



WHAT WOMEN'S NETWORKS CAN DO TO CLOSE THE GENDER GAP

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The Mission

More representation of women
(Gender Balance)

Diversity & Inclusion
(Beyond Gender, Balanced Human
Development)



DATA-BASED SOLUTION: MEASURING THE PARTICIPATION OF WOMEN



Numbers

- Women in STEM: a policy issue worldwide since early 2000
 - EU : SHE Figures (1999 proposed pan European statistics on women in STEM, First publication in 2003)
 - US (NSF's "Realizing America's potential" 2000, report in 2003)
 - "Federal Gov't should expand funding for programs that best succeed in graduating underrepresented minorities and women in S&E. ..."
 - UNESCO (1999 World Conference on Science → 2004 Mainstreaming gender issue as top priority identified in International Consultation in S&T Priorities and Information)
- Numbers as "evidence based statistics" for policy & decision making
- Sex –disaggregated indicators can visualize gender disparities



Numbers measured in various ways

- Numbers as Indicators, Information, Statistics, Gender Impact Assessment (GIA)
- UIS, Eurostat, OECD, WEF, ISC, SAGA (tool kit) etc

Human Development Index, UNDP
Gender Inequality Index, UNDP
Gender Gap Index, WEF



Components of HDI (since 1980?)

Components of HDI	Basis of calculation
Life expectancy at birth 기대수명	Life expectancy at birth assuming that the death rate will be maintained as when one was born
Mean years of schooling 평균 교육년수	Years that a 25-year-old person or older has spent in schools
Expected years of schooling 기대 교육년수	Years that a 5-year-old child will spend with his education in his whole life
Gross national income per capita 1인당 실질국민소득	Measured based on Purchasing Power Parity (PPP)



Components of GGI (since 2006)

Structure of the GGI (ratio = Female/Male)

Subindex	Variable	Weights	Source
Economic participation and opportunity	Female labor force participation over male value	0.199	International Labor Organization
	Wage equality between women and men for similar work	0.310	World Economic Forum
	Female estimated earned income over male value	0.221	World Economic Forum
	Female legislators, senior officials and managers over male value	0.149	International Labor Organization
	Female professional and technical workers over male value	0.121	International Labor Organization
	Total	1	
Educational attainment	Female literacy rate over male value	0.191	UNESCO Institute for Statistics
	Female net primary enrolment rate over male value	0.459	UNESCO Institute for Statistics
	Female net secondary enrolment rate over male value	0.230	UNESCO Institute for Statistics
	Female gross tertiary enrolment ratio over male value	0.121	UNESCO Institute for Statistics
	Total	1	
Health and survival	Sex ratio at birth (converted to female-over-male ratio)	0.693	Central Intelligence Agency
	Female healthy life expectancy over male value	0.307	World Health Organization
	Total	1	
Political empowerment	Females with seats in parliament over male value	0.310	Inter-Parliamentary Union
	Females at ministerial level over male value	0.247	Inter-Parliamentary Union
	Number of years of a female head of state (last 50 years) over male value	0.443	World Economic Forum
	Total	1	

Source: WEF, Global Gender Gap Report



SHE Figures (since 2003)

- Pool of graduate talent
- Participation in S&T Occupations
- Labour market participation as researchers
- Working conditions of researchers
- Career advancement and participation in decision-making
- Research and innovation output



135.6 years

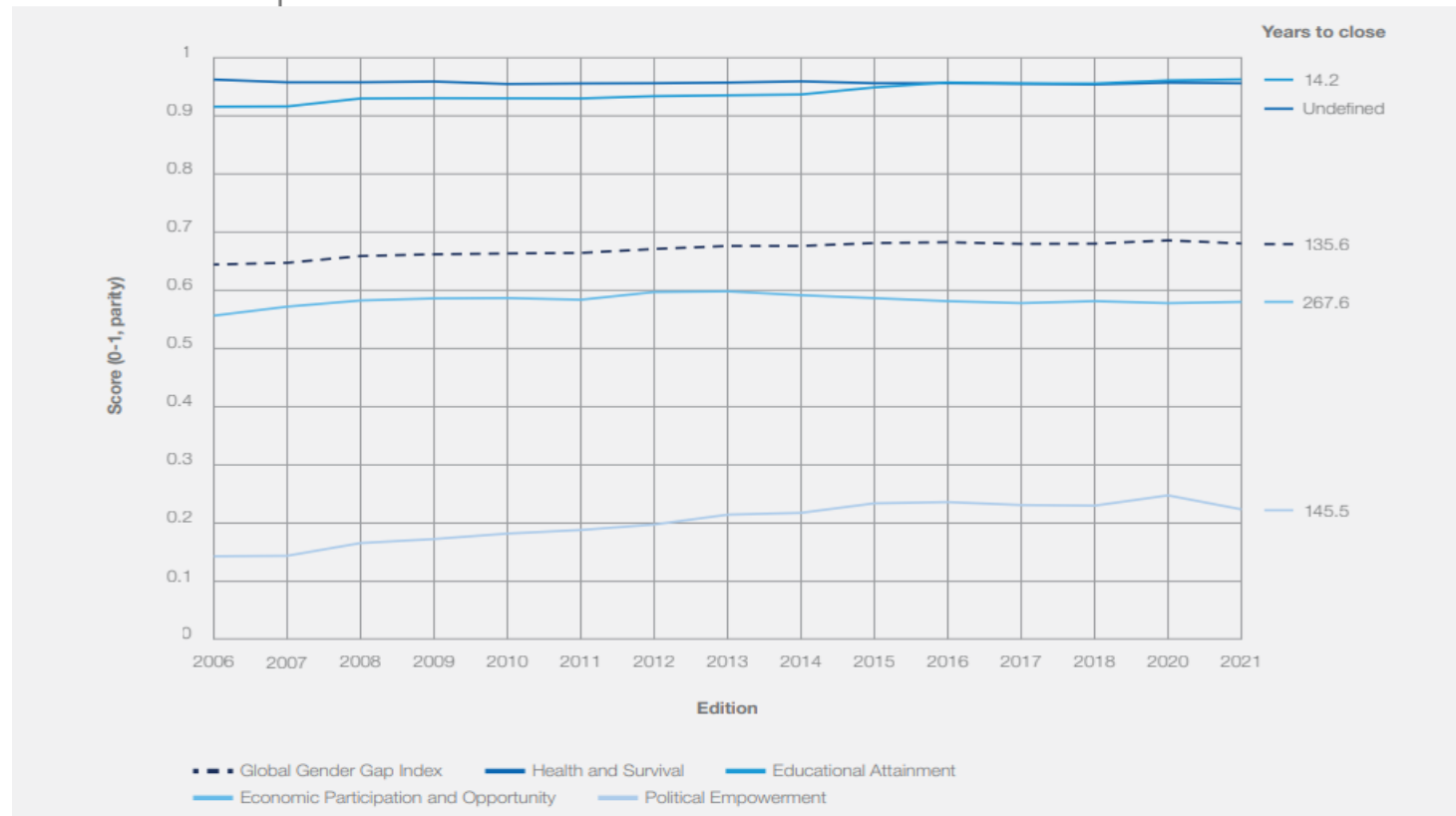


Gender gaps will fully close in 135.6 years at the current rate

FIGURE 1.4

Evolution of the Global Gender Gap Index and subindexes over time

Evolution in scores, 2006–2020





How have the numbers changed?

- Gender gap is still vivid
- Gender gap varies by nation (eg Korea vs Mongolia),
by fields (eg, Biotechnology vs Space technology)
and by workplace (eg, industry vs university)
- Fixing the numbers vs Fixing the system
(Gender barrier perceived by women themselves)



WOMENS NETWORKS... HOW, AND WHY?



Notable Organizations

- General STEM-oriented groups
 - American Association of University Women (1881)
 - Association of Women in Science (1971)
 - European Platform of Women Scientists (2005)
 - Graduate Women in Science (Sigma Delta Epsilon Graduate Women in Science, Cornell University, 1921)
 - **International Network of Women Engineers and Scientists (2002)**
 - Organization for Women in Science for the Developing World (1987)
 - Kovalevskaja Fund (to support women in science in Vietnam, 1985)
- Subject-specific groups: **WES (1919)**, SWE (1950) etc
- Location-specific groups : KWSE (1993) etc



THE ASSOCIATION OF KOREAN WOMAN SCIENTISTS AND ENGINEERS ■ ■ ■ ■ ■

KWSE was established as one of the first associations of women scientists and engineers in Korea. KWSE aims to contribute to the enhancement of the scientific capacity as well as to the status-uplifting of the women in industry, academia and research institutes.

*Established in 1993
as the first formal organization
of women in STEM in Korea*



**Started in Daejeon
with about 250
women in STEM**

**Most of them
were contingent
employees**



GGGI Korea, 2006-2022

Year (no of countries)	GGI (Rank)	Economic Participation and Opportunity (Rank)	Education Attainment (Rank)	Health and Survival (Rank)	Political Empowerment (Rank)
2006 (115)	0.616 (92)	0.481 (96)	0.948 (82)	0.967 (94)	0.067 (84)
2012 (135)	0.636 (108)	0.509 (116)	0.959 (99)	0.973 (78)	0.101 (86)
2016 (144)	0.649 (116)	0.537 (123)	0.964 (102)	0.973 (76)	0.120 (92)
2020 (153)	0.672 (108)	0.555(127)	0.973 (101)	0.980 (1)	0.179 (79)
2022 (146)	0.689 (99)	0.592 (115)	0.973 (104)	0.976 (54)	0.214 (68)
Changes ('22- '06)	0.073	0.111	0.025	0.009	0.147



GGGI Korea, 2022

Total population		2019	2020	2021
Work participation and leadership				
Indicator	Unit	Value		
Gender pay gap (OECD only)	%	31.48		
Share of women's membership in boards	% (OECD countries only)	8.70		
Firms with female majority ownership	% firms	n. a.		
Firms with female top managers	% firms	n. a.		
Share of workers in informal sector	% workers	n. a.		
Indicator	1-7 (best)	Value		
Advancement of women to leadership roles		4.45		
Indicator	1 Million people	◆ Female	◆ Male	Value
Labour-force		12.05	16.26	0.43
Indicator	Unit	◆ Female	◆ Male	Value
Unemployed adults (15-64)	% of labour force	3.10	3.18	3.14
◆				
Workers employed part-time	% of employed people	0.35	0.19	0.25
◆				
Proportion of time spent on unpaid domestic and care work	%	2.85	1.04	n. a.
◆◆				
Access to finance				
Indicator	0-1 (Equal rights)	Value		
Access to financial services		Equal rights	◆	
Inheritance rights for widows and daughters		Equal rights	◆	
Access to land assets		Near-equal rights	◆	
Access to non-land assets		Near-equal rights	◆	
Civil and political freedom				
Indicator	Unit	Value		
Year women received right to vote	year	1948		

Right to divorce		Equal rights		
Indicator	Days	Female	Male	Value
Length of parental leave		90.00	14.00	n. a.
Education and skills				
Indicator	Attainment %	Female	Male	Value
STEM Graduates		25.22	74.78	0.34
Agri., Forestry, Fisheries & Veterinary		44.83	55.17	0.81
Arts & Humanities		66.04	33.96	1.94
Business, Admin. & Law		49.02	50.98	0.96
Education		77.27	22.73	3.40
Engineering, Manuf. & Construction		20.05	79.95	0.25
Health & Welfare		71.48	28.52	2.51
Information & Comm. Technologies		n. a.	n. a.	n. a.
Natural Sci., Mathematics & Statistics		49.20	50.80	0.97
Social Sci., Journalism & Information		60.17	39.83	1.51
Vocational training		11.96	16.23	14.20
PhD graduates		0.39	1.17	0.77
Graduates %		Female	Male	Value
Graduates from tertiary education		54.63	48.11	51.21

Captured 2022-08-18 from the WEF Global Gender Gap Report 2021 (p217)



Enactment of the law on “Fostering and Supporting Women in Science and Technology”

- The year 2002 marks an important turning point in the history of women scientists in Korea
- Legal basis for policies to support women scientists and engineers
- Basic Plan (National Plan) renewed every 5 years
 - Designation of officers in charge of women in STEM
 - Affirmative action: Target system



International Network of Women Engineers & Scientists

INWES is a global network of organizations of women in STEM, with Organizational Members, Corporate Members, University Members, and Individual Members, all together representing about 250,000 women from over 40 countries worldwide.

“To build a better future worldwide through full and effective participation of women and girls in all aspects of STEM”





History of INWES

- 1964: the Continuing Committee for the International Conferences for Women Engineers and Scientists (ICWES)
- **2002: INWES established (ICWES 12)**
- 2004: Incorporated in Canada as a not-for-profit corporation
- 2008: Official NGO partner of UNESCO with consultative status
- 2017: Consultative status of UN Economic and Social Council

“As a solution to tackle the issue of gender imbalances in STEM, UNESCO aims to support and promote networks of women scientists in various scientific domains and regions, such as, among others, ... the International Network of Women Engineers and Scientists.”



International Conference of Women Engineers & Scientists

ICWES is the flagship event of INWES which is an international conference for women engineers and scientists held every 3-4 years since 1964.

The first ICWES (**ICWES 1**) was held in New York, USA,
hosted by the Society of Women Engineers (SWE).

ICWES 2 was held in Cambridge, UK in 1967

hosted by the Women's Engineering Society (WES).

ICWES 18 was most recently held and the first virtual ICWES, hosted by U Warwick,
UK, 2020(21)

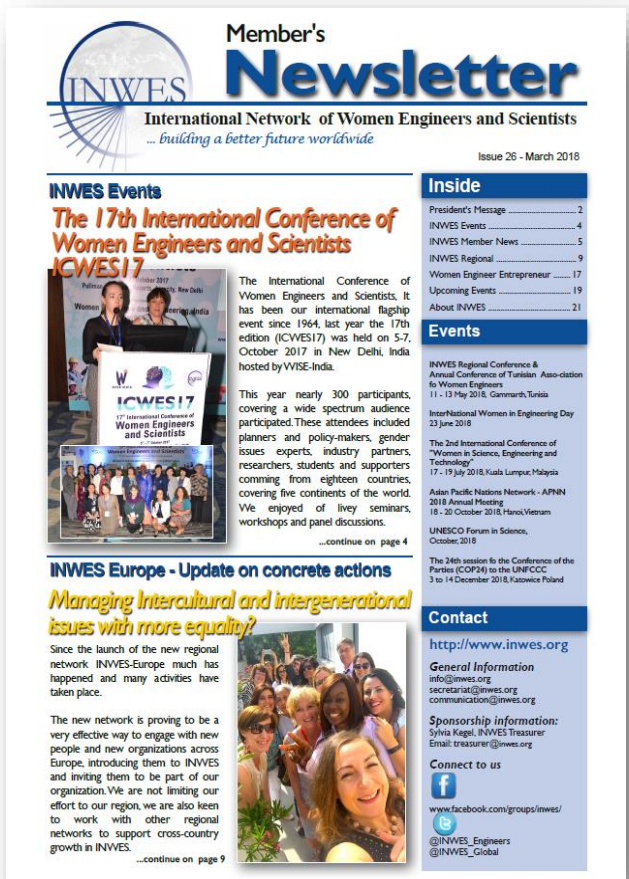
ICWES19 will be held in hybrid format in New Zealand (AWIS & EngNZ), 2023





INWES Functional Areas and Programs

- **Advocacy** : Provide an international voice for women in STEM careers such as at UN Women and UNESCO events and other international conferences
- **Communications** :
 - Produce quarterly newsletters regarding women in STEM activities and events worldwide
 - Establishing a web portal for information on women in STEM
- **Research** : Share of research via conferences, publications and collaborations





INWES Functional Areas and Programs

- **Outreach Programs on Gender & STEM :**

Conduct programs and share best practices for outreach to girls and their parents, encouragement for college students, and professional and leadership development for members

- **Support New Women in STEM Networks:**

Encourage the foundation of new organizations for women in STEM for professional development and recognition

- **Conduct Workshops :** Provide workshops for schools, universities, employers and professional associations

- **Seek travel support for members:** Establish relationships with corporations and foundations to support travel for women in STEM to study abroad and attend workshops and present research at conferences



Collaboration

UN Millennial Declaration MDGs for 2020 followed by SDGs for 2030

- Removal of gender segregated work
- Governments resolved to empower women as effective ways to promote sustainable development
- UN Framework Convention on Climate Change, 2012 including gender and climate change
- Governments are to ensure equal access for women to full and productive employment and decent work
- Girls in STEM – focus for education worldwide



INWES is collaborating through UN Women and ECOSOC



INWES Projects for 2022

✓ **Research & Education**

- ✓ INWES-KWSE Joint Survey on Gender Barriers in STEM, year 2
- ✓ Electrifying Women : History of women engineers and applied scientists
- ✓ Gender in STEM Conference

✓ **UN Women: COP27 / NGO CSW 66**

✓ **Conference: Webinars (Enhancing Research Culture project funded by U Warwick) & 20 year anniversary celebration**

✓ **Regional networks annual meetings & Reports**

✓ **Support the establishment of new STEM organizations/network :**

✓ **Collaborations:**

- ✓ UNESCO, the UN Women, WFEO and other international STEM organizations



Why Perception of Gender Barrier?

- ⑩ Increasing numbers or proportions of women in STEM is NOT enough.
- ⑩ Cultural change including awareness of hidden barriers is needed.
- ⑩ A GISE index can be a “tool for change”



An INWES KWSE Collaborative Study on the Perception
of Gender Barriers in STEM

GENDER BARRIERS IN STEM



The APNN Collaborative Study



- APNN was established as the first regional network of INWES in 2011 at ICWES15
- The Study was organized by KWSE, 2014-2018
- Participating Countries : Australia, Bangladesh, India, Japan, Korea, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Sri Lanka, Taiwan, Vietnam



Scope of the 2021 Study

Purpose:

- ⑩ share statistical data on gender perceptions in the STEM fields
- ⑩ by country, gender and age
- ⑩ **foundation and pilot for developing international indicators on women in STEM and a continued longitudinal study**
- ⑩ play a key role in building a policy road map for the balanced development of future human resources worldwide.

Targets & numbers





The Questionnaire

Key questions - based on 2018 APNN survey

Section B: Perception of Gender Barriers in STEM

Sections C/D: Direct/Indirect Experience of Gender Barriers in STEM (C - female; D - male)

Section E: Career outlook for women in STEM and need for Support Policies to combat Gender barriers

Section F: Gender Equity and Gender Roles

Section G: Gender Barriers in the work, study and research environments in STEM

Section H: Respondent's own STEM Career.

= Same languages and using Google Forms



<http://www.inwes.org/gise>

The 2021 Report on International Perceptions of Gender Barriers in STEM

Outputs and outcomes of the INWES-KWSE Pilot Survey
“Gender perceptions in Science and Engineering” (GISE)

The International Network of Women Engineers and Scientists (INWES) &
The Association of Korean Woman Scientists and Engineers (KWSE)





How Networks can close the Gender Gap & Overcome the Barriers ?

- **Collective Wisdom through Networking**
 - Networks that can set the gender norms in STEM.
 - Successful networks can support the start of new organizations, worldwide

- **Voice of Women into Numbers**
 - The Voice of Women can be heard better
 - Networks can conduct collaborative research to reveal “numbers”
 - The “numbers” can convince policy makers -> Law

- **Support for Future women in STEM**
 - Gender barriers exist, in a different form from the past



Thank you!

“building a better future worldwide through the full participation of women in girls in STEM”

<http://www.inwes.org>