
The Researcher Journey Through a Gender Lens

Focus on Japan



ELSEVIER

An examination of research participation, career progression and perceptions across the globe

This document is an adaptation of the full report

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Executive Summary

Gender diversity and inclusion are of growing importance and focus in many sectors, including business, education, government, and research. Increasing gender diversity has a positive impact on productivity, boosts problem-solving, and increases innovation – all essential outcomes for tackling the great challenges of our time, from health to food security, from climate change to sustainable communities.

Our new report *The Researcher Journey Through a Gender Lens* builds on our previous two reports- *Gender in the Global Research Landscape* and *Mapping Gender in the German Research Arena*- and is a part of Elsevier's ongoing efforts to promote gender diversity and advance gender equity in research. The latest report includes analysis on research participation, research footprint, publishing careers and mobility, collaboration networks, as well as qualitative analysis on researcher's perspectives of gender equality in academia across 15 countries and the EU28.

In recent decades we are seeing an increased focus on factoring gender into research. Japan's Fourth Basic Plan for Gender Equality,¹ released in 2015, states the need to ensure an environment in which women researchers can express their abilities to their maximum potential. The plan also promotes women's participation in research, in order to improve Japan's international competitiveness in various scientific fields, while also admitting that women's participation has been inadequate thus far. While progress has been made, our report shows that disparities still exist, demonstrating that there is more work to do to address issues that cut across diversity as well as inclusion.

Finally, at the time of completion of the main report, the COVID-19 pandemic had not yet occurred. Currently, we are still in the midst of the pandemic. Several studies have already suggested that women researchers have been impacted differently and there have been calls to incorporate a gender perspective in pandemic response. Nevertheless, we hope that this document, along with the main report, provides useful insights into advancing gender equity in research.

This document is a summarized version of the full report with a specific focus on Japan.

¹ The Government of Japan. (2015). The Fourth Basic Plan for Gender Equality. Gender Equality Bureau Cabinet Office. Retrieved from: http://www.gender.go.jp/about_danjo/basic_plans/4th/index.html, Accessed June 4, 2020.

Research Participation

Studies have shown that gender diversity in the workforce correlates with profitability and value creation,² and that gender-diverse leadership improves productivity.³ Yet, the gender gap among researchers within the global scientific workforce persists across subject areas and geographic regions.⁴ In 2019, 29.3% of researchers globally were women per the UNESCO Institute for Statistics,⁵ and in Japan, the Ministry of Internal Affairs and Communications (MIC) reported that 16.6% of researchers were women in 2019.⁶

AUTHORS OF RESEARCH PUBLICATIONS

Authorship of research publications is one way in which researchers contribute to the advancement of knowledge. The demographics of the author pool may reflect gender differences if research does not appeal to women and men to the same degree. The appeal of research can differ because of cultural differences in how research is portrayed or perceived, or how welcoming the research environment is to women compared to men. This can ultimately manifest as differences in who is recruited and retained in the research workforce.

We found progress towards gender parity among authors when comparing active authors in 2014–2018 to those in 1999–2003 in all countries studied and the EU28 (Fig 1.1). Portugal showed the greatest increase in the ratio of women to men authors, from 63 women per 100 men in 1999–2003 to 94 women per 100 men in 2014–2018. Japan showed the smallest change over time, from 11 women per 100 men in 1999–2003 to 18 women per 100 men in 2014–2018. When looking at the overall picture in Japan for the 2014–2018 period, 15.2% of active researchers were women. This is slightly below the value reported by the MIC in 2018 (16.2%).⁷ This difference may be attributed to different definitions of researchers - in the report by MIC, ‘researchers’ were defined as any individual who has graduated university (or has the same level of expertise) and is carrying out research in any particular topic. Meanwhile, our analysis was limited to those authors with a Scopus ID for whom a first name could be determined. Analysis of authors during the periods 1999–2003 and 2014–2018 were based on “active authors” for which a definition is provided on the next page.

2 McKinsey & Company. (2018). Delivering through Diversity. Retrieved from: www.mckinsey.com/~/media/mckinsey/business%20of%20functions/organization/our%20insights/delivering%20through%20diversity/delivering-through-diversity_full-report.ashx. Accessed November 24, 2019.; Zhang, L. (forthcoming). An institutional approach to gender diversity and firm performance. Organization Science. Retrieved from: www.hbs.edu/faculty/Publication%20Files/Final_version_6cb3dbd5-9c48-4a1c-gafa-237d2a1a7b4.pdf. Accessed November 24, 2019.

3 Dezzo, C. L., & Ross, D. G. (2011). Does female representation in top management improve firm performance? A panel data investigation (March 9, 2011). Robert H. Smith School Research Paper No. RHS 06-104. Retrieved from: papers.ssrn.com/sol3/papers.cfm?abstract_id=1088182 Accessed November 24, 2019.

4 Charlesworth, T., & Banaji, M. (2019). Gender in science, technology, engineering, and mathematics. *Journal of Neuroscience*, 39(37), 7228–7243. doi: 10.1523/JNEUROSCI.0475-18.2019; Fox, M., Whittington, K., & Linkova, M. (2017). Gender, (in)equity, and the scientific workforce. In: *Handbook of Science and Technology Studies*. Cambridge, MA: MIT Press.; Elsevier. (2015). Mapping Gender in the German Research Arena. Retrieved from: www.elsevier.com/research-intelligence/resource-library/gender-2015. Accessed October 28, 2019.; United Nations Educational, Scientific and Cultural Organization. (2015). UNESCO Science Report: Towards 2030. Retrieved from: unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&qid=p::usmarcdef_0000235406&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_871d5667-bd86-4feb-a045-f802628d2f48%3F_%3D235406eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000235406/PDF/235406eng.pdf#%5B%5B%22num%22%3A647%2C%22gen%22%3A0%7D%2C%22name%22%3A%22XYZ%22%7D%2Cnull%2Cnull%2C%5D Accessed November 24, 2019.

5 UNESCO. (2019). Women in Science. Retrieved from: <http://uis.unesco.org/sites/default/files/documents/fs55-women-in-science-2019-en.pdf>. Accessed June 4, 2020.

6 Ministry of Internal Affairs and Communications. (2019). 2019 Science and Technology Research Results. The Government of Japan. Retrieved from: <https://www.stat.go.jp/data/kagaku/kekka/youyaku/pdf/2019youyaku.pdf> Accessed June 4, 2020.

7 Ministry of Internal Affairs and Communications (2018). 2018 Science and Technology Research Results. The Government of Japan. Retrieved from: <https://www.stat.go.jp/data/kagaku/kekka/youyaku/pdf/30youyaku.pdf> Accessed June 4, 2020.

FIGURE 1.1

Gender ratio among active authors during the periods 1999–2003 and 2014–2018 in each country and the EU28.

KEY

- 1999–2003
- 2014–2018

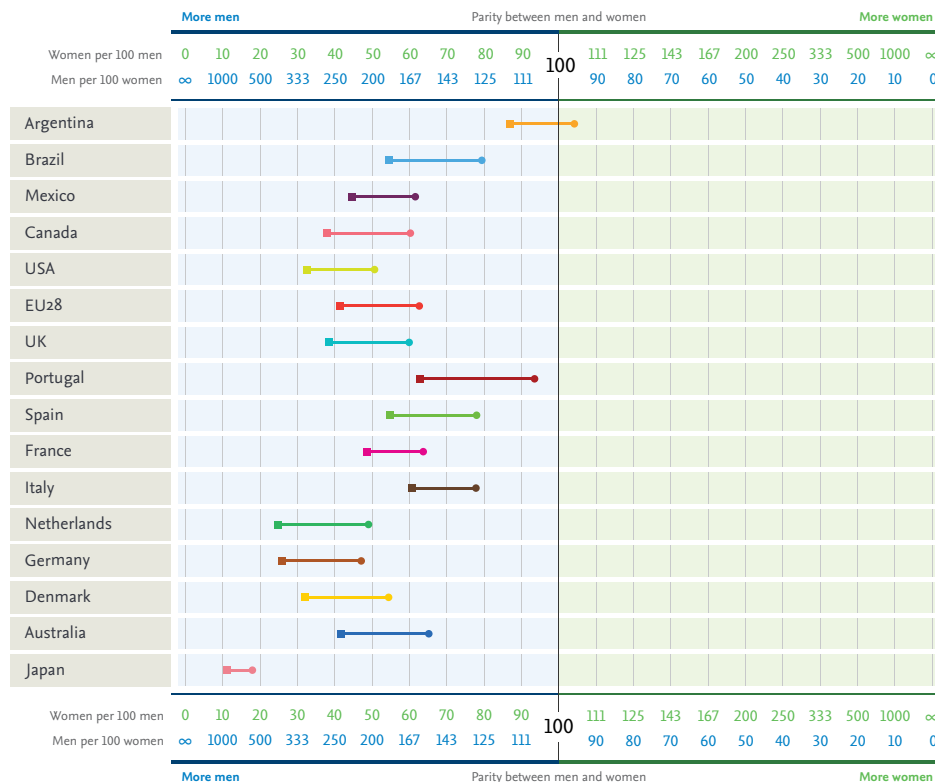


FIGURE 1.1 TAKEAWAY:

In all countries and the EU28, the ratio of women to men is closer to parity in the period 2014–2018 compared to 1999–2003.

HOW WE CONDUCTED THE AUTHOR-LEVEL ANALYSES

For each period analyzed, we defined active authors as those who authored at least two publications during the study period. To ensure that we did not exclude junior authors, we included any author who had their first publication during the period of 1999–2003 if they had at least one more publication in the five years after the first publication, and any author who had only one publication during 2014–2018. See the main report for more details.

Country-level gender statistics are greatly influenced by author and gender distribution across subject areas. Figure 1.3 shows that among active authors during the period 2014–2018, the lowest ratio of women to men was observed in the physical sciences. In many life sciences and health sciences subject areas, the median ratio among the countries analyzed was close to parity. Nursing was an exception among the health sciences, and psychology was the exception among the social sciences, in that women predominated. In Japan however, the ratio of women to men was low in all subject areas, including Nursing and Psychology.

See the main report for a full set of subject areas.

In the Fourth Basic Plan for Gender Equality,⁸ the Japanese government set discipline-based numerical targets for proportion of women in research. Specifically, they aimed to reach 30% in natural sciences overall, 20% in the sciences, 15% in engineering, 30% in agricultural sciences, and 30% in medicine, dentistry and pharmacology combined, by 2020. Our subject specific analysis for the period of 2014–2018 shows that the proportion of women researchers in Japan were 21.0% in agricultural sciences, 6.6% in engineering, 19.3% in medicine, 22.0% in dentistry, and 23.1% in pharmacology. While we did not have an overall category for the natural sciences, our results from biochemistry (20.8%), chemistry (14.9%), earth and planetary sciences (10.3%), and physics and astronomy (7.3%) show that there is still a long way to go to reach the numerical targets set by the Japanese government.

⁸ The Government of Japan. (2015). The Fourth Basic Plan for Gender Equality. Gender Equality Bureau Cabinet Office. Retrieved from: http://www.gender.go.jp/about_danjo/basic_plans/4th/index.html, Accessed June 4, 2020.

FIGURE 1.3

Physical sciences
Life sciences

Gender ratio among active authors during the period 2014–2018, disaggregated according to subject area.

KEY

- Argentina
- Brazil
- Mexico
- Canada
- USA
- EU28
- UK
- Portugal
- Spain
- France
- Italy
- Netherlands
- Germany
- Denmark
- Australia
- Japan

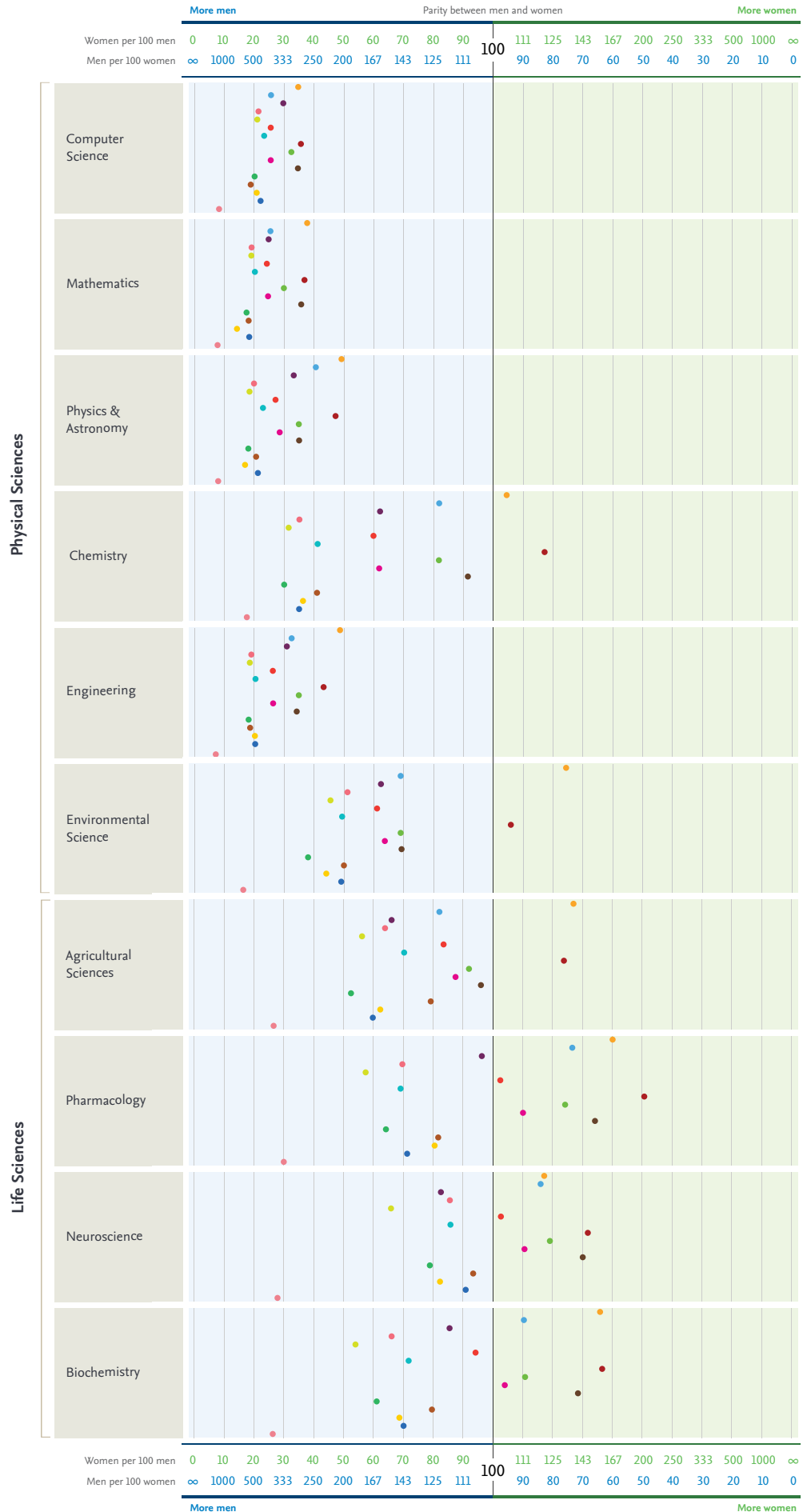


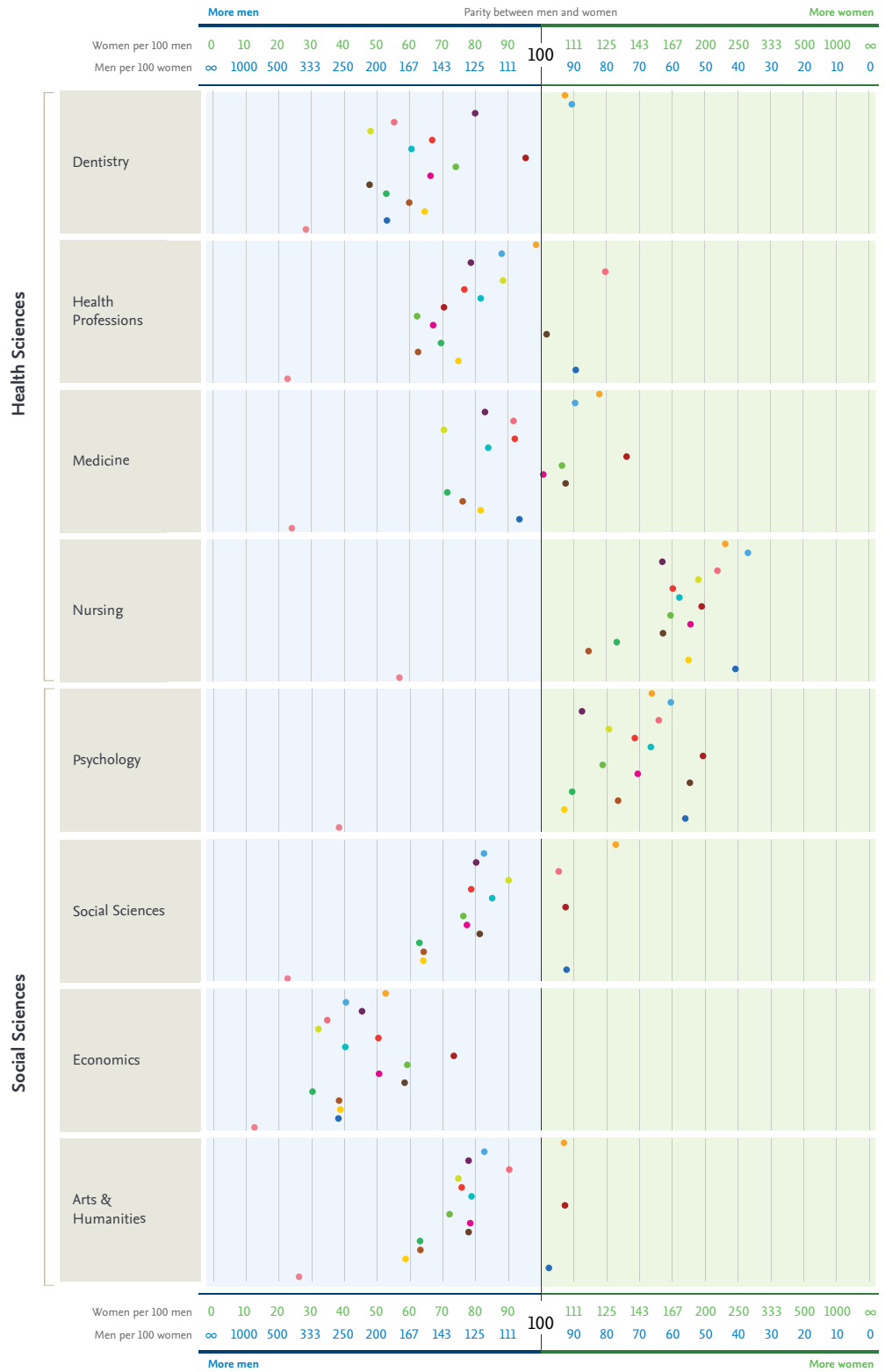
FIGURE 1.3 (CON'T)

Health sciences
Social sciences

Gender ratio among active authors during the period 2014–2018, disaggregated according to subject area.

KEY

- Argentina
- Brazil
- Mexico
- Canada
- USA
- EU28
- UK
- Portugal
- Spain
- France
- Italy
- Netherlands
- Germany
- Denmark
- Australia
- Japan



HOW WE DID THE SUBJECT-LEVEL ANALYSES

To examine how author gender distribution varies within research disciplines, we assigned gender ratios using the Scopus journal classification system, All Science Journal Classification (ASJC). Titles in Scopus are classified under four broad clusters (life, physical, health, and social sciences), which are further divided into 27 subject areas, which in turn are composed of more granular subcategories. Authors were counted towards a subject area if more than 30% of their publications during the period were published in a journal belonging to a category.

GRANT AWARDEES

Assessment of grant awardees provides insight into the gender composition of those who are successfully competing for research funding and contributing to funding agencies' research portfolios and missions. Many factors contribute to the composition of grant awardees, such as the available pool of individuals who are qualified to apply, or the quality of the application itself.

For reference, in Japan, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) reported that while overall acceptance rates for national grants were more or less equal for both genders, with 26.1% of grant applications by women and 24.6% of grant applications by men being accepted in 2018, actual number of grant applications by women are much lower than that of men. In 2018, women comprised only 20.2% of the overall number of applications, and 21.2% of overall accepted applications.⁹

For our analysis, we assessed the ratio of women to men among awardees during the period 2014-2018. Awardees in the report were limited to those for whom a Scopus author ID was available, and only countries with at least 5,000 awardees for whom a gender could be inferred were selected for analysis. Detailed methodology can be found in the full report.

We observed fewer women awardees than men in all countries included in this analysis (Figure 1.7). Canada had the highest representation of women among grantees, with 50 women per 100 men awarded a research grant, while Japan was the furthest from parity with 10 women per 100 men. All other countries and the EU28 in aggregate had a ratio between 25 to 45 women awardees per 100 men.

Our results should not be directly compared with those from the MEXT report due to the difference in methodology and scope; however, from both results we can see that women are awarded grants less frequently than men.

FIGURE 1.7

Gender ratio among research grant awardees receiving an award during the period 2014–2018 compared to author ratios among all active authors.

KEY

- Canada
- USA
- EU28
- UK
- Germany
- Australia
- Japan



Women researchers are awarded grants less frequently compared to men researchers.

⁹ Ministry of Education, Culture, Sports, Science and Technology, Research Promotion Bureau. (2019). 2018 Science Research Grants Allocation. Retrieved from: https://www.mext.go.jp/content/1414908_01.pdf Accessed June 4, 2020.

Research Footprint

Ensuring that the research workforce is diverse is an important first step towards ensuring diverse perspectives are reflected in and inform research. Here, we examine the outcomes of these research activities, which form a researcher's "footprint".

AUTHOR PUBLICATION OUTPUT

In this section, we assessed the average number of publications by women and men. We calculated the average number of publications for each gender by first counting the number of publications by each author and then determining the average across authors of the same gender.

It should be noted here that the methodology used in this report differs from our report released in 2017, *Gender in the Global Research Landscape*, for which we reported on the mean number of publications per author for men and women.

Our data show that, on average, women published less than men in a five-year period in every country assessed, regardless of authorship position (Fig 2.1). Men on average authored 1.5 times more publications than women in 11 of the 15 countries, including EU28. In Japan, men authored 1.8 times more publications than women.

Japan stood out for having the greatest difference in publication output among first, last, and corresponding authors. The average publication count for first author publications ranged from no difference in the Netherlands to 1.3 times more publications by men compared with women in Japan. The difference in publication output among those in last author position ranged from 1.1 times more on average by men than women in Argentina to 1.7 times more by men in Japan. For corresponding authors in Japan, men published 1.7 times more than women.

FIGURE 2.1

Ratio of the average number of publications by women to men and men to women, as shown. Data are based on average number of publications by active authors in the period 2014–2018 in each country, disaggregated according to author position.

- Argentina
- Brazil
- Mexico
- Canada
- USA
- EU28
- UK
- Portugal
- Spain
- France
- Italy
- Netherlands
- Germany
- Denmark
- Australia
- Japan



FIELD WEIGHTED CITATIONS IMPACT

Citations accrued by publications can provide insight into the scholarly impact of publications.

We used a field-weighted metric in which citation count is normalized to account for publication type, publication year, and subject area because these three variables greatly impact the accrual of citations by a publication. This metric is called the field weighted citation impact (FWCI).

Our analyses revealed that, among the countries studied, the average FWCI for men compared to women when assessing all authors, regardless of authorship position, was close to equivalent in all countries and the EU28, with a ratio of FWCI for men to women of 1.03 for all authors in Japan, and a median of 1.01 among countries studied (Figure 2.2).

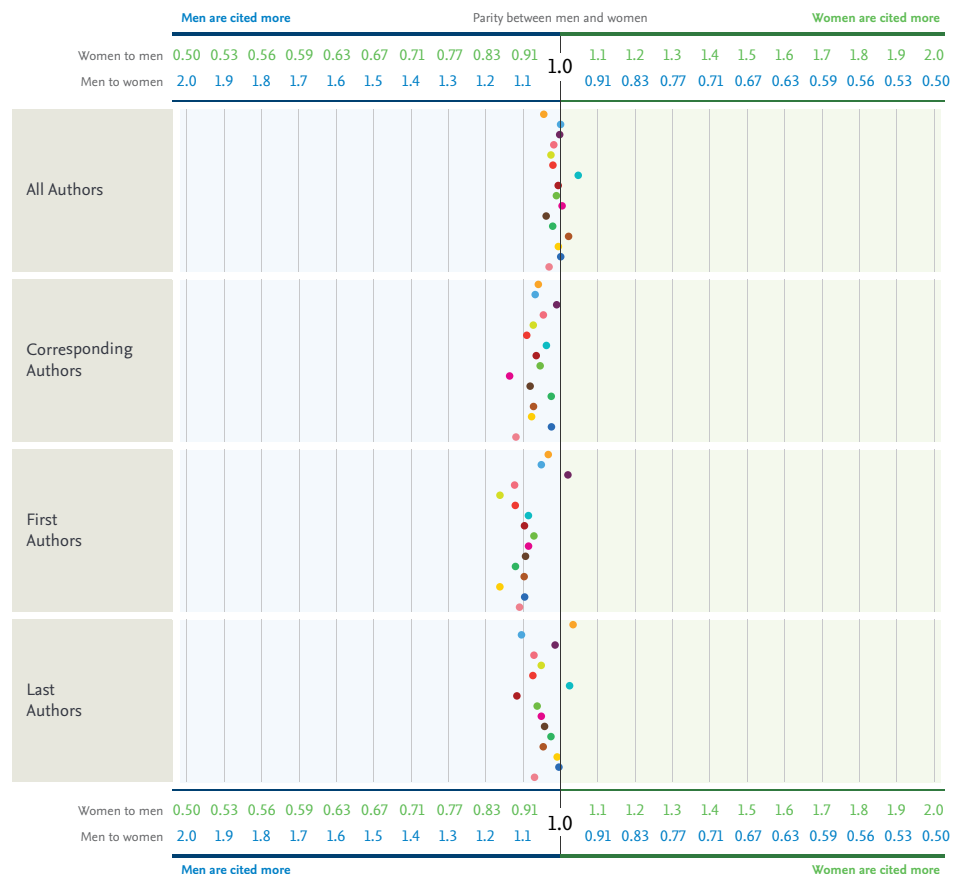
The difference between average FWCI among men and women was slightly higher when assessing last authors with a ratio of 1.07 in Japan and a median ratio of 1.05 among the countries studied. The trend among last authors was similar to that of corresponding authors (ratio of average FWCI of men to women of 1.12 in Japan with a median of 1.06 among countries). The greatest difference in average FWCI was observed among first authors. Among first authors, men's average FWCI was greater than women's by 1.1 times or more in 12 of the 15 countries studied along with the EU28. Together, this suggests that gender influences citation behavior on the basis of authorship position, particularly among first authors.

Overall, differences in FWCI of publications by men and women remained small.

FIGURE 2.2

Ratio of the average FWCI of publications by women to men and men to women, as shown. Data are based on publications by active authors during the period 2014–2018 in each country, disaggregated according to author position.

- Argentina
- Brazil
- Mexico
- Canada
- USA
- EU28
- UK
- Portugal
- Spain
- France
- Italy
- Netherlands
- Germany
- Denmark
- Australia
- Japan



Overall, differences in FWCI of publications by men and women remained small.

NUMBER OF PATENT APPLICATIONS

Patenting allows individuals to turn their research into practical applications with potential for commercial value and societal impact. Various factors can influence whether individuals apply for patents. In addition to having an invention that is suitable for patenting, individuals are more likely to apply for a patent if they have support throughout the patenting process.

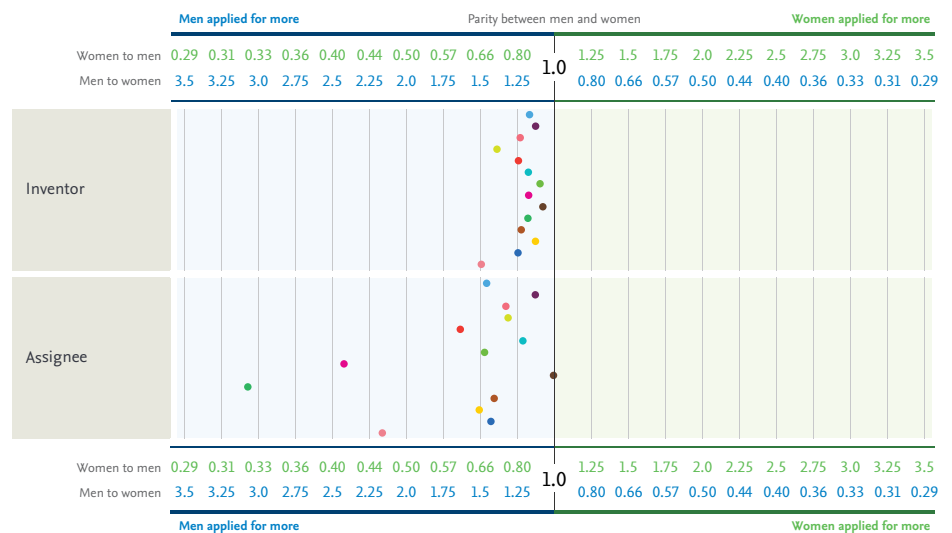
We analyzed data from the United States Patent and Trade Office (USPTO) and European Patent Office (EPO). We found that during the period 2012-2016, women inventors and assignees appearing on EPO and USPTO patent applications were contributors on fewer patent applications than men on average in every country and the EU28 (Figure 2.4).

Among inventors, the average number of patents for which men applied ranged from 1.1 times more than women (in Italy, Spain, and Denmark) to 1.5 times more than women (in Japan). Among the countries studied, the median ratio of the average number of patent applications by men compared to that of women was 1.2. The trend for assignees was slightly higher, with a median ratio of 1.4 among the countries studied. Italy was at the lowest end, with no difference in the average number of patent applications by men and women assignees. The greatest difference in the average number of patent applications by men compared to women assignees was seen for the Netherlands (on average, men applied for 3.1 times more patents than women). Along with the Netherlands, France and Japan were far above the median, with men assignees in these countries applying for 2.4 and 2.1 times more patents, respectively, than women.

FIGURE 2.4

Ratio of the average number of patent applications by women to men and men to women in each country during the period 2014–2018.

- Brazil
- Mexico
- Canada
- USA
- EU28
- UK
- Spain
- France
- Italy
- Netherlands
- Germany
- Denmark
- Australia
- Japan



Among inventors, men tend to apply for more patents than women. This difference is greater among assignees.

Researcher Perspectives

To understand perceptions and attitudes of researchers about the role of gender in academia, an online survey was sent to researchers working in various subject areas and geographic regions. To get a better understanding of these varying viewpoints, we then interviewed 25 researchers who had provided open-ended responses in the online survey. Based on these survey results, we defined eight clusters of survey answers related to points of view on gender, such as the importance of gender balance, the fairness of academic systems, and the impact of family on researcher’s careers (fig 5.2). Detailed methodology can be found in the full report.

The survey revealed differences in the perception of gender issues reported by men and women. When asked about the importance of gender diversity in the research workplace (Fig. 5.3), most women (90%) and most men (62%) answered that it was extremely or very important. Further interviews however revealed that viewpoints varied, with some recognizing the importance of gender balance, some who were not concerned, and others who thought there was too much attention given to the matter.

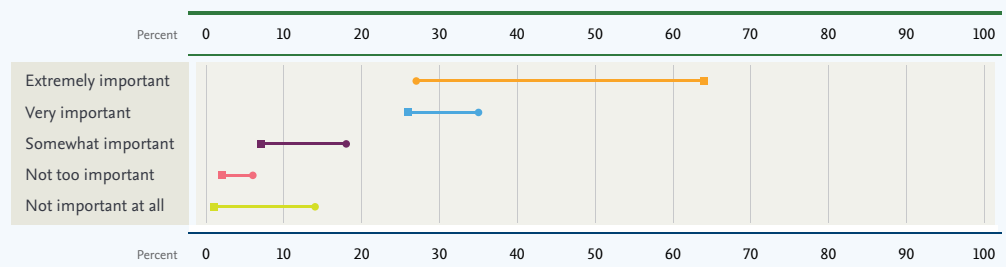
When asked about the impact of family on researchers, most agreed that family obligations negatively affected women’s research careers, and 45% of women researchers felt that balancing their personal life with their career is one of the biggest barriers to their career progression.

In Japan, results from two surveys conducted by Science Council Japan’s Committee for Scientific Community’s sub-committee on Gender Equality, and the OPENeD National Diversity Network in 2019, showed that most women (95.8%) and most men (87.6%) agreed or somewhat agreed on the importance of promoting gender balance in the research workplace. Furthermore, the survey revealed that while nearly 30% of women respondents had taken parental leave compared to only 4.6% of men, both women and men agreed that taking an extended or frequent leave of absence made them feel concerned or guilty.¹⁰ More women (44.8%) than men (18.4%) agreed or somewhat agreed that they felt like they could not take on a position with further responsibilities due to their household responsibilities, and 38.2% of women responded that they feel burdened by their household, childcare, or elderly care responsibilities, compared to 18.3% of men respondents.¹¹

FIGURE 5.3

Responses to the survey question, “How important is it to have gender diversity in the research workplace?”

■ Women
● Men

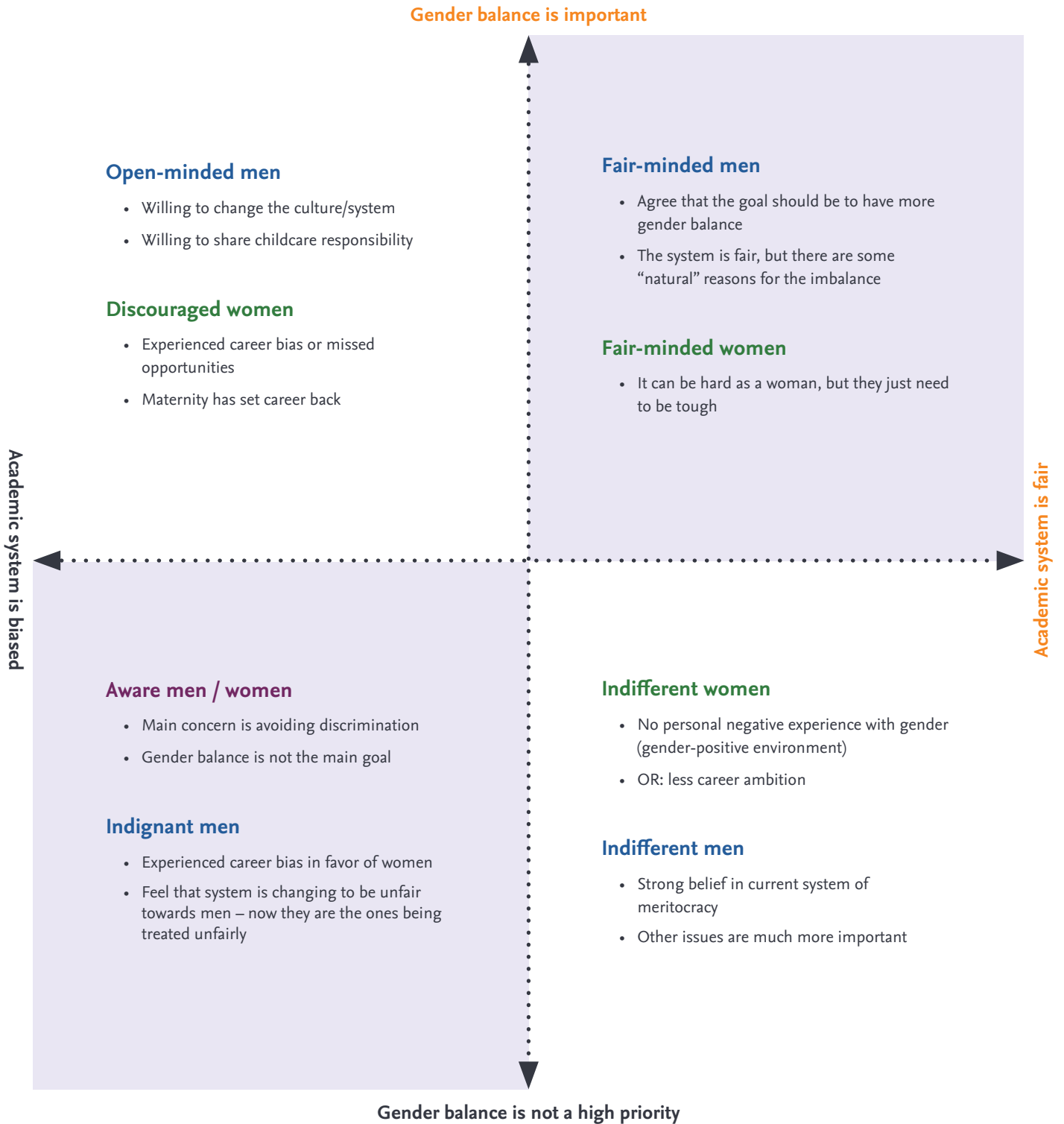


¹⁰ O-Progressive Initiatives of Empowering Network for Diversity (OPENeD Network) and Science Council Japan. (2020). 研究に関する男女共同参画・ダイバーシティの推進状況に関するアンケート調査 (その1) 大学・研究機関における男女共同参画の推進状況に対する意見・感想. Retrieved from: https://www.opened.network/user/wp-content/uploads/2020/05/survey2_gender.pdf. Accessed June 4, 2020.

¹¹ O-Progressive Initiatives of Empowering Network for Diversity (OPENeD Network) and Science Council Japan. (2020). 研究に関する男女共同参画・ダイバーシティの推進状況に関するアンケート調査 (その2) 研究環境に関する意見・感想. Retrieved from: https://www.opened.network/user/wp-content/uploads/2020/05/survey2_gender.pdf. Accessed June 4, 2020.

FIGURE 5.2

Overview of the eight clusters of different points of view on based on the survey results, aligned along the two main parameters evaluated.



Miyoko O. Watanabe, PhD

Executive Director and Director, Office for Diversity and Inclusiveness,
Japan Science and Technology Agency (JST)

How would you describe the current state of gender diversity in research, compared with 5 years ago, and its impact on research and/or researchers globally and/or in your region in particular?

In Japan, the ratio of women to men researchers is continuously increasing, but it is happening very slowly. The government set a target to increase the share of women researchers to 30% by 2020, but by 2019 we had only achieved 16.6%. I believe the pace of change has been so slow because decisions are made by consensus after extensive discussion between multiple stakeholders, rather than by a few decision-makers. While there are advantages to consensus-based decision making, it has slowed the progress towards achieving gender equality in Japan. I should also say that Japanese people are also perfectionists: they may avoid addressing something that they cannot perfect. Perhaps it is time for us to focus on issues that really require attention, even if we cannot achieve perfection.

Are there initiatives, policies, or interventions that have emerged within your region and/or field in the last 3-5 years that you feel have impacted progress and should be monitored to assess impact?

We hosted the Gender Summit in Tokyo in 2017, and it turned out to be a good opportunity for Japan to think about gender equality and initiate change. At the Summit, we presented encouraging data from the Development Bank of Japan showing that the economic value of patents from gender-mixed teams was higher than that of patents from male-only teams. These data were re-analyzed last year, and confirmed that the economic value of patents from gender-mixed teams was 54% higher. Data like this—that describes the economic impact of women's contributions to research—is particularly impressive and effective at changing minds and policy in Japan.

By comparison, data on the ratio of women to men researchers or how slowly it is changing is almost too simple because it does not give us answers about why or how to change it. Japanese researchers want to know about how we got here, not just the result. Our objective in gender equality is not really to achieve a 50:50 ratio, but for everyone to receive equal opportunity and create a society that is inclusive of all kinds of people.

What value do data and an evidence-base offer as tools to policymakers and institutional leaders to address issues of gender diversity and equality?

In the past, we did not have a lot of data.

Decisions were made based on people's experiences. Today, data gives us the opportunity to change our decision-making process from something driven by experience and opinion to something that is truly evidence-based. There is a generational component to making this shift—younger people are much more data-literate and are able to use and analyze data more effectively than older people who tend to make decisions based on their experience.

What information or insight from the report do you find particularly interesting and important for policymakers and institutional leaders to consider in relation to your region or specific subject areas?

The qualitative analysis is quite interesting.

For example, most researchers said that there are more women in research now compared to 10 years ago, which is consistent with my thoughts. I am slightly anxious, however, about the consequences for young men and boys entering careers in research. Among young researchers right now, it appears easier for young women to get permanent jobs, because many people, managers, and societies want to see an increase in women's participation in research. The emphasis really needs to be on inclusion and opportunity for everyone, regardless of gender.

Gender equality is not an isolated problem—it is related to age, race, ability, culture, sexuality, and geography, among other factors.

My opinion is framed by the fact that Japan will soon experience a drastic depopulation, and many other countries will follow. Considering China's massive population, depopulation in China will have a global effect. In a growing society, efficiency is very important, and the individual is less valued. However, in a shrinking society, there is opportunity for everyone to have a place and contribute.

In the report there are trends identified from scientific publications, which are confirmed for both awarded grants and even more so when analyzing patents. What does this say about the gender innovation gap?

I think there is a huge innovation gap in Japan.

Traditionally, men were considered to be the innovators, the inventors. But there are many new ventures in Japan now, and you can really see the difference between those founded by men and women. I get the impression that men founders are interested in industries separated from our daily life, whereas women founders are more interested in new industries connected to our daily lives. Businesses founded by men often achieve a net positive value on a shorter timescale and raise more capital, but the companies have a higher failure rate. On the other hand, businesses founded women might take longer to achieve a net positive value, but once they do, they are successful for a longer time. Both types of businesses are important, so we should continue to promote both men and women.

With regard to funding, I recently analyzed data on venture capital in the US for the World Science Forum. Over 90% of decision-makers at top venture capital firms are men. If you look at how venture capital firms make investments, 85% of their investments go to start-ups founded by men, while 13% go to mixed-gender teams, and only 2% go to women founders. This is consistent with the report's findings that men select and support other men.

I am also on the World Science Forum organizing committee, which decides on candidates for plenary speakers. The committee is 64% female. The steering committee, which decides on the actual speakers, is 35% female. The final ratio of plenary speakers at this year's World Science Forum was 53% female. So, from this example, it is clear that when women and men work together, they select both women and men and together achieve gender balance in the group.

Thinking about the future of gender diversity and equity in research globally, where do you think we'll be in 10 years' time and what organizational and or cultural issues do you think will influence change most significantly?

I always say that gender equality is not an isolated problem—it is related to age, race, ability, culture, sexuality, and geography, among other factors. If we only talk about gender equality, we lose sight of these connections. We should be promoting gender equality in the context of these other factors, with a focus on diversity, not just gender.

In addition, I feel that many senior men are simply unaware of women's talent in Japan. This year we launched the 1st Brilliant Female Researchers Award (Jun Ashida Award) for excellent women researchers and institutions promoting women in science. We always wondered why we didn't have many women researchers applying for funding, but for this award, we had over 100 applicants. Many of us were unaware of these talented women prior to launching this award. We need to continue creating platforms to support and promote women.

Conclusion

Overall, our analysis revealed that while there has been definite progress towards gender parity in all countries, there is still room for improvement in many areas. For example, our analysis revealed incremental improvements in women's representation among researchers in all countries, however, men researchers still outnumber women researchers in most countries including Japan. Men researchers also publish more than women on average, however, we observed little difference in citation impact between women and men researchers, suggesting that gender does not have a bearing on the perceived quality of publications.

Our qualitative research survey and interviews demonstrated great diversity in perceptions and attitudes of gender in research. According to our research survey, as well as some local survey results, most women and men believe that gender diversity in the research workplace is important.

These results may signify an opportunity for the Japanese science community to think further about how to make significant progress towards gender equality in science, as well as inclusion and diversity overall.

Finally, as mentioned in the introduction, we are still in the midst of a global pandemic. At Elsevier, we are committed to gender and diversity and hope to make progress in various ways. In particular, we recently launched a large-scale study to investigate the impact of COVID-19 lockdowns on women authors and reviewers in Elsevier journals. We hope that this new study, along with our gender report, will provide useful insights and drive action towards gender diversity in the research community.

Authors and Contributors

Adaptation

Yuhri Ishizaki, Global Strategic Networks Associate APAC, Global Strategic Networks, Elsevier

Review and comments

Sarah Huggett, MA, Head of Analytical Services APAC, Analytical Services, Elsevier

Anders Karlsson, PhD, Vice President, Academic Relations (Japan APAC), Global Strategic Networks, Elsevier

Ryo Sato, MEng, Analyst, Analytical Services, Elsevier

Subject Matter Expert

Miyoko O. Watanabe, PhD, Executive Director and Director, Office for Diversity and Inclusiveness, Japan Science and Technology Agency (JST)- Interviewee

