

# The Shadowed Light: STEM Women in Japan

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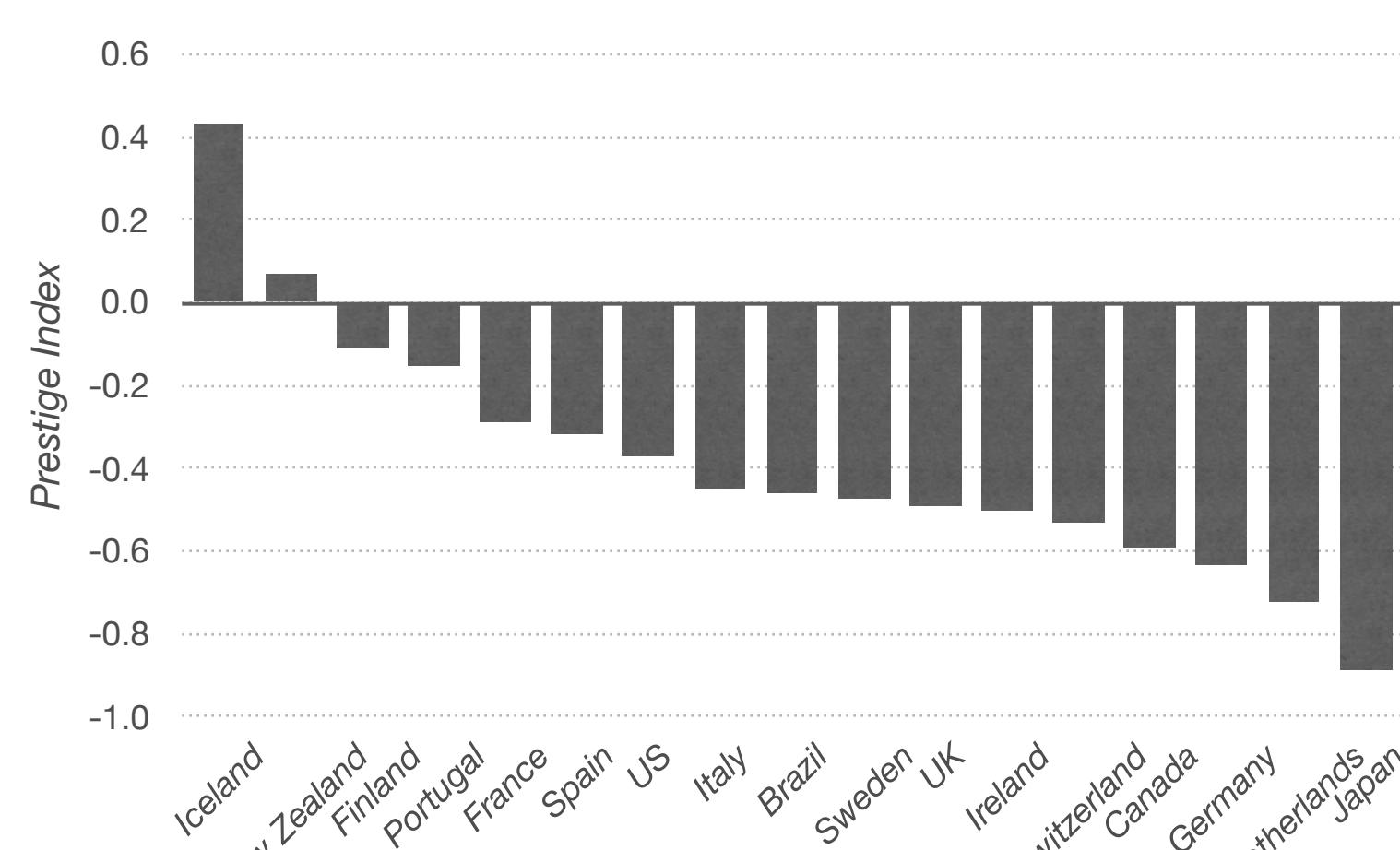
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“Japan is the first and most Nobel laureate country in Asia. In the 21st century, in the field of natural science, the number of Japanese winners of the Nobel Prize has been second behind the United States of America. While all twenty-eight Nobel laureates in Japan are male, Japanese female still be an external image of the science and technology arena.”

## STEM Environment in Japan

### A shadowed group

In academia, Technology and R&D Statistics from OECD shows that Japan has the least proportion of women researchers among all 37 countries, only 16.18% in 2017. In articles published between 2008 and 2016, in 54 of the 68 journals listed on the Nature Index, **women in Japan are significantly underrepresented** in prestigious authorship positions.



Source: Bendels, M. H. K. et al. PLoS ONE (2018).

### Possibilities of Japanese STEM women

An Elsevier report published in 2017 at the Gender Summit in Tokyo identified Japan as the only country where the score of **Scholarly Output per Researcher** during the years 2011–2015 was **higher for women than for men**. Japanese women published an average 1.8 papers over the period, which was 38% more than men at 1.3 papers.

## Why so few? —Rikejo in Japan

### A strongly masculine, collectivist and tight Japanese culture

“Old Boys Network”, stereotype threat and implicit bias. STEM women are devalued social groups dubbed *Rikejo* in Japan.

### Work-life balance

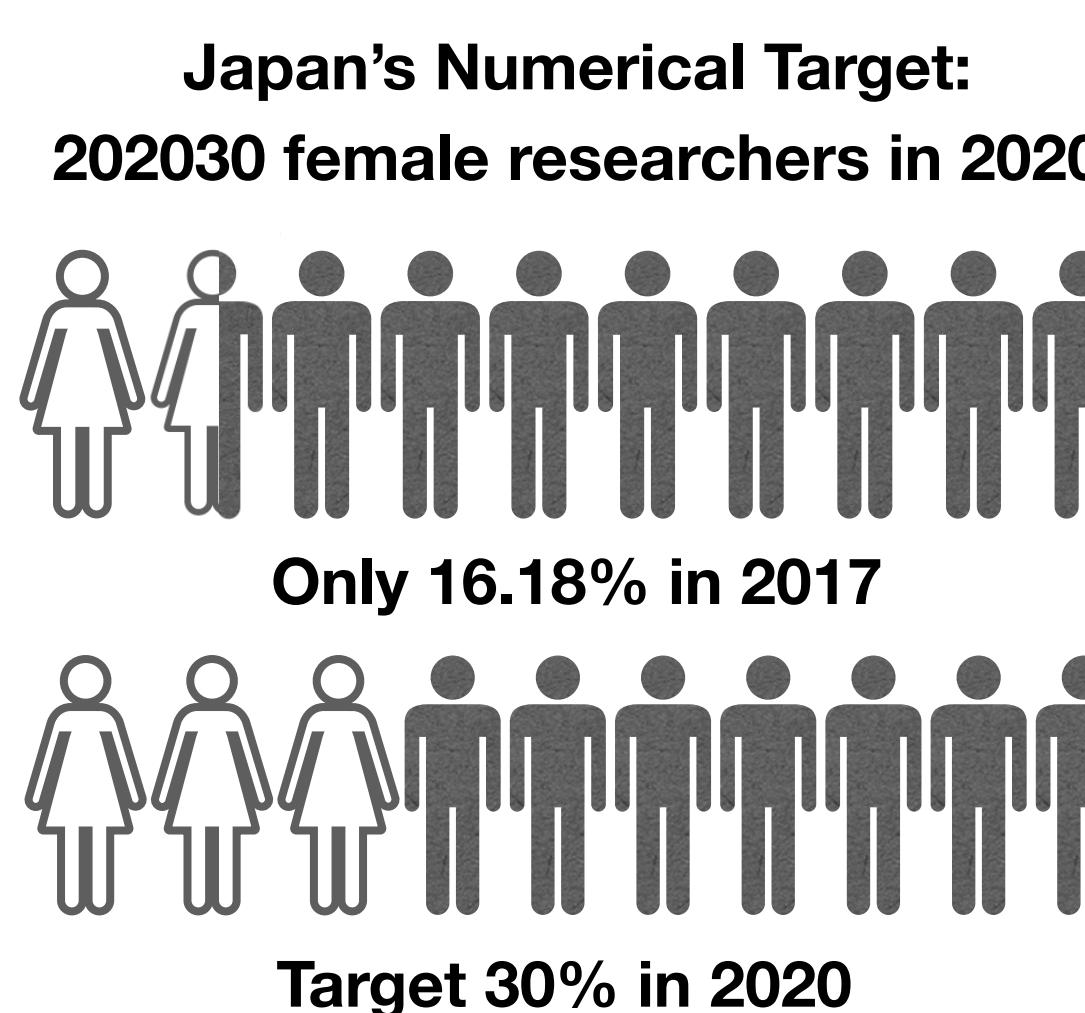
Japanese men work twice as many hours as, for comparison, French men. Because Japanese men spend less time at home, women carry a heavier load of housework and child care.

### A paradox of highly developed society

STEM career may appear as an investment in a more secure future. With developed security systems Japanese women are less likely to choose STEM compared to those in less developed countries.

## Policy Support for her

- **One Numerical Target**, 30% by 2020 since 2003
- **Two Basic Plans** Every 5 years since 2005  
The Basic Plan for Science and Technology  
The Basic Plan for Gender Equality
- **Three Programs** funded by MEXT since 2006
  1. Supporting Activities for Female Researchers; “KASOKU-Program/Acceleration-Program”
  2. Restart Postdoctoral (RPD) Fellowship
  3. Support for Female High-School Students into Science



### STEM students need more input

More than of science and engineering students would continue a graduate degree, while only 8% at other schools on average.

### Dilemma of Waseda Vision 150

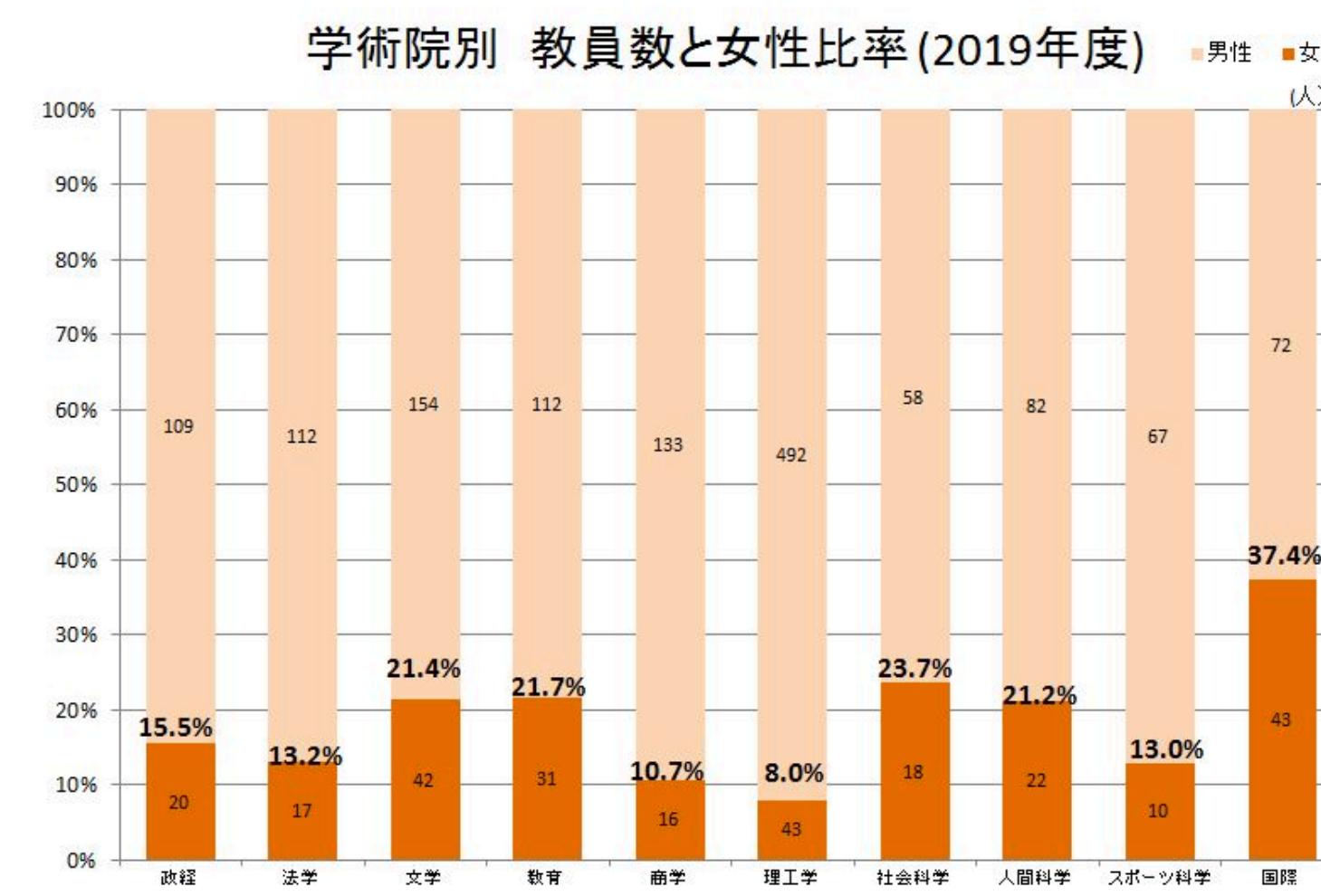
Because of faculty autonomy, some schools fail to agree with plans of gender equality. In addition, More resources are given to national universities rather than private universities.



Interview with Prof. Tamaki Emi (on the right) from Graduate School of Creative Science and Engineering (2020.1)

## Case study: Waseda University

In 2007, Waseda University released “Gender Equality Declaration” and founded “Gender Equality Promotion Committee”. Now, Waseda University offers multiple supports for female researchers, e.g., “Female Researcher Mentor System”. Waseda Vision 150, formulated in 2012, it set numerical targets for female students, staff and faculty numbers by 2032, the 150th anniversary of the university’s founding.



Source: Office for Promotion of Equality and Diversity, Waseda University

### Increasing female students in Science and Technology

In 2006, female student accounts for 11.1% at the School of Science and Engineering, while in 2018, the number raised up to 18.4%.

## Conclusions

The rise of female power in the STEM field, might inject new energy into Japanese economic as well as society. The goals of gender equality promotion in STEM should emphasize on creating **favorable platforms** for the female where they can choose their specialties at their own will.

- Get girls interested in science:  
Joshiyoku ⇒ Feminine Power
- Share Her family burdens
- STEM women network  
e.g. Joint participation in planning and decision-making with men

### References:

- Bendels, M. H., Müller, R., Brueggemann, D., & Groneberg, D. A. (2018). Gender disparities in high-quality research revealed by Nature Index journals. *PLoS one*, 13(1), e0189136.
- Ohtsubo, H., et al. "Beyond the Bias and Barriers—What We have Done in These 10 years in STEM Field in Japan." Presentation at the AASSA-SCJ Workshop. 2017.
- Osumi, N. (2018). "Calling rikejo." *Nature*, 555(7697).
- Williams, Wendy M., and Stephen J. Ceci. "National hiring experiments reveal 2: 1 faculty preference for women on STEM tenure track." *Proceedings of the National Academy of Sciences* 112.17 (2015): 5360-5365.
- Yoshikawa, Katsuhiko, Akiko Kokubo, and Chia-Huei Wu. "A cultural perspective on gender inequity in STEM: the Japanese context." *Industrial and Organizational Psychology* 11.2 (2018): 301-309.

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