The 2014
Policy Report on
Balanced Development of
Human Resources for the Future

Analyses of Global Gender Indicies & Joint Survey Results from APNN Countries

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Foreword

A nation's competitiveness for the future hinges on successful nurturing and cultivation of creative talent in conjunction with science and engineering. For a country like Korea that lacks natural resources, cultivation of competent human resources has always been a matter of great importance, which will only increase for years to come in the process of national development. However, labor force participation rate by highly educated women has always been low, indicating a severe waste of talent. This policy study therefore has started from our contemplation of an efficient measure to ensure balanced development of human resources for the future; this report is the outcome of our study, which was carried out from January 2014 as part of the International Cooperation Policy Project of The Association of Korean Women Scientists & Engineers (KWSE). This English version is the selected translation of the Korean report, excluding some contents only relevant to Korea.

Taking into consideration the need to propose a policy based on analysis of quantitative statistical data, the study team first carried out an analysis of indices published by the Organization for Economic Cooperation and Development (OECD), the World Economic Forum (WEF) and the United Nations Development Programme (UNDP). A joint survey on gender equality in the fields of science and engineering was then conducted for comparative analyses by nationality, age and field (science or engineering). A total of 1,329 women participated from 11 member countries of the Asia and Pacific Nations Network (APNN) of the International Network of Women Engineers and Scientists (INWES), in which KWSE has been playing a leading role. Moreover, the study team collected and analyzed the current policies of 12 countries on gender equality in the fields of science and engineering. In addition, through the Policy Forum of the Meeting of Asia and Pacific Women in Science and Technology (MAPWiST), which took place on July 30, 2014 at Ewha Womans University in Korea, information was gathered which include data on the status of female science and engineering professionals in Asia presented by Mr. Schaaper of the UNESCO Institute for Statistics; best-practice cases from the Cooperative Program of the University of Waterloo in Canada by Ms. Jarvie; information on gender equality policies implemented in Europe by Ms. Caroline Belan-Menagier. Materials from the panel discussions among the representatives from APNN member countries have also been attached.

The significance of this study comes from the fact that it represents the first joint international survey among APNN member countries. Since 2003, the EU has been publishing every three years the "She Figures" which is a collection of statistics for policies targeting gender innovation in science and engineering. Though this report has yet to reach such a level, we hope that it will serve as a foundation for creating an Asian equivalent, and lay a foundation for policy development to ensure balanced utilization of highly educated and talented female science and engineering professionals in the Asia and Pacific region, including Korea.

November 20, 2014

The Policy Forum Committee for MAPWiST
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1) Representative to APNN or the person in charge of the survey.

Established in 2011, APNN is the Asia-Pacific regional network of INWES. APNN currently has 12 member countries which are INWES members of the Asia and Pacific region. The annual meetings of APNN took place in Australia in 2011, in India in 2012 and in Taiwan in 2013, followed by the latest meeting in Korea in 2014. The first chair organization was KWSE of Korea; INWES-Japan was elected the second chair organization for 2014. The 2015 APNN meeting will take place in Mongolia.

2) Did not participate in the survey but submitted the Action Plan.

Summary

- **International Indices on Human Resource Development by APNN Member Country**

(HDI=1: most developed, GDI=1: complete equality, GII=0: complete equality, GGI=1: complete equality)

Country	UNDP HDI		UNDP GDI		UNDP GII		WEF GGI	
	2013 from 187 countries		2013 from 187 countries		2013 from 152 countries		2014 from 142 countries	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Nepal	145	0.912	102	0.912	98	0.479	112	0.6458
New Zealand	7	0.971	47	0.971	34	0.185	13	0.7772
Malaysia	62	0.935	91	0.935	39	0.210	107	0.6520
Mongolia	103	1.021	32	1.021	54	0.320	42	0.7212
Vietnam	121	0.638	-	-	58	0.322	76	0.6915
Sri Lanka	73	0.750	66	0.961	75	0.383	79	0.6903
India	135	0.586	132	0.828	127	0.563	114	0.6455
Japan	17	0.890	79	0.951	25	0.138	104	0.6584
Taiwan	-	-	-	-	-	-	-	-
Pakistan	146	0.537	145	0.750	127	0.563	141	0.5522
Korea	15	0.891	85	0.940	17	0.101	117	0.6403
Australia	2	0.933	40	0.975	19	0.113	24	0.7409

Please note that the sequence of the countries listed are according to the Korean alphabetical order.

(Source: UNDP Human Development Report 2014; WEF Global Gender Gap Report 2014)

- **Answers to Individual Survey Questions by APNN Members**

Q1 Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education from primary school to college?
Q2 What do you think about the description of female scientists/engineers in your textbooks during your education from primary school to college? Was there a balanced depiction of male and female scientists (or engineers)?
Q3 Do you believe the contributions of female scientists (engineers) are fairly described with respect to those of their counterparts?
Q4 Have you experienced any unfair evaluation during your science education due to your gender?
Q5 Do you think you have got less attention from teachers compared to boys due to your gender during science education?
Q6 Have you felt any sort of chilly climate for women during your science education, such as sexual harassment or hostile comments about women?
Q7 Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibit the pursuit of a professional science career?

Country	Number of respondents	Q1	Q2	Q3	Q4	Q5	Q6	Q7
		M=2.45	M=2.40	M=2.95	M=1.98	M=2.36	M=2.00	M=2.47
Nepal	105	2.43	2.36	2.59	1.73	2.09	2.30	2.62
Malaysia	106	2.81	2.60	2.92	1.88	2.13	1.89	1.97
Mongolia	323	2.33	2.40	4.00	2.18	2.38	1.76	2.05
Vietnam	100	2.74	2.69	2.77	2.01	2.06	1.80	2.37
Sri Lanka	101	2.72	2.68	2.75	1.99	2.07	1.79	2.41
India	100	2.12	2.28	2.21	1.88	2.01	2.18	2.94
Japan	103	2.06	2.83	2.99	1.52	3.52	2.15	2.84
Taiwan	104	2.69	1.64	1.99	2.09	2.77	2.25	3.08
Pakistan	105	2.66	2.62	2.74	2.09	2.16	2.09	2.95
Korea	123	2.36	2.26	2.69	2.06	2.46	2.04	2.56
Australia	67	2.16	1.95	2.40	1.83	2.20	2.42	2.00

* Out of a 5 point scale, gender equality is higher with higher numbers for Q1~Q3, and with lower numbers for Q4~Q7.

- **The top three difficulties APNN members face as women scientists and engineers, and related policies, overall and by country**

Country	Top 3 Difficulties	Policies to Nurture and Utilize Women Scientists and Engineers
APNN (overall)	Work/life balance Workplace culture Lack of career support	Although policies vary from country to country, groups of female science and technology professionals are taking leading roles in policy proposals and operation of relevant programs. There is an overall shortage of policies for gender equality and for changing social perception, compared to education, mentoring, and career development programs.
Nepal	Work/life balance Lack of job opportunity Discrimination	Very few programs are being implemented. Priority should be placed on presenting role models and on improving workplace culture to help female students advance into science and technology fields.
New Zealand	*Did not participate in the survey*	Mentoring programs for each life-cycle stage (education, career fair, mentoring) are available. Programs for mid-level female science and engineering professionals as well as better acceptance of flexible working hours are needed.
Malaysia	Work/life balance Career limits in technical roles Lack of women in senior roles	Policies and programs to promote science are active. But programs specifically designed for women are needed. Childcare facilities at work and employment policies based on gender equality need to be activated.
Mongolia	Work/life balance Lack of women in senior roles Lack of career support	Science education and the environment for science and technology need to be activated. Establishment of infrastructure and English education for the global era are urgently needed. Future policy development is anticipated with the establishment of WSTEM for female scientists/engineers.
Vietnam	Work/life balance Lack of career support Career limits in technical roles	Programs for gender equality in general, rather than in science and technology, are in operation. The “Girls to School” policy is being implemented due to the low female school enrollment ratio. Policies are needed to raise the ratio of female leaders in senior positions.
Sri Lanka	Work/life balance Lack of career support Lack of women in senior roles	Educational programs need to be activated. Plans are underway to start “pocket meetings” for college students and mentoring programs for working women in 2015. Future policy development is anticipated, with the establishment of an organization for female scientists/engineers.
India	*No response*	Raising the school enrollment ratio for females is urgently needed. A mentoring program in STEM is underway.
Japan	*No response*	Camps and mentoring for high-school girls and above are active. Career development programs for graduate school students, and for childcare facilities at workplace as well as for afterschool programs to ensure “work/life balance” are needed.
Taiwan	Workplace culture Work/life balance Lack of career support	Gender issues are best implemented among all participating countries. Gender science camps, performance of gender analysis in research projects, and implementation of recruitment and promotion target systems are needed.
Pakistan	Work/life balance Workplace culture Lack of job opportunity	Various programs for science education and equal employment policies are in place. However, education in and policies for science and technology focusing on gender are still needed.
Korea	Work/life balance Workplace culture Lack of job opportunity	Being the only country that enforces the “Act on Fostering and Supporting Women Scientists and Technicians,” Korea operates various programs for each life-cycle stage and has a number of policies including the recruitment target system, promotion target system, and officer-in-charge system. But more efforts need to be made to enhance the policies’ effectiveness.
Australia	Work/life balance Lack of women in senior roles Workplace culture	Gender equality is well reflected in the education system, and women-friendly programs are in partial operation. Mentoring programs for girls in junior high and high school, and career development and career path development programs for female college students are needed.

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Chapter 1. Current Status of Human Resource Development of APNN Countries

1. Current Status of Human Resource Development of APNN Countries

1-1. Cross-country comparison based on HDI of UNDP

A. HDI composition and cross-country comparison

The Human Development Index (hereinafter referred to as “HDI”) reported every year by the UNDP is the composite statistics of three key dimensions of human development: a long and healthy life, being knowledgeable and a decent standard of living. For the purpose of this measurement, the specific indices of life expectancy, mean years of schooling and expected years of schooling, and gross national income per capita are assessed (see Table 1-1). The HDI is expressed in values between 0 and 1, where a higher HDI translates to greater achievement in human development.

Table 1-1 The components of HDI

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

Table 1-2 lists the 2013 HDI and in specific indices of select countries. A total of 187 countries were subject to the evaluation and have been divided into four groups based on the HDI indices: countries of very high human development (of rank 1 to 49), of high human development (ranks 50 to 102), of medium human development (ranks 103 to 144), and of low human development (ranks 145-187). Norway ranked the highest in terms of human development with a value of 0.994, while Korea ranked 15th with 0.891. Japan, despite having the longest life expectancy, took the 17th place with the score 0.890. Niger was found to be the country of the lowest human development scoring 0.337.

As for the HDI of the countries in the Asia-Pacific region that participated in the current joint survey, Australia, New Zealand, Korea and Japan were in the group of very high human development; Malaysia and Sri Lanka were in the high human development group; Mongolia, Vietnam and India were in the medium human development group; Nepal and Pakistan belonged to the low human development group. The life expectancies of India, Nepal and Pakistan were below 70 years, and their mean schooling years failed to surpass five years, both of which indicate very poor conditions.

Table 1-2 HDI and its components by country (2013)

(HDI=1: Highest human development index)

HDI rank	Countries	HDI	Life expectancy (years)	Mean years of schooling (years)	Expected years of schooling (years)	Purchasing power parity per person (2011 PPP $)
Very high human development						
1	Norway	0.944	81.5	12.6	17.6	63,909
2	Australia	0.933	82.5	12.8	19.9	41,524
3	Switzerland	0.917	82.6	12.2	15.7	53,762
4	Netherland	0.915	81.0	11.9	17.9	42,397
5	U.S.A	0.914	78.9	12.9	16.5	52,308
6	Germany	0.911	80.7	12.9	16.3	43,049
7	New Zealand	0.910	81.1	12.5	19.4	32,569
8	Canada	0.902	81.5	12.3	15.9	41,887
9	Singapore	0.901	82.3	10.2	15.4	72,371
10	Denmark	0.900	79.4	12.1	16.9	42,880
11	Ireland	0.899	80.7	11.6	18.6	33,414
12	Sweden	0.898	81.8	11.7	15.8	43,201
13	Iceland	0.895	82.1	10.4	18.7	35,116
14	England	0.892	80.5	12.3	16.2	35,002
15	Hong Kong	0.891	83.4	10.0	15.6	52,383
15	Korea	0.891	81.5	11.8	17.0	30,345
17	Japan	0.890	83.6	11.5	15.3	36,747
19	Israel	0.888	81.8	12.5	15.7	29,966
20	France	0.884	81.8	11.1	16.0	36,629
49	Argentina	0.808	76.3	9.8	16.4	17,297
High human development						
62	Malaysia	0.773	75.0	9.5	12.7	21,824
73	Sri Lanka	0.750	74.3	10.8	13.6	9,250
91	China	0.719	75.3	7.5	12.9	11,477
Medium human development						
103	Mongolia	0.698	67.5	8.3	15.0	8,466
121	Vietnam	0.638	75.9	5.5	11.9	4,892
135	India	0.586	66.4	4.4	11.7	5,150
Low human development						
145	Nepal	0.540	68.4	3.2	12.4	2,194
146	Pakistan	0.537	66.6	4.7	7.7	4,652
186	Rep. Congo	0.338	50.0	3.1	9.7	444
187	Niger	0.337	58.4	1.4	5.4	873

(Shaded) APNN countries (except Taiwan. No HDI data found on Taiwan)

(Source: UNDP Human Development Report 2014)

A. Cross-country comparison based on the GDI and the HDI by gender

The UNDP also publishes an index that shows male HDI against female HDI; this is known as the gender-related development index (hereinafter referred to as GDI). The GDI values for the countries listed in Table 1-2 are listed in Table 1-3. In the GDI, the country with the lowest gender gaps ranks the highest, and when the value of [(female HDI)/male HDI]-1] is closer to 0, the ranking is higher. Though not shown in the table below, Slovakia, whose HDI ranking is the 37th at 0.830, ranked top in GDI as its female HDI is the same as its male HDI. It is quite notable that Korea, despite being at the 15th in the HDI, has a much lower ranking of 85th in terms of GDI, indicating that the country's female HDI (0.860) is much lower than its male HDI (0.915).

Table 1-3 GDI ranks and female/male HDI scores by country (2013)

HDI rank	Country	Female HDI/Male HDI	GDI rank	Female HDI	Male HDI
Very high human development					
1	Norway	0.997	5	0.940	0.943
2	Australia	0.975	40	0.920	0.944
3	Switzerland	0.953	76	0.895	0.939
4	Netherland	0.968	51	0.899	0.929
5	U.S.A	0.995	7	0.911	0.915
6	Germany	0.962	61	0.892	0.928
7	New Zealand	0.971	47	0.896	0.923
8	Canada	0.986	24	0.893	0.906
9	Singapore	0.967	52	0.878	0.908
10	Denmark	0.989	17	0.895	0.906
11	Ireland	0.965	56	0.881	0.913
12	Sweden	1.004	6	0.898	0.894
13	Iceland	0.982	30	0.883	0.899
14	England	0.993	13	0.887	0.894
15	Hongkong	0.969	49	0.874	0.902
15	Korea	0.940	85	0.860	0.915
17	Japan	0.951	79	0.863	0.907
19	Israel	0.984	29	0.879	0.893
20	France	0.989	17	0.878	0.888
49	Argentina	1.001	2	0.806	0.805
High human development					
62	Malaysia	0.935	91	0.743	0.794
73	Sri Lanka	0.961	66	0.720	0.749
91	China	0.939	88	0.696	0.740
Medium human development					
103	Mongolia	1.021	32	0.705	0.691
121	Vietnam	-	-	-	-
135	India	0.828	132	0.519	0.627
Low human development					
145	Nepal	0.912	102	0.514	0.564
146	Pakistan	0.750	145	0.447	0.596
186	Rep. Congo	0.822	134	0.304	0.369
187	Niger	0.714	147	0.275	0.385

APNN countries (except Taiwan. No HDI data found on Taiwan)

(Source: UNDP Human Development Report 2014)

1-2. Cross-country comparison based on Gender Inequality Index (GII) of UNDP

As mentioned above, Korea's HDI is relatively good but the gender gap of the HDI is strikingly large. To ensure balanced cultivation of future talent, bridging this gender gap should be addressed as the country's urgent priority. Thus we further pursued a more in-depth analysis of additional indices regarding gender gaps. Internationally, representative gender equality indices include the Gender Inequality Index (GII) of the UNDP and the Gender Gap Index (GGI) of the WEF. Here, we will have a look at the GII of the UNDP first. The GII is a new index developed by the UNDP in 2010 in order to improve on the shortcomings of the GDI, which was briefly touched upon above, and the Gender Empowerment Measure (GEM)[1], which was not mentioned specifically. GII can be used to confirm the loss arising from inequality in male and female development. Korea ranked 27th in GII among 148 countries in 2012.

A. Composition of the GII

As shown in Table 1-4, the GII consists of a total of five indices in three specific areas: reproductive health measured by maternal mortality ratio and adolescent fertility rates, which are special indices dealing only with females to measure female health and inequality in job opportunities; empowerment, measured by proportion of parliamentary seats occupied by females and proportion of adult females and males with at least some secondary education; and economic status, expressed as labor market participation and measured by labor force participation rate.

Table 1-4 The components of GII

Area	Dimensions	
Reproductive health	Maternal mortality ratio	Mortality of women due to pregnancy, delivery and complications (per 100,000 live births)
	Adolescent fertility rate	Births per 1000 women aged 15-19 years old
Empowerment	Female share of parliamentary seats	Female ratio in parliament
	Ratio of secondary education	Ratio of secondary education attainment of population over 25 years old, by sex
Economic status	Labor force participation rate	Female/male ratio of labor force participation of population over 15 years of age (or ages 15 to 64)

As shown in the specific indices, the GII does not include income as one of its indices, considering that statistics on income levels in different countries are not sufficient. Because GII was designed to allow indices with higher correlation to gender equality to have greater values, it is sometimes pointed out as a weakness.

B. Comparison of GII among OECD member countries

Table 1-5 shows the GII of OECD member countries in 2012. The GII values are between 0 and 1, with 0 denoting complete equality and with 1 representing complete inequality. The Netherlands ranked number one at 0.045, whereas Korea ranked 25th out of 34 countries at 0.153 in 2012. Korea's rank went up to 16th out of 34 countries at 0.101 in 2013, indicating that gender inequalities in Korea are being eased.

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1)The GEM is measured by female participation in political activities and political decision-making, female participation in economic activities and economic power.

Table 1-5 GII status of OECD member countries (2013)

- MMR=Maternal mortality ratio
- FSPS=Female share of parliamentary seats
- LFPR=Labor force participation rate
- AFR=Adolescent fertility rate
- RSE=Ratio of secondary education

(unit: points, %, GII=0: complete equality)

Country	GII		MMR	AFR	FSPS	RSE		LFPR	
	OECD/UN rank	Value				Female	Male	Female	Male
Slovenia	1/1	0.021	12	0.6	24.6	95.8	98.0	52.3	63.5
Switzerland	2/2	0.030	8	1.9	27.2	95.0	96.6	61.2	75.3
Germany	3/3	0.046	7	3.8	32.4	96.3	97.0	53.5	66.4
Sweden	4/4	0.054	4	6.5	44.7	86.5	87.3	60.2	68.1
Denmark	5/5	0.056	12	5.1	39.1	95.5	96.6	59.1	67.5
Austria	5/5	0.056	4	4.1	28.7	100.0	100.0	54.6	67.7
Netherland	7/7	0.057	6	6.2	37.8	87.7	90.5	79.9	87.3
Italy	8/8	0.067	4	4	30.6	71.2	80.5	39.4	59.4
Belgium	9/9	0.068	8	6.7	38.9	77.5	82.9	46.9	59.4
Norway	9/9	0.068	7	7.8	39.6	97.4	96.7	61.5	69.5
Finland	11/11	0.075	5	9.2	42.5	100.0	100.0	56.0	64.3
France	12/12	0.080	8	5.7	25.1	78.0	83.2	50.9	61.8
Rep. Czech	13/13	0.087	5	4.9	20.6	99.9	99.7	50.1	67.8
Iceland	14/14	0.088	5	11.5	39.7	91.0	91.6	70.6	77.3
Spain	15/16	0.100	6	10.6	35.2	66.8	73.1	52.6	66.5
Korea	16/17	0.101	16	2.2	15.7	77.0	89.1	49.9	72.0
Israel	16/17	0.101	7	7.8	22.5	84.4	87.3	58.1	69.5
Australia	18/19	0.113	7	12.1	29.2	94.3	94.6	58.8	71.9
Ireland	19/20	0.115	6	8.2	19.5	80.5	78.6	52.7	67.9
Portugal	20/21	0.116	8	12.6	28.7	47.7	48.2	55.4	67.2
Canada	21/23	0.136	12	14.5	28.0	100.0	100.0	61.6	71.2
Japan	22/25	0.138	5	5.4	10.8	87.0	85.8	48.1	70.4
Poland	23/26	0.139	5	12.2	21.8	79.4	85.5	48.9	64.8
Greece	24/27	0.146	3	11.9	21.0	59.5	67.0	44.2	62.6
Luxembourg	25/29	0.154	20	8.3	21.7	100.0	100.0	50.7	64.9
Estonia	25/29	0.154	2	16.8	20.8	100.0	100.0	56.0	68.7
Slovakia	27/32	0.164	6	15.9	18.7	99.1	99.5	51.0	68.7
New Zealand	28/34	0.185	15	25.3	32.2	95.0	95.3	62.1	73.9
England	29/35	0.193	12	25.8	22.6	99.8	99.9	55.7	68.8
Hungary	30/45	0.247	21	12.1	8.8	97.9	98.7	44.7	59.9
U.S.A.	31/47	0.262	21	31.0	18.2	95.1	94.8	56.8	69.3
Chile	32/68	0.355	25	55.3	13.9	73.3	76.4	49.0	74.6
Turkey	33/69	0.360	20	30.9	14.2	39.0	60.0	29.4	70.8
Mexico	34/73	0.376	50	63.4	36.0	55.7	60.6	45.0	80.0

(Source: UNDP, Human Development Report 2014)

C. Comparison of the GII among APNN member countries

Table 1-6 shows the GII among APNN member countries in 2013 for comparison. Korea's GII dropped dramatically from 0.153 in 2012 to 0.101 in 2013, and, as shown in the table below, Korea had the lowest level of gender inequality among all APNN member countries. However, as mentioned above, the index fluctuates from year to year, and thus one must refrain from judging a country's gender equality based on a single year's result only.

Table 1-6 GII values of APNN member countries in 2013

- MMR=Maternal mortality ratio
- AFR=Adolescent fertility rate
- FSPS=Female share of parliamentary seats
- RSE=Ratio of secondary education
- LFPR=Labor force participation rate

(unit: point, %)

Country	GII		MMR	AFR	FSPS	RSE		LFPR	
	OECD/UN rank	Value				Female	Male	Female	Male
Korea	17	0.101	16	2.2	15.7	77.0	89.1	49.9	72.0
Australia	19	0.113	7	12.1	29.2	94.3	94.6	58.8	71.9
Japan	25	0.138	5	5.4	10.8	87.0	85.8	48.1	70.4
New Zealand	34	0.185	15	25.3	32.2	95.0	95.3	62.1	73.9
Malaysia	39	0.210	29	5.7	13.9	66.0	72.8	44.3	75.3
Mongolia	54	0.320	63	18.7	14.9	85.3	84.1	56.1	68.8
Vietnam	58	0.322	59	29.0	24.4	59.4	71.2	72.8	81.9
Sri Lanka	75	0.383	35	16.9	5.8	72.7	75.5	35.0	76.4
Nepal	98	0.479	170	73.7	33.2	17.9	39.9	54.3	63.2
India	127	0.563	200	32.8	10.9	26.6	50.4	28.8	80.9
Pakistan	127	0.563	260	27.3	19.7	19.3	46.1	24.4	82.9

* No data exists for Taiwan, a member of APNN (Source: UNDP, Human Development Report 2014)

D. Recent changes in Korea's GII

Korea's GII has fluctuated recently, as shown in Table 1-7, but, overall, it has a higher level of gender equality when considering the mean GII of the participating countries under the UN; Korea has a generally lower level of gender equality, except for adolescent fertility rates, compared to the mean GII among OECD member countries.

Table 1-7 GII values of Korea from 2008 to 2013

- The same abbreviations as in Table 1-6

(unit: point, %)

Year	GII		Reproductive health		Empowerment			Economic activity	
	Rank	Value	MMR	AFR	FSPS	RSE		LFPR	
						Female	Male	Female	Male
2008[a]	20/138	0.310	14	5.5	13.7	79.4	91.7	54.5	75.6
2011[b]	11/146	0.111	18	2.3	14.7	79.4	91.7	50.1	72.0
2012[c]	27/148	0.153	16	5.8	15.7	79.4	91.7	49.2	71.4
2013[d]	17/152	0.101	16	2.2	15.7	77.0	89.1	49.9	72.0
2013(UN)	-	0.451	145	47.4	21.1	54.2	64.2	50.6	76.7
2013(OECD)	-	0.133	10.6	13.5	26.8	85.4	88.1	53.7	68.8

(Source: UNDP, Human Development Reports [a]2010, [b]2011, [c]2013, [d]2014)

1-3. Cross-country comparison of the GGI values from WEF

The GGI measures gender gaps in the economy, education, health and politics; it focuses on closing the gender gap in a country, rather than on female empowerment. Korea has a very low GGI ranking, 117th out of 142 countries in 2014, indicating that gender inequality in Korea is quite severe.

A. Composition of the GGI and data source

The GGI consists of a total of 14 specific indicators under four fundamental categories: economic participation and opportunity, educational attainment, health and survival, and political empowerment. Specific indicators for each area, and data sources for each index, are listed in Table 1-8. All indicators are calculated as a male indicator value against a female indicator value; a value closer to 1 denotes a narrower gender gap, while a value smaller than 1 indicates that females have lower standings than males, and a value greater than 1 means that females have higher standings than male.

Each indicator is given with weighted values which include wage equality between women and men for similar work, sex ratio at birth, female net primary enrollment rate over male value, and years with female head of state (female-over-male ratio) over the past 50 years getting greater weights.

Table 1-8 Structure of the GGI

(Ratio=Female/Male)

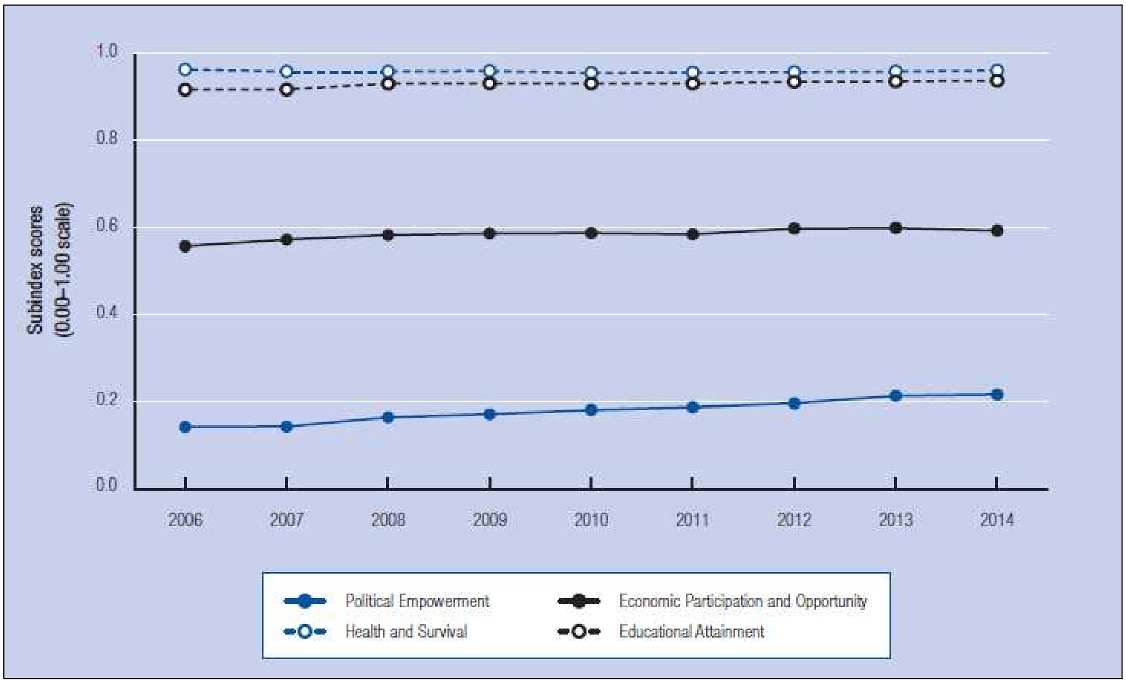
Subindex	Variable	Weights	Source
Economic participation and opportunity	**Labor force participation rate ratio**	0.199	International Labour Organization
	Wage equality between women and men for similar work	0.310	World Economic Forum
	Female estimated earned income over male value	0.221	World Economic Forum
	Female legislators, senior officials and managers over male value	0.149	International Labour Organization
	Female professional and technical workers over male value	0.121	International Labour 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)

B. Recent changes in subindices of the GGI

Prior to comparing GGI values among OECD member countries or among APNN member countries, if we look at the evolution of indicators from 2006 to 2014, we can tell that gender gaps in health and survival, and in educational attainment, have already been substantially closed, as shown in Fig. 1-1. However, gender gaps are still wide in terms of economic participation and political empowerment. In particular, the gender gap in political empowerment is quite low, but it is encouraging that it is displaying more visible improvements compared to other categories.

Fig. 1-1 GGI evolution 2006~2014



(Source: WEF Global Gender Gap Index 2014)

C. Comparison of the GGI among OECD member countries

Table 1-9 shows the GGI of 34 OECD member countries in 2014 and individual scores and rankings for each category. The rankings are based on 142 countries, and the GII rankings in the first column are based on 152 countries surveyed by the UNDP. Slovenia, which ranked highest in the GII, took 23rd place in the GGI, while top-ranking Iceland in the GGI took the 14th position in the GII, indicating that there are huge gaps between the two indices. Such differences are attributable to the fact that the GII focuses on female survival and minimum dignity by considering maternal mortality ratio and adolescent fertility rates, among other factors, whereas the GGI takes into consideration gender ratios of decision makers and wages.

Korea is one of the countries with the largest gaps, with its GII ranking of 17th and GGI ranking of 117th. This is not very different from Japan's situation: it ranked 25th in the GII but 104th in the GGI. Among OECD countries, Turkey was found to have the widest gender gap (125th place among all countries), followed by Korea in 33rd place, with the second widest gender gap.

Table 1-9 GGI ranks and values of OECD member countries (2014)

GII rank	Country	GGI		Economic participation & opportunity		Education attainment		Health and survival		Political empowerment	
		Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
1	Slovenia	23	0.7443	22	0.7827	27	0.9999	74	0.9730	43	0.2214
2	Switzerland	11	0.7798	23	0.7797	72	0.9922	70	0.9737	16	0.3737
3	Germany	12	0.7780	34	0.7388	34	0.9995	67	0.9739	11	0.3998
4	Sweden	4	0.8165	15	0.7989	43	0.9974	100	0.9694	5	0.5005
5	Denmark	5	0.8025	12	0.8053	1	1.0000	65	0.9741	7	0.4306
5	Austria	36	0.7266	68	0.6704	1	1.0000	52	0.9789	36	0.2573
7	Netherland	14	0.7730	51	0.7106	1	1.0000	94	0.9699	9	0.4116
8	Italy	69	0.6973	114	0.5738	62	0.9939	70	0.9737	37	0.2479
9	Belgium	10	0.7809	27	0.7577	73	0.9921	52	0.9789	13	0.3948
9	Norway	3	0.8374	2	0.8357	1	1.0000	98	0.9695	3	0.5444
11	Finland	2	0.8453	21	0.7859	1	1.0000	52	0.9789	2	0.6162
12	France	16	0.7588	57	0.7036	1	1.0000	1	0.9796	20	0.3520
13	Rep. Czech	96	0.6737	100	0.6216	1	1.0000	37	0.9791	109	0.0940
14	Iceland	1	0.8594	7	0.8169	1	1.0000	128	0.9654	1	0.6554
16	Spain	29	0.7325	84	0.6470	44	0.9973	87	0.9719	23	0.3139
17	Korea	117	0.6403	124	0.5116	103	0.9648	74	0.9730	93	0.1117
18	Israel	65	0.7005	90	0.6392	49	0.9964	96	0.9698	49	0.1965
19	Australia	24	0.7409	14	0.8010	1	1.0000	70	0.9737	53	0.1887
20	Ireland	8	0.7850	28	0.7543	40	0.9979	67	0.9739	8	0.4140
21	Portugal	39	0.7243	44	0.7192	68	0.9933	85	0.9724	44	0.2124
23	Canada	19	0.7464	17	0.7928	1	1.0000	100	0.9694	42	0.2233
25	Japan	104	0.6584	102	0.6182	93	0.9781	37	0.9791	129	0.0583
26	Poland	57	0.7051	61	0.6808	36	0.9995	37	0.9791	68	0.1609
27	Greece	91	0.6784	87	0.6434	53	0.9954	55	0.9785	108	0.0961
29	Luxembourg	28	0.7333	29	0.7529	1	1.0000	106	0.9678	45	0.2123
29	Estonia	62	0.7017	56	0.7055	1	1.0000	37	0.9791	88	0.1221
32	Slovakia	90	0.6806	88	0.6431	1	1.0000	74	0.9730	100	0.1061
34	New Zealand	13	0.7772	30	0.7517	1	1.0000	96	0.9698	14	0.3872
35	England	26	0.7383	46	0.7140	32	0.9996	94	0.9699	33	0.2698
45	Hungary	93	0.6759	69	0.6683	71	0.9924	37	0.9791	128	0.0636
47	U.S.A.	20	0.7463	4	0.8276	39	0.9980	62	0.9747	54	0.1847
68	Chile	66	0.6975	119	0.5523	30	0.9997	36	0.9792	35	0.2589
69	Turkey	125	0.6183	132	0.4532	105	0.9527	1	0.9796	113	0.0877
73	Mexico	80	0.6900	120	0.5519	75	0.9906	1	0.9796	39	0.2380

(Source: WEF, Global Gender Gap Report 2014)

D. Comparison of the GGI among APNN member countries

Table 1-10 shows the GII ratings of APNN member countries in 2014. Korea's GGI deteriorated further in 2014 and Korea was found to have the second widest gender gap, following Pakistan, among all APNN countries. As shown in the table, Asian countries generally underperformed in terms of gender gap, with Mongolia having the narrowest gender gap among Asian countries, ranking 42^{nd} in the GGI, and highest in health and survival, jointly with Sri Lanka.

Table 1-10 GGI ranks and values of APNN member countries (2014)

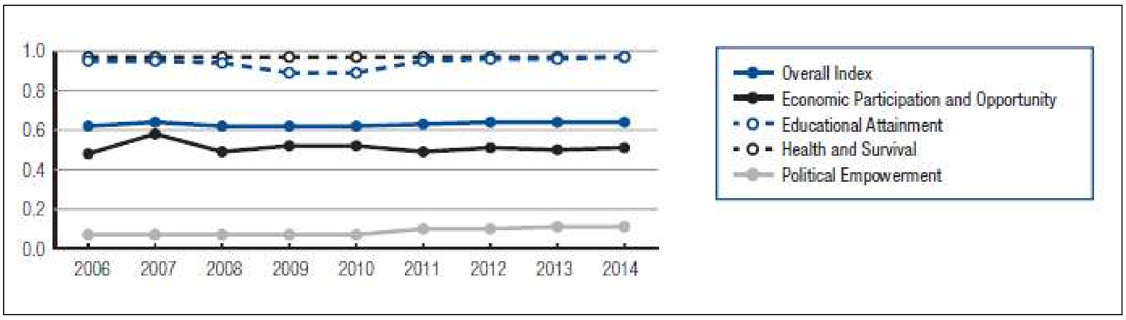
Country	Country		GGI		Economic participation & opportunity		Education attainment		Health and survival	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
New Zealand	13	0.7772	30	0.7517	1	1.0000	96	0.9698	14	0.3872
Australia	24	0.7409	14	0.8010	1	1.0000	70	0.9737	53	0.1887
Mongolia	42	0.7212	10	0.8082	69	0.9932	1	0.9796	103	0.1037
Vietnam	76	0.6915	41	0.7260	97	0.9719	137	0.9441	87	0.1241
Sri Lanka	79	0.6903	109	0.5908	59	0.9942	1	0.9796	50	0.1965
Japan	104	0.6584	102	0.6182	93	0.9781	37	0.9791	129	0.0583
Malaysia	107	0.6520	104	0.6174	100	0.9693	102	0.9692	132	0.0523
Nepal	112	0.6458	122	0.5470	122	0.8889	88	0.9717	61	0.1756
India	114	0.6455	134	0.4096	126	0.8503	141	0.9366	15	0.3855
Korea	117	0.6403	124	0.5116	103	0.9648	74	0.9730	93	0.1117
Pakistan	141	0.5522	141	0.3094	132	0.8054	119	0.9666	85	0.1273

* No data is available for Taiwan. (Source: WEF, Global Gender Gap Report 2014)

E. Recent changes in Korea's GGI

Fig. 1-2 shows that recent changes in Korea's GGI and its indicators are not greatly different from the changes of all other countries in the survey. In particular, no visible change is shown across all areas since 2011, which can be interpreted as showing a lack of effort by the government to close the gender gap.

Fig. 1-2 GGI evolution of Korea (2006~2014)



(Source: WEF Global Gender Gap Report 2014)

Table 1-11 displays changes in Korea's GGI ranking and scores over the 2011-2014 period. Korea continues to rank among the lowest in terms of gender gap, and, by area, it has the narrowest gender gap in health and survival and the widest gender gap in economic participation and opportunity compared to other countries.

By indicator, Korea ranks top in female literacy, with a female rate higher than the male rate, and in female healthy life expectancy, with a female rate higher than the male rate, with the latter recording a score of 1.06, indicating that Korean women have relatively longer life expectancy than men. On the other hand, Korea ranked 125th in wage quality between women and men for similar work in 2014, representing the greatest gender gap among all indicators. Korea's female net secondary enrollment rate, which has a value over the male value, took 114th place in 2014, while its sex ratio at birth ranked 122nd, suggesting that the country's boy preference is decreasing but that a wide gender gap still exists for the birth of a third child. Political empowerment, too, is an area in which the gender gap remains wide.

Table 1-11 GGI status of Korea (2011~2014)

Sub-index	Year	2011	2012	2013	2014
	GGI	0.628	0.635	0.635	0.640
	Rank/Number of countries	107/135	108/135	111/136	117/142
Economic participation & opportunity	Economic participation value (Rank)	0.493 (117)	0.509 (116)	0.504 (118)	0.512 (124)
	Labor force participation rate ratio (Rank)	0.73 (84)	0.73 (83)	0.72 (87)	0.72 (86)
	Wage equality between women and men (Rank)	0.51 (126)	0.54 (117)	0.52 (120)	0.51 (125)
	Female estimated earned income over male value (Rank)	0.41 (113)	0.44 (109)	0.44 (108)	0.48 (109)
	Female legislators, senior officials and managers over male value (Rank)	0.11 (111)	0.11 (104)	0.11 (105)	0.12 (113)
	Female professional and technical (Rank)	0.69 (87)	0.69 (87)	0.69 (90)	0.69 (98)
Educational attainment	Education attainment value (rank)	0.948 (97)	0.959 (99)	0.959 (100)	0.9648 (103)
	Female literacy rate over male value (Rank)	1 (1)	1 (1)	1 (1)	1 (1)
	Female net primary enrolment rate over male value (Rank)	0.99 (96)	0.99 (94)	0.99 (86)	0.99 (83)
	Female net secondary enrolment rate (Rank)	0.96 (97)	0.99 (91)	0.99 (82)	0.99 (85)
	Female gross tertiary enrolment ratio over male value (Rank)	0.7 (110)	0.72 (112)	0.72 (108)	0.75 (114)
Health and survival	Health and survival value (Rank)	0.974 (78)	0.973 (78)	0.973 (75)	0.9730 (74)
	Sex ratio at birth (Rank)	0.94 (124)	0.93 (121)	0.93 (119)	0.93 (122)
	Female healthy life expectancy over male (Rank)	1.06 (1)	1.06 (1)	1.06 (1)	1.06 (1)
Political empowerment	Political Empowerment value (Rank)	0.097 (90)	0.101 (86)	0.105 (86)	0.1117 (93)
	Females with seats in parliament over male (Rank)	0.17 (79)	0.19 (81)	0.19 (85)	0.19 (91)
	Females at ministerial level over male (Rank)	0.14 (75)	0.14 (80)	0.14 (79)	0.13 (94)
	Number of years of a female head of state (last 50 years) over male value (Rank)	0.02 (40)	0.02 (41)	0.03 (42)	0.05 (39)

(Source: WEF, Global Gender Gap Report)

1-4. Cross-country comparison of labor force participation rates of the OECD members

In this section, we will take a look at the labor force participation rate, considering that while Korea's GGI rankings were poor in all areas, it had a particularly low rating in the category of economic participation and opportunity. The OECD's labor force participation rates are based on the population of people aged 15 to 64, which is somewhat different from the International Labour Organization (ILO) criteria, which involve a population of people aged 15 or older. The OECD criteria are more in use nowadays, and thus this study, too, used the OECD statistics. For clarification, labor force population is an indicator that is calculated based on the employed population and the unemployed population seeking employment during the survey period; labor force population does not necessarily mean employed population.

A. Male and female labor force participation rates among OECD member countries

Table 1-12 shows male and female labor force participation from 2010 to 2012 based on the OECD statistics. In 2012, Korea's female labor force participation was at a mere 55.2%, falling greatly short of the OECD average of 62.3% and ranking 30th among 34 countries. Compared to the top ranking country, Iceland, for the same year, which had a value of 83.3%, the difference is almost 30%. Meanwhile, Korea's neighboring country Japan recorded 63.4% of female labor force participation, a higher rate than the OECD average and as much as 8.2% higher than that of Korea, indicating that women in Japan have more active labor force participation than their Korean counterparts.

Although labor force participation by Korean women has been on a slight rise year after year, this growth cannot be considered dramatic, and, as pointed out in the gender gap section above, female labor force participation is very low compared to male labor force participation. In a small country like Korea, which lacks natural resources, such an imbalance in human development is extremely detrimental to the country's economic competitiveness. In particular, the fact that female labor force participation lingers at around 55% when equality in educational opportunity has been achieved goes to show that labor force participation by highly educated women is also low. As such, efforts to promote labor force participation by women – highly educated women in particular – must be made with the highest priority in order to ensure balanced development of human resources for the future.

Indeed, Korea's rate of labor force participation by women with tertiary education is the lowest among all OECD countries (as of 2011), at 62.4%, representing a difference of nearly 20% points from the OECD average of 82.6%. Labor force participation rates by highly educated men and women among OECD countries for the year 2011 are listed in Table 1-13. The OECD averages suggest that gender gaps do exist, with the rate of the overall labor force participation by highly educated people standing at 87.1%, by highly educated men at 91.7% and by highly educated women at 82.6%; however, a country like Norway does not display a gender gap, with the overall rate at 91.8%, the rate for men at 93.2% and the rate for women at 90.6%, indicating that almost all highly educated people are participating in the labor force regardless of their gender. In Korea, the overall labor force participation by highly educated people stood at 79.2%, with values of 92.4% for men and 62.4% for women, meaning that labor force participation by highly educated men is higher than the OECD average, but the same rate for women is very low, causing the overall participation rate to fall short of the OECD average.

Among OCED countries, Japan and Korea fail to surpass 70% in labor force participation by highly educated women, but Korea's rate is 6.9% lower than that of Japan, suggesting an urgent need to induce more labor force participation by highly educated women in Korea.

Table 1-12 Female & male labor force participation rate of OECD members (2010~2012)

(unit: %)

Country	2010			2011			2012		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**
Australia	76.5	82.9	70.0	76.7	82.9	70.5	76.4	82.5	70.4
Austria	75.1	80.9	69.3	75.3	81.1	69.5	75.9	81.4	70.3
Belgium	67.7	73.4	61.8	66.7	72.3	61.1	66.9	72.5	61.3
Canada	77.8	81.5	74.2	77.8	81.5	74.2	77.9	81.6	74.3
Chile	64.8	77.8	51.8	66.2	78.6	53.9	66.3	78.0	54.6
Rep. Czech	70.2	78.6	61.5	70.5	78.7	62.2	71.6	79.5	63.5
Denmark	79.4	82.6	76.0	79.3	82.3	76.1	78.6	81.4	75.8
Estonia	73.7	76.7	70.9	74.7	78.1	71.4	74.9	78.7	71.4
Finland	74.6	76.7	72.5	75.1	77.5	72.7	75.4	77.3	73.4
France	70.5	74.9	66.1	70.4	74.8	66.2	71.0	75.4	66.7
Germany	76.6	82.4	70.8	77.2	82.6	71.8	77.1	82.4	71.7
Greece	68.2	78.9	57.6	67.7	77.7	57.5	67.9	77.4	58.4
Hungary	62.4	68.3	56.7	62.7	68.8	56.8	64.3	70.5	58.3
Iceland	85.5	88.2	82.7	85.2	87.8	82.4	85.5	87.6	83.3
Ireland	69.8	77.4	62.3	69.5	76.7	62.3	69.4	76.7	62.2
Israel	64.5	68.2	60.9	64.6	68.2	60.9	71.5	75.9	67.1
Italy	63.1	74.4	51.8	63.1	74.2	52.2	64.6	75.0	54.2
Japan	74.0	84.8	63.2	73.8	84.4	63.0	73.9	84.3	63.4
Korea	65.8	77.1	54.5	66.2	77.4	54.9	66.4	77.6	55.2
Luxembourg	68.2	76.0	60.3	67.9	75.0	60.7	69.4	75.9	62.8
Mexico	63.7	83.0	46.3	63.3	82.3	45.9	64.5	83.0	47.8
Netherland	78.2	83.8	72.6	78.4	83.6	73.1	79.3	84.2	74.3
New Zealand	77.5	83.6	71.8	77.8	83.6	72.2	77.7	83.2	72.5
Norway	78.2	80.8	75.6	78.0	80.1	75.8	78.4	80.7	75.9
Poland	65.3	72.1	58.5	65.7	72.6	58.9	66.5	73.3	59.7
Portugal	74.0	78.2	69.9	74.1	78.5	69.8	73.9	77.9	70.1
Slovakia	68.7	76.0	61.3	68.8	76.7	61.0	69.4	77.1	61.7
Slovenia	71.5	75.4	67.4	70.3	73.9	66.5	70.4	73.7	66.9
Spain	74.4	81.9	66.8	74.7	81.5	67.9	75.1	81.3	68.8
Sweden	79.0	81.8	76.2	79.9	82.4	77.4	80.3	82.6	77.9
Switzerland	82.4	88.3	76.4	82.8	88.7	76.7	83.0	88.8	77.2
Turkey	52.7	75.4	30.2	53.8	76.4	31.5	54.0	75.8	32.3
England	76.3	82.5	70.2	76.5	82.7	70.4	77.1	83.2	71.0
U.S.A	73.9	79.6	68.4	73.3	78.9	67.8	73.1	78.8	67.6
OECD average	**70.7**	**79.7**	**61.7**	**70.6**	**79.5**	**61.8**	**70.9**	**79.7**	**62.3**

(Source: OECD Employment Outlook 2013)

Table 1-13 Labor force participation rate of highly educated* female and male of OECD members (2011)

(unit: %)

Country	All	Male	Female	Country	All	Male	Female
Australia	86.7	92.7	81.9	Japan	82.4	95.2	69.3
Austria	88.6	91.7	84.7	Korea	79.2	92.4	62.4
Belgium	87.1	90.1	84.5	Luxembourg	88.1	92.4	83.1
Canada	85.9	89.4	83.0	Mexico	83.3	91.6	74.2
Chile	83.9	91.9	76.0	Netherland	89.9	92.3	87.2
Rep. Czech	85.3	93.7	76.6	New Zealand	87.5	93.2	83.3
Denmark	90.4	92.6	88.6	Norway	91.8	93.2	90.6
Estonia	86.9	90.9	84.6	Poland	88.7	92.7	86.0
Finland	87.8	91.1	85.4	Portugal	90.6	91.8	89.8
France	88.1	91.4	85.3	Slovakia	86.1	91.4	81.8
Germany	90.1	93.1	86.3	Slovenia	90.7	91.9	89.9
Greece	85.9	88.7	82.9	Spain	89.2	91.9	86.7
Hungary	82.5	88.2	78.2	Sweden	92.2	93.8	91.1
Iceland	93.0	95.2	91.5	Switzerland	91.1	95.5	84.8
Ireland	87.0	92.1	82.8	Turkey	82.4	89.3	72.0
Israel	86.2	89.2	83.6	England	86.5	91.3	82.0
Italy	83.3	88.4	79.3	U.S.A	84.1	89.2	79.6
OECD average	**87.1**	**91.7**	**82.6**				

(Source: OECD Employment Outlook 2013)

* Labor force participating population who are highly educated, aged 25 to 64

B. Korea’s labor force participation rate

Korea’s labor force participation rates by academic major, gender and marital status are listed in Table 1-14. It must be noted first that the labor force participation rates in this section are based on the ILO criteria (population aged 15 or older), and are different from the labor force participation rates based on the OECD criteria (population aged 15 to 64) that have been used until now.

By academic major, gender gaps in labor force participation across all majors were severe, but the gap was extremely wide at over 30% points in natural science and engineering majors. Such gender gaps become even wider with marital status, showing a gap of 42.0% between married men and women with majors in natural science and a gap of 44.7% between married men and women with majors in engineering. What is notable is that, even for women with medical degrees who were mostly able to have specialized jobs, labor force participation rate before marriage was 90.6% but fell sharply to 63.8% after marriage.

Table 1-14 Labor force participation rate of Korean by sex, field of specialty, and marital status (2012)

(unit: %)

Natural science				Engineering				Medical science				Others			
Male		Female		Male		Female		Male		Female		Male		Female	
89.7		58.8		92.9		63.3		91.2		73.6		86.3		64.2	
S	M	S	M	S	M	S	M	S	M	S	M	S	M	S	M
86.0	90.9	84.0	48.9	86.9	95.2	85.1	50.5	85.0	93.3	90.6	63.8	81.2	88.1	84.7	53.8

* S: Single (not married), M: Married
* Note that values are from ILO (of 15 years or older population) which is different from the OECD values where the population of ages 15 to 64.

(Source: 2012 Re-evaluation Report of Statistics for nurturing and utilyzing women in science and technology)

The gender gaps in labor force participation by marital status are shown in labor force participation rates by age as well. Table 1-15 shows the labor force participation rates by men and women with majors in natural science and in engineering by age. Men and women in their 20s have a small gender gap, as both show values of around 70 to 80% for labor force participation; however, for men over 30, the rate exceeds 90%, while for women in the same age group, the rate drops to the 50% range, representing a huge gender gap. This is attributable to increased burdens of housework, childbirth and childrearing after marriage, which make women's participation in the labor force difficult.

Table 1-15 Labor force participation rate of the science and engineering population of Korea by age group (2012)

(unit: %)

Specialty/Gender \ Age		20~29	30~39	40~49	50~59
Natural science	Male	85.1	96.1	97.0	93.0
	Female	76.2	57.3	55.8	47.8
Engineering	Male	85.4	96.4	97.0	93.8
	Female	75.3	57.0	59.8	65.0

* Note that values are from ILO (of 15 years or older population) which is different from the OECD values where the population of ages 15 to 64.

(Source: 2012 Re-evaluation Report of Statistics for nurturing and utilyzing women in science and technology)

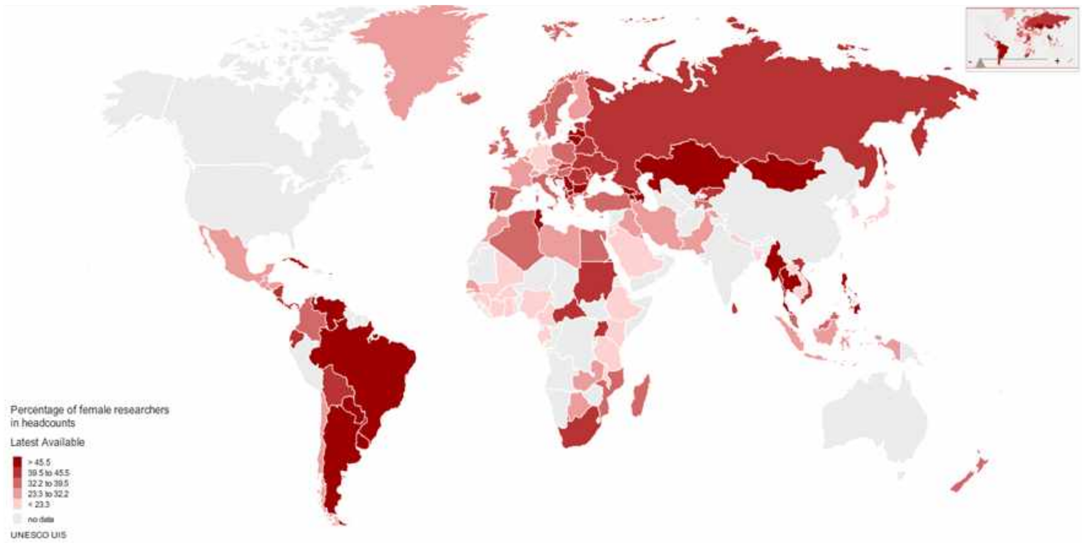
1-5. Cross-country comparison based on the UNESCO statistics on women in science

The UNESCO Institute for Statistics (hereinafter referred to as UIS) has been conducting a biannual statistical survey since 2004. In this section, the outcomes of the UIS statistical survey are rearranged and put together to focus on women in science. It should be noted that science fields in this survey are defined to include not only natural sciences and engineering fields but also social sciences and humanities. Therefore, the ratios regarding women in science suggested by the UIS are generally higher than those perceived in the current study.

A. Overview of female scientists by region

According to the UIS analysis, the average ratio of female scientists globally is 30%; by region, the highest was in Central Asia at 45.5%. Also, the ratio was over 40% in Latin America and the Caribbean, and in Eastern Europe. The region with the lowest ratio of female researchers is the East Asia and Pacific region, to which Korea belongs, and which had a rate of only 19.7%.

Fig. 1-3 Ratio of women researchers by region



(Source: UNESCO Institute for Statistics)

Fig. 1-3 shows the representation of women as a share of total researchers around the world by region using different colors. Vivid red represents a higher ratio of female researchers, while grey denotes no statistical data available. The vivid red in Central Asia and Latin America is in stark contrast to the pale red of Korea.

Table 1-16 Ratio of female researcher by region

(unit: %)

Region	Ratio of female researcher
World average	30.0
Central Asia	45.5
Latin America / Caribbean	43.8
Central and Eastern Europe	40.4
United Arab Republic	37.9
North America / Western Europe	32.1
Africa of Southern Sahara	29.2
Southern and Western Asia	20.0
Eastern Asia and Pacific	19.7

(Source: UNESCO Institute for Statistics)

The ratios of female researchers by region are presented in Table 1-16, and, as mentioned above, the world average stands at 30%; Africa, Southwest Asia, and East Asia and the Pacific are the regions that fall below the world average. Though not included in the table below, some countries have over 50% of female researchers. These are Georgia, Azerbaijan, the Philippines, New Zealand, Thailand and Myanmar. In particular, Myanmar's ratio of female researchers is as high as 85%.

B. Overview of female researchers in countries in the Asia-Pacific region
Using the geographical categorization developed by UIS, let us take a look at the ratios of female researchers in Central Asia, East Asia and the Pacific, and Southwest Asia by employer type and major. First, the ratios of female researchers by employer type, as shown in Table 1-17, show that similar ratios of female researchers in Central Asia or in Southwest Asia are employed in all types of organizations; however, in East Asia and the Pacific, the ratio of female researchers in business organizations is notably low, but is high in higher educational institutions. This is similar to the tendency found in Korea.

Table 1-17 Ratio of female researchers by sector of employment in Asia and the Pacific

(unit: %)

Region \ Sector	Business	Government	Higher education	Private Non-Profit
Central Asia	44.0	48.5	43.3	47.7
East Asia and the Pacific	10.3	25.5	31.8	21.4
Southwest Asia	21.3	20.6	28.9	22.8

(Source: UNESCO Institute for Statistics)

Meanwhile, as shown in Table 1-18, the ratios of female researchers by major were relatively low in engineering & technology and agricultural sciences across all regions but high in medical sciences and humanities.

Table 1-18 Ratio of female researchers by field of science in Asia and the Pacific

(unit: %)

Region \ Field	Natural sciences	Engineering & Technology	Medical sciences	Agricultural sciences	Social sciences	Humanities
Central Asia	46.0	36.7	57.8	34.7	43.0	52.1
East Asia and the Pacific	20.6	8.0	33.1	23.8	30.6	39.4
Southwest Asia	34.0	14.7	42.7	13.0	27.6	41.9

(Source: UNESCO Institute for Statistics)

Unlike the other two regions, the region of East Asia and the Pacific, to which Korea belongs, had the lowest ratios of female researchers in engineering and natural sciences, at 8.0% and 20.6%, respectively.

Table 1-19 lists the ratios of female researchers for APNN member countries that participated in the joint survey, in accordance with the UIS; the country-specific details will be discussed in the next chapter. New Zealand had the highest ratio of female researchers at 52.0%, followed by Mongolia and Vietnam at 49.2% and 42.8%, respectively, indicating no visible gender gaps. The country with the lowest ratio of female researchers is Nepal at a meager 7.8%, but Japan, India and Korea, too, display very low ratios at 13.8%, 14.8% and 16.7%, respectively. In particular, as mentioned above, the ratios of female researchers as determined by the UIS include researchers in the fields of humanities, social sciences and medical science, and thus it should be stressed once again that the ratios of female researchers in pure natural sciences and engineering are significantly lower than the UIS figures.

Table 1-19 Female researcher ratio of APNN member countries

(unit: %)

Region	Ratio of female researcher
New Zealand	52.0
Mongolia	49.2
Vietnam	42.8
Sri Lanka	37.0
Japan	13.8
Malaysia	48.7
Nepal	7.8
India	14.8
Korea	16.7
Pakistan	27.2

* Data do not exist for Australia and Taiwan

(Source: UNESCO Institute for Statistics)

2. Results of the Survey on Gender Equality among Women Scientists and Engineers in Asia and the Pacific Nations

Thus far, we have taken a close look of gender equality in Korea's conditions through indicators published by the UN and the WEF, and compared Korea's standing in the world and among OECD member countries. In addition, we have examined the level of gender equality in the science and engineering fields through the outcomes of analysis by UNESCO and research on the actual conditions of Korean women scientists and engineers. Although we reached a conclusion that Korea's gender equality is at a relatively low level, the Korean government in the past decade has enacted the Law on Fostering and Supporting Women Scientists and Engineers, while establishing five year plans and introducing several relevant policies to that end. While such policy-making attempts by the Korean government have yet to bring about satisfying outcomes, they are still evaluated to be positive and meaningful, worth sharing with neighboring countries that have relatively insufficient gender equality cultures with regards to science and engineering professionals.

Therefore, in this chapter, we will examine the results of a joint survey that was carried out for the first time involving the Asia and Pacific Nations Network (APNN)[1] member countries under the International Network of Women Engineers and Scientists (INWES). As the first step of this study, the survey asks basic questions only, but it is believed that this will serve as a basis for determining the policy proposals that are needed primarily in each country and for determining if Korea's existing policies, in particular, which will be further described in the next chapter, can be applied to other countries as well.

2-1. Survey and analytical methods and respondents

A. Survey method

The survey was conducted in 12 member countries of the APNN with female science and engineering professionals on their perception of gender equality. Of the 12 countries, 11 member countries participated in the survey by using their respective networks to ask respondents to take respond to either the online or offline questionnaire. Fig. 2-1 and Fig. 2-2 present the guidelines for the survey and the survey questionnaire, respectively. The survey consisted of eight questions, seven of which were supposed to be answered using a 5 point scale, and the last of which was to be answered by choosing three items.

B. Method to analyze survey results

Survey results were statistically analyzed using the following analytical method.[2]

- For general characteristics of survey participants, frequency analysis was performed to obtain frequency and percentage.
- For each item, descriptive statistical analysis was performed to obtain the average and standard deviation. Independent t-test and post-analysis ANOVA and Scheffe were performed on differences caused by general characteristics; in cases in which the equal variance assumption was not satisfied using ANOVA, Welch's test and the Games-Howell post-hoc test were performed afterwards.
- A weight was given to the questions involving priority answers for descriptive statistical analysis.

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1) Established in 2011, APNN is a network of countries in the Asia-Pacific region under the INWES. APNN currently has 12 member countries including INWES's Asian members, Australia and New Zealand. APNN hosts an annual meeting, which took place in Australia in 2011, in India in 2012 and in Taiwan in 2013, followed by the latest meeting in Korea in 2014. The first chair organization was KWSE of Korea; INWES-Japan was elected as the second chair organization for 2014. It has been confirmed that the 2015 APNN meeting will take place in Mongolia.

2) SPSS was carried out for statistical analysis.

Fig. 2-1 Guidelines for the survey

Guidelines for Survey for the Policy Report

You are kindly asked to prepare your report based on the two attached surveys. Due to the amount of work that needs to be put in, KWSE will be supporting your task with a modest honorarium for each task.

I. Conduct survey

A. The file "Survey(MAPWiST)" is a two page survey that should be collected from your members. We are asking for as many participants as possible up to 100 people. The survey should be conducted by "professional women scientists and/or engineers." "Professional women" means those who have graduated with a minimum of a bachelors degree (BS) in science/engineering related fields and who are currently working or pursuing further studies in related fields.

B. We ask that you send us the raw data (if possible) and collate the results to be presented in your report.

C. Depending on the number of surveys conducted, you will be reimbursed for expenses up to 500,000KRWon (about 450 USDollars, depending on exchange rate).

II. Fill in information on action plans

A. The file "Action_plans_to_be_filled_out(MAPWiST)" is a two page survey that should be filled out by you or anyone representing your organization. Only one person needs to do this. The instructions are found on page 1 and page two is the table that needs to be filled with the necessary information. You are welcome to add more information in attached pages.

B. We ask that you send us the raw data.

C. We will reiumburse you for expenses up to 200,000KRWon (about 180 USDollars, depending on exchange rate)

III. The results of the surveys and presentations at the MAPWiST Policy Forum will be compiled into a printed report and sent to related organizations (including UNESCO) and your organization before the year end.

Fig. 2-2 Survey questionnaire

Gender Inequality Survey for Science and Engineering Professionals

The purpose of this survey instrument is to compare the level of gender inequality across countries in the Asia Pacific region. The result is only for statistical analysis and will be kept anonymous. Please answer every question. We thank you for your cooperation.

I. Personal Information:

1. Age of Respondent: ___________years old
2. Major Field (ex. Chemical Engineering) _____________
3. Nationality: ____________________
4. Are you a scientist or engineer or others?

II. Gender inequality survey

1. Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education*?

Never	Rarely	Sometimes	Often	All of the Time
1	2	3	4	5

**education means formal schooling covering primary to college (tertiary) systems*

2. What do you think about the description of female scientists/engineers in your textbook during your education? Was there balance on the depiction of male and female scientist (or engineer)?

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

3. Do you believe the contributions of female scientist (engineer) are fairly described with respect to those of the counterpart?

Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5

4. Have you experienced any unfair evaluation during your science education due to your gender?

Never	Occasionally	Fairly many times	Very Often	Always
1	2	3	4	5

(continued in the back)

5. Do you think you have gotten less attention from teachers compared to boys due to your gender during science education?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

6. Have you felt any chilly climate for women during your science education such as sexual harassment or hostile comments on women?

Never	Rarely	Sometimes	Often	All of the Time
1	2	3	4	5

7. Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibit pursuing professional science career?

None	Few	Quite a bit	Extreme amount	All
1	2	3	4	5

8. What do you believe are the most significant difficulties as a female science/engineering professional in your country?
: select and rank three issues as 1, 2, 3 according to their importance. (1=most important)

Issues	Rank (Only mark three items)
Work/life balance	
Workplace culture	
Lack of access to senior roles	
Lack of women in senior roles	
Lack of career support	
Unclear career objectives	
Lack of job opportunities	
Lack of network	
Career limit in technical roles	
Discrimination	
Lack of other women in workplace	
Access to training	

End of Survey
Thank you for your cooperation

C. Overview of survey participants

The outcomes of the survey, submitted via email, post or in person from the 11 countries, are as shown in Table 2-1. In all countries requested except Australia, over 100 female science and engineering professionals participated in the survey; the participation was highest in Mongolia, with 323 respondents. In all, 1,337 female science and engineering professionals participated in the survey. By age, those in their 20s took up the largest part at 39.5%, followed by those in their 30s at 22.9%, those in their 40s at 19.5%, and those in their 50s at 18.1%, showing relatively even participation by all age groups. This is presumably attributable to the fact that the survey was carried out through female scientist and engineer organizations in each country, like the KWSE in Korea. Meanwhile, in terms of the ratio between scientists and engineers who participated in the survey, engineers took up a larger portion at 54.7%; this is presumably because the membership of the APNN organizations is mostly comprised of female engineers. In addition, as the values for participants by nation indicate, participation varies among different groups, and KWSE has a higher number of scientists than engineers.

Table 2-1 Summary of respondents of the survey by country, age group, and specialty

		Number of participants (n)	**Ratio (%)**
Country	Nepal	105	7.9
	Malaysia	106	7.9
	Mongolia	323	24.2
	Vietnam	100	7.5
	Sri Lanka	101	7.6
	India	100	7.5
	Japan	103	7.7
	Taiwan	104	7.8
	Pakistan	105	7.9
	Korea	123	9.2
	Australia	67	5.0
	Total	1,337	100
Age Group	20s	513	39.5
	30s	298	22.9
	40s	254	19.5
	50s and above	235	18.1
	Total	1,300*	100
Specialty	Science	352	26.5
	Engineering	727	54.7
	Others	250	18.8
	Total	1,329*	100

* Non-respondents were excluded from the ratio calculation

2-2. Descriptive statistical analysis of the survey results

A. Cross-country comparison

As for survey questions Q1 through Q7, a higher score for questions Q1 through Q3 denotes a higher level of gender equality, while a lower score for questions Q4 through Q7 represents a higher level of gender equality on the 5-point scale. An analysis of the descriptive statistical average value of all respondents for each question found that, as shown in Table 2-2, answers for none of the questions from Q1 to Q3 exceeded 3 points; Q3, on the relative fairness in describing the contributions of female scientists and engineers, had the highest score at 2.95. Even among questions Q4 through Q7, no question came close to a score of 1, denoting gender equality, and only Q1, on fair evaluation during formal schooling, had a score of 1.98; this can be interpreted as indicating the objective evaluation of students through school exams. The score for Q7, in particular, was 2.47, suggesting that the respondents were feeling cultural pressure on themselves as girls/women to conform to traditional gender roles.

Table 2-2 Results of the descriptive statistical analysis of the survey questionnaire

Question	Mean (M)	Standard deviation (SD)	Rank
Q1 Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education from primary school to college?	2.45	0.98	2
Q2 What do you think about the description of female scientists/engineers in your textbooks during your education from primary school to college? Was there a balanced depiction of male and female scientists (or engineers)?	2.40	0.89	3
Q3 Do you believe the contributions of female scientists (engineers) are fairly described with respect to those of their counterparts?	2.95	1.07	1
Q4 Have you experienced any unfair evaluation during your science education due to your gender?	1.98	0.97	1
Q5 Do you think you have got less attention from teachers compared to boys due to your gender during science education?	2.36	1.02	3
Q6 Have you felt any sort of chilly climate for women during your science education, such as sexual harassment or hostile comments about women?	2.00	0.98	2
Q7 Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibit the pursuit of a professional science career?	2.47	1.01	4

* Out of a 5 point scale, gender equality is higher with higher numbers for Q1~Q3, and with lower numbers for Q4~Q7.

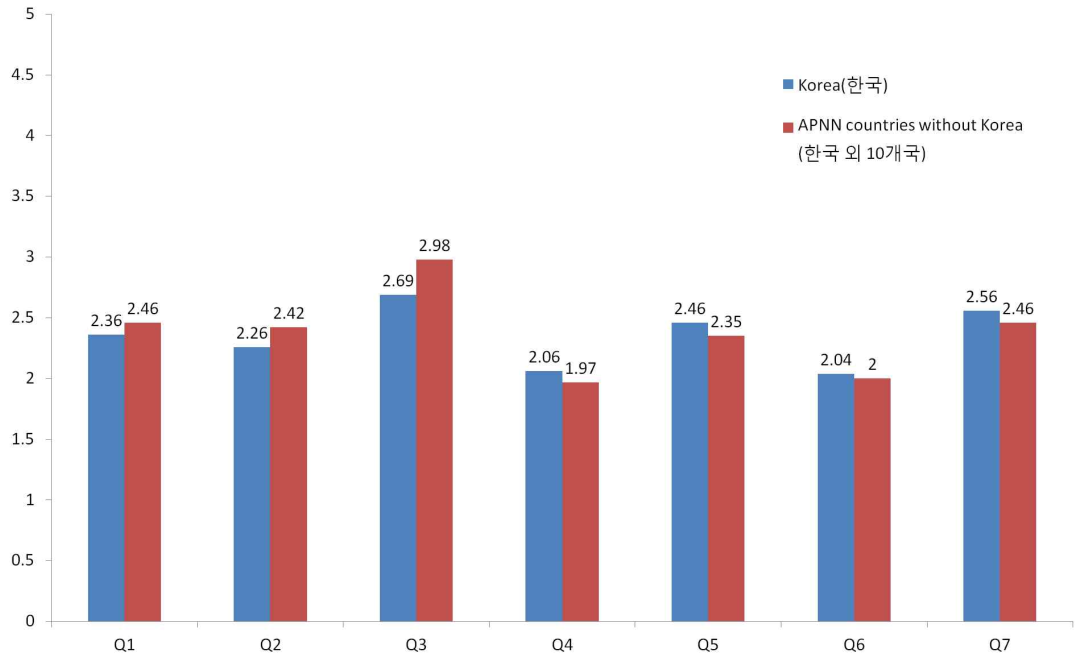
The results of Korea compared to the rest of the APNN countries was significantly different in Q2 ($p<.05$). Korea's Q2 was 2.26, whereas other countries' Q2 was 2.42 on average, higher than that of Korea, indicating that Korea had insufficient description of female scientists/engineers in its textbooks compared to other APNN countries. Q3 ($p<.01$) was also found to be significantly different; Korea's Q3 was 2.69, whereas other countries' Q3 was 2.98 on average, suggesting that members of other countries felt more strongly that they had provided a fair description of the contributions made by female scientists (engineers) in their respective textbooks compared to Korea (see Table 2-3 and Fig. 2-3).

Table 2-3 Comparison of results from Korea with the other 10 APNN countries*

Question	Korea		10 APNN countries except Korea		t	p
	M	SD	M	SD		
Q1 Role models among women scientists and engineers?	2.36	0.92	2.46	0.99	-1.070	.285
Q2 Balanced description of female/male in science textbooks?	2.26	0.83	2.42	0.89	-1.999	.047
Q3 Contributions of women scientists and engineers fairly described in textbooks?	2.69	0.84	2.98	1.09	-3.490	.001
Q4 Unfair evaluation compared to male scientists and engineers?	2.06	0.93	1.97	0.98	.951	.342
Q5 Less attention from teachers compared to male classmates?	2.46	1.02	2.35	1.02	1.131	.258
Q6 Chilly climate in class related to gender equality	2.04	0.91	2.00	0.98	.484	.628
Q7 Cultural pressure in the workplace to conform to traditional gender roles?	2.56	0.92	2.46	1.02	1.008	.314

* Out of a 5 point scale, gender equality is higher with higher numbers for Q1~Q3, and with lower numbers for Q4~Q7.

Fig. 2-3 Comparing results of questionnaire for Korea with the other 10 APNN countries



The analytical results by country for each question are shown in Table 2-4; just like the outcomes of the Welch's test, country specific characteristics are manifested in a radial form graph, in Fig. 2-4. Most significant differences are found in all items that are used to analyze differences by nation (p<001).

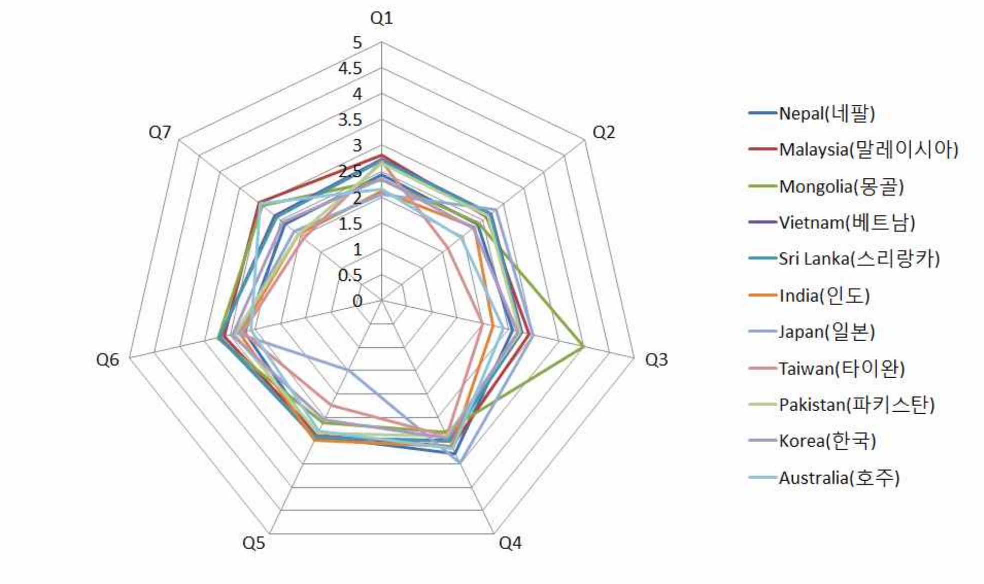
Table 2-4 Comparative results of questionnaire by country*

Country	Q1	Q2	Q3	Q4	Q5	Q6	Q7
Nepal	2.43	2.36	2.59	1.73	2.09	2.30	2.62
Malaysia	2.81	2.60	2.92	1.88	2.13	1.89	1.97
Mongolia	2.33	2.40	4.00	2.18	2.38	1.76	2.05
Vietnam	2.74	2.69	2.77	2.01	2.06	1.80	2.37
Sri Lanka	2.72	2.68	2.75	1.99	2.07	1.79	2.41
India	2.12	2.28	2.21	1.88	2.01	2.18	2.94
Japan	2.06	2.83	2.99	1.52	3.52	2.15	2.84
Taiwan	2.69	1.64	1.99	2.09	2.77	2.25	3.08
Pakistan	2.66	2.62	2.74	2.09	2.16	2.09	2.95
Korea	2.36	2.26	2.69	2.06	2.46	2.04	2.56
Australia	2.16	1.95	2.40	1.83	2.20	2.42	2.00
F(p)	7.968 (.000)†	24.221 (.000)†	85.717 (.000)†	5.077 (.000)	21.530 (.000)†	6.735 (.000)	23.427 (.000)†

† Welch test

* Out of a 5 point scale, gender equality is higher with higher numbers for Q1~Q3, and with lower numbers for Q4~Q7.

Fig. 2-4 Comparative results of questionnaire by country

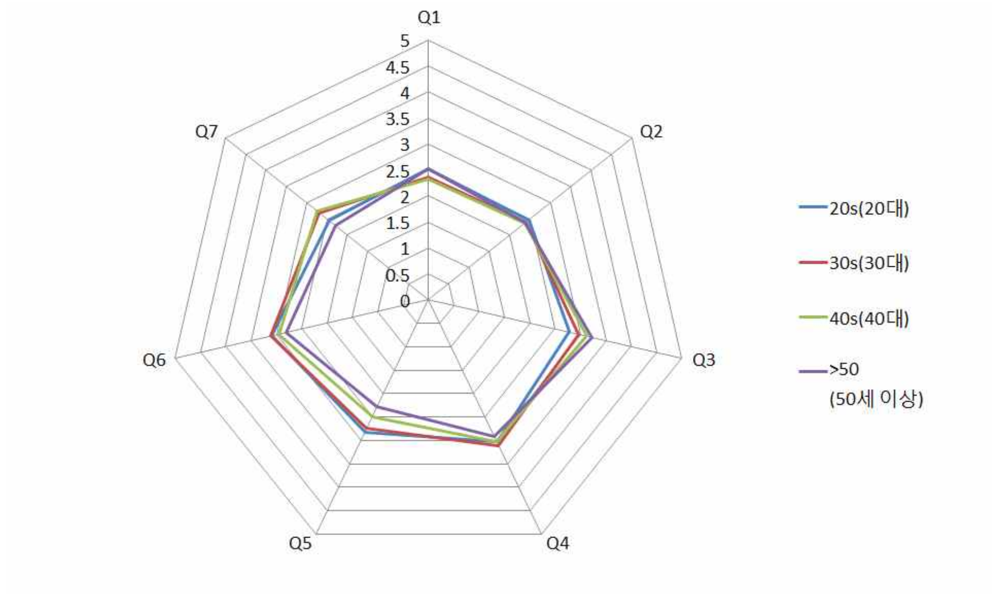


* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

B. Comparison of individual questions

Responses to the seven questions measured with the 5-point scale are illustrated in Fig. 2-5 and Fig. 2-6. What is notable is that Q1 through Q3, or the questions that are considered to indicate a higher level of gender equality when the score is high, all had scores lower than 3. In addition, Q4 through Q7, or the questions that are considered to indicate a higher level of gender equality when the score is low, mostly had scores around 2. Q3 and Q5 are the questions that are given scores in proportion to age; for Q3, younger respondents answered that there was less inequality in the description of the contributions by male and female scientists and engineers, whereas for Q5, older respondents answered that they had got less attention from teachers during science education because they were female.

Fig. 2-5 Comparison of results of questionnaire by age group

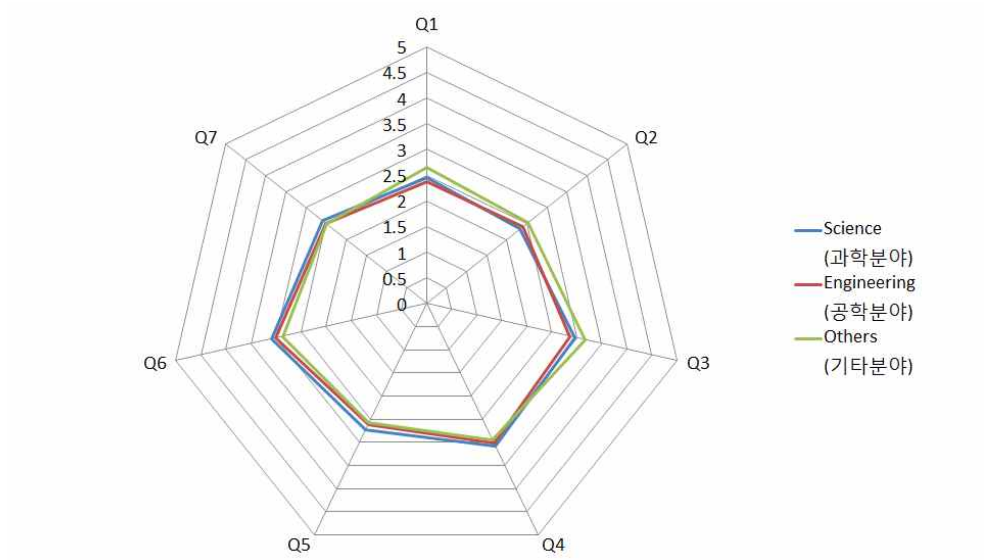


* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

As for survey responses by specialty, those who majored in engineering were found to give higher scores than those who majored in science for Q1 through Q3, while those who majored in engineering gave lower scores than did those who majored in science for Q4 through Q7, with results as shown in Fig. 2-6. This can be interpreted as showing that women in engineering generally experienced and are experiencing more gender inequality than those in science.

Now, let us look at the outcomes of the descriptive statistical analysis for each question. In addition, we will provide an analysis of the priority response given to the final question on the most significant difficulties that the respondents experience as female science/engineering professionals, for which they chose and ranked three issues according to importance. At this time, in order to verify if there were any differences in responses based on age and field, an analysis of variance (ANOVA) was performed and then the Scheffe's post-hoc test was applied. However, if a survey question was unable to satisfy the equal variance assumption, ANOVA could not be used and thus Welch's test and the Games-Howell post-hoc test, which are heteroscedastic ANOVA, were performed instead, and, in such cases, the fact was noted below each affected table.

Fig. 2-6 Comparative results of questionnaire by specialty



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

1) *Q1 Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education from primary school to college?*

An analysis of differences for Q1 based on general characteristics found that there were differences based on age (p=.017<.01) and field of specialty (p<.001). The Scheffe's test and Games-Howell's post-hoc test found that in terms of age, the score was higher among those in their 20s (M=2.53) and those aged 50 or older (M=2.52) than among those in their 30s and 40s; in terms of field, the score was higher among those not in science and engineering (M=2.65) than among those in science and engineering.

Table 2-5 Results of Q1 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	2.53	0.97	a, d > b, c	3.400	.017
	30s(b)	2.36	0.95			
	40s(c)	2.33	0.99			
	>50s(d)	2.52	1.02			
Specialty	Science(e)	2.45	1.03	g > e, f		.000†
	Engineering(f)	2.37	0.94			
	Others(g)	2.65	1.01			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

2) *Q2 What do you think about the description of female scientists/engineers in your textbook during your education from primary school to college? Was there a balance in the depiction of male and female scientists (or engineers)?*

An analysis of differences for Q2 based on general characteristics found that Q2 (p=.036<.05) had a significant difference by field. The Games-Howell post-hoc test found that those not in science and engineering (M=2.52) had higher levels of recognition than did those in science (M=2.33).

Table 2-6 Results of Q2 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	2.47	0.92		1.009	.388†
	30s(b)	2.40	0.80			
	40s(c)	2.37	0.75			
	>50s(d)	2.38	1.04			
Specialty	Science(e)	2.33	0.82	g > e	3.330	.036†
	Engineering(f)	2.40	0.90			
	Others(g)	2.52	0.97			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

3) *Q3 Do you believe the contributions of female scientists (engineers) are fairly described with respect to those of their counterparts?*

An analysis of differences for Q3 based on general characteristics found that there were differences based on age (p<.001) and field (p<.01). The Games-Howell post-hoc test found that in terms of age, the score was higher among those in their 30s than among those in their 20s; in terms of field, the score was higher among those not in science and engineering (M=3.17) than among those in science and engineering.

Table 2-7 Results of Q3 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	2.77	1.03	c, d > a	11.749	.000†
	30s(b)	2.97	1.04			
	40s(c)	3.12	1.07			
	>50s(d)	3.23	1.15			
Specialty	Science(e)	2.97	1.04	g > e, f	6.786	.001†
	Engineering(f)	2.87	1.06			
	Others(g)	3.17	1.12			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

4) *Q4 Have you experienced any unfair evaluation during your science education due to your gender?*

An analysis of differences for Q4 based on general characteristics found no significant difference.

Table 2-8 Results of Q4 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	1.97	1.04		2.056	.105
	30s(b)	1.89	0.92			
	40s(c)	1.98	0.94			
	>50s(d)	2.09	0.88			
Specialty	Science(e)	1.93	0.94		.996	.370
	Engineering(f)	1.98	1.01			
	Others(g)	2.05	0.94			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

5) *Q5 Do you think you have got less attention from teachers compared to boys due to your gender during science education?*

An analysis of differences for Q5 based on general characteristics found that there was a significant difference based on age (p<.001). The Games-Howell post-hoc test found that the score was the highest among those aged 50 or older (M=2.72), while the score was higher among those in their 40s (M=2.50) than among those in their 20s and 30s.

Table 2-9 Results of Q5 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	2.18	0.98	d > c > a, b	16.808	.000†
	30s(b)	2.27	0.97			
	40s(c)	2.50	0.96			
	>50s(d)	2.72	1.09			
Specialty	Science(e)	2.28	0.96		2.021	.133†
	Engineering(f)	2.39	1.03			
	Others(g)	2.42	1.09			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

6) *Q6 Have you felt any sort of chilly climate for women during your science education, such as sexual harassment or hostile comments about women?*

An analysis of differences for Q4 based on general characteristics found that there were significant differences based on age (p=.001<.05) and on field (p=.036<.05). The Games-Howell post-hoc test found that in terms of age, the score was higher among those aged 50 or older (M=2.20) than it was among those in their 20s and 30s; in terms of field, the score was higher among those not in science and engineering (M=2.13) than it was among those in science.

Table 2-10 Results of Q6 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	1.91	0.96	d > a, b	5.450	.001†
	30s(b)	1.89	0.92			
	40s(c)	2.04	0.89			
	>50s(d)	2.20	1.07			
Specialty	Science(e)	1.91	0.91	g > e	3.351	.036†
	Engineering(f)	1.99	0.97			
	Others(g)	2.13	1.10			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

7) *Q7 Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibits the pursuit of a professional science career?*

An analysis of differences for Q7 based on general characteristics found that there was a significant difference based on age (p<.001). The Games-Howell post-hoc test found that the score was higher among those in their 20s (M=2.55) and those aged 50 or older (M=2.71) than those in their 30s and 40s.

Table 2-11 Results of Q7 by age group and specialty*

		M	SD	Post-Hoc	F	p
Age group	20s(a)	2.55	1.06	a, d > b, c	11.473	.000†
	30s(b)	2.32	0.94			
	40s(c)	2.26	0.88			
	>50s(d)	2.71	1.06			
Specialty	Science(e)	2.41	0.95		.912	.402†
	Engineering(f)	2.49	0.99			
	Others(g)	2.51	1.17			

* 5 point scale where higher numbers indicate higher gender equality
† Welch test & Games-Howell's post-hoc test

8) *Q8 What do you believe are the most significant difficulties as a female science/engineering professional in your country? (select and rank three issues out of 12 as 1,2,3 according to their importance, with 1 being most important).*

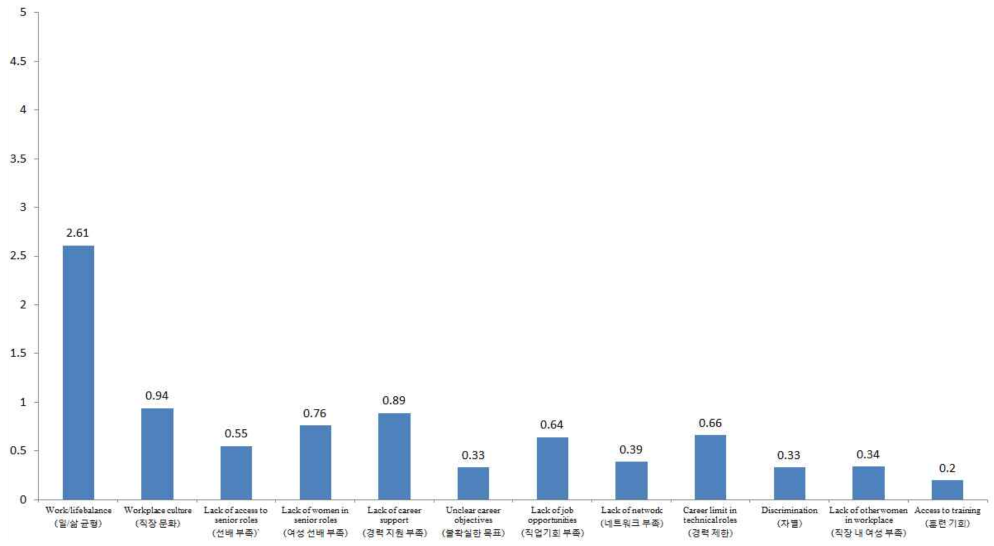
The priority response was given, and the first, second and third priorities were weighted 5, 3 and 1 point(s), respectively, for analysis. As shown in Table 2-12, the respondents placed the first and second priorities in terms of the most significant difficulties they face as female science/engineering professionals on work/life balance (M=2.61) and workplace culture (M=0.94), while the third priority was given to lack of career support (M=0.89). What is interesting is that the difference between the mean values of the first and second priorities was quite large (see Fig. 2-7), meaning that the single biggest difficulty that female science and engineering professionals face in most countries around the Asia-Pacific region is work/life balance. Nevertheless, the fact that the first priority's score is 2.61 can be interpreted as showing that work/life balance is not the only difficulty: the respondents are facing difficulties from various aspects.

Meanwhile, access to training (M=0.20) received the lowest score among all difficulties, indicating that equal opportunities for education and training are given to both genders overall. Furthermore, discrimination received a score of 0.33, suggesting that this is relatively not a significant difficulty.

Table 2-12 Most significant difficulties faced by women scientists and engineers

Difficulty	M	SD	Rank
Work/life balance	2.61	2.24	1
Workplace culture	0.94	1.64	2
Lack of access to senior roles	0.55	1.30	7
Lack of women in senior roles	0.76	1.49	4
Lack of career support	0.89	1.62	3
Unclear career objectives	0.33	1.01	11
Lack of job opportunities	0.64	1.39	6
Lack of network	0.39	1.05	8
Career limit in technical roles	0.66	1.41	5
Discrimination	0.33	1.02	10
Lack of other women in workplace	0.34	1.03	9
Access to training	0.20	0.73	12

Fig. 2-7 Most significant difficulties faced by women scientists and engineers



a) Comparison of responses by age and field

As shown in Table 2-13, the single most significant difficulty that female science and engineering professionals face regardless of age and field was found to be work/life balance. In particular, the response scores for those in their 30s and 40s were the highest at 3.05 and 3.12, respectively, and this can be presumably attributable to issues involving children's education. Difficulties from workplace culture, lack of career support, and lack of network that those aged 50 or older experienced were relatively less notable among younger respondents, indicating that they are being eased. Compared to those in other age groups, female scientists and engineers in their 20s pointed out lack of job opportunities as a significant difficulty: those who are not in their 20s collectively gave this factor a score of 0.5, while those in their 20s gave it a score of 0.81, highlighting the seriousness of unemployment among youth.

By field, those who work in science selected lack of women in senior roles and lack of network as significant difficulties more than did those in engineering, whereas those who work in engineering pointed to career limits in technical roles, discrimination and lack of other women in the workplace more than did those who work in science. The scores for each difficulty by age and field are illustrated in Fig. 2-8 and Fig. 2-9, respectively.

Table 2-13 Most significant difficulties faced by women scientists and engineers: by age and specialty

Difficulty	Age group				Specialty		
	20s	30s	40s	>50s	Science	Engineering	Others
Work/life balance	2.30	3.05	3.12	2.62	2.61	2.40	3.40
Workplace culture	0.77	0.96	1.09	1.18	1.06	0.94	0.74
Lack of access to senior roles	0.42	0.55	0.59	0.84	0.74	0.45	0.59
Lack of women in senior roles	0.70	0.93	0.72	0.64	0.67	0.88	0.49
Lack of career support	0.88	0.81	0.91	1.22	0.95	0.78	1.18
Unclear career objectives	0.38	0.34	0.24	0.22	0.41	0.34	0.18
Lack of job opportunities	0.81	0.54	0.50	0.42	0.69	0.62	0.66
Lack of network	0.32	0.39	0.38	0.71	0.54	0.35	0.28
Career limit in technical roles	0.76	0.71	0.58	0.33	0.45	0.79	0.54
Discrimination	0.35	0.33	0.37	0.23	0.22	0.44	0.16
Lack of other women in workplace	0.45	0.24	0.16	0.27	0.20	0.43	0.26
Access to training	0.19	0.26	0.15	0.23	0.24	0.21	0.10

Fig. 2-8 Most significant difficulties faced by women scientists and engineers: by age

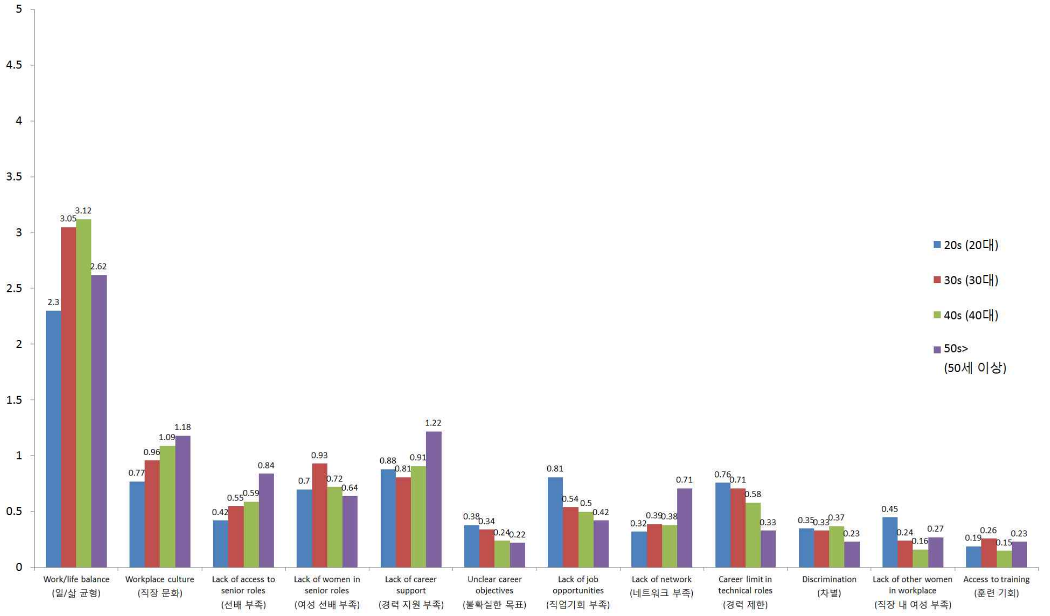
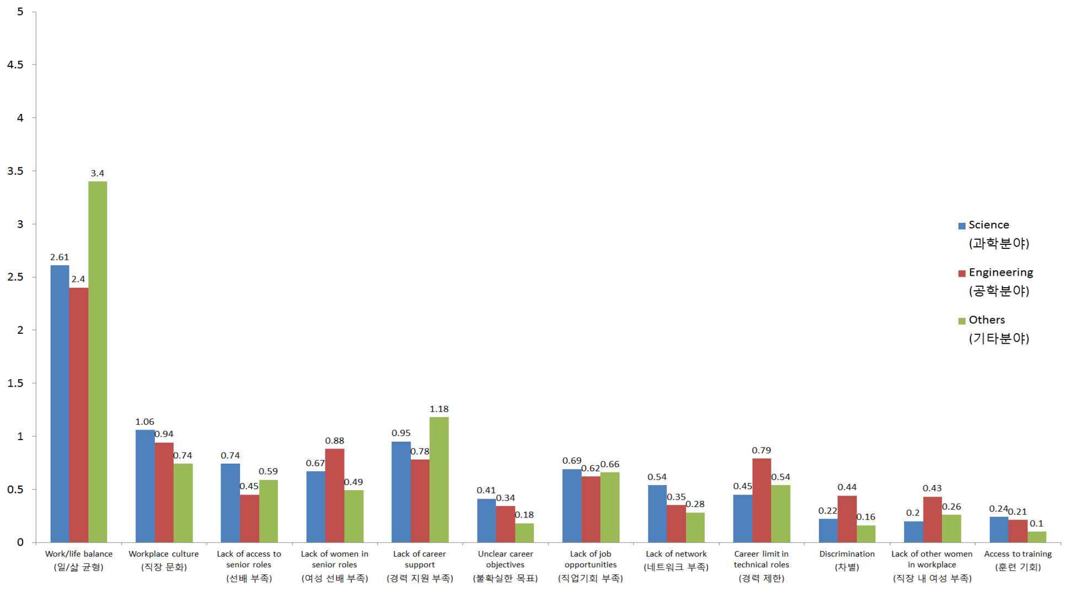


Fig. 2-9 Most significant difficulties faced by women scientists and engineers: by specialty



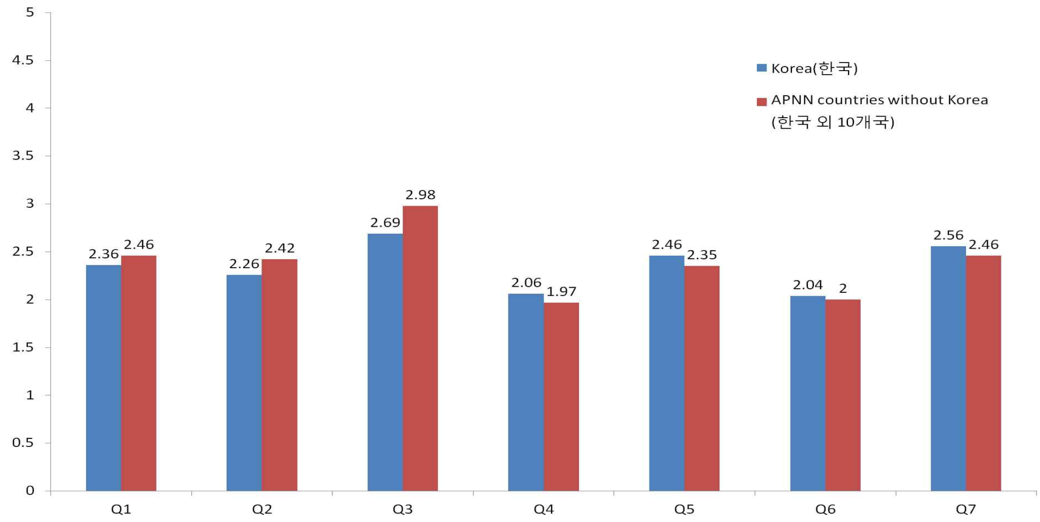
b) Comparison of Korea and other countries

Comparison of the responses by Korean participants as to the significant difficulties they experience as female science/engineering professionals with the responses by participants from other countries found that Korean participants pointed to work/life balance as the single most significant difficulty, with a score of 3.06, which is much higher than the mean value of other countries, 2.53. Scores for workplace culture and lack of job opportunities were also much higher than the mean values of other countries, indicating that gender equality at the workplace is relatively low and job opportunities are not equally given to both genders in Korea.

Table 2-14 Most significant difficulties faced by women scientists and engineers: comparing Korea with the other 10 APNN countries

Difficulty	Korea		10 APNN countries except Korea	
	M	SD	M	SD
Work/life balance	3.03	2.20	2.53	2.24
Workplace culture	1.53	1.93	0.83	1.55
Lack of access to senior roles	0.44	1.05	0.56	1.34
Lack of women in senior roles	0.62	1.30	0.78	1.52
Lack of career support	0.50	1.29	0.96	1.67
Unclear career objectives	0.16	0.75	0.36	1.04
Lack of job opportunities	1.00	1.65	0.58	1.34
Lack of network	0.70	1.32	0.33	0.99
Career limit in technical roles	0.30	1.04	0.72	1.45
Discrimination	0.32	0.95	0.34	1.03
Lack of other women in workplace	0.25	0.78	0.36	1.07
Access to training	0.10	0.49	0.21	0.77

Fig. 2-10 Most significant difficulties faced by women scientists and engineers: comparing Korea with the other 10 APNN countries



2-3. Analysis of survey results by participating countries

Thus far, we have taken an overall look at the survey results of the 11 participating countries. In this section, we will analyze the survey results by individual countries. Please note that the sequence of the countries listed are according to the Korean alphabetical order.

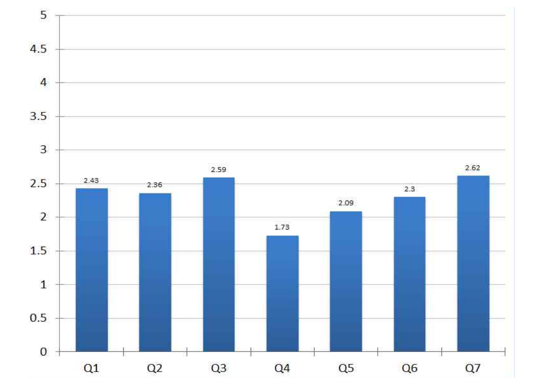
A. Nepal

1) Number of respondents: 105

		Number of respondents	Ratio (%)
Age group	20s	76	72.4
	30s	21	20.0
	40s	7	6.7
	>50s	1	1.0
Specialty	Science	1	1.0
	Engineering	89	84.8
	Others	15	14.3

2) Descriptive statistical analysis for each question
The descriptive statistical analysis found that Q3 had the highest score at 2.59 among Q1, Q2 and Q3, the questions for which a high score represents higher gender equality, while Q4 had the lowest score at 1.73 and Q7 had the highest score at 2.62 among Q4, Q5, Q6 and Q7, the questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Question	M	SD
Q1	2.43	0.97
Q2	2.36	0.92
Q3	2.59	0.98
Q4	1.73	0.88
Q5	2.09	0.94
Q6	2.30	0.95
Q7	2.62	0.87



Q1 based on general characteristics
An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.55	0.97		2.420	.094
	30s	2.20	0.95			
	40s	1.86	0.90			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	2.49	0.98		1.558	.122
	Others	2.07	0.88			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.47	0.96		14.373	.124†
	30s	2.10	0.77			
	40s	2.00	0.63			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	2.43	0.92		1.415	.160
	Others	2.07	0.80			

† Welch test & Games-Howell's post-hoc test

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found that Q3 based on field (p=.006<.01) had a significant difference. This can be interpreted as showing that those in engineering (M=2.67) had higher recognition of gender equality than did those not in science and engineering (M=2.14).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.66	1.07		.713	.493
	30s	2.45	0.76			
	40s	2.29	0.49			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	2.67	1.01		2.977	.006
	Others	2.14	0.53			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.78	0.87		1.652	.197
	30s	1.40	0.75			
	40s	1.86	0.90			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	1.76	0.91		.651	.517
	Others	1.60	0.74			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.11	1.00		.222	.801
	30s	2.10	0.79			
	40s	1.86	0.69			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	2.09	0.98		.092	.927
	Others	2.07	0.70			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on age ($p=.006<.01$) had a significant difference. This can be interpreted as showing that those in their 40s ($M=2.86$) were found to have lower recognition of gender equality than were those in their 20s and 30s.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.30	0.94	c > a, b	6.428	.006†
	30s(b)	2.05	1.02			
	40s(c)	2.86	0.38			
	>50s(d)	-	-			
Specialty	Science	-	-			
	Engineering	2.28	0.99		-1.290	.208
	Others	2.53	0.64			

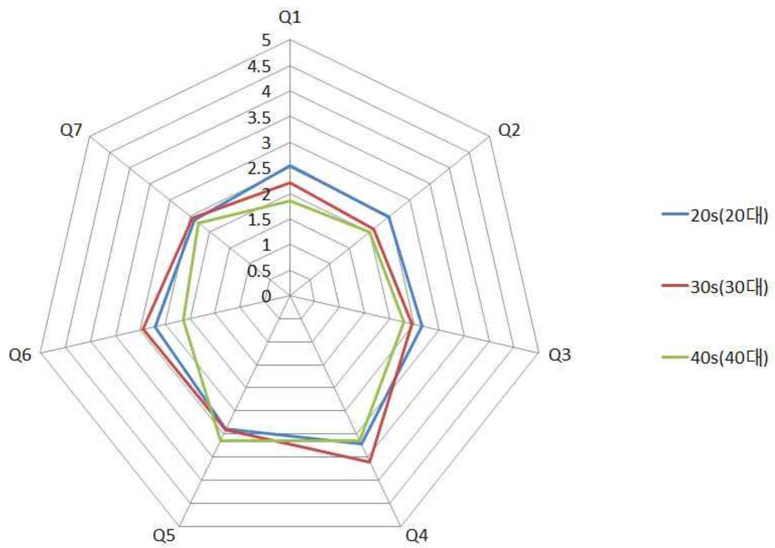
† Welch test & Games-Howell's post-hoc test

Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

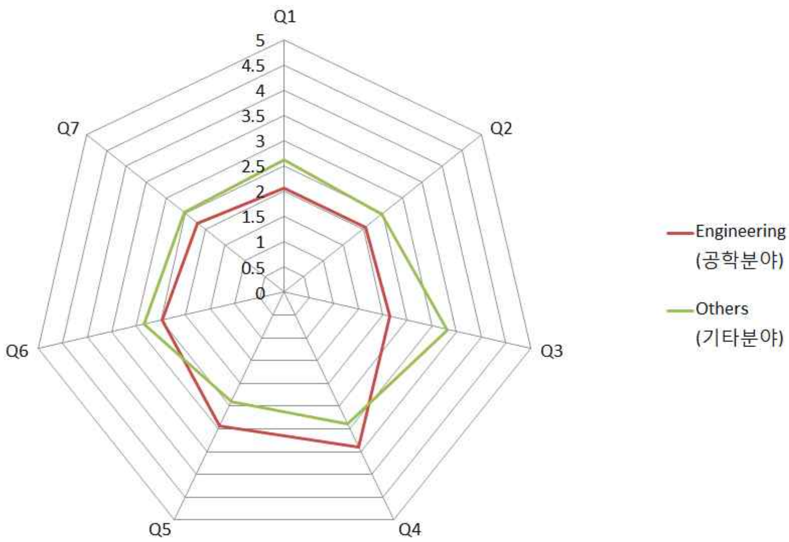
		M	SD	Post-Hoc	t or F	p
Age group	20s	2.62	0.89		.071	.932
	30s	2.57	0.87			
	40s	2.71	0.76			
	>50s	-	-			
Specialty	Science	-	-			
	Engineering	2.57	0.88		-.941	.349
	Others	2.80	0.77			

Fig. 2-11 Mean value of questionnaire results: by age group (Nepal)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-12 Mean value of questionnaire results: by specialty (Nepal)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

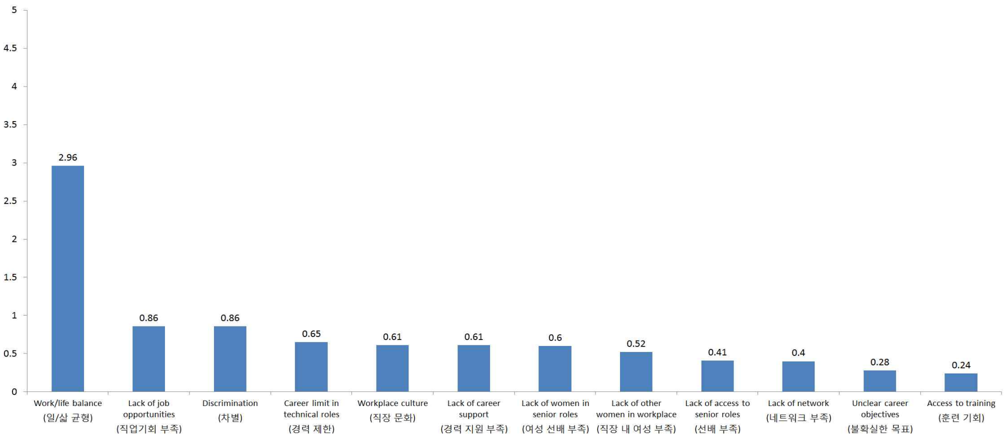
Q8 for difficulties as a female science/engineering professionals

The biggest difficulties female science/engineering professionals experience were work/life balance (M=2.96), lack of job opportunities (M=0.86) and discrimination (M=0.86).

Table 2-15 Most significant difficulties of women scientists and engineers by rank (Nepal)

Difficulty	M	SD	Rank
Work/life balance	2.96	2.27	1
Workplace culture	0.61	1.39	5
Lack of access to senior roles	0.41	0.99	9
Lack of women in senior roles	0.60	1.27	7
Lack of career support	0.61	1.39	5
Unclear career objectives	0.28	0.91	11
Lack of job opportunities	0.86	1.74	2
Lack of network	0.40	1.05	10
Career limit in technical roles	0.65	1.36	4
Discrimination	0.86	1.56	2
Lack of other women in workplace	0.52	1.20	8
Access to training	0.24	0.75	12

Fig. 2-13 Most significant difficulties of women scientists and engineers by rank (Nepal)



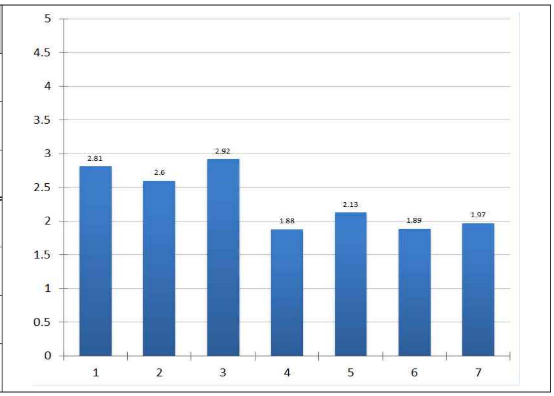
B. Malaysia

1) Number of respondents: 106 (One participant gave no response for age and one participant gave no response for field)

		Number of respondents	Ratio (%)
Age group	20s	57	54.3
	30s	28	26.7
	40s	17	16.2
	>50s	3	2.9
Specialty	Science	13	12.4
	Engineering	83	79.0
	Others	9	8.6

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.81	1.05
Q2	2.60	0.87
Q3	2.92	0.90
Q4	1.88	0.89
Q5	2.13	0.77
Q6	1.89	0.93
Q7	1.97	0.92



The descriptive statistical analysis found that Q3 had the highest score at 2.92 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 had the lowest score at 1.88 and Q5 had the highest score at 2.13 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Q1 based on general characteristics

An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.89	1.11		1.412	.244
	30s	2.71	1.05			
	40s	2.88	0.78			
	>50s	1.67	1.15			
Specialty	Science	3.31	1.32		1.758	.178
	Engineering	2.76	1.03			
	Others	2.56	0.73			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found that Q3 based on field (p=.033<.05) had a significant difference. The Games-Howell post-hoc test of this question indicates that those in science (M=2.92) were found to have higher recognition of gender equality than were those in science and engineering (M=2.14).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.60	0.90		.484	.694
	30s	2.75	0.97			
	40s	2.47	0.51			
	>50s	2.33	1.15			
Specialty	Science	2.92	0.76	a > c	4.053	.033†
	Engineering	2.60	0.91			
	Others	2.22	0.44			

† Welch test & Games-Howell's post-hoc test

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	3.04	1.00		.938	.425
	30s	2.79	0.83			
	40s	2.88	0.70			
	>50s	2.33	0.58			
Specialty	Science	3.23	0.83		1.507	.226
	Engineering	2.92	0.91			
	Others	2.56	0.88			

† Welch test & Games-Howell's post-hoc test

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.98	0.94		.844	.473
	30s	1.86	0.89			
	40s	1.71	0.77			
	>50s	1.33	0.58			
Specialty	Science	1.62	0.77		.715	.492
	Engineering	1.92	0.89			
	Others	2.00	1.12			

† Welch test & Games-Howell's post-hoc test

Q5 based on general characteristics

An analysis of differences for Q5based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.16	0.80		1.006	.394
	30s	1.96	0.79			
	40s	2.35	0.61			
	>50s	2.33	0.58			
Specialty	Science	1.85	0.55		1.131	.327
	Engineering	2.18	0.80			
	Others	2.22	0.67			

Q6 based on general characteristics

An analysis of differences for Q6based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.84	0.94		1.541	.209
	30s	1.86	0.93			
	40s	1.82	0.88			
	>50s	3.00	0.00			
Specialty	Science	1.92	0.86		.067	.936
	Engineering	1.88	0.97			
	Others	1.78	0.67			

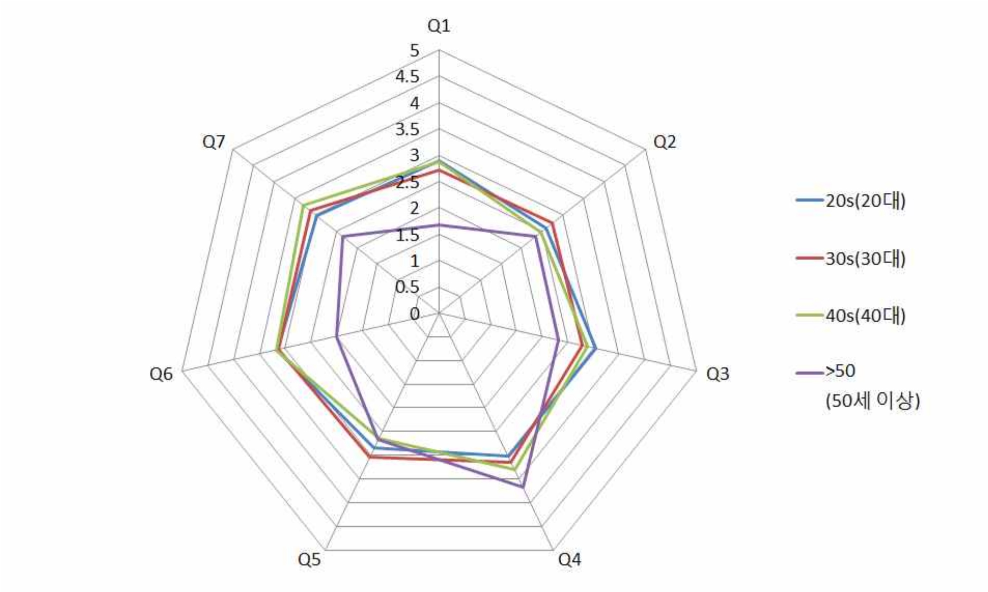
Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.04	0.98		1.208	.311
	30s	1.89	0.83			
	40s	1.71	0.85			
	>50s	2.67	0.58			
Specialty	Science	2.00	0.91		.039	.962
	Engineering	1.96	0.90			
	Others	1.89	1.17			

Scores of each question by age and field were drawn into radial form graphs shown in Fig. 2-14 and Fig. 2-15, respectively. On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-14 Mean value of questionnaire results: by age group (Malaysia)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

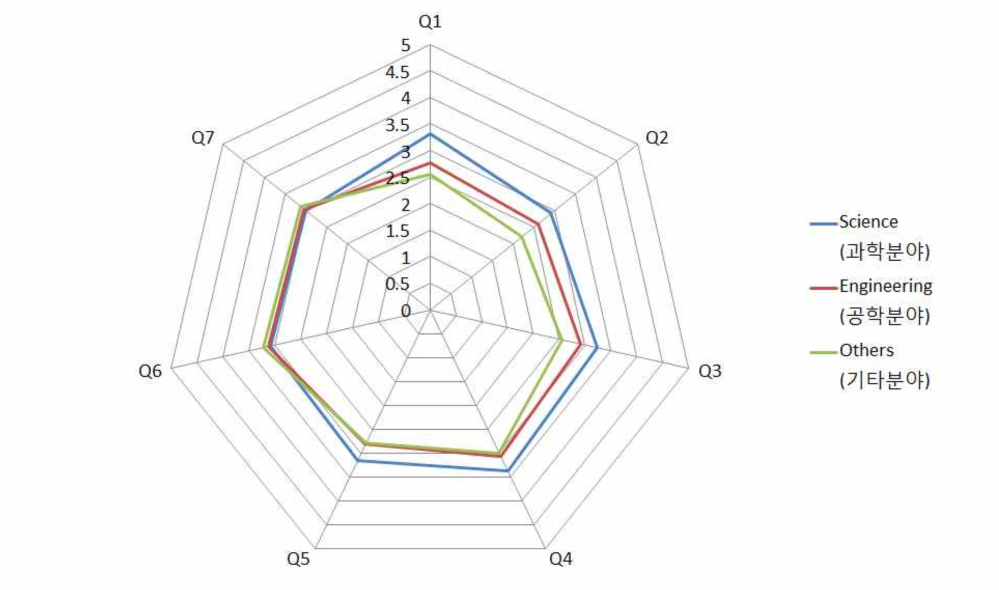
Q8 for difficulties as a female science/engineering professionals

The biggest difficulties female science/engineering professionals experience are work/life balance (M=2.96), lack of job opportunities (M=0.86), and discrimination (M=0.86).

Table 2-16 Most significant difficulties of women scientists and engineers by rank (Malaysia)

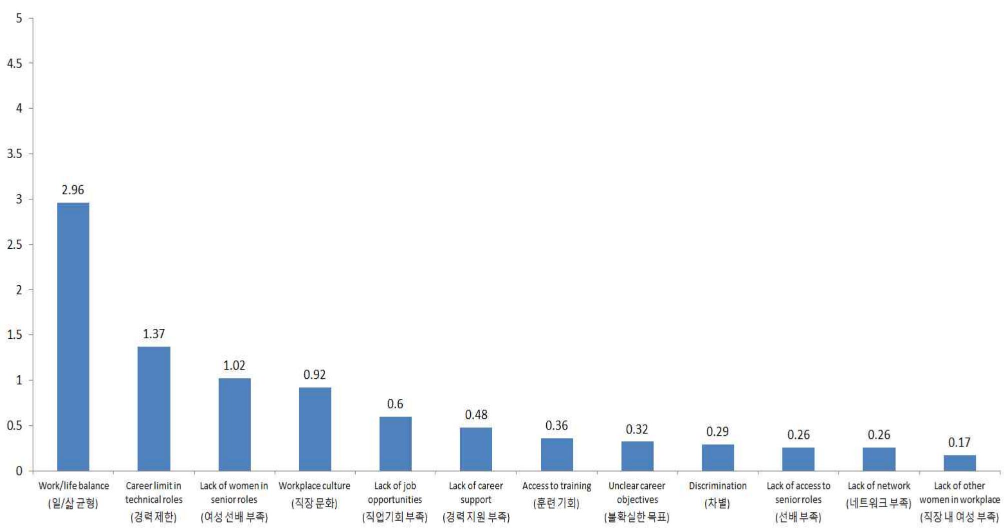
Difficulty	M	SD	Rank
Work/life balance	2.96	2.20	1
Workplace culture	0.92	1.57	4
Lack of access to senior roles	0.26	0.85	10
Lack of women in senior roles	1.02	1.66	3
Lack of career support	0.48	1.24	6
Unclear career objectives	0.32	0.90	8
Lack of job opportunities	0.60	1.30	5
Lack of network	0.26	0.90	10
Career limit in technical roles	1.37	1.89	2
Discrimination	0.29	1.00	9
Lack of other women in workplace	0.17	0.76	12
Access to training	0.36	0.98	7

Fig. 2-15 Mean value of questionnaire results: by specialty (Malaysia)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-16 Most significant difficulties of women scientists and engineers by rank (Malaysia)



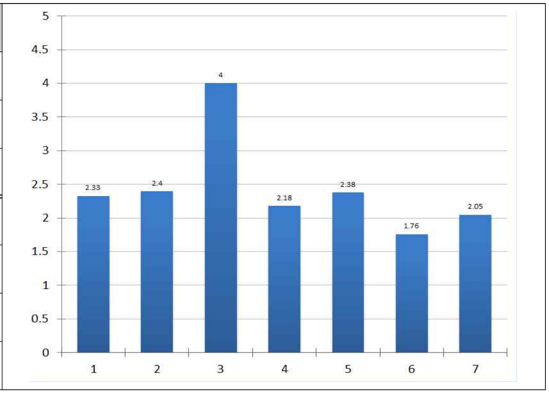
C. Mongolia

1) Number of respondents: 323

		Number of respondents	Ratio (%)
Age group	20s	34	10.5
	30s	94	29.1
	40s	98	30.3
	>50s	97	30.0
Specialty	Science	108	33.4
	Engineering	128	39.6
	Others	87	26.9

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.33	0.87
Q2	2.40	0.78
Q3	4.00	0.78
Q4	2.18	0.89
Q5	2.38	0.91
Q6	1.76	0.91
Q7	2.05	0.67



The descriptive statistical analysis found that Q3 had a notably high score at 4.00 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q6 had the lowest score at 1.76 and Q5 had the highest score at 2.38 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Q1 based on general characteristics

An analysis of differences for Q1 based on general characteristics found that Q1 based on age (p=.039<.05) had a significant difference. The Games-Howell post-hoc test found that those in their 20s (M=2.62) had higher recognition of gender equality than did those in their 40s (M=2.19).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.62	0.74	a > c	2.861	.039†
	30s(b)	2.30	0.77			
	40s(c)	2.19	0.76			
	>50s(d)	2.39	1.08			
Specialty	Science	2.30	0.87		1.211	.299
	Engineering	2.27	0.93			
	Others	2.45	0.79			

† Welch test & Games-Howell's post-hoc test

Q2 based on general characteristics
An analysis of differences for Q2 based on general characteristics found that Q2 based on field ($p=.010<.05$) had a significant difference. The Scheffe's post-hoc test found that those in science ($M=2.67$) had higher recognition of gender equality than those not in science and engineering ($M=2.26$).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.56	0.50		1.647	.182
	30s	2.44	0.50			
	40s	2.35	0.48			
	>50s	2.35	1.22			
Specialty	Science(a)	2.58	0.82	a > c	4.624	.010
	Engineering(b)	2.35	0.77			
	Others(c)	2.26	0.71			

Q3 based on general characteristics
An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	4.03	0.81		.980	.402
	30s	3.90	0.82			
	40s	3.98	0.69			
	>50s	4.09	0.81			
Specialty	Science	4.00	0.66		.810	.446[†]
	Engineering	4.05	0.83			
	Others	3.91	0.83			

[†] Welch test & Games-Howell's post-hoc test

Q4 based on general characteristics
An analysis of differences for Q4 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.97	0.76		1.430	.237
	30s	2.29	1.00			
	40s	2.11	0.82			
	>50s	2.21	0.88			
Specialty	Science	2.31	0.91		1.816	.164
	Engineering	2.09	0.89			
	Others	2.14	0.86			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.53	0.96		.690	.559
	30s	2.43	0.98			
	40s	2.37	0.87			
	>50s	2.29	0.87			
Specialty	Science	2.39	0.89		.885	.414
	Engineering	2.30	0.87			
	Others	2.47	1.00			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found no significant difference.

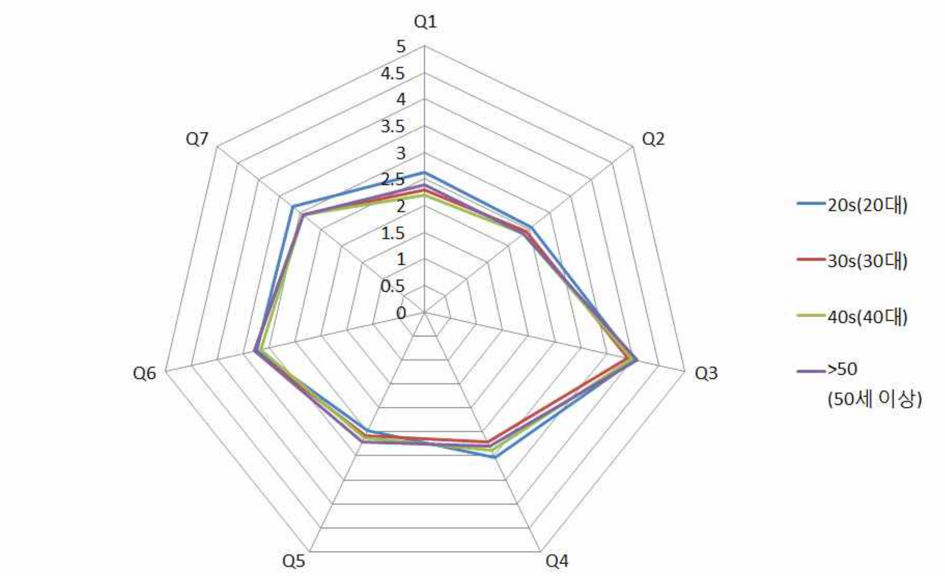
		M	SD	Post-Hoc	t or F	p
Age group	20s	1.76	0.85		.358	.783
	30s	1.72	0.93			
	40s	1.83	0.88			
	>50s	1.71	0.95			
Specialty	Science	1.79	0.87		.316	.730
	Engineering	1.71	0.96			
	Others	1.79	0.89			

Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

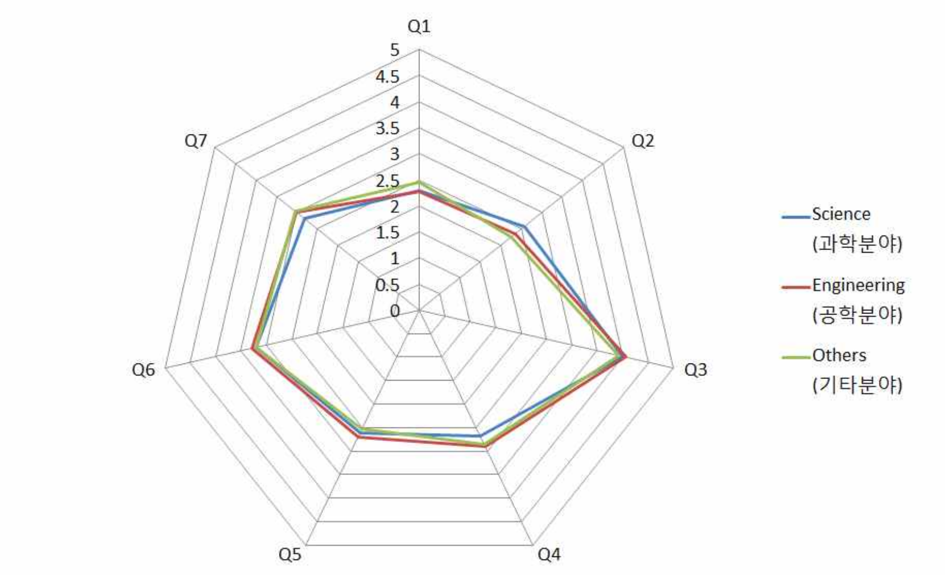
		M	SD	Post-Hoc	t or F	p
Age group	20s	1.82	0.72		.882	.451
	30s	2.08	0.93			
	40s	2.08	0.83			
	>50s	2.08	0.88			
Specialty	Science	2.19	0.87		2.117	.122
	Engineering	1.99	0.90			
	Others	1.96	0.79			

Fig. 2-17 Mean value of questionnaire results: by age group (Mongolia)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-18 Mean value of questionnaire results: by specialty (Mongolia)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

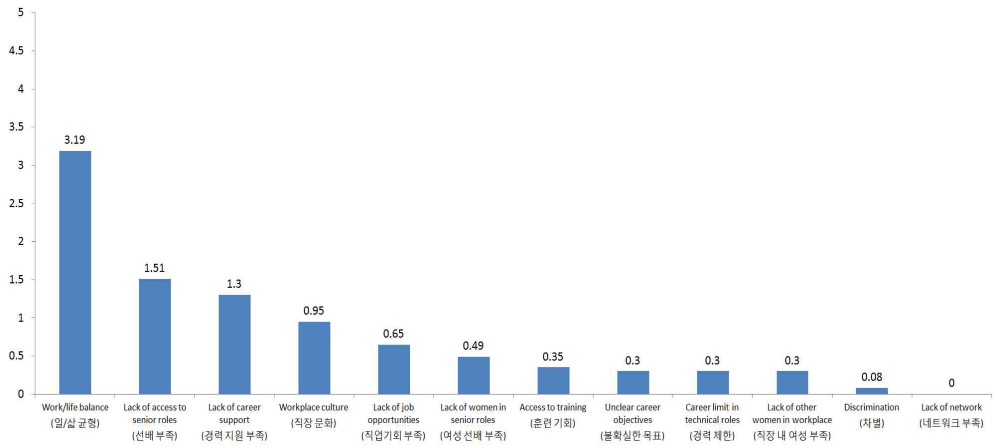
Q8 for difficulties as a female science/engineering professionals

The most significant difficulties female science/engineering professionals experience are work/life balance (M=3.19), lack of women in senior roles (M=1.51), and lack of career support (M=1.30). It is worth mentioning that lack of network (M=0.0) was not a difficulty at all for female science and engineering professionals in maintaining their careers.

Table 2-17 Most significant difficulties of women scientists and engineers by rank (Mongolia)

Difficulty	M	SD	Rank
Work/life balance	3.19	1.98	1
Workplace culture	0.95	1.65	4
Lack of access to senior roles	1.51	1.74	2
Lack of women in senior roles	0.49	1.30	6
Lack of career support	1.30	1.90	3
Unclear career objectives	0.30	0.97	8
Lack of job opportunities	0.65	1.49	5
Lack of network	0.00	0.00	12
Career limit in technical roles	0.30	0.97	8
Discrimination	0.08	0.28	11
Lack of other women in workplace	0.30	1.15	8
Access to training	0.35	1.06	7

Fig. 2-19 Most significant difficulties of women scientists and engineers by rank (Mongolia)



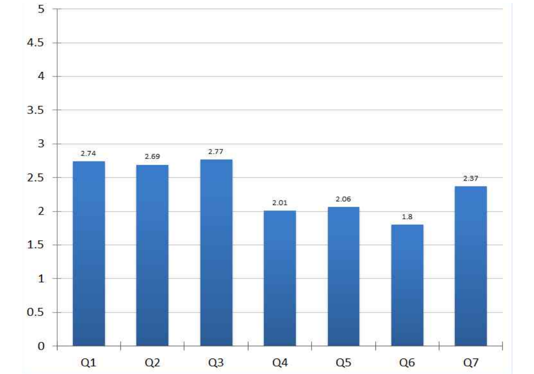
D. Vietnam

1) Number of respondents: 100

		Number of respondents	Ratio (%)
Age group	20s	59	59.0
	30s	10	10.0
	40s	16	16.0
	>50s	15	15.0
Specialty	Science	17	17.0
	Engineering	55	55.0
	Others	28	28.0

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.74	1.01
Q2	2.69	0.90
Q3	2.77	0.94
Q4	2.01	1.07
Q5	2.06	0.98
Q6	1.80	0.96
Q7	2.37	0.97



The descriptive statistical analysis found that Q3 had a rather high score at 2.77 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q6 had the lowest score at 1.80 and Q7 had the highest score at 2.37 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Q1 based on general characteristics

An analysis of differences for Q1 based on general characteristics found that Q1 based on age (p=.030<.05) and on field (p=.003<.05) had a significant difference. The Scheffe's post-hoc test found that those in their 30s (M=3.40) and those in engineering (M=2.44) had higher recognition of gender equality than did those in their 20s (M=2.56), and those not in science and others, respectively.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.56	0.97	b > a	3.102	.030
	30s(b)	3.40	0.70			
	40s(c)	3.13	1.02			
	>50s(d)	2.60	1.12			
Specialty	Science(e)	3.12	0.93	f > e, g	6.075	.003
	Engineering(f)	2.44	0.92			
	Others(g)	3.11	1.07			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found that Q2 based on age (p=.013<.05) had a significant difference. The Scheffe's post-hoc test found that those in their 30s (M=3.20) had higher recognition of gender equality than did those aged 50 or older (M=2.29).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.56	0.97	b > a	3.102	.030
	30s(b)	3.40	0.70			
	40s(c)	3.13	1.02			
	>50s(d)	2.60	1.12			
Specialty	Science(e)	3.12	0.93	f > e, g	6.075	.003
	Engineering(f)	2.44	0.92			
	Others(g)	3.11	1.07			

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.79	0.85		1.350	.263
	30s	2.70	0.82			
	40s	3.06	1.24			
	>50s	2.40	0.91			
Specialty	Science	2.94	0.75		.588	.557
	Engineering	2.78	0.94			
	Others	2.63	1.04			

† Welch test & Games-Howell's post-hoc test

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found that Q4 based on age (p=.003<.05) and on field (p=.005<.05) had a significant difference. The Games-Howell post-hoc test for this question indicates that those aged 50 or older (M=2.33) and those in engineering (M=2.27) were found to have higher recognition of gender equality than were those in their 30s (M=1.40) and those in science (M=1.35).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.03	1.22	d > b	5.586	.003†
	30s(b)	1.40	0.52			
	40s(c)	2.00	0.97			
	>50s(d)	2.33	0.62			
Specialty	Science(e)	1.35	0.61	f > e	5.506	.005†
	Engineering(f)	2.27	1.18			
	Others(g)	1.89	0.88			

† Welch test & Games-Howell's post-hoc test

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found that Q5 based on field ($p=.021<.05$) had a significant difference. The Scheffe's post-hoc test found that those in engineering ($M=2.20$) had higher recognition of gender equality than did those in science ($M=1.47$).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.14	1.07		1.550	.207
	30s	1.50	0.71			
	40s	1.94	0.85			
	>50s	2.27	0.80			
Specialty	Science(a)	1.47	0.80	b > a	4.006	.021
	Engineering(b)	2.20	1.02			
	Others(c)	2.14	0.89			

† Welch test & Games-Howell's post-hoc test

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on age ($p=.003<.05$) had a significant difference. The Scheffe's post-hoc test found that those aged 50 or older ($M=2.60$) had higher recognition of gender equality than did those in their 20s ($M=1.59$).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.59	0.85	d > a	4.858	.003
	30s(b)	1.80	0.79			
	40s(c)	1.81	1.11			
	>50s(d)	2.60	0.99			
Specialty	Science	1.82	0.88		2.858	.062
	Engineering	1.62	0.97			
	Others	2.14	0.93			

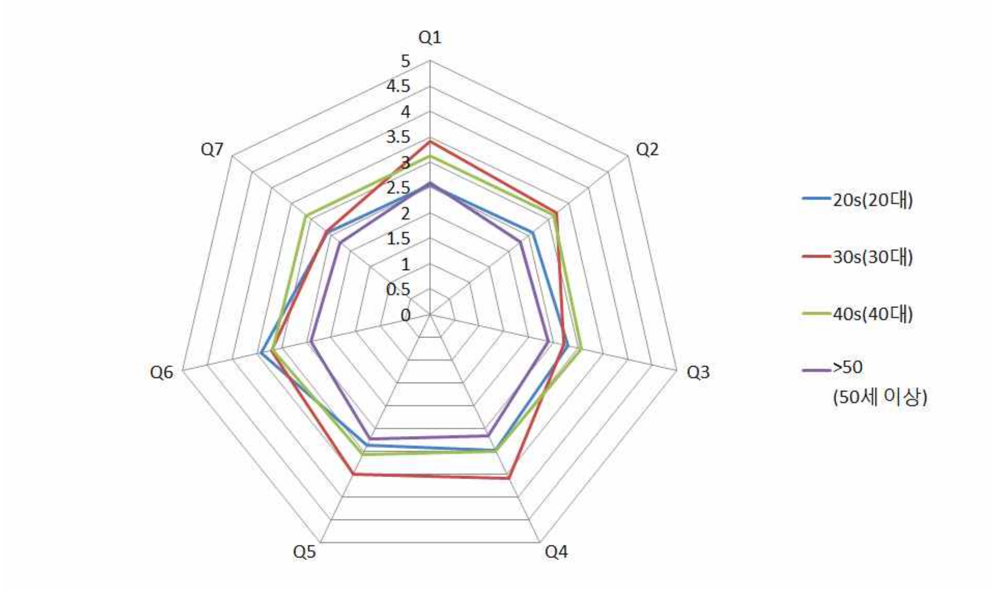
Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found that Q7 based on age ($p=.037<.05$) had a significant difference. The Games-Howell post-hoc test for this question indicates that those aged 50 or older ($M=2.73$) were found to have higher recognition of gender equality than were those in their 40s ($M=1.88$).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.41	1.02	d > c	3.258	.037†
	30s(b)	2.40	1.07			
	40s(c)	1.88	0.89			
	>50s(d)	2.73	0.59			
Specialty	Science	2.29	1.16		.282	.755
	Engineering	2.44	0.98			
	Others	2.29	0.85			

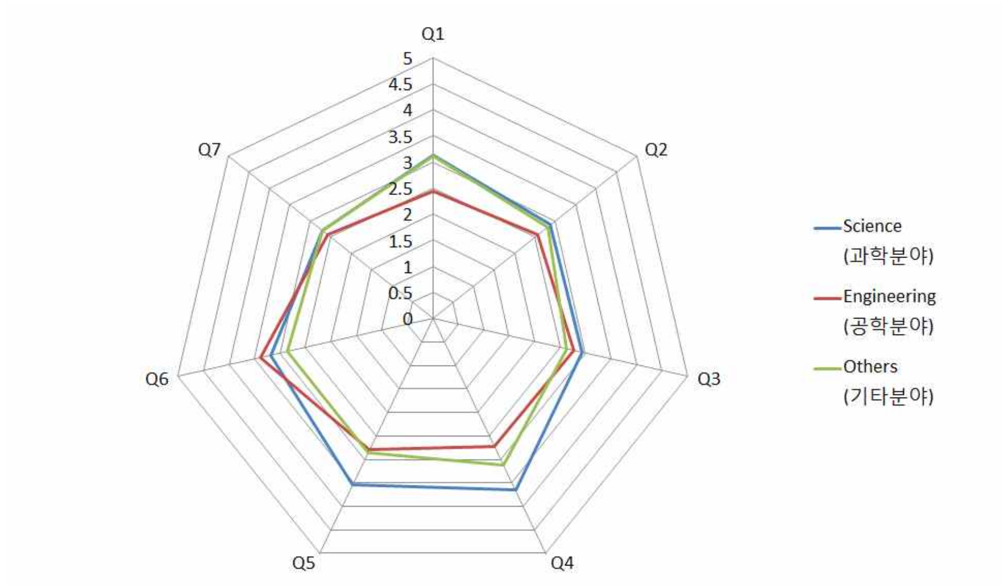
† Welch test & Games-Howell's post-hoc test

Fig. 2-20 Mean value of questionnaire results: by age group (Vietnam)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-21 Mean value of questionnaire results: by specialty (Vietnam)



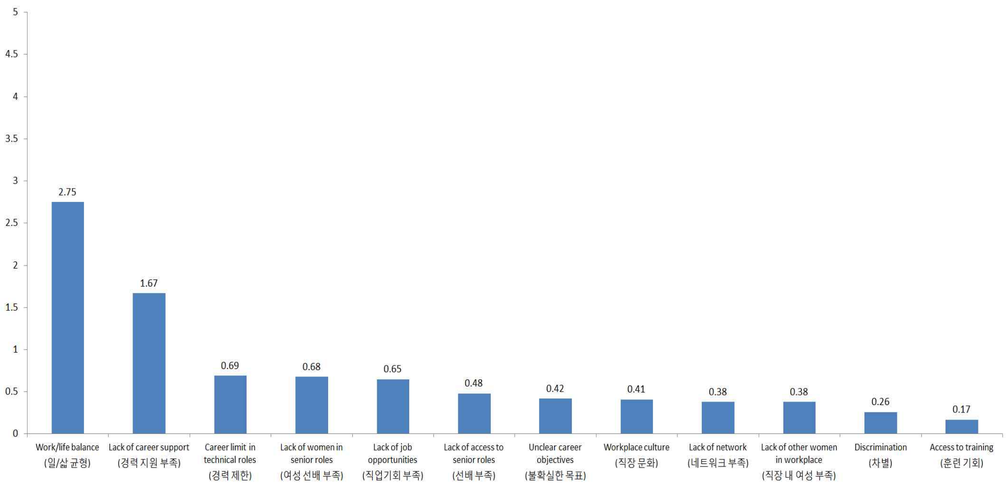
* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Q8 for difficulties as a female science/engineering professionals
The most significant difficulties that female science/engineering professionals experience are work/life balance (M=2.75), lack of career support (M=1.67), and career limits in technical roles (M=0.69).

Table 2-18 Most significant difficulties of women scientists and engineers by rank (Vietnam)

Difficulty	M	SD	Rank
Work/life balance	2.75	2.37	1
Workplace culture	0.41	1.15	8
Lack of access to senior roles	0.48	1.34	6
Lack of women in senior roles	0.68	1.41	4
Lack of career support	1.67	1.89	2
Unclear career objectives	0.42	1.10	7
Lack of job opportunities	0.65	1.30	5
Lack of network	0.38	1.02	9
Career limit in technical roles	0.69	1.34	3
Discrimination	0.26	0.85	11
Lack of other women in workplace	0.38	1.13	9
Access to training	0.17	0.65	12

Fig. 2-22 Most significant difficulties of women scientists and engineers by rank (Vietnam)



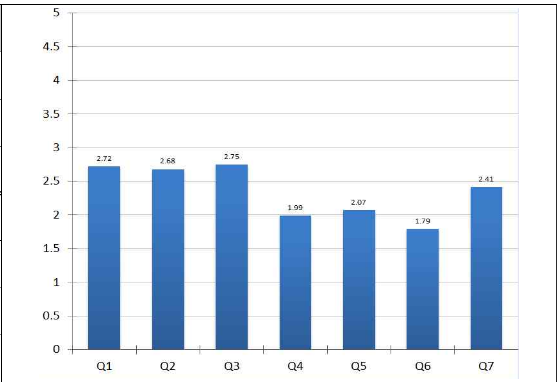
E. Sri Lanka

1) Number of respondents: 101

		Number of respondents	Ratio (%)
Age group	20s	60	59.4
	30s	10	9.9
	40s	16	15.8
	>50s	15	14.9
Specialty	Science	16	15.8
	Engineering	53	52.5
	Others	32	31.7

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.72	1.02
Q2	2.68	0.91
Q3	2.75	0.95
Q4	1.99	1.07
Q5	2.07	0.98
Q6	1.79	0.96
Q7	2.41	1.00



The descriptive statistical analysis found that Q3 had a rather high score at 2.75 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q6 had the lowest score at 1.79 and Q7 had the highest score at 2.41 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found that Q1 based on age (p=.025<.05) and on field (p=.005<.05) had a significant difference. The Scheffe's post-hoc test found no difference, but those in their 30s (M=3.40) had higher recognition than did those in their 20s (M=2.53), and that those in engineering (M=2.42) had a lower recognition than did those in science (M=3.06) and those not in science and engineering (M=3.06).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.53	0.98		3.263	.025
	30s	3.40	0.70			
	40s	3.13	1.02			
	>50s	2.60	1.12			
Specialty	Science	3.06	0.93		5.522	.005
	Engineering	2.42	0.91			
	Others	3.06	1.11			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found that Q2 based on age (p=.012<.05) had a significant difference. The Scheffe's post-hoc test found that those in their 30s (M=3.20) had higher recognition of gender equality than did those aged 50 or older (M=2.29).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.56	0.90	b > d	3.877	.012
	30s(b)	3.20	0.63			
	40s(c)	3.13	1.02			
	>50s(d)	2.29	0.73			
Specialty	Science	2.88	0.72		1.662	.195
	Engineering	2.52	0.90			
	Others	2.84	1.00			

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.76	0.88		1.288	.283
	30s	2.70	0.82			
	40s	3.06	1.24			
	>50s	2.40	0.91			
Specialty	Science	2.88	0.72		.228	.797
	Engineering	2.75	0.96			
	Others	2.68	1.05			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found that Q4 based on age (p=.004<.05) and on field (p=.002<.05) had a significant difference. The Games-Howell post-hoc test for this question indicates that those aged 50 or older (M=2.33) and those in engineering (M=2.23) had higher recognition of gender equality than did those in their 30s (M=1.40) and those in science (M=1.38).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.00	1.22	d > b	5.516	.004†
	30s(b)	1.40	0.52			
	40s(c)	2.00	0.97			
	>50s(d)	2.33	0.62			
Specialty	Science(e)	1.38	0.62	f > e	7.213	.002†
	Engineering(f)	2.23	1.20			
	Others(g)	1.91	0.89			

† Welch test & Games-Howell's post-hoc test

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found that Q5 based on field (p=.037<.05) had a significant difference. The Scheffe's post-hoc test found that those in engineering (M=2.21) had higher recognition of gender equality than did those in science (M=1.50).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.17	1.08		1.524	.213
	30s	1.50	0.71			
	40s	1.94	0.85			
	>50s	2.20	0.77			
Specialty	Science(a)	1.50	0.82	b > a	3.421	.037
	Engineering(b)	2.21	1.04			
	Others(c)	2.13	0.87			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on age (p=.003<.05) and on field (p=.016<.05) had a significant difference. The Scheffe's post-hoc test found that those aged 50 or older (M=2.60) and those not in science and engineering (M=2.16) had higher recognition of gender equality than did those in their 20s (M=1.58) and those in engineering (M=1.55).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.58	0.85	d > a	5.003	.003
	30s(b)	1.80	0.79			
	40s(c)	1.81	1.11			
	>50s(d)	2.60	0.99			
Specialty	Science	1.88	0.89		4.337	.016
	Engineering	1.55	0.91			
	Others	2.16	0.99			

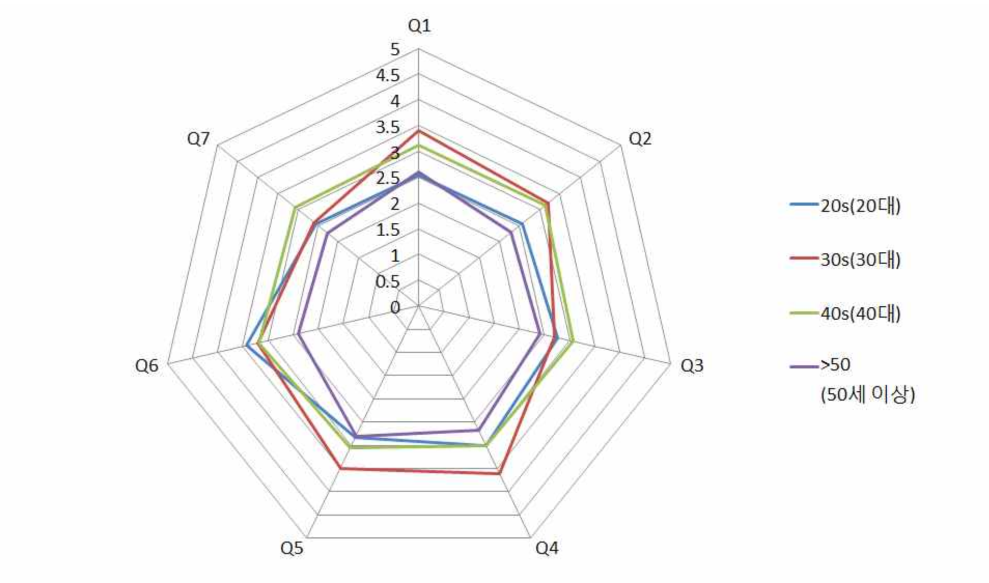
Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.45	1.06		2.715	.064†
	30s	2.40	1.07			
	40s	1.93	0.88			
	>50s	2.73	0.59			
Specialty	Science	2.19	1.11		.779	.462
	Engineering	2.52	1.02			
	Others	2.34	0.90			

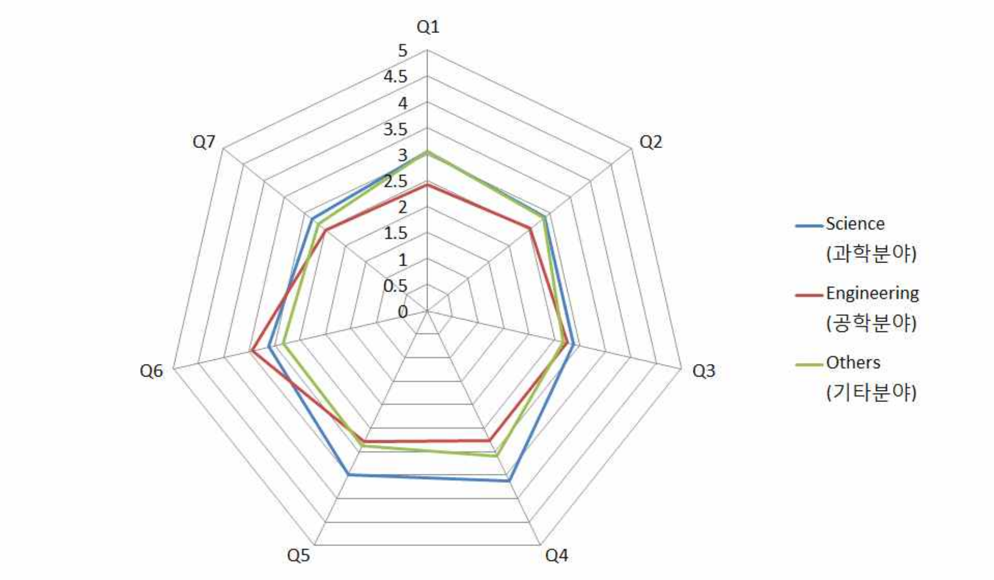
† Welch test & Games-Howell's post-hoc test

Fig. 2-23 Mean value of questionnaire results: by age group (Sri Lanka)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-24 Mean value of questionnaire results: by specialty (Sri Lanka)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

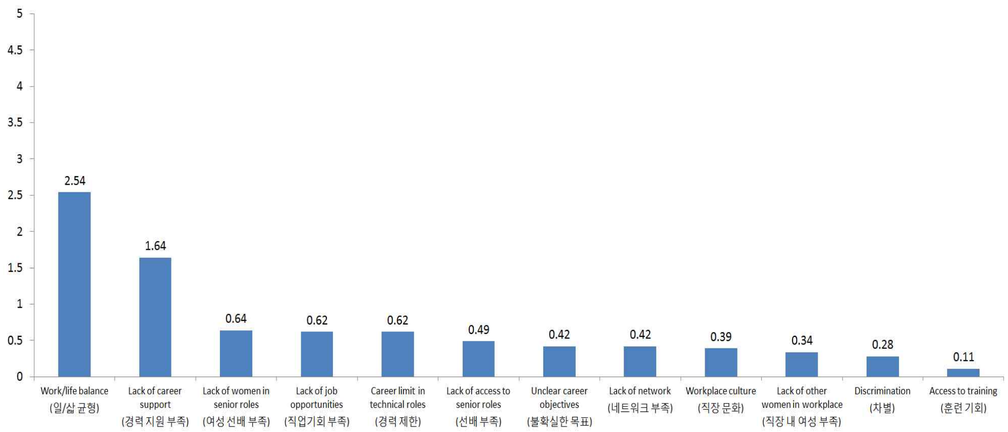
Q8 for difficulties as a female science/engineering professionals

The most significant difficulties female science/engineering professionals experience are work/life balance (M=2.54), lack of career support (M=1.64), and lack of women in senior roles (M=0.64).

Table 2-19 Most significant difficulties of women scientists and engineers by rank (Sri Lanka)

Difficulty	M	SD	Rank
Work/life balance	2.54	2.38	1
Workplace culture	0.39	1.12	9
Lack of access to senior roles	0.49	1.32	6
Lack of women in senior roles	0.64	1.38	3
Lack of career support	1.64	1.91	2
Unclear career objectives	0.42	1.10	7
Lack of job opportunities	0.62	1.27	4
Lack of network	0.42	1.06	7
Career limit in technical roles	0.62	1.29	4
Discrimination	0.28	0.92	11
Lack of other women in workplace	0.34	1.07	10
Access to training	0.11	0.40	12

Fig. 2-25 Most significant difficulties of women scientists and engineers by rank (Sri Lanka)



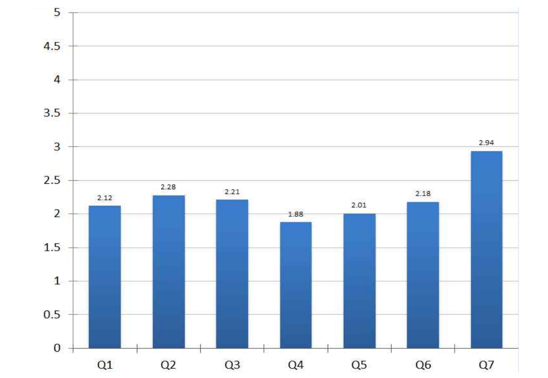
F. India

1) Number of respondents: 100

		Number of respondents	Ratio (%)
Age group	20s	56	56.6
	30s	32	32.3
	40s	7	7.1
	>50s	4	4.0
Specialty	Science	10	10.0
	Engineering	75	75.0
	Others	15	15.0

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.72	1.02
Q2	2.68	0.91
Q3	2.75	0.95
Q4	1.99	1.07
Q5	2.07	0.98
Q6	1.79	0.96
Q7	2.41	1.00



The descriptive statistical analysis found that Q2 had a rather high score at 2.28 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 had the lowest score at 1.88 and Q7 had the highest score at 2.94 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.53	0.98		3.263	.025
	30s	3.40	0.70			
	40s	3.13	1.02			
	>50s	2.60	1.12			
Specialty	Science	3.06	0.93		5.522	.005
	Engineering	2.42	0.91			
	Others	3.06	1.11			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.36	0.88		.629	.598
	30s	2.22	0.71			
	40s	2.00	0.00			
	>50s	2.50	0.58			
Specialty	Science	2.20	0.63		.062	.939
	Engineering	2.29	0.85			
	Others	2.27	0.59			

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.29	1.04		.711	.565†
	30s	2.09	0.64			
	40s	2.14	0.69			
	>50s	2.50	0.58			
Specialty	Science	2.50	0.85		1.273	.285
	Engineering	2.23	0.88			
	Others	1.93	0.96			

† Welch test & Games-Howell's post-hoc test

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found that Q4 based on field ($p=.036<.05$) had a significant difference. The Scheffe's post-hoc test found that those not in science and engineering (M=2.40) had higher recognition of gender equality than did those in science (M=1.50).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.05	0.98		1.691	.174
	30s	1.69	0.78			
	40s	1.43	0.79			
	>50s	2.00	1.41			
Specialty	Science(a)	1.50	0.71	c > a	3.427	.036
	Engineering(b)	1.83	0.94			
	Others(c)	2.40	0.91			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.09	0.96		.316	.814
	30s	1.91	0.93			
	40s	1.86	1.07			
	>50s	2.00	0.82			
Specialty	Science	1.70	0.82		.608	.547
	Engineering	2.04	0.96			
	Others	2.07	0.88			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.21	1.09		.333	.801†
	30s	2.19	0.74			
	40s	2.29	0.49			
	>50s	1.75	0.96			
Specialty	Science	2.60	0.52		3.481	.050†
	Engineering	2.09	0.84			
	Others	2.33	1.50			

† Welch test & Games-Howell's post-hoc test

Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

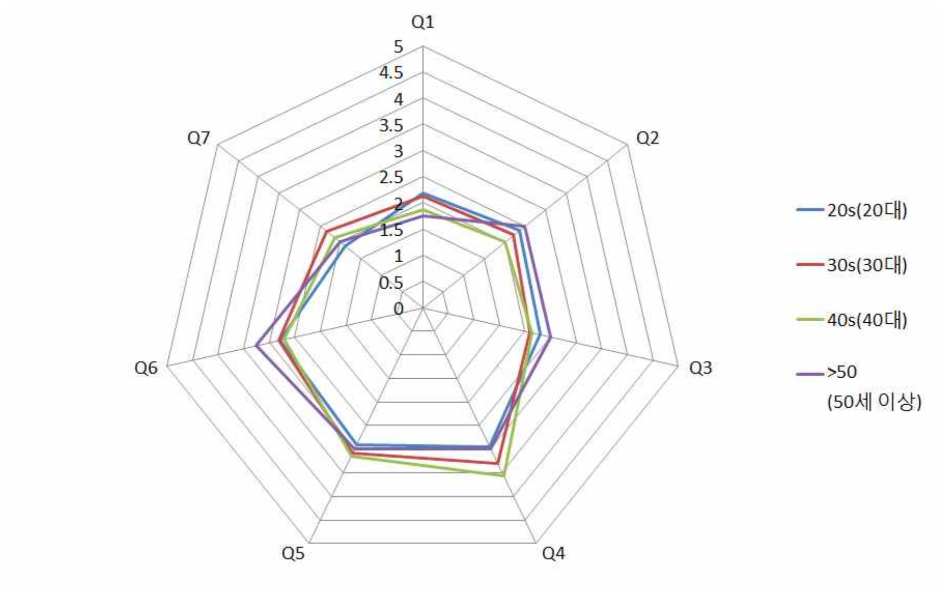
		M	SD	Post-Hoc	t or F	p
Age group	20s	3.11	1.06		1.522	.214
	30s	2.66	0.75			
	40s	2.86	0.69			
	>50s	3.00	1.41			
Specialty	Science	3.10	0.32		2.047	.149†
	Engineering	2.84	0.90			
	Others	3.33	1.40			

† Welch test & Games-Howell's post-hoc test

Q8 for difficulties as a female science/engineering professionals

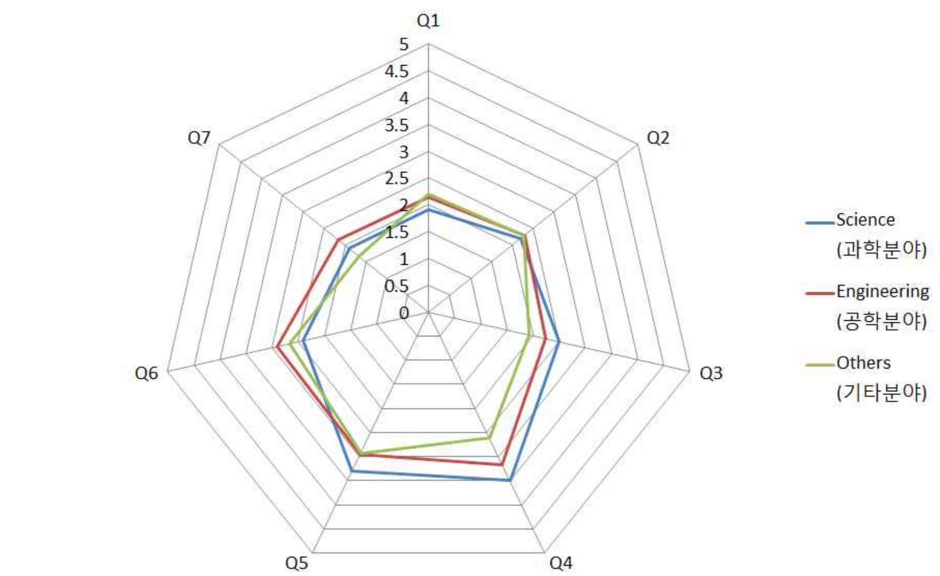
No survey data available.

Fig. 2-26 Mean value of questionnaire results: by age group (India)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-27 Mean value of questionnaire results: by specialty (India)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

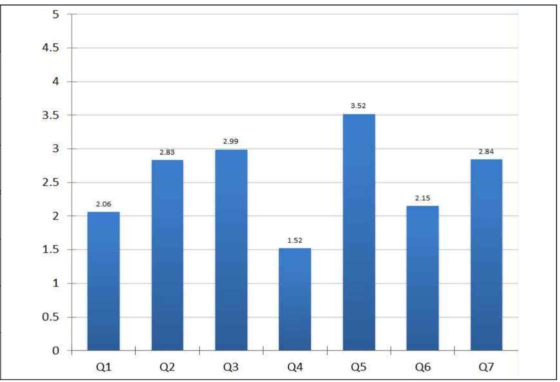
G. Japan

1) Number of respondents: 103 (Three participants gave no response for age, and one participant gave no response for field.)

		Number of respondents	Ratio (%)
Age group	20s	10	10.0
	30s	20	20.0
	40s	23	23.0
	>50s	47	47.0
Specialty	Science	30	29.4
	Engineering	51	50.0
	Others	21	20.6

2) Descriptive statistical analysis for each question
The descriptive statistical analysis found that Q3 had the highest score at 2.99 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 had the lowest score at 1.52 and Q5 had the highest score at 3.52 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Question	M	SD
Q1	2.06	1.08
Q2	2.83	0.74
Q3	2.99	0.75
Q4	1.52	0.91
Q5	3.52	0.97
Q6	2.15	1.06
Q7	2.84	1.27



<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found that Q1 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that those aged 50 or older (M=2.83) had higher recognition than did those in their 20s, 30s and 40s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.00	0.00	d > a, b, c	54.656	.000
	30s(b)	1.15	0.67			
	40s(c)	1.48	0.51			
	>50s(d)	2.83	0.70			
Specialty	Science(e)	1.00	0.00	g > f > e	112.416	.000
	Engineering(f)	2.06	0.70			
	Others(g)	3.57	0.75			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found that Q2 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that the level of recognition was high in the order of those in their 40s, those aged 50 or older, those in their 30s, and those in their 20s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.50	0.53	c, d > b > a	56.099	.000
	30s(b)	2.25	0.55			
	40s(c)	3.00	0.00			
	>50s(d)	3.28	0.50			
Specialty	Science(e)	1.97	0.56	g > f > e	130.625	.000
	Engineering(f)	3.00	0.00			
	Others(g)	3.74	0.56			

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found that Q3 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that the level of recognition was high in the order of those aged 50 or older, those in their 30s and 40s, and in their 20s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.60	0.52	d > b, c > a	35.891	.000
	30s(b)	2.70	0.57			
	40s(c)	3.00	0.00			
	>50s(d)	3.40	0.61			
Specialty	Science(e)	2.30	0.70	g > f > e	90.065	.000
	Engineering(f)	3.00	0.00			
	Others(g)	4.05	0.52			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found that Q4 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that those aged 50 or older (M=2.83) had higher recognition than did those in their 20s, 30s and 40s; those not in science and engineering (M=2.95) had higher recognition that did those in science or in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.00	0.00	d > a, b, c	13.866	.000
	30s(b)	1.15	0.67			
	40s(c)	1.00	0.00			
	>50s(d)	1.98	0.94			
Specialty	Science(e)	1.00	0.00	g > e, f	82.039	.000
	Engineering(f)	1.27	0.45			
	Others(g)	2.95	1.05			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found that Q5 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that the level of recognition was high in the order of those aged 50 or older, those in their 30s, and those in their 40s and 20s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.50	0.53	d > c > b > a	99.444	.000
	30s(b)	2.80	0.70			
	40s(c)	3.65	0.49			
	>50s(d)	4.13	0.34			
Specialty	Science(e)	2.30	0.75	g > f > e	122.441	.000
	Engineering(f)	3.86	0.35			
	Others(g)	4.43	0.51			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that the level of recognition was high in the order of those aged 50 or older, those in their 40s, and those in their 20s and 30s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.00	0.00	d > c > a, b	31.760	.000
	30s(b)	1.20	0.70			
	40s(c)	2.00	0.00			
	>50s(d)	2.81	0.97			
Specialty	Science(e)	1.07	0.25	g > f > e	292.597	.000
	Engineering(f)	2.10	0.30			
	Others(g)	3.90	0.72			

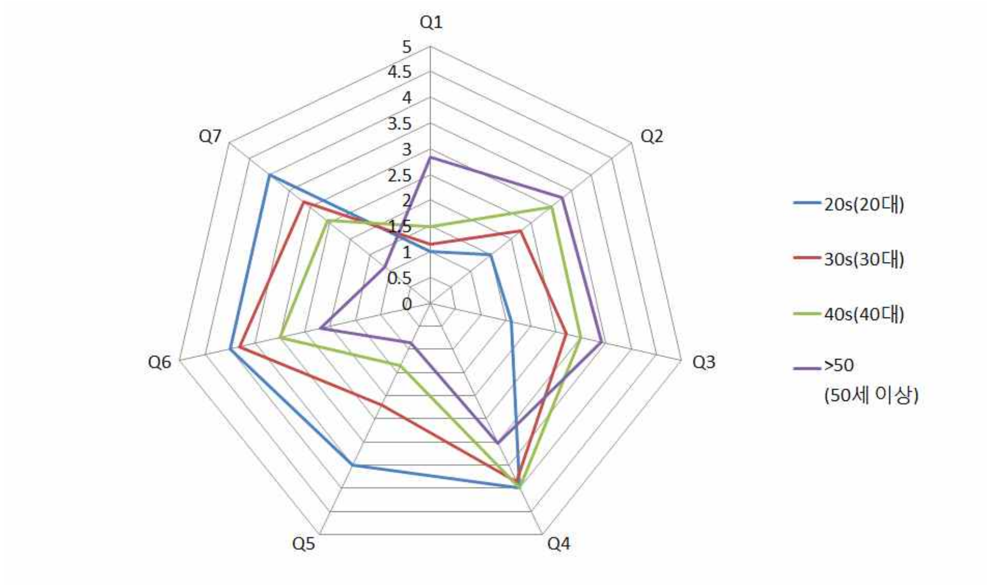
Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found that Q7 based on age (p<.001) and on field (p<.001) had a significant difference. The Scheffe's post-hoc test found that the level of recognition was high in the order of those aged 50 or older, those in their 30s and 40s, and those in their 20s; the level of recognition was high in the order of those not in science and engineering, those in science, and those in engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.00	0.00	d > b, c > a	65.277	.000
	30s(b)	1.85	0.88			
	40s(c)	2.43	0.51			
	>50s(d)	3.87	0.83			
Specialty	Science(e)	1.47	0.51	g > f > e	184.493	.000
	Engineering(f)	2.96	0.66			
	Others(g)	4.78	0.43			

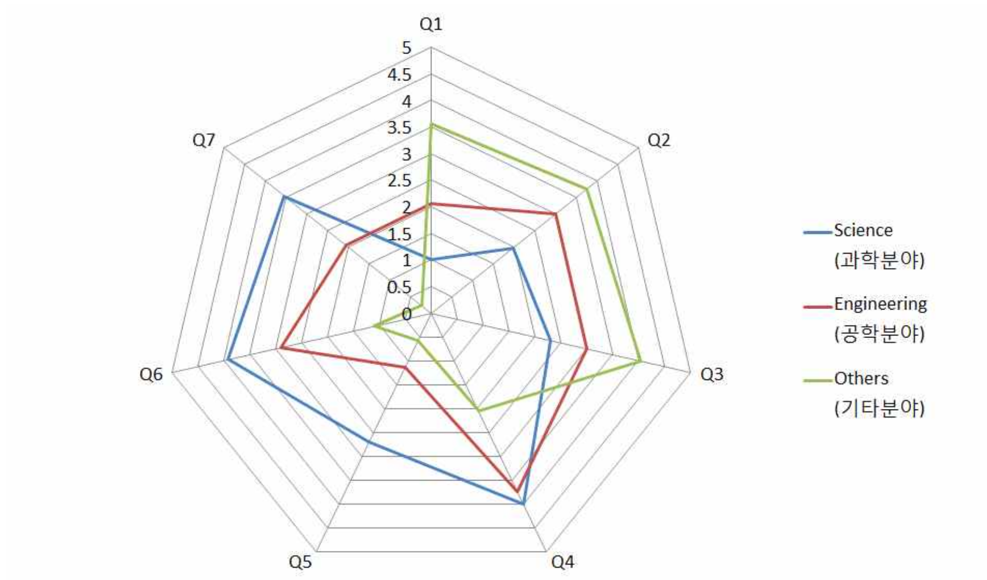
Q8 for difficulties as a female science/engineering professionals
No survey data available.

Fig. 2-28 Mean value of questionnaire results: by age group (Japan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-29 Mean value of questionnaire results: by specialty (Japan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

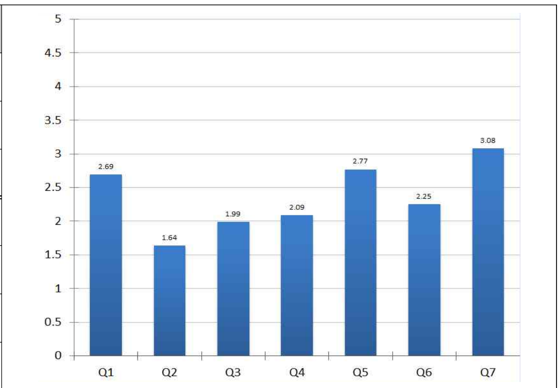
H. Taiwan

1) Number of respondents: 104 (Two participants gave no response for age.)

		Number of respondents	Ratio (%)
Age group	20s	27	26.5
	30s	13	12.7
	40s	29	28.4
	>50s	33	32.4
Specialty	Science	58	55.8
	Engineering	46	44.2
	Others	0	0

2) Descriptive statistical analysis for each question
The descriptive statistical analysis found that Q1 had the highest score at 2.69 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 had the lowest score at 2.09 and Q7 had the highest score at 3.08 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

Question	M	SD
Q1	2.69	1.06
Q2	1.64	0.61
Q3	1.99	0.80
Q4	2.09	1.00
Q5	2.77	1.03
Q6	2.25	1.00
Q7	3.08	0.85



<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found that Q1 based on field (p=.027<.05) had a significant difference. It was found that those in science (M=2.90) had higher recognition of gender equality than did those in engineering (M=2.43).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.67	1.00	.077	.972	.025
	30s	2.62	0.96			
	40s	2.66	1.17			
	>50s	2.76	1.12			
Specialty	Science	2.90	0.99	2.245	.027	.005
	Engineering	2.43	1.11			
	Others	-	-			

Q2 based on general characteristics
An analysis of differences for Q2 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.59	0.50		1.172	.325
	30s	1.92	0.95			
	40s	1.66	0.61			
	>50s	1.56	0.50			
Specialty	Science	1.74	0.52		1.751	.084
	Engineering	1.52	0.69			
	Others	-	-			

Q3 based on general characteristics
An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.07	0.83		.872	.458
	30s	2.23	0.93			
	40s	1.83	0.76			
	>50s	1.97	0.80			
Specialty	Science	2.02	0.73		.383	.703
	Engineering	1.96	0.89			
	Others	-	-			

Q4 based on general characteristics
An analysis of differences for Q4 based on general characteristics found that Q4 based on age (p=.002<.05) had a significant difference. The Games-Howell post-hoc test for this question indicates that those in their 40s (M=2.66) had higher recognition of gender equality than did those aged 50 or older.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.96	1.16	c > d	5.652	.002[†]
	30s(b)	2.00	0.82			
	40s(c)	2.66	1.04			
	>50s(d)	1.72	0.63			
Specialty	Science	2.02	0.98		-.825	.411
	Engineering	2.18	1.02			
	Others	-	-			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found that Q5 based on field (p=.037<.05) had a significant difference. The Scheffe's post-hoc test found that those in engineering (M=2.21) had higher recognition of gender equality than did those in science (M=1.50).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.22	0.97	b, c > a	4.587	.005
	30s(b)	3.08	1.04			
	40s(c)	3.14	0.88			
	>50s(d)	2.77	1.06			
Specialty	Science	2.67	1.06		-1.189	.237
	Engineering	2.91	1.00			
	Others	-	-			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on age (p=.002<.05) had a significant difference. The Games-Howell post-hoc test for this question indicates that those in their 40s and those aged 50 or older (M=2.33) had higher recognition of gender equality than did those in their 20s.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	1.67	0.78	c, d > a	6.721	.001†
	30s(b)	2.15	0.55			
	40s(c)	2.72	1.00			
	>50s(d)	2.32	1.05			
Specialty	Science	2.30	0.98		.603	.548
	Engineering	2.18	1.03			
	Others	-	-			

† Welch test & Games-Howell's post-hoc test

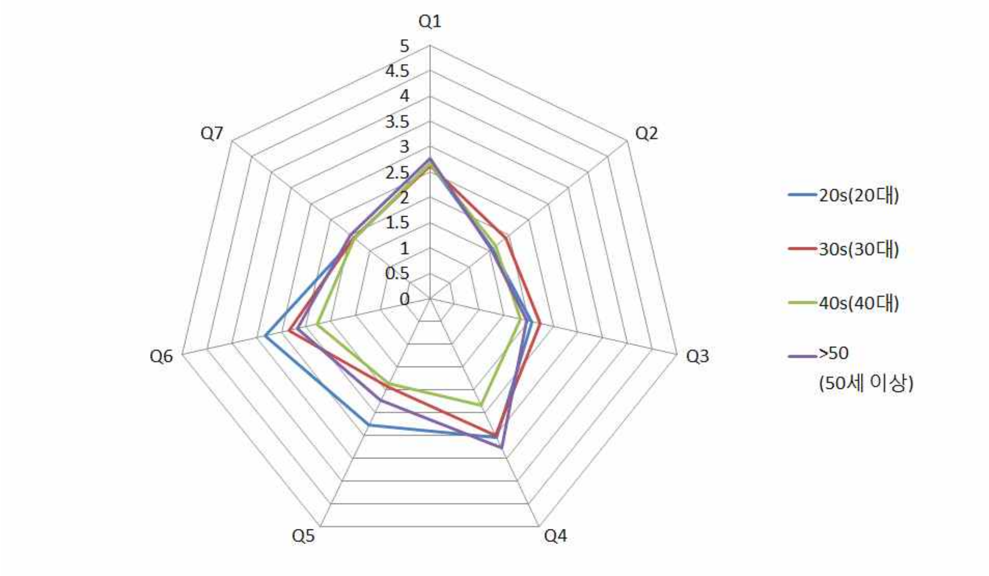
Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	3.11	1.09		.959	.064†
	30s	3.08	0.76			
	40s	3.11	0.77			
	>50s	3.00	0.77			
Specialty	Science	3.11	0.72		.722	.462
	Engineering	3.04	1.00			
	Others	-	-			

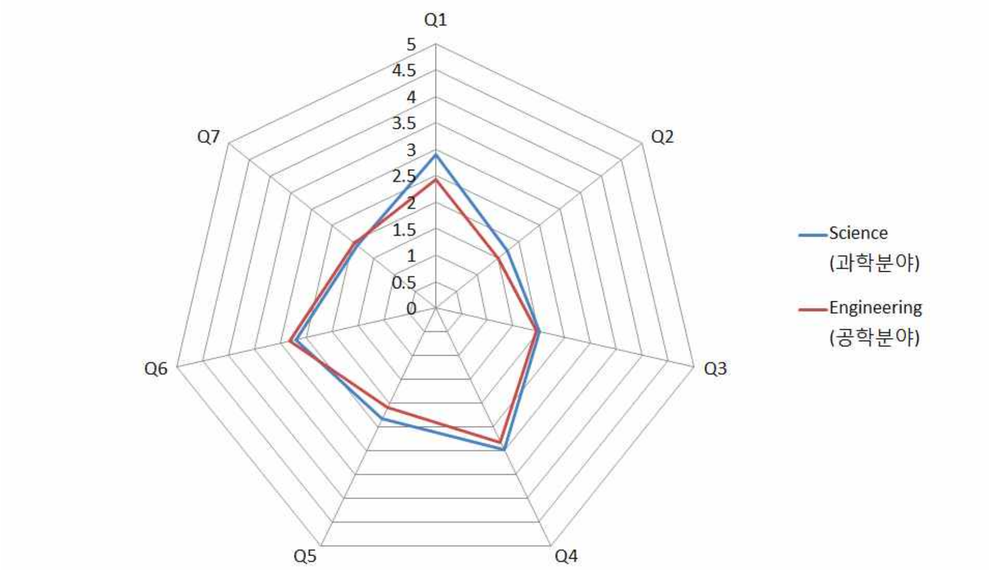
† Welch test & Games-Howell's post-hoc test

Fig. 2-30 Mean value of questionnaire results: by age group (Taiwan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-31 Mean value of questionnaire results: by specialty (Taiwan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

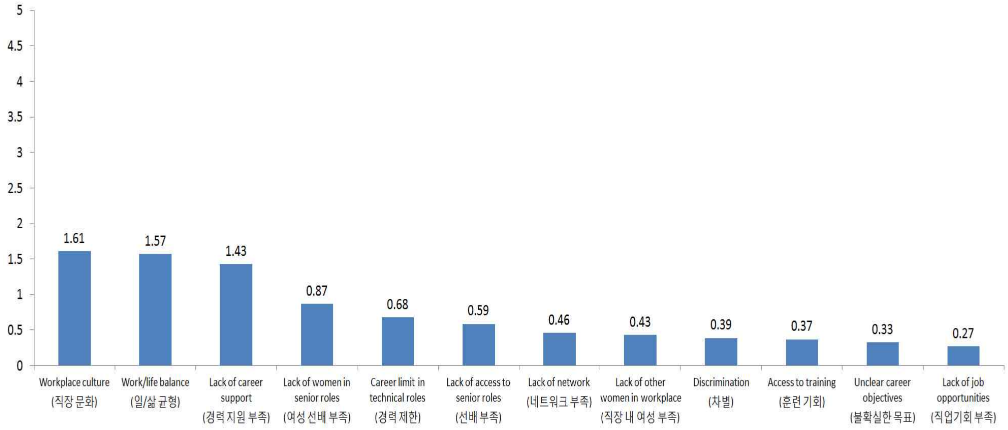
Q8 for difficulties as a female science/engineering professionals

Unlike other countries, the most significant difficulties female science/engineering professionals experience in Taiwan are workplace culture (M=1.61), work/life balance (M=1.57) and lack of career support (M=1.43).

Table 2-20 Most significant difficulties of women scientists and engineers by rank (Taiwan)

Difficulty	M	SD	Rank
Work/life balance	1.57	1.46	2
Workplace culture	1.61	1.88	1
Lack of access to senior roles	0.59	1.55	6
Lack of women in senior roles	0.87	1.72	4
Lack of career support	1.43	1.90	3
Unclear career objectives	0.33	1.14	11
Lack of job opportunities	0.27	0.99	12
Lack of network	0.46	1.35	7
Career limit in technical roles	0.68	1.58	5
Discrimination	0.39	1.23	9
Lack of other women in workplace	0.43	1.26	8
Access to training	0.37	1.17	10

Fig. 2-32 Most significant difficulties of women scientists and engineers by rank (Taiwan)



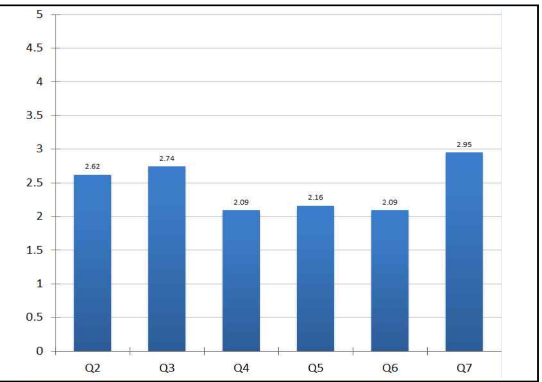
I. Pakistan

1) Number of respondents: 105 (Three participants gave no response for age and five participants gave no response for field.)

		Number of respondents	Ratio (%)
Age group	20s	86	84.3
	30s	12	11.8
	40s	3	2.9
	>50s	1	1.0
Specialty	Science	13	13.0
	Engineering	61	61.0
	Others	26	26.0

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.66	0.88
Q2	2.62	1.10
Q3	2.74	0.94
Q4	2.09	1.11
Q5	2.16	0.99
Q6	2.09	0.96
Q7	2.95	0.97



The descriptive statistical analysis found that Q3 had the highest score at 2.74 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 and Q6 had the lowest score at 2.09 and Q7 had the highest score at 2.95 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows. It should be noted, however, that there was only one respondent among the age group of 50 or above, who was thus excluded from the analysis.

Q1 based on general characteristics

An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.65	0.83		2.366	.099
	30s	3.08	1.00			
	40s	2.00	1.00			
	>50s	-	-			
Specialty	Science	2.77	0.93		1.028	.362
	Engineering	2.68	0.77			
	Others	2.42	1.03			

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.69	1.10		1.370	.259
	30s	2.50	1.09			
	40s	1.67	1.15			
	>50s	-	-			
Specialty	Science	2.69	1.25		.604	.549
	Engineering	2.70	1.09			
	Others	2.42	1.03			

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.83	0.96		2.930	.058
	30s	2.17	0.72			
	40s	2.33	0.58			
	>50s	-	-			
Specialty	Science	3.00	1.00		.610	.545
	Engineering	2.69	0.98			
	Others	2.69	0.84			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found that Q4 based on age (p=.019<.05) and on field (p=0.33<.05) had a significant difference. The Games-Howell post-hoc test for this question indicates that those in their 20s (M=2.21) and those in engineering (M=2.25) had higher recognition of gender equality than did those in their 30s and those not in science and engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.21	1.16	a > b	8.579	.019[†]
	30s(b)	1.42	0.51			
	40s(c)	1.33	0.58			
	>50s(d)	-	-			
Specialty	Science(e)	2.23	1.01	f > g	3.653	.037[†]
	Engineering(f)	2.25	1.23			
	Others(g)	1.65	0.85			

[†] Welch test & Games-Howell’s post-hoc test

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found that Q5 based on field ($p=.005<.05$) had a significant difference. The Games-Howell post-hoc test for this question indicates that those in engineering ($M=2.38$) had higher recognition of gender equality than did those not in science and engineering.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.23	1.01		2.117	.126
	30s	1.67	0.65			
	40s	1.67	1.15			
	>50s	-	-			
Specialty	Science(a)	1.85	0.69	b > c	6.060	.005†
	Engineering(b)	2.38	1.05			
	Others(c)	1.69	0.79			

† Welch test & Games-Howell's post-hoc test

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found no significant difference.

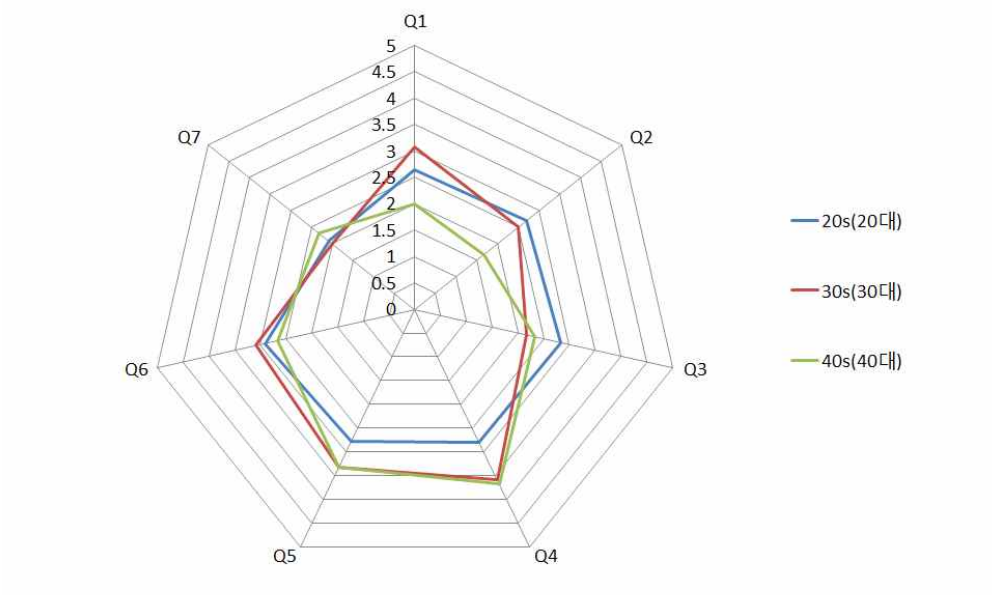
		M	SD	Post-Hoc	t or F	p
Age group	20s	2.09	0.99		.272	.762
	30s	1.92	1.00			
	40s	2.33	0.58			
	>50s	-	-			
Specialty	Science	2.00	0.71		.073	.930
	Engineering	2.10	0.98			
	Others	2.04	1.08			

Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

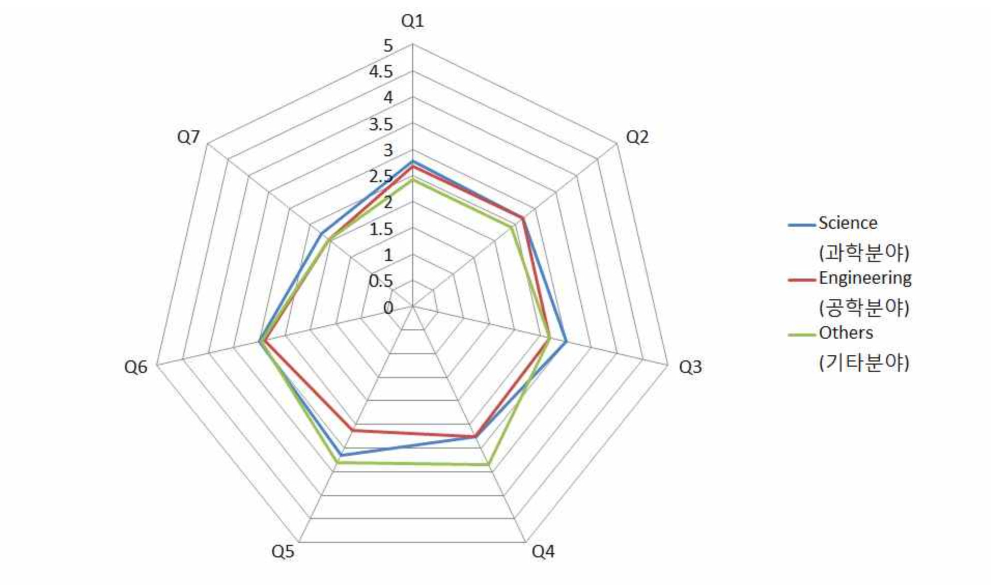
		M	SD	Post-Hoc	t or F	p
Age group	20s	2.92	0.98		.142	.868
	30s	3.00	0.95			
	40s	2.67	0.58			
	>50s	-	-			
Specialty	Science	2.77	0.93		.232	.793
	Engineering	2.97	0.98			
	Others	2.96	0.96			

Fig. 2-33 Mean value of questionnaire results: by age group (Pakistan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-34 Mean value of questionnaire results: by specialty (Pakistan)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

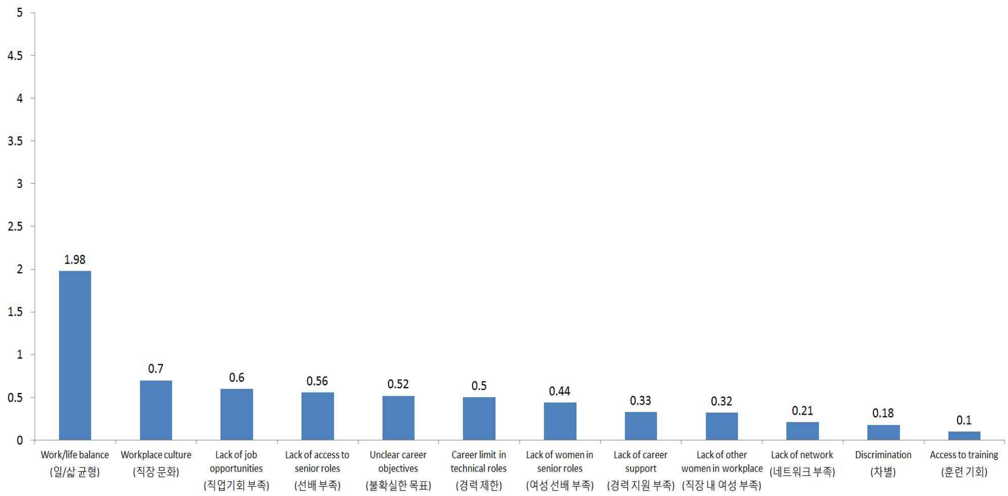
Q8 for difficulties as a female science/engineering professionals

The most significant difficulties female science/engineering professionals experience are work/life balance (M=1.98), workplace culture (M=0.79), and lack of job opportunities (M=0.60).

Table 2-21 Most significant difficulties of women scientists and engineers by rank (Pakistan)

Diffuculty	M	SD	Rank
Work/life balance	1.98	1.98	1
Workplace culture	0.70	0.70	2
Lack of access to senior roles	0.56	0.56	4
Lack of women in senior roles	0.44	0.44	7
Lack of career support	0.33	0.33	8
Unclear career objectives	0.52	0.52	5
Lack of job opportunities	0.60	0.60	3
Lack of network	0.21	0.21	10
Career limit in technical roles	0.50	0.50	6
Discrimination	0.18	0.18	11
Lack of other women in workplace	0.32	0.32	9
Access to training	0.10	0.10	12

Fig. 2-35 Most significant difficulties of women scientists and engineers by rank (Pakistan)



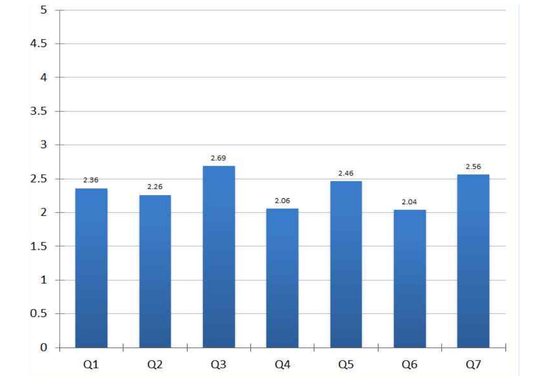
J. Korea

1) Number of respondents: 123

		Number of respondents	Ratio (%)
Age group	20s	39	31.7
	30s	38	30.9
	40s	29	23.6
	>50s	17	13.8
Specialty	Science	80	65.0
	Engineering	32	26.0
	Others	11	8.9

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.36	0.92
Q2	2.26	0.83
Q3	2.69	0.84
Q4	2.06	0.93
Q5	2.46	1.02
Q6	2.04	0.91
Q7	2.56	0.92



The descriptive statistical analysis found that Q3 had a rather high score at 2.69 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q6 had the lowest score at 2.04 and Q7 had the highest score at 2.56 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.33	0.70		.018	.997†
	30s	2.37	0.97			
	40s	2.38	1.15			
	>50s	2.35	0.86			
Specialty	Science	2.48	0.91		2.372	.098
	Engineering	2.06	0.76			
	Others	2.36	1.21			

† Welch test & Games-Howell's post-hoc test

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found that Q2 based on age (p=.002<.01) had a significant difference. The Games-Howell post-hoc test for this question indicates that those in their 20s (M=2.46) had higher recognition of gender equality than did those aged 50 or older (M=1.88).

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.46	0.82	a > d	5.379	.002†
	30s(b)	2.29	1.01			
	40s(c)	2.17	0.71			
	>50s(d)	1.88	0.33			
Specialty	Science	2.25	0.75		1.402	.250
	Engineering	2.16	0.92			
	Others	2.64	1.03			

† Welch test & Games-Howell's post-hoc test

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found that Q3 based on age (p=.008<.01) and on field (p=.004<.01) had a significant difference. The Scheffe post-hoc test for this question indicates that those in their 20s (M=2.90) had higher recognition of gender equality than did those in their 30s (M=2.87) and those aged 50 or older (M=2.24); based on field, "others" had the highest recognition of gender equality, at 3.45.

		M	SD	Post-Hoc	t or F	p
Age group	20s(a)	2.90	0.79	a, b > d	4.109	.008
	30s(b)	2.87	0.96			
	40s(c)	2.45	0.69			
	>50s(d)	2.24	0.66			
Specialty	Science(e)	2.58	0.76	g > e, f	3.725	.004
	Engineering(f)	2.72	0.89			
	Others(g)	3.45	0.93			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.87	0.83		1.069	.365
	30s	2.08	0.88			
	40s	2.28	1.00			
	>50s	2.06	1.09			
Specialty	Science	2.04	0.91		.698	.500
	Engineering	2.19	0.93			
	Others	1.82	1.08			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.31	1.00		.954	.417
	30s	2.45	1.11			
	40s	2.72	0.88			
	>50s	2.41	1.06			
Specialty	Science	2.40	0.99		.591	.555
	Engineering	2.53	1.11			
	Others	2.73	1.01			

Q6 based on general characteristics

An analysis of differences for Q1 based on general characteristics found no significant difference.

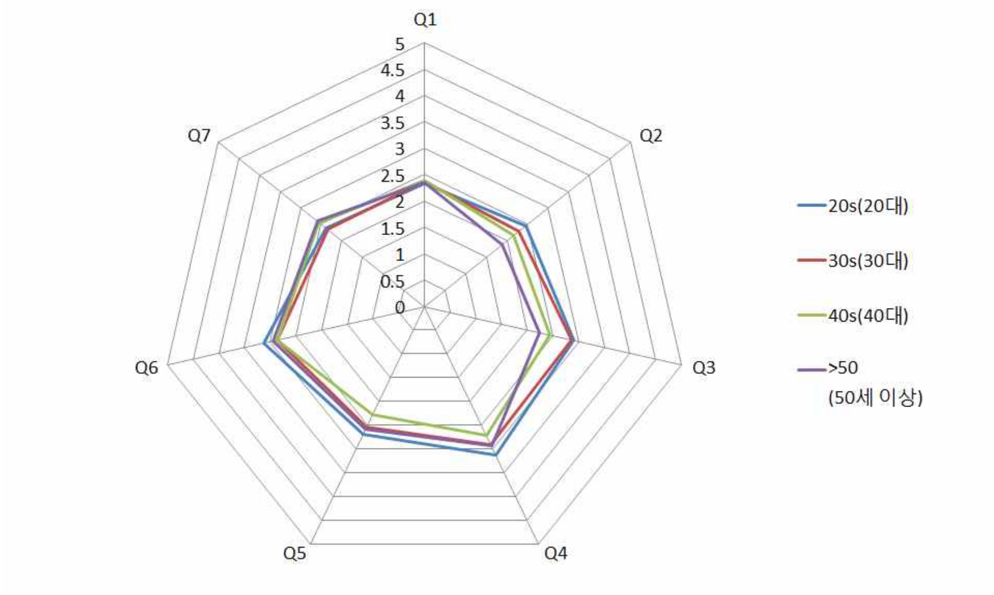
		M	SD	Post-Hoc	t or F	p
Age group	20s	1.87	0.95		.683	.564
	30s	2.13	0.96			
	40s	2.14	0.79			
	>50s	2.06	0.90			
Specialty	Science	2.03	0.90		1.735	.181
	Engineering	2.22	0.87			
	Others	1.64	1.03			

Q7 based on general characteristics

An analysis of differences for Q1 based on general characteristics found no significant difference.

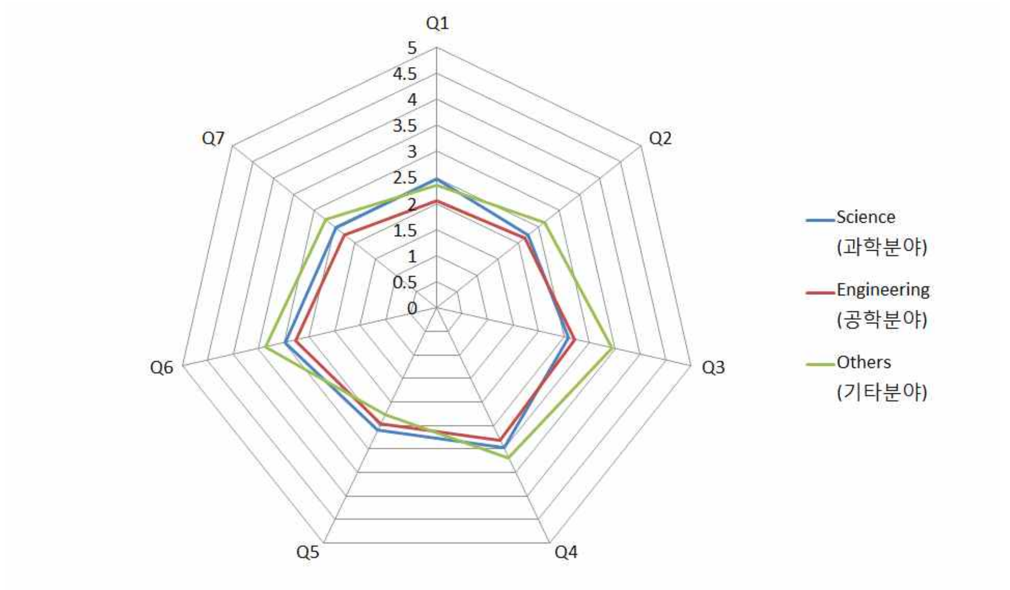
		M	SD	Post-Hoc	t or F	p
Age group	20s	2.62	1.09		.469	.704
	30s	2.66	0.85			
	40s	2.45	0.87			
	>50s	2.41	0.80			
Specialty	Science	2.53	0.87		1.269	.285
	Engineering	2.75	0.95			
	Others	2.27	1.19			

Fig. 2-36 Mean value of questionnaire results: by age group (Korea)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-37 Mean value of questionnaire results: by specialty (Korea)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

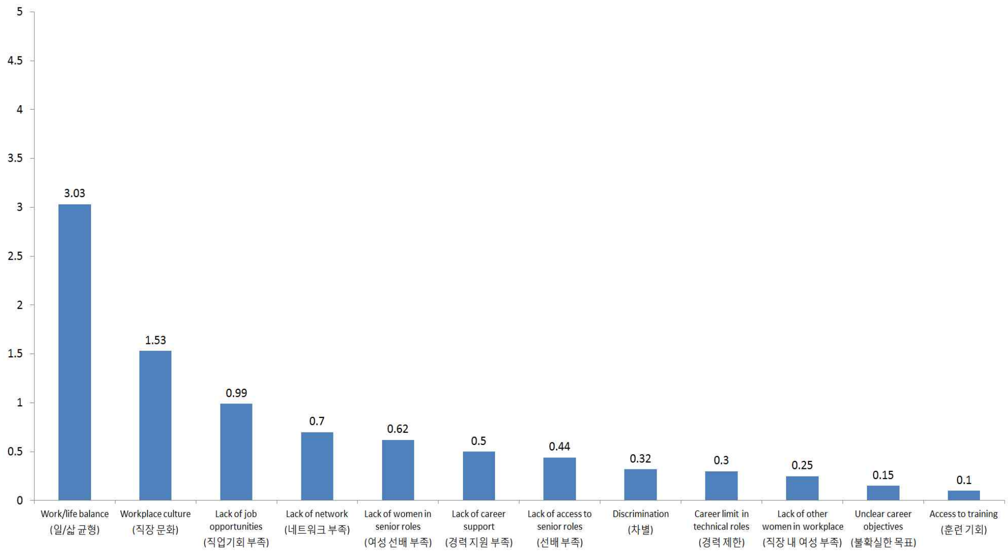
Q8 for difficulties as a female science/engineering professionals

The most significant difficulties female science/engineering professionals experience are work/life balance (M=3.03), workplace culture (M=1.53), and lack of job opportunities (M=0.99).

Table 2-22 Most significant difficulties of women scientists and engineers by rank (Korea)

Difficulty	M	SD	Rank
Work/life balance	3.03	2.20	1
Workplace culture	1.53	1.93	2
Lack of access to senior roles	0.44	1.05	7
Lack of women in senior roles	0.62	1.30	5
Lack of career support	0.50	1.28	6
Unclear career objectives	0.15	0.75	11
Lack of job opportunities	0.99	1.64	3
Lack of network	0.70	1.31	4
Career limit in technical roles	0.30	1.03	9
Discrimination	0.32	0.94	8
Lack of other women in workplace	0.25	0.77	10
Access to training	0.10	0.49	12

Fig. 2-38 Most significant difficulties of women scientists and engineers by rank (Korea)



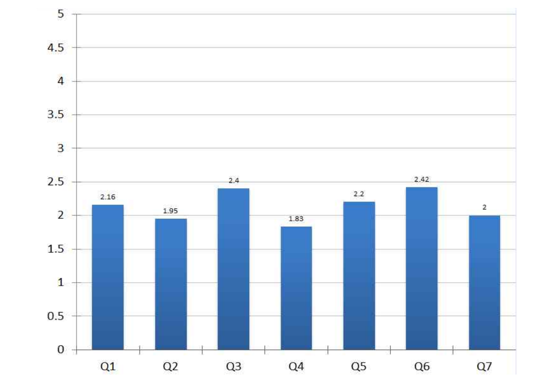
K. Australia

1) Number of respondents: 67 (Twenty-seven participants gave no response for age and one participant gave no response for field.)

		Number of respondents	Ratio (%)
Age group	20s	9	22.5
	30s	20	20.0
	40s	9	22.5
	>50s	2	5.0
Specialty	Science	6	9.1
	Engineering	54	81.8
	Others	6	9.1

2) Descriptive statistical analysis for each question

Question	M	SD
Q1	2.16	0.86
Q2	1.95	0.74
Q3	2.40	0.73
Q4	1.83	1.00
Q5	2.20	0.85
Q6	2.42	1.08
Q7	2.00	0.68



The descriptive statistical analysis found that Q3 had the highest score at 2.40 among Q1, Q2 and Q3, questions for which a high score represents higher gender equality, while Q4 had the lowest score at 1.83 and Q6 had the highest score at 2.42 among Q4, Q5, Q6 and Q7, questions for which a low score represents higher gender equality. The characteristics of each question by age and field can be described as follows:

<u>Q1 based on general characteristics</u>
An analysis of differences for Q1 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.44	1.01		1.494	.233
	30s	2.30	0.80			
	40s	1.78	0.83			
	>50s	1.50	0.71			
Specialty	Science	2.67	0.52		3.033	.110†
	Engineering	2.06	0.80			
	Others	2.40	1.52			

† Welch test & Games-Howell's post-hoc test

Q2 based on general characteristics

An analysis of differences for Q2 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.22	0.44		1.128	.352
	30s	2.11	0.83			
	40s	1.63	0.52			
	>50s	2.00	1.41			
Specialty	Science	2.00	0.00		.115	.892†
	Engineering	1.96	0.82			
	Others	1.80	0.45			

† Welch test & Games-Howell's post-hoc test

Q3 based on general characteristics

An analysis of differences for Q3 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.78	0.97		1.032	.390
	30s	2.37	0.60			
	40s	2.67	0.71			
	>50s	2.00	1.41			
Specialty	Science	2.83	0.41		1.613	.208
	Engineering	2.31	0.73			
	Others	2.60	0.89			

Q4 based on general characteristics

An analysis of differences for Q4 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	1.44	0.97		2.804	.054
	30s	2.00	0.60			
	40s	1.22	0.71			
	>50s	2.00	1.41			
Specialty	Science	1.83	1.17		.155	.856
	Engineering	1.87	1.03			
	Others	1.60	0.55			

Q5 based on general characteristics

An analysis of differences for Q5 based on general characteristics found no significant difference.

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.00	0.87		1.629	.200
	30s	2.45	0.83			
	40s	1.78	0.83			
	>50s	2.50	0.81			
Specialty	Science	1.80	0.84		.635	.536
	Engineering	2.28	0.88			
	Others	1.60	0.55			

Q6 based on general characteristics

An analysis of differences for Q6 based on general characteristics found that Q6 based on field (p=.002<.05) had a significant difference. Those in engineering (M=2.56) had higher recognition of gender equality than did those not in science and engineering (M=1.20).

		M	SD	Post-Hoc	t or F	p
Age group	20s	2.11	0.93		4.436	.948†
	30s	2.20	1.01			
	40s	2.00	0.71			
	>50s	2.50	2.12			
Specialty	Science(a)	2.33	1.03	b > c	13.885	.002†
	Engineering(b)	2.56	1.07			
	Others(c)	1.20	0.45			

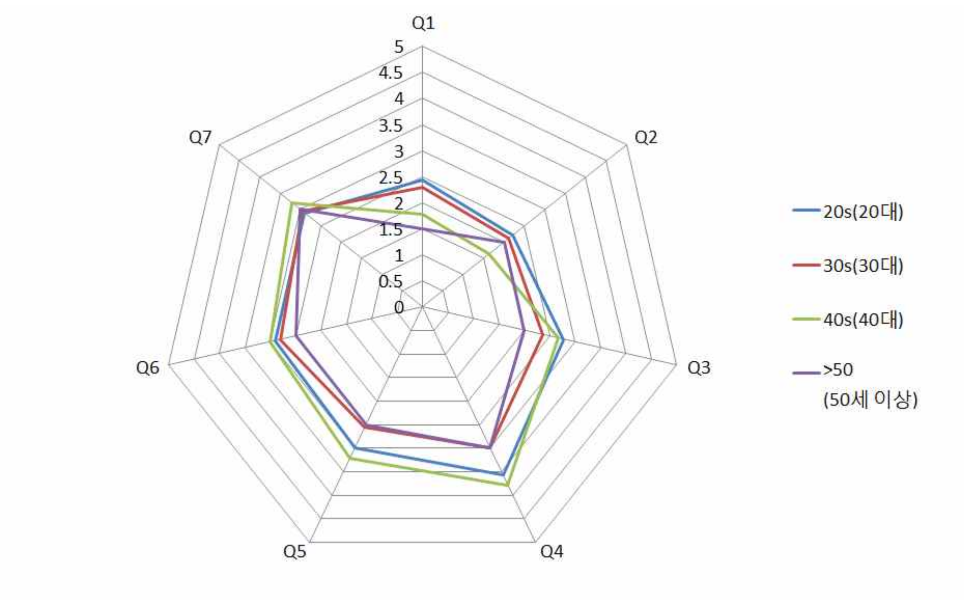
† Welch test & Games-Howell's post-hoc test

Q7 based on general characteristics

An analysis of differences for Q7 based on general characteristics found no significant difference.

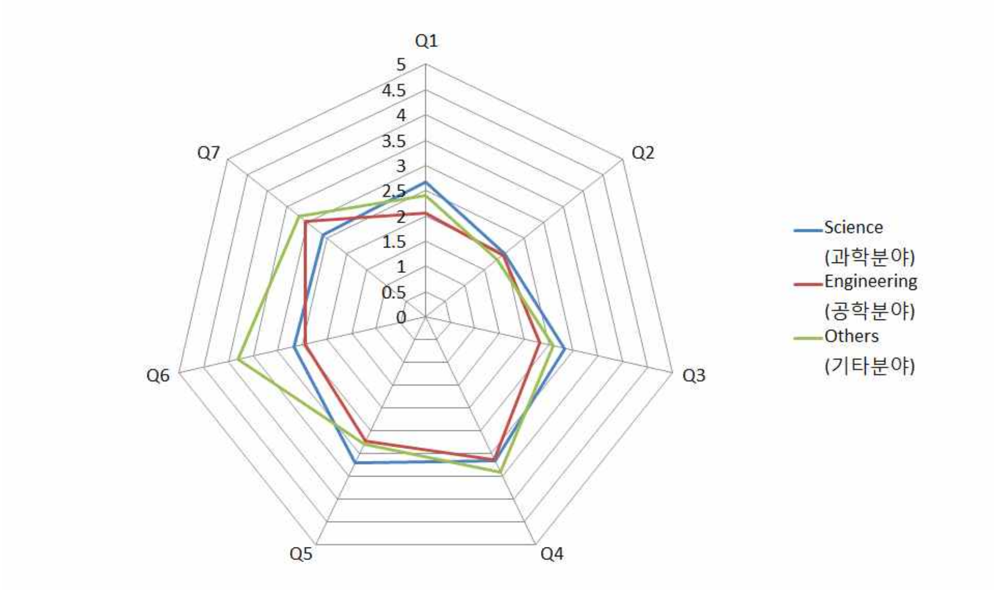
		M	SD	Post-Hoc	t or F	p
Age group	20s	2.11	0.60		.418	.741
	30s	2.05	0.76			
	40s	1.78	0.44			
	>50s	2.00	1.41			
Specialty	Science	2.40	0.55		1.098	.345
	Engineering	1.97	0.68			
	Others	1.80	0.84			

Fig. 2-39 Mean value of questionnaire results: by age group (Australia)



* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Fig. 2-40 Mean value of questionnaire results: by specialty (Australia)



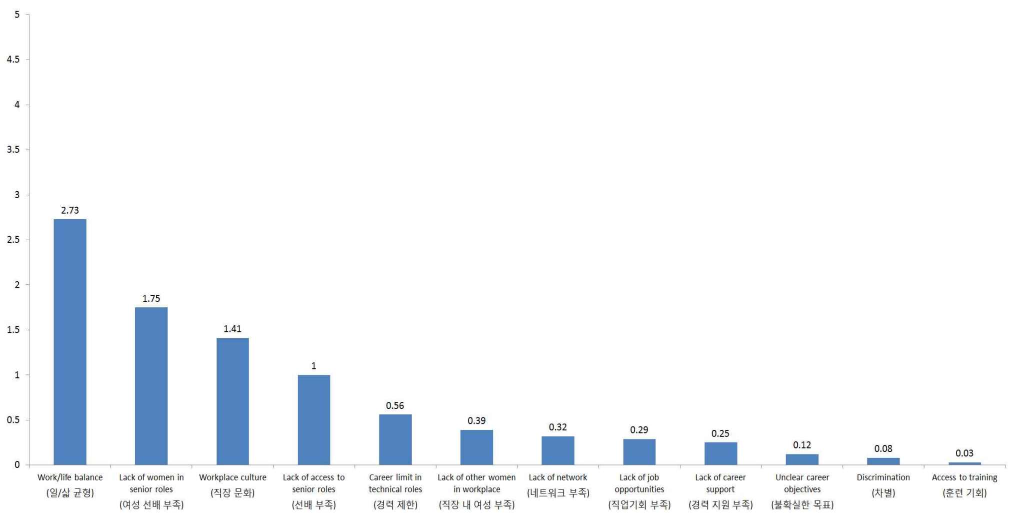
* On the 5-point scale, Q1 through Q3 indicate higher gender equality when the score is high, while Q4 through Q7 indicate higher gender equality when the score is low. However, it should be stressed once again that, for better visual recognition, the values on the axes for Q4 through Q7 were set to increase towards the center, meaning the larger a radial graph is, the higher the level of gender equality it represents.

Q8 for difficulties as a female science/engineering professionals
The most significant difficulties female science/engineering professionals experience are work/life balance (M=2.73), lack of women in senior roles (M=1.75) and workplace culture (M=1.41).

Table 2-23 Most significant difficulties of women scientists and engineers by rank (Australia)

Diffuculty	M	SD	Rank
Work/life balance	2.73	2.21	1
Workplace culture	1.41	1.82	3
Lack of access to senior roles	1.00	1.63	4
Lack of women in senior roles	1.75	1.98	2
Lack of career support	0.25	0.99	9
Unclear career objectives	0.12	0.56	10
Lack of job opportunities	0.29	0.93	8
Lack of network	0.32	0.80	7
Career limit in technical roles	0.56	1.44	5
Discrimination	0.08	0.43	11
Lack of other women in workplace	0.39	1.05	6
Access to training	0.03	0.18	12

Fig. 2-41 Most significant difficulties of women scientists and engineers by rank (Australia)



3. Policies and Programs in Asia and the Pacific Nations for Gender Equality in STEM

This chapter introduces policies and programs (action plans) for different life-cycle stages that are on-going and those that are not activated yet but need implementation in the future. These information have been provided by each country as described by the representatives of the participating organizations, in addition to the survey on gender equality involving female science and engineering professionals in the Asia-Pacific region. The action plan is largely divided into four areas: education/ training/mentoring, career choice and development/retention, women friendliness/gender equality at work, and changing social recognition and tradition. First, we will look at the current state of action plans being carried out in different countries based on their responses to each of the aforementioned areas; then, we will suggest policies needed in Korea and the APNN countries. An overview of the programs for each area that are either ongoing or that are desired in each country, and an overview of specific programs being operated by each country, are listed in two separate tables. However, it should be noted that the two tables do not match completely, as any program reported that is irrelevant to gender equality in each of the specific areas concerned or in science and engineering has been excluded.

3-1 Education/training/mentoring

An overview of education/training/mentoring programs for each life-cycle stage that are either ongoing or desired in each country, and an overview of specific programs implemented in each country are provided in Table 3-1 and Table 3-2, respectively. Country-specific information is summarized as follows:

A. Nepal

Few programs are being implemented and more programs need to be developed and implemented in the future. The respondent (WISE-Nepal) hoped to have lectures by successful female professionals as role models for college students, and a program that will provide graduate school students with employment-related information and consultation. In addition, the respondent indicated that the country needed programs to help students select topics of their dissertations and research, to help raise a sense of pride among female students, and a program in which women who had retired from STEM (science, technology, engineering and mathematics) fields share their own experiences and stories of overcoming difficulties with aspiring female science/engineering professionals.

B. New Zealand

Although not many programs are on offer, mentoring programs are in place for each life-cycle stage from high school to working; no program is being offered to mid-level female science and engineering professionals. Regardless, the respondent (IPENZ) indicated that the country needed improvement on career guidance to encourage young women to consider becoming an engineer as a potential career choice, as well as a mentoring program for mid-level female science and engineering professionals.

C. Malaysia

Programs to promote science are being implemented successfully. However, there are few programs designed only for women, indicating that women may not be a minority in science and engineering. Nonetheless, the respondent (IEM) answered that the country needed a program at elementary schools to increase the number of science teachers at elementary, middle and high schools, as well as employment training and opportunities for non-employed female college students to network with people in the right places.

Table 3-1 Policies-active or policies-in-need on education/training/mentoring by life cycle and by country

Country \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Nepal	**A**					■			
	NA				o	o			o
New Zealand	**A**			■	■	■	■	■	■
	NA			o				o	
Malaysia	**A**	■	■	■	■	■	■	■	
	NA	o	o	o			o		
Mongolia	**A**				■	■		■	
	NA	o	o	o	o	o	o	o	
Vietnam	**A**	■	■	■	■		■	■	
	NA		o	o					
Sri Lanka	**A**								
	NA		o		o				
India	**A**	■	■	■	■				
	NA		o		o	o	o		
Japan	**A**			■	■	■		■	
	NA								
Taiwan	**A**	■	■	■	■	■		■	
	NA	o	o	o	o	o		o	
Pakistan	**A**	■	■	■	■	■	■	■	■
	NA	o	o	o	o	o	o	o	o
Korea	**A**	■	■	■	■	■	■	■	
	NA	o	o	o	o	o			
Australia	**A**	■	■	■	■	■		■	■
	NA		o	o	o	o			

A: Policy activated, **NA**: Policy not activated yet but needed

D. Mongolia

Based on the country's reports on the conditions of science education and on the urgent need for building educational infrastructure and for English education in the era of globalization, it can be assumed that Mongolia has yet to reach a stage at which it can consider gender equality in science and engineering in earnest. The respondent (WSTEM) suggested that the country should bring teaching methods and curricula for primary and middle school students up to date, offer English education and mentoring programs to help male and female high school students make better career decisions, and provide support for outstanding female students in science and engineering; it should also teach college students how to write a résumé and self-introduction, bring graduate school curricula up to date, perform overall upgrade of knowledge, skills and perceptions of instructors and professors, and offer entrepreneurship education for unemployed women and training for women in research positions on how to write dissertations.

E. Vietnam

Previously being a socialist country, Vietnam operates more diverse programs in several areas for gender equality compared to other countries, but due to the low rate of female enrollment in schools, it is implementing a program to “send girls to school.”

F. Sri Lanka

The respondent (Wise-Sri Lanka) reported that there is no educational program, but plans are underway to start a mentoring program for middle school girls from 2014 and to develop new programs from 2015. In addition, a mentoring program in the form of pocket meetings joined by college students together with female professionals is scheduled to start in January, 2015.

Table 3-2 Countries with policies-active or policies-in-need on education/training/mentoring by life cycle

Policy & program \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Mentoring/ Networking	**A**		Sri Lanka India Korea	Korea	New Zealand Japan Korea	New Zealand Japan Korea	Korea	Taiwan Japan Korea Australia	
	NA	Taiwan Korea	Taiwan Sri Lanka India Korea Australia	Taiwan Mongolia Korea Australia	Nepal Taiwan Sri Lanka India Korea	Taiwan Koran	Malaysia Pakistan	New Zealand Taiwan India Pakistan	Nepal
Science camp/ expo/conference Research participation	**A**	Malaysia Taiwan Korea	Malaysia Taiwan Pakistan Korea	Malaysia Japan Taiwan Pakistan Korea	Malaysia Taiwan Korea	Nepal Malaysia Taiwan Korea	Korea	Malaysia Korea	Pakistan
	NA		Pakistan		Nepal Taiwan	Taiwan			
Gender equality education/ camp/conference	**A**	Taiwan Vietnam Australia	Taiwan Vietnam Australia	Taiwan Vietnam Australia	Taiwan India				
	NA	Mongolia	Mongolia Pakistan						
Job training Career development program/camp	**A**			New Zealand	Malaysia Korea Australia	Korea Australia	Malaysia Vietnam Pakistan Korea	Malaysia Vietnam Pakistan Korea	
	NA		Pakistan	New Zealand Pakistan	New Zealand Mongolia Australia	New Zealand Nepal Mongolia Australia	New Zealand Malaysia Mongolia India Pakistan	Mongolia Pakistan	

A: Policy activated, **NA**: Policy not activated yet but needed

G. India

Efforts are being made to increase the rate of female enrollment in schools, and the Rashtriya Madhyamik Shiksha Abhiyan program is being carried out to nurture female students in science and engineering. Plans are in place to start mentoring programs from 2014. That said, more mentoring programs are needed to promote a sense of pride and safety among middle school girls, and a pilot program to that end is in operation as of 2014. Building upon this, a number of new programs will be developed in 2015. Meanwhile, college students in STEM fields will have opportunities to meet with senior female professionals to learn about their latter's experience in a program scheduled to start in November 2014. Also scheduled are mentoring programs for working women, and lectures to inspire female students in STEM fields. For unemployed women, general courses on how to increase income, and camps to nurture individual capabilities, will be open as well.

H. Japan

Three organizations for female scientists and engineers including the Society of Women in Engineering and the Society of Japanese Women Scientists are working together to offer camps and lectures and to host mentoring and networking events for high school girls and older females. Interestingly, the Japanese representative (INWES-Japan) did not suggest any policy or program believed to be needed in the future.

I. Taiwan

Among all countries surveyed for this report, Taiwan best reflects gender factors in science and engineering. While gender-related elements are infused in curricula and research, more thorough and additional efforts are reportedly needed. Also suggested was a mentoring program for female students and a more comprehensive infusion of gender concepts into science textbooks. The respondent (TWiST) suggested the need for gender science camps for college and graduate students, mentoring camps for female students, mentoring programs for working women, and a thorough infusion of gender analysis into science projects.

J. Pakistan

While there are science-related programs for elementary, middle and high school students, and for college students, gender-focused educational programs for advanced science and engineering are insufficient. The respondent (WESTIP) suggested an infusion of gender equality into teaching methods and science education curricula, technical education workshops for female students, lectures by role models, female student days, science workshops, etc. In addition, mentoring and institutional innovation policies are needed for graduates, while programs to help regain competitiveness and to develop employment skills, and breakfast/luncheon networking meetings are needed for unemployed women. Meanwhile, the respondent said that the country needs a policy to prevent sexual harassment, programs to nurture female leadership and management techniques, a network of female scientists and engineers, and programs to make men aware of female contributions; respondent hoped that a center for female science and engineering professionals would be established.

K. Korea

Afterschool science education and "Hands-on Science Class" are in operation for elementary students, and mentoring programs for middle to high school female students are well developed. Various educational programs are being developed and operated for women from college students to those employed. However, it should be made mandatory for elementary schools to have a dedicated science teacher, and mentoring programs should be operated for male students and teachers. The respondent (KWSE) also suggested the need to open a science high school exclusively for girls.

L. Australia

Gender equality-oriented education is well infused in the curricula from elementary to high schools. Internship programs and job fairs are operated for undergraduate and graduate students. The respondent (Engineers-Australia) thought that the country requires mentoring programs for middle to high school girls, as well as résumé clinics and career counseling programs for undergraduate and graduate students.

3-2. Career development/retention

An overview of career development/retention programs for each life-cycle stage, which programs are either ongoing or desired in each country, and an overview of specific programs implemented in each country are provided in Table 3-3 and Table 3-4, respectively.

Table 3-3 Policies-active or policies-in-need on career development/retention by life cycle and by country

Country \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Nepal	A					■			
	NA				o	o			
New Zealand	A				■	■	■	■	■
	NA							o	
Malaysia	A			■	■	■	■	■	
	NA								
Mongolia	A							■	
	NA	o	o	o	o	o	o	o	o
Vietnam	A			■	■	■			
	NA				o				
Sri Lanka	A								
	NA						o		o
India	A								
	NA						o		o
Japan	A		■	■	■	■		■	
	NA					o			
Taiwan	A	■	■	■	■	■	■	■	■
	NA				o	o	o	o	
Pakistan	A				■	■	■	■	
	NA	o	o	o	o	o	o	o	o
Korea	A				■	■	■	■	
	NA	o	o	o	o	o	o	o	o
Australia	A				■	■	■	■	■
	NA				o	o	o	o	o

A: Policy activated, **NA**: Policy not activated yet but needed

Table 3-4 Countries with policies-active or policies-in-need on career development/ retention by life cycle

Policy & program \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Internship	**A**				Vietnam Korea	Vietnam Pakistan Korea	Nepal		
	NA				Taiwan	Taiwan	Sri Lanka India		
Career development center counseling/ couching Career networking/ Future job promotion	**A**			Vietnam	Nepal Japan Pakistan Korea Australia	Nepal Japan Korea Australia	Nepal New Zealand Malaysia Pakistan Korea Australia	New Zealand Malaysia Korea Australia	New Zealand
	NA	Korea	Korea	Korea	Vietnam Taiwan Korea Australia	Taiwan Korea Australia	Mongolia Pakistan Korea Australia	New Zealand Mongolia Korea Australia	Sri Lanka India Pakistan Korea
Career path/ Employment expo	**A**		Japan	Japan	New Zealand Pakistan Korea	New Zealand Taiwan Korea	Korea		
	NA						Mongolia		
Best WSE Awards/ Professional meeting travel support/ Research grants for women	**A**					Korea	Taiwan Korea	Japan Taiwan Korea	Taiwan
	NA							Pakistan	
Employment/ promotion target system Equal opportunity	**A**						Korea	Korea	
	NA						Taiwan Pakistan	Taiwan Pakistan	

A: Policy activated, **NA**: Policy not activated yet but needed
WSE=Women Scientists and Engineers

Country-specific information is summarized as follows:

A. Nepal
Nepal provides college graduates with internship opportunities that can lead to regular positions, but lectures by role models for college students and programs to teach how to write a good résumé and self-introduction for graduates are needed.

B. New Zealand
Career fairs are being held for undergraduate and graduate students, and career development and retention is promoted through networking among female engineers who are seeking jobs, working or retired. The respondent emphasized the need for mentoring for mid-level female scientists to promote career retention among them.

C. Malaysia
Malaysia operates programs for career development and retention for those who are seeking jobs or are working, but no programs are specifically designed for a minority, whether it is male or female science and engineering professionals, and the respondent (IEM) does not suggest the need for operating gender equality programs.

D. Mongolia
No program is in operation at the moment, but with the establishment of the Mongolian WSTEM organization, Mongolia is taking interest in developing such programs at last.

On policies and programs needed in the future, the country reports that job fairs and the building of networks with potential employers are needed for women seeking jobs, while statistical analysis and “fairness for creative women in science and engineering” are needed for the further career development of those already working.

E. Vietnam

A career choice program for male and female high school students, field training for female college students and vocational training for graduate students are being offered; the need for a program to allow female college students to have a variety of experience for career development prior to graduation was suggested.

F. Sri Lanka

Although no program is in operation at the moment, plans are underway to launch in 2015 an internship program for female job seekers, as well as a program to let retired women share their success stories of work-life balance.

G. India

Like Sri Lanka, India currently has no program in operation but suggested the need for internship programs for female job seekers and for sharing successful cases of work-life balance by retired women.

H. Japan

Japan operates career development summer school programs for middle and high school girls, and career model cafés for undergraduate and graduate students and working women; it also provides grants for female engineers under 40. The country is suggesting the need for more career development programs for graduate students.

I. Taiwan

Promotional brochures and video clips on female science and engineering professionals are being created and used as career development materials, while internship programs are in place for graduate students, and an e-journal service is provided to female scientists and engineers who are seeking employment, already working or retired. The respondent (TWiST) suggested the need for expanding internship and other diverse career development programs for undergraduate and graduate students, and for introducing a recruitment target system and a promotion target system.

J. Pakistan

Pakistan promotes career opportunities in science and engineering among college students, and operates job fairs, internships, and résumé-writing clinics for graduate students and seniors at college; it has entrepreneurship programs and coaching for women seeking employment, and leaves of absence for “age relaxation,” and policies for gender equality for working women. The respondent (WESTIP) suggested the need for a role model for men to share housework, coaching programs for women returning to R&D jobs, tax exemptions for organizations hiring female scientists and engineers, and support for working women’s participation in academic societies.

K. Korea

Internship programs are offered to undergraduate students, and every university has a career development center. Job fairs are organized as well. In addition, research funding is provided to female scientists and engineers, and awards are given to young female scientists; research activities by academic societies are supported as well. Recruitment target and promotion target systems are in operation for female scientists and engineers. Korea needs programs to ensure career development over the entire life cycle from the elementary school years and to promote future job trends.

L. Australia
   Various career development programs are in partial operation from the college level. The respondent (Engineers-Australia) suggested career development through career-related mentoring and coaching, and through exchange with female science and engineering professionals who are already working.

3-3. Women friendliness/gender equality at work

An overview of policies and programs for women friendliness/gender equality at work at each life-cycle stage that are either ongoing or desired in each country, and an overview of specific programs implemented in each country, are provided in Table 3-5 and Table 3-6, respectively. Country-specific information is summarized as follows:

A. Nepal
   No program is currently in operation, but the respondent (WISE-Nepal) points out the need for flexible working hours and improvements in the workplace environment, including separation of male and female restrooms.

B. New Zealand
   The country conducts a survey on policies for diversity and flexibility to ensure work-life balance through IPENZ each year, and the respondent (IPENZ) concludes that flexible working hours should be activated and more part-time positions should be made available.

C. Malaysia
   Though no program is currently in operation, it is interesting that the respondent (IEM) proposes the need to establish schools only for girls. Malaysia also emphasizes the need for providing means of transportation to and from school for elementary students, establishing middle and high school and colleges only for female students, promoting gender equality-based recruitment and installing childcare facilities at workplace.

D. Mongolia
   Although no program is in operation at the moment, Mongolia suggests the need to put an officer in charge of handling statistical data every year on the progress of women from college to the workplace, and of suggesting measures to foster a women-friendly environment.

E. Vietnam
   Several preferred policies are in place for working female science and engineering professionals, such as priority financial support, priority assignment to desire position and extended retirement age for women scientists and engineers; however, a policy to raise the ratio of women leaders in senior roles is needed.

F. Sri Lanka
   Programs to prevent sexual harassment are scheduled to start in October 2014, and no other programs are in operation at the moment. Gender equality presentations by high school students are being organized, but no other programs or policies were suggested as necessary.

G. India
   A law to prevent sexual harassment was passed in 2013, but no programs are in operation

at the moment. Gender equality presentations by high school students are being planned to be held in 2015, but no other programs or policies were suggested as necessary.

Table 3-5 Policies-active or policies-in-need on women-friendliness/gender equality by life cycle and by country

Country \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Nepal	**A**								
	NA						o		
New Zealand	**A**							■	
	NA							o	
Malaysia	**A**	■	■	■		■	■	■	
	NA				o				
Mongolia	**A**								
	NA				o	o	o	o	o
Vietnam	**A**							■	
	NA							o	
Sri Lanka	**A**								
	NA			o				o	
India	**A**							■	
	NA			o					
Japan	**A**				■	■		■	■
	NA					o		o	o
Taiwan	**A**						■	■	■
	NA						o	o	
Pakistan	**A**	■	■	■	■	■	■	■	■
	NA	o	o	o	o	o	o	o	o
Korea	**A**				■	■	■	■	
	NA	o	o	o	o			o	
Australia	**A**				■	■	■	■	■
	NA				o	o	o	o	

A: Policy activated, **NA**: Policy not activated yet but needed

H. Japan

Childcare facilities and friendship meetings at colleges or at workplaces are suggested as programs to promote women friendliness. The respondent (INWES-Japan) also pointed out the need for more childcare facilities and afterschool activities.

Table 3-6 Countries with policies-active or policies-in-need on women friendliness/ gender equality by life cycle

Policy & program \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
S&T education/ gender equaltiy	A				Korea				
	NA			Sri Lanka India Pakistan		Pakistan			
Women friendly innovation of institution/ committee/ flexible work hours	A				Korea	Korea		New Zealand Vietnam Korea	Pakistan
	NA				Pakistan	Pakistan	Pakistan	New Zealand Nepal Pakistan Korea	
Active/passive quota system	A				Korea		Korea	Vietnam Korea	
	NA	Korea	Korea	Korea	Korea		Taiwan	Vietnam Taiwan Korea	Pakistan
Attaché program for WSE	A							Korea	
	NA				Mongolia	Mongolia		Mongolia	
Child care center for WSE	A				Japan	Japan		Japan Korea	
	NA				Japan	Japan		Malaysia Japan Korea	

A: Policy activated, **NA**: Policy not activated yet but needed
WSE=Women Scientists and Engineers

G. India

A law to prevent sexual harassment was passed in 2013, but no programs are in operation at the moment. Gender equality presentations by high school students are being planned to be held in 2015, but no other programs or policies were suggested as necessary.

H. Japan

Childcare facilities and friendship meetings at colleges or at workplaces are suggested as programs to promote women friendliness. The respondent (INWES-Japan) also pointed out the need for more childcare facilities and afterschool activities.

I. Taiwan

No special program for elementary, middle and high school students and college students, or for science and engineering professionals is in operation, and laws on gender equality-based employment and prevention of sexual harassment in general are in place. The respondent (TWiST) pointed out the need to introduce recruitment and promotion target systems.

J. Pakistan

Pakistan has middle and high schools and colleges exclusively for women, as well as a bank for women (First Women Bank); many other programs and policies are in place to promote gender equality, including provision of accommodations and transportation for working women, support for building childcare facilities, and utilization of retired women as gender advisors, but the programs are not confined to science and engineering fields only. The respondent (WESTIP) suggested a program to encourage women's advances into graduate schools in science and engineering, family-friendly policies, awards given to businesses with excellent records of diversity, and establishment of a national chair-professor system for retired female science and engineering professionals.

K. Korea

Korea has various policies and programs including engineering education programs based on gender equality, programs to foster women-friendly institutional innovation, quotas for male students in colleges of education, recruitment target systems, promotion target systems, and childcare facilities for female scientists and professionals. However, the Korean respondent (KWSE) suggested the need for more proactive measures such as setting quotas for male teachers at elementary, middle and high schools, for female principals and vice-principals, for female freshmen in colleges of engineering, and for female directors of R&D centers; respondent also suggested placing a ban on meetings outside working hours.

L. Australia

Several women-friendly programs are in partial operation but the respondent (Engineers-Australia) is suggesting that more projects are needed. Specific programs have not been proposed and thus are excluded from Table 3-6.

3-4. Changing social recognition and tradition

An overview of policies and programs for changing social recognition and tradition for each life-cycle stage that are either ongoing or desired in each country, and an overview of specific programs implemented in each country are provided in Table 3-7 and Table 3-8, respectively. Country-specific information is summarized as follows:

A. Nepal

No program is currently in operation, but the respondent believes that a program to make both male and female high school students understand that female students have competitiveness in science, technology and engineering should be carried out at least once a year among public high schools.

B. New Zealand

Women and men appear in promotional materials designed for high school students through graduate students, and for working women, articles on female engineers are repeatedly included in IPENZ promotional materials. However, the notions that women, too, can become engineers and that female students are as good at math and science as male students must be accepted.

C. Malaysia

Malaysia operates workshops and lectures for high school and college students to bring about changes in social recognition and tradition; international symposiums for working women are being held.

D. Mongolia

Currently three kinds of academic awards are in place for both men and women, but the respondent (WSTEM) emphasized the need to establish an award for its members (for women only) and suggested the creation of science and engineering achievement awards for retired women.

E. Vietnam

There are ongoing efforts to publicize female scientists and engineers via media, and to promote gender equality via women networks, as well as activities to raise awareness among neighbors by retired female scientists. The respondent (VAFIW) proposed housework training for men.

F. Sri Lanka
Although no program is in operation at the moment, WISE-Sri Lanka is working together with Women Chamber of Commerce to establish an award by 2015 for outstanding female scientists and engineers.

Table 3-7 Policies-active or policies-in-need on changing social recognition by life cycle and by country

Country \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
Nepal	**A**								
	NA			o					
New Zealand	**A**			■	■	■		■	
	NA							o	
Malaysia	**A**			■	■			■	
	NA							o	
Mongolia	**A**							■	■
	NA							o	o
Vietnam	**A**						■	■	■
	NA						o	o	o
Sri Lanka	**A**								
	NA							o	
India	**A**								
	NA	o	o					o	
Japan	**A**				■	■		■	
	NA							o	
Taiwan	**A**	■	■	■	■	■	■	■	■
	NA	o	o	o	o	o	o	o	o
Pakistan	**A**	■	■	■	■	■	■	■	■
	NA	o	o	o	o	o	o	o	o
Korea	**A**			■	■	■	■	■	■
	NA	o	o	o	o	o	o	o	o
Australia	**A**	■	■	■	■	■	■	■	■
	NA				o	o	o	o	

A: Policy activated, **NA**: Policy not activated yet but needed

Table 3-8 Countries with policies-active or policies-in-need on change of social recognition by life cycle

Policy & program \ Life cycle		~Primary school	Middle school	High school	College	Graduate school	Job searching	Employed	Retired~
WSE science fair/ national programs	A			Malaysia Korea	Malaysia Korea	Korea	Korea	Malaysia Korea	Korea
	NA			Nepal				Malaysia	
Best RTS Award Best IIP Award Best WSE Award	A				Korea	Korea		Mongolia Korea	Mongolia
	NA							Mongolia Sri Lanka India	Mongolia
Gender equality in S&T promotion/ campaign	A			Pakistan New Zealand	New Zealand Japan	New Zealand Japan	Vietnam Taiwan	New Zealand Pakistan Korea Vietnam Japan Taiwan	Vietnam
	NA	Korea	Pakistan Korea	Pakistan Korea	Pakistan Korea	Korea	Taiwan Kora	New Zealand India Japan Taiwan Pakistan Korea	Pakistan Korea
Maternity leave/ childcare leave/ incentives	A								
	NA				Australia	Australia	Australia	Vietnam Australia	

A: Policy activated, **NA**: Policy not activated yet but needed
WSE = Women Scientists and Engineers
RTS = Recruit Target System
IIP = Institutional Innovative Project

G. India

No program is currently in operation, but WISE-India suggests awards for parents who educate their daughters, a policy to describe gender equality in textbooks, and establishment of awards for outstanding female science and engineering professionals at agencies under Women Chamber of Commerce.

H. Japan

INWES-Japan contributes a weekly essay series titled, “Thought, Work and Life of Women in Science and Engineering” written by different people each week, to an industrial daily newspaper for promotional purposes. Programs to change social recognition and tradition in order to realize work/life balance are needed.

I. Taiwan

Ideal female talent is being promoted among job-seeking and working scientists and engineers, and TWiST is suggesting that media promotion is needed to raise awareness of non-traditional roles of women.

J. Pakistan

Although Pakistan endeavors to discourage early marriage, gives awards to the most outstanding professors and scientists, and has as many as 60 female parliamentary members out of 342 seats, WESTIP emphasizes the needs for a campaign to promote “Invest for Your Daughter,” an analysis of gender ratio statistics in science and engineering, development of gender equality indices, promotion of experiences by retired women scientists, and establishment of achievement awards.

K. Korea

BIEN, an international conference of women scientists and engineers, is being held, and organizations with outstanding records of women-friendly institutional innovation and with excellent outcomes from the recruitment target system are given awards. Female Scientist and Engineer Awards are also conferred. However, the need to create a TV drama series depicting the lives of female science and engineering professionals or to launch a campaign to promote work-life balance for both men and women is being raised.

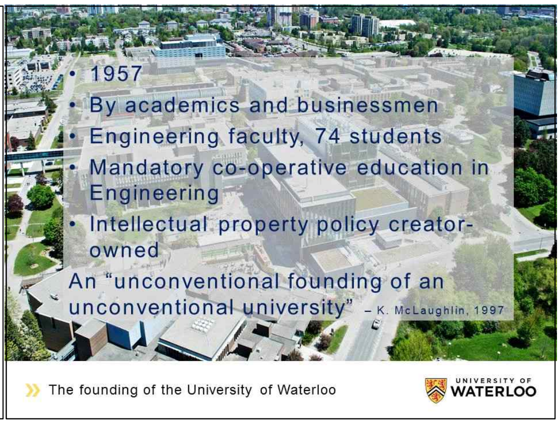
L. Australia

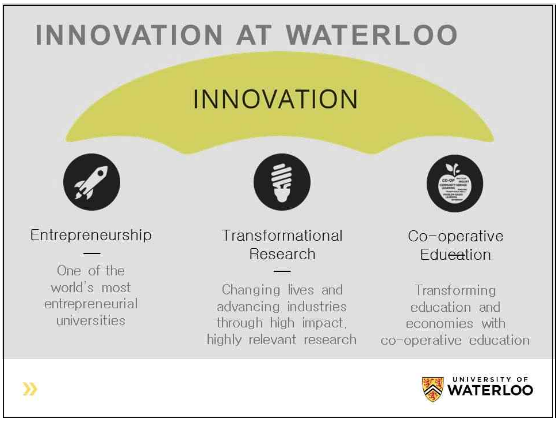
Efforts to enhance social perception are being reflected in elementary, middle and high school education, and several women-friendly programs are being partially operated. However, the respondent (Engineers-Australia) suggested the need for more projects in the job-seeking and working stages. Specific programs in operation were not suggested and thus were excluded from Table 3-6, but the respondent indicated the need for economic support during women's leaves for maternity or childcare, which are considered traditional obligations of women.

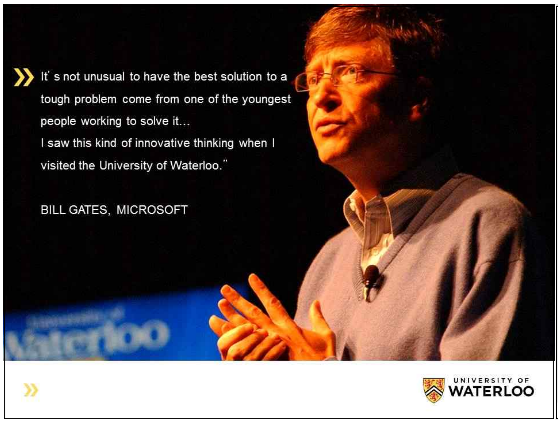
4. Appendix

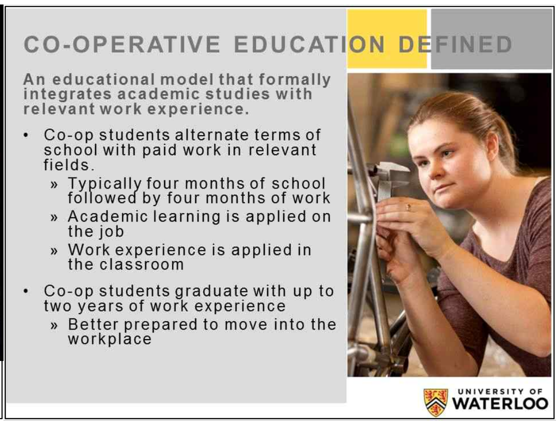
4-1. MAPWiST Policy Forum invited lectures

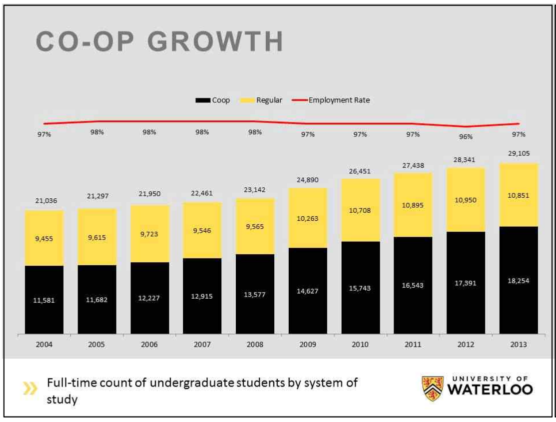
A. Innovation in Education: The University of Waterloo's Co-operative Education Program by Peggy Jarvie

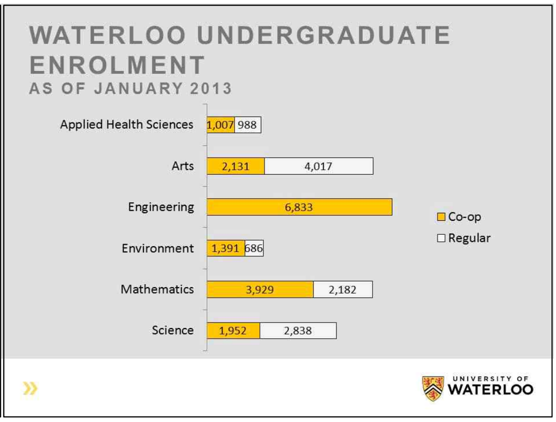


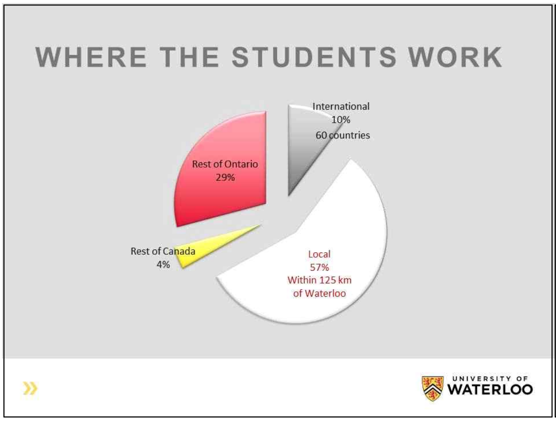


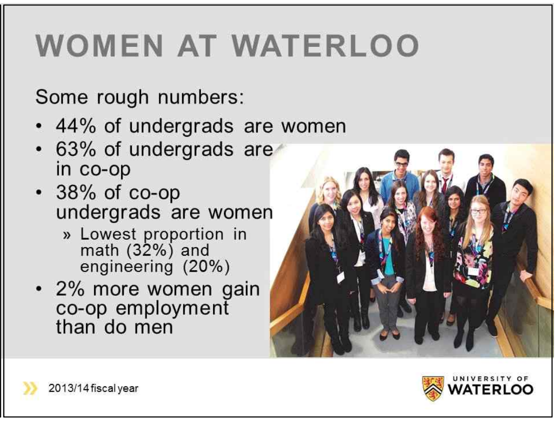

It's not unusual to have the best solution to a tough problem come from one of the youngest people working to solve it…
I saw this kind of innovative thinking when I visited the University of Waterloo."
BILL GATES, MICROSOFT
UNIVERSITY OF WATERLOO


CO-OPERATIVE EDUCATION DEFINED
An educational model that formally integrates academic studies with relevant work experience.
• Co-op students alternate terms of school with paid work in relevant fields.
» Typically four months of school followed by four months of work
» Academic learning is applied on the job
» Work experience is applied in the classroom
• Co-op students graduate with up to two years of work experience
» Better prepared to move into the workplace
UNIVERSITY OF WATERLOO

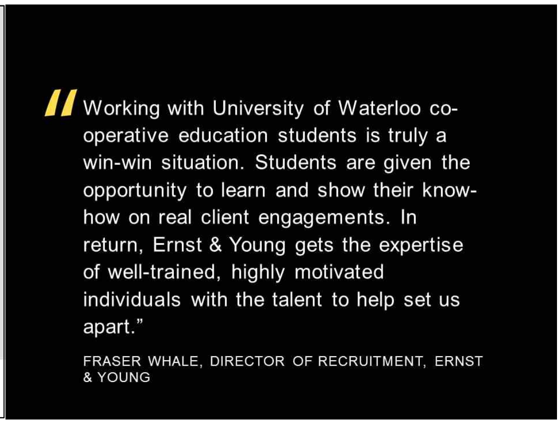

CO-OP GROWTH
Coop
Regular
Employment Rate
97% 98% 98% 98% 98% 97% 97% 97% 96% 97%
21,036 21,297 21,950 22,461 23,142 24,890 26,451 27,438 28,341 29,105
9,455 9,615 9,723 9,546 9,565 10,263 10,708 10,895 10,950 10,851
11,581 11,682 12,227 12,915 13,577 14,627 15,743 16,543 17,391 18,254
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013
Full-time count of undergraduate students by system of study
UNIVERSITY OF WATERLOO


WATERLOO UNDERGRADUATE ENROLMENT
AS OF JANUARY 2013
Applied Health Sciences 1,007 988
Arts 2,131 4,017
Engineering 6,833
Environment 1,391 686
Mathematics 3,929 2,182
Science 1,952 2,838
Co-op
Regular
UNIVERSITY OF WATERLOO


WHERE THE STUDENTS WORK
International 10% 60 countries
Rest of Ontario 29%
Rest of Canada 4%
Local 57% Within 125 km of Waterloo
UNIVERSITY OF WATERLOO


WOMEN AT WATERLOO
Some rough numbers:
• 44% of undergrads are women
• 63% of undergrads are in co-op
• 38% of co-op undergrads are women
» Lowest proportion in math (32%) and engineering (20%)
• 2% more women gain co-op employment than do men
2013/14 fiscal year
UNIVERSITY OF WATERLOO


CO-OP EMPLOYERS
• Microsoft
• Sander Geophysics Limited
• Allstate
• TD Business Banking
• Fisheries and Oceans Canada
63 countries worldwide
5,200 organizations
18,657 job postings
8.9% Accounting, Tax Preparation, Bookkeeping, and Payroll
11.5% Architectural, Engineering, and Related Services
7.9% Communications Equipment Manufacturing
15.2% Computer Systems Design and Related Services
6.1% Depository Credit Intermediation
9.7% Federal Government Public Administration
5.3% Insurance Carriers
4.8% Local, Municipal, and Regional Public Administration
6.7% Management, Scientific, and Technical Consulting Services
6.1% Software Publishers
17.9% Universities
UNIVERSITY OF WATERLOO


"Working with University of Waterloo co-operative education students is truly a win-win situation. Students are given the opportunity to learn and show their know-how on real client engagements. In return, Ernst & Young gets the expertise of well-trained, highly motivated individuals with the talent to help set us apart."
FRASER WHALE, DIRECTOR OF RECRUITMENT, ERNST & YOUNG

HOW DOES CO-OP WORK?

UNIVERSITY OF WATERLOO

CO-OP AT WATERLOO

- **Largest** in the world >> over 18,000 students in more than 140 programs of study
- **World class** experience >> students work in over 60 countries
- **Competitive** employment process >> not a "placement"
- **Mandatory career prep** programs >> online job-skill development courses
- Job **performance evaluation** >> high incentive to perform well
- **Critical thinking** >> written work report explores the link between academic study and workplace

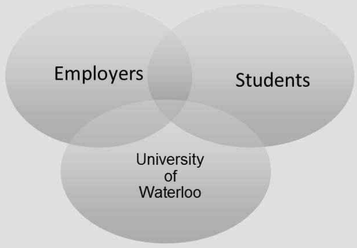
UNIVERSITY OF WATERLOO

TYPICAL WATERLOO WORK/STUDY SEQUENCES

Year 1			Year 2			Year 3			Year 4			Year 5	
F	W	S	F	W	S	F	W	S	F	W	S	F	W
1A	1B	**WT**	2A	**WT**	2B	**WT**	3A	**WT**	3B	**WT**	4A	**WT**	4B
1A	**WT**	1B	**WT**	2A	**WT**	2B	**WT**	3A	**WT**	3B	**WT**	4A	4B
1A	1B	Off	2A	**WT**	2B	**WT**	3A	**WT**	3B	**WT**	4A	**WT**	4B

UNIVERSITY OF WATERLOO

THE CO-OP PARTNERSHIP



CO-OPERATIVE EDUCATION & CAREER ACTION

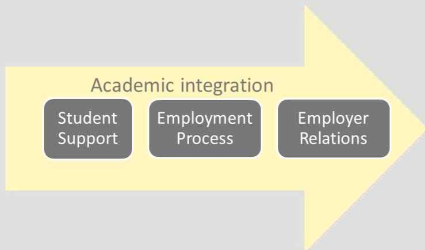
UNIVERSITY OF WATERLOO

THE UNIVERSITY PARTNERSHIP

CO-OPERATIVE EDUCATION & CAREER ACTION

UNIVERSITY OF WATERLOO

ADMINISTRATION AND SUPPORT

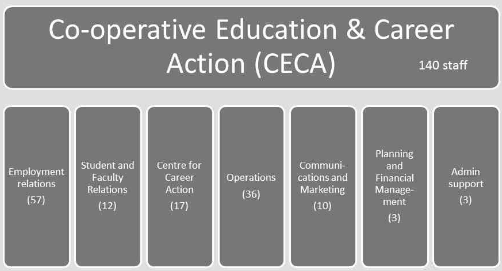


UNIVERSITY OF WATERLOO

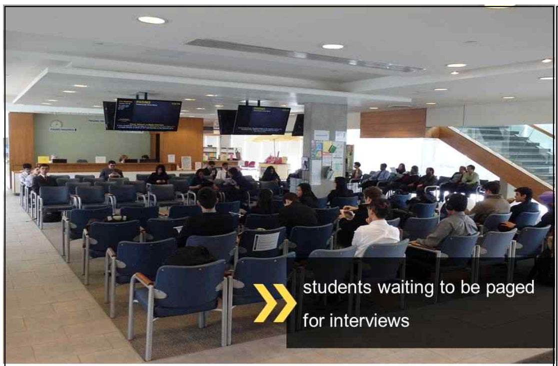
Named for Waterloo co-op alumnus, William M. Tatham, and funded through his philanthropy and student support

UNIVERSITY OF WATERLOO

ADMINISTRATION AND SUPPORT



UNIVERSITY OF WATERLOO



students waiting to be paged for interviews

Tatham Centre for Co-operative Education & Career Action

UNIVERSITY OF WATERLOO

INSTITUTION

Value	Commitment
• Makes the institution more attractive and affordable for students • Attracts excellent students who are highly motivated • More relevant curriculum • Knowledge transfer between the workplace and the classroom • Builds links with business and industry	• Resources ($ and people) • Academic credit for work experience • Schedule classes to accommodate work terms • Values work experience in classroom • Teach year round • Hires students • Promotes with business, government, etc.

UNIVERSITY OF WATERLOO

EMPLOYERS

Value	Commitment
• Hire with flexibility » Fill immediate needs cost-effectively • Recruit permanent employees » Low risk, cost effective • Bring new ideas from classroom to workplace • Contribute to building country's talent	• Provide students with worthwhile work and *pay* them • Effective supervision, coaching and evaluation • Promote co-op within company and to other employers

UNIVERSITY OF WATERLOO

"Youths who gain work experience and receive on the job training while studying are much more likely to find suitable and sustainable employment."

CANADIAN IMPERIAL BANK OF COMMERCE, DEPUTY CHIEF ECONOMIST BENJAMIN TAL

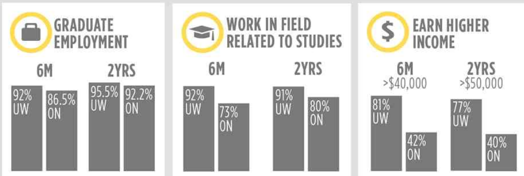
STUDENTS

Value	Commitment
• Enhance learning • Up to 2 years' work experience • Network of professional contacts • Evaluate career options • Help finance education	• Work hard » Academic term and job search » Work term • Maturity and acculturation to work force • At Waterloo, pay fee

UNIVERSITY OF WATERLOO

CO-OPERATIVE EDUCATION OUTCOMES

Waterloo graduates achieve higher employability and income compared to other Ontario graduates.



UNIVERSITY OF WATERLOO

https://uwaterloo.ca/about/what-we-do/university-waterloo-economic-impact-study-2013

UNIVERSITY OF WATERLOO

GOVERNMENT SUPPORT

- Funding for academic credits
- Tax credit for employers
- Hiring students

UNIVERSITY OF WATERLOO

CO-OP AND "THE BIG IDEA"

Experience on co-op work terms leads to…

- Big ideas that can be developed in Velocity, e-coop work terms, 4th year design projects
- Start ups hire co-op students to help bring product to market
  - » First student hired a "make or break" for young entrepreneurs
- Students working in start ups discover whether they wish to pursue entrepreneurship

»

UNIVERSITY OF WATERLOO

ENTREPRENEURSHIP

STUDENTS
VeloCity
Co-op

RESEARCHERS
IP Policy
WatCo

TOP 20 INNOVATIVE ECOSYSTEMS
StartupGenome

»

UNIVERSITY OF WATERLOO

NATALIE SHAM

» **Environment - Planning**
United Nations Human Settlements Programme

- **Natalie** worked at the UN-HABITAT headquarters in Nairobi, Kenya and increased the agency's knowledge on the global state of the existing formal housing by implementing an original idea to develop a Sustainable Housing Rehabilitation Index (SHRI)
- She published the paper, Sustainable Housing Rehabilitation for Inclusive Cities, and presented it during a conference in Melbourne, Australia hosted by RMIT University and the UN Compact Cities Program. The prestigious Global Cities Review published the paper in December.

»

UNIVERSITY OF WATERLOO

PERAKAA SETHUKAVALAN

» **Applied Health Sciences – Health Studies**
Sunnybrook Health Sciences Centre

- **Perakaa**'s passion for prostate cancer research motivated her to design effective studies, receive ethics board approval, and collect and analyze the data and publish the results
- Investigated and demonstrated that stereotactic radiation research saves cancer patients $2,000 in out of pocket expenses
- Found that rapid diagnosis of prostate cancer cut wait times by 2 months average
- Published four articles, two as first author and nine abstracts, six as first author

»

UNIVERSITY OF WATERLOO

MELANIE CHANONA

» **Mathematics – Applied Mathematics**
University of Waterloo – Faculty of Science

- **Melanie** learned the concept of RigidQuasilocal Frames formalism to construct fundamental conservation laws for energy and momentum
- Three separate research endeavours of Melanie's have been submitted for publication
- Won first prize in the best student presentation competition at the Canadian Association of Physicists Congress where she competed against over 100 graduate level candidates
- Won first prize for best presentation in the Mathematical and Theoretical Physics Division at the Canadian Undergraduates Physics Conference

»

UNIVERSITY OF WATERLOO

SORINA CHIOREAN

» **Science - Biochemistry**
Environment Canada

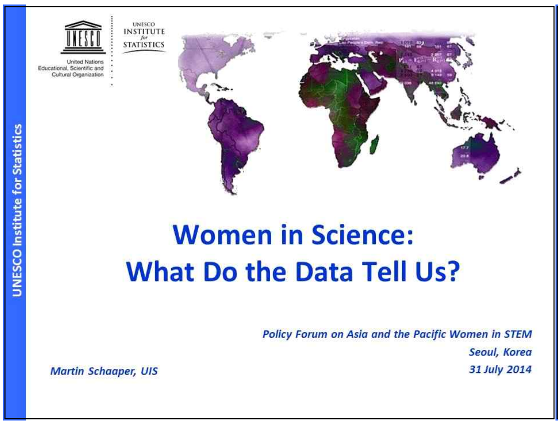
- **Sorina** learned and performed biological tests involving radioactivity and immunology on collected animal samples for steroid levels in two days rather than the expected one week
- Compared the current procedure with a new one to determine which was more effective. Her research helped to optimize the current method which will help to lower the cost and time associated with running the tests.
- Travelled to Fort McMurray to help monitor fish species found in the oil sand regions. Helped catch, label, and record information on the region's aquatic life to be compiled into a valuable report that will be used to evaluate the effects oil companies are having on the environment around them and will be published online for public access.

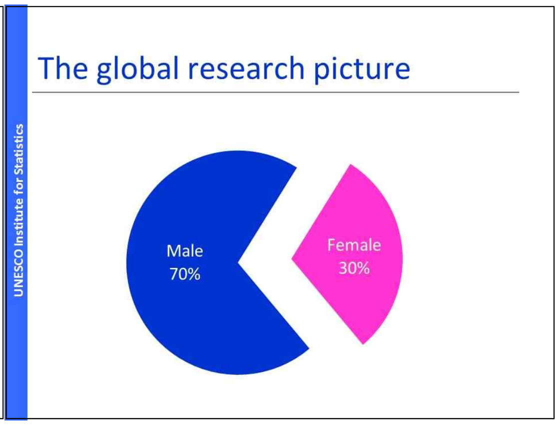
»

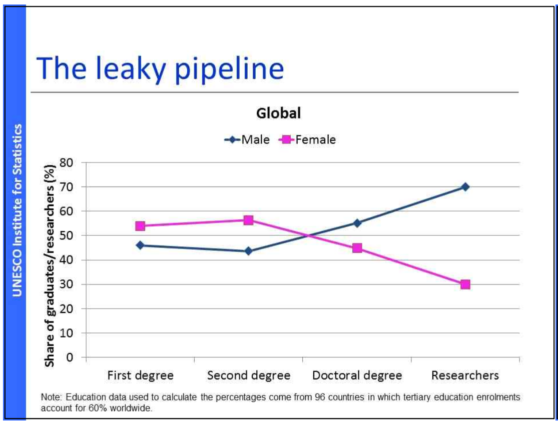
UNIVERSITY OF WATERLOO

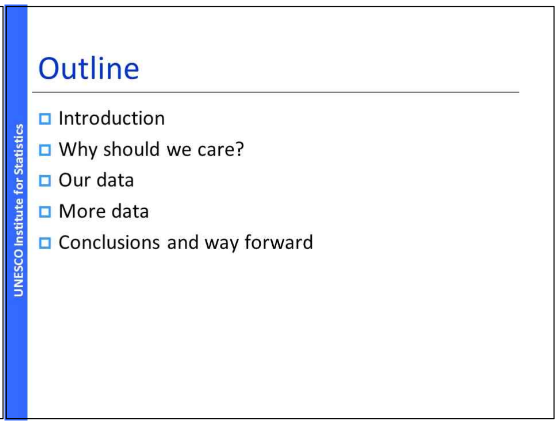
UNIVERSITY OF WATERLOO

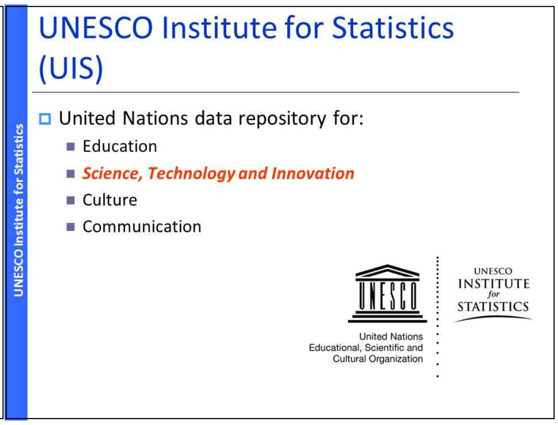
B. Women in Science: What Do the Data Tell Us? by Martin Schaaper











UIS is the UN lead agency for STI statistics

- Official STI data source for UNSD, WB, GII, etc.
- Data publicly available at: http://www.uis.unesco.org
- UIS Publications (can be downloaded from the UIS website): S&T Bulletins; Fact sheet, eAtlas on R&D statistics
- UNESCO Reports, e.g. UNESCO Science Report 2015

UNESCO Institute for Statistics

Areas of work

- R&D personnel & expenditure
- Human resources devoted to S&T and international mobility
- Innovation data
- Longer term: Output & Impact

UNESCO Institute for Statistics

Lines of action

- STI survey operations and data guardianship
  - R&D Survey
  - Innovation Survey
- Training in STI statistics: workshops & other training activities
- Standard setting and methodological developments
- Analysis and publications

UNESCO Institute for Statistics

WOMEN IN SCIENCE: WHY SHOULD WE CARE?

UNESCO Institute for Statistics

Why we need (more) women in STEM

- Diversity
- Quality
- Equality
- Quantity

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UIS DATA

UNESCO Institute for Statistics

Survey on Statistics of Research and Development (R&D)

- Biennially
- 2004, 2006, 2008, 2010 and 2012 R&D surveys completed
- 6th round was launched in July 2014
- Data and metadata released on UIS website (http://stats.uis.unesco.org)
- Cooperation with international and regional organisations (OECD, Eurostat, RICYT, AU/NEPAD)

UNESCO Institute for Statistics

Education surveys

- UIS/ED/A: Students and Teachers (ISCED 0-4)
- UIS/ED/B: Educational Expenditure (ISCED 0-8)
- UIS/ED/C: Students and Teachers (ISCED 5-8)
- UIS/ED/D: Intended Instructional Time
- UIS/ED/ISC11: National Education Systems
- UIS/ED/AT: Educational Attainment
- UIS/LIT: Literacy

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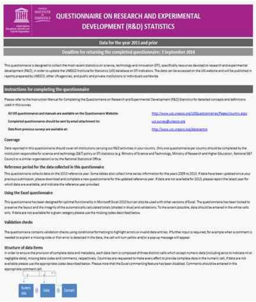
Data collection: R&D Survey

R&D Personnel

- By sector of employment, occupation, qualification, and field of science
- In headcount and FTE
- By gender

R&D Expenditure

- By sector of performance and source of funds
- By type of activity and field of science

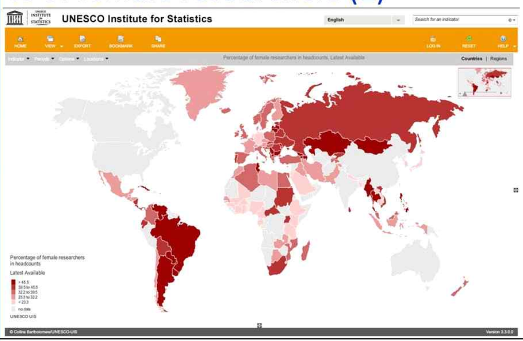


Engineering

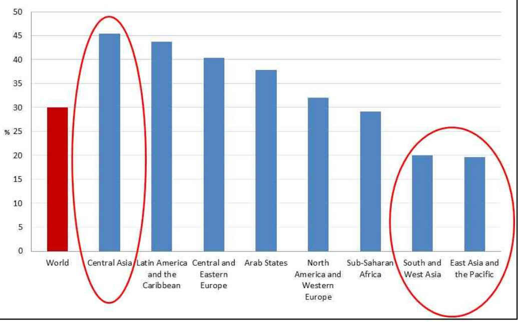
- No data collection
- UNESCO Engineering Report

UIS data visualisation

% of female researchers (1)

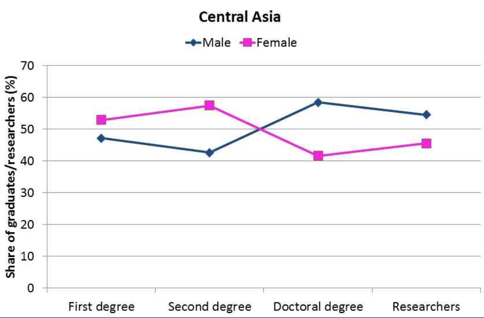


% of female researchers (2)

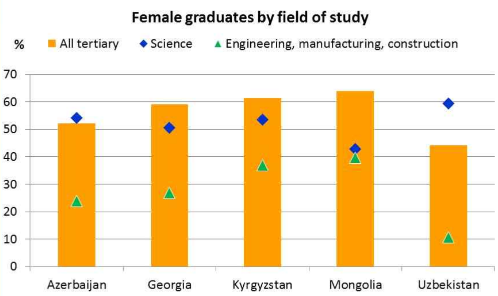


Central Asia

Relative equality in Central Asia



Bias towards “soft studies”?



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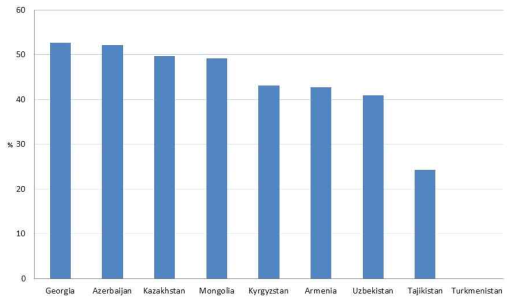
Central Asia - % female researchers

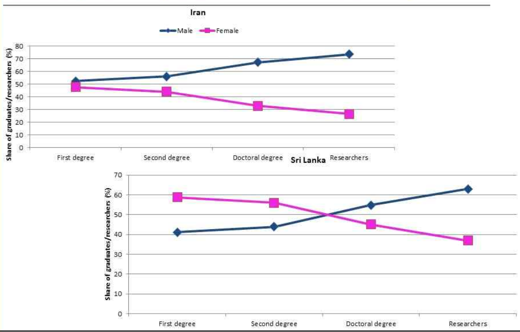


UNESCO Institute for Statistics

South and West Asia

UNESCO Institute for Statistics

Scissors in South and West Asia



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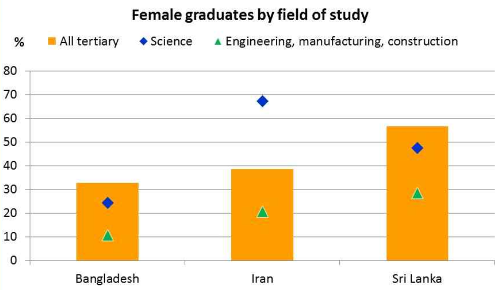
Choice of study



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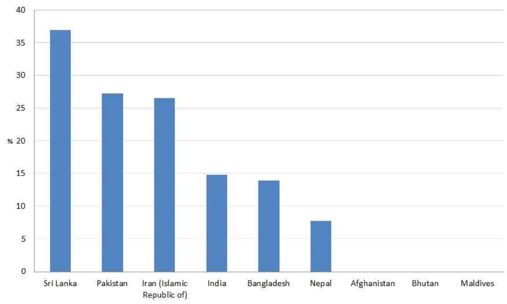
South and West Asia - % female researchers



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East Asia and the Pacific

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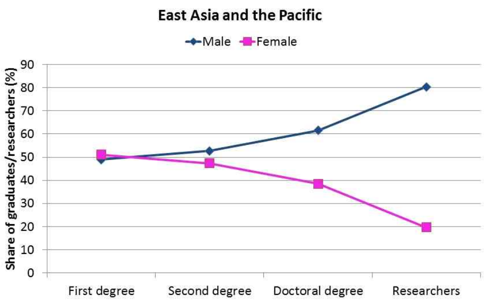
Big gap in EAP



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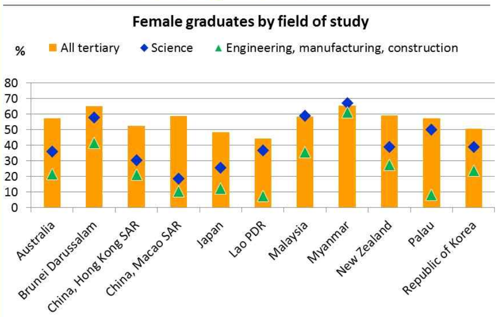
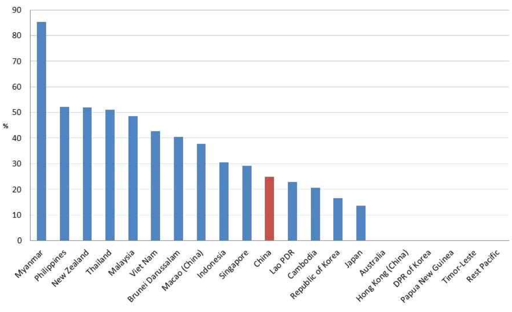
Few female engineers



East Asia and the Pacific - % female researchers



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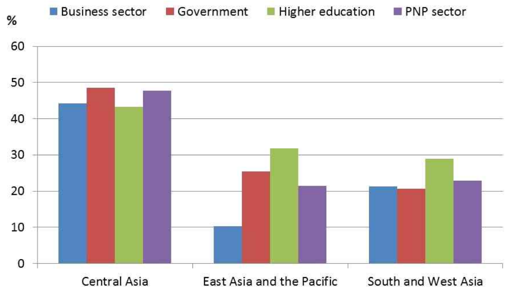
Female researchers by sector of employment



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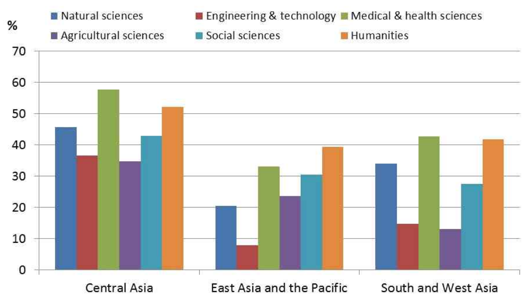
Female researchers by field of science



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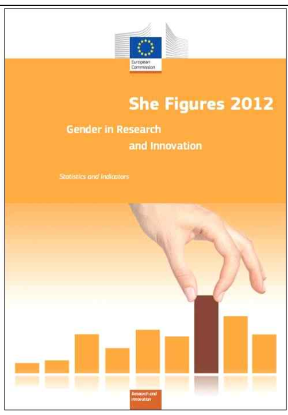
OTHER DATA SOURCES

UNESCO Institute for Statistics



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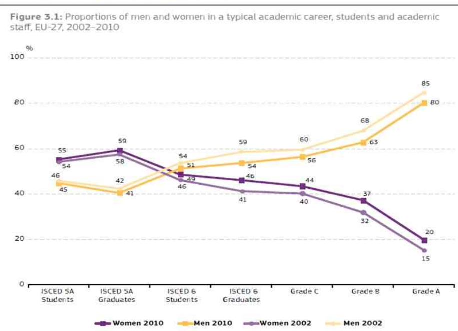
Extended scissors



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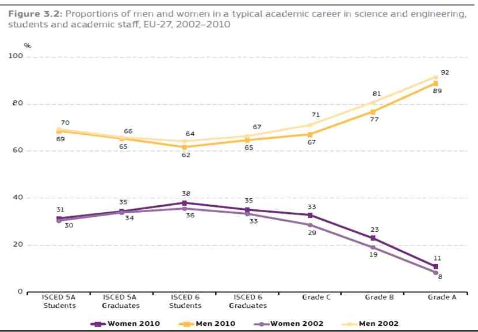
Worse in science and engineering



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More results from the EU

- On average in the EU-27, 20 % of grade A academics are women but just 10 % of universities have a female rector
- Predominantly men set the scientific agenda as on average in the EU-27 there is only about one woman for every two men in scientific and management boards
- A gender gap continues to exist in the success rates of researchers to obtain research funding

UNESCO Institute for Statistics

And from the US

- National Science Foundation (NSF) survey found that only a little more than a fourth of the deans in colleges and universities are women
- Females hold just 19 percent of tenured full professorships in science, engineering, and technology

UNESCO Institute for Statistics

Careers of Doctorate Holders (CDH) project

- Joint OECD/UNESCO Institute for Statistics/Eurostat project
- Focus on the crucial role of highly qualified individuals who represent a key to the production, application and transmission of knowledge
- Toolkit
  - Model questionnaire and Instruction Manual
  - Output tables and variables definitions
  - Methodological guidelines
  - Bridge table model questionnaire - output tables

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CDH (2)

- Modules
  - Doctoral Education (EDU)
  - Early Career Research positions (ECR)
  - Employment situation (EMP)
  - International mobility (MOB)
  - Career-related experience (CAR)
  - Personal characteristics (PER)
- 3 data collections to date
- Mainly developed countries

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Gender tables in 2009 data collection (source OECD)

- Median age at graduation of recent doctorate holders, by main field of study
- Total doctorate holders
  - by age class
  - by sector of employment
  - employed as researchers and as non-researchers, by sector of employment
  - by field of study
  - employed as researchers and as non-researchers, by field of study
  - perception of job relation to their doctoral degree
  - satisfaction level

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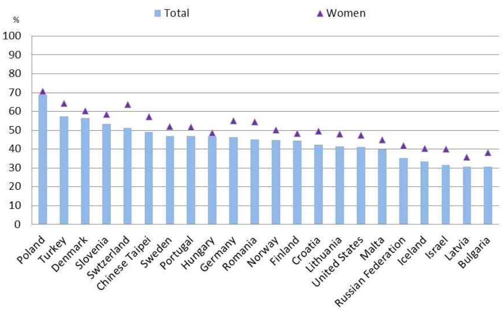
Share of doctorate holders below 45 years old, 2009



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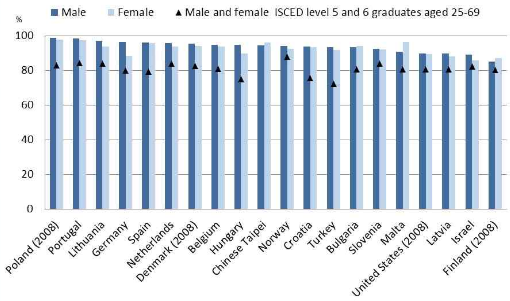
Employment rate of doctorate holders by gender, 2009



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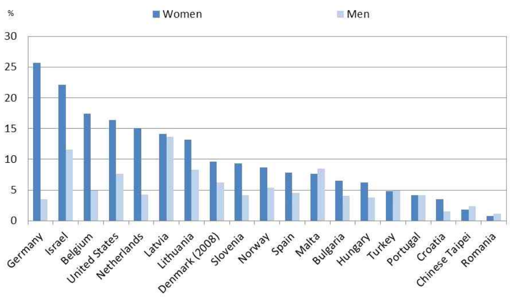
Percentage of doctorate holders working part time, by gender, 2009



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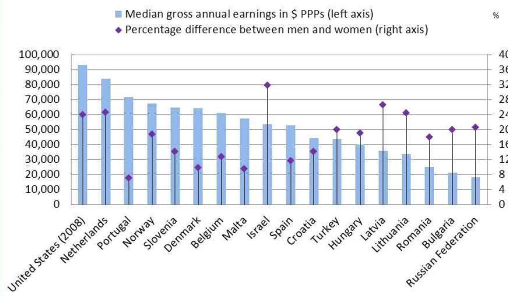
Median gross annual earnings of doctorate holders



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CONCLUSIONS AND WAY FORWARD

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Conclusions

- Scissors charts are very informing
- Not a uniform picture
- Variety by region and country
- More data needed

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Some reasons

- Glass ceiling and maternal wall
- Work-life balance
- Engendered
- Environment
- Status
- Satisfaction
- Personal preferences

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Example: engineering in the US

- While around 20 per cent of American graduates in engineering were women, females accounted for only 11 per cent of practitioners in the field
- Workplace climate issues including poor treatment and behaviour from supervisors and colleagues as well as a lack of policy and culture to support work/life balance and advancement are among key reasons why women are leaving the engineering profession
- Source: http://sourceable.net/why-american-women-are-leaving-engineering/

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Policy implications (1)

From SheFigures:

- Women may not automatically 'catch up' to their male counterparts
- Proactive policies are thus essential to significantly reduce these gaps
- Work-life issue remain a key element in achieving gender equality
- There is not just a 'glass ceiling' but also a 'maternal wall' hindering the career of female researchers

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Policy implications (2)

- A gender-mixed composition of nominating commissions, an increase in the objectivity of the applied selection criteria, tutoring of women, or even the fixing of quotas, are all policies that are generally evoked, and in some countries already implemented, to balance out the unequal situation that continues to prevail in the academic sector

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Gender equality in the SDGs

Proposed goal 5. Achieve gender equality and empower all women and girls

- …
- 5.5 ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life
- …
- 5.c adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

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Improved Measurement of Gender Equality in Science and Engineering

- UNESCO proposal to Sida
- If funded, work will start in 2015
- Dedicated staff to be hired for 3 years
- Includes pilot data collection and capacity building

Objectives

- Reduce the gender gap in scientific and engineering fields in all countries at all levels of education and research
- Analyse gender related policies and indicators and how they affect the gender balance in science, technology, engineering and mathematics (STEM)
- Strengthen gender equality perspectives in science policy design

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Expected results (1)

- Member States, UNESCO and others enabled to measure the status of women and girls in science using sound methodologies and tested indicators on gender equality in science, technology, engineering and mathematics (STEM) and data included in the UIS database.
- An updated inventory of policy instruments affecting gender equality in STEM incorporated in the Global Observatory on Science Technology and Innovation Policy Instruments (GO→SPIN).

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Expected results (2)

- A critical mass of officials in pilot countries trained to collect data.
- Technical Paper of proposed standard practice for surveys on gender policy instruments and indicators on STEM published.

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Data to be developed/collected (1)

- women/men in STEM, by level of seniority, subject area, age, country and region
- male and female researchers working in the science-related private sector, by sector, country and region, full time/part time
- male and female academic researchers and faculty, by scientific discipline, country and region
- economic participation of man and women with STEM degrees, by type of degree, subject and age

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Data to be developed/collected (2)

- ratio of women with STEM degrees, by discipline, country and region
- men and women sitting in scientific boards, by country and region
- male and female students in STEM obtaining scholarships, by country and region

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Thank you for your attention!

http://www.uis.unesco.org

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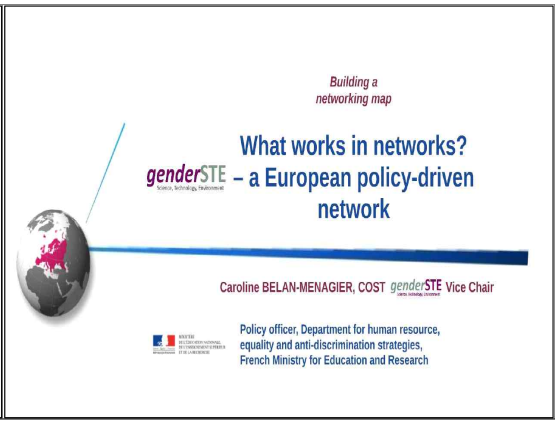
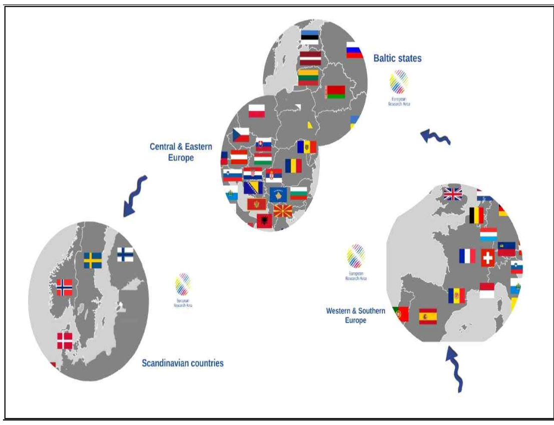
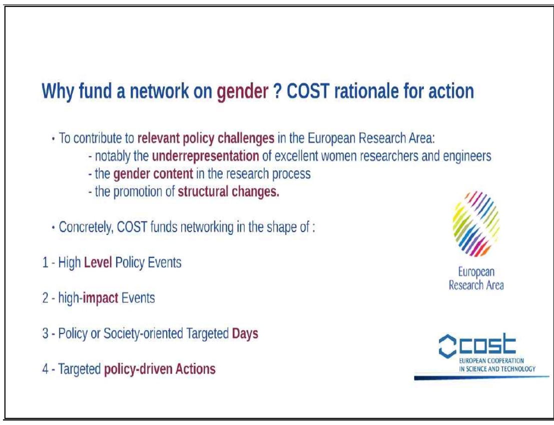
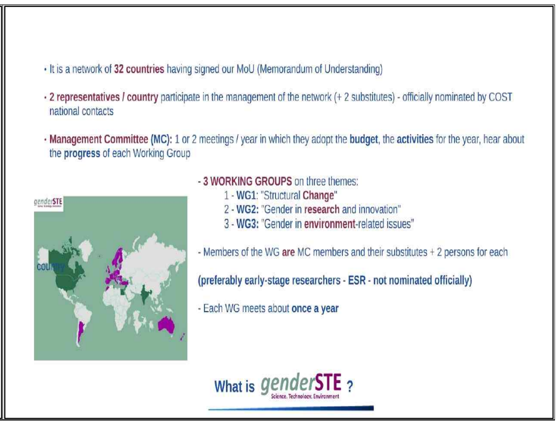
C. What works in networks? genderSTE-a European policy-driven network by Caroline Belan-Menagier









What works in genderSTE ?

- Short Term Scientific Missions (**STSMs**)
- Using WG meetings to share, to **learn**, to disseminate, to raise the members' personal **awareness** to gender, equality and discrimination, but not to manage the network
- **Core Group** meetings and shared **responsibilities** of CG members
- **Flexibility** in formats of events (targeted info days, workshops in ministry, presentation to other COST networks, specific trainings) and activities (translation, writing short stories, preparing reports, using social media, etc.)
- Healthy **competition**
- Funding to actually **DO** things

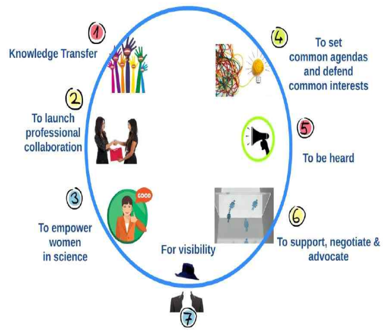
What works in COST rules and methods for genderSTE ?

- Giving **responsibility to early-stage researchers**
- Giving **autonomy** to WG leaders, when they have their own ideas, agendas and road maps
- Our own yearly reporting of activities to MC members and to the COST Office
- The mid-term **evaluation of impact** and of **individual engagement** into the network by COST evaluators based on **country reports**
- Countries which have signed / **agreed to** the Memorandum of Understanding and understand COST **rules**
- Official & non-official members
- People who want to "**learn**" & people who want to "**share**"
- Researchers / gender experts **and** policy makers from different countries

genderSTE members & women networks

- Our members belong to -- at least-- **28** Associations of Women Scientists
- **16** of those associations are **national**
- **6** are **regional** (mainly Baltic States); **6** are **European** and /or **international**
- One country has no association to our members' knowledge (Bosnia and Herzegovina)
- 38 respondents say that women networks are **important** and 5 that they are **very** important
- One remarks they are "**strongly voluntary :-)**"

Why did our members join a women network / association?



Next steps?

- Awaiting the result of mid-term **evaluation**
- New **teams**?
- Launch a group of **policy-makers** within genderSTE
- Get more **men** involved
- **Attract** more ESR
- Devise and propose a post- genderSTE project
- Make change **happen for impact**
- Build **bridges?**

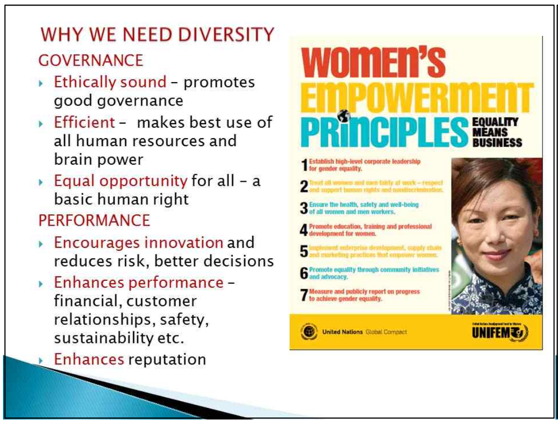
Thank you for your attention!

caroline.belan-menagier@recherche.gouv.fr

http://www.genderste.eu/

4-2. MAPWiST Policy Forum panel presentations

A. Marlene Kanga (Australia)

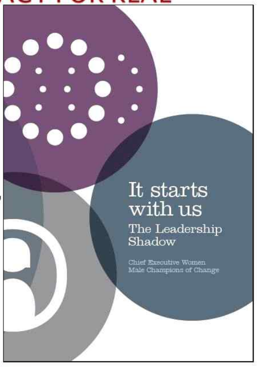


OUR LEADERS MUST ACT FOR REAL CHANGE

BOARDS ARE CONCERNED WITH

- GOVERNANCE
- PERFORMANCE

- ACTION ON INCLUSIVENESS, DIVERSITY AND WELLBEING ADDRESSES KEY ISSUES TO IMPROVE BOTH



AUSTRALIAN WOMEN IN LEADERSHIP

- In Australia women comprise 45 percent of the workforce but only:
  - 9.2% percent of Key management Personnel in ASX 500 companies
  - 9.2% of ASX 500 company board members
  - 2.6% Chairs of ASX 500 Boards
  - Significantly lower percentages than other countries on every measure
  - Percentages for UK. USA, Canada, New Zealand, South Africa between 15 and 20 percent, 20-30 percent in Scandinavian countries

2012 Australian Census of Women in leadership, Australian Government, Equal Opportunity for Women in the Workplace Agency.

WOMEN IN ENGINEERING IN AUSTRALIA

- Less than 20% as students, less than 10% in workforce
- Large proportions leave between 30-50 years
- Only 1000 Australian born women engineers aged >50 years in Australia
- Women earn less than men at every level
- Half of women in engineering have no children, 25% have only 1 child
- 90% of employers provide flexible work arrangements but uptake is low
- Around 25% report sexual harassment, 30% report bullying, 40% report observing bullying
- 35% reported discrimination, increases with age

ACHIEVING DIVERSITY & INCLUSIVENESS

- Diversity extends beyond gender
- Stage 1 –Gender diversity
- Stage 2 – Broader Diversity – Gender, age, ethnicity, religion , physical ability etc.
- Stage 3 – Diversity in Leadership

Sara Akbar, chemical engineer, former CEO Kuwait Energy Corporation – produced oil in 9 countries, revenues exceed US$400 million, acquired by KPOC

THE LAG – ENGINEERING ORGANISATIONS

- Engineering companies in Australia have the lowest proportion of women on boards in the ASX 200:
  - Automobiles
  - Capital goods
  - Consumer durables
  - Materials
  - Energy
  - Utilities
- WGEA Employer of Choice 2012 - Australian engineering organisations:
  - Utilities
    - AGL Energy Ltd
    - Origin Energy Ltd
  - Manufacturing – - Nil Australian owned, list includes BP. Shell, Pepsico, GM Holden, Glaxo Smith Kline
  - Mining – Nil Australian owned - list includes Alcoa, Conoco Philips, Exxon Mobil
  - Professional engineering services
    - AECOM
    - ARUP
    - SKM (now owned by Jacobs, global group)

"A diverse group of competent performers almost always outperform a homogenous group of star performers by a substantial margin when it comes to complex problem solving or innovating"

Scott Page, Professor of Complex Systems Theory, University of Michigan

DIVERSITY NEEDED FOR INNOVATIVE SOLUTIONS TO THE WORLD'S MOST IMPORTANT PROBLEMS

- Engineers, scientists and technologists are needed to develop and implement solutions for key global problems:
  - Depleting resources sustainably
  - Climate change
  - Increasing urbanisation
  - Clean water and sanitation
  - Energy
  - Environmental degradation
  - Loss of Bio diversity
- Diverse teams, using the best brains in science, engineering and technology will:
  - Be more innovative
  - Develop solutions that are technically credible, financially viable, sustainable and socially responsible
- Diversity is an opportunity that cannot be ignored

DIVERSITY IMPROVES BUSINESS PERFORMANCE

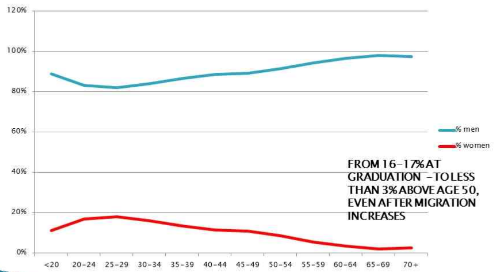
- Catalyst (2004, 2011) Research:
  Fortune 500 companies in the US with the highest proportion of women in top management had higher Return on Equity (35% higher) and Total Return to Shareholders (34% higher).
- McKinsey (2013) companies in the top quartile in diversity had 47% higher ROE and 55% higher EBIT relative to those in the lowest quartile.
- JBWere (2011) – Australian companies with diverse boards performance that was 11% higher.

INCLUSIVENESS, WELLBEING AND DIVERSITY IMPROVES SAFETY PERFORMANCE

- A workforce that feels safe and secure and that is free from bullying and harassment will
  - Have improved performance as a team
  - Have lower levels of non-compliance with policies and procedures, especially for safety
  - Have improved safety performance
  - Will contribute effectively to the organisation

WHAT WORKS?
SNAPSHOT OF DIVERSITY ISSUES IN ENGINEERING IN AUSTRALIA

PARTICIPATION IN ENGINEERING OVER A CAREER



SOURCE: CENSUS DATA, 2011

THE LEAKY PIPELINE

	University graduates	Entry-level professionals	Mid-to-senior mana-gement	Executive Committee	CEO	Board
WOMEN - AUSTRALIA CORPORATE	57%	45%	37%	12%	3%	17%
	LOSSES TO THE ENGINEERING PROFESSION					
	STUDENTS	GRADUATES	MEMBERS	FELLOWS		HON FELLOWS
ENGINEERS AUSTRALIA WOMEN MEMBERS	14%	14%	7%	3%	-	3%
	<24 YRS	24-34 YRS	34-49 YRS	50-59 YRS		ABOVE 59
CENSUS 2011 WOMEN ENGINEERS	17%	17%	12%	7%	-	3%
CENSUS 2011 - EXCL O/S BORN WOMEN ENGINEERS	9%	6%	4%	2%	-	1%

MIGRATION AND INTERNATIONAL STUDENTS BOOST WOMEN'S NUMBERS IN EARLY ENGINEERING CAREERS

REASONS FOR LEAVING – STRUCTURAL ISSUES

Women have high ambitions, like men on graduation BUT

- Young age group for women engineers, majority <35 years, lack mentors and role models
- Lack of work flexibility – long working hours, incompatible with family responsibilities
- Lack of on-ramp programs after parental leave
- Structural issues lead to cultural issues:
  - Bullying and harassment
  - Remote locations have few women (less than 3% in mining)
  - Gender segregated decision making, task allocation, ongoing disadvantage

DO OUR LEADERS KNOW THIS?

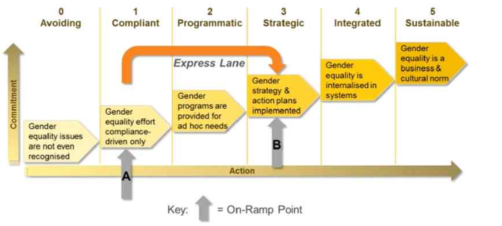
- Lack of understanding and awareness by predominantly male leaders of issues faced by women
- Senior men are more likely to promote someone with a style similar to their or who they know well, less likely to "buck" the trend and appoint a woman
- Less likely to speak up when observing discrimination
- Women less likely to have a sponsor
- Women tend to work in functional roles
- Women undersell their capabilities
- Women tend to carry family responsibilities – competing priorities
- Career disruption and failure to return to work after parental leave

	Phase 1		Phase 2		Phase 3
	Getting in the Game		Getting Serious		Capturing the Diversity Advantage
Source of Impact					
Leadership Culture			Surface barriers and biases	Shift to Culture Change	DIVERSITY ON CEO AND BOARD AGENDA
CEO/Leadership Commitment	CEO MAKES PERSONAL COMMITMENT, SET UP DIVERSITY COUNCIL	A Business Imperative	LEADERSHIP TEAM RESPONSIBLE FOR DIVERSITY, KEY APPOINTMENTS INCORPORATE DIVERSITY, MANAGEMENT REPORTING Vs KPIs		MANAGEMENT COMMITMENT, CORPORATE CULTURE SUPPORTING DIVERSITY, QUANTITATIVE TARGETS, MONITOR AND REVIEW
Skill building, Enablers-Policies and Practices	ATTRACTION & RETENTION POLICIES, RECRUITMENT AND TRAINING, HR POLICIES INCLUDING EQUAL PAY WORK FLEXIBILITY		ATTRACT AND SUPPORT THE BEST TALENT, IDENTIFY AND SUPPORT POTENTIAL LEADERS, CAREER FLEXIBILITY		MENTORING, COACHING AND TRAINING NETWORKING ROLE MODELS
Centre of Gravity	HR		Senior Leadership		Whole System
Impact	Low Impact despite investments		Good progress before reaching a plateau		Positive impact on business performance as well as diversity
Risks	Over-programming and lip service		Perceived or actual violation of promotion on merit		Execution risks and mind sets too entrenched

SOURCE: AUSTRALIAN HUMAN RIGHTS COMMISSION, MALE CHAMPIONS FOR CHANGE, 2011

A STRATEGIC APPROACH FOR INCLUSIVENESS WELLBEING & DIVERSITY

Strategic Approach-> Express Lane



SOURCE: WORKPLACE GENDER EQUALITY AGENCY, GENDER EQUITY TOOL KIT (DRAFT, JUNE 2014)

IWD: LEADERS NEEDED FOR SUCCESS

The Human Rights Commission has identified key factors for success with diversity programs:

1. Commitment from Board, CEO and senior management:
   - champion diversity, set performance measures, monitor progress
2. Leadership development and support for women:
   - providing the skills and confidence to master the corporate codes, raise ambition and profiles
3. Basic- Enabling policies and procedures:
   - Recruitment, promotion, equal pay, training
   - Flexible working hours, career flexibility
   - HR procedures that support diversity in recruitment, promotion, career development
   - Mentoring, networking, coaching role models

Note: Globally, only 16% of companies have all 3 elements
(Source McKinsey: Women Matter 2013)

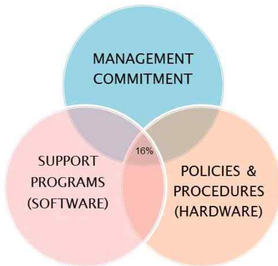
POLICIES AND PRACTICES IN CORPORATE AUSTRALIA

1. Leadership recognises the importance of diversity issues
2. Ensure every promotion panel has a woman to eliminate gender biases and a woman candidate
   - Clear, objective hiring and promotion criteria
   - Mentoring and networking
3. Formal policies to support diversity
   - Assign resources to support diversity
   - Diversity is a performance measure for managers
   - Zero tolerance harassment policy
   - Recruitment demonstrates gender balance
   - Work-life balance policies

THE DIVERSITY ECO-SYSTEM

ONLY 16% OF COMPANIES GLOBALLY HAVE AT LEAST ONE MEASURE IN PLACE IN EACH PART OF THIS ECO-SYSTEM

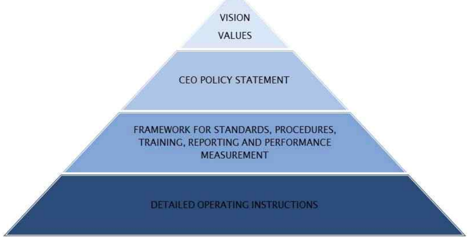
SOURCE: McKINSEY: WOMEN MATTER, 2013




WorleyParsons
Global Diversity and Inclusion Policy
OneWay

Note: The journey began in January 2013

LEADING CULTURAL CHANGE



Note: A similar structure is used to implement a safety culture on engineering organisations

CHANGING THE CULTURE - FOR INCLUSIVENESS, WELLBEING & DIVERSITY

CEO and Board Commitment

1. Explicit highly visible policy statement, agreed leadership actions
2. IWD Policy compliance is non-negotiable (similar to safety)
3. Monitor and report on diversity achievements and impact on business performance
4. Lead embedding of strategy at every level of the organisation
5. Walk the talk

Women's leadership development and retention

1. Define what great leadership looks like
2. Leadership skill building, role models, support for sponsorship by senior executives

Organisational Capability

1. Develop an action plan to change the culture
2. Set Specific and measurable targets at every management level
3. Ensure HR policies and procedures -selection, promotion, development, compensation support diversity
4. Communicate to employees, shareholders and community - the importance of diversity and benefits achieved

STRATEGY FOR IWD

- ENDORSED BY SCIENCE, TECHNOLOGY AND ENGINEERING ORGANISATIONS IN AUSTRALIA AND INTERNATIONALLY
- BEING ADOPTED BY CEOS AND BOARDS AS THE "**ROAD MAP – A GAME CHANGER**"

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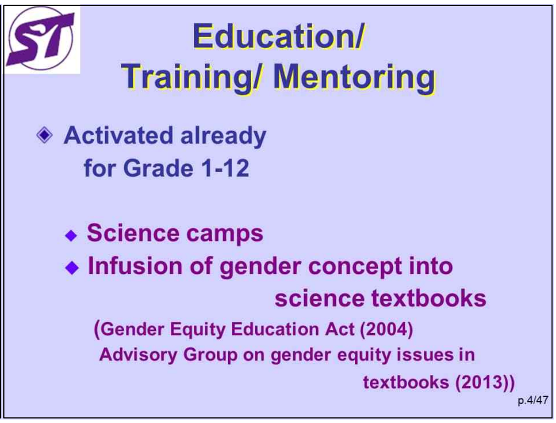
B. Chia-Li Wu (Taiwan)



Education/ Training/ Mentoring

- Activated already for employed
  - Mentoring programs (few cases)
  - Infusion of gender analysis into science projects (beginning stage)

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Education/ Training/ Mentoring

- Non-activated but needed

p.8/47

Education/ Training/ Mentoring

- Non-activated but needed for Grade 1-12
  - Mentoring programs
  - Infusion of gender concepts into science textbooks more thoroughly

p.9/47

Education/ Training/ Mentoring

- Non-activated but needed in College & Grad school
  - More Gender courses
  - Gender/Science camps
  - Mentoring programs for female students

p.10/47

Education/ Training/ Mentoring

- Non-activated but needed for employed
  - More mentoring programs
  - Infusion of gender analysis into science projects

p.11/47

Career Development/ Retention

- Activated already

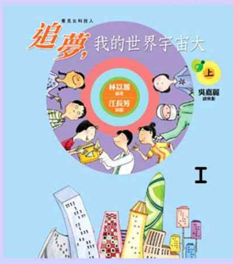
p.12/47

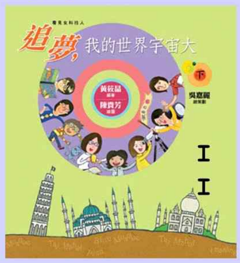
Career Development/ Retention

- Activated already for grade 1-12
  - Picture books published on local women scientists
  - Documentary films produced on local women scientists

p.13/47

Picture books —*Dream Catchers*





p.14/47

Fly with Dreams

Stories of 9 female scientists

Career Development/ Retention

◈ Activated already in College & Grad school
- A few books published on local women scientists
- Documentary films produced on local women scientists
- Internship, Job Fair

Career Development/ Retention

◈ Activated already for employed/retired

- E-Journal for women scientists and technologists (since 2008)

台灣女科技人電子報
Monthly E-Journal since 2008

News/ F-Scientist Profiles/ Forum/ Meetings & Activities/ Articles & Books/ Reports from Meetings

Career Development/ Retention

◈ Non-activated but needed

Career Development/ Retention

◈ Non-activated but needed in College & Grad school

- Internship
- Job Fair
- CV Clinic
- Career consulting

Career Development/ Retention

◈ Non-activated but needed for unemployed

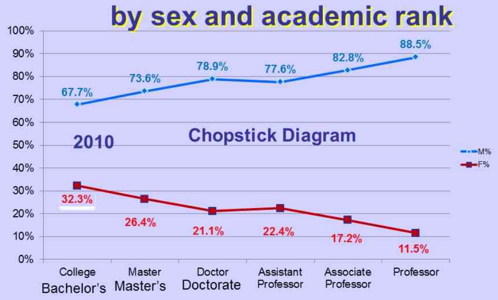
- The Recruitment Target System

Career Development/ Retention

◈ Non-activated but needed for employed

- Promotion Target System

Participation rate of academic STEM women in Taiwan by sex and academic rank



% of College Professor Distributions by discipline and academic rank 2010

2011

Discipline \ rank	Assistant Professor	Associate Professor	Professor
Humanity	51.4%	47.3%	33.6%
Social Sci	40.0	34.7	21.3
Science	22.4 23.1	17.2 18.0	11.5 11.6
Science in 2006	19.2	15.2	10.6
Av.	35	29.3	18

Source: The Dept. of Statistics, Minister of Education

Women Friendliness/ Gender Equality at Work

- Activated already

Women Friendliness/ Gender Equality at Work

- Activated already
  for unemployed/employed
  - Act of Gender Equality in Employment (2002)
  - Prevention of Sexual Harassment (2006)
  - Sexual Assault Prevention Act (1997)

Women Friendliness/ Gender Equality at Work

- Non-activated but needed
  for unemployed/employed
  - The Recruitment Target System
  - Promotion Target System

Changing Social Recognition and Tradition

- Activated already

Changing Social Recognition and Tradition

- Activated already
  for grade 1-12
  - Gender Equity Education Act (2004)

Changing Social Recognition and Tradition

- Activated already
  in College & Grad school
  - Gender Equity Education Act (2004)
  - Prevention of Sexual Harassment (2006)
  - Sexual Assault Prevention Act (1997)

Changing Social Recognition and Tradition

- Activated already
  for employed/retired
  - Gender Impact Assessment (2009)
  - Act of Gender Equality in Employment (2002)
  - Prevention of Sexual Harassment (2006)
  - Sexual Assault Prevention Act (1997)
  - Portraits on women scientists

p.31/47

Changing Social Recognition and Tradition

- Non-activated but needed

p.32/47

Changing Social Recognition and Tradition

- Non-activated but needed
  for grade 1-12
  - Re-enforcement on Gender Equity Education Act

p.33/47

Changing Social Recognition and Tradition

- Non-activated but needed
  in College & Grad school
  - Re-enforcement on Gender Equity Education Act

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Changing Social Recognition and Tradition

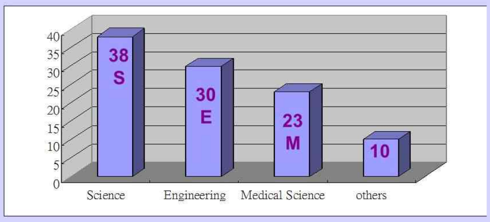
- Non-activated but needed
  for employed
  - More media exposure on non-traditional roles
  - Infuse gender concept into research

p.35/47

Gender inequality survey

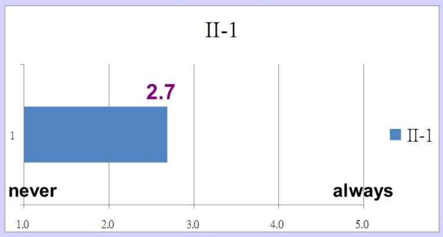
p.36/47

Gender inequality survey
personal background



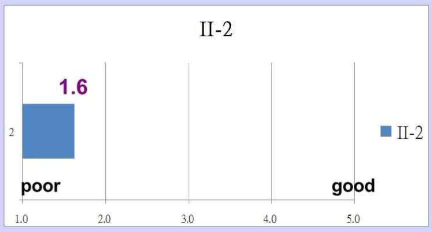
p.37/47

II-1. Chance to identify any female role model as a scientist (or engineer) during your science/engineering education



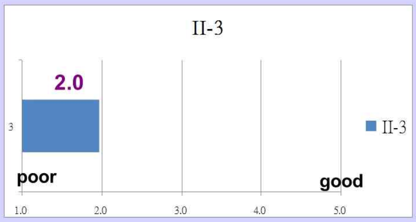
p.38/47

II-2 Was there **balance on the depiction of male and female scientist** (or engineer) in your textbook during your education?



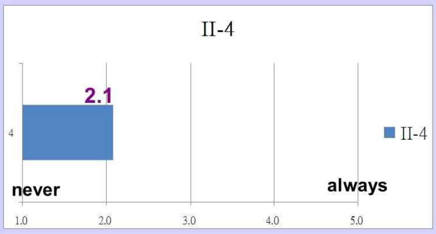
p.39/47

II-3 The **contributions of female scientist (engineer) are fairly described** with respect to those of the counterpart



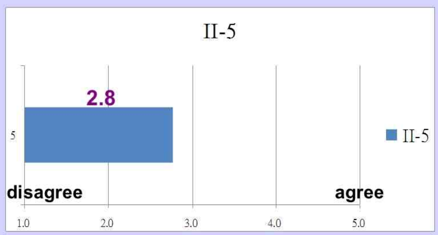
p.40/47

II-4 Any **unfair evaluation** during your science education due to your gender?



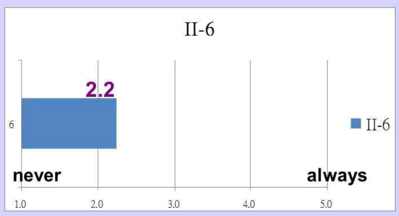
p.41/47

II-5 **Less attention from teachers** compared to boys due to your gender during science education?



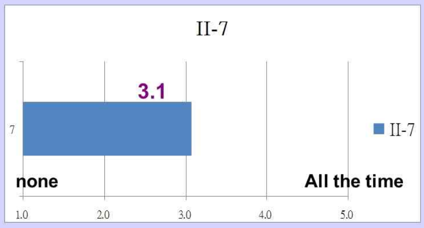
p.42/47

II-6 Any **chilly climate** for women during your science education such as **sexual harassment** or **hostile comments**?



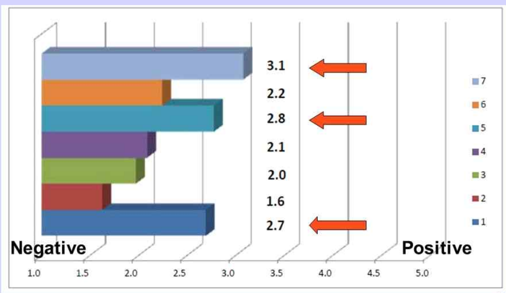
p.43/47

II-7 Any **cultural pressure** on girls/women **to conform to traditional gender roles** that prohibit pursuing professional science career?



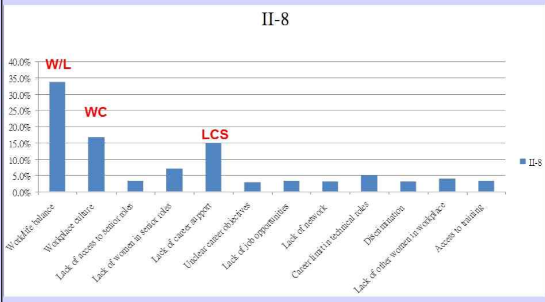
p.44/47

II-7 Culture pressure
II-5 Less attention
II-1 Female role models



p.45/47

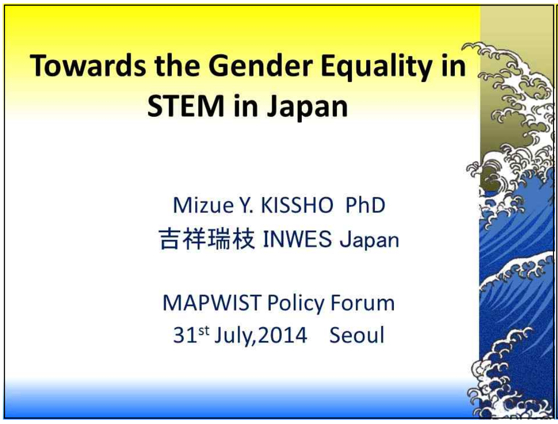
8. The **most significant difficulties** as a female SE professional

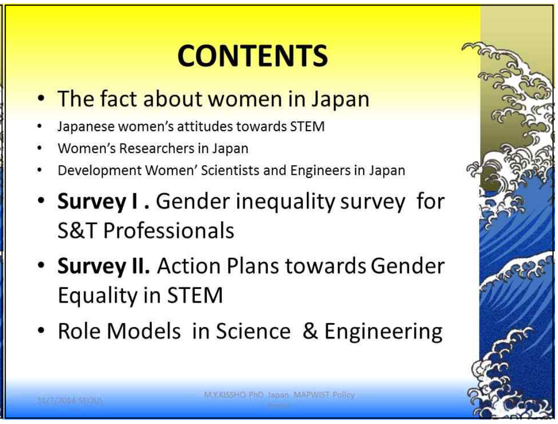


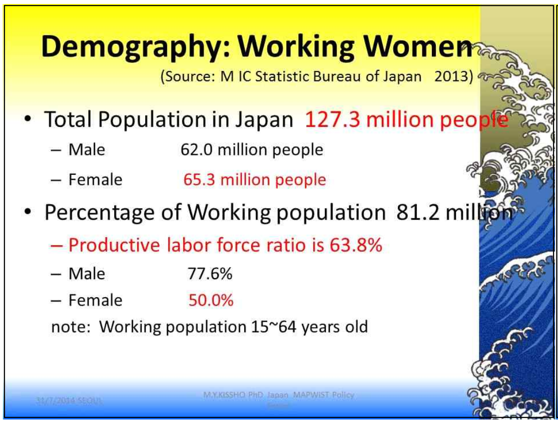
p.46/47

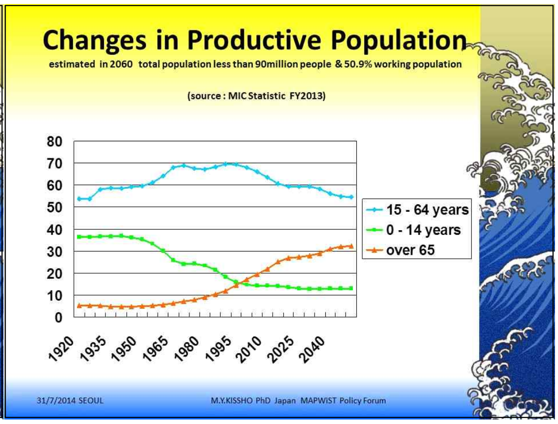

Many
Thanks
for your attention
Chia-Li Wu
President of TWiST
http://www.twist.org.tw/
p.47/47

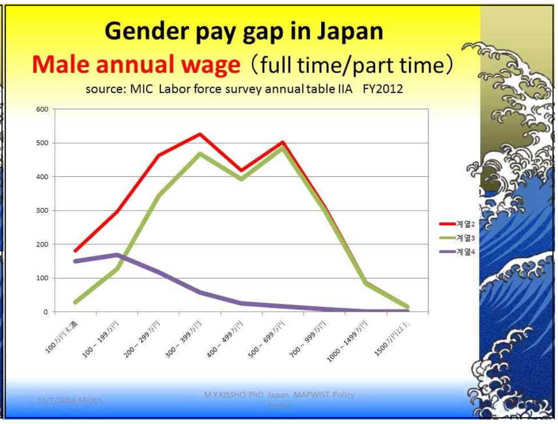
C. Mizue Y. Kissho (Japan)





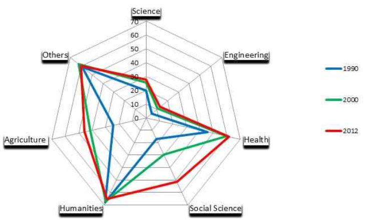






Shares(%) of female entered universities by field of study in Japan

(Source: S&T Indicators 2012 NISTEP・Statistic Bureau)
http://www.stat.go.jp/data/index.htm



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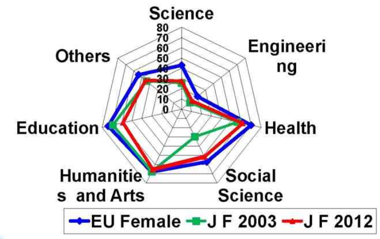
Shares(%) of female of graduates by field of study in Japan and EU

(Source: Third European Report on S&T Indicators, 2003, Statistical Abstract 2003 MoE and and MEXT NISTEP S&T Indicator FY2013)



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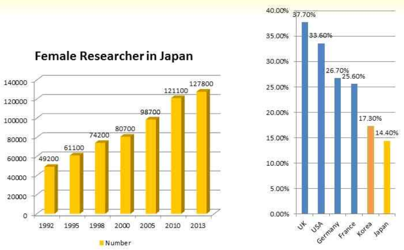
Ratio of Regular Female Researchers in Japan (source: White Paper on S&T MEXT FY2014)



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History of S &E Education in Japan

Madame Curie 1867-1934, Kono Yasui PhD 1880-1971

- 1873 Japan's engineering education introduced by Henry Dyer at The Univ. of Tokyo
- 1875 Science education for women at school
- 1913 Women students entered Science College, The Tohoku Imperial University
- 1927 the first Japanese woman doctor in Science coal research in Japan, 47 years old. Photograph in 1901, (Right)

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Development of Japanese Women in Science & Engineering

- 1920s World Great Depression delayed the implementation of wide spread women's science education
- 1947 Education Basic Law: Equality in education opportunities for Japanese women
- 1985 The Convention on the Elimination of All forms of Discrimination against Women (Japan the 72nd ratified)
- 1985 Equal Employment Opportunity Law
- 1995 S&T Basic Law (Basic Plan 1st 1996-2000, 2nd 2001-05, 3rd 2006-2010, 4th 2011-2015, 5th ~)
- 1999 Basic Law for a Gender-Equal Society

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FY26 White Paper on Science & Technology

Source: Ministry of Education, Culture, Sports, Science and Technology, JAPAN July 2014

- Chapter 2 Science and Technology Innovation human resources & promotion measures and future trend 94pp~116pp

Key words: Environment for Diversity and Environment for Female Researcher build Japan as an innovative country .

- http://www.mext.go.jp/

MEXT white paper in English 2012

- http://www.gender.go.jp

gender equality office , Cabinet Office

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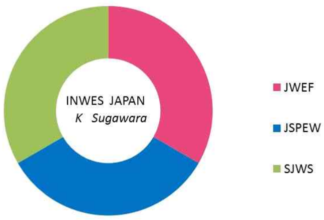
INWES Japan networking

JWEF: Japan Women Engineers Forum
JSPEW: Japan Society for Professional Engineers of Women
SJWS: Society of Japanese Women Scientists



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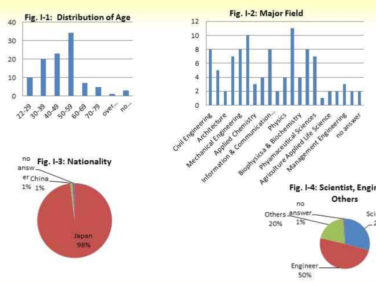
1. Gender Inequality Survey for S&E Professionals

1-I . Personal Information



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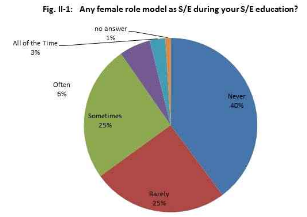
1-II. Gender inequality survey

1. Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education?



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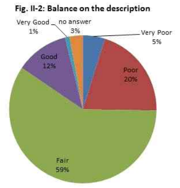
1-II. Gender inequality survey

2. What do you think about the description of female scientists/engineers in your textbook during your education? Was there balance on the depiction of male and female scientist (or engineer)?



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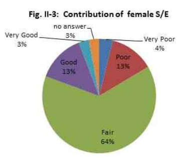
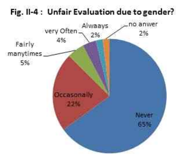
1-II. Gender inequality survey

3. Do you believe the contributions of female scientist (engineer) are fairly described with respect to those of the counterpart?

4. Have you experienced any unfair evaluation during your science education due to your





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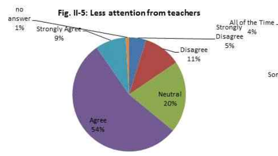
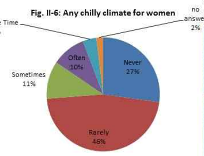
1-II. Gender inequality survey

5. Do you think you have gotten less attention from teachers compared to boys due to your gender during science education

6. Have you felt any chilly climate for women during your science education such as sexual harassment or hostile comments on women?





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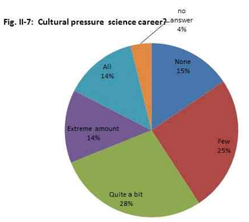
1-II. Gender inequality survey

7. Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibit pursuing professional science career?



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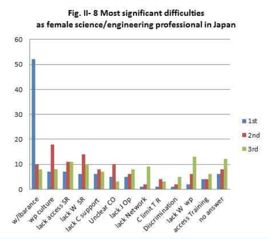
1-II. Gender inequality survey

8. What do you believe are the most significant difficulties as a female science/engineering professional in your country?

select and rank three issues as 1, 2, 3 according to their importance. (1=most)



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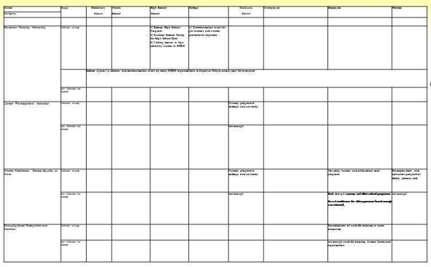
2. Survey on Action Plans towards Gender Equality in STEM in Japan (Fig.1)



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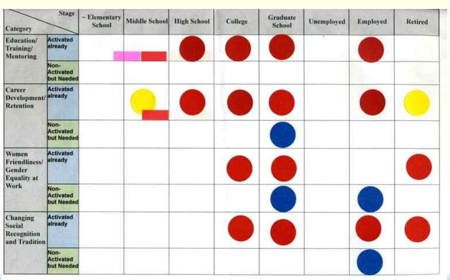
2. Survey on Action Plans towards Gender Equality in STEM (Fig.2)

INWES Japan networking JWEF JSPEW SJWS



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2-1.Survey on Action Plans towards Gender Equality in STEM INWES Japan networking (JWEF JSPEW SJWS)

- Stage - High School, Category – E/T/M (Education/Training/Mentoring)

AAP- 1. Science High School Program note) AAP: Activated Action Plans
2. Summer Science Camp for High School female students
3. Visiting lecture in High School

- Stage – College, Category – E/T/M

AAP- 1. Communication event for female students and women professional engineers.
2. Metering Salon
3. Lecture Meeting

- Stage – Graduate School, Category – E/T/M

AAP- 1. Metering Salon
2. Lecture Meeting

- Stage – Employed, Category – E/T/M

AAP- 1. Metering Salon (group discussion on career life and life events)
2. Lecture Meeting

AAP all stage Science Agora by organized JST(Japan S &T Agency) since 2006
Nov.7-9,2014 will be held. http://www.jst.go.jp/csc/scienceagora/

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2-2. Survey on Action Plans towards Gender Equality in STEM INWES Japan networking (JWEF JSPEW SJWS)

- Stage –Middle & High School, Category – Career Development/retention

AAP- 1.NWEC female junior and high school students Summer School (2014.8.7-9)

- Stage – College, Category & Graduate School – Career D/retention

AAP- 1. Nursery program
2. Career Model Café
3. Career Lecture Meeting/ Consultants

- Stage – Employed, Category – Career Development/retention

AAP- 1. Prize for Encourage women engineers less than 40years old.
2. Career Model Café and free Q&A discussion

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2-3. Survey on Action Plans towards Gender Equality in STEM INWES Japan networking (JWEF JSPEW SJWS)

- Stage – College & Graduate School , Category – Women Friendliness/Gender Equality at Work

AAP- 1. Nursery program
2. Plant visit & social gathering meeting

- Stage – Employed, Category – E/T/M

AAP- 1. Providing nursery and after school program
2. Plant visit & social gathering meeting

- Stage – Retired, Category – E/T/M

AAP- 1. Re-employment and activation program of elderly skill.
NAAP-1. nursery and after school program
2. social care for elderly persons (care house)

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2-4. Survey on Action Plans towards Gender Equality in STEM INWES Japan networking (JWEF JSPEW SJWS)

- Stage – College & Graduate School, Category – Changing Social Recognition and Tradition

AAP- 1. Daily Industrial Newspaper series article on Woman Engineer Essay

- Stage – Employed, Category –CSR/T

AAP- 1. Daily Industrial Newspaper series article on Woman Engineer Essay title on "Science and Engineering women's thoughts on working and life "
once a week by a different author
NAAP-1. Work /Life balance in most farms and organization.

AAP all stage " Science Agora" by organized JST(Japan S &T Agency) science and society since 2006 in Tokyo
2014 Nov.7-9 will be held.
http://www.jst.go.jp/csc/scienceagora/

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Marie Skłodowska-Curie as a Role Model

Definition of Role Model

- "A role model is someone you admire and try to imitate." by Collins COBUILD Dictionary, CD-ROM 2006
- *"Date:1957 : a person whose behavior in a particular role is imitated by others"* by Merriam-Webster's 11th Collegiate Dictionary
- Do not mix up "Career Model"

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Marie Skłodowska-Curie as a great leader (30% women researchers)

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Role Model as an Engineer Lillian Moller Gilbreth (1878-1974)

Mother of Modern Management

Lillian Gilbreth was the mother of modern management. Together with her husband Frank, she pioneered industrial management techniques still in use today. She was one of the first "superwomen" to combine a career with her home life. She was a prolific author, the recipient of many honorary degrees, and the mother of 12. She is perhaps best remembered for motherhood. Her children wrote the popular books Cheaper by the Dozen and Belles on Their Toes about their experiences growing up with such a large and famous family.

But Lillian Moller Gilbreth was not only a mother; she was an engineer and an industrial psychologist.

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15 Women Nobel Prize recipients

Female laureates during 113 years (1901-2013) in Science

Physics	2	1903	Marie Sklodowska Curie
		1963	Maria Goeppert Mayer
Chemistry	4	1911	Marie Sklodowska Curie
		1935	Irène Joliot-Curie
		1964	Dorothy Crowfoot Hodgkin
		2009	Ada E. Yonath
Physiology or Medicine	10	1947	Gerty Radnitz Cori
		1977	Rosalyn Sussman Yalow
		1983	Barbara McClintock
		1986	Rita Levi-Montalcini
		1988	Gertrude B. Elion
		1995	Christiane Nusslein-Volhard
		2004	Linda B. Buck
		2008	Francoise Barre-Sinoussi
		2009	Elizabeth H. Blackburn
		2009	Carol W. Greider

http://www.nobelprize.org/nobel_prizes/lists/women.html

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Women in Science Transition

(Source: Nobel Prize centennial 2001/4/1/~2004/8/31 Nobel Museum)

Why are these women smiling?

- Few Nobel Prize recipients are women.
- ◆ The Nobel Prize reflect the value of society.
- In time past, science was a task for men only.
- Women did not have access to higher education, let alone careers as research scientists.
- The women who did become scientists often did so against great adversity.
- Some Nobel Prize have been criticized specifically because a female collaborator of the recipient was not allowed to share in the honor.
- But why haven't more women received Nobel Prize in literature and peace?
- Many prominent women have woken in these areas, yet only a tenth of those prizes have gone to women.
- ◆ Today, more women than ever before are entering the field of scientific research.
- Female authors and peace activities meet with greater respect.
- ◆ This should mean that women will receive Nobel Prizes in future.
- Perhaps that is why these women are smiling.

Let’s smile !

Thank you

D. Sangeeta Wij (India)

POLICY FRAMEWORK : FAVOURING WOMEN IN INDIA

Sangeeta Wij
President
WISE India

APNN & MAPWiST, Seoul, Korea

WISE - INDIA

Supported BY INWES

- To create awareness and to encourage women engineers and scientists to and promote women scientists and engineers them reach the top --- WISE - India has been created – to become the voice of women engineers and scientists.
- WISE - INDIA is supported by International Network of Women Engineers and Scientists and looks forward to its guidance and cooperation for its future activities

VISION

To build better prospects for women in science and engineering through their active participation and involvement.

WISE - INDIA

Supported BY INWES

MISSION

WISE - India aims to create career opportunities for women by *increasing awareness*, *providing support*, *enhancing capacity building* and by *influencing policies for promoting women* in the field of science and engineering.

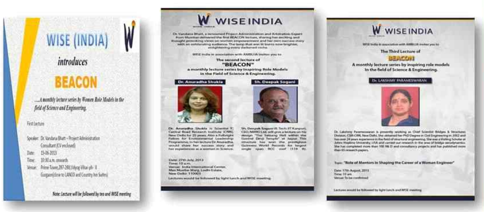
WISE – India also provides a platform for *dissemination and sharing of knowledge, mentoring, professional development* and *networking opportunities* to facilitate the success of women in the science and engineering related fields.

WISE - INDIA

Supported BY INWES

BEACON : THE LECTURE SERIES BY WISE INDIA

WISE India has been conducting a monthly Lecture Series, BEACON, invite successful women engineers / scientists role models in India to share the stories of professional success.



Socio-economic empowerment of women through 'Science, Technology and Innovation Policy in India, 2013

The Science, Technology and Innovation Policy (STI), 2013 documents states that the 'benefits of Science, Technology and Innovation should focus on faster, sustainable and inclusive development of the people. This emphasis on inclusive growth is very much in line with the objectives of the 12th Five-Year Plan (2012-17) in the country that envisions achieving 'faster, sustainable and inclusive growth'. Inclusive growth has to ensure opportunities for all sections of the population with a special emphasis on poor **particularly women** who are most likely to be marginalized. **WISE India participated, facilitated and organized the policy consultations and shared views and concerns.**

WISE - INDIA

Supported BY INWES

Key features of STI Policy, 2013 for women:

- Enhancing skills for applications of science among the young from all social sectors and linking contributions of STI with inclusive growth agenda,
- Increasing accessibility, availability and affordability of STI, especially for women
-Wide range of mechanisms is envisaged to be deployed to realize these policy aspirations, specifically for empowering women through appropriate STI inputs.

STI policy, 2013 acknowledges that participation of women in STI activities is important and new and flexible schemes would be put in a place to address the mobility challenges of employed women and scientists and technologists. A broad scope for re-entry of women into R & D and new facilitation mechanisms with special carrier paths in diverse areas will also be made feasible.

WISE - INDIA

Supported BY INWES

DISHA-Science Communicators:

The initiative is a notion for the women who have the scientific degree and can contribute to popularize science and technology among the masses and stimulate a scientific and technological temper among people through S&T communications in different languages. The scheme provide opportunity to:

(i) Women scientists to work from home/part-time as a science communicator.
(ii) Women scientists to interact closely with media organizations.
(iii) The media specialist to get personal experience to recent developments taking place in laboratories with a view to enhance their effectiveness in communicating scientific knowledge to the people more meaningfully and effectively.

WISE - INDIA

Supported BY INWES

Future Plans

1. Continue the BEACON Lecture Series across the country.
2. Establish Regional Chapters (East, West, North and South) to have a strong presence across the country.
3. Carry out Research and Development activities on Women in STEM.
4. Preparation of a database for women engineers and Scientists.
5. To frame a calendar of activities for the year September 2014 to August 2015.
6. To prepare for ICWES 17th in 2017 ???

WISE - INDIA

Supported BY INWES

INWES / WISE in South Asia

As a commitment to INWES, WISE India is in process of establishing INWES chapters in South Asian countries.

1. Women in Science and Engineering in Sri Lanka (WISE SL) has been founded in 2013.

2. Women in Science and Engineering in Nepal (WISE Nepal) has been founded in 2013.

WISE - INDIA

Supported BY INWES

INWES / WISE in South Asia

As a commitment to INWES, WISE India is in process of establishing INWES's chapter in South Asian countries.

3. Women in Science and Engineering in Bangladesh has been founded recently.

Dr. Siddika Sultana
Convener
WISE Bangladesh
House # 8/1, Block-C, Lalmatia
Dhaka-1207, Bangladesh
Tel: +880-2-9130017
Cell: +880-171-2827582
E-mail: siddikas@gmail.com

First meeting of the formation of WISE Bangladesh

WISE - INDIA

Supported BY INWES

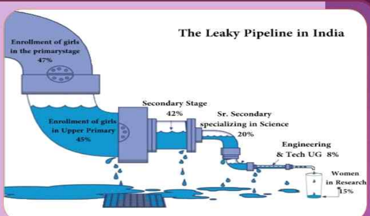
WISE Bangladesh working team

WISE - INDIA

Supported BY INWES

The leaky pipeline model

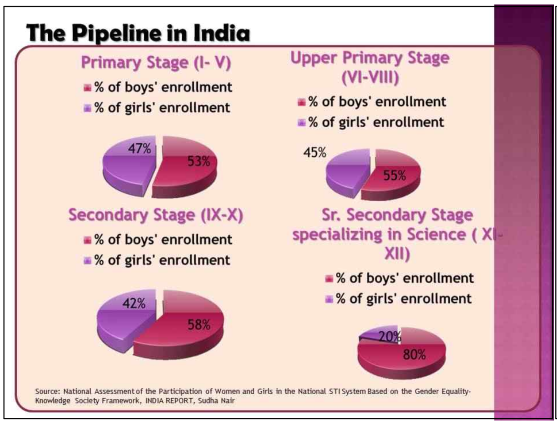
Sue Berryman's in the report *'Who will do science? Minority and Female attainment of science and mathematics degrees: Trends and Causes (1983)'* first introduced the concept of the pipeline model.

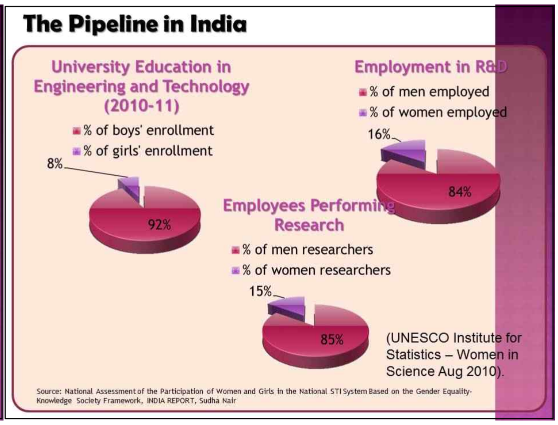


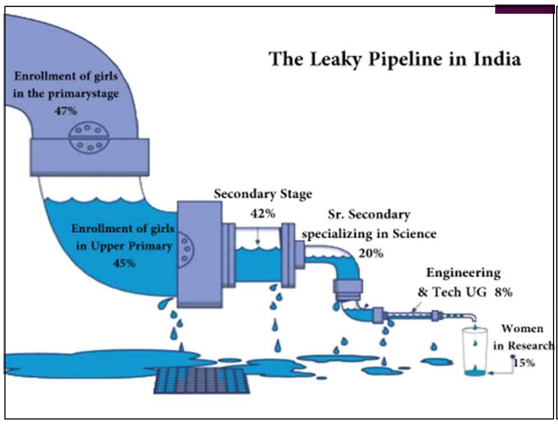
"The pipeline model conceptualizes the scientific career as the sections of a narrowing pipeline, while the entry of girls into the pipeline at the pre-primary and primary stages is equivalent to that of boys, their number decreases while travelling down the pipeline (HORIZONTAL SEGREGATION) because of their higher rate of leakage from the pipeline despite their comparable and, in many cases, better attainment than their male counterparts."

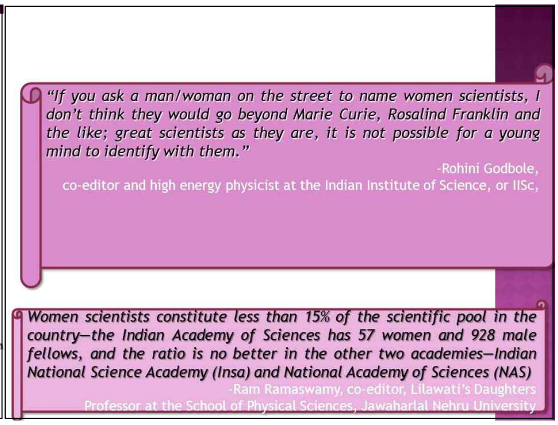
WHY THE 'LEAKY PIPELINE'??

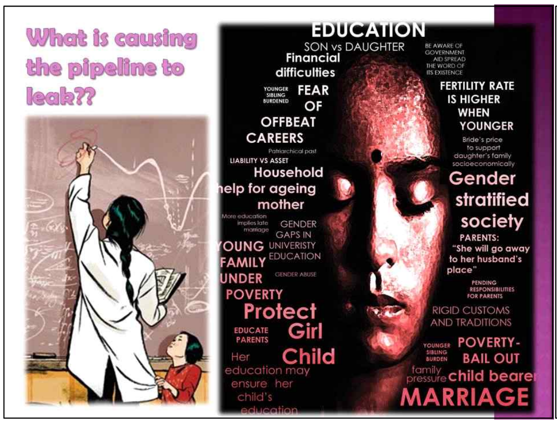
- It prompts questions about the **quantity of women travelling down the pipeline** (horizontal segregation) and **the slow speed of their progress along it** (vertical segregation)
- Neatly **captures the political concerns about women's entry rates** and the **emerging focus on their progression**.
- It **prompted an analysis of where the points of greatest 'leakage' were**, supporting the arguments that the point at which women were exiting scientific careers coincided with their greater family responsibilities.
- In doing so the **model has acted as a means to focus policy intervention** on certain stages **of education and on organisational practices**.

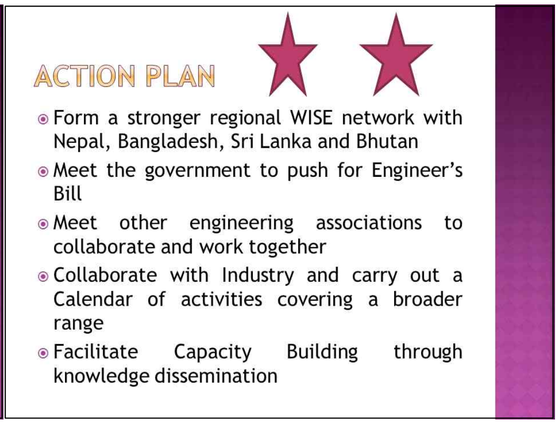

The Pipeline in India
Primary Stage (I- V)
% of boys' enrollment
% of girls' enrollment
47%
53%
Upper Primary Stage (VI-VIII)
% of boys' enrollment
% of girls' enrollment
45%
55%
Secondary Stage (IX-X)
% of boys' enrollment
% of girls' enrollment
42%
58%
Sr. Secondary Stage specializing in Science (XI-XII)
% of boys' enrollment
% of girls' enrollment
20%
80%
Source: National Assessment of the Participation of Women and Girls in the National STI System Based on the Gender Equality-Knowledge Society Framework, INDIA REPORT, Sudha Nair

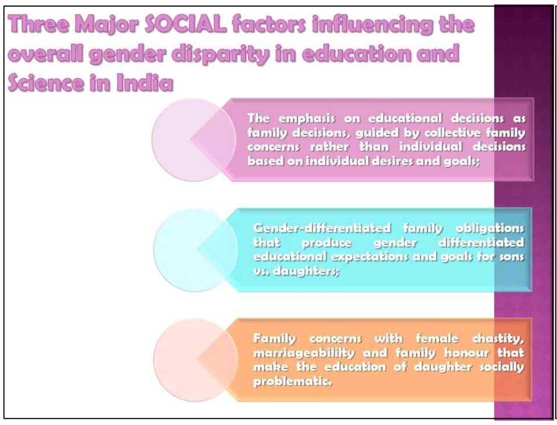

The Pipeline in India
University Education in Engineering and Technology (2010-11)
% of boys' enrollment
% of girls' enrollment
8%
92%
Employment in R&D
% of men employed
% of women employed
16%
84%
Employees Performing Research
% of men researchers
% of women researchers
15%
85%
(UNESCO Institute for Statistics – Women in Science Aug 2010).
Source: National Assessment of the Participation of Women and Girls in the National STI System Based on the Gender Equality-Knowledge Society Framework, INDIA REPORT, Sudha Nair

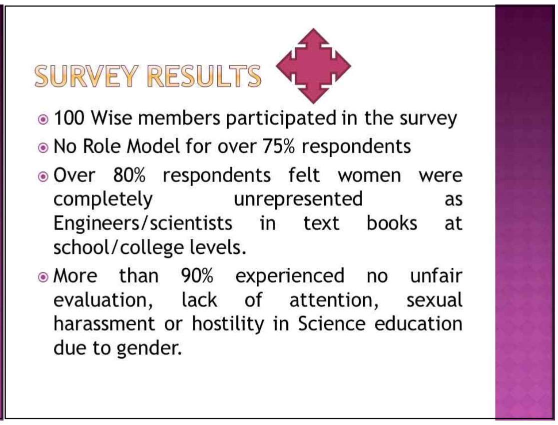

The Leaky Pipeline in India
Enrollment of girls in the primarystage 47%
Enrollment of girls in Upper Primary 45%
Secondary Stage 42%
Sr. Secondary specializing in Science 20%
Engineering & Tech UG 8%
Women in Research 15%


"If you ask a man/woman on the street to name women scientists, I don't think they would go beyond Marie Curie, Rosalind Franklin and the like; great scientists as they are, it is not possible for a young mind to identify with them."
-Rohini Godbole,
co-editor and high energy physicist at the Indian Institute of Science, or IISc,
Women scientists constitute less than 15% of the scientific pool in the country—the Indian Academy of Sciences has 57 women and 928 male fellows, and the ratio is no better in the other two academies—Indian National Science Academy (Insa) and National Academy of Sciences (NAS)
-Ram Ramaswamy, co-editor, Lilawati's Daughters
Professor at the School of Physical Sciences, Jawaharlal Nehru University


What is causing the pipeline to leak??
EDUCATION
SON vs DAUGHTER
Financial difficulties
FEAR OF OFFBEAT CAREERS
Household help for ageing mother
GENDER GAPS IN UNIVERSITY EDUCATION
YOUNG FAMILY UNDER POVERTY
Protect Girl Child
Her education may ensure her child's education
FERTILITY RATE IS HIGHER WHEN YOUNGER
Gender stratified society
PARENTS: "She will go away to her husband's place"
RIGID CUSTOMS AND TRADITIONS
POVERTY-BAIL OUT
family pressure child bearer
MARRIAGE


ACTION PLAN
Form a stronger regional WISE network with Nepal, Bangladesh, Sri Lanka and Bhutan
Meet the government to push for Engineer's Bill
Meet other engineering associations to collaborate and work together
Collaborate with Industry and carry out a Calendar of activities covering a broader range
Facilitate Capacity Building through knowledge dissemination


Three Major SOCIAL factors influencing the overall gender disparity in education and Science in India
The emphasis on educational decisions as family decisions, guided by collective family concerns rather than individual decisions based on individual desires and goals;
Gender-differentiated family obligations that produce gender differentiated educational expectations and goals for sons vs. daughters;
Family concerns with female chastity, marriageability and family honour that make the education of daughter socially problematic.


SURVEY RESULTS
100 Wise members participated in the survey
No Role Model for over 75% respondents
Over 80% respondents felt women were completely unrepresented as Engineers/scientists in text books at school/college levels.
More than 90% experienced no unfair evaluation, lack of attention, sexual harassment or hostility in Science education due to gender.

SURVEY RESULTS

- Over 65% felt pressure to conform to traditional gender roles; the younger women felt less societal pressure
- More than 60% felt work life balance, lack of career support and lack of access to senior roles inhibited their success stories whereas about 30% felt lack of other women in work place, discrimination and work place culture affected them adversely.

POLICY FRAMEWORK IN INDIA

NATIONAL POLICY FOR THE EMPOWERMENT OF WOMEN(2001)

- **Focusses on Social and educational empowerment of women to overcome declining women to men ratio, gender biases and inequality**
- **A no of policy frameworks incorporated to bring about educational and economic upliftment of women through a large no of policy reforms**

POLICY OBJECTIVES

- Creating an environment through positive economic and social policies for full development of women to enable them to realize their full potential
- The *de-jure* and *de-facto* enjoyment of all human rights and fundamental freedom by women on equal basis with men in all spheres - political, economic, social, cultural and civil
- Equal access to participation and decision making of women in social, political and economic life of the nation
- Equal access to women to health care, quality education at all levels, career and vocational guidance, employment, equal remuneration, occupational health and safety, social security and public office etc.
- Strengthening legal systems aimed at elimination of all forms of discrimination against women
- Changing societal attitudes and community practices by active participation and involvement of both men and women.

- Mainstreaming a gender perspective in the development process.
- Elimination of discrimination and all forms of violence against women and the girl child; and
- Building and strengthening partnerships with civil society, particularly women's organizations.
- Equal access to women to health care, quality education at all levels, career and vocational guidance, employment, equal remuneration, occupational health and safety, social security and public office etc.
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- Equal access to women to health care, quality education at all levels, career and vocational guidance, employment, equal remuneration, occupational health and safety, social security and public office etc.
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- Mainstreaming a gender perspective in the development process.
- Elimination of discrimination and all forms of violence against women and the girl child; and
- Building and strengthening partnerships with civil society, particularly women's organizations.

POLICY PRESCRIPTIONS

- More responsive and gender sensitive judicial systems
- With full participation of Community and Religious leaders, a change in personal laws to eliminate discrimination
- Ensuring legal ownership and property rights of inheritance for women through consensus
- Participation in decision making process at all levels in polity,educational , banking and industry sectors
- Economic empowerment and poverty eradication

NEED OF THE HOUR??

- Self empowerment through education
- Assertion of own rights
- Recognition of self worth and potential
- Attaining power through economic independence
- Continuous skill enhancement
- To be nothing but the best….
- To accept nothing but the best
- To gear up to work hard with commitment to achieve the highest laurels

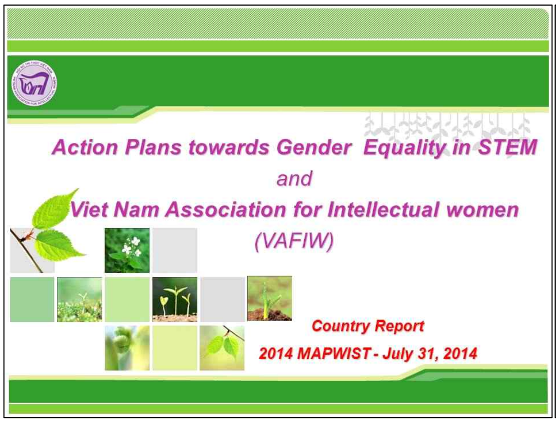
NEED OF THE HOUR??

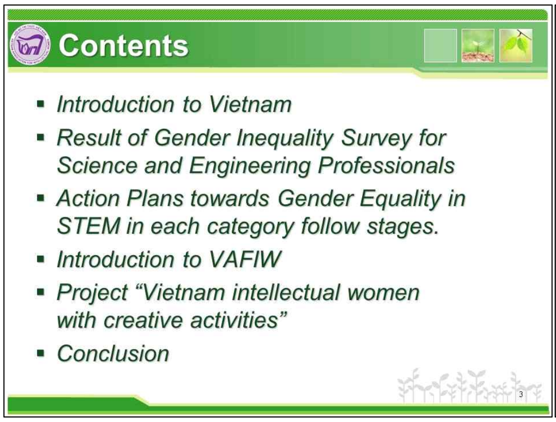
- It's ok to accept we are smarter
- It's not ok to accept a lower position, pay or rank on gender grounds
- It's not ok to work yourself to death while trying to do the rope balancing act…
- It's not ok to sacrifice your economic independence at any cost for anyone…
- It's certainly not ok to be an inferior partner in this game of power…play it hard and tilt this equation in your favour and enjoy the fruits of your labour

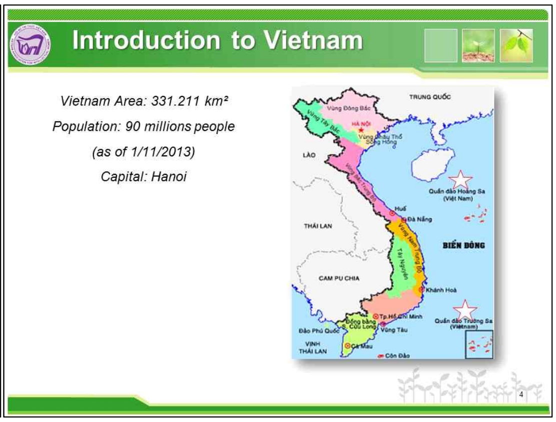
ACTIONABLES

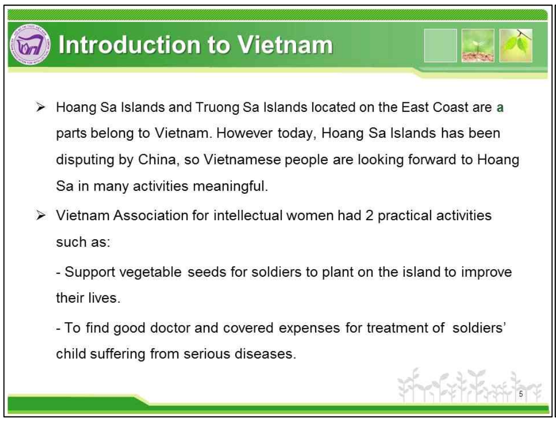
- To forge alliance with other Industry Associations
- Push for Engineer's Bill
- Meet Govt representatives and UNESCO
- Work together with other WISE networks
- Capacity Building through national conferences and seminars
- Create a stronger WISE through regional Chapters
- Be a help-line and an industry voice for all women engineers and scientists

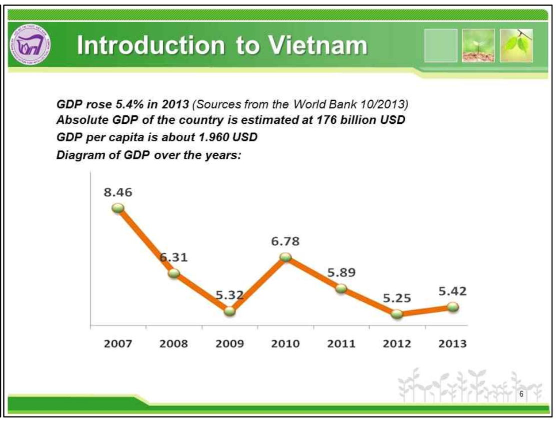
E. Nguyen Thi Mai Lan (Vietman)











Introduction to Vietnam

- ✓ Vietnam is a socialist republic country, which situates in the South East Asia.
- ✓ **Climate:** tropical
- ✓ **Topography:** The territory of Vietnam, including 3/4 is mountainous.
- ✓ **Resources:** Vietnam has abundant natural resources such as forest resources, aquatic resources, tourism resources and diverse types of mineral.
- ✓ **Administrative Units:** 63 provinces and cities.
- ✓ Vietnam has a long-lasting history with over four thousand years.
- ✓ There are 54 ethnic groups and the Kinh is the largest group. All the ethnic groups live peacefully under a common roof - Vietnam country.

7

Gender Inequality Survey for Science and Engineering Professionals

1. Have you had a chance to identify any female role model as a scientist (or engineer) during your science/engineering education*?
   42% rarely, 31% sometimes, 14% never, 11% often, 2% all of the time
2. What do you think about the description of female scientists/engineers in your textbook during your education? Was there balance on the depiction of male and female scientist (or engineer)?
   45% poor, 31% fair, 14% good, 10% very poor
3. Do you believe the contributions of female scientist (engineer) are fairly described with respect to those of the counterpart?
   44% fair, 32% poor, 23% good, 1% very poor

8

Gender Inequality Survey for Science and Engineering Professionals

4. Have you experienced any unfair evaluation during your science education due to your gender?
   69% occasionally, 27% fairly many times, 4% never
5. Do you think you have gotten less attention from teachers compared to boys due to your gender during science education?
   45% neutral, 33% disagree, 13% agree, 9% strongly disagree
6. Have you felt any chilly climate for women during your science education such as sexual harassment or hostile comments on women?
   61% rarely, 30% sometimes, 7% never, 2% often

9

Gender Inequality Survey for Science and Engineering Professionals

7. Is there any cultural pressure on girls/women to conform to traditional gender roles in your country that prohibit pursuing professional science career?
   34% extreme amount, 33% quite a bit, 27% few, 6% none.
8. What do you believe are the most significant difficulties as a female science/engineering professional in your country?

- ➢ Work/life balance: **19.66% (15% most important)**
- ➢ Lack of career support: **17% (8% most important)**
- ➢ Workplace culture: **16.66 % (6.3% most important)**
- ➢ Other issues are very low.

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Action Plans towards Gender Equality in STEM

1. Education/Training/ Mentoring

1.1 In Elementary School

Activated already

- ➢ In Vietnam, in poor and remote areas, the percentage of uneducated girls is higher than boys.
  ➔ So, there should be policies to encourage girl going to school.
- ➢ In teaching textbooks, male characters researching science and technology appear more than female in the stories, pictures.
  ➔ There must be balance to educate children that science and technology are both for men and women.

1.2 In Middle School

Activated already

- ➢ Currently, Vietnamese schools lack of teaching subject gender equality, so bringing this knowledge into school are essential issues.
- ➢ At the same time, schools should organize periodically contests on Gender Equality knowledge through articles in newspapers, magazines.

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Action Plans towards Gender Equality in STEM

Non-Activated but Needed

Organize regular culture, sports camps to encourage equal participation of boys and girls.

1.3 High School

Activated already

Organize contests on knowledge and practice of gender equality on television for all high schools in provinces and all over the country.

Non-Activated but Needed

Organize international summer camp for children to connect across continents, learning from experiences of developing countries on gender equality.

1.4 College

Activated already

Set up law - bookcase of gender equality in university - library is important active.

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Action Plans towards Gender Equality in STEM

1.5 Unemployed

Activated already

- ➢ At the local, positive propaganda and education of good case studies, typically in the implementation of gender equality.
- ➢ Mass communication on the violation of gender equality to boost public opinion and prevent people from violation.

1.6 Employed

Activated already

- ➢ Set up regular training courses on professional development and management for women scientist.
- ➢ Organize gender and gender equality knowledge for the leaders related to the protection and implementation of equal rights for women.
- ➢ Organize TV shows on science and technology to improve women knowledge and encourage them in their career.

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Action Plans towards Gender Equality in STEM

II. Career Development/Retention

2.1 High School

Activated already

Career-oriented according to the preferences and abilities of male and female, no gender restrictions.

2.2 College

Activated already

Organize for female students to be practiced in the companies that consistent with preferences.

Non-Activated but Needed

Creating playgrounds, extracurricular activities, practices on gender equality and social activities related to career support for women before graduation.

2.3 Graduate School

Activated already

Create more job opportunities for women through training course for apply a job, so they can easily meet the needs of employers.

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Action Plans towards Gender Equality in STEM

III. Friendliness Women / Gender Equality at Work

3.1 In employed

Activated already

- High priority should be given for female scientists, such as financial support mechanisms and working time in some large institutions, such as Vietnam National University at Ha Noi, Vietnam Academy of Science and Technology.
- Ensure that qualified intellectual women are holding key management positions.
- Ensure relatively balanced proportion of men and women in the profession.
- Increase the retirement age for women scientists.

Non-Activated but Needed

- Increase the rate, structure of female leaders in state management agencies.

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Action Plans towards Gender Equality in STEM

IV. Changing Social Recognition and Tradition

4.1 Unemployed

Activated already

- Strengthening the introduction, propagation through the mass media (radio, TV, online media, newspapers):
  - Introducing the achievements of women in all areas, introducing typical woman, to help society understand more about capacity and contribution of women.
  - Educate women to enhance self-confidence, how to balance between career and family, and educate children to help their mother and sister in housework.

Non-Activated but Needed

- Organize programs, projects of social and economic development, poverty reduction at the local, of which women are headed, and support them to fulfill their tasks, thereby empowering the women, gradually eliminate inequality exist in many localities.

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Action Plans towards Gender Equality in STEM

4.2 Employed

Activated already

- Organize well of social services, reducing the burden of housework for women.

  The object of VAFIW is the graduated up women working in the field of Science and Technology, so we focus on some specific activities as follows:
  - Creating equal opportunities for women in all professional activities , conform to international standards on gender equality in labor and employment (the opportunity to improve their training at home and abroad, create opportunities of advancement for intellectual women)
  - There is a reasonable regulation of working age for women in Education, Science and Technology, in both universities and Institutes.

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Action Plans towards Gender Equality in STEM

- Reserve funding for women in training and research programs.
- Create diverse approaches on gender equality to boost social awareness of the importance of gender equality to the country's development.
- Develop strong network of Vietnam association for intellectual women (VAFIW) all over the country, support and create favorable conditions for operating efficiently.
- Strengthening coordination between VAFIW and Vietnam Union of Science and Technology, Vietnam Youth Union and other associations.

Non-Activated but Needed

- ***Opening housework training courses for men.***

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Action Plans towards Gender Equality in STEM

4.3 Retire

Activated already

- Encouraging capable women scientists participating in training activities, scientific research.
- Exploiting their intelligence, experience in raising the capable of women in general, and next generation in particular, to create useful results for society.
- Strengthening support of gender equality activities in the neighborhoods where they live.

Non-Activated but Needed

- Provide all kinds of propaganda and educational documents on law, gender and gender equality to all women and communities.

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VIETNAM ASSOCIATION FOR INTELLECTUAL WOMEN (VAFIW)

- Establishment on March 8th 2011
- Address: 39 Hàng Chuối – Hai Bà Trưng – Hà Nội – Việt Nam
- Tel: 04 39 728 747/ Hotline: 0919 903 104
- E-mail: hoinutrithucvietnam@gmail.com
- Web: www.hoinutrithucvietnam.org.vn

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VIETNAM ASSOCIATION FOR INTELLECTUAL WOMEN (VAFIW)

Facts and figures:

- **Executive committee consists 36 members**
- **Standing committee : 10 members**
- **05 specific divisions**
- **16 branches**
- **03 member associations**
- **2500 members**

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VIETNAM ASSOCIATION FOR INTELLECTUAL WOMEN (VAFIW)

Honorary President:

Prof. Dr. Nguyen Thi Doan

Vice President of Socialist Republic of Vietnam

President of VAFIW:

Prof. Dr.Sc Pham Thi Tran Chau

Functions and Tasks of VAFIW

- Mobilize intellectual women to participate in the building, protecting the country and improve their professional skills, contributing to improvement of the spiritual and physical life of intellectual women.
- Recognize, foster and support development of talent women and honor Vietnam talent intellectual women.
- Protect legal rights about their profession and creative activities of the joined members.
- Perform consultancy and social verification to build scientific basis in the intellectual women related fields in accordance with the law.
- **Strengthen cooperation with the respective national, regional and international associations.**
- Fulfill function of member of the Vietnam Women's Union.

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05 Specific Divisions of VAFIW

- Division of Science - Technology and Finance - Economy
- Training and Capability Improvement Division
- Information and Propaganda Division
- Culture and Arts Division
- Social Issue Division

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VAFIW BRANCHES (16 BRANCHES)

- Intellectual Women Association's Branch of **Nutrition and Food Safety**
- Intellectual Women Association's Branch of **Ho Chi Minh City University of Technology**
- Intellectual Women Association's Branch of **Ha Noi University of Natural Science**
- Intellectual Women Association's Branch of **Biology Department – Ha Noi National University of Education**
- Intellectual Women Association's Branch of **Law Faculty– Vietnam National University**
- Intellectual Women Association's **Ha Noi InterBranch**

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VAFIW BRANCHES (16 BRANCHES)

- Intellectual Women Association's Branch of **Vietnam Commercial University**
- Intellectual Women Association's Branch of **Research Institution of Agricultural Sciences**
- Intellectual Women Association's Branch of **Vietnam Academy of Science and Technology**
- Intellectual Women Association's Branch of **Research Institute of growing Fisheries 1**
- Intellectual Women Association's Branch of **Environmental Protection and Climate Change**

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Activities of VAFIW

On the occasion of the 81st anniversary of the establishment of Vietnam Women's Union (1930/10/20 – 2011/10/20), Oct 18th 2011, VAFIW organized the direct discussion:

"***Exchange young intellectual women with high ranking officer***"

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Activities of VAFIW

Guests include:

- Prof.Dr. Nguyen Thi Doan - Vice President of Socialist Republic of Vietnam
- Prof.Dr. Pham Vu Luan - Member of the Central Committee of the Communist Party - Minister of Education and Training
- MSc. Nguyen Thi Thanh Hoa, Member of the Central Committee of the Communist Party – President of the Vietnam Women's Union; and
- Prof.Dr. Mai Trong Nhuan, President of Hanoi National University.

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Activities of VAFIW

The main content of the meeting:

- *To share experiences*
- *Strengthen position and role of women*
- *Highlight the difficulties and problems of the team of young intellectual women*
- *Propose recommendations for the Party, the Ministries concerned.*

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Activities of VAFIW

- Held the live online discussion "***Vietnam Intellectual women with the construction and development of the country during the integration period***" (on March 4th 2012)
- The program was broadcasted on Television and web www.vtc.vn (VTC News)

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Activities of VAFIW

- ***Instruction of Vice State President Nguyen Thi Doan and Central Scientific Council of Vietnam Women's Union:***
- Perform scientific research with the subordinating topic ***"Research and propose the retirement age of highly qualified female leaders and intellectuals"*** (in cooperation with Central School of Women Officers)

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Activities of VAFIW

- ***"Reasonable approach to genetically modified crops in Vietnam"*** report (at several National scientific symposiums), it was interested and supported by scientists in the fielfs of biological, medical and agricultural sciences
- VAFIW and Vietnam Women's Union held a conference to comment for ***"The 1992 Constitution (as amended)".***
- Seminar on the topic ***"The role and position of intellectuals in the construction and development of the country in the 21st century."*** (invited speaker: Prof. Chu Hao)
- Workshop on ***"Building a strategic plan for training and enhancing of capacity for intellectual women period 2012 - 2016"***
- In response to the ***"Vietnam Year of the Family"*** VAFIW held a seminar on ***"Women with careers and families"*** (March 1, 2013)

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Project: Vietnam intellectual women with creative activities

The project ***"Viet Nam intellectual women with creative activities"*** is a main activity of VAFIW in 2013.

The project carried out on Television, 12 programs/year. The main purpose of this project is:

- To promote the scientific research of intellectual women in research institutes and universities
- To promote the commercialization of research results in solving vital need problems of socio-economics by bridging the supply-demand between intellectual women and business man
- Learning intellectual property to protect research results.

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Project: Vietnam intellectual women with creative activities

Guests of each program, including:

- Female scientist has been awarded prizes: Kovalepskaia, Vifotec, L'OREAL- UNESCO or VietNam Women.
- Experts related to the specific scientific field of introduced female scientist
- Successful entrepreneur.
- Experts on Intellectual Property, Commercialization, other scientists and interested audience.

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Project: Vietnam intellectual women with creative activities

The intellectual women have been invited for 12 programs are in different generations:

- From age 35 to age 70
- Their research results closed to practical life and have commercialization potential.

There are about 5 million audience/monthly:

- On Television
- On Electronic media
- On Newspaper
- On Social networking

***Now, we' re preparing for the next perioud of this project. It' ll begin in November, 2014. And it has also 12 programs on Vietnam Television. You could see through website:* hoinutrithucvietnam.org.vn**

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Conclusions

- Vietnam has implemented many policies for gender equality in all areas, facilitated, supported for women raising education levels, occupations, the rate of women in the fields is increasing.
- From university degrees or less, the rate of female and male students equally, there are a number of universities/majors, where women are higher rates than men.
- At the graduate level, the rate of women decreasing, especially professor ratio, the rate of women in leadership in universities is very low.

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Conclusions

- Since 2011, Vietnam has established Vietnam Association for Intellectual Women (VAFIW), to gather the intellectual women of Vietnam in different areas of S & T.
- VAFIW have extensive networks in schools, institutes, and provinces/cities.
  Activities of VAFIW are increasingly diverse, with the enthusiastic support of the Vietnam Women's Union.

VAFIW would like to cooperate with the International women S&T organizations !

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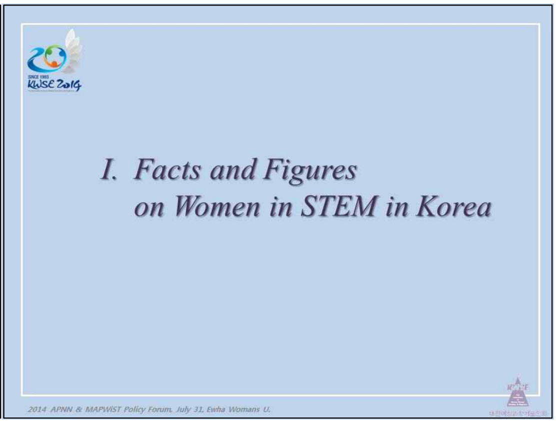
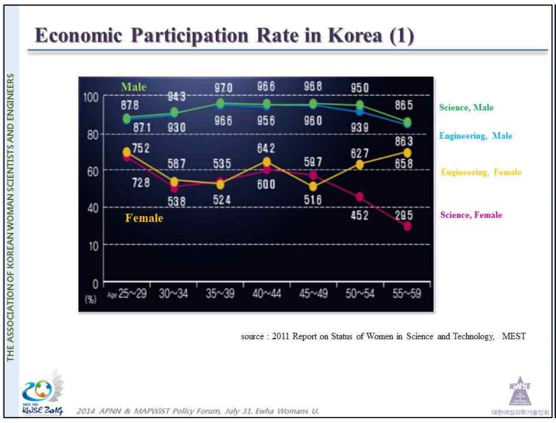
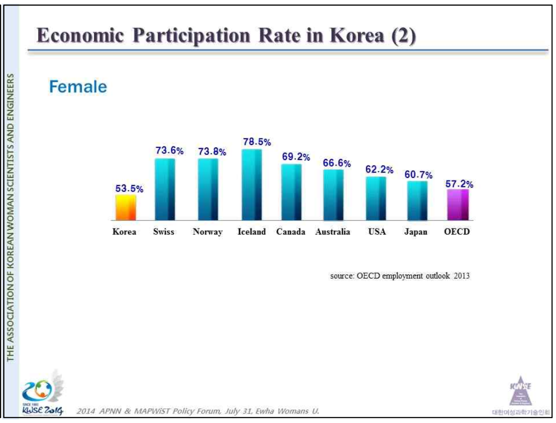
THANK YOU FOR YOUR ATTENTION !

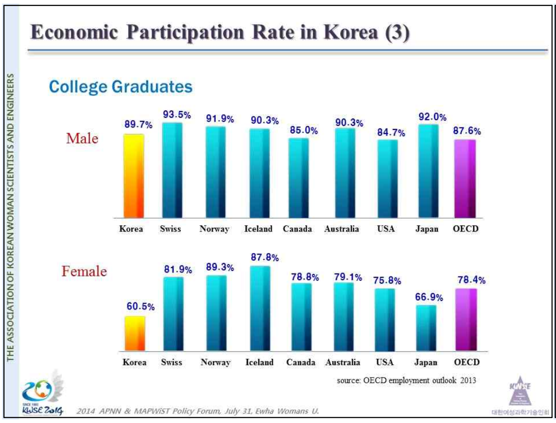
38

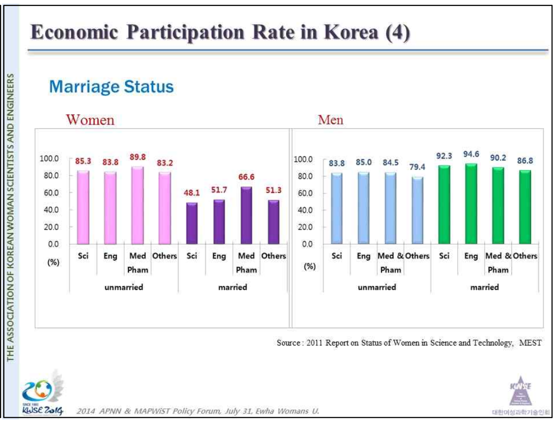
F. Jung Sun Kim (Korea)



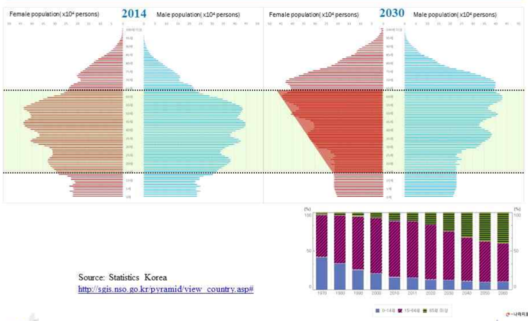






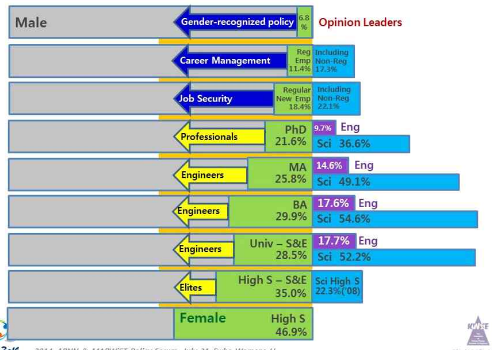


Future Population Projection of Korea



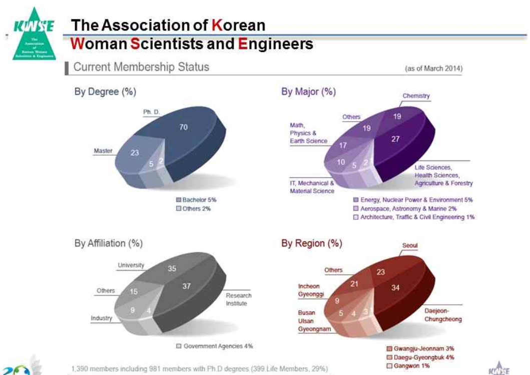
Source: Statistics Korea
http://sgis.nso.go.kr/pyramid/view_country.asp#

Sex Ratio from Youngsters to Leaders in S&E (2010)



II. Results of Survey on Gender Equality for Women in STEM conducted in Korea

The Association of Korean Woman Scientists and Engineers



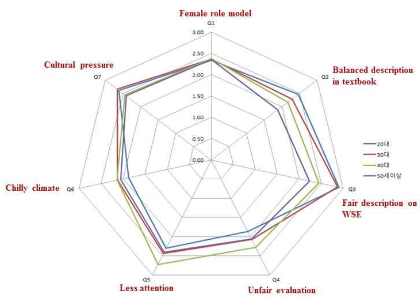
General Information of 123 Respondents

	group	n	%
Age group	20s	39	31.7
	30s	38	30.9
	40s	29	23.6
	>50s	17	13.8
Specialty	Scientists	80	65.0
	Engineers	32	26.0
	others	11	8.9

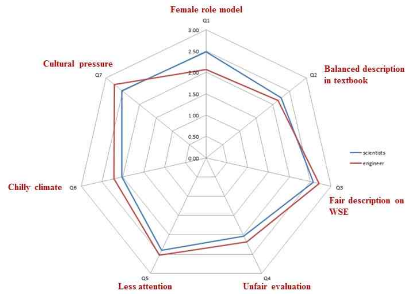
Results: Descriptive Statistics

Never 1 · Rarely 2 · Sometimes 3 · Often 4 · Always 5	Mean	SD
Q1 ..chance to identify any **female role model** as a scientist (or engineer) during your science/engineering education?	2.36	0.92
Q2 ..description of female scientists/engineers in your **textbook** during your education? Was there balance on the depiction of male and female ..?	2.26	0.83
Q3 ...**contributions** of female scientist (engineer) are **fairly** described..?	2.69	0.84
Q4 ..experienced any **unfair evaluation** during your science education due to your gender?	2.06	0.93
Q5 ..gotten **less attention** from teachers compared to boys due to your gender during science education?	2.46	1.02
Q6 ..felt any **chilly climate** for women during your science education such as sexual harassment or hostile comments on women?	2.04	0.91
Q7 ..**cultural pressure** on girls/women to conform to traditional gender roles in your country that prohibit pursuing professional science career?	2.56	0.93

Results by Age Group



Results by Scientists vs Engineers



Q1 ..chance to identify any female role model

		M	SD	t or F	p
Age group	20s	2.33	0.70	0.018	0.997†
	30s	2.37	0.97		
	40s	2.38	1.15		
	50s & above	2.35	0.86		
Specialty	Scientists	2.48	0.91	2.259	0.026
	Engineers	2.06	0.76		

† Welch test

- No difference among ages groups.
- Significant difference between scientists and engineers: Engineers have had more difficulty identifying role models

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Q2 ..description of female scientists/engineers in textbook..?

		M	SD	Post-Hoc	t or F	p
Age group	a) 20s	2.46	0.82	a > d	5.379	0.002†
	b) 30s	2.29	1.01			
	c) 40s	2.17	0.71			
	d) 50s & above	1.88	0.33			
Specialty	Scientists	2.25	0.75		0.557	0.579
	Engineers	2.16	0.92			

† Welch test & Games-Howell's post-hoc test

- Significant difference among ages groups.
- Post-hoc test shows that description of female scientists has significantly changed over 30 years.
- No Significant difference between scientists and engineers.

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Q3 …contributions of female scientist (engineer) are fairly described..?

		M	SD	Post-Hoc	t or F	p
Age group	a) 20s	2.90	0.79	a, b > d†	4.109	0.008
	b) 30s	2.87	0.96			
	c) 40s	2.45	0.69			
	d) 50s & above	2.24	0.66			
Specialty	Scientists	2.58	0.76		- 0.861	0.394
	Engineers	2.72	0.89			

† Scheffe's post-hoc test

- Significant difference among ages groups.
- Post-hoc test shows that contribution of female scientists or engineers are significantly more fairly described than 20 years ago.
- No Significant difference between scientists and engineers.

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Q4 ..experienced any unfair evaluation during science education due to your gender?

		M	SD	t or F	p
Age group	20s	1.87	0.83	1.069	0.365
	30s	2.08	0.88		
	40s	2.28	1.00		
	50s & above	2.06	1.09		
Specialty	Scientists	2.04	0.91	- 0.785	0.434
	Engineers	2.19	0.93		

- Overall, respondents occasionally, but not many times, experienced unfair evaluation.
- No Significant difference among ages groups.
- No Significant difference between scientists and engineers.

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Q5 ..less attention from teachers compared to boys during science education?

		M	SD	t or F	p
Age group	20s	2.31	1.00	0.954	0.417
	30s	2.45	1.11		
	40s	2.72	0.88		
	50s & above	2.41	1.06		
Specialty	Scientists	2.40	0.99	- 0.613	0.541
	Engineers	2.53	1.11		

- Overall, respondents tend to disagree that they have received less attention than boys from teachers.
- No Significant difference among ages groups.
- No Significant difference between scientists and engineers.

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Q6 .. felt any chilly climate for women during your science education…?

		M	SD	t or F	p
Age group	20s	1.87	0.95	0.683	0.564
	30s	2.13	0.96		
	40s	2.14	0.79		
	50s & above	2.06	0.90		
Specialty	Scientists	2.03	0.90	- 1.039	0.301
	Engineers	2.22	0.87		

- Overall, respondents rarely experienced a chilly climate for women during their education.
- No Significant difference among ages groups.
- No Significant difference between scientists and engineers.

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Q7 ..cultural pressure prohibiting professional science career?

		M	SD	t or F	p
Age group	20s	2.62	1.09	0.469	0.704
	30s	2.66	0.85		
	40s	2.45	0.87		
	50s & above	2.41	0.80		
Specialty	Scientists	2.53	0.87	- 1.203	0.232
	Engineers	2.75	0.95		

- Overall, respondents experienced a few cultural pressure to pursue professional science (engineering) career.
- No Significant difference among ages groups.
- No Significant difference between scientists and engineers.

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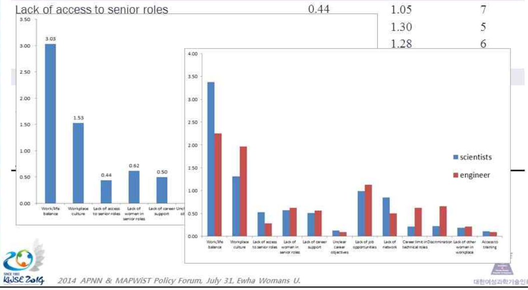
Q8 . . most significant difficulties as a female science/engineering professional

	M	SD	순위
Work/life balance	3.03	2.20	1
Workplace culture	1.53	1.93	2
Lack of access to senior roles	0.44	1.05	7
		1.30	5
		1.28	6



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III. Action Plans towards Gender Equality in STEM in Korea

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Education/Training/Mentoring

Activating Now | Non-Activating yet, but Needed

Elementary School	Middle School	High School	College	Graduate School	Unemployed	Employed	Retired
• After-School Program of Science for boys and girls	• Mentoring for girls • Outreach Lab for girls • National Conf. on Biology for girls	• Mentoring for girls • Early Birds' Lab for girls • Team-Research-Project Support for girls	• Mentoring Fellowship for female • Mentoring on Seeking Jobs • Competency Development Training • Gender Mainstreaming in Engineering • Field Adaptability Reinforcement Program for female students in Eng. • Academic-Industrial Cooperation & Employment Acceleration Program for S&E female students • Team-Research-Project Support for female students in Eng • Research-Competency Development Training	• Mentoring Fellowship for female • Mentoring on Seeking Jobs • Competency Development Training • Gender Mainstreaming in Engineering • Field Adaptability Reinforcement Program for female students in Engineering • Academic-Industrial Cooperation & Employment Acceleration Program for S&E female students • Team-Research-Project Support for female students in Eng • Research-Competency Development Training	• Training Programs for Female Returners • Competency Development Training • Mentoring on Seeking Jobs • Science Communicator Training • Professional Research Equipment Engineering Training • Intellectual Property R&D Training	• Mentoring Fellowship for female career starters • Competency Development Training for female career starters • Research-Competency Development Training • Leadership-in-Workplace Training • Management Training in S&E • Top Leaders' Course for experienced female scientists and engineers	
• Mandatory Science-Teacher System • Mentoring for teachers	• Mentoring for boys • Mentoring for science teachers	• Mentoring for boys • Mentoring for science teachers • Girls' Science High School	• Mentoring for male	• Mentoring for male			

Education/Training/Mentoring

Activating Now | Non-Activating yet, but Needed

College

- Mentoring Fellowship for female
- Mentoring on Seeking Jobs
- Competency Development Training
- Gender Mainstreaming in Engineering
- Field Adaptability Reinforcement Program for female students in Eng.
- Academic-Industrial Cooperation & Employment Acceleration Program for S&E female students
- Team-Research-Project Support for female students in Eng.
- Research-Competency Development Training

Education/Training/Mentoring

Activating Now | Non-Activating yet, but Needed

• Mandatory Science-Teacher System • Mentoring for teachers	• Mentoring for boys • Mentoring for science teachers	• Mentoring for boys • Mentoring for science teachers • Girls' Science High School	• Mentoring for male	• Mentoring for male

Career Development / Retention

Activating Now | Non-Activating yet, but Needed

Elementary School	Middle School	High School	College	Graduate School	Unemployed	Employed	Retired
			• Internship Program • Job Fair • Career Development Center in Univ.	• Young Female Researcher Award • Job Fair • Career Development Center in Univ.	• Counseling on Career Development • Job Fair • Research Funds exclusively for WSE • Extra Point System for R&D Project with WSE	• Young Female Research Award • Conference and Training Participation Support for female researches in non-regular position • Counseling on Career Development • Research Funds exclusively for WSE • Extra Point System for R&D Project with WSE	
• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend	• Publicity Activity on Future Job Trend

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Career Development / Retention

Activating Now | Non-Activating yet, but Needed

College	Graduate School	Unemployed	Employed
• Internship Program • Job Fair • Career Development Center in Univ.	• Young Female Researcher Award • Job Fair • Career Development Center in Univ.	• Counseling on Career Development • Job Fair • Research Funds exclusively for WSE • Extra Point System for R&D Project with WSE	• Young Female Research Award • Conference and Training Participation Support for female researches in non-regular position • Counseling on Career Development • Research Funds exclusively for WSE • Extra Point System for R&D Project with WSE

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Career Development / Retention

Activating Now | Non-Activating yet, but Needed

- Publicity Activity on Future Job Trend

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Women Friendliness/Gender Equality at Work

Activating Now | Non-Activating yet, but Needed

	Elementary School	Middle School	High School	College	Graduate School	Unemployed	Employed	Retired
Activating Now				• Support for Gender-Recognized Education System in Engineering • Institutional Innovation Project for WSE (IIP) • Male-Student Quota System in National Univ. of Education	• Institutional Innovation Project for WSE	• Recruitment Target System for WSE (RTS)	• Attaché Program for Women in STEM • Promotion Target System for WSE • Institutional Innovation Project for WSE • Childcare Center for WSE	
Non-Activating yet, but Needed	• Male-Teacher Quota System • Female-Principal Quota System	• Male-Teacher Quota System • Female-Principal Quota System	• Male-Teacher Quota System • Female-Principal Quota System	• Female-Student Quota System in Engineering			• Female-Director Quota System in R&D Institutions • Campaign for Meeting only during Business Hour	

Women Friendliness/Gender Equality at Work

Activating Now | Non-Activating yet, but Needed

College	Graduate School	Unemployed	Employed
• Support for Gender-Recognized Education System in Engineering • Institutional Innovation Project for WSE • Male-Student Quota System in National Univ. of Education	• Institutional Innovation Project for WSE	• Recruitment Target System for WSE (RTS)	• Attaché Program for Women in STEM • Promotion Target System for WSE • Institutional Innovation Project for WSE (IIP) • Childcare Center for WSE

Women Friendliness/Gender Equality at Work

Activating Now | Non-Activating yet, but Needed

• Male-Teacher Quota System • Female-Principal Quota System	• Female-Student Quota System in Engineering		• Female-Director Quota System in R&D Institutions • Campaign for Meeting only during Business Hour

Changing Social Recognition and Tradition

Activating Now | Non-Activating yet, but Needed

	Elementary School	Middle School	High School	College	Graduate School	Unemployed	Employed	Retired
Activating Now			• National Conference of WSE	• National Conference of WSE • Best IIP Award	• National Conference of WSE • Best IIP Award	• National Conference of WSE	• National Conference of WSE • Best RTS Award • Best IIP Award • Best WSE Award	• National Conference of WSE
Non-Activating yet, but Needed	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women	• Drama Production on WSE's life • Work-Life Balance Campaign for Men & Women

- WSE: Woman Scientists and Engineers
- RTS: Recruit Target System
- IIP: Institutional Innovative Project

Changing Social Recognition and Tradition

Activating Now | Non-Activating yet, but Needed

High School	College	Graduate School	Unemployed	Employed
• National Conference of WSE	• National Conference of WSE • Best IIP Award	• National Conference of WSE • Best IIP Award	• National Conference of WSE	• National Conference of WSE • Best RTS Award • Best IIP Award • Best WSE Award

- WSE: Woman Scientists and Engineers
- RTS: Recruit Target System
- IIP: Institutional Innovative Project

Changing Social Recognition and Tradition

Activating Now | Non-Activating yet, but Needed

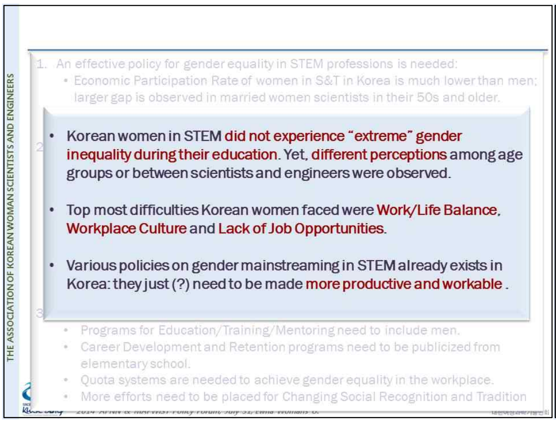
• Drama Production on WSE's life
• Work-Life Balance Campaign for Men & Women

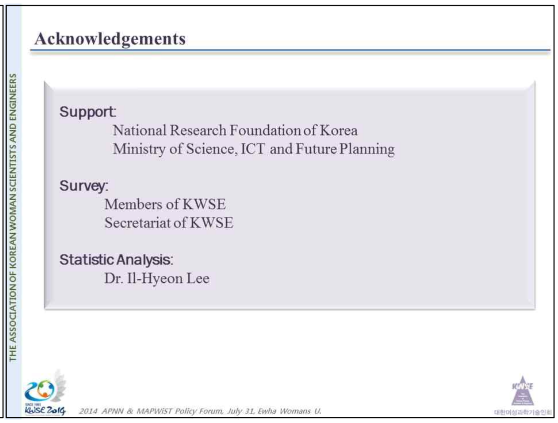
- WSE: Woman Scientists and Engineers
- RTS: Recruit Target System
- IIP: Institutional Innovative Project

KWSE 2014

IV. Summary

1. An effective policy for gender equality in STEM professions is needed:
   - Economic Participation Rate of women in S&T in Korea is much lower than men; larger gap is observed in married women scientists in their 50s and older.
   - The decrease in birth-rate will call for more women in S&T as opinion leaders.
2. Survey shows women in S&T in Korea did not experience "extreme" gender inequality during their education. **Yet,**
   - Women engineers had more difficulty identifying role models than scientists.
   - Although description of female scientists was significantly changed over 30 years, there was unfair descriptions in textbooks.
   - Women experienced some cultural pressure to pursue professional science (engineering) careers.
   - The top 2 most difficulty women in S&T faced were work/life balance followed by workplace culture.
3. Action Plans to achieve gender equality in STEM in Korea showed that :
   - Programs for Education/Training/Mentoring need to include men.
   - Career Development and Retention programs need to be publicized from elementary school.
   - Quota systems are needed to achieve gender equality in the workplace.
   - More efforts need to be placed for Changing Social Recognition and Tradition


THE ASSOCIATION OF KOREAN WOMAN SCIENTISTS AND ENGINEERS
1. An effective policy for gender equality in STEM professions is needed:
• Economic Participation Rate of women in S&T in Korea is much lower than men; larger gap is observed in married women scientists in their 50s and older.
• Korean women in STEM did not experience "extreme" gender inequality during their education. Yet, different perceptions among age groups or between scientists and engineers were observed.
• Top most difficulties Korean women faced were Work/Life Balance, Workplace Culture and Lack of Job Opportunities.
• Various policies on gender mainstreaming in STEM already exists in Korea: they just (?) need to be made more productive and workable .
• Programs for Education/Training/Mentoring need to include men.
• Career Development and Retention programs need to be publicized from elementary school.
• Quota systems are needed to achieve gender equality in the workplace.
• More efforts need to be placed for Changing Social Recognition and Tradition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Members of KWSE
Secretariat of KWSE
Statistic Analysis:
Dr. Il-Hyeon Lee
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4-3. MAPWiST Policy Forum speakers and APNN representatives

Affiliation	Name (contact)	Country	Role
Ewha Womans University	Kong-Ju-Bock Lee (kjblee@ewha.ac.kr)	Korea	Committee Chair
Kookmin University	Kim, Do-Hyeon (drkim@kookmin.ac.kr)	Korea	Workshop Chair
UNESCO UIS	Martin Schaaper (m.schaaper@unesco.org)	Netherland	Keynote speaker
University of Waterloo	Margaret Jarvie (pjarvie@uwaterloo.ca)	Canada	Keynote speaker
Ministry of Higher Education and Research, France	Caroline Belan-Menagier (caroline.belan-menagier@recherche.gouv.fr)	France	APNN Keynote speaker
Engineers-Australia	Marlene Kanga (marlenekanga@bigpond.com)	Australia	Panel and survey
IEM	Rosaline Ganendra (roseg2@minconsult.com)	Malaysia	Survey
INWES-Japan	Mizue Y. Kissho (kissho-y@fol.hi-ho.ne.jp)	Japan	Panel and survey
IPENZ	Tracey Ayre[1] (PolicyAdvisor@ipenz.org.nz)	New Zealand	Survey
KWSE	Jung Sun Kim (jsk@gdsu.dongseo.ac.kr)	Korea	Committee Panel and survey
TWiST	Chia-Li Wu (clwuster@gmail.co)	Taiwan	Panel and survey
VAFIW	Nguyen Thi Mai Lan (mailanhointt@gmail.com)	Vietnam	Panel and survey
WESTIP	Durdana Habib (durdanahabib2002@yahoo.com)	Pakistan	Survey
WISE-India	Dillip Pattanaik (dillip.pattanaik@wiseindia.org)	India	Survey
WISE-India	Sangeeta Wij (sangeetawij@wiseindia.org)	India	Panel
WISE-Nepal	Jun Hada (jun.hada@eda.admin.ch)	Nepal	Survey
WISE-Sri Lanka	Vishaka Hidelage (vishaka.hidellage@practicalaction.org.lk)	Sri Lanka	Survey

1) Did not participate in survey or forum but submitted materials for chapter 3 of this report.

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