Europäisches Patentamt
European Patent Office
Office européen des brevets

Women's participation in inventive activity

Evidence from EPO data

Key Findings

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Executive summary

While women's contributions to science and technology have been increasing in recent decades, parity with men has still not been reached. This study examines women's participation in patenting activity at the EPO in the 38 contracting states to the European Patent Convention (EPC).[1] The analysis focuses on all European patent applications submitted between 1978 and 2019, with occasional extensions until 2021, where possible. Using disambiguated inventor data and attributing gender to individual inventors based on their names, the analysis provides evidence on the presence of women inventors across different countries, time periods, technology fields and patent applicant profiles.

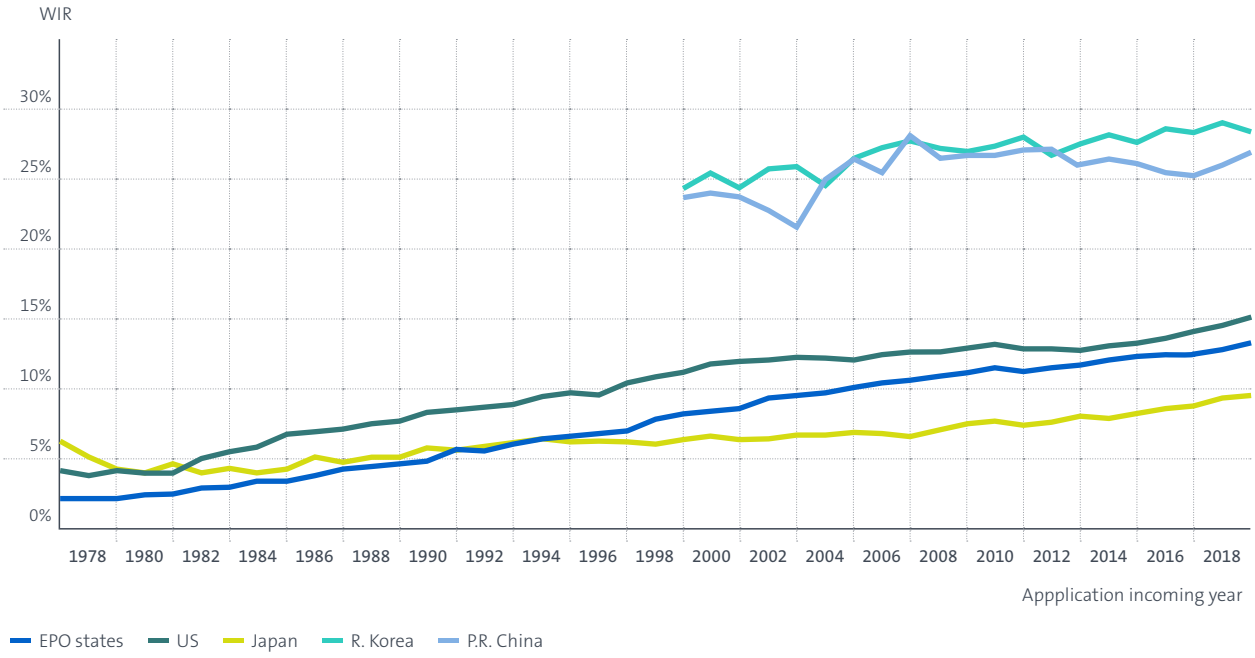
1 The data exclude Montenegro, which acceded the EPC on 1 October 2022, after this study was prepared.

Key findings

1. The share of women inventors has increased steadily over time but is still below parity with that of inventors who are men. In EPO countries, the women inventor rate (WIR), which measures the percentage of women inventors among all inventors in patent applications in a given year, increased from around 2% in the late 1970s to more than 13% in 2019.

Figure E.1

WIR, 1978–2019

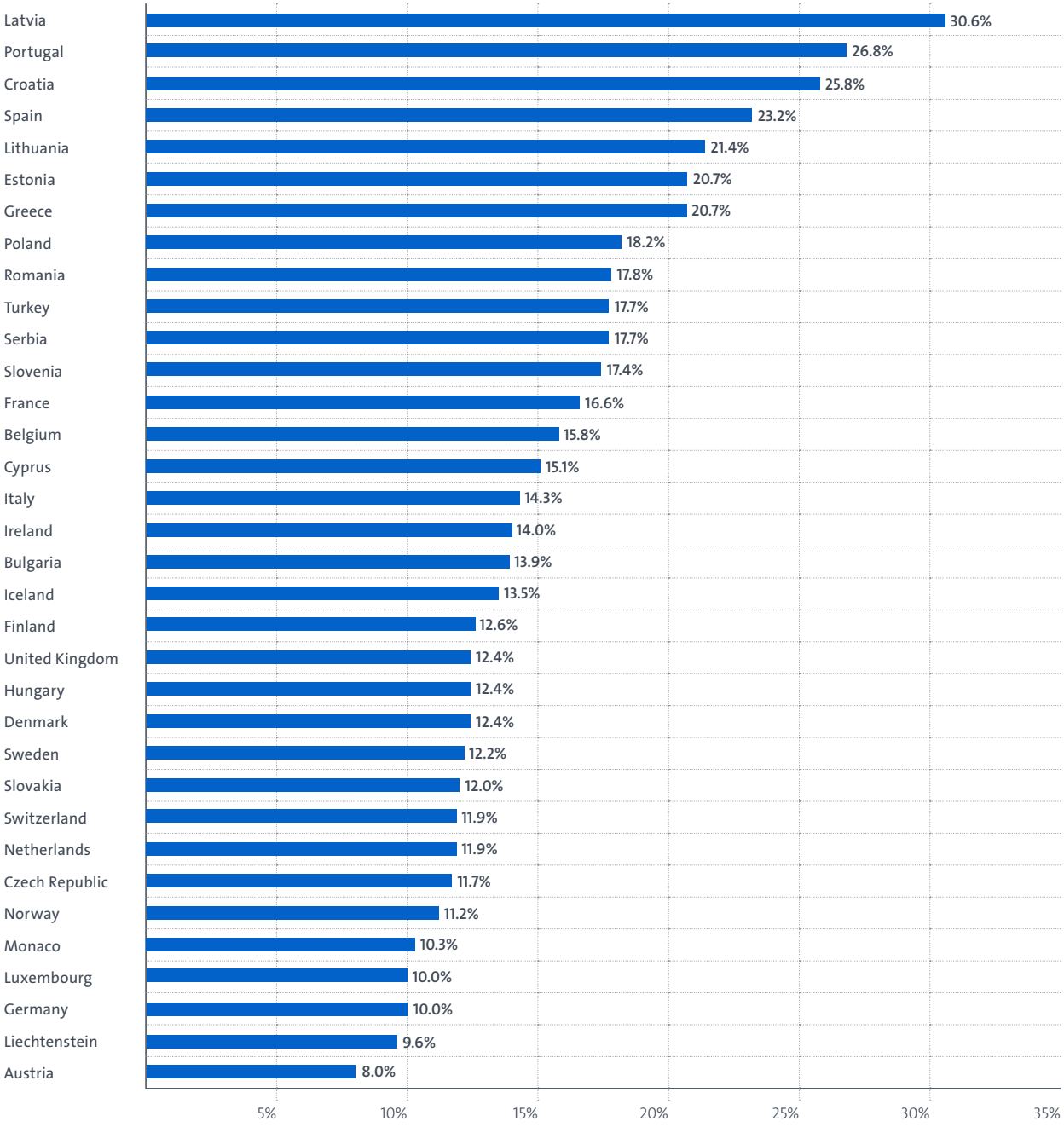


Source: author's calculations

2. In 2019, the WIR in EPO countries (13.2%) is well above that in Japan (9.5%) but below the US WIR (15.0%). P.R. China and R. Korea show much higher shares of women inventors (26.8% and 28.3% in 2019, respectively), although the estimates are less robust than for other countries. Among EPC contracting states, Latvia (30.6% in 2010-2019), Portugal (26.8%), Croatia (25.8%), Spain (23.2%) and Lithuania (21.4%) have the highest WIR values, while Germany (10.0%), Luxembourg (10.0%), Liechtenstein (9.6%) and Austria (8.0%) have the lowest.

Figure E.2

WIR by EPO country, 2010–2019



Source: author's calculations

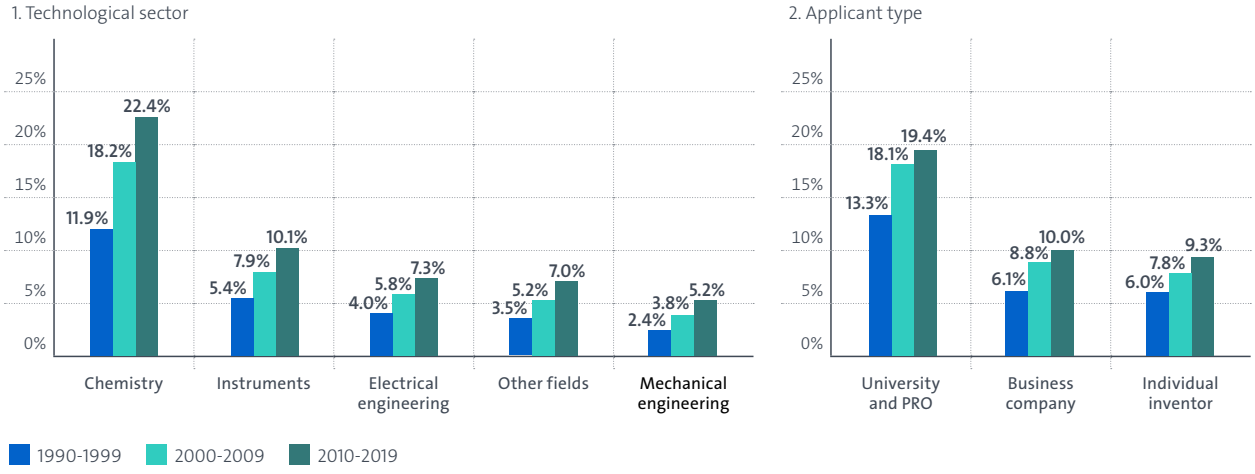
3. Differences across EPO countries can largely be explained by those countries' technology specialisations and the contributions of universities and public research organisations (PROs) to patenting activity.

    a. Chemistry stands out as the technology sector with the highest share of women inventors. The WIR in the 2010–2019 period reached over 22%, while the values in other technology sectors ranged from 10.1% in Instruments to 5.2% in Mechanical engineering. Within the Chemistry sector, Biotechnology and Pharmaceuticals have WIR values over 30%.

    b. Patent applications from universities and PROs have a significantly larger share of women inventors than their counterparts from companies. The WIR of 19.4% for this segment in 2010–2019 significantly exceeds that of individual inventors (9.3%) and private companies (10.0%).

Figure E.3

WIR in EPO countries by technological sector and applicant type, 2010–2019



Source: author's calculations

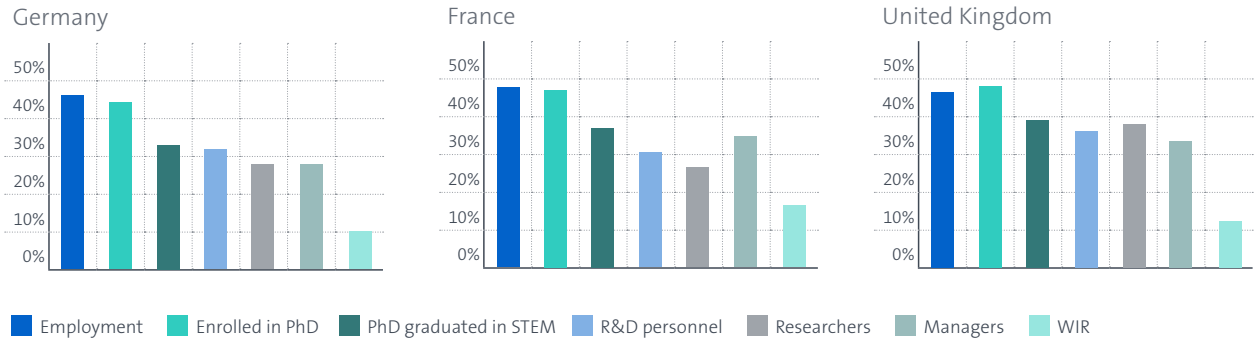
4. There is a consistent pattern of a decreasing share of women in segments ranging from total employment to PhD enrolment, to PhD graduates in STEM, to R&D personnel and researchers, to patenting. This confirms the diagnostic of a "leaking pipeline" issue, whereby women in EPO countries face increasing obstacles when progressing in STEM careers. Further analysis shows that women inventors, on average, produce fewer inventions than inventors who are men, which is partly due to their lower seniority.

5. Women are more likely to be found in inventor teams than among individual inventors, but they tend to have less senior positions in such teams than men. This reflects the increasing division of intellectual labour that accompanies the accumulation of knowledge, especially in technology fields in which women inventors tend to specialise, and bodes well for the future of women in patenting.

6. Women are also over-represented among inventors whose names and surnames are infrequent in their country of activity and more frequent abroad, which indicates a higher WIR for migrant women inventors than for native ones. This suggests that support for international mobility may give women more opportunities to engage in inventive careers.

Figure E.4

Comparison of WIR with women's shares in total employment, PhD enrolment, PhD graduates in STEM, R&D personnel, researchers and managers, 2010–2019



Source: author's calculations

The full report is available for download at:
epo.org/women-inventors

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