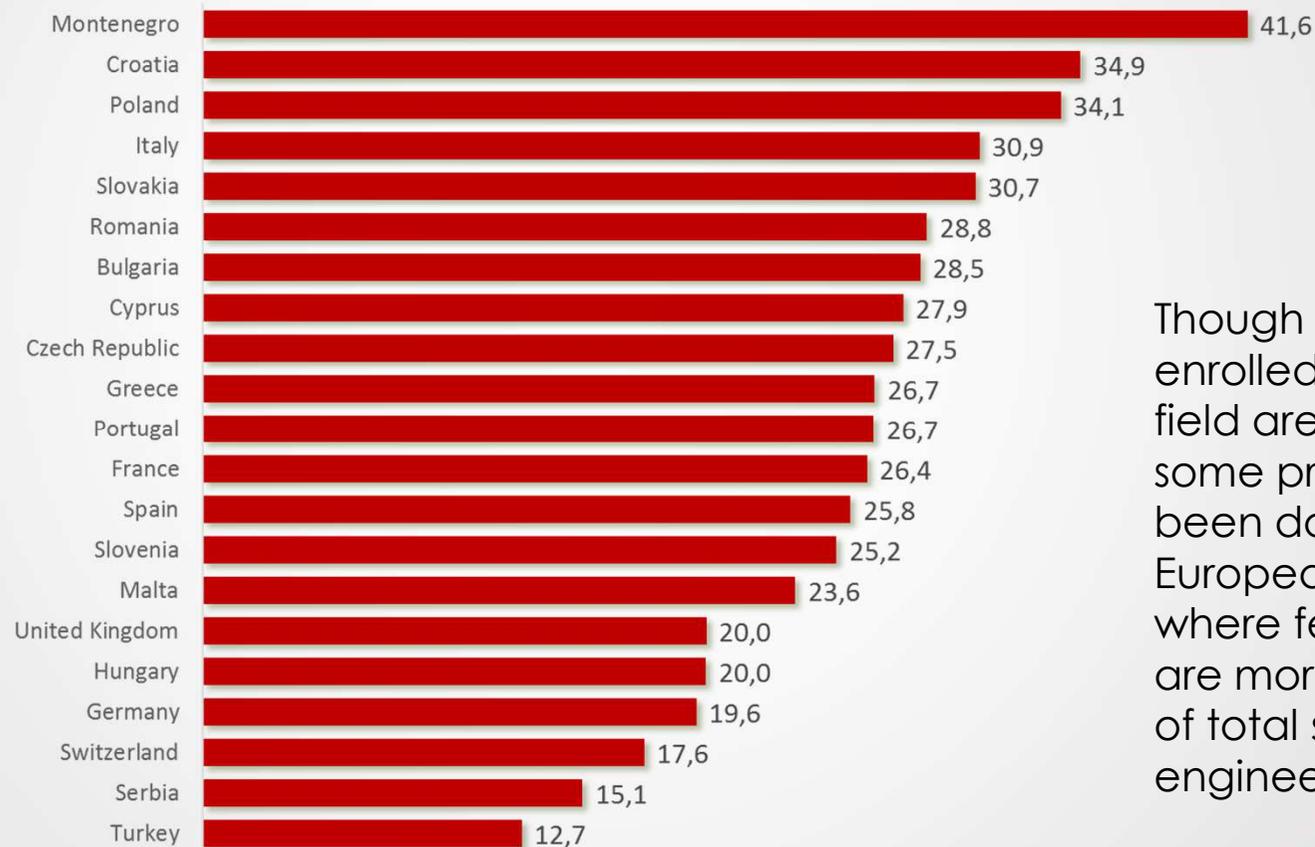
EU 28 countries - Female students (ISCED 5-6) enrolled in engineering, manufacturing and construction field - as % of male and female students in these fields



Source: Eurostat data processed by Centro Studi CNI

Some european countries belonging to WFEO

% of female students enrolled in engineering, manufacturing and construction field out of total students enrolled in the same field – year 2014



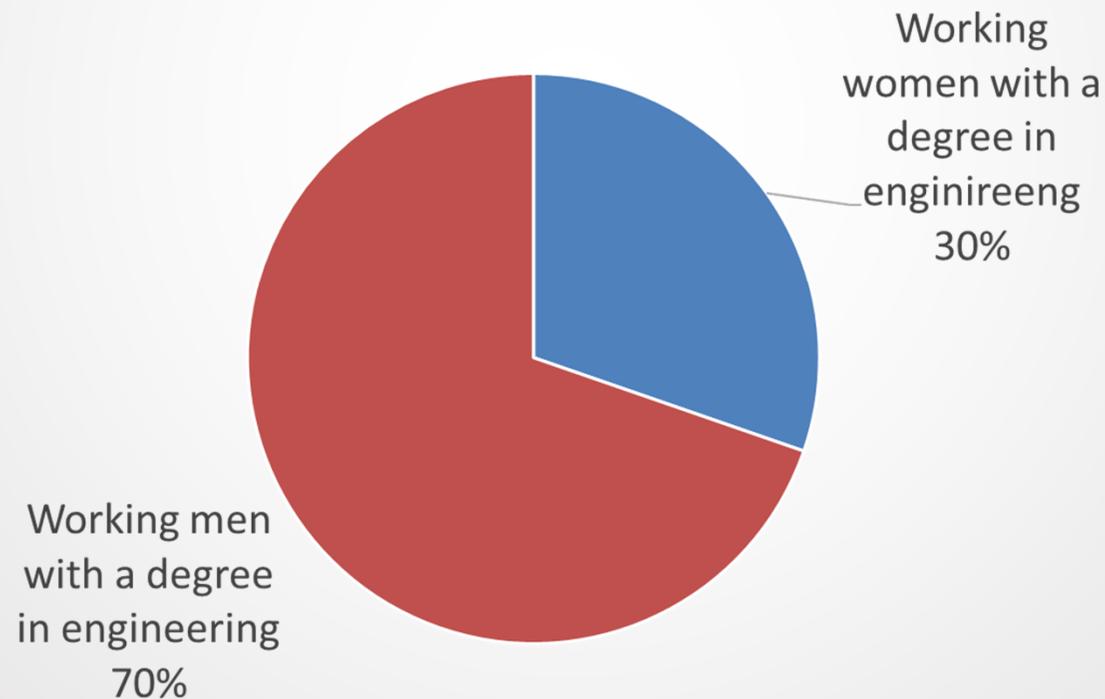
Though women enrolled in engineering field are still a minority, some progresses have been done in some European countries, where female students are more than 30% out of total students in engineering

Source: Eurostat data processed by Centro Studi CNI

Engineers in the labour market

28 EU countries count 3.5 millions engineers and architects in the labour market. The share of women is 30% in 2016; it was 28% in 2014

Share of engineers and architects in the labour market (EU 28 countries)



Eu statistics do not separate engineers and architects

Source: Eurostat data processed by Centro Studi CNI

The highest number of women in engineering in EU is concentrated in the following countries

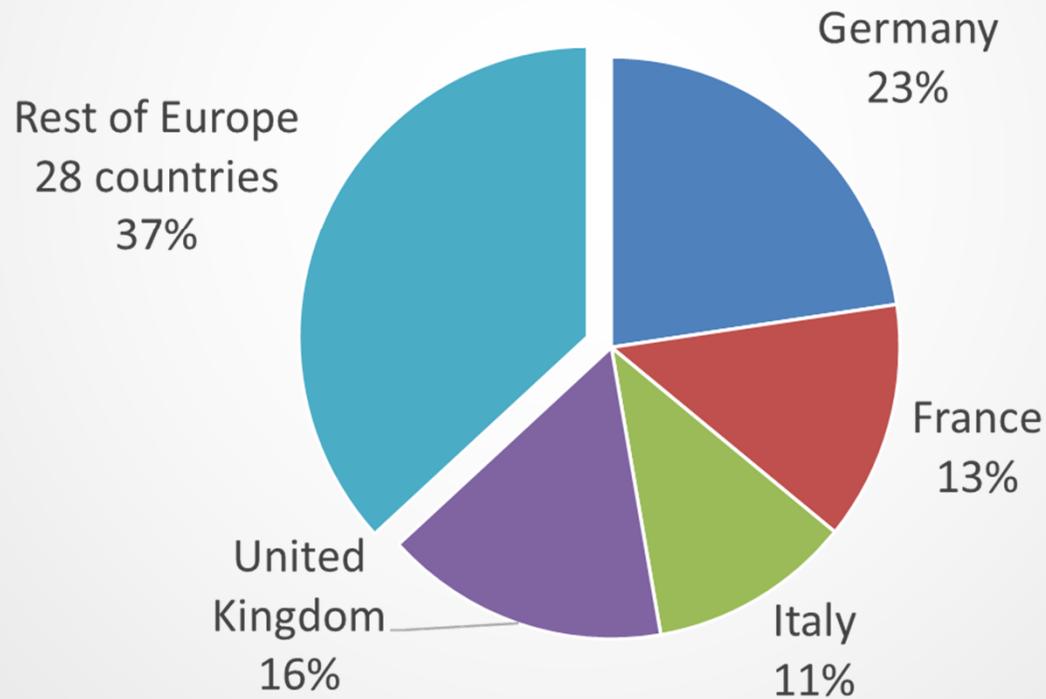
Number of working women with a degree in engineering or architecture in the EU (thousands) - year 2016



Source: Eurostat data processed by Centro Studi CNI

Women in Engineering in Europe

Working women with a degree in architecture or engineering (share out of total women in the same field in EU 28 countries)



Source: Eurostat data processed by Centro Studi CNI



There is a lack of **extensive** statistic datasets concerning **freelance** (self-employed) **engineers** in different countries or engineers enrolled in National Register o Official professional Association (like in Italy, Austria ecc).

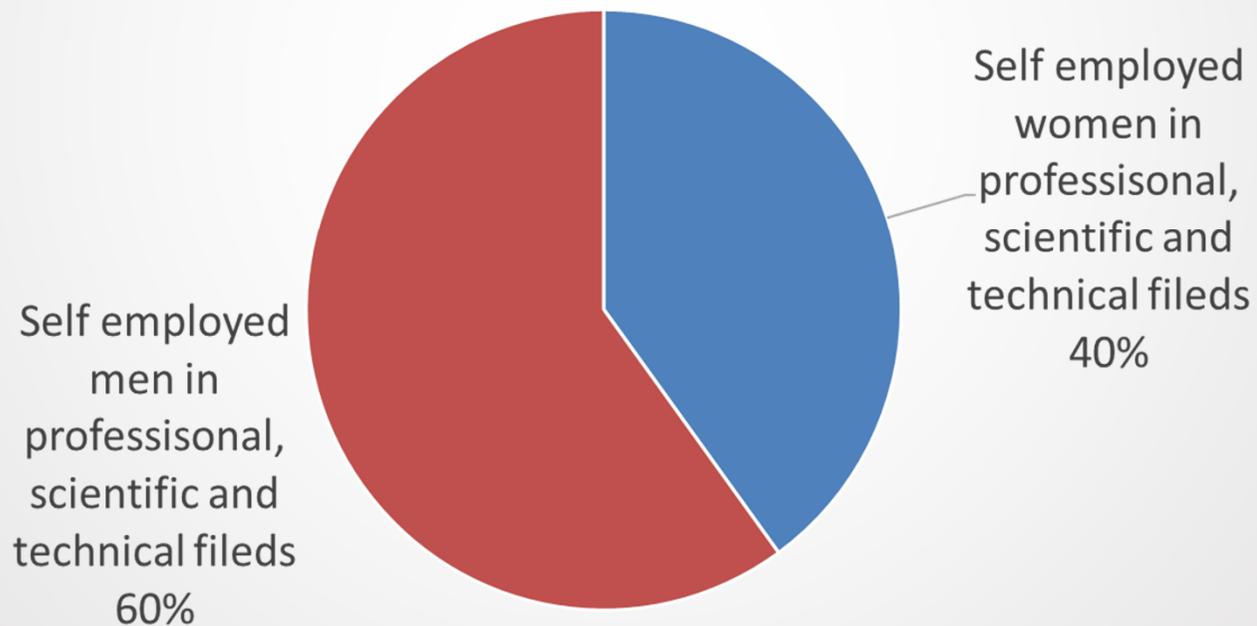
EU database contains the only aggregated number of men and women self-employed in professional activities, scientific and technical activities.

FEANI publishes the number of engineers enrolled in professional Association, with no distinction between men and woman.

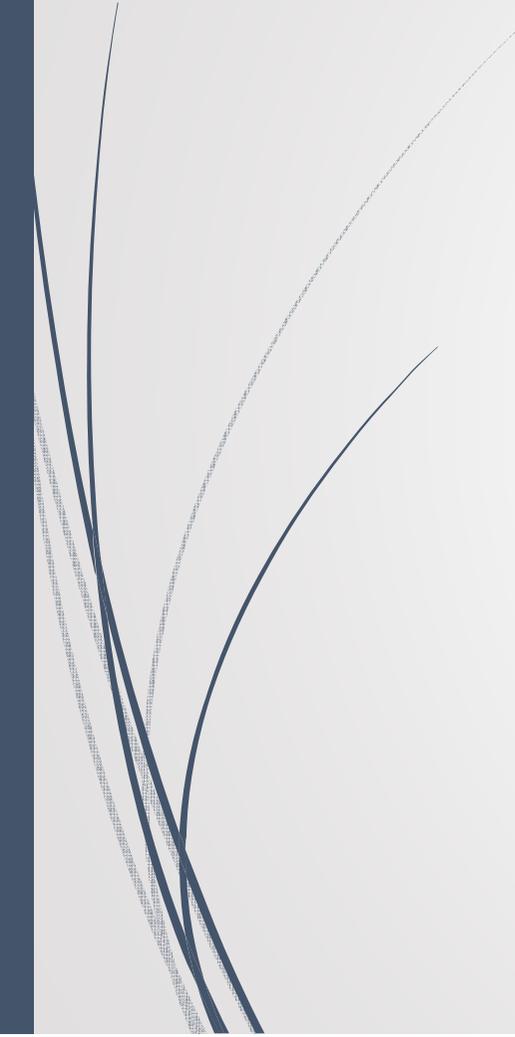
WFEO should promote an exstensive survey and annual monitoring on women and men belonging to National Register and self-employed market

Self-employed workers (own-account workers) in professional and technical fields, including engineering in EU 28 countries

Freelance women and men in **professional and technical fields** - Eu 28 countries, year 2015



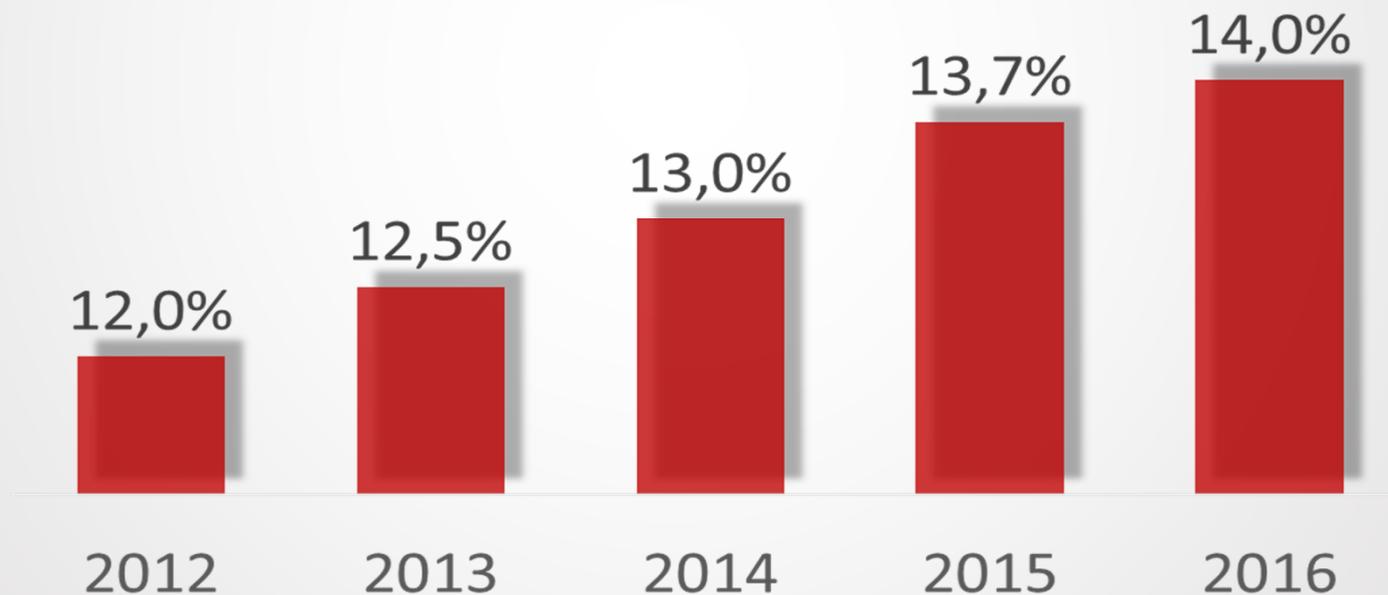
Source: Eurostat data processed by Centro Studi CNI



An example:
**Italy and women in engineering
enrolled in the Albo Ingegneri**

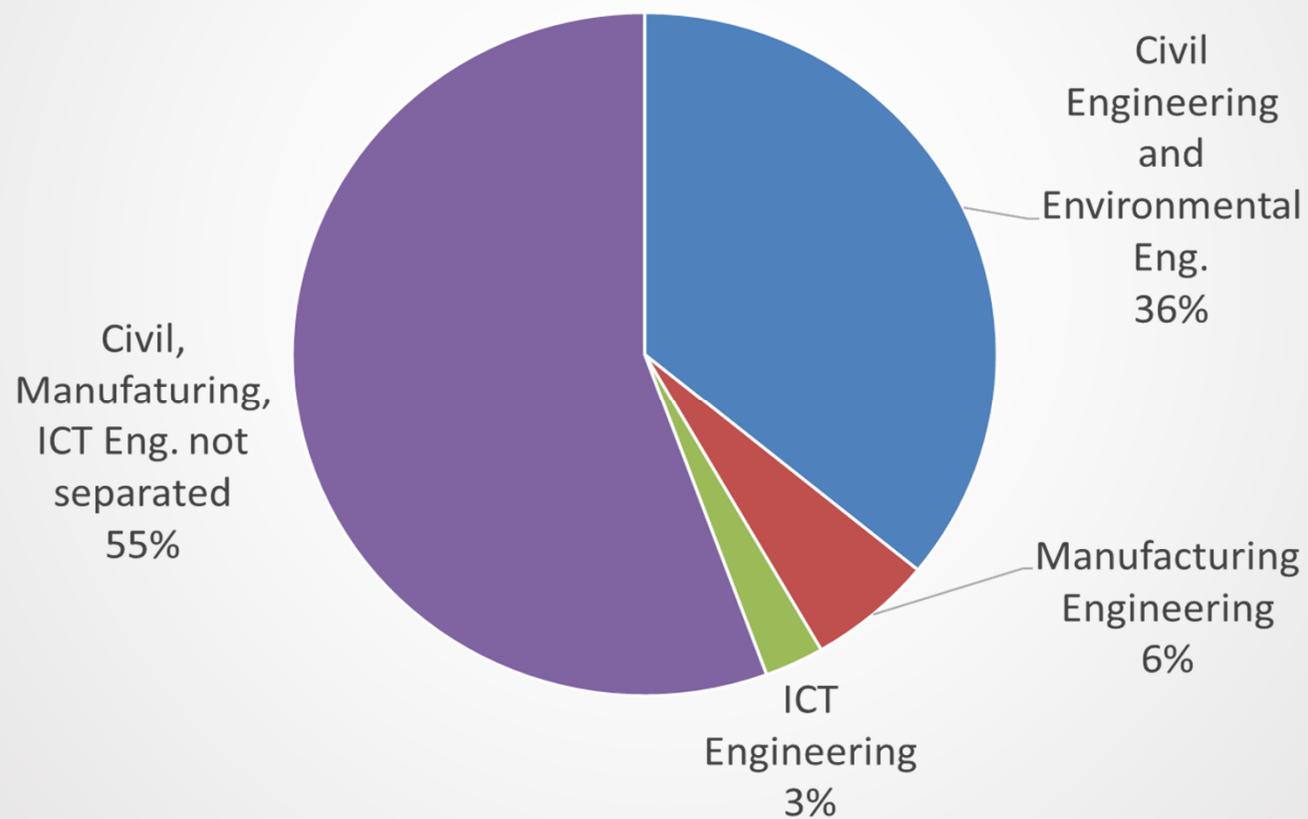
The share of women enrolled in the Italian Albo Ingegneri is increasing, but women are still a minority. The Italian Albo counts **33.433** women and 204.733 men in engineering

Italy - Women in engineering (Albo ingegneri)



Source: Centro Studi CNI

Italian Albo Ingegneri – Women in engineering by field of professional activity



Source: Centro Studi CNI



A quick overview on female empowerment policies and data



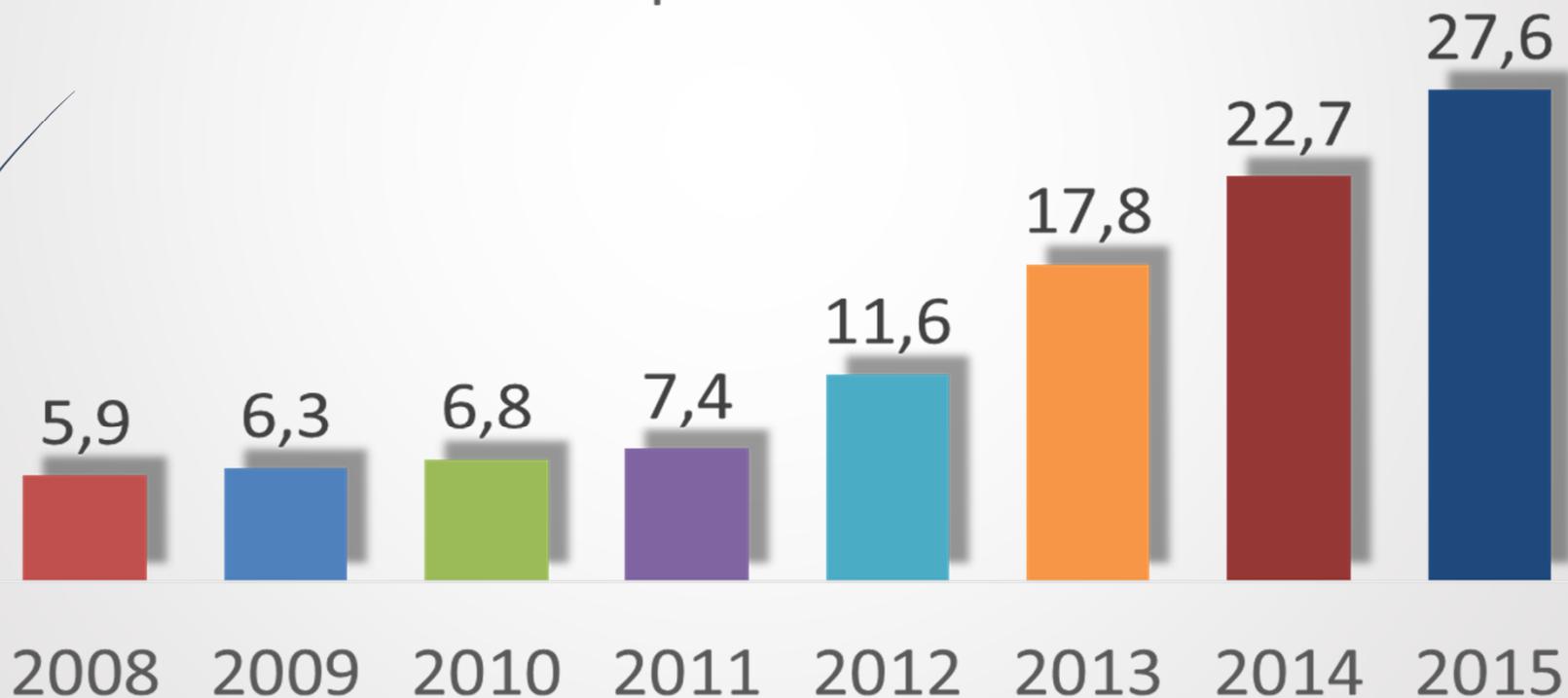
Gender gap and female empowerment can be assessed through a wide range of data at global level. However the presence of women with a degree in engineering at high level in corporations or institutions is difficult to be discovered.

A specific scouting on female empowerment concerning engineers should be launched by WFEO, through collaboration among different member countries.

An analysis on policies, laws and best practices supporting female empowerment in WFEO different countries should be launched.

CNI and *Ingenio al femminile* have conducted a specific analysis on female empowerment and women in engineering in Italy

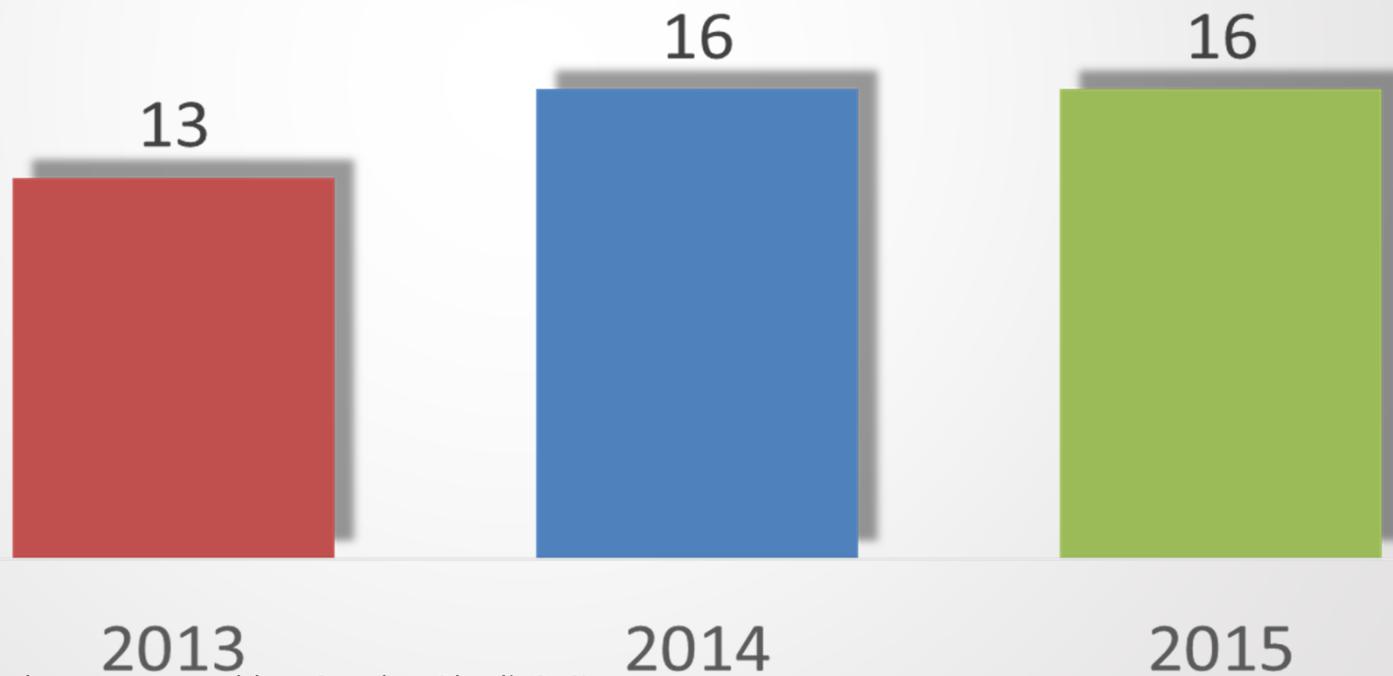
Share (%) of women in Italian listed companies' board



Source: Consob data processed by Centro Studi CNI

Female empowerment data in Italy: an example

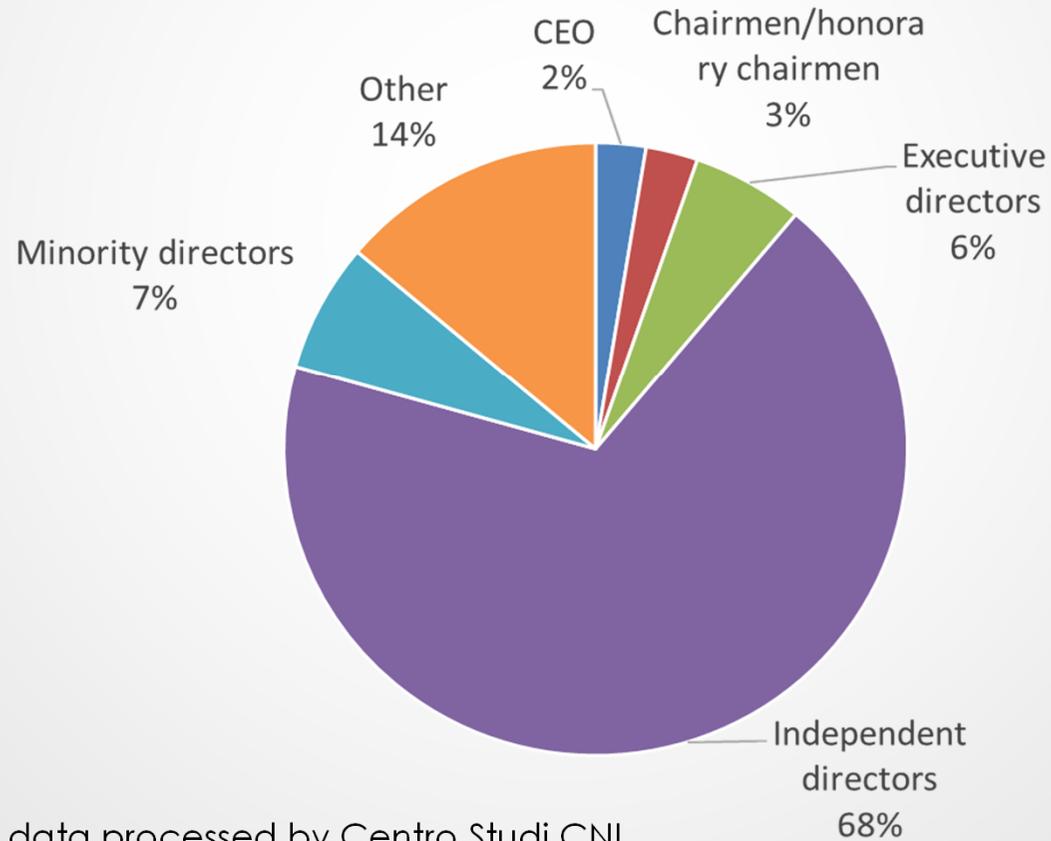
Number of female CEO in the Italian listed companies



Source: Consob data processed by Centro Studi CNI

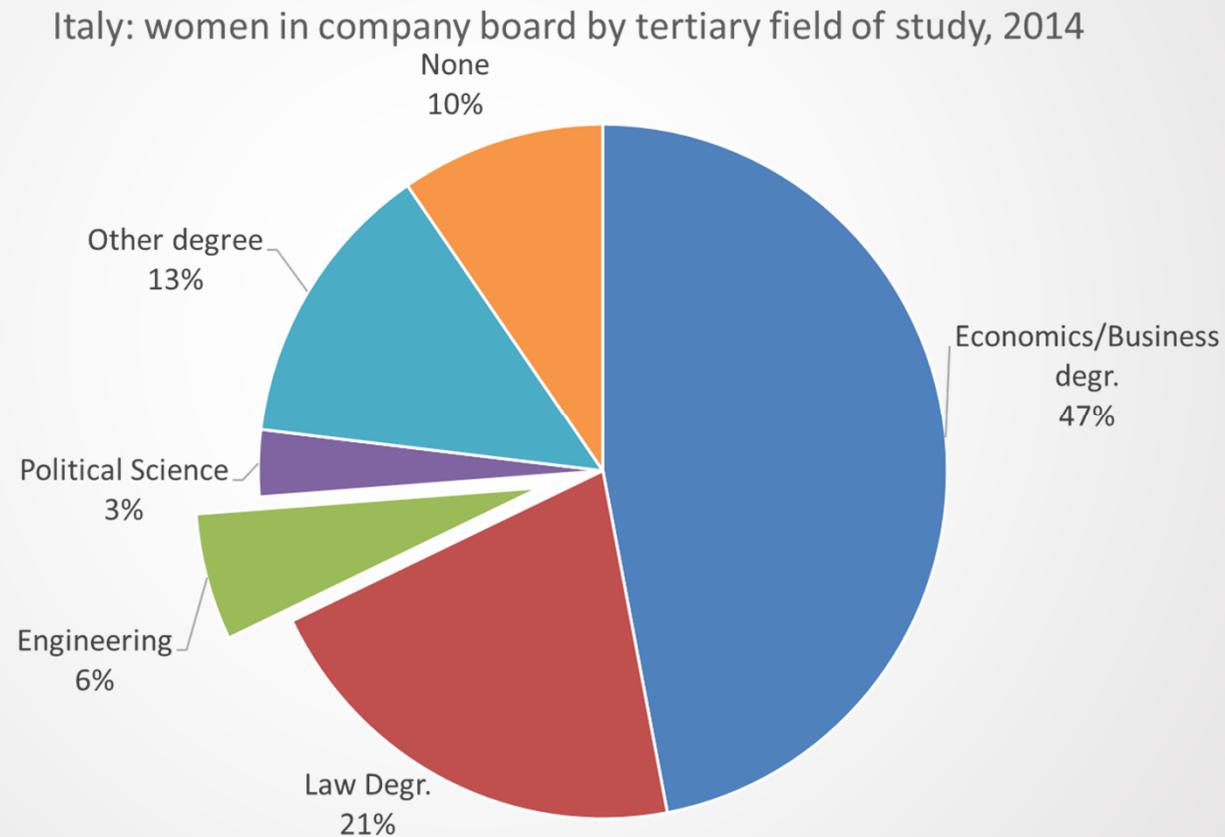
Italy: more than 1.000 women with a role in the board of Italian companies

Share of women in Italian companies' board, year 2015



Source: Consob data processed by Centro Studi CNI

A very few women in company board are engineers



Source: Consob data processed by Centro Studi CNI

Conclusion/ideas/proposal

- ▶ WFEO should implement a monitoring system of data concerning women in engineering starting from wide existing dataset
- ▶ Monitoring activities should consider, at a preliminary stage, the main official datasets represented by the following official sources: Unesco, ILO, Eurostat, OECD, UNO, FEANI
- ▶ Identification of other relevant sources of data concerning women (and men) in engineering should be implemented
- ▶ The main official databases (like Unesco or FEANI) can provide important information concerning engineering, but also reveal specific weaknesses: information are often incomplete. Some relevant countries do not provide clear data on engineering and on women in engineering. WFEO should implement a network composed by a referent for each member country, providing every year a dataset on engineering sector and on women in engineering
- ▶ Starting from data on gender gap and female empowerment, WFEO should implement a review on best practices in different member countries