Gender Gap in Patent Activities in Europe

Three Indicators describing the Issue
Statistical Considerations about Patents

- European Patent Office EPO (main task to grant European patents): Annual reports and statistics
- Eurostat: Statistical office of the European Union
- Patent applications have applicants (sectors: Business BES, Higher Education HES, Government GOV, Hospital HOS, Private-non-profit PNP, Individuals IND, Others OTH) and inventors
- Patents are classified in technology fields (IPC)
- Geographical assignment:
  - EPO does statistics on the basis of first-named applicant
  - Eurostat does statistics on the basis of inventors’ residence

(Sources: EPO 2017, Eurostat 2017)
Key Facts about Patent Activities in Europe

- Patenting is an increasingly important business factor, patents as indicator for innovation activities and success (output indicator)

- Patent activities differ in countries and technology fields (e.g. some countries and technology fields are more prolific than others, traditions of patenting)

- Overall numbers of patent applications (2014, EU-28):
  - Germany 20.7 thousand (36.5% of all countries EU-28)
  - France 9.1 thousand
  - United Kingdom 5.3 thousand

- Applications per million inhabitants per country (2014, EU-28):
  - Sweden 349 per million inhabitants
  - Finland 340 per million inhabitants
  - Germany 256 per million inhabitants

(Source: Eurostat 2017)
The Gender Issue

- Gender of inventors is not recorded on the applications and therefore in the original database by EPO
- For building gendered indicators or conducting gendered analyses first of all a gender assignment to the inventors is necessary (pioneering project on behalf of the EU: Naldi and Parenti 2002)
- Methodology: First name gender assignment
- She Figures 2015: Gendered statistics on patents for the first time (Eurostat)
- Also done so in various projects: Naldi & Parenti 2002; Busolt & Kugele 2009; Frietsch et al 2009; Busolt et al. 2014

- Own analysis on raw patstat data (EPO) on the data 2016
INODE Indicator

- Output-input-ratio is introduced as INODE indicator (invention gender gap indicator): relation of female researchers as input and the female inventors as output.
- Dividing the percentage of female inventors (Head counts) by percentage of female researchers (Head counts) in Business Sector (BES).
- It shows gap and potential at the same time as inventions are done by researchers in BES generally.
- Value of 1.0 indicates no gap at all, close to 1.0 indicates a narrow gap, whereas low values indicate large gaps and a significantly lower harvest of the women’s research and inventive potential.
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FIPMIN Indicator

- Traditional indicator: applications per million inhabitants per country
- FIPMIN-indicator (number of female inventors per million inhabitants indicator)
- Built by relating the absolute number of female inventors (Head Count) to the absolute number of inhabitants per country, similar as the established indicator for patents
- FIPMIN-Indicator provides important additional information on gender performance between member states
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WIN Indicator

- WIN indicator (women researchers and inventors indicator) gathers the majority of the European Member States in three groups (A, B and C)
- The A-level group of Member States has the highest percentage of female researchers (Head Count) and the highest percentage of female inventors (Head Count) within the business enterprise sector (BES)
- Group B defines the EU Member States, which show a performance at medium level in both dimensions
- Group C represents EU Member States, which perform definitely below the EU mean values in both dimensions
- WIN indicator marks the performance enhancement
WIN Indicator
Conclusions

- **Women in science and technology have to play a more important role** in research and the innovation process if Europe strives to be the most innovative region of the world and to maintain a leading role in the global economy, especially in light of the current and upcoming challenges such as demographic changes or progressive digitisation.

- The patent activities in relation to the women workforce in R&D show that there is a **potential of women who could contribute on a higher level** in terms of performance. The proposed indicators INODE indicator (invention gender gap indicator) and FIPMIN-indicator (number of female inventors per million inhabitants) can give a swift **assessment of the use of potential of female researchers** and of the **female inventors** in relation to inhabitants of a country.

- All three indicators are necessary to get a detailed view as there are EU Member States, which perform badly regarding the INODE or the WIN indicator, but show a better performance regarding the FIPMIN indicator. The indicators enable countries to get a better understanding of their (gendered) performance.
Thank you for your attention.

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