Advancing Gender Equity in STEM Structural Barriers, Epistemic Bias, and Policy Interventions in Korea

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https://www.gister.re.kr/front/user/main.do

https://www.youtube.com/@gister9795

Gendered Innovations in STEM is a process of creating new value by integrating SGBA into research

About GISTeR

Center for Gendered Innovations in Science and Technology Research was founded in 2021 with the approval of Ministry of Science & ICT

Vision

Transformative future: Equitable STEMM advancements for all by GIs

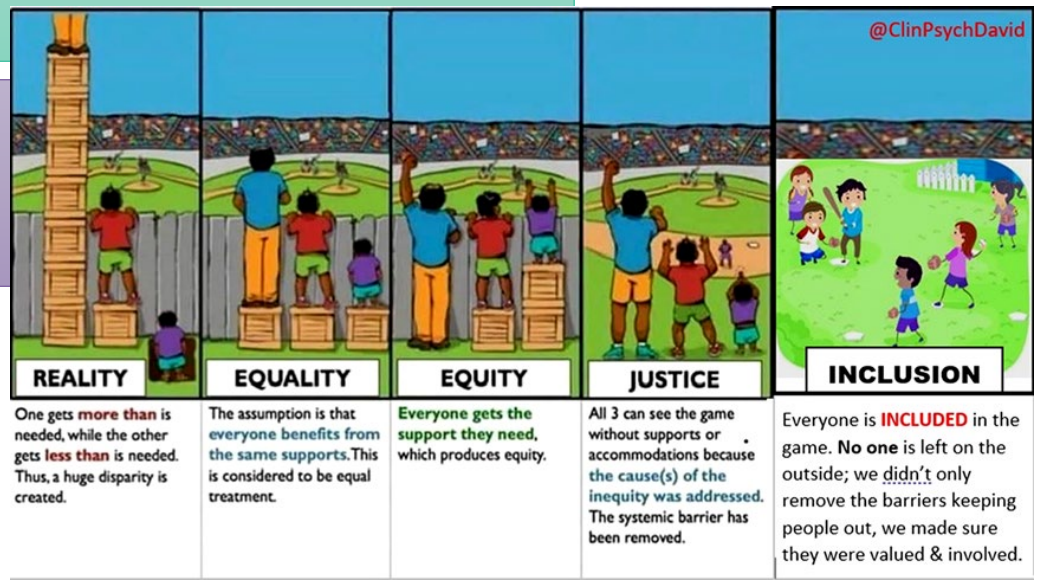
Mission

Advance Inclusive & Equitable R&I in STEMM by Fostering GIs

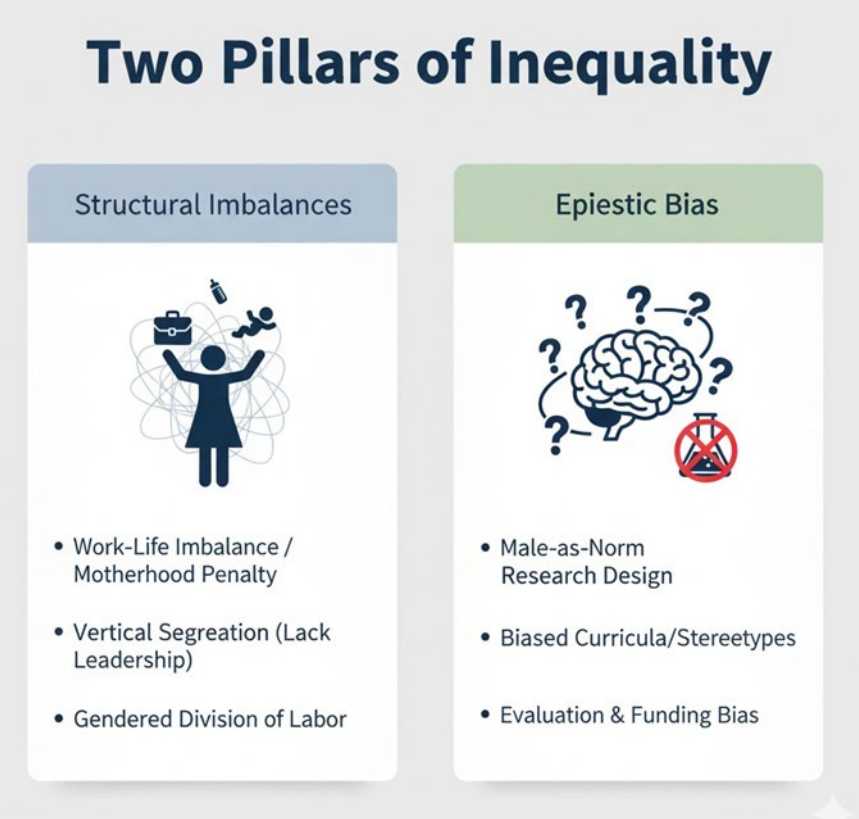
Core Values

- Gendered Innovation Policy Leadership
- Strengthening Capacity and Awareness on GI
- Inclusivity, Diversity and Equity via GI
- Global Collaboration and Partnership
- Research Excellency by integrating SGA
- Education & Empowerment for GI
- Accountability and Impact
- Sustainability with Collaboration

Contents



Dual Challenges: Imbalances and Epistemic Bias



1. Structural Imbalances: The Work-Life Collision

Challenge A: Vertical Segregation- Few women reach leadership

Challenge B: The Penalty of Parenthood- Inadequate institutional support for balancing family and career

2. Epistemic Bias: Bias in Knowledge Production

Definition: Bias embedded within the research process, curricula, and institutional culture itself.

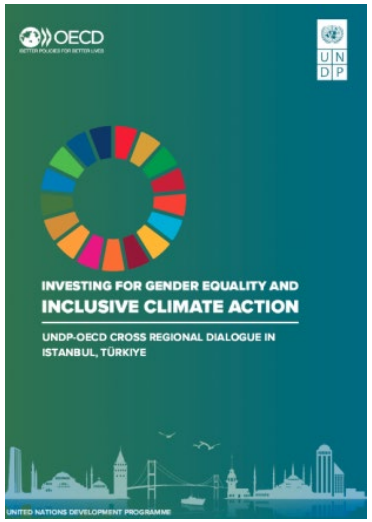
Examples: Research Design, Curriculum/Textbooks, Evaluation Bias to promote SGIR (Sex and Gender Integrated Research)

Key Argument: Fixing the numbers won't fix the science unless epistemic biases are addressed. However, these two gender issues are interrelated closely.

The Cost of Bias: Solving Complex Global Problems

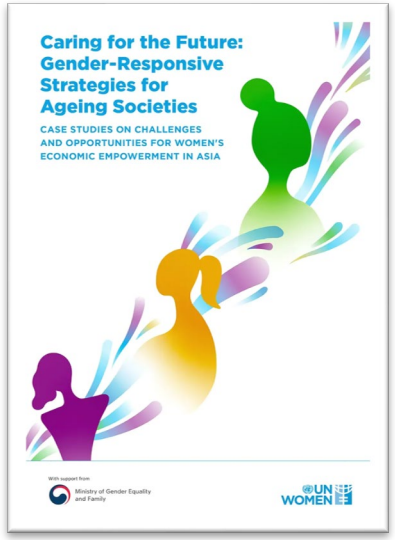
Gender Diversity in STEM is an imperative for global innovation, competitiveness, and addressing complex social problems:

Ex.1. Climate change



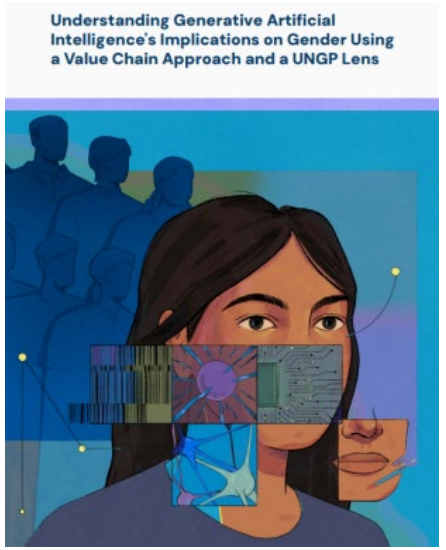
https://www.undp.org/eurasia/publications/investing-gender-equality-and-inclusive-climate-action

Ex.2. Aging



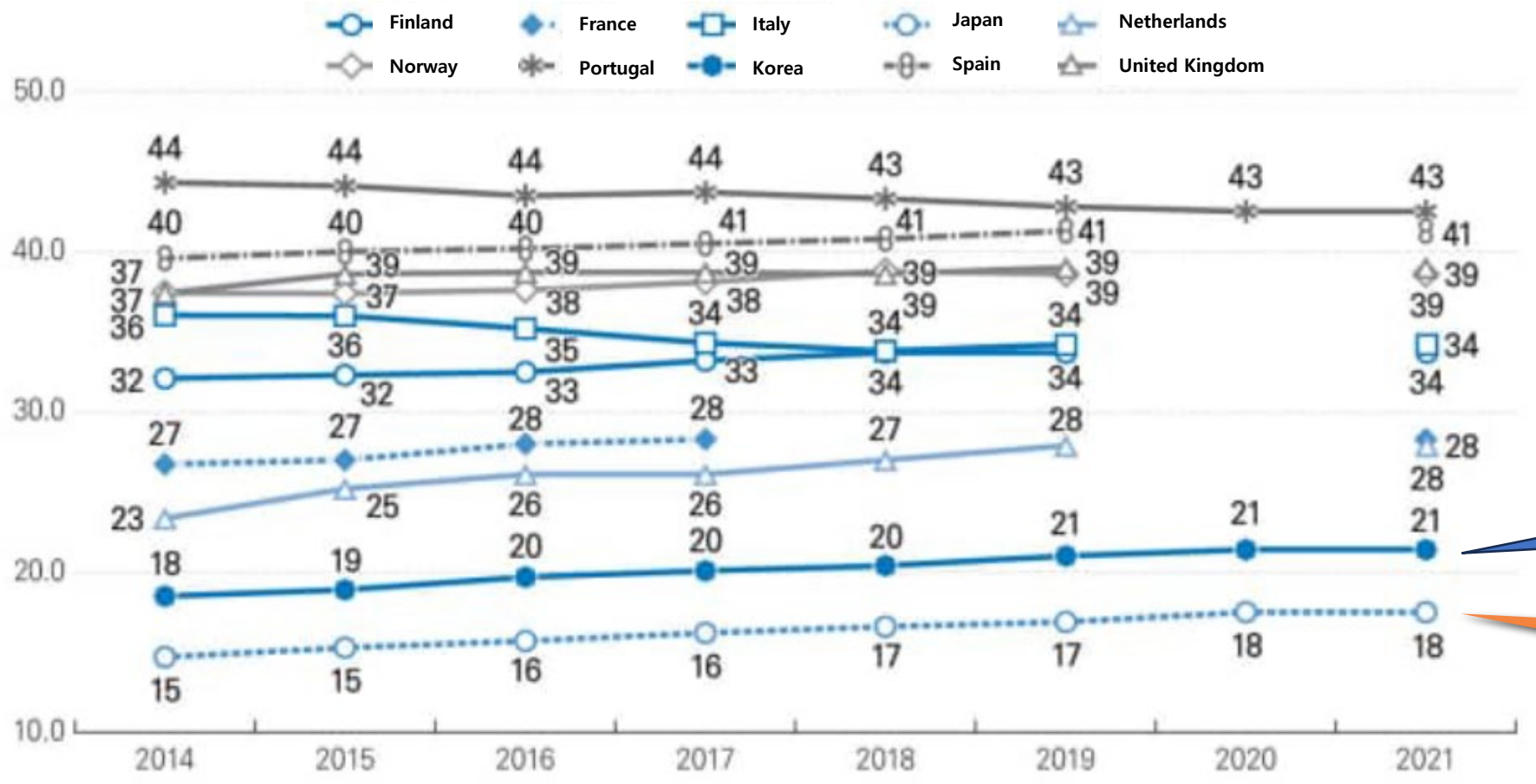
https://asiapacific.unwomen.org/en/digital-library/publications/2025/03/caring-for-the-future

Ex.3. Agentic AI



https://www.undp.org/india/publications/understanding-generative-ais-implications-gender-using-value-chain-approach-and-ungp-lens

Gender Gap in STEM: A Persistent Challenge for Korea and Japan



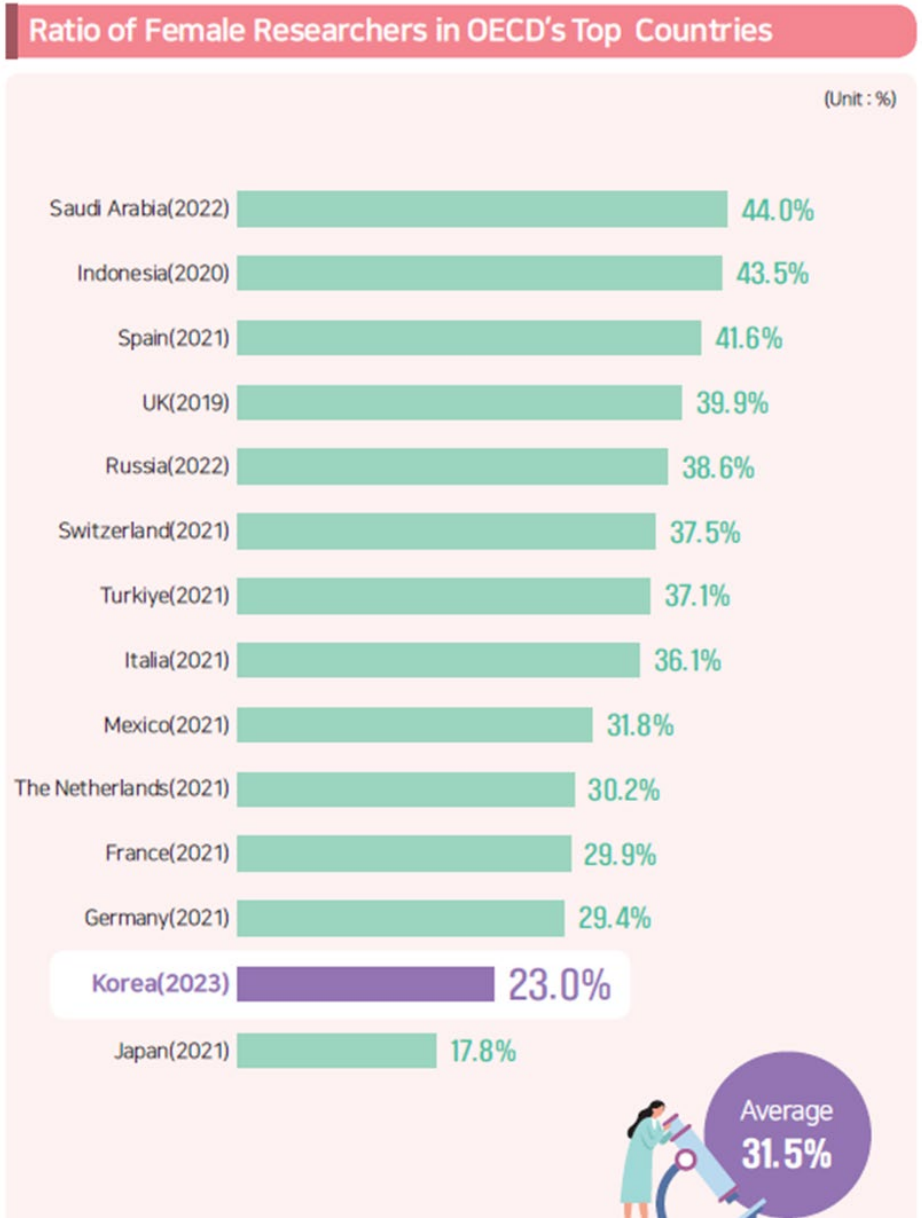
Analysis Report on the Statistics of Development and Utilization of Women and Men in STEM p. 195

Korea

Japan

https://www.wiset.or.kr/prog/pblcte/kor/sub02_03_01/rptpAll/view.do?pageIndex=2&seNo=rptpAll&pblcteNo=897

Gender Gap in STEM in OECD's Top Countries (2023)



Percentage of Female R&D Personnel in Korea in **1997 was 9.7%**

Note 1) Base year: 2022 or the latest / Counting target: researchers / Counting method: headcount
2) In the case of the US, China, India, Brazil, Canada, and Australia, the data were not registered in the OECD data base and were excluded from analysis.
3) In the case of R&D activity survey (Ministry of Science and ICT, KISTEP), the current status of workforce in all fields, including STEM and medicine & pharmacy, social sciences, humanities, and arts, is surveyed based on participants (researchers) regardless of employment type, in accordance with the OECD R&D activity survey implementation guidelines.

» In 2023, female researchers in Korea make up 23.0%, below the world average of 31.5% and ranking low alongside Japan.

Note. Researchers are based on HC and full-time equivalents (FTE).
Original Data: Female researchers as a percentage of total researchers(in headcounts) (UIS Estimation, 2024.10.24))
Source: Korea Foundation for Women in Science, Engineering and Technology(WISET) (2024),
Analysis Report on the Statistics of Development and Utilization of Women and Men in STEM in 2023

Source: Korea Foundation for Women in Science, Engineering and Technology (WISET) and the Analysis Report on the Statistics of Development and Utilization of Women and Men in STEM in 2023.

Advancing Scientific Excellence: The Global Push for Epistemic Fairness

SGIR is for better science and health equity.

2003

European Commission policy to consider sex and gender in research projects

2011

Gender Summit Global platform established.
GS AP held in 2015 at Seoul, and 2017 in Tokyo

2022

The UK MRC required both male and female animals to be used in experiments

1993

The US NIH established guidelines on including women and minorities in clinical trials

2010

Canadian Institutes for Health Research adopted policies to improve integration of sex and gender in their research

2016

US NIH Mandates integration of Sex as a Biological Variable (SABV) in Research proposal for NIH Funding

2025

US FDA removed draft guidance on improving clinical trial diversity and funding for the HHS's Women's Health Initiative is uncertain

Advancing Scientific Excellence: Academic Accountability and Tensions

- SAGER Guidelins
- Journals by Nature Springer, Elsevier & more recommend(or require) sex and gender integration to authors.

March 14, 2024

EDITORIAL | 01 May 2024

Why it's essential to study sex and gender, even as tensions rise

Some scholars are reluctant to research sex and gender out of fear that their studies will be misused. In a series of specially commissioned articles, *Nature* encourages scientists to engage.

In 2023, students protested against a new policy in Texas, where parents would be notified if their child asks to be identified as transgender. Credit: Brett Coomer/Houston Chronicle/Getty

- There are strong recommendations from J. editors that integrating gender dimension can enhance scientific excellence, but tensions also rise.
- Some scholars are reluctant to incorporate SGIR into their research out of fear that their studies will be misused.
- Some scientists have been warned off studying sex differences by colleagues.
- Others, who are already working on sex or gender-related topics, are hesitant to publish their views.
- Such a climate of fear and reticence serves no one. To find a way forward we need more knowledge, not less.

A Brief History of Promoting Gender Equality in STEM in Korea

2002

Enactment of the Act on Fostering and Supporting Women in STEM

1st outreach program WISE for girls into STEM launched

2003

Center for WIST established to support women in STEM

2004

1st Master plan for women in STEM established

1st Publication of Statistics on Women in R&D

2011

WISET established by uniting 4W programs affiliated at EWU

Mentoring program

2013

WISET Establishment of a public interest foundation

Support Career interrupted women in STEM

2017 ~ 2020

WISET Classified under "Other Types of Public Institution" under the Ministry of Science and ICT

Secured stable financial support from the government

2021

WISET become Korea Foundation for Women In Science, Engineering and Technology (WISET)

Establishment of a policy research center (2021.06)

Launch of W Bridge, a platform for women in STEM (2021.03)

Legal Framework and policy Foundation for Women in STEM in Korea

➢ The Foundational Legal Framework: The Act on Fostering and Supporting Women Scientists and Technicians (Enacted in 2002)

- **This is Korea's superordinate law**, serving as the primary legal basis for all policies promoting women in STEM.
- It was enacted to **empower women in STEM** and directly contribute to **national science and technology development.**
- **Impact**: Provides a strong, overarching legal foundation for women's advancement and gender equity in Korea's scientific and technological sectors.

➢ The National Mater Plan: Master Plan for Fostering and Supporting Women in STEM (First established 2004):

- This national-level plan sets mid- and long-term policy goals and strategic directions for supporting women in STEM.
- It is updated every five years to adapt to evolving needs and challenges.
- Impact: Ensures a systematic, comprehensive approach to implementing various support programs across the nation, translating the legal framework into actionable strategies.

WISET's Strategic Role in Fostering Women in STEM

WISET Korea Foundation for Women In Science, Engineering and Technology

WISET's Mission and Mandate:

- **Purpose:** WISET's establishment is mandated by Korean law to contribute to the national advancement of science and technology by facilitating supporting programs and improving the relevant systems and environment for women in STEM.

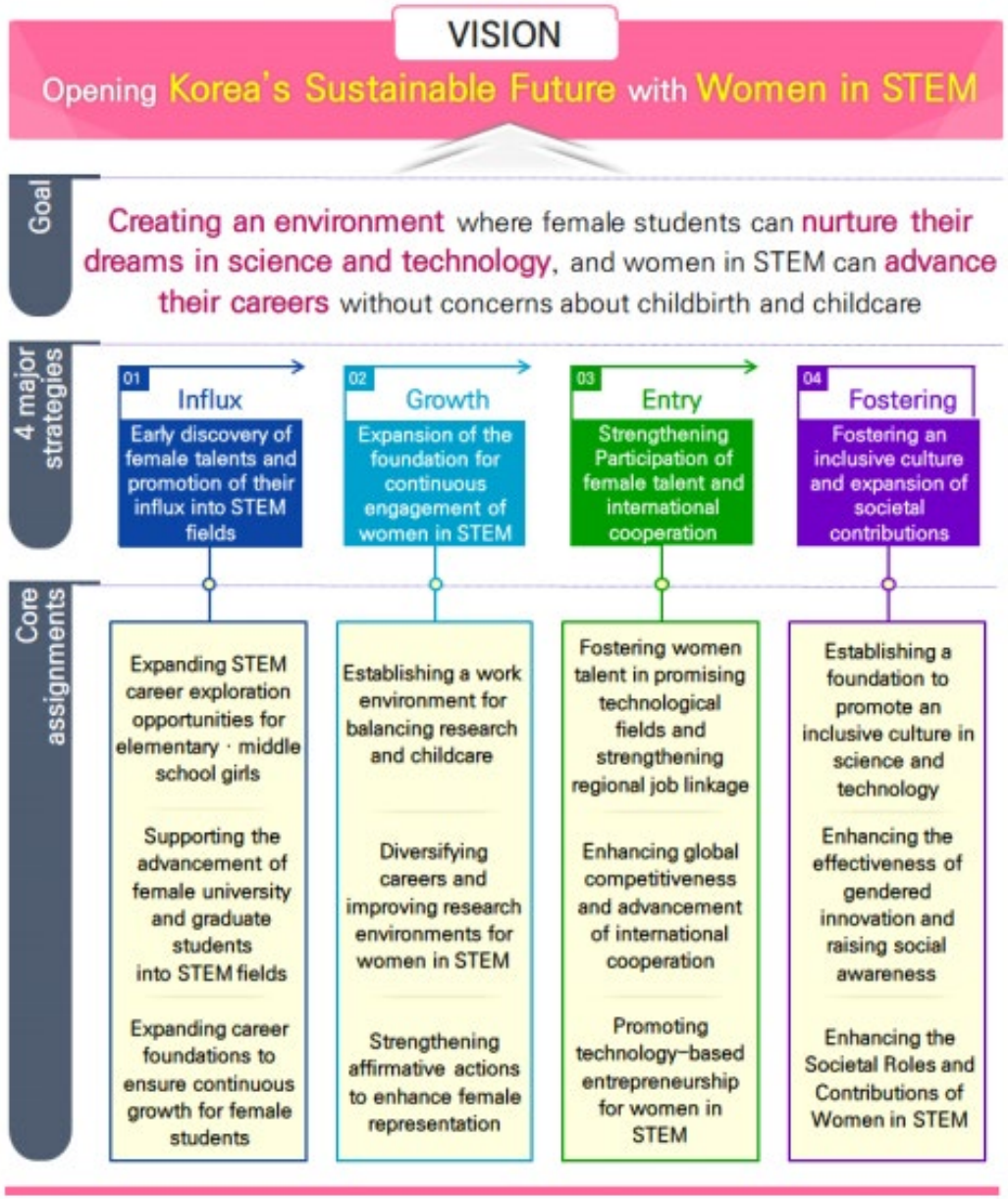
- **Legal Grounds:** Its operation is anchored in two key statutes: the Civil Act and the Act on Fostering and Supporting Women Scientists and Technicians.

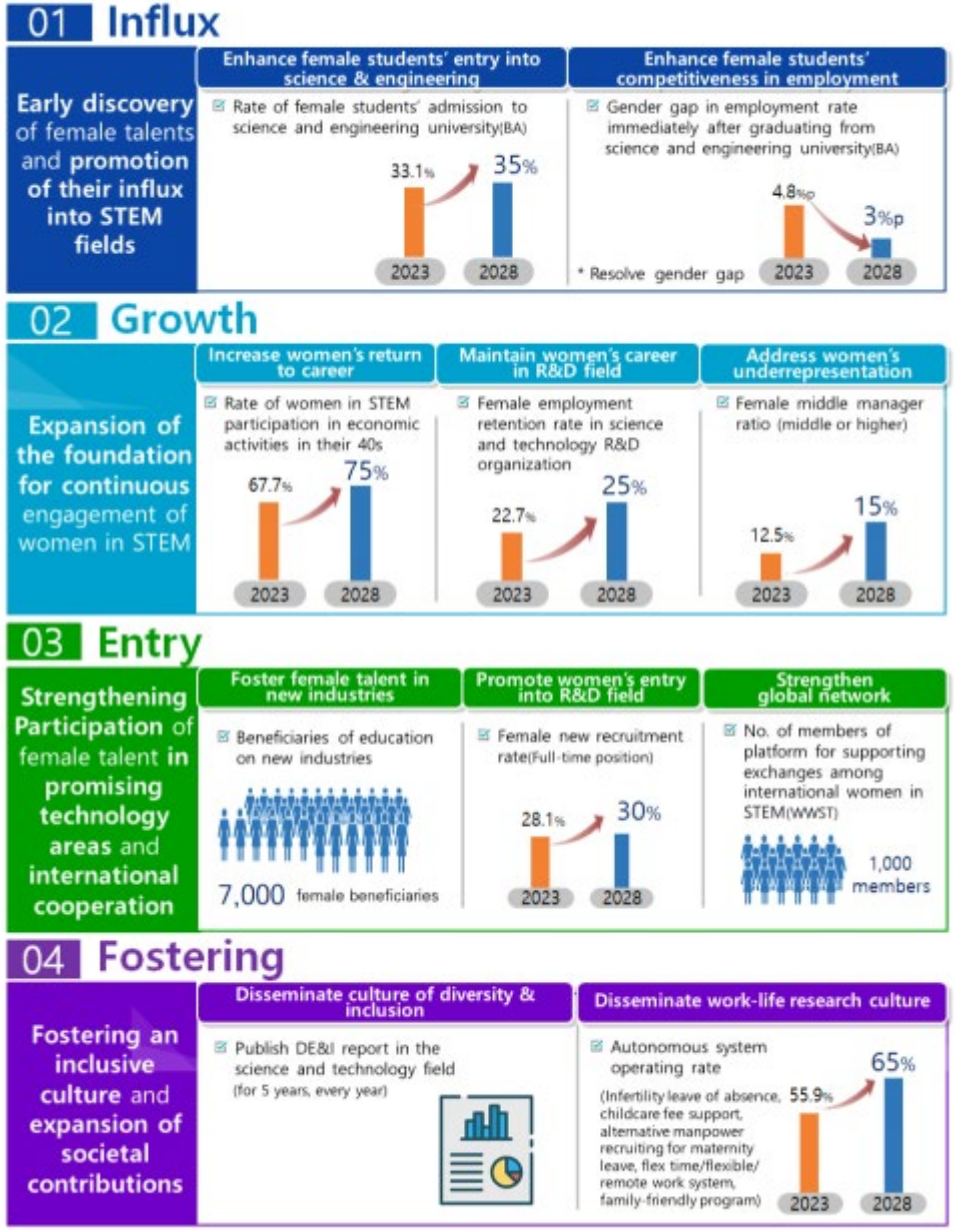
https://www.wiset.or.kr/eng/sub01_01_01.do

Mid-to-Long Term Development Strategy:

- **WISET's strategy** moves beyond just increasing numbers to foster global female leaders and create an ecosystem for the sustainable growth of women in STEM.
- **Strategic Goals** focus on harnessing female talent for the Fourth Industrial Revolution and building mutual respect/ethical management within the labor environment.
- **Implementation Goals** are comprehensive, covering the entire career lifecycle from attracting female students to STEM and promoting career growth to establishing work-family balance systems and strengthening ethical standards.
- This demonstrates that Korea's institutional response is a holistic strategy that tackles systemic, cultural, and individual career barriers.

5th Mater plan for fostering and supporting women in STEM (2024-2028)





※ The years 2023 and 2028 are survey points, and the results reflect the status of the

4th and 3rd Mater plans for fostering and supporting women in STEM

4th Mater Plan(2019-2023)

Vision

Society in which creative competencies and the potential value of women in STEM are realized

Goals

Achieve qualitative growth of women in STEM and gender equality in the fields of science and technology

Promotion of influx and growth	Expansion of activities and participation	Innovation of system and culture
• Influx of female students into engineering (25% (2017) -> 30% (2023))	• Female jobs in the fields of STEM R&D (16% (2017) -> 30% (2023))	• Introduction of the female position target system (9.5% (2017)->20% (2023))
• Output of female talents going into new industries 3,000 (30%)	• Percentage of women in STEM in their 40s participating in economic activities (60.8% (2017) -> 70% (2023))	• Establishment of an activity ecosystem index for women in STEM (index for fostering, utilization, and infrastructure)
• Employment rate of female STEM students (62.2% (2016) -> 70% (2023))	• Strengthened participation of female members in all stages of R&D	• Institutionalization of gendered innovation in R&D

Implementation strategy	Core implementation agendas
1. Promote influx and growth of STEM workforce in strategic areas	1. Encourage becoming the women in STEM of the future 2. Reinforce fostering of women in STEM in promising new industries
2. Enhance innovation and global competencies	1. Expand support for R&D activities by female researchers 2. Support technology-based startups by women in STEM 3. Enhance global competitiveness of women in STEM
3. Facilitate retention and progression through the entire career path	1. Promote development and diversification of careers for women in STEM 2. Establish an environment for work-life balance and increase the number of quality jobs 3. Set up a career ladder for women in STEM to become leaders
4. Establish a gendered innovation system	1. Extend research and raise awareness in creative gendered innovation 2. Expand the foundation for vitalization of gendered innovation in national R&D projects

3rd Mater Plan(2014-2018)

Vision

A creative economy and science & technology led together by both gender

Goals

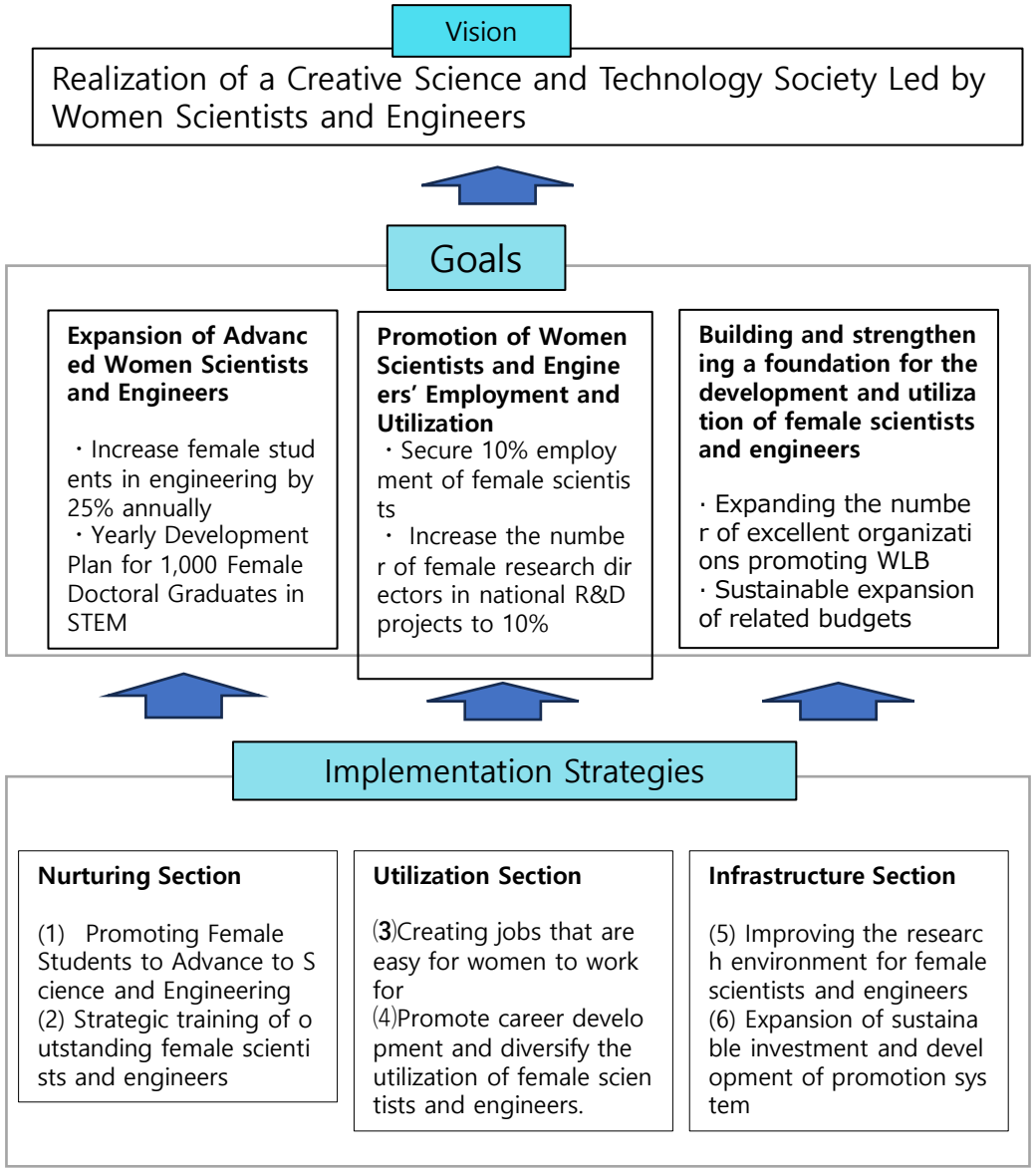
Capability Challenge	Balance	Diversity
• 60% employment rate of female science and engineering students • 15% of female science and technology researchers are in charge of research	· 20% of female employers in science and technology R&D · The long-term economic activity rate of female scientists and engineers in their 40s is 60%	· Female Head of Science and Technology: 10% · Development and adaptation of guidelines for R&D gender analysis

Five Strategies & Eleven Policy Tasks

1. Securing and Utilizing Excellent Female Human Resources	· Presentation of career visions in the field of science and technology for female students · Strengthening the advancement of female science and engineering students into research and industry
2.Enhance Global Competitiveness	· Strengthening the capacity of female science and technology personnel and expanding R&D participation · Strengthening the global network of female science and technology
3. Expansion of comfortable workplaces	· Increase employment opportunities for female scientists and engineers · Promotion of female scientists and engineers to start-up
4.Improve Quality of Life	· Enhance work-life balance policies · Provide better support systems for career continuity
5.Create Gender-Inclusive Science & Technology Culture	· Expanding Female Leaders · Diffusion of understanding of gender characteristics · Establish diversity standards and monitoring systems

2nd and 1st Mater plans for fostering and supporting women in STEM

2nd Mater Plan(2009-2013)



1st Mater Plan(2004-2008)

The overarching goal is to **establish and efficiently implement the "Act on Fostering and Supporting Women Scientists and Technicians"** to increase their presence and impact in the science and technology fields.

Key Priorities:

1. **Increase Female Participation:** Promote female students' entry, especially into traditionally male-dominated majors, and expand job opportunities for female STEM professionals.
2. **Strengthen Competency:** Provide enhanced education, training, career development support, and research participation opportunities for female students and professionals.
3. **Build a System:** Establish a **"virtuous cycle"** of fostering and utilizing talent by expanding programs, implementing Affirmative Action, and building the necessary support infrastructure (networks, regional cooperation).
4. **Improve Perception:** Raise social awareness and boost the morale of women scientists and technicians.

Essentially, it's a comprehensive plan to get more women into STEM, give them the tools to succeed, and make sure society recognizes their value.

Gender Equality Officer System:

Strategic Leadership for GE- Management Officer System for GE in STEM

- **This system designates science and technology leaders within public universities and research institutes to champion gender equality.**
- **Role: These officers actively work to:** ① **Promote opportunities** for women researchers within their organizations. ②**Attract and retain** female talent. ③ **Create a supportive research environment** that ensures work-life balance for all.
- **Impact:** Decentralizes and embeds gender equity efforts directly within key STEM institutions.

Designation of GE Officer System in STEM and their Roles

In Korea, the legal basis for the GE Officer *System in STEM* is established under Article 12 of the **Act on Fostering and Supporting Women in Science, Engineering and Technology**, as well as Articles 14 and 15 of the Enforcement Decree of the same Act. (Regarding how to designating Officers and their duties in the Public Institutions)

Each institution must designate at least two Officers. One must be a female researcher at the department head level or higher, and the other must be a personnel or administrative officer, jointly appointed to the role. In addition, institutions may designate additional officers to handle practical or operational tasks as needed.

While other countries may assign committee roles or officer-like duties to researchers, these are typically handled by administrative staff. Thus, the Korean Women in STEM Officer Program is unique as an unparalleled mechanism for advancing diversity in science and technology.

The Women in STEM Officers' work is voluntary and lacks a formal performance evaluation. However, officers must submit annual activity reports, and their institutions participate in a yearly survey assessing workplace women-friendliness. The government (MSICT) further encourages performance by conferring a Minister's Commendation to outstanding officers annually.

Ref: Personal communication with Dr. J. Kwan, Director of Policy Center at WISET

Gender Equity Management Officer System in STEM

Present

• **Mandate:** It is mandatory to appoint one to five officers in public universities and public research institutes.

• **Reporting Structure:** Officers report their activities to the CEO, though their rank is not necessarily high.

• **Performance Evaluation:**
  - WISET monitors their activities, offers training programs, and supports their networking.

• **Impact:** The evaluation does not directly affect budget allocation or research funding but may impact the evaluation of the CEO.

Policy Recommendation

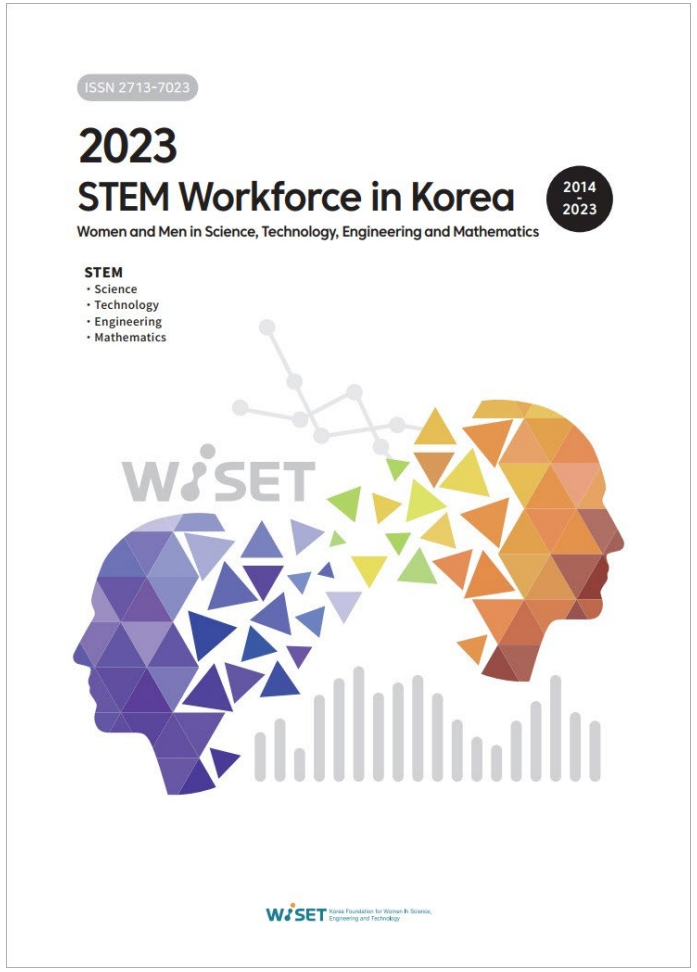
1. Gender Equity Committee
- **Mandate & Authority:** Operate a dedicated Committee on Gender Equity by clearly defining its duties, roles, and authority.

2. Mitigate Bias & Conflict
- **Focus Areas:** Address issues such as Work-Life Conflict and Epistemic Bias (bias in knowledge production).
- **Action:** Run relevant training programs to mitigate these biases.

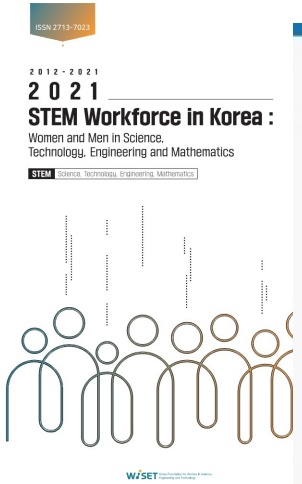
3. Funding & Evaluation Incentives
- **Accountability:** Gender Equity achievements should be reflected in government funding decisions and institutional evaluations.

Policies to support Women in STEM: The Publication of Annual Report

Publication of Annual Report on Policy/Statistics: 2012-2023 by WISET

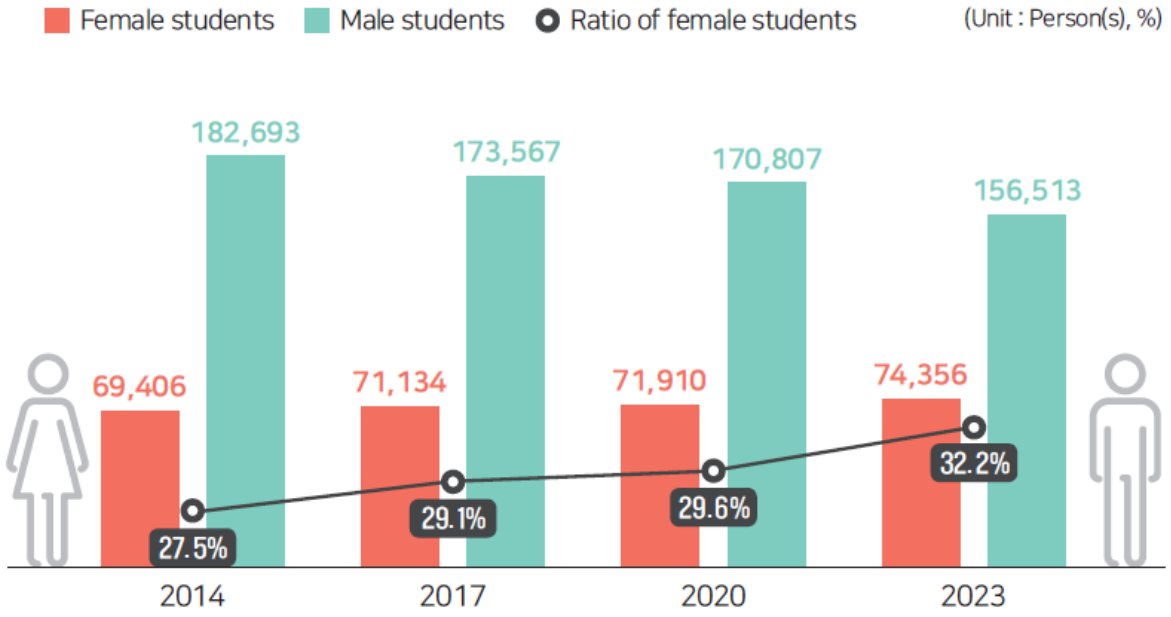


The Publication of Annual Report," highlights the systematic effort by WISET to gather and disseminate data on the STEM workforce. This is a critical action because accurate statistics are the foundation for evidence-based policy.

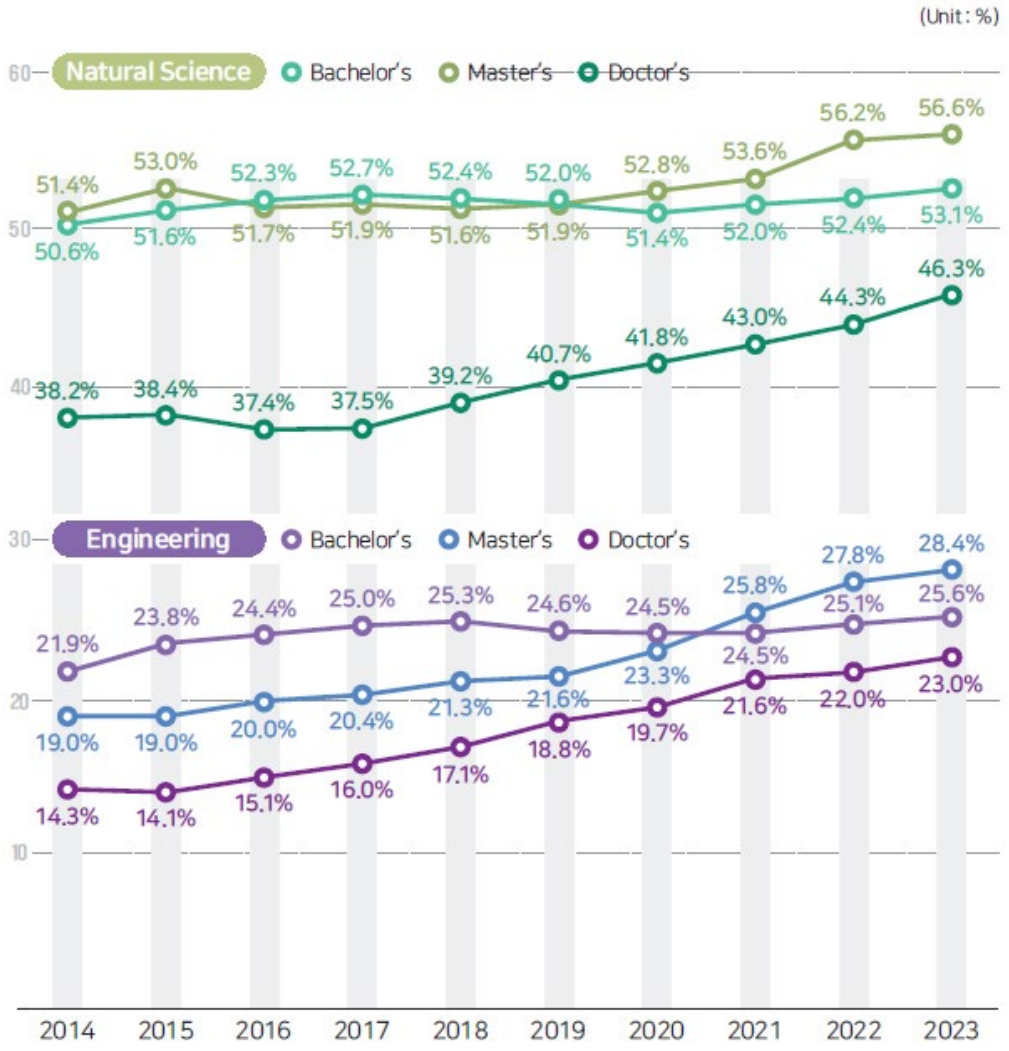


The State of Women and Men in STEM Education

Number of STEM College Entrants by Gender(2014-2023)



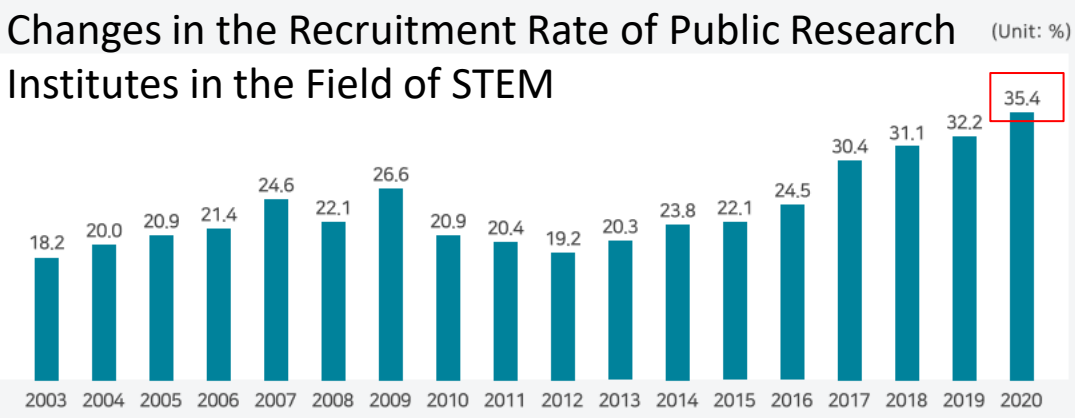
Gap between the Female Ratio by Degree Program Enrolled in S&E Majors(2014-2023)



Ref. Women and Men in Science, Engineering and Technology 2014-2023, WISET

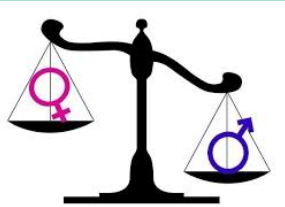
Policy for GE: Affirmative action (Gender Quota system)

Increase the target: The "Recruitment/Employment Target System" currently aiming for 30% female employees in STEM roles could be modified to target a higher rate.
Pilot program for leadership: A "Management Position Target System" pilot program is being developed to encourage women in STEM to pursue leadership positions.



https://www.wiset.or.kr/module/pdf.js/web/viewer.html?file=/thumbnail/pblcte/TP_20240314155301454Na60.pdf

Policy for GE: Implementation of Quota system



Target System Implementation

- Mandatory Application: The system is mandatorily applied to national and public research institutes, as well as public universities.
- Recruitment/Employment Target System: The target has progressively increased across the 1st through 5th Master Plans (30%). The current goal of 30% female new hires has been achieved.

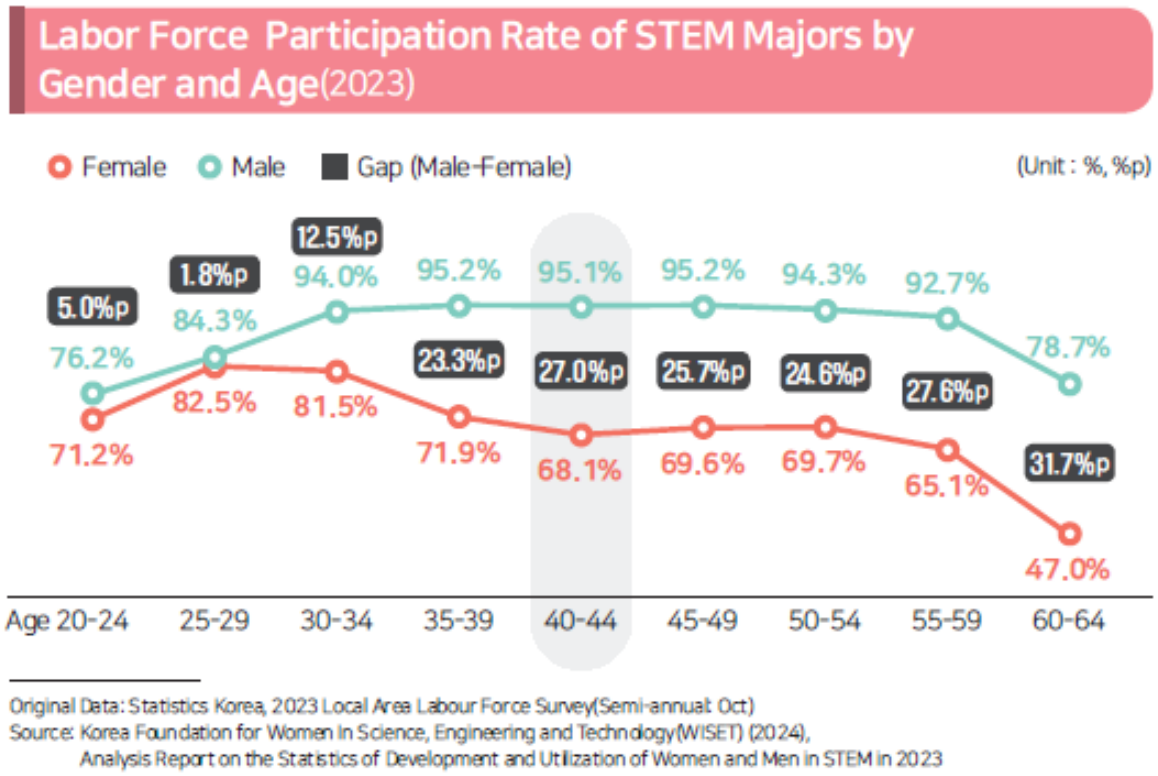
Specific Goals

- The long-term goal is to increase the proportion of women in science and technology at research institutions from the current level of 23% to 30%.
- To achieve this, each institution is required to set a three-year target ratio, and annual progress is evaluated against these institution-specific targets. The initiative applies to government-funded public research institutes(not all the public institute), research institutes affiliated with public corporations and the four major Institutes of Science and Technology(KAIST, GIST, DGIST, UNIST).

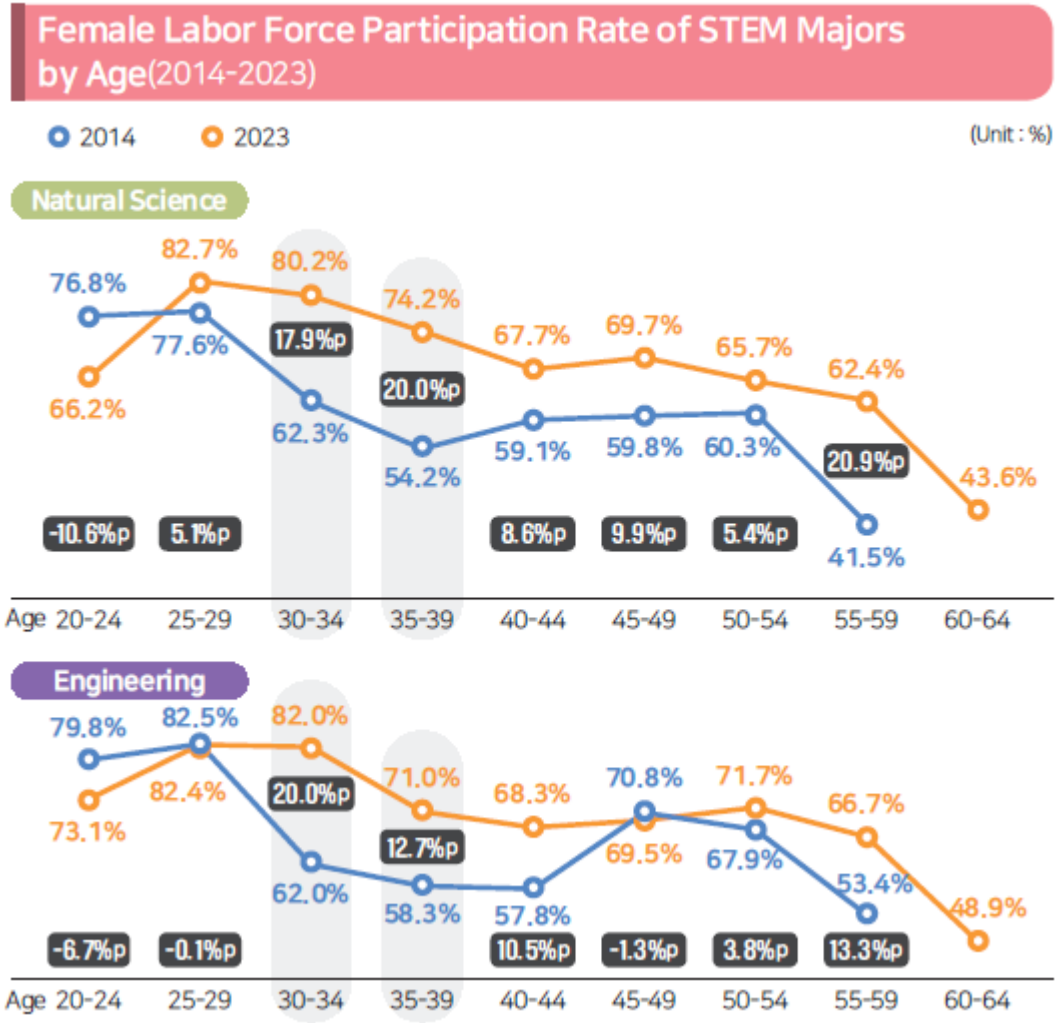
- Korea's 2024 amendment to the Act on Fostering and Supporting Women in Science and Technology expanded affirmative action, requiring institutions to set rank-based target ratios for managerial positions. The system is now being prepared for implementation by the government and WISET.

Ref: Personal communication with Dr. J. Kwan, Director of Policy Center at WISET

Women and Men in STEM Workforce (2023): The L/M-Curve phenomenon



Original Data: Statistics Korea, 2023 Local Area Labour Force Survey(Semi-annual Oct)
Source: Korea Foundation for Women In Science, Engineering and Technology(WISET) (2024),
Analysis Report on the Statistics of Development and Utilization of Women and Men in STEM in 2023

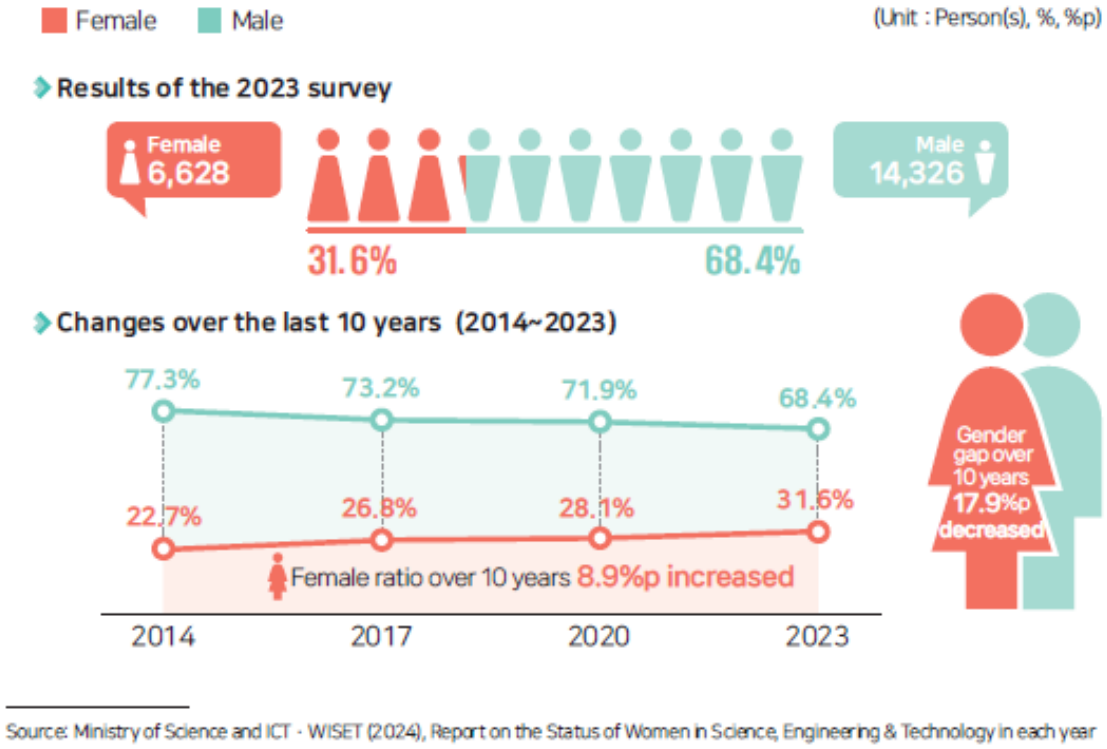


- Over the past 10 years, the economic participation rate of women in the field of engineering increased by 20.0%p among those aged 35 to 39.
- Compared to 10 years ago, the graph of the economic activity participation rate of women in the engineering majors has changed from an M shape to an L shape

2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

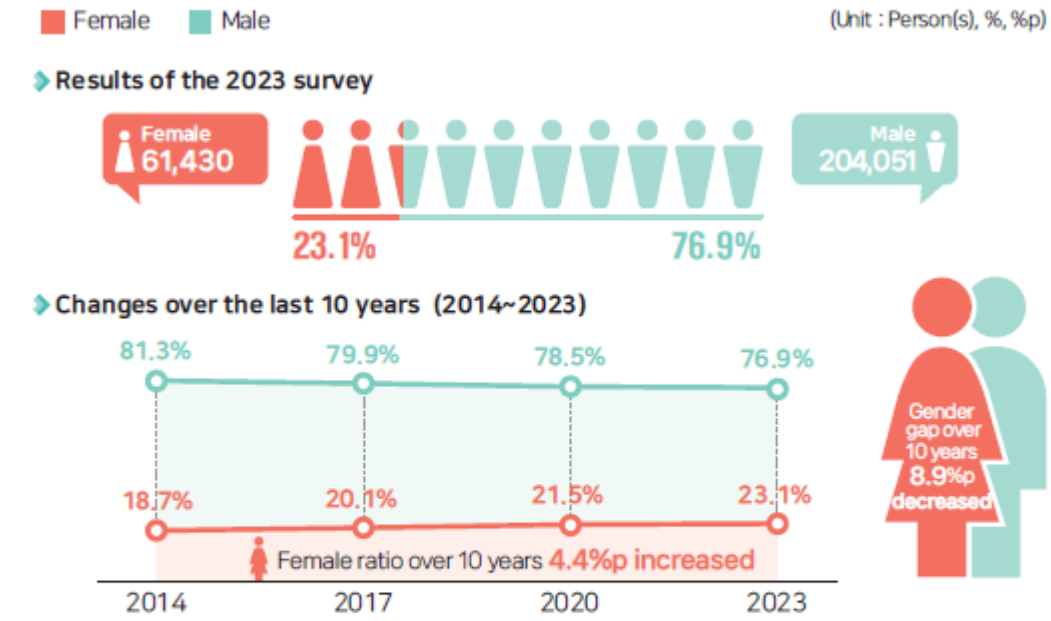
Women and Men in STEM Workforce (2014-2023)

Newly hired ratio of STEM R&D Workforce(2014-2023)



Source: Ministry of Science and ICT - WISET (2024), Report on the Status of Women in Science, Engineering & Technology in each year

Employment ratio of STEM R&D Workforce(2014-2023)

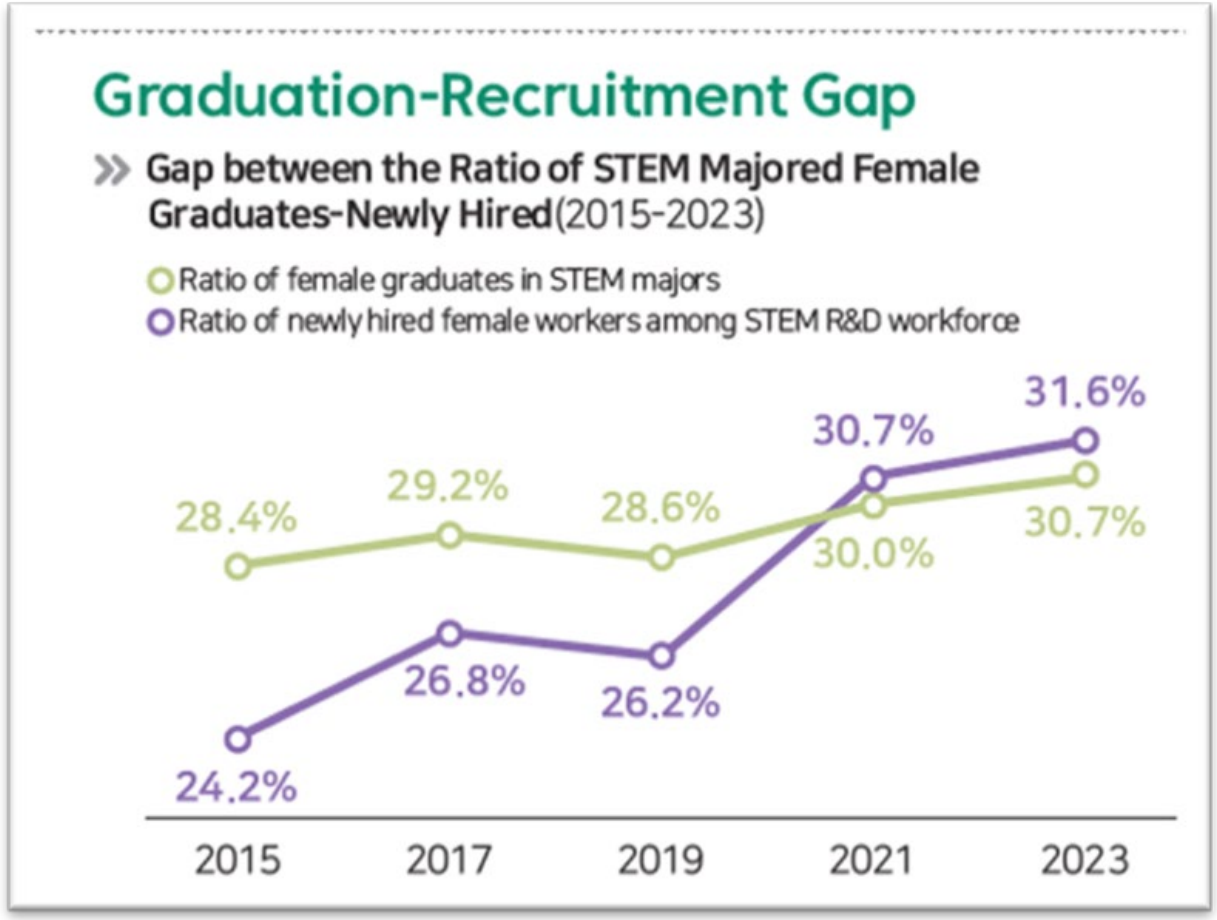


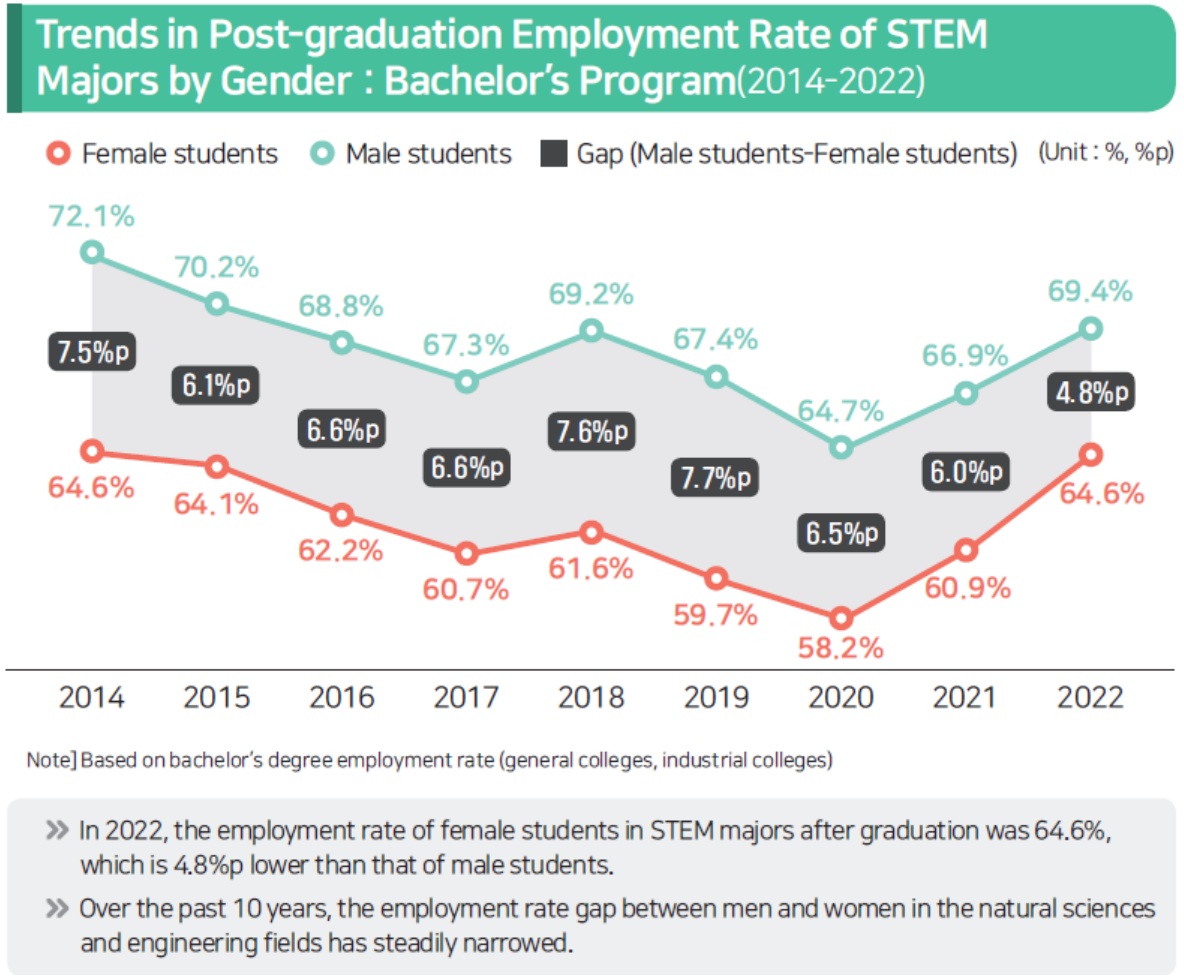
» The ratio of employed women is still around 20%, but the gender gap has been slightly decreasing over the past 10 years.

» Over the past 10 years, the number and ratio of newly hired and employed women have shown an increasing trend.
※ New recruitment 22.7% in 2014 → 31.6% in 2023,
employment (hired) 18.7% in 2014 → 23.1% in 2023

2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

Changes in the STEM Workforce (2014-2023): Progress and the Persistent Gap

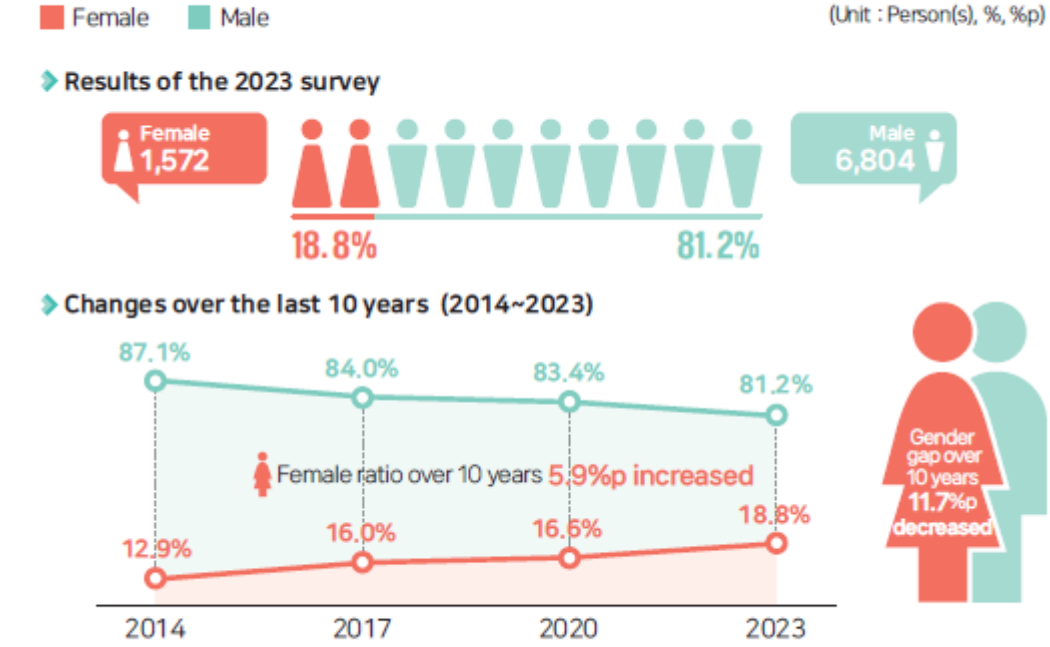




2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

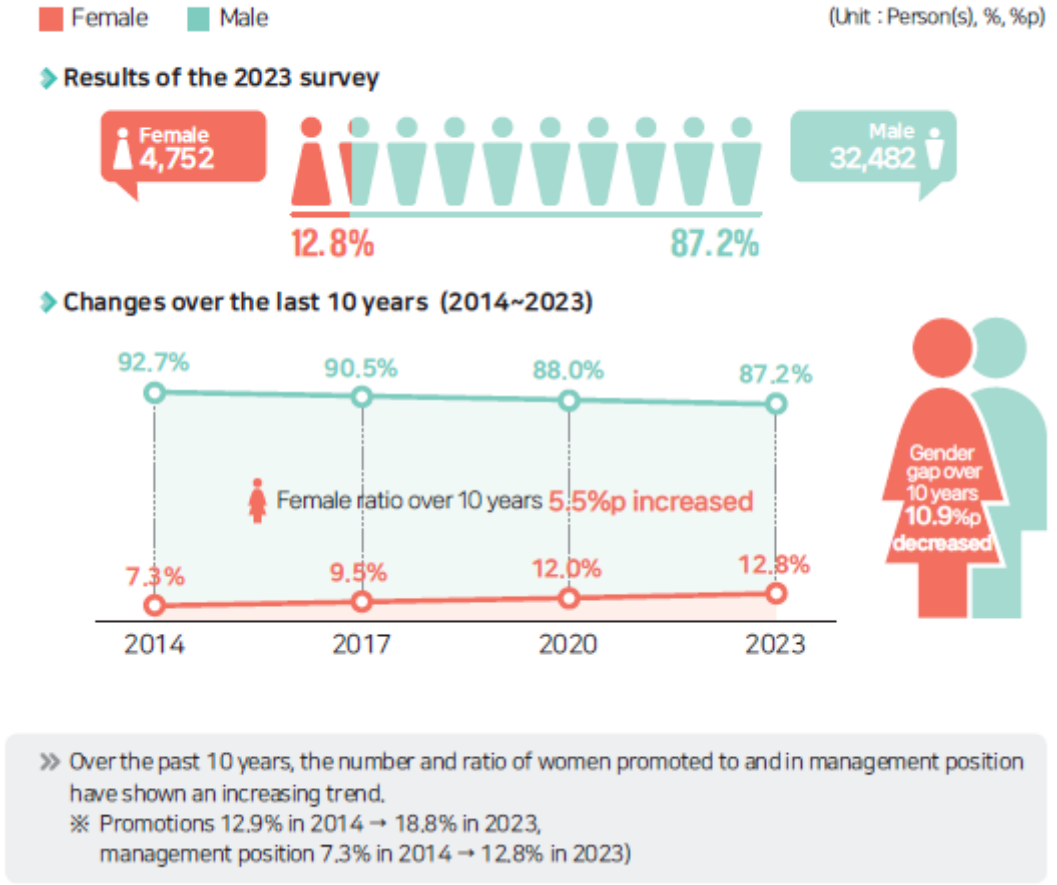
Women in STEM Workforce: The Acute Problem of Vertical Segregation

Promotion ratio of STEM R&D Workforce(2014-2023)



Source: Ministry of Science and ICT · WISET (2024), Report on the Status of Women in Science, Engineering & Technology in each year

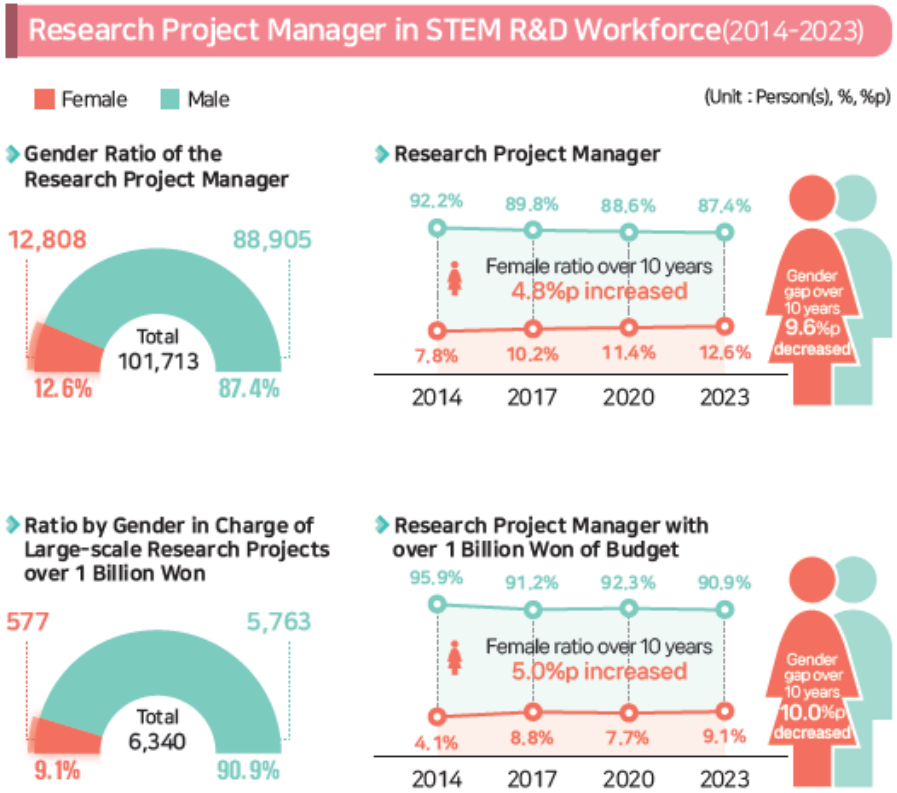
Manager of STEM R&D Workforce(2014-2023)



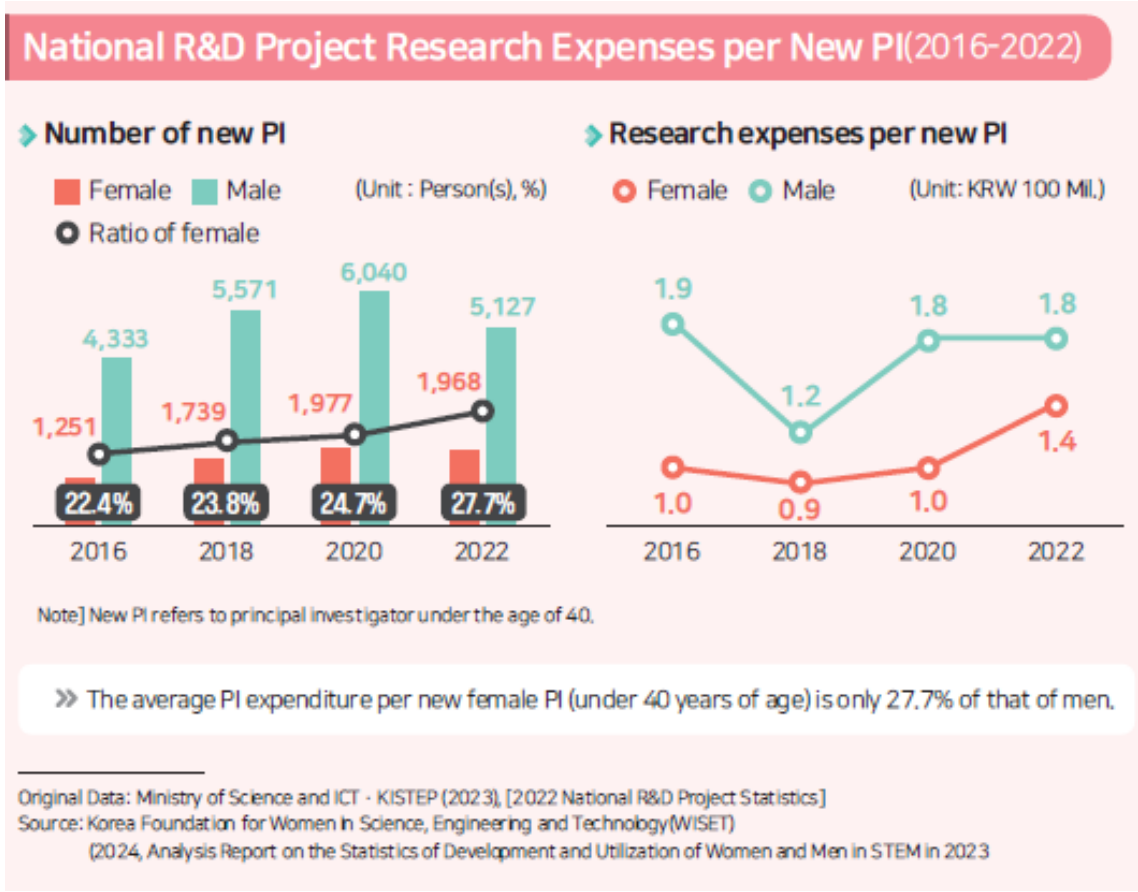
» Over the past 10 years, the number and ratio of women promoted to and in management position have shown an increasing trend.
※ Promotions 12.9% in 2014 → 18.8% in 2023,
management position 7.3% in 2014 → 12.8% in 2023)

2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

Women in STEM Workforce: The Acute Problem of Vertical Segregation



Source: Ministry of Science and ICT · WISET (2024), Report on the Status of Women in Science, Engineering & Technology in each year



Original Data: Ministry of Science and ICT · KISTEP (2023), [2022 National R&D Project Statistics]
Source: Korea Foundation for Women in Science, Engineering and Technology(WISET)
(2024, Analysis Report on the Statistics of Development and Utilization of Women and Men in STEM in 2023

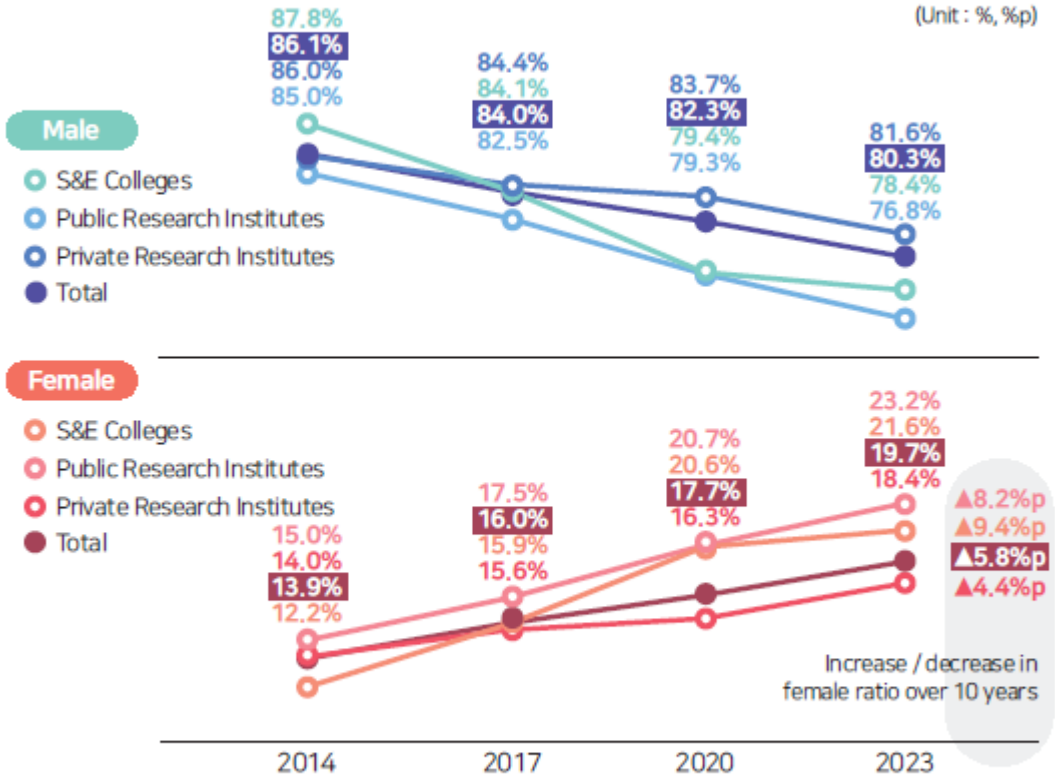
» As women advance in their careers, female ratio decreases and gender gap tends to widen.

» Proportion of Women in STEM by Career stage : University graduates (Bachelor's degree) 34.4% → Newly hired 31.6% → Employed 23.1% → Research Project Manager 12.6%.

2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

Women and Men in STEM Workforce

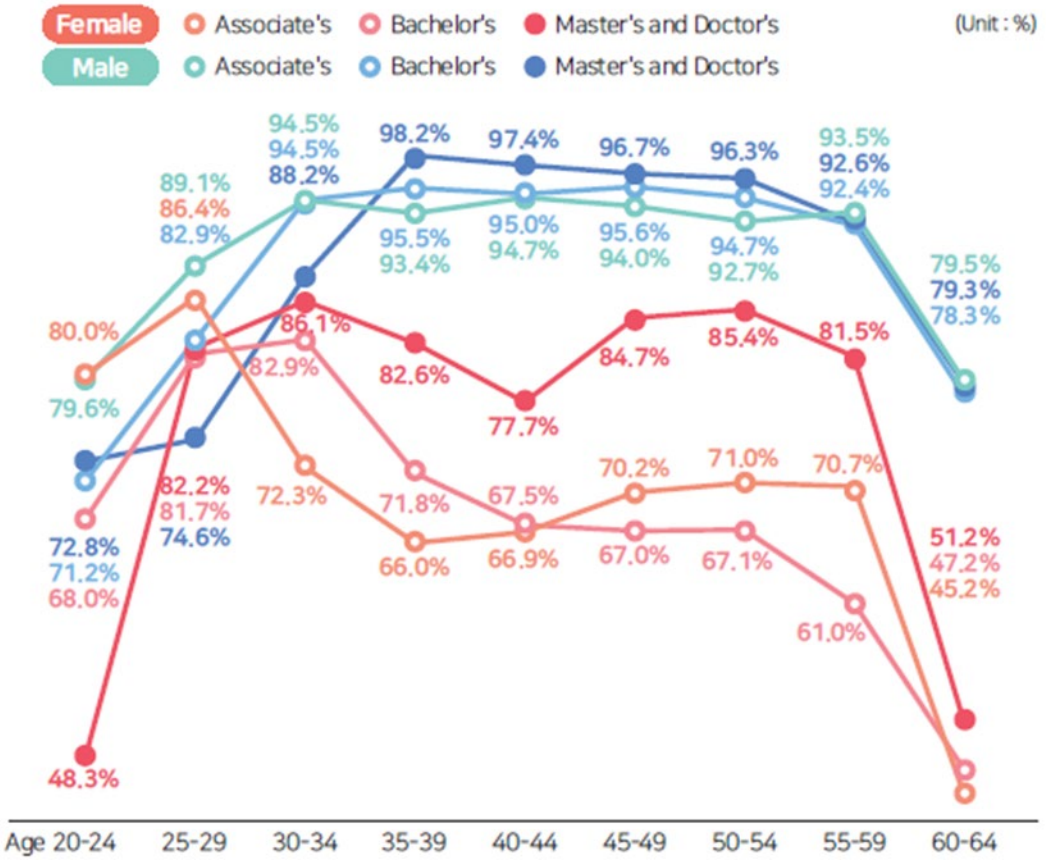
Changes in Employment Patterns of Full-Time STEM R&D Workforce by Institution Type(2014-2023)



» Even though the ratio of female permanent workers at STEM colleges and public research institutes has increased significantly, the total female ratio is less than 20%.

Source: Ministry of Science and ICT · WISET (2024), Report on the Status of Women in Science, Engineering & Technology in each year

Labor Force Participation Rate of STEM Majors by Gender, Age, Degree(2023)



» Women with associate degrees have the highest economic activity participation rate in their late 20s, and women with bachelor degrees have the highest economic activity participation rate in their early 30s.

2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

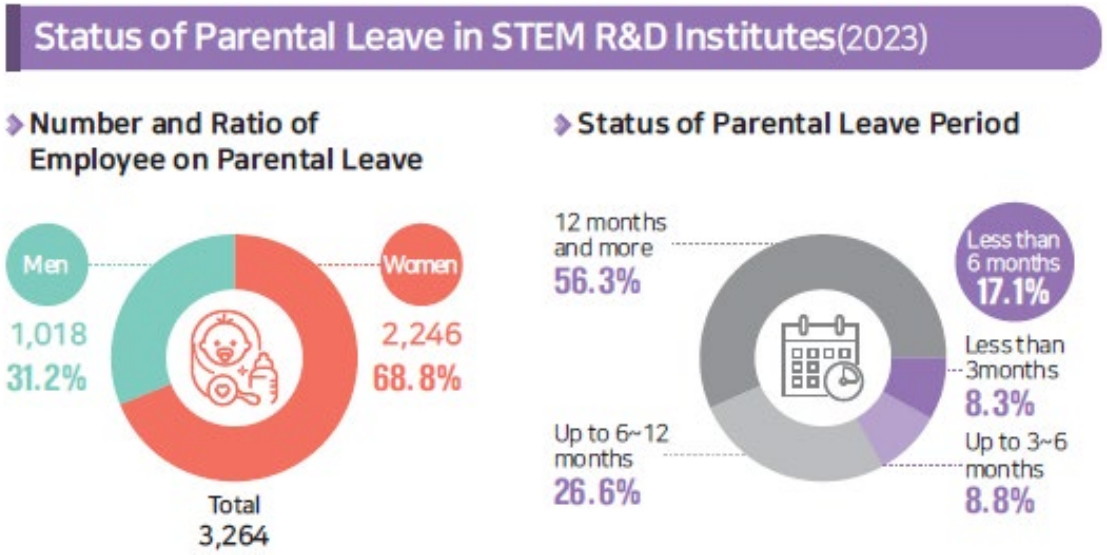
Legal Systems for Gender Equality and Work-Life Balance in STEM

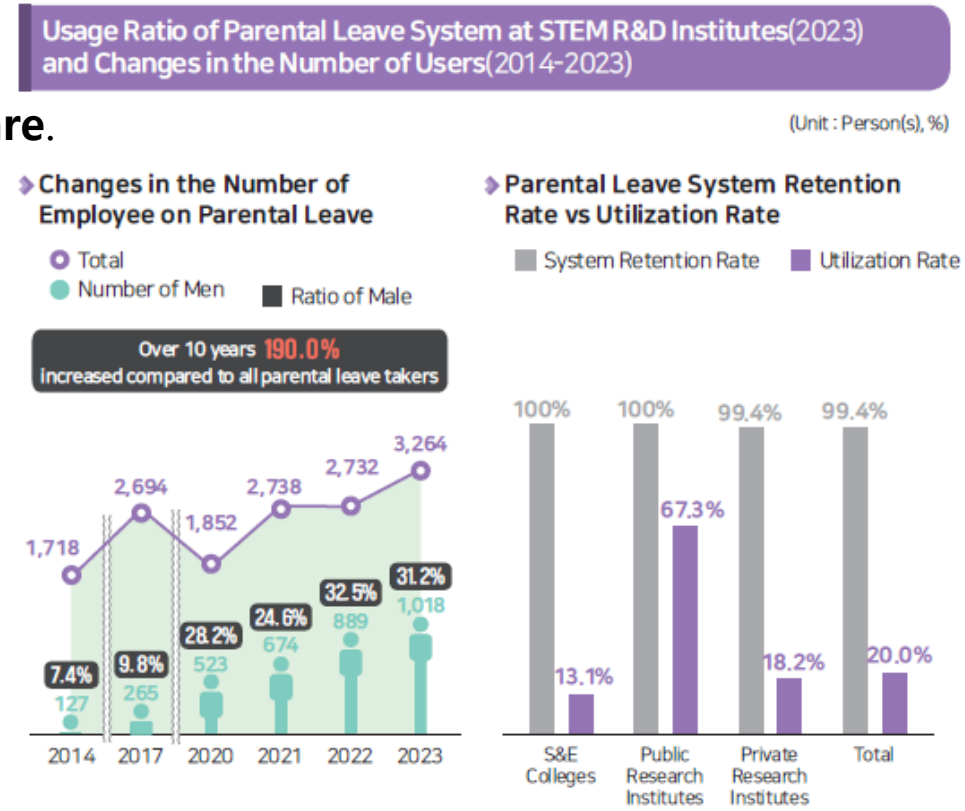
Shared Parental Leave Child Care Support: A Bright Side for Work-Life Balance in STEM

- The number of men using parental leave is increasing, driven by changes in research environment culture.
- One of the most notable measures is the Parental Co-leave System, which provides increased wage ceilings for both parents when they each take parental leave within the first 18 months of their child's life. In addition, the government legally guarantees paternity leave for spouses.
- Shared parental leave policies can help alleviate childcare burdens for female researchers.

- **The WISET program supports female graduate students and Postdocs by introducing a voucher system for childcare.**

Ref: Personal communication with Dr. J. Kwan, Director of Policy Center at WISET

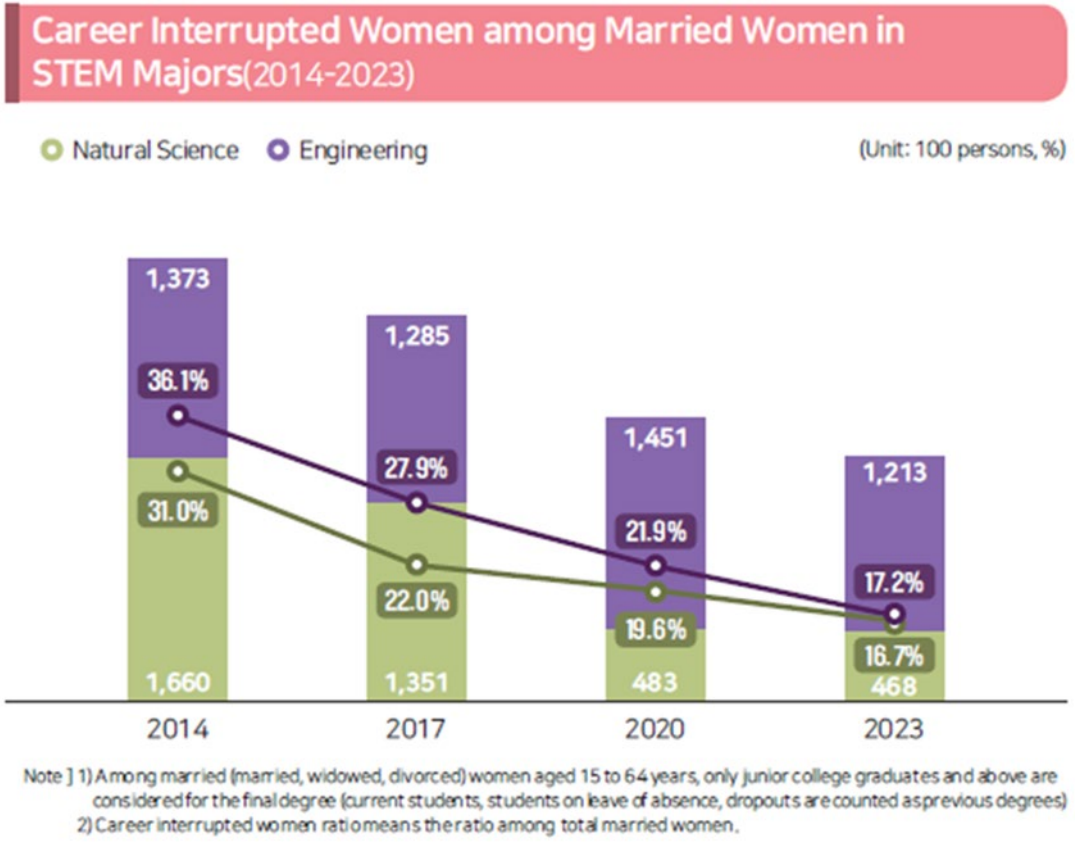




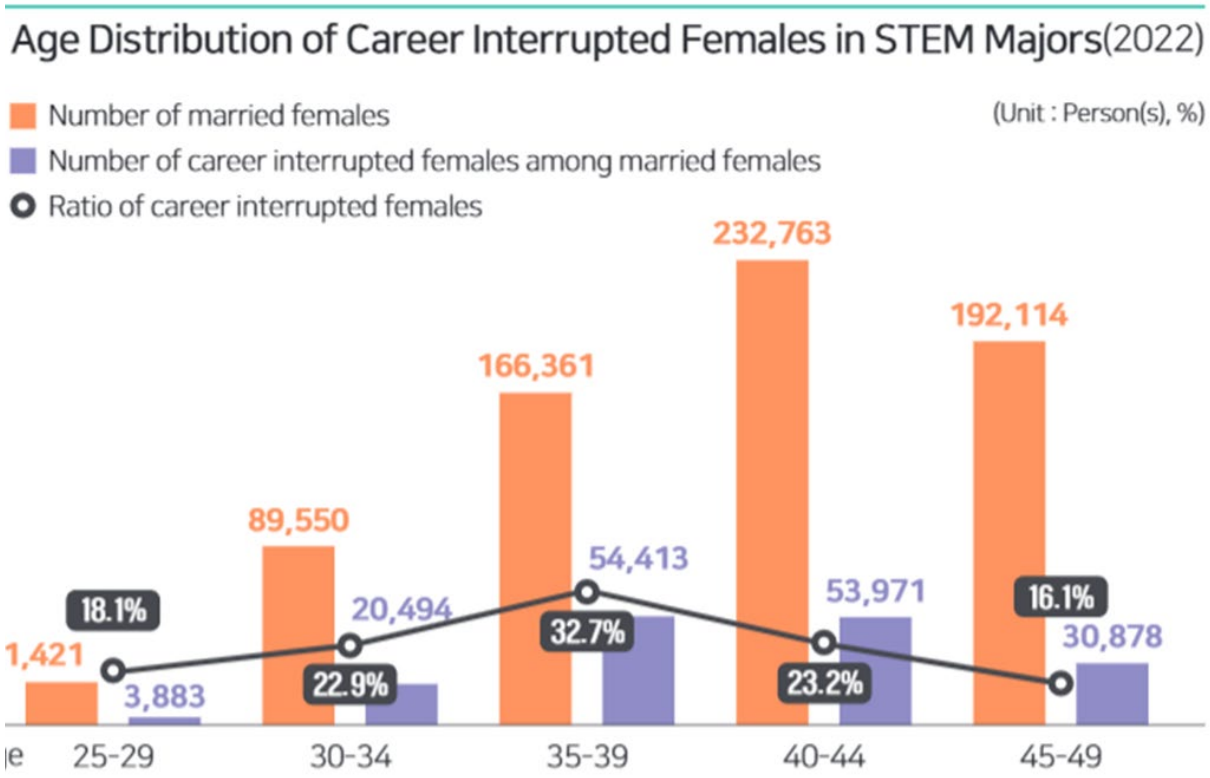
2023 STEM Workforces in Korea https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do

Challenges for the GE in STEM Careers: Precarious Employment for Women

Career interruption decreases gradually. However, for college-educated women in STEM, mid-career years (ages 35–39) show the highest rate of **career interruptions**. This instability is driven by many holding **non-permanent positions**, where a lack of certainty and benefits impedes career advancement.



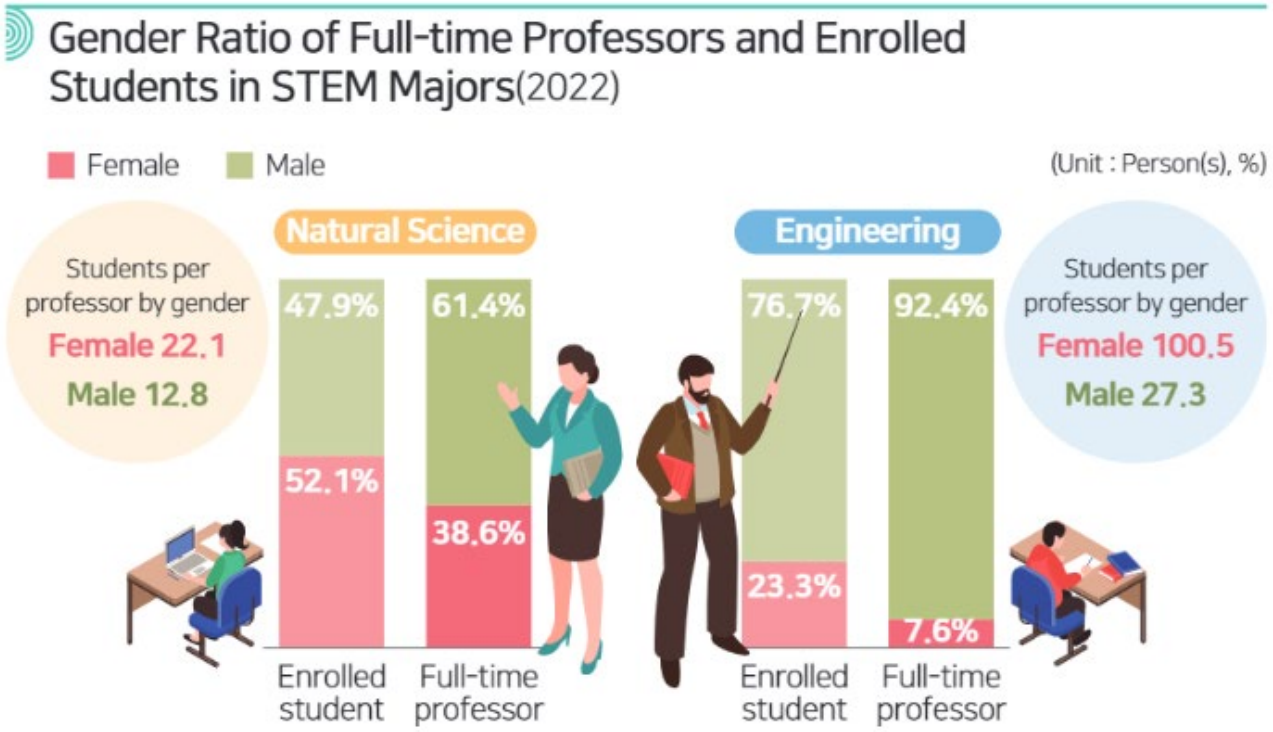
2023 STEM Workforces in Korea, https://www.wiset.or.kr/prog/pblcte/eng/sub04_02_02/03/view.do



https://www.wiset.or.kr/module/pdf.js/web/viewer.html?file=/thumbnail/pblcte/TP_20240314155301454Na60.pdf

Challenges for the GE: The Severe Role Model Deficit in Academia

While women comprise a significant portion of engineering graduates (34.9%), their representation steadily shrinks at each career stage, with only 7.6% becoming full professors, highlighting a widening gender gap in engineering.



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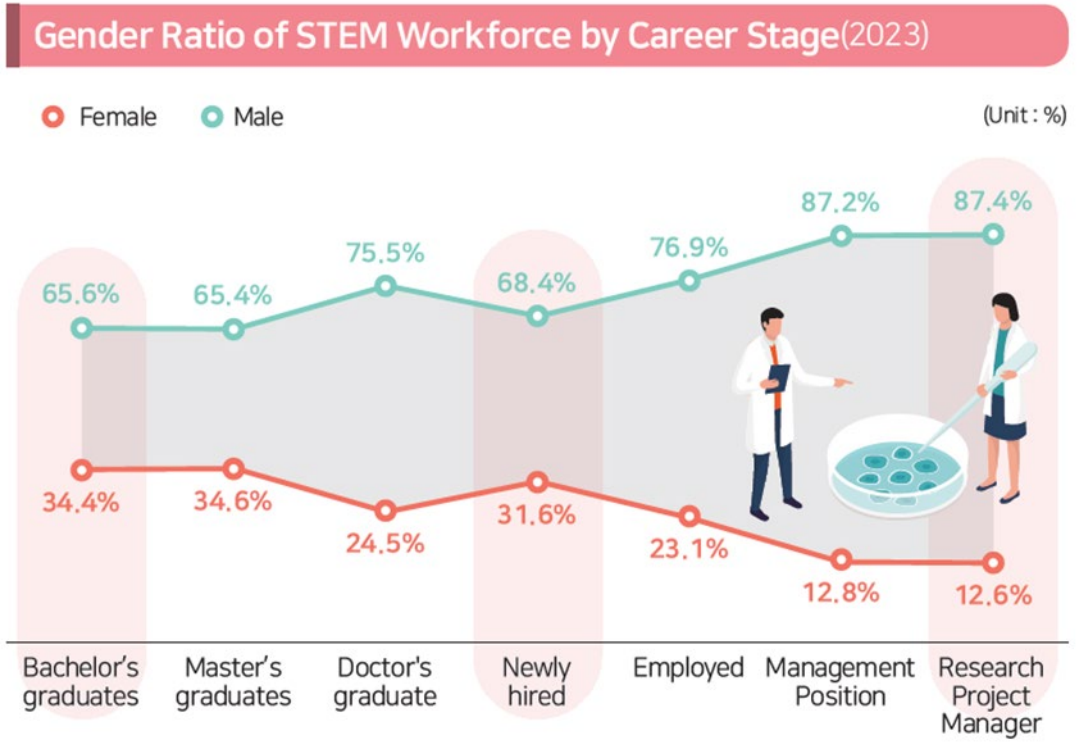


Women and Men in Science, Engineering and Technology 2014-2023

Gendered Innovations (GI) Initiatives in Korea: Brief History

2013 - 2014
The concept of GI introduced systematically &
1st research report

2015

GS- AP held in Seoul, Korea with theme on GI to SDGs
Co-hosted by WISET & NRF

2016-2020
Case Studies and research on policy on GI
GI Policy Forums held at the parliament
4th Master Plan for Women in STEM (2019-2023)
GS Global for SDGs held in Seoul (2020)

2021
Establishing GISTeR with permission by Ministry of Science & ICT

Amendment of **the Framework Act on S&T and Research performance evaluation Act** integrating SGBA into research

2022
Increase Learning platform for GI
OECD-GISTeR: Seminar for GI to Technology Assessment
GISTeR's Collaboration: National Academy of Medicine of Korea

2023

Integrating GI in the **5th Master Plan for S&T (2023-2027))**

Research on GI Index & indicators
GISTeR Fellowship Program for young researchers

2024
1st International Symposium hosted by **Ministry of Science & ICT** (2024.12.18)
5th Master Plan for Women in STEM (2024-2028)
Research Assessment including GI/global network

Legal basis to promote Gendered Innovations

Law amendment to disseminate Gendered Innovations

Articles	Content
Article 7 (Master Plans for Science and Technology)	15-4 Implementation of science and technology to enhance social values in consideration of characteristics such as sex and gender
Article 14 (Technology Assessment and Evaluation)	③ When conducting a technology impact assessment, the government should ensure that the analysis of characteristics such as sex/gender is reflected by taking into account the characteristics of the target technology.
Article 26-2 (Surveys and Analysis of Scientific and Technological Statistics and Indexes)	③ When investigating and analyzing science and technology statistics and indicators, the government should reflect the characteristics of the analysis such as sex/gender by considering the characteristics of individual science and technology statistics and indicators.

Legal basis to promote Gendered Innovations: 5th Master Plan

The 5th Master Plan for S&T (2023~2027)

A strategic blueprint outlining development goals and policy directions for Science and Technology over the next five years

Strategies and Objectives

1. **Advancing the S&T System for Qualitative Growth**

2. Enhancing the Capacities of Innovation Actors and Cultivating an Open Ecosystem

3. Addressing National Challenges and Anticipating the Future through Science and Technology

Integrate sex and gender analysis into all research practices and applications.

- Enhance backing for research domains conducive to fresh insights via sex and gender analysis

※ (Example) Study how treatments affect disease development and management for both sexes, using SGA to improve therapies.

- Support further research that uses sex, gender, and intersectionality to develop marketable products from research findings.

※ (Example) Create a database of research results that considers sex, gender, and intersectionality in biomedicine. This will help develop new medical devices and treatments.

Legal basis to promote Gendered Innovations: Full Legal Integration needed

- Organize Series of National Assembly Forums hosted by congress men for the Amendment of Acts to integrate SGBA into research (2018-2023) why sex and gender matters in STEMM research

=> Amendment of Framework Act on science and Technology introducing SGBA (2021) after the Gender Summit Global for SDGs in Seoul in 2020

=> Amendment of the Act on the Performance Evaluation & Management of National R&D Programs introducing SGBA (2021)

https://www.youtube.com/watch?v=qnQQhOz5pDo&t=211s

GISTeR Photo News
https://www.gister.re.kr/front/user/main.do

- Need to integrate SGIR to the following acts:
- Bioethics and Safety Act
- Biotechnology Promotion Act
- Brain Research Promotion Act
- Act on Safety and Support for Advanced Regenerative Medicine and Advanced Biopharmaceuticals
- Healthcare Basic Law

Legal basis to promote GI: The GI Mandate and the Implementation Gap

Integration of SGBA to the Act on the Performance Evaluation & Management of National R&D Programs

Article 3(Basic Principles of Performance Evaluations & Management)	(7) When conducting a performance evaluation, the Government shall consider whether characteristics, such as gender, are reflected in research and development programs, taking into account the nature of such programs. <Enforced on June. 29, 2022>

Remaining Challenges to Promote Gendered Innovations

- **Limited Implementation of SGBA**: Researchers have autonomy over integrating SGBA into their research, leading to inconsistent and incomplete implementation.=> Increase awareness
  - Limited Awareness of GI: There is a need to increase awareness of the importance of GI

- **Lack of Gender Dimension in Policy**: The Korean Brain Research Promotion Act overlooks the gender dimension in brain research. While the 3rd Brain Research Promotion Plan (2018-2022) considers SGBA, the 4th Brain Research Promotion Plan (2023-2027) does not.

- **Insufficient Funding for Gendered Research**: There is no mandatory funding specifically designated for research that integrates SGBA.

Legal basis to promote GIs: Associate member of Horizon Europe

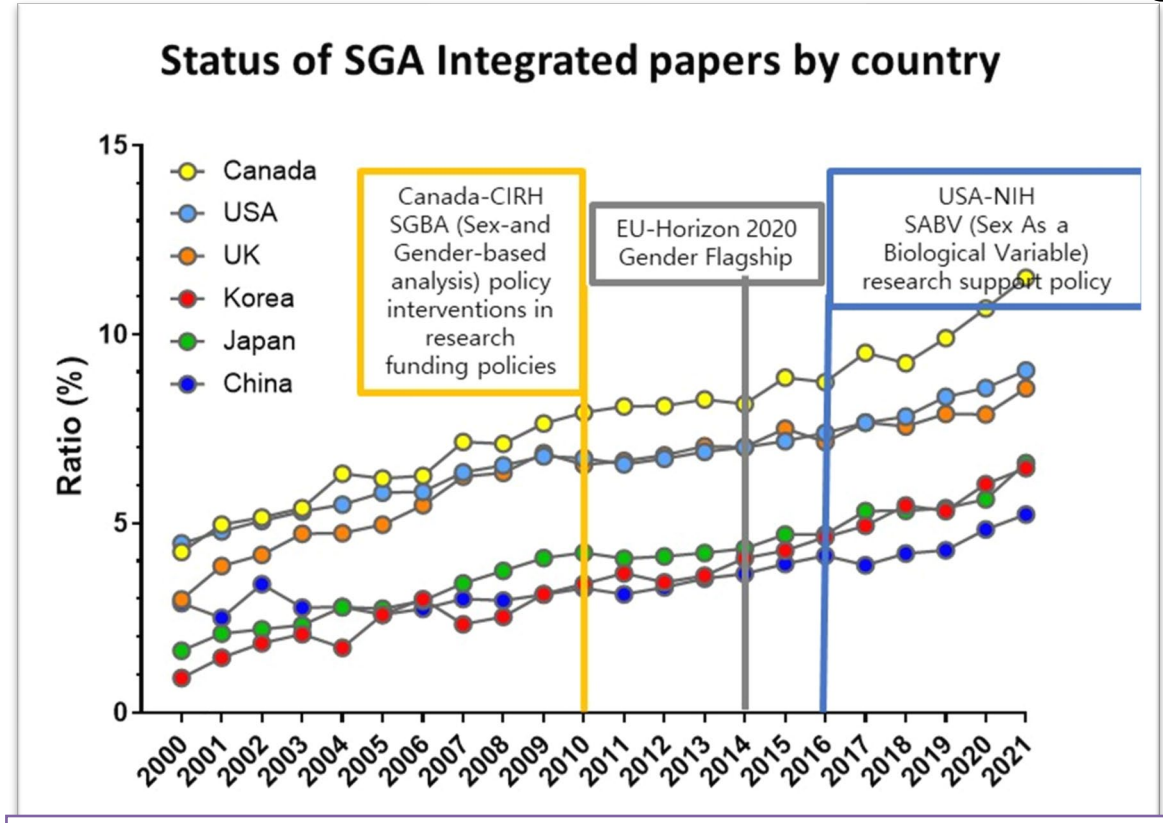
- As Korea joins as an associate member of Horizon Europe, establishing a Gender Equality Plan (GEP) and integrating the gender dimension into research is going to be “partially” mandatory.

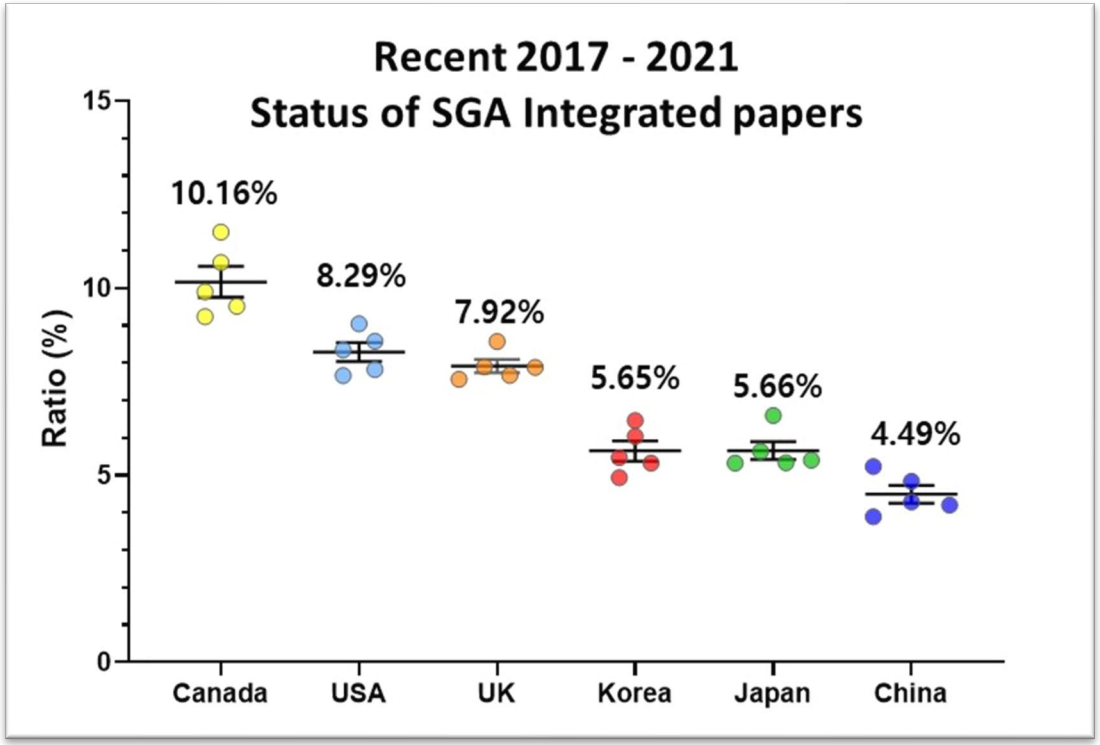
- To ensure this, a more concrete action plan in the 5th Master Plan for women in STEM is needed that respects researchers' autonomy while effectively incorporating gender considerations, compared to the 4th Master Plan.

- Law and policy for Gendered Innovations are necessary but not sufficient to promote SGIR.

The Funding Imperative for Epistemic Fairness

CurrentstatusofSex/gender-integratedpapers





- Funding agencies can start with dedicated funding, such as Gender Flagship Project to increase the effectiveness of the amendment to the Framework Act on S&T, introducing Sex and Gender Analysis (SGA), while maintaining the autonomy of researchers.

REF: The impact of sex/gender-specific funding and editorial policies on biomedical research outcomes: a cross-national analysis (2000–2021). Sci Rep 14, 26599 (2024). https://doi.org/10.1038/s41598-024-77018-0

Policy Evolution for Gender Equity in Korea

Korea's Response: Policy Evolution

Stage 1: First-Generation Scientists (Early 2000s)

Act on Fostering Women Scientists & Engineers (2002)

Focus:
Direct support, scholarships, numerical increase.

Outcome:
Increased numbers, but slow systemic change

Second Generation (2015s - Present)

Framework Act on Science and Technology With SGIR (2021)

Focus:
Sex and Gender Integrated Research (Mandates integrating gender perspective in design & funding)

Outcome:
Embedding equity into research quality; challenging bias

From Legal Mandate to Effective Implementation

Necessity for Effectiveness: While Korea has progressed from First-Generation policies (direct support, scholarships) to Second-Generation policies (mandating SGIR integration in the Framework Act), the legal mandate alone is insufficient to challenge deeply embedded bias.

Seven Key Measures

1. **Mandatory SGIR Implementation: Requires moving beyond voluntary integration to enforce compliance.**
2. **Dedicated Funding: Essential for incentivizing researchers, as shown by international examples, and ensuring high-quality SGIR projects.**
3. **Evaluation and Monitoring: Requires developing specific indicators and establishing systems to measure the application of gender analysis throughout the research process.**
4. **Capacity Building: Investing in Leadership Enhancement Programs is necessary to ensure science and technology leaders are equipped to champion and implement GI.**
5. **Collaboration and Networking: Required to share knowledge and best practices.**
6. **Best Practices and Awareness: Crucial for overcoming researcher reluctance and limited knowledge of GI.**
7. **Policy Implementation Review: Ensures the policies remain relevant and responsive to emerging challenges.**

Conclusion and Discussion: Shared Lessons for East Asia

Point 3

Institutional Accountability

Shift focus from 'fixing women' to 'fixing institutions' and their cultures

Point 2

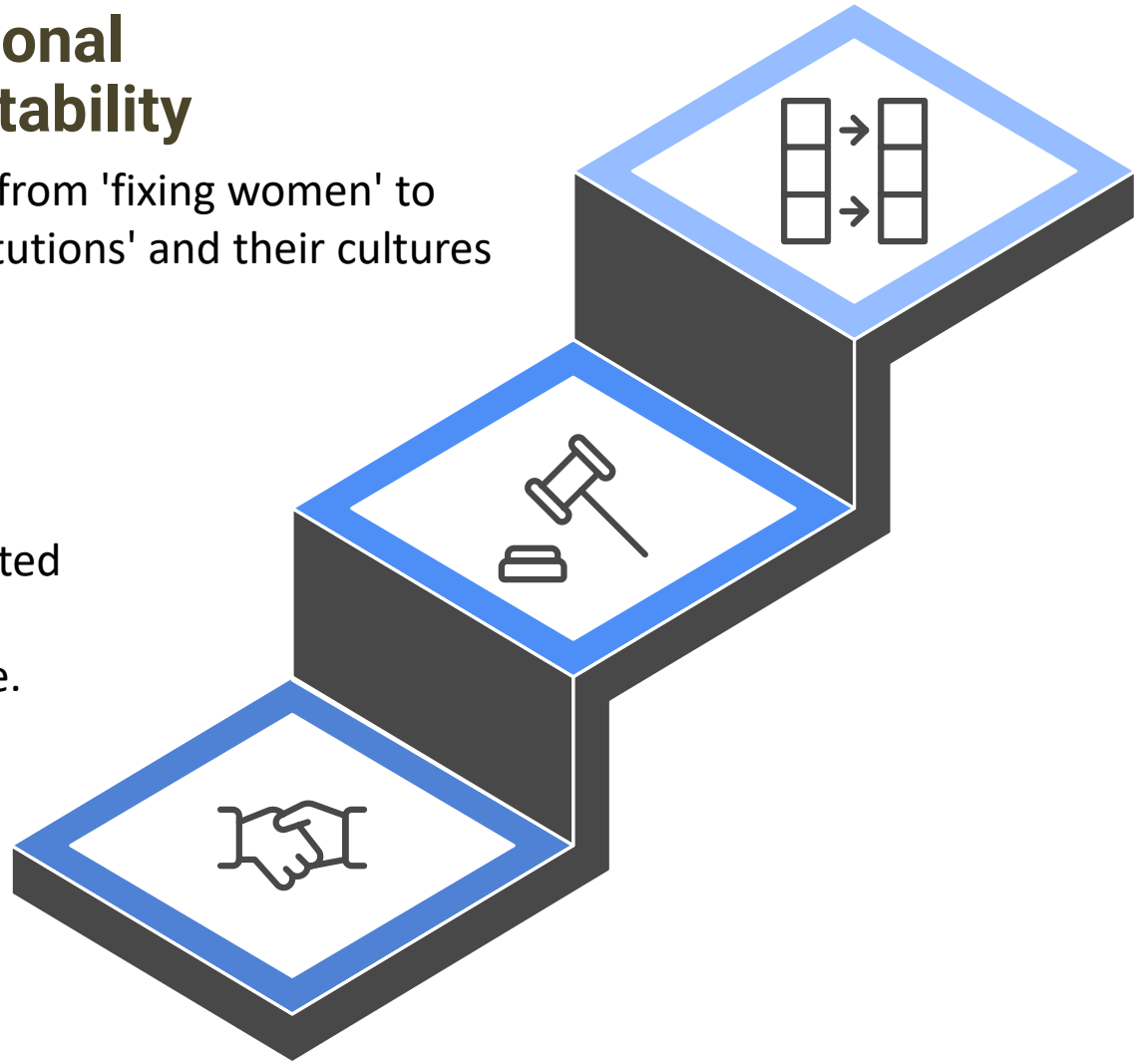
Mandates Over Guidelines

Legal mandates and targeted funding are the crucial drivers of systemic change.

Point 1

Dual Strategy

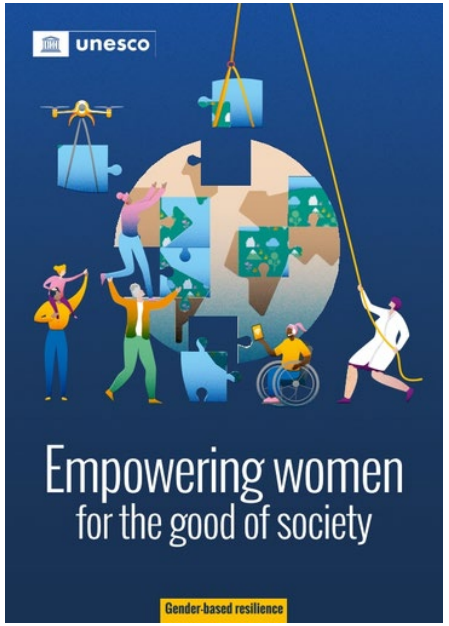
Address both Structural and Epistemic barriers to gender equality.



Key Takeaway

The Final Imperative

Gender diversity in STEM is an imperative for global innovation, competitiveness, and addressing complex social problems. We cannot solve crises like **Climate Change, Health Equity, Aging, or the ethical challenges of Agentic AI** without engaging and leveraging all talent through equitable and epistemically sound systems.

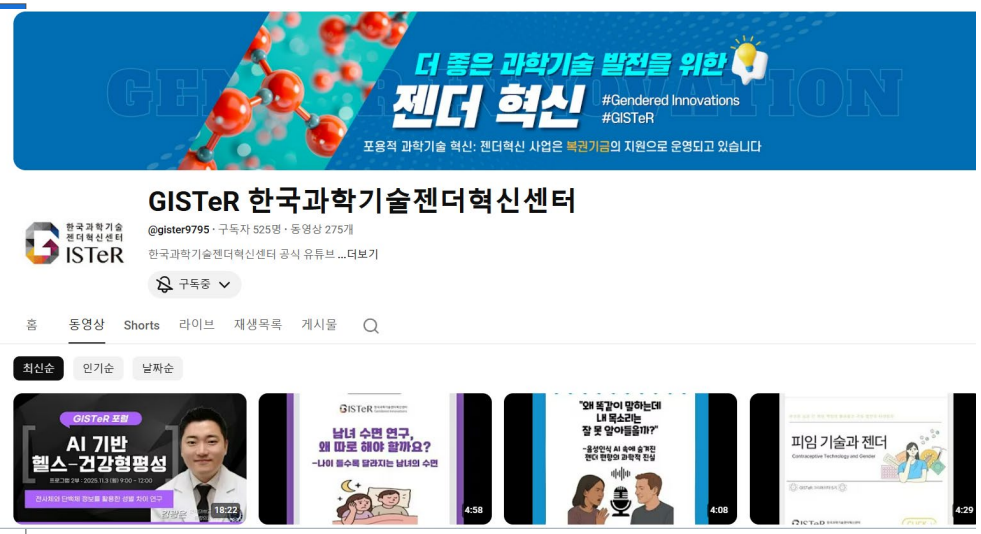


Key Takeaway:

For East Asia to secure its future in the high-tech, innovation-driven global economy, it must implement comprehensive, legally-backed strategies that ensure its knowledge base is epistemically robust and its talent pipeline is structurally equitable.

Actions to increase awareness on GIs: GISTeR's Knowledge Creation for SGIR

Website gister.re.kr



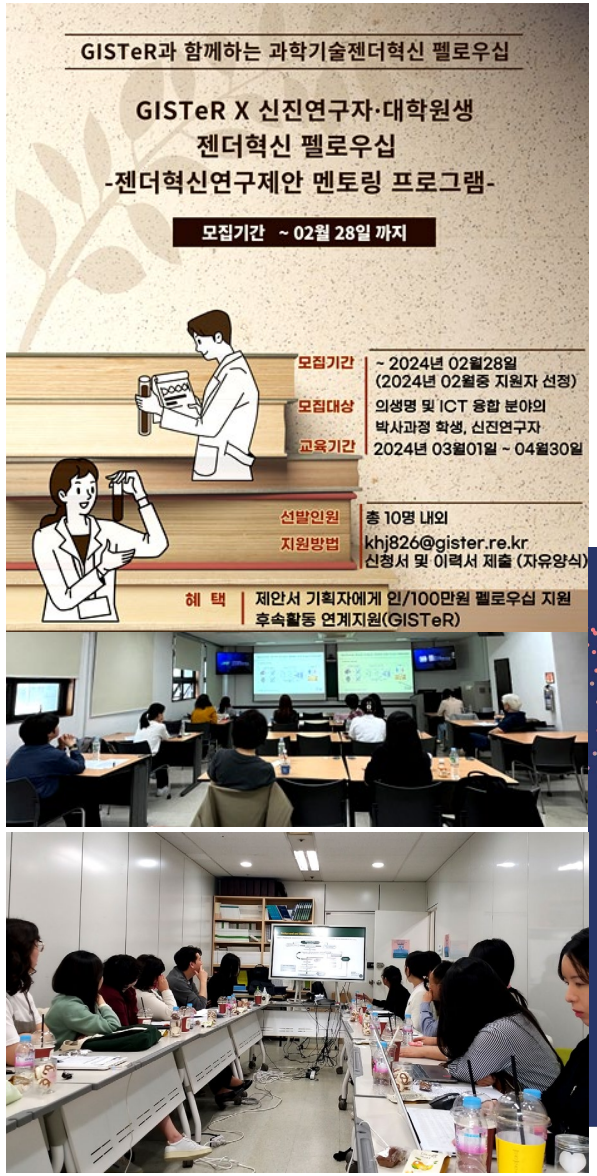
https://www.youtube.com/@gister9795/videos

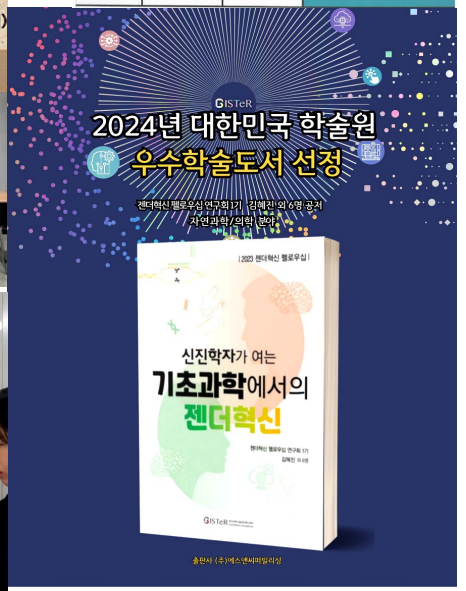
Actions to increase awareness on GIs: Junior Fellowship

- **Support GI Junior Fellowship**
  - Training program for young researchers (1 week)
  - support Fellowship to develop proposal integrating sex and gender analysis (3 months) with mentoring by gender experts
  - Only 3 men participated out of 43.

=> 43 proposals created by Ph.D. students and postdoctoral fellows('23-'24)

⇒ Small research grants ('24: 8 persons)
⇒ Presentation at the GI forum
⇒ Book chapter writing: The book selected an excellent book by NAS, ROK ('24)



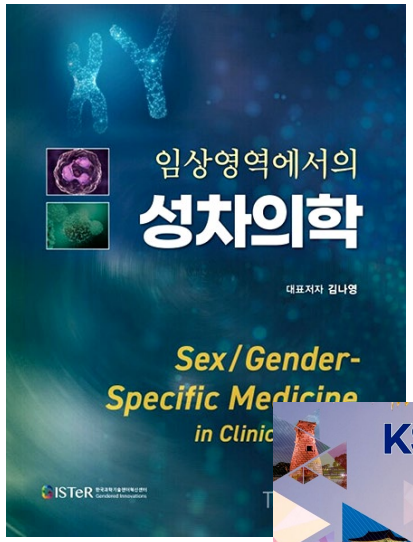


GISTeR

Actions to increase awareness on GI: Highlight Partnership

- In Korea outreach program open to both genders but ratio of male participant is less than 10%.
- To promote GI need support on GI from leaders in STEMM => Partnership with professional societies

1. Collaboration with National Academy of Medicine of Korea: Publication and Forum co-organize
   · Gender Medicine Textbook: Won best book of the year(2023) by The National Academy of Science, ROK
   · Gender Medicine adopted into a few medical school curriculum



Selected an excellent academic book by the NAS, ROK (‘23)

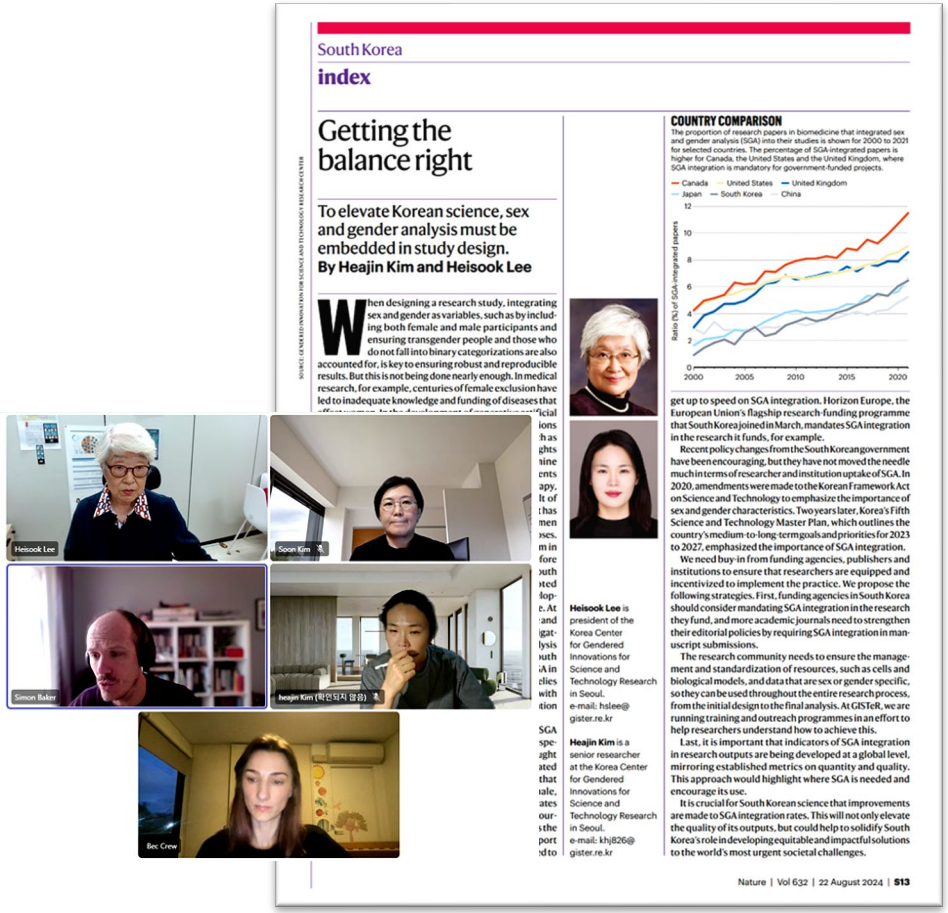
2. Collaboration with Professional Societies: Co-host Workshop on GI with KSBNS at the Biennial Meeting of APSN (2024.10.17, 2025.8.26)

3. Special Session on GI at annual symposium co-hosted by KSMBE and GISTeR (2024.11.8)

4. Launch: The Korea Society of Sex and Gender Specific Biomedical Science

Actions to increase awareness on Gendered Innovations:

- Reflect GI to research Assessment: Collaboration with Nature Index to develop indices or indicators



South Korea

index

Getting the balance right

To elevate Korean science, sex and gender analysis must be embedded in study design.

By Heajin Kim and Heisook Lee

When designing a research study, integrating sex and gender as variables, such as by including both female and male participants and ensuring transgender people and those who do not fall into binary categorizations are also accounted for, is key to ensuring robust and reproducible results. But this is not being done nearly enough. In medical research, for example, centuries of female exclusion have led to inadequate knowledge and funding of diseases that

COUNTRY COMPARISON

The proportion of research papers in biomedicine that integrated sex and gender analysis (SGA) into their studies is shown for 2000 to 2021 for selected countries. The percentage of SGA-integrated papers is higher for Canada, the United States and the United Kingdom, where SGA integration is mandatory for government-funded projects.

Canada — United States — United Kingdom
Japan — South Korea — China

Ratio (%) of SGA-integrated papers

get up to speed on SGA integration. Horizon Europe, the European Union's flagship research-funding programme that South Korea joined in March, mandates SGA integration in the research it funds, for example.

Recent policy changes from the South Korean government have been encouraging, but they have not moved the needle much in terms of researcher and institution uptake of SGA. In 2020, amendments were made to the Korean Framework Act on Science and Technology to emphasize the importance of sex and gender characteristics. Two years later, Korea's Fifth Science and Technology Master Plan, which outlines the country's medium-to-long-term goals and priorities for 2023 to 2027, emphasized the importance of SGA integration.

We need buy-in from funding agencies, publishers and institutions to ensure that researchers are equipped and incentivized to implement the practice. We propose the following strategies. First, funding agencies in South Korea should consider mandating SGA integration in the research they fund, and more academic journals need to strengthen their editorial policies by requiring SGA integration in manuscript submissions.

The research community needs to ensure the management and standardization of resources, such as cells and biological models, and data that are sex or gender specific, so they can be used throughout the entire research process, from the initial design to the final analysis. At GISTeR, we are running training and outreach programmes in an effort to help researchers understand how to achieve this.

Last, it is important that indicators of SGA integration in research outputs are being developed at a global level, mirroring established metrics on quantity and quality. This approach would highlight where SGA is needed and encourage its use.

It is crucial for South Korean science that improvements are made to SGA integration rates. This will not only elevate the quality of its outputs, but could help to solidify South Korea's role in developing equitable and impactful solutions to the world's most urgent societal challenges.

Heisook Lee is president of the Korea Center for Gendered Innovations for Science and Technology Research in Seoul. e-mail: hslee@gister.re.kr

Heajin Kim is a senior researcher at the Korea Center for Gendered Innovations for Science and Technology Research in Seoul. e-mail: khj826@gister.re.kr

- Responsible reform of research assessment could deliver more value for South Korea

https://www.springernature.com/gp/advancing-discovery/springboard/blog/blogposts-open-research/kraf-2024-research-assessment/27701464

Soon Kim and Ayako Miyazaki
Author: Soon Kim and Ayako Miyazaki

Springer Nature held its inaugural Korea Research Advisory Forum (KRAF) on August 20, 2024, bringing together a diverse group of influential figures from South Korean research organisations.

The importance of diversity and inclusion in research practices was also emphasised by Heisook Lee, President, GISTeR, addressing key areas for improvement, including the integration of gender and gender-based analysis as a vital step towards fostering more inclusive
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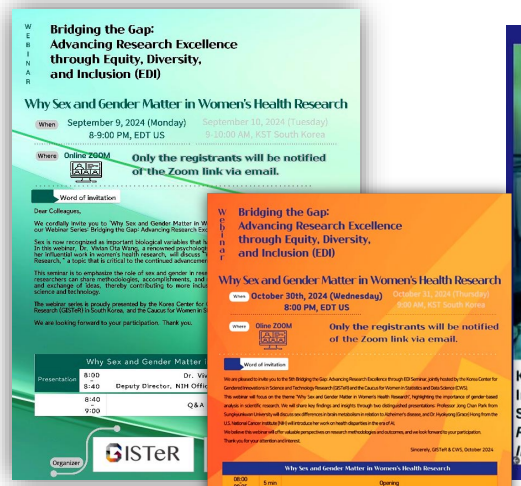
that support diversity were
s
to be embedded into resea
need for a diverse approac
effectiveness and relevanc

Actions to increase awareness on Gendered Innovations:



https://www.youtube.com/watch?v=-AHvoyZPwdg

GISTeR-CWS Webinar on GI

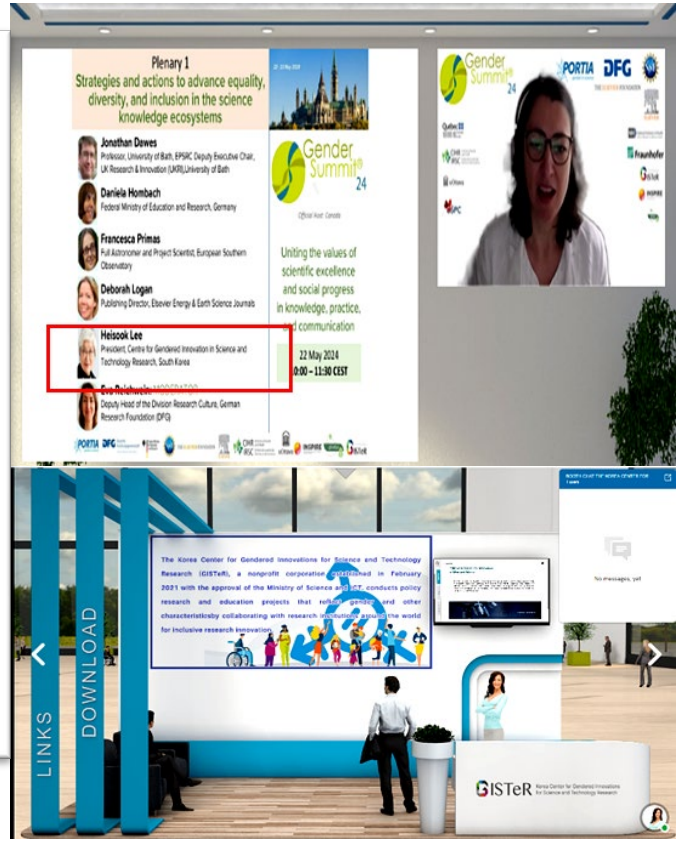
Pavital Webinar to disseminate gendered innovations with Vietnam:

- Share the knowledge on GI
- From Vietnam we learned on the health equity in the area of SGBA in dieseas related toi global warming
- Identify the research collaboration topics
- GISTeR-UN Women Center in Korea- Gender Medicine Research Center in SNU Bundang Hospital

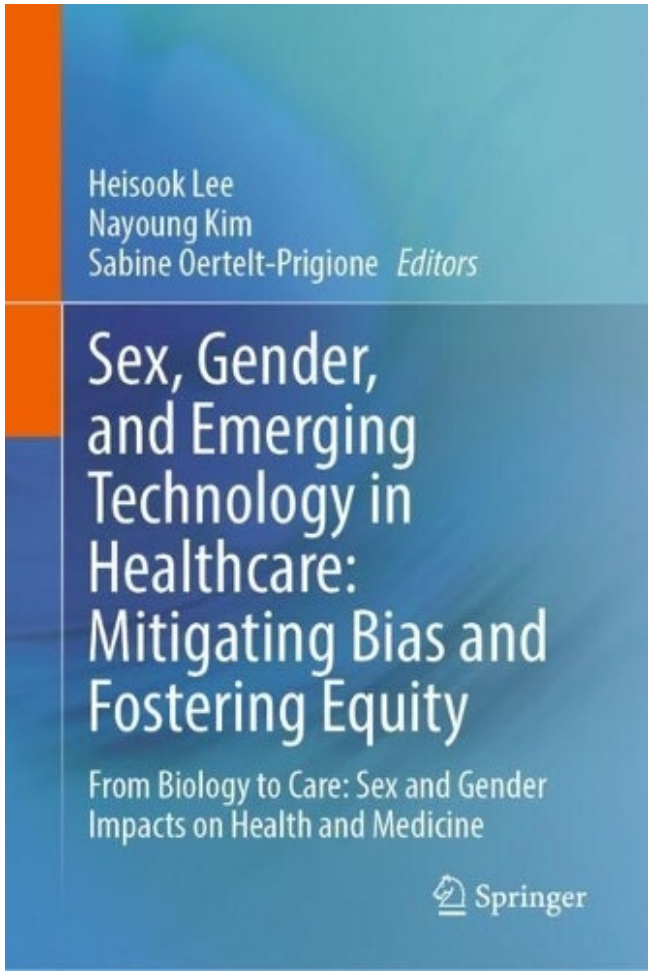
Actions to increase awareness on Gendered Innovations

Promote Gendered Innovations for Sustainable Development through Gender Summits:

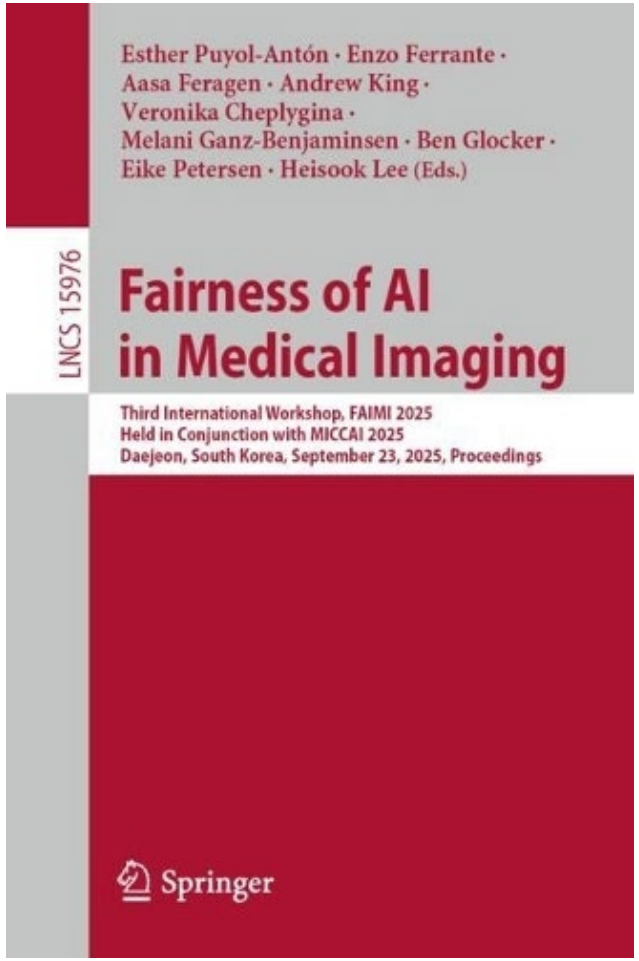
- Co-Host Gender Summit AP in 2015
- Co-Host Gender Summit Global for SDGs
- Through partnership of GS, we share Korean Initiatives on Gendered Innovations



Actions to increase awareness on Gendered Innovations



This book is an outcome of BrainLink 2023 held in Korea hosted by GISTeR and KOFST in 2023.



Fairness of AI in Medical Imaging: Third International Workshop, FAIMI 2025, Held in Conjunction with MICCAI 2025, Daejeon, South Korea, September 23, 2025

WISET's Initiative for DEI: Networking to build DEI Allyship

한국다양성협의체
Korea Diversity Committee

다양성이 만드는 더 나은 미래
포용이 만드는 더 큰 가치

다양한 배경을 가진 조직이 함께 만든 한국다양성협의체는 포용적인 미래를 위한 플랫폼입니다. 우리는 다양한 목소리를 위한 공론의 장을 마련하고, 함께 성장하는 협력 체계를 구축하여 사회 인식 개선을 위해 노력합니다. 우리 는 다양성 담론을 생산하는 포럼 기획, 교육 프로그램 개발 및 운영 등을 통해 사회 변화를 선도하고 있습니다.

연혁 (History)

2024. 1. 23.
한국다양성협의체 준비위원회 발족
(6개 기관)

2024. 6. 18.
한국다양성협의체 발족
(8개 회원사)
초대 의장 취임: 문애리
한국여성과학기술인육성재단 이사장

2024. 8. 9.
제1기 운영위원회 위원 위촉

2024. 11. 9.
한국다양성포럼 개최

2024. 12. 9.
2024년도 하반기 정기회의 개최

2025. 2. 26.
편집위원회 구성

2025. 3. 27.
2025년도 상반기 정기회의 개최
제2대 의장 취임: 문애리
한국여성과학기술인육성재단 이사장(연임)
제2기 운영위원회 위원 위촉(연임)

2025. 4. 30.
뉴스레터 창간호 발행

협의체 활동

한국다양성포럼
(Korea Diversity Forum)

다양한 조직이 함께하는 열린 토론의 장을 마련하여, 다양성 & 포용성 가치 실현에 대한 영감과 전략을 교류하고 새로운 담론을 생산합니다.

다양성 기반 조직 운영을 위한 정보 및 교육 프로그램 지원

다양성의 가치가 조직의 우수성과 창의성을 제고하는 핵심 자원으로써 정착할 수 있도록 실행 가이드 및 맞춤형 교육 프로그램을 제공합니다.

협력 네트워크 구축

모든 조직이 다양성과 포용성을 실현하고 지속 가능한 성장을 이룰 수 있도록 다양한 이해관계자와 협력하여 네트워크를 구축합니다.

WISET's Initiative for DEI: Networking to build DEI Allyship

다양한 관점과 경험을 통해 더 나은 해결책을 찾고, 포용적인 문화를 정착시켜 우리 사회에 선한 영향력을 행사하는 데 관심 있는 조직의 참여를 기대합니다.

총 17개 회원사

공공기관

WISET 한국여성과학기술인육성재단

한국여성과학기술인육성재단

기업

GM 한국사업장 | 온세미 코리아 | 포스코이앤씨 | HP 프린팅 코리아 | 한국 IBM | 유한킴벌리 | 기아

대학교

서울대학교 다양성위원회 | 카이스트 포용성위원회 | 경북대학교 다양성위원회 | 부산대학교 다양성위원회 | 고려대학교 다양성위원회

협회 및 단체

실천하는 다양성 네트워크 | 대한여성과학기술인회 | 한국여성과학기술단체총연합회 | 한국과학기술젠더혁신센터

- Seoul National University has established a university-wide DEI Committee. Furthermore, the Medical College has independently established its own DEI Committee, reflecting its specific agenda and appointing a chair.

감사합니다.
ご清聴ありがとうございました
Thank you