The 2016 Policy Report on Balanced Development of Human Resources for the Future

Analysis of Global Gender Indices and Joint Survey Results from INWES APNN Member Countries

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Foreword

Launched in 2014, this policy study started as part of the International Cooperation Policy Project of the Association of Korean Woman Scientists & Engineers (KWSE). While its rapid transition to an aging society and low birth rate have been identified as factors hindering national competitiveness, Korea is still poorly ranked among OECD member countries in terms of participation by highly educated women in economic activity. As a more efficient approach to the balanced development of human resources for the future, an utmost priority of Korea is to maximize the utilization of highly educated women. Considering how national competitiveness is proportionate to competitiveness in science and technology, this study focuses on fully utilizing highly educated female scientists and engineers.

Similar to the first study, this study examined quantitative indices published annually by the Organization for Economic Cooperation and Development (OECD), the World Economic Forum (WEF) and the United Nations Development Program (UNDP), and examined changes over the past two years. The analysis of international human resources development indices covered the 13 member countries (Nepal, New Zealand, Malaysia, Mongolia, Bangladesh, Vietnam, Sri Lanka, India, Japan, Taiwan, Pakistan, Korea and Australia) of the Asia and Pacific Nations Network (APNN) under the International Network of Women Engineers and Scientists (INWES), in which KWSE is playing a leading role. Several interpretations may exist depending on the definitions of international indices, but this study is meaningful in that it allows a rough comparison of the status of human resources development around the world. In addition, the analysis of indices from the perspective of gender holds significance in contributing to the development of balanced human resources policies.

A large part of this report is dedicated to the results of the 2016 joint survey on the gender barriers in the fields of science and technology involving 1,379 female scientists and engineers from 13 member countries of the APNN, in continuance to the 2014 joint survey on gender equality in the fields of science and technology and the 2015 survey on the glass ceiling as perceived by female scientists and engineers. This gender barriers survey is comprised of various questions including the perception of discriminatory, discriminatory experiences, the concept of gender role ideology, career prospects, policy demands and the concept of gender equality. To facilitate more extensive and efficient utilization, the results are presented by each member country.

The greatest significance of this study is that the international joint survey of APNN member countries is now in its third consecutive year. As mentioned in the foreword of the 2014 report, we hope that this report will lay a foundation to create an Asian equivalent to She Figures (a collection of statistics for policies targeting gender research innovation published by the EU every three years since 2003), and serve as a useful reference in policy development for the balanced utilization of highly educated and talented female science and engineering professionals in the Asia-Pacific region, including Korea.

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1) A representative to APNN or the person who carried out the survey.
Established in 2011, APNN is a network of countries in the Asia-Pacific region under the INWES. APNN currently has 13 member countries, including INWES's Asian members, and Australia and New Zealand. APNN hosts an annual meeting, which took place in Australia in 2011, in Malaysia in 2012, in Taiwan in 2013, in Korea in 2014, in Mongolia in 2015, followed by the latest meeting in New Zealand in 2016. The first chair organization was KWSE of Korea; JNWES was elected the second chair organization from 2014. It has been confirmed that the 2017 APNN meeting will take place in Yokohama, Japan.

Summary of International Indices for Human Resources Development and Joint Survey Results by APNN Member Country

1)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	
	2014 from 188 countries		2014 from 188 countries		2014 from 155 countries		2015 from 145 countries	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Nepal	145	0.548	114	0.908	108	0.489	110	0.658
New Zealand	9	0.913	68	0.961	32	0.157	10	0.782
Malaysia	62	0.779	90	0.947	42	0.209	111	0.655
Mongolia	90	0.727	49	1.028	63	0.325	56	0.709
Bangladesh*	142	0.570	109	0.917	111	0.503	64	0.704
Vietnam	116	0.666	-	-	60	0.308	83	0.687
Sri Lanka	73	0.757	85	0.948	72	0.370	84	0.686
India	130	0.609	151	0.795	130	0.563	108	0.664
Japan	20	0.891	66	0.961	26	0.133	101	0.670
Taiwan**	(25)	0.882	-	-	(5)	0.052	(79)	0.690
Pakistan	147	0.538	160	0.726	121	0.536	144	0.559
Korea	**17**	**0.898**	**104**	**0.930**	**23**	**0.125**	**115**	**0.651**
Australia	2	0.935	42	0.976	19	0.110	36	0.733

* Bangladesh has been an INWES APNN member country since 2015

** Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology (source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(Source: UNDP, Human Development Report 2015, WEF Global Gender Gap Report 2015)

2) Survey on Gender barriers Among APNN Member Countries : Overall Average

(unit: points)

Classifications			① Item	Average	Standard deviation
Gender barriers	② Perception of discrimination	1	Boys are encouraged more than girls to go into the STEM field.	2.46	1.219
		2	It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.51	1.180
		3	Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for	2.50	1.235
		4	Women in STEM generally receive less pay for equal work, compared with their equally-qualified male	2.93	1.318
		Sub-scales		**2.60**	
	③ Experience of discrimination	5	I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.00	1.272
		6	I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.32	1.221
		7	I have experienced sexual harassment or unfair treatments sometime in my career.	3.30	1.356
		8	Balancing work and life (marriage and family) has been a handicap for me.	2.60	1.217
		Sub-scales		**3.05**	
	④ Gender role stereotypes	9	Primary breadwinners (who take care of financial obligations) of households should be men.	3.55	1.343
		10	Women are born to have a way of caring children that men are not capable of in the same way.	3.34	1.347
		11	In order to maintain the order and peace of a family, the husband should have greater power and authority than the	3.78	1.327
		12	In a relative sense, men are rational while women are emotional and thus, they ought to complement each other	2.92	1.387
		Sub-scales		**3.40**	
⑤ Career outlook		13	I believe things will turn out fine in my future career.	**3.70**	1.044
⑥ Policy needs		14	It is crucial to have strong policy support to solve gender inequality in the STEM field.	**4.07**	1.070
⑦ Equality concept		15	I believe gender equality will be fully achieved only if women are given equal opportunities as men.	**2.13**	1.149

note: ① The responses to questions were measured with a five-point Likert scale (1.Strongly agree, 2.Somewhat agree, 3.Neutral, 4. Somewhat disagree, 5. Strongly disagree)

② Perception of discrimination: Lower score means higher perception of discrimination

④ Experience of discrimination: Lower score means more discrimination experienced

⑤ Gender role ideologies: Higher score means more progressive

⑥ Career outlook: Higher score means a more positive outlook

3) Survey on Gender barriers Among APNN Member Countries: Average by Nation and by indicators

(unit: points)

Classifications	Perception of discriminatory reality	Discriminato-ry experience	Gender role ideology	Career prospects	Policy demand	Gender equality
Nepal	2.51	3.26	4.14	3.83	4.55	1.56
New Zealand	2.51	2.99	4.28	3.68	4.25	1.78
Malaysia	3.20	3.43	3.15	3.62	3.69	2.25
Mongolia	2.21	2.89	2.81	3.99	4.26	2.06
Vietnam	3.19	2.44	3.07	3.37	4.77	1.85
Sri Lanka	3.37	3.61	3.47	4.11	4.09	2.37
India	1.13	2.27	4.68	3.55	4.30	1.01
Japan	2.84	2.91	3.22	2.96	3.15	3.26
Taiwan	2.65	3.19	3.87	3.78	3.87	2.24
Pakistan	2.64	3.31	2.40	4.02	4.07	1.71
Korea	**2.24**	**2.99**	**3.61**	**3.39**	**4.19**	**3.12**
Pakistan	2.29	3.18	3.06	4.37	4.23	1.41
Other	2.92	3.15	3.65	3.63	3.91	1.88
Average	**2.60**	**3.05**	**3.40**	**3.70**	**4.07**	**2.13**
F	57.321	22.784	55.032	16.588	19.734	49.809
P ****(p<.001)*	***	***	***	***	***	***

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1. Introduction

1. Introduction

According to Statistics Korea, Korea will become a super-aged society in the next 10 years; that is, more than 20% of its population will be aged 65 or older. Given that Korea's birth rate is already the lowest in the world, its rapid pace of aging indicates a rapid decline of the economically active population. Even with computers replacing humans in the age of artificial intelligence, a country's workforce remains a highly influential factor in determining national competitiveness. This is because the size of the competent workforce decreases when the overall workforce falls below a critical point, which also causes a deterioration in the nation's capacity to develop novel technology.

One silver lining to Korea's workforce prospects is that women are not participating actively in economic activities. Korea's female participation in economic activities was a mere 57.9% in 2015, lower than the OECD average of 63.0%. Worse, its rate of labor participation by women with tertiary education stood at 64.1% in 2013, falling short of the OECD average of 83.3% and making it the lowest among OECD member countries. Even Turkey, which recorded the lowest female labor force participation (35.0% in 2015) among OECD member countries, had a higher value of 73.7% when it came to labor force participation by highly educated women. With highly educated men in Korea recording 92.4% in labor force participation, slightly higher than the OECD average of 92.1%, the very low rate of labor force participation by female counterparts leaves room for various sociocultural interpretations. By utilizing highly educated women who are currently not participating in or who are unable to participate in economic activities, we can expect a slowing of the decline in the workforce, caused by rapid aging and low birth rate.

It is a highly challenging task to encourage highly educated women to participate more actively in economic activities. The difficulty of work-life balance and the collective ignorance of Korean society are main reasons for the low rate of female labor force participation. Some mistakenly believe that gender equality has been achieved, while others claim that reverse discrimination has made possible the rapid progress of women in teaching and state examinations. There are illusions such as: "There is no gender discrimination among professionals," and "All practices in the fields of science and technology are rational." Women who have gained reputations in their professions after beating off stiff competition from men are often told to rely on their individual capacity, demonstrating the society's lack of interest in resolving structural gender discrimination. This study approached these structural issues using the two methods described below.

First, this study examined international statistics concerning the aforementioned structural issues by country. To perform a comparative analysis of female human resources development, it analyzed quantitative indices published annually by the OECD, WEF and

UNDP. Each international organization has different definitions and objectives, but this study is meaningful in that it allows a rough comparison of the status of human resources development around the world. In addition, the analysis of indices from the perspective of gender holds significance in contributing to the development of balanced human resources policies. The analysis of international human resources development indices covered the 13 member countries (Nepal, New Zealand, Malaysia, Mongolia, Bangladesh, Vietnam, Sri Lanka, India, Japan, Taiwan, Pakistan, Korea and Australia) of the Asia and Pacific Nations Network (APNN) under the International Network of Women Engineers and Scientists (INWES), in which KWSE is playing a leading role.

Second, utilizing the existing KWSE network a joint survey of INWES APNN member countries has been conducted for three consecutive years. The 2014 survey focused on gender equality in the fields of science and technology[1], the 2015 survey on the glass ceiling as perceived by female scientists and engineers[2] and the 2016 survey on gender barriers in the fields of science and technology. The gender barriers refers to the existence and experiences of gender discrimination that function as hindrances to gender equality. This includes institutional/customary barriers and conscious/unconscious barriers. Specific examples are traditional gender role stereotypes, unfairness in employment and promotion, work-life balance and responsibility for family and other unfair treatment. To assess gender barriers experienced by female scientists and engineers in all stages, from talent nurturing, job-seeking and re-entry after a career break, the survey was broadly divided into perception of discriminatory reality, discriminatory experiences and gender role ideology, which covered career prospects, policy demands and the concept of gender equality. A total of 1,379 female scientists and engineers from 12 APNN member countries, excluding Australia, participated in this year‘s survey. This demonstrates that the joint international survey is gaining support among member countries, and that it is opening up more opportunities for countries in the Asia-Pacific region to share methods of nurturing and utilizing female scientists and engineers. The results were presented by member country in order to facilitate more extensive and efficient utilization.

Chapter 2 examines the current status of human resources development by country based on the aforementioned international indices, while Chapter 3 gives a summary of the gender barriers survey completed by APNN member countries. Chapter 4 provides survey results by indicator, question and country. The report ends in Chapter 5 with a conclusion and recommendations.

1 2014 Policy Report on Balanced Development of Human Resources for the Future; Analysis of Global Gender Indices & Joint Survey Results from APNN Countries, Kong-Ju-Bock Lee, Jung Sun Kim (2014).

2 The Glass Ceiling for Asian Women in STEM: The 2015 INWES APNN Joint Survey Report. International Cooperation Policy Research Team of the Association of Korean Women Scientists & Engineers (2015).

2. Current Status of Human Resources Development by Nation

2. Current Status of Human Resources Development by Nation

This chapter examines the definition of the Human Development Index (HDI) and the Gender Inequality Index (GII) as released by the UN, the definition of the Gender Gap Index (GGI) as released by the WEF, and the current status of human resources development in member countries of the OECD and APNN under INWES. It also reviews the status of female scientists based on a recent report by UNESCO. The definitions of the various indices are the same as those provided in the 2013 Policy Report on Balanced Development of Human Resources for the Future.

2.1 Cross-country comparison based on HDI by UNDP

2.1.1 HDI composition and cross-country comparison

The Human Development Index (hereinafter referred to as "HDI") of the UNDP is a summary measure of average achievement in three key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living. For the purpose of this measurement, specific indices such as life expectancy, mean years of schooling, expected years of schooling and gross national income per capita are assessed (see Table 2-1). The HDI is designed to have a value between 0 and 1; a higher HDI translates to greater achievement in human development.

< Table 2-1 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 2-2 lists some countries' performance in HDI and in specific indices based on the Human Development Report 2015 by UNDP. The number of countries surveyed increased from 187 in 2013 to 188 in 2014. The countries are divided into several groups based on the HDI indices: countries of very high human development (rankings 1 to 49 with an average HDI of 0.896), of high human development (rankings 50 to 105 with an average HDI of 0.744), of medium human development (rankings 106 to 144 with an average HDI of 0.630) and of low human development (rankings 145-188 with an average HDI of 0.505). Norway ranked the highest in terms of human development achievement at 0.994, topping the list of countries for the 12th consecutive year. Korea attained a slightly higher HDI of 0.898 compared to 0.891 in 2013, but fell from the 15th to the 17th place. Japan dropped from the 17th position in 2013 to the 20th position in 2014, recording an HDI of only 0.891. Similar to the results for 2013, Niger had the lowest achievement in human development at 0.348.

< Table 2-2 HDI and its components by country (2014)>

(HDI=1: Highest human development index)

HDI rank	Country	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	81.6	12.6	17.5	64,992
2	Australia	0.935	82.4	13.0	20.2	42,261
3	Switzerland	0.930	83.0	12.8	15.8	56,431
4	Denmark	0.923	80.2	12.7	18.7	44,025
5	Netherland	0.922	81.6	11.9	17.9	45,435
6	Germany	0.916	80.9	13.1	16.5	43,919
6	Ireland	0.916	80.9	12.2	18.6	39,568
8	U.S.A	0.915	79.1	12.9	16.5	52,947
9	Canada	0.913	82.0	13.0	15.9	42,155
9	New Zealand	0.913	81.8	12.5	19.2	32,689
11	Singapore	0.912	83.0	10.6	15.4	76,628
12	Hong Kong	0.910	84.0	11.2	15.6	53,959
13	Liechtenstein	0.908	80.0	11.8	15.0	79,851
14	Sweden	0.907	82.2	12.1	15.8	45,636
14	England	0.907	80.7	13.1	16.2	39,267
16	Iceland	0.899	82.6	10.6	19.0	35,182
17	Korea	0.898	81.9	11.9	16.9	33,890
18	Israel	0.894	82.4	12.5	16.0	30,676
19	Luxembourg	0.892	81.7	11.7	13.9	58,711
20	Japan	0.891	83.5	11.5	15.3	36,927
49	Montenegro	0.802	76.2	11.2	15.2	14,558
High human development						
62	Malaysia	0.779	74.7	10.0	12.7	22,762
73	Sri Lanka	0.757	74.9	10.8	13.7	9,779
90	China	0.727	75.8	7.5	13.1	12,547
90	Mongolia	0.727	69.4	9.3	14.6	10,729
Medium human development						
116	Vietnam	0.666	75.8	7.5	11.9	5,092
130	India	0.609	68.0	5.4	11.7	5,497
142	Bangladesh	0.570	71.6	5.1	10.0	3,191
Low human development						
145	Nepal	0.548	69.6	3.3	12.4	2,311
147	Pakistan	0.538	66.2	4.7	7.8	4,866
188	Niger	0.348	61.4	1.5	5.4	908
(25)	Taiwan	0.882	79.8	16.2	10.7(2010)	45,148

APNN countries (Taiwan's data from: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(Source: UNDP Human Development Report 2015)

Table 2-2 distinguishes the HDI of APNN member countries from non-member countries. In the Asia-Pacific region, New Zealand, Korea and Japan were in the group of very high human development, despite slight drops in the ranking. Malaysia, Sri Lanka and Mongolia were in the high human development group. In particular, Mongolia showed a significant improvement in ranking, jumping from the 103 rd position in 2013 to the 90 th position in 2014.

<Table 2-3 GDI ranks and female/male HDI scores by country (2014)>

HDI rank	Country	GDI = Female HDI/Male HDI	GDI rank	Female HDI	Male HDI
Very high human development					
1	Norway	0.996	12	0.940	0.944
2	Australia	0.976	42	0.922	0.945
3	Switzerla	0.950	80	0.898	0.945
4	Denmark	0.977	39	0.912	0.934
5	Netherla	0.947	89	0.893	0.943
6	Germany	0.963	64	0.901	0.936
6	Ireland	0.973	48	0.901	0.926
8	U.S.A	0.995	14	0.911	0.916
9	Canada	0.982	31	0.904	0.921
9	New	0.961	68	0.894	0.930
11	Singapor	0.985	24	0.898	0.912
12	Hong	0.958	71	0.892	0.931
14	Sweden	0.999	3	0.906	0.906
14	England	0.965	62	0.888	0.920
16	Iceland	0.975	44	0.886	0.909
17	Korea	0.930	104	0.861	0.926
18	Israel	0.971	52	0.879	0.905
19	Luxemb	0.971	53	0.877	0.903
20	Japan	0.961	66	0.870	0.905
49	Montene	0.954	77	0.782	0.819
High human development					
62	Malaysia	0.947	90	0.753	0.795
73	Sri	0.948	85	0.730	0.769
90	China	0.943	94	0.705	0.747
90	Mongoli	1.028	49	0.737	0.716
Medium human delopment					
116	Vietnam	-	-	-	-
130	India	0.795	151	0.525	0.660
142	Banglade	0.917	109	0.541	0.590
Low human development					
145	Nepal	0.908	114	0.521	0.574
147	Pakistan	0.726	160	0.436	0.601
188	Niger	0.729	159	0.287	0.394

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

(Source: UNDP Human Development Report 2015)

Vietnam and India remained in the medium human development group despite moving up in ranking from the 121st and 135th in 2013 to the 116th and 130th place in 2014, respectively. Bangladesh, which became an APNN member state last year, was also in the group of medium human development. Nepal and Pakistan again belonged to the low human development group, with their mean schooling years failing to surpass five years.

2.1.2 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). GDI is defined as the female HDI divided by the male HDI. The country with the lowest gender gap ranks the highest; this is the country for which the absolute value of [(female HDI)/male HDI]-1] is closest to 0. Because the UNDP did not provide GDI rankings in 2015, this study calculated the values using the same standards as were used in the previous year. The GDI values for the countries listed in Table 2-2 are listed in Table 2-3. The HDI and GDI of APNN member countries in 2013 and 2014 are given in Table 2-4.

<Table 2-4 The HDI and GDI of APNN member countries in 2013 and 2014>

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

Country	UNDP HDI				UNDP GDI			
	2013 from 187 countries		2014 from 188 countries		2013 from 187 countries		2014 from 188 countries	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Nepal	145	0.912	145	0.548	102	0.912	114	0.908
New Zealand	7	0.971	9	0.913	47	0.971	68	0.961
Malaysia	62	0.935	62	0.779	91	0.935	90	0.947
Mongolia	103	0.698	90	0.727	32	1.021	49	1.028
Bangladesh *	142	0.558	142	0.570	107	0.908	109	0.917
Vietnam	121	0.638	116	0.666	-	-	-	-
Sri Lanka	73	0.750	73	0.757	66	0.961	85	0.948
India	135	0.586	130	0.609	132	0.828	151	0.795
Japan	17	0.890	20	0.891	79	0.951	66	0.961
Taiwan **	(21)	0.882	(25)	0.882	-	-	-	-
Pakistan	146	0.537	147	0.538	145	0.750	160	0.726
Korea	**15**	**0.891**	**17**	**0.898**	**85**	**0.940**	**104**	**0.930**
Australia	2	0.933	2	0.935	40	0.975	42	0.976

* Bangladesh has been an INWES APNN member country since 2015

** Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology (source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(Source: UNDP, Human Development Report 2014, 2015)

Despite its 17th position in the HDI, Korea has a much lower ranking of 104th in terms of GDI, indicating that the country's female HDI (0.861) is much lower than its male HDI (0.926). The fact that Korea ranked 85th in GDI in 2013 means that the gender gap broadened in 2014. In Mongolia, male HDI was lower than female HDI, leading to a GDI higher than 1.

2.2 Cross-country comparison based on GII of UNDP

As mentioned above, Korea's HDI is relatively good but the gender gap of the HDI is strikingly large. This gap has worsened in recent years compared to other countries. To ensure balanced cultivation of future talent, bridging this gender gap should be addressed as the country's urgent priority. Therefore, we would like to further examine a few indices regarding gender gaps that were analyzed in the 2014 report. In the global sense, 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 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, 17th among 152 countries in 2013 and 23rd among 155 countries in 2014. The following section examines the composition of indices and the current status of member countries of the OECD and APNN.

2.2.1 Composition of the GII

<Table 2-5 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
Economic status	Labor force Participate on rate	Female/male ratio of labor force participation of population over 15 years of age (or ages 15 to 64)

As shown in Table 2-5, the GII consists of to a total of five indices for three specific areas: reproductive health measured by maternal mortality ratio and adolescent birth 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.

[1] The GEM measures female participation in political activities and political decision-making, female participation in economic activities and economic decision-making and female share of income.

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, and also because GII was designed to allow indices with higher correlation to gender equality to have greater values, which is sometimes pointed out as a weakness.

2.2.2 Comparison of GII among OECD member countries

<Table 2-6 GII status of OECD member countries (2014)>

- 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: points, %, GII=0: complete equality)

Country	GII		MMR	AFF	FSPS	RSE		LFPR	
	Value	OECD/UN rank				Female	Male	Female	Male
Slovenia	0.016	1/1	7	0.6	27.7	95.8	98.0	52.3	63.2
Switzerland	0.028	2/2	6	1.9	28.5	95.0	96.6	61.8	74.9
Germany	0.041	3/3	7	3.8	36.9	96.3	97.0	53.6	66.4
Denmark	0.048	4/4	5	5.1	38.0	95.5	96.6	58.7	66.4
Austria	0.053	5/5	4	4.1	30.3	100.0	100.0	54.6	67.7
Sweden	0.055	6/6	4	6.5	43.6	86.5	87.3	60.3	67.9
Netherlands	0.062	7/7	6	6.2	36.9	87.7	90.5	58.5	70.6
Belgium	0.063	8/8	6	6.7	42.4	77.5	82.9	47.5	59.3
Norway	0.067	9/9	4	7.8	39.6	97.4	96.7	61.2	68.7
Italy	0.068	10/10	4	4.0	30.1	71.2	80.5	39.6	59.5
Finland	0.075	11/11	4	9.2	42.5	100.0	100.0	55.7	64.0
Iceland	0.087	12/12	4	11.5	41.3	91.0	91.6	70.5	77.4
France	0.088	13/13	12	5.7	25.7	78.0	83.2	50.7	61.6
Rep. Czech	0.091	14/15	5	4.9	18.9	99.9	99.7	51.1	68.3
Spain	0.095	15/16	4	10.6	38.0	66.8	73.1	52.5	65.8
Luxembourg	0.100	16/17	11	8.3	28.3	100.0	100.0	50.7	64.6
Israel	0.101	17/18	2	7.8	22.5	84.4	87.3	57.9	69.1
Australia	0.110	18/19	6	12.1	30.5	94.3	94.6	58.8	71.8
Portugal	0.111	19/20	8	12.6	31.3	47.7	48.2	54.9	66.2
Ireland	0.113	20/21	9	8.2	19.9	80.5	78.6	53.1	68.1
Korea	0.125	21/23	27	2.2	16.3	77.0	89.1	50.1	72.1
Canada	0.129	22/25	11	14.5	28.2	100.0	100.0	61.6	71.0
Japan	0.133	23/26	6	5.4	11.6	87.0	85.8	48.8	70.4
Poland	0.138	24/28	3	12.2	22.1	79.4	85.5	48.9	64.9
Greece	0.146	25/29	5	11.9	21.0	59.5	67.0	44.2	62.5
New Zealand	0.157	26/32	8	25.3	31.4	95.0	95.3	62.0	73.8
Estonia	0.164	27/33	11	16.8	19.8	100.0	100.0	56.2	68.9
Slovakia	0.164	28/33	7	15.9	18.7	99.1	99.5	51.1	68.6
England	0.177	29/39	8	25.8	23.5	99.8	99.9	55.7	68.7
Hungary	0.209	30/42	14	12.1	10.1	97.9	98.7	44.8	60.0
U.S.A	0.280	31/55	28	31.0	19.4	95.1	94.8	56.3	68.9
Chile	0.338	32/65	22	55.3	15.8	73.3	76.4	49.2	74.8
Turkey	0.359	33/71	20	30.9	14.4	39.0	60.0	29.4	70.8
Mexico	0.373	34/74	49	63.4	37.1	55.7	60.6	45.1	79.9

* Latvia is not included because it became a member of OECD in May, 2016

(Source: UNDP, Human Development Report 2015)

Table 2-6 shows the GII of OECD member countries in 2014. The GII takes a value between 0 and 1, with 0 denoting complete equality and with 1 representing complete inequality. Most countries showed minimal differences compared to 2013, but Luxembourg jumped from the 25th (GII=0.154) to the 16th place (GII=0.100) among OECD countries, while Korea fell from the 16th (GII=0.101) to the 21st place (GII=125)

2.2.3 Comparison of the GII among APNN member countries

Table 2-7 shows the GII of APNN member countries, in increasing order of gender inequality, in 2014. Because Taiwan was not covered by the UN survey, the GII value provided by the Taiwanese government was used instead to calculate its ranking.

<Table 2-7 GII values of APNN member countries in (2014)>

- The same abbreviations as in Table 2-6 (unit: points, %)

Country	GII		MMR	AFR	FSPS	RSE		RSE LFPR	
	UN Rank	Value				Female	Male	Female	Male
Taiwan*	(5)	0.052	7	4.0	35.5	-	-	-	-
Australia	19	0.110	6	12.1	30.5	94.3	94.6	58.8	71.8
Korea	23	0.125	27	2.2	16.3	77.0	89.1	50.1	72.1
Japan	26	0.133	6	5.4	11.6	87.0	85.8	48.8	70.4
New Zealand	32	0.157	8	25.3	31.4	95.0	95.3	62.0	73.8
Malaysia	42	0.209	29	5.7	14.2	65.1	71.3	44.4	75.5
Vietnam	60	0.308	49	29.0	24.3	59.4	71.2	73.0	82.2
Mongolia	63	0.325	68	18.7	14.9	85.3	84.1	56.6	69.3
Sri Lanka	72	0.370	29	16.9	5.8	72.7	76.4	35.1	76.3
Nepal	108	0.489	190	73.7	29.5	17.7	38.2	79.9	87.1
Bangladesh**	111	0.503	170	80.6	20.0	34.1	41.3	57.4	84.1
Pakistan	121	0.536	170	27.3	19.7	19.3	46.1	24.6	82.9
India	130	0.563	190	32.8	12.2	27.0	56.6	27.0	79.9

* Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology (source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)
* * Bangladesh has been an INWES APNN member country since 2015

(Source: UNDP, Human Development Report 2015)

The countries with severe gender inequality were Bangladesh, which became an APNN member country in 2015, Nepal, Pakistan and India. Korea's GII at the 23rd position was slightly higher than Japan's 26th, but Korea had a much higher maternal mortality ratio of 27 per 100,000 than Japan's 6 per 100,000. Given that maternal mortality ratio is defined as "the annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy or its management," we can see that this ratio falls far behind Korea's level of economic development. This can be considered a consequence of a loophole in social welfare policies for the alienated female population, and should be taken into account in the development and implementation of policies for female welfare.

Table 2-8 compares the GII values and rankings of APNN member countries

over the past two years. Excluding Taiwan, for which the GII was provided by its government, APNN member countries had fairly low GII rankings. Moreover, the GII rankings of countries, except New Zealand, Bangladesh and Sri Lanka were lower than that of 2013. Nepal and Mongolia showed a significant drop in ranking, while Bangladesh improved compared to 2013 despite its level of gender inequality still remaining severe.

<Table 2-8 the GII of APNN member countries in 2013 and 2014>

(GII=0: complete equality)

Country	UNDP GII			
	2013 from 152 countries		2014 from 155 countries	
	Rank	Value	Rank	Value
Nepal	98	0.479	108	0.489
New Zealand	34	0.185	32	0.157
Malaysia	39	0.210	42	0.209
Mongolia	54	0.320	63	0.325
Bangladesh*	142	0.529	111	0.503
Vietnam	58	0.322	60	0.308
Sri Lanka	75	0.383	72	0.370
India	127	0.563	130	0.563
Japan	25	0.138	26	0.133
Taiwan**	(5)	0.055	(5)	0.052
Pakistan	127	0.563	121	0.536
Korea	**17**	**0.101**	**23**	**0.125**
Australia	19	0.113	19	0.110

* Bangladesh has been an INWES APNN member country since 2015
* * Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology(source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(Source: UNDP, Human Development Report 2015)

2.2.4 Recent changes in Korea's GII

Korea's GII has fluctuated recently, as shown in Table 2-9, 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 birth rates, compared to the mean GII among OECD member countries.

Some results deserving more attention are the ratio of women with secondary or higher education and the female labor force participation. In the 2014 survey by the UN, the average ratio of women with secondary or higher education was 54.5%, and the average rate of female labor force participation was 50.3%. Although Korean women with secondary or higher education accounted for a high 77.0%, the female labor force participation rate was only 50.1%, indicating that highly educated women are not actively involved in economic activities. This trend can be observed in other OECD member countries. Among OECD member countries, the average ratio of women with secondary

or higher education was 85.4%, but the average rate of female labor force participation was 53.2%. More details on labor force participation are given in Section 2-4. It should be noted, however, that Korea's labor force participation by women with secondary or higher education was similar to the OECD average, but its labor force participation by women with tertiary education was lower at 62.3% than the OECD average of 78.6%.

<Table 2-9 GII values of Korea from 2008 to 2014>

- The same abbreviations as in Table 2-6 (unit: points, %)

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	54.4	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
2014[e]	23/155	0.125	27	2.2	16.3	77.0	89.1	50.1	72.1
2014(UN)	-	0.449	210	47.4	21.8	54.5	65.4	50.3	76.7
2014(OECD)	-	0.128	9.9	13.5	27.7	85.4	88.1	53.2	68.1

* Latvia is not included because it became a member of OECD in May, 2016

(Source: UNDP, Human Development Report [a]2010, [b]2011, [c]2013, [d]2014, [e]2015),

<Table 2-10 International indices on Human Resource Development by APNN Member Countries(2014)>

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

Country	UNDP HDI		UNDP GDI		UNDP GII	
	2014 from 188 countries		2014 from 188 countries		2014 from 15 countries	
	Rank	Value	Rank	Value	Rank	Value
Nepal	145	0.548	114	0.908	108	0.489
New Zealand	9	0.913	68	0.961	32	0.157
Malaysia	62	0.779	90	0.947	42	0.209
Mongolia	90	0.727	49	1.028	63	0.325
Bangladesh*	142	0.570	109	0.917	111	0.503
Vietnam	116	0.666	-	-	60	0.308
Sri Lanka	73	0.757	85	0.948	72	0.370
India	130	0.609	151	0.795	130	0.563
Japan	20	0.891	66	0.961	26	0.133
Taiwan**	(25)	0.882	-	-	(5)	0.052
Pakistan	147	0.538	160	0.726	121	0.536
Korea	**17**	**0.898**	**104**	**0.930**	**23**	**0.125**
Australia	2	0.935	42	0.976	19	0.110

* Bangladesh has been an INWES APNN member country since 2015

* * Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology (source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(source: UNDP, Human Development Report 2015)

Section 2-1 and 2-2 examined the various indices of human resources development, such as HDI, GDI and GII, released by the UNDP. Table 2-10 gives the 2014 statistics for APNN member countries. Most countries have similar rankings in the three indices, but Korea shows a wide gap across the indices. Korea ranked 17th and 23rd in HDI and GII, but performed very poorly in GDI at the 104th position. Although Korea has an individual human development index higher than those of many other countries, its female HDI is much lower than its male HDI. This wide gap in HDI and GDI rankings was observed in New Zealand and Australia as well.

2.3 Cross-country comparison of the GGI of the WEF

The GGI, reported by the WEF, 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 shockingly low GGI ranking (115 th out of 145 countries in 2015). Some have criticized this result as unreliable, but the index composition and supporting evidence provided below indicate that the GGI ranking cannot be overlooked.

2.3.1 Composition of the GGI and data source

<Table 2-11 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**	

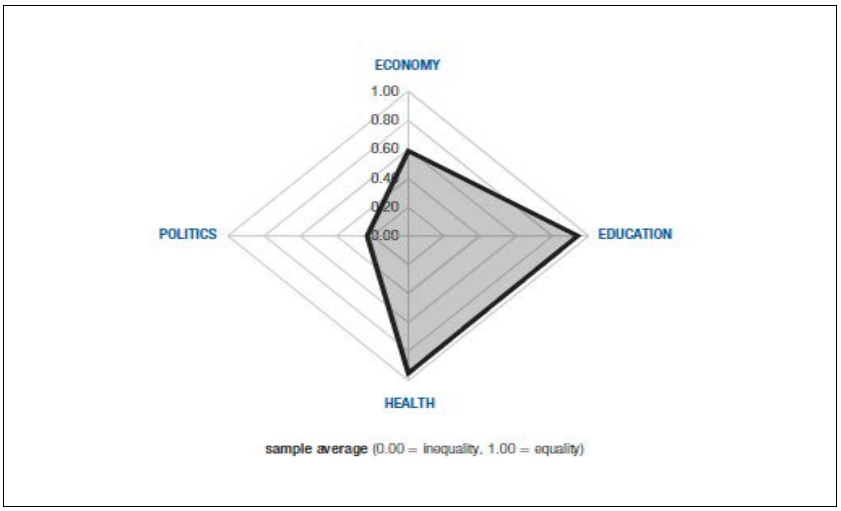
(source: WEF, Global Gender Gap Report)

The GGI consists of a total of 14 specific indicators in 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 2-11. 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 a weighting, with wage equality between women and men for similar work, female net primary enrollment rate over male value, sex ratio at birth and years with female head of state (female-over-male ratio) over the past 50 years getting greater weights.

2.3.2 Recent changes in sub-indices of the GGI

Prior to comparing GGI values among OECD member countries or among APNN member countries, let's examine the average values and yearly changes of indicators for each area of the countries included in the WEF study. Fig. 2-1 shows the world average of indicators for each area in 2015. We can see that gender gaps in health and survival and in educational attainment have been substantially closed, with each area recording values of 0.96 and 0.95, respectively. However, gender gaps are still wide in economic participation and contribution at 0.59, and in political empowerment at 0.23.

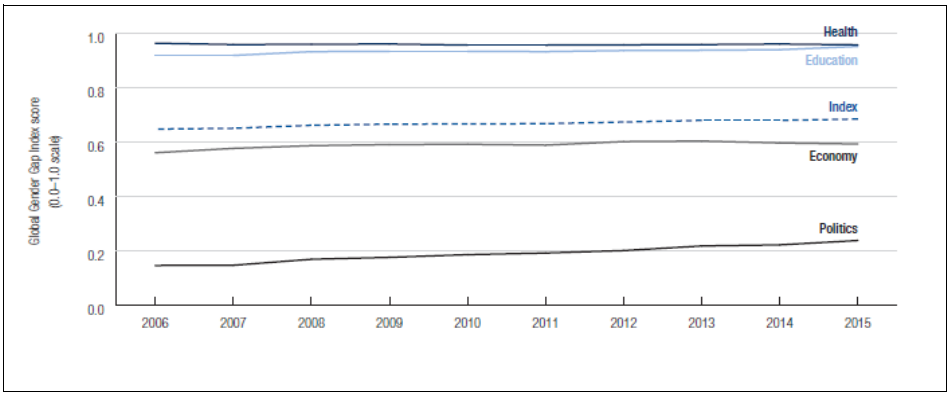
<Figure 2-1 The World Average of GGI by Indicators (2015)>



(source: WEF Global Gender Gap Index 2015)

Figure 2-2 shows the yearly changes in GGI indicators for each area over the past decade. The yearly changes are very gradual across all areas, except political empowerment. The slow pace of improvement in economic participation and contribution, despite the large gender gap, has many implications. More details can be found in the following section.

<Figure 2-2 GGI evolution 2006~2015>



(source: WEF Global Gender Gap Index 2015)

2.3.3 Comparison of the GGI among OECD member countries

Table 2-12 shows the GGI of 34 OECD member countries in 2015 (35 member countries including Latvia in 2016) and individual scores and rankings for each category. The rankings are based on 145 countries, and the GII rankings in the first column are based on the 155 countries surveyed by the UNDP.

The GII rankings by the UNDP and the GGI rankings by the WEF are provided together to highlight the importance of using different indices for a more comprehensive assessment of gender equality. The latest data on GII involved 155 countries in 2014, while GGI involved 145 countries in 2015. While there are some differences in the number of participating countries and in the reference years, the two rankings can be compared because the overall trends remain largely the same. For instance, as shown in Table 2-12, the top-ranking GII country Slovenia ranked 9th out of 145 countries in GGI (23rd out of 142 countries in 2014). Iceland, which took the 12th place in GII, was the top country in the GGI rankings (1st in 2014). Such differences are attributable to the fact that the GII focuses on female survival and minimum dignity by considering maternal mortality ratio and adolescent births, 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 23rd out of 155 countries and GGI ranking of 115th out of 145 countries (117th out of 142 countries in 2014). This is not very different from Japan's situation: it ranked 26th in the GII but 101st in the GGI. Among OECD countries, Turkey was found to have the widest gender gap, with its GII ranking of 71st and GGI ranking of 130th. Interestingly, the countries with poor GGI rankings among the 34 OECD member countries are either in Asia (Japan and Korea) or bordering Asia and Europe (Turkey). This implies that geocultural conditions are closely related to gender issues.

<Table 2-12 GGI ranks and values of OECD member countries (2015)>

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	9	0.784	24	0.778	29	1.000	79	0.973	16	0.385
2	Switzerland	8	0.785	17	0.798	69	0.993	74	0.974	18	0.376
3	Germany	11	0.779	38	0.737	88	0.987	56	0.979	11	0.413
4	Denmark	14	0.767	20	0.788	1	1.000	107	0.970	29	0.309
5	Austria	37	0.733	52	0.705	1	1.000	1	0.980	39	0.246
6	Sweden	4	0.823	4	0.836	54	0.996	71	0.974	5	0.486
7	Netherland	13	0.776	39	0.732	1	1.000	104	0.970	13	0.401
8	Belgium	19	0.753	34	0.762	1	1.000	66	0.974	35	0.275
9	Norway	2	0.850	1	0.868	32	1.000	70	0.974	3	0.559
10	Italy	41	0.726	111	0.603	58	0.995	74	0.974	24	0.331
11	Finland	3	0.850	8	0.815	1	1.000	1	0.980	2	0.607
12	Iceland	1	0.881	5	0.836	1	1.000	105	0.970	1	0.719
13	France	15	0.761	56	0.699	1	1.000	1	0.980	19	0.365
15	Rep. Czech	81	0.687	94	0.636	1	1.000	42	0.979	83	0.134
16	Spain	25	0.742	67	0.674	47	0.998	93	0.972	26	0.326
17	Luxembourg	32	0.738	31	0.766	1	1.000	71	0.974	53	0.212
18	Israel	53	0.712	71	0.671	51	0.996	69	0.974	54	0.205
19	Australia	36	0.733	32	0.766	1	1.000	74	0.974	61	0.193
20	Portugal	39	0.731	46	0.712	60	0.995	79	0.973	41	0.244
21	Ireland	5	0.807	26	0.777	44	0.998	56	0.979	6	0.474
23	Korea	115	0.651	125	0.557	102	0.965	79	0.973	101	0.107
25	Canada	30	0.740	28	0.773	1	1.000	109	0.969	46	0.218
26	Japan	101	0.670	106	0.611	84	0.988	42	0.979	104	0.103
28	Poland	51	0.715	75	0.667	38	1.000	42	0.979	52	0.213
29	Greece	87	0.685	87	0.644	56	0.996	56	0.979	91	0.120
32	New Zealand	10	0.782	30	0.768	1	1.000	105	0.970	15	0.390
33	Estonia	21	0.749	47	0.711	39	0.999	1	0.980	30	0.308
33	Slovakia	97	0.675	93	0.638	1	1.000	79	0.973	115	0.087
39	England	18	0.758	43	0.724	37	1.000	66	0.974	23	0.335
42	Hungary	99	0.672	62	0.685	76	0.991	42	0.979	139	0.035
55	U.S.A.	28	0.740	6	0.826	40	0.999	64	0.975	72	0.162
65	Chile	73	0.698	123	0.570	36	1.000	41	0.979	42	0.243
71	Turkey	130	0.624	131	0.459	105	0.957	1	0.980	105	0.103
74	Mexico	71	0.699	126	0.545	75	0.991	1	0.980	34	0.281

* Note that the rankings of UNDP GII in 2014 are the latest.

* Latvia is not included because it became a member of OECD in May, 2016

(Source: UNDP, Human Development Report 2014,
WEF, Global Gender Gap Report 2015)

2.3.4 Comparison of the GGI among APNN member countries

Table 2-13 gives the GGI, released by the WEF in 2015, for APNN member countries. Among APNN member countries, New Zealand and Australia showed no gender gaps in educational attainment, ranking first for two consecutive years since 2014. In terms of political empowerment, the gender gap was closer at 39% for New Zealand, but only 19.3% for Australia. As a result, New Zealand took the 10th position in the GGI rankings, and Australia ranked a much lower 36 th.

In Asia, most countries have relatively low GGI rankings, except for Mongolia in the 56th place. While Mongolia and Sri Lanka topped the list of countries in health and survival, this merely indicates that gender gaps do not exist in this area, and should not be misinterpreted as showing that people in the two countries lead longer and healthier lives. Japan, India, Nepal, Malaysia, Korea and Pakistan did not make it into the top 100 of GGI rankings. Malaysia, Mongolia, Japan and Korea showed wide gender gaps in the area of political empowerment. Among APNN member countries, India had the smallest gender gap in political empowerment at 0.433. The GGI scores and rankings of APNN member countries in 2014 and 2015 are given in Table 2-14.

<Table 2-13 GGI ranks and values of APNN member countries (2015)>

Country	GGI		Economic participation & opportunity		Education attainment		Health and survival		Political empowerment	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
New Zealand	10	0.782	30	0.768	1	1.000	105	0.970	15	0.390
Australia	36	0.733	32	0.766	1	1.000	74	0.974	61	0.193
Taiwan*	(79)	0.690	(43)	0.727	(1)	1.000	(115)	0.968	(35)	0.275
Mongolia	56	0.709	22	0.783	73	0.992	1	0.980	117	0.084
Bangladesh **	64	0.704	130	0.462	109	0.948	95	0.971	8	0.433
Vietnam	83	0.687	41	0.731	114	0.941	139	0.950	88	0.124
Sri Lanka	84	0.686	120	0.577	57	0.995	1	0.980	59	0.193
Japan	101	0.670	106	0.611	84	0.988	42	0.979	104	0.103
India	108	0.664	139	0.383	125	0.896	143	0.942	9	0.433
Nepal	110	0.658	121	0.575	122	0.917	94	0.972	70	0.169
Malaysia	111	0.655	95	0.634	100	0.967	110	0.969	134	0.051
Korea	115	0.651	125	0.557	102	0.965	79	0.973	101	0.107
Pakistan	144	0.559	143	0.330	135	0.813	125	0.967	87	0.127

* Taiwan's data from: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)
** Bangladesh has been an INWES APNN member country since 2015

(Source: WEF, Global Gender Gap Report 2015)

<Table 2-14 The GGI of APNN member countries in 2014 and 2015>

(GDI=1: complete equality)

Country	WEF GGI			
	2014 from 142 countries		2015 from 145 countries	
	Rank	Value	Rank	Value
Nepal	112	0.6458	110	0.658
New Zealand	13	0.7772	10	0.782
Malaysia	107	0.6520	111	0.655
Mongolia	42	0.7212	56	0.709
Vietnam *	68	0.6973	64	0.704
Vietnam	76	0.6915	83	0.687
Sri Lanka	79	0.6903	84	0.686
India	114	0.6455	108	0.664
Japan	104	0.6584	101	0.670
Taiwan**	(50)	0.7144	(79)	0.690
Pakistan	141	0.5522	144	0.559
Korea	**117**	**0.6403**	**115**	**0.651**
Australia	24	0.7409	36	0.733

* Bangladesh has been an INWES APNN member country since 2015
** Taiwan's data were determined by the Taiwanese government based on the UNDP and WEF methodology (Source: http://eng.stat.gov.tw/ct.asp?xItem=25280&ctNode=6032&mp=5)

(Source: WEF, Global Gender Gap Report 2015)

2.3.5 Recent changes in Korea's GGI

<Table 2-15 GGI evolution of Korea by indicators for past decade (2006~2015)>

Year (Number of Participating Countries)	GGI		Economic participation & opportunity		Education attainment		Health and survival		Political empowerment	
	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
2006 (115)	92	0.616	96	0.481	82	0.948	94	0.967	84	0.067
2007 (128)	97	0.641	90	0.580	94	0.949	106	0.967	95	0.067
2008 (130)	108	0.615	110	0.487	99	0.937	107	0.967	102	0.071
2009 (134)	115	0.615	113	0.520	109	0.894	80	0.973	104	0.071
2010 (134)	104	0.634	111	0.520	100	0.947	79	0.973	86	0.097
2011 (135)	107	0.628	117	0.493	97	0.948	78	0.974	90	0.097
2012 (135)	108	0.636	116	0.509	99	0.959	78	0.973	86	0.101
2013 (136)	111	0,635	118	0.504	100	0.959	75	0.973	86	0.105
2014 (142)	117	0,640	124	0.512	103	0.965	74	0.973	93	0.112
2015 (145)	115	0.651	125	0.557	102	0.965	79	0.973	101	0.107
changes	▲0.035		▲0.077		▲0.017		▲0.006		▲0.040	

(Source: WEF, Global Gender Gap Report 2015)

The WEF began releasing GGI rankings in 2006. Korea's GGI indicators by area for the past decade are shown in Table 2-15. Similar to Fig. 2-2, the gender gaps in educational attainment and health and survival did not grow any narrower. Unlike the average changes exhibited by other countries, Korea over the past decade showed a greater bridging of gender gaps in economic participation and opportunity than in political empowerment. Specifically, Korea's gender gap in economic participation and opportunity was reduced by 7.7%, and in political empowerment by 4%. Despite having the greatest improvement of gender gap in economic participation and opportunity, compared to other countries Korea still shows the largest gender gap in this area.

Table 2-16 displays changes in Korea's GGI ranking and scores over the past five years (2011-2015). By indicator, Korea continues to rank at the top in female literacy and in female healthy life expectancy. The latter recorded a score of 1.06, indicating that Korean women have relatively longer life expectancy than men. The ratio of women holding ministerial positions, which was maintained at around 10% of male counterparts, fell to 6% in 2015. This was the indicator having the lowest rank at the 130th position. It is surprising that such a rapid decline occurred under the leadership of the country's first female president. This is significantly related to Korea's gender gap in political empowerment being reduced by only 4% over the past decade.

Korea's education fever and high reliance on private education have long been social problems. In 2015, Korea took the 116th position in terms of the gender gap in net secondary enrollment rate, with a number of female students equivalent to only 75% of the number of male students. The favorable treatment given to boys appears to continue until the teenage years, such that they have more opportunities for secondary education. The preference for sons over daughters is decreasing these days, but Korea's sex ratio at birth stood at 0.93, giving it a low rank of 128th. The country ranked 116th in wage equality between women and men for similar work in 2015, with women earning only about 55% compared to men. For the same year, Korea fell to the 113th place for gender gap in managerial and executive positions, with the ratio of women holding managerial and executive positions remaining at 10% of their male counterparts.

The recent increase in the number of female candidates passing various state examinations has induced claims of reverse discrimination against men. However, statistical data provided by the WEF in various areas shows that gender gaps clearly exist, even though accurate measurements may not be possible. The statistical figures also indicate that changes do not occur in the short term. Recently, the issue of low birth rate has come under the spotlight in discussions of welfare policies. Concerns over a decrease in population are connected to a deterioration of national competitiveness caused by the smaller economically active population. Over the past five years, the female labor force participation in Korea has remained unchanged at 72-73% of male labor force

participation. In other words, the low female labor force participation deserves more attention than do policies to fight low birth rate.

<Table 2-16 GGI status of Korea (2011~2015)>

Sub-index \ Year	2011	2012	2013	2014	2015
GGI	0.628	0.635	0.635	0.640	0.651
Rank/Number of countries	**107/135**	**108/135**	**111/136**	**117/142**	**115/145**
Economic participation & opportunity	**Economic participation value (Rank)**	0.493 (117)	0.509 (116)	0.504 (118)	0.512 (124)	0.557 (125)
	Labor force participation rate ratio (Rank)	0.73 (84)	0.73 (83)	0.72 (87)	0.72 (86)	0.73 (90)
	Wage equality between women and men (Rank)	0.51 (126)	0.54 (117)	0.52 (120)	0.51 (125)	0.55 (116)
	Female estimated earned income over male value (Rank)	0.41 (113)	0.44 (109)	0.44 (108)	0.48 (109)	0.56 (101)
	Female legislators, senior officials and managers over male value (Rank)	0.11 (111)	0.11 (104)	0.11 (105)	0.12 (113)	0.12 (113)
	Female professional and technical (Rank)	0.69 (87)	0.69 (87)	0.69 (90)	0.69 (98)	0.83 (86)
		(97)	(99)	(100)	(103)	(102)
Educational attainment	**Education attainment value (rank)**	0.948 (97)	0.959 (99)	0.959 (100)	0.9648 (103)	0.965 (102)
	Female literacy rate over male value (Rank)	**1 (1)**	**1 (1)**	**1 (1)**	**1 (1)**	**1 (1)**
	Female net primary enrolment rate (Rank)	0.99 (96)	0.99 (94)	0.99 (86)	0.99 (83)	0.99 (83)
	Female net secondary enrolment rate (Rank)	0.96 (97)	0.99 (91)	0.99 (82)	0.99 (85)	0.99 (89)
	Female gross tertiary enrolment ratio over male value (Rank)	0.7 (110)	0.72 (112)	0.72 (108)	0.75 (114)	0.75 (116)
Health and survival	**Health and survival value (Rank)**	0.974 (78)	0.973 (78)	0.973 (75)	0.9730 (74)	0.973 (79)
	Sex ratio at birth (Rank)	0.94 (124)	0.93 (121)	0.93 (119)	0.93 (122)	0.93 (128)
	Female healthy life expectancy over male (Rank)	**1.06 (1)**	**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)	0.107 (101)
	Females with seats in parliament over male (Rank)	0.17 (79)	0.19 (81)	0.19 (85)	0.19 (91)	0.20 (94)
	Females at ministerial level over male (Rank)	0.14 (75)	0.14 (80)	0.14 (79)	0.13 (94)	0.06 (130)
	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)	0.07 (31)

(Source: WEF, Global Gender Gap Report 2011 ~ 2015)

2.4 Cross-country comparison of labor force participation rates of the OECD

As mentioned earlier, Korea's gender gap in educational attainment is only 4%. That is, the ratio of female educational attainment to male educational attainment is 0.96. However, the female-to-male ratio in economic participation and opportunity is 0.5, translating to a wide gender gap of 50%. Though women and men have similar educational levels, women face tougher conditions for economic activity than men do. As such, we will take a closer look at the labor force participation rate in this section.

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 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.

2.4.1 Male and female labor force participation rates among OECD member countries

Table 2-17 shows male and female labor force participation from 2013 to 2015 based on OECD statistics. Latvia was excluded as it joined the OECD only in May 2016. Over the past three years, the OECD average in labor force participation rose slightly from 71.0% to 71.3%. What is encouraging is that the female labor force participation increased from 62.6% to 63.0%.

Iceland, the top ranking country, continued to show a steady increase in labor force participation, recording a value of 86.6% in 2013 and a higher value of 87.9% in 2015. It showed the smallest gender gap among the countries surveyed, with both men and women recording values of 80-89% in labor participation. Other countries in northern Europe with small gender gaps in labor participation have a flexible attitude toward gender roles, such that both men and women participate in childrearing. Fathers are required to apply for childcare leave, and wages are likely to remain the same during this period. In Iceland, the mother and father are each assigned five months in the 12-month childcare leave, and the remaining period is left to choice. Iceland's high labor force participation rates and low gender gaps can be attributed to its effective welfare policies.

Meanwhile, the lowest-ranking Turkey showed a drastic gender gap in labor force participation in 2015, with men at 77% and women at a mere 35%. Although not as severe as Turkey, other countries such as Mexico, Chile, Italy, Greece, Japan and Korea showed large gender gaps in labor force participation.

Korea's female labor force participation increased from 55.6% in 2013 to 57.9%

in 2015, falling short of the OECD average by 5%p and putting Korea at a rank of 30th among 34 countries. Compared to the top ranking country, Iceland, the difference is almost 30%p. Meanwhile, female labor participation in Korea's neighboring country Japan rose from 65.0% in 2013 to 66.7% in 2015, or 8%p higher than that of Korea, indicating that women in Japan have more active labor participation than their Korean counterparts. As pointed out in the gender gap section above, female labor participation in Korea is very low compared to male labor participation. In particular, the fact that female labor participation falls below 60% when equality in educational opportunity has been achieved goes to show that labor participation by highly educated women is also low.

<Table 2-17 OECD Female & male labor force participation rate of OECD members (2013~2015)>

(unit: %)

Country	2013			2014			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Australia	76.4	82.4	70.5	76.3	82.1	70.5	77.0	82.7	71.2
Austria	75.5	80.4	70.7	75.4	80.0	70.8	75.5	80.1	70.9
Belgium	67.5	72.7	62.3	67.7	72.4	63.0	67.6	72.2	63.0
Canada	78.0	81.4	74.7	77.8	81.3	74.7	78.0	81.8	74.2
Chile	66.4	78.1	54.9	66.6	77.6	55.7	66.8	77.7	55.8
Rep. Czech	72.9	80.5	65.1	73.5	81.2	65.6	74.0	81.4	66.5
Denmark	78.1	80.6	75.6	78.1	81.1	75.0	78.5	81.6	75.3
Estonia	75.1	78.6	71.7	75.2	79.3	71.2	76.6	80.4	72.9
Finland	74.8	76.0	73.5	75.5	77.1	73.8	75.9	77.4	74.4
France	71.1	75.5	67.0	71.1	75.3	67.2	71.2	75.3	67.3
Germany	77.6	82.6	72.6	77.7	82.5	72.9	77.6	82.1	73.1
Greece	67.5	76.9	58.3	67.4	76.0	59.0	67.8	75.9	59.9
Hungary	64.7	71.0	58.6	67.0	73.4	60.7	68.6	75.3	62.2
Iceland	86.6	88.8	84.3	86.7	89.1	84.2	87.9	90.3	85.5
Ireland	70.1	77.2	63.2	69.7	77.1	62.5	70.1	77.6	62.8
Israel	71.6	76.0	67.3	72.2	76.1	68.4	72.2	76.1	68.3
Italy	64.3	74.4	54.3	64.9	74.7	55.2	65.0	75.2	54.9
Japan	74.9	84.6	65.0	75.5	84.9	66.0	75.9	85.0	66.7
Korea	**66.6**	**77.6**	**55.6**	**67.8**	**78.6**	**57.0**	**68.3**	**78.6**	**57.9**
Luxembourg	69.9	76.3	63.2	70.8	77.2	64.2	70.9	76.0	65.6
Mexico	64.3	82.5	47.8	63.7	82.1	46.8	63.4	81.8	46.6
Netherland	79.7	84.7	74.6	79.3	84.6	74.0	79.6	84.6	74.7
New Zealand	77.9	83.1	73.0	79.0	84.1	74.1	79.0	84.2	74.1
Norway	78.3	80.4	76.1	78.1	80.2	75.9	78.4	80.5	76.2
Poland	67.0	73.9	60.1	67.9	74.6	61.1	68.1	74.8	61.4
Portugal	73.0	76.5	69.8	73.2	76.7	70.0	73.4	76.7	70.3
Slovakia	69.8	77.2	62.4	70.3	77.6	62.8	70.9	77.5	64.3
Slovenia	70.5	74.2	66.6	70.9	74.3	67.2	71.8	75.4	67.9
Spain	75.3	80.9	69.7	75.3	80.7	69.8	75.5	80.9	70.0
Sweden	81.1	83.3	78.8	81.5	83.6	79.3	81.7	83.5	79.9
Switzerland	83.3	88.6	78.0	83.8	88.5	79.0	84.1	88.5	79.8
Turkey	55.0	76.3	33.7	55.1	76.6	33.6	56.1	77.0	35.0
England	77.2	82.9	71.6	77.6	83.1	72.1	77.6	82.8	72.5
U.S.A	72.8	78.7	67.2	72.7	78.5	67.1	72.6	78.5	66.9
OECD average	**71.0**	**79.6**	**62.6**	**71.2**	**79.7**	**62.8**	**71.3**	**79.7**	**63.0**

* Latvia is not included because it became a member of OECD in May, 2016

(Source: OECD.Stat, Labour force participation rate (indicator).
doi: 10.1787/8a801325-en (Accessed on 15 July 2016)

Labor force participation rates by highly educated men and women among OECD countries for the year 2011 to 2013 are listed in Table 2-18. As defined by the OECD, persons who have received tertiary education are considered highly educated. In the Korean context, this is equivalent to a two-year college education or higher. Labor force participation by highly educated persons is, as expected, higher than the overall rate. In particular, the OECD average for labor force participation by highly educated women is 83%, which is 20%p higher than the overall rate for women.

<Table 2-18 Labor force participation rate of highly educated* female and male of OECD members (2011~2013)>

(unit: %)

Country	2011			2012			2013		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Australia	86.7	92.7	81.9	86.9	92.9	82.0	86.0	91.9	81.3
Austria	88.6	91.7	84.7	89.2	92.1	85.7	89.4	91.7	86.7
Belgium	87.1	90.1	84.5	87.6	90.4	85.1	87.9	90.9	85.3
Canada	85.9	89.4	83.0	85.9	89.6	83.0	86.0	89.7	83.0
Chile	83.9	91.9	76.0	88.1	95.9	81.2	-	-	-
Rep. Czech	85.3	93.7	76.6	85.8	93.3	78.4	87.0	94.7	79.6
Denmark	90.4	92.6	88.6	90.6	93.1	88.7	90.6	92.6	89.1
Estonia	86.9	90.9	84.6	87.5	91.6	85.2	87.8	92.6	85.0
Finland	87.8	91.1	85.4	87.8	91.0	85.4	87.8	90.8	85.5
France	88.1	91.4	85.3	88.9	92.2	86.1	89.1	92.3	86.3
Germany	90.1	93.1	86.3	90.0	93.3	86.1	89.9	93.2	86.1
Greece	85.9	88.7	82.9	85.8	88.5	83.1	83.3	84.8	81.8
Hungary	82.5	88.2	78.2	83.1	90.0	78.0	83.2	90.0	78.2
Iceland	93.0	95.2	91.5	93.4	-	-	93.5	-	91.1
Ireland	87.0	92.1	82.8	86.1	91.4	81.7	85.9	91.4	81.5
Israel	86.2	89.2	83.6	88.6	92.6	85.4	88.8	93.0	85.5
Italy	83.3	88.4	79.3	84.1	88.7	80.4	83.8	88.2	80.4
Japan	82.4	95.2	69.3	82.4	95.0	69.6	83.6	95.6	71.3
Korea	**79.2**	**92.4**	**62.4**	**79.4**	**92.5**	**63.0**	**79.7**	**92.4**	**64.1**
Luxembourg	88.1	92.4	83.1	87.8	92.8	81.7	88.1	92.5	83.3
Mexico	83.3	91.6	74.2	84.3	92.5	75.4	84.0	92.5	75.2
Netherland	89.9	92.3	87.2	90.4	92.8	87.7	91.4	93.5	89.1
New Zealand	87.5	93.2	83.3	87.6	92.9	83.6	89.1	93.9	85.2
Norway	91.8	93.2	90.6	91.7	93.6	90.2	91.2	93.0	89.7
Poland	88.7	92.7	86.0	89.0	93.2	86.1	89.3	93.5	86.3
Portugal	90.6	91.8	89.8	91.5	92.2	91.0	90.9	91.7	90.4
Slovakia	86.1	91.4	81.8	85.2	90.6	81.0	84.9	90.8	80.1
Slovenia	90.7	91.9	89.9	90.3	91.4	89.5	89.0	90.7	87.7
Spain	89.2	91.9	86.7	89.7	92.4	87.2	89.8	92.2	87.5
Sweden	92.2	93.8	91.1	92.5	94.0	91.3	92.9	94.5	91.6
Switzerland	91.1	95.5	84.8	91.8	95.9	85.9	91.9	95.5	86.7
Turkey	82.4	89.3	72.0	82.3	89.2	72.5	83.4	90.3	73.7
England	86.5	91.3	82.0	87.2	92.3	82.3	87.4	92.6	82.6
U.S.A	84.1	89.2	79.6	84.0	89.3	79.5	83.8	89.4	79.0
OECD average	**87.1**	**91.7**	**82.6**	**87.5**	**92.1**	**82.8**	**87.6**	**92.1**	**83.3**

* Latvia is not included because it became a member of OECD in May, 2016

(Source: OECD Employment Outlook 2013, 2014, 2015)

Some data for Iceland are not available, but it can be inferred that labor force participation rates of highly educated men and women fall in the 90-99% range. In Norway, Portugal, Slovenia and Sweden, labor force participation rates by highly educated women are approximately 90% or higher. Regardless of gender, a vast majority of highly educated persons participate in economic activities. Turkey, where the female labor force participation rate was only 33.7% in 2013, recorded a value of 73.7% for labor force participation by highly educated women.

In Japan and Korea, the gender gap in labor force participation grows more prominent among highly educated persons. In 2013, the labor force participation by highly educated men surged to 95.6% in Japan, and 92.4% in Korea. Smaller increases in labor force participation by highly educated women, with values of 71.3% in Japan and 64.1% in Korea, contributed to a broader gender gap. Among OECD member countries, Korea has had the lowest labor participation rate by highly educated women for the past several years, indicating that the country is extremely inefficient at utilizing human resources.

2.4.2 Korea's labor force participation rate by highly educated women

This section takes a closer look at labor force participation rates in Korea, which has the lowest labor force participation rate by highly educated women among OECD member countries. 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. However, this difference is negligible in understanding general correlations.

<Table 2-19 Labor force participation rate of Korean by sex, field of specialty, and marital status (2014)>

(unit: %)

Natural science				**Engineering**				**Medical science**				**Others**			
average 72.7				average 88.4				average 80.0				average 74.7			
Male		**Female**		**Male**		**Female**		**Male**		**Female**		**Male**		**Female**	
88.9		59.5		92.8		66.1		92.8		74.6		86.4		65.7	
S	**M**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**M**
84.9	90.3	84.6	50.7	88.0	94.7	86.1	55.1	87.5	94.8	91.0	65.1	82.9	87.7	84.8	56.1

* 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: 2014 Re-evaluation Report of Statistics for nurturing and utilizing women in science and technology)

Korea's labor force participation rates by academic major, gender and marital status for the year 2014 are listed in Table 2-19. By major, engineering majors have the highest labor force participation at 88.4%, and natural science majors the lowest at 72.7%. The higher labor force participation by engineering majors compared to medical and pharmaceutical majors can be attributed to the larger economically active population in the former (3,124,913 in 2014) than the latter (248,014 in 2014). Gender gaps in labor force participation across all majors were severe, but the gap was extremely wide at 29.4%p for natural science majors. This was higher than the gap of 26.7%p for engineering majors, 18.2%p for medical and pharmaceutical majors, and 20.7%p for other majors.

In Korea, the gender gap in labor force participation differs significantly according to marital status. Married men have higher labor force participation than single men across all majors. For women, however, the labor force participation rate drops by about 30%p across all majors after marriage. By major, the gender gap in labor force participation is relatively small before marriage, but grows to about 40%p after marriage. While single women in medical and pharmaceutical majors recorded a higher labor force participation rate than their male counterparts, the same rate by married women falls below that of married men by as much as 30%p. This prevalent gender gap even among medical and pharmaceutical majors, who are able to take specialized jobs, shows that Korean society holds many stereotypes about the role of a married woman. Rather than seeking solutions to the problem of low birth rate, it will be more efficient to develop measures that encourage the economically active population, especially highly educated women, to play a more active role in the workforce.

<Table 2-20 Labor force participation rate of the science and engineering population of Korea by age group (2014)>

(unit: %)

Specialty/Gender \ Age		20~29	30~39	40~49	50~59
Natural science	**Male**	82.5	94.8	96.9	92.6
	Female	77.4	58.2	59.4	53.4
Engineering	**Male**	85.5	96.4	97.5	92.9
	Female	81.7	60.2	62.0	63.7

* 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: 2014 Re-evaluation Report of Statistics for nurturing and utilizing women in science and technology)

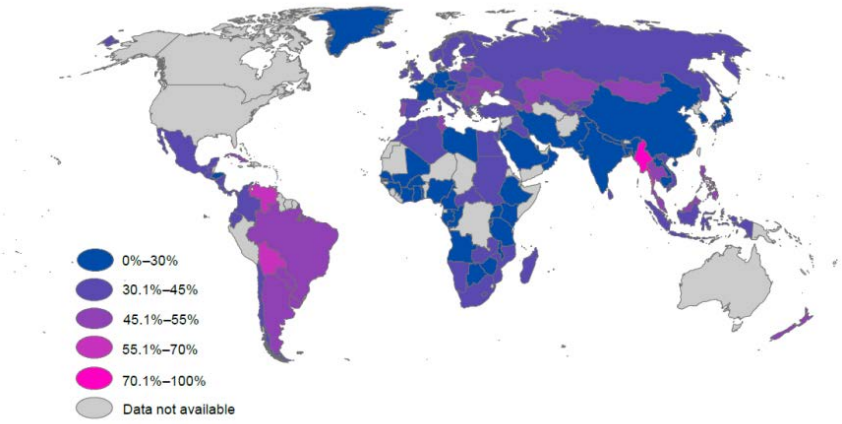
The gender gaps in labor force participation by marital status are shown in labor force participation rates by age as well. Table 2-20 shows the labor force participation rates by men and women with majors in natural science and in engineering by age. Considering that the average age of first marriage is 32.6 for men and 30.0 for women, 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, this rate exceeds 90%, while for women in the same age group, the rate drops below 60% for natural science majors and to the 60% range for engineering majors, 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. Moreover, they lead to a chain of social problems such as an increase in the average age of first marriage among women and a greater avoidance of childbirth.

2.5 Cross-country comparison based on the overview of female scientists by UNESCO

The UNESCO Institute for Statistics (hereinafter referred to as UIS) has been conducting a biannual statistical survey since 2004. This section examines the status of female scientists reported in 2015 by the UIS (statistics provided for 2013); unfortunately, the report contains insufficient data on female scientists in Asian countries. Moreover, 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 by our study.

According to the UIS analysis, as can be seen in Table 2-21, the average ratio of female scientists globally is 28.4%. By region, this measure was highest in Central Asia at 47.1%, as was the case in 2011. The ratio of female scientists in Latin America and the Caribbean increased by 0.5%p to 44.3%, and decreased in Central Asia and Eastern by 0.5%p to 39.9%. In East Asia and the Pacific region, to which Korea belongs, the ratio of female scientists was the lowest in 2011. This region showed an increase from 19.7% to 22.6%, while Southwest Asia had the lowest ratio following a decrease from 20.0% to 18.9%.

<Figure 2-3 Ratio of women researchers by region (2013)>



Note: Data in this map are based on headcounts (HC), except for Congo, India and Israel which are based on full-time equivalents (FTE)). Data for China are based on total R&D personnel instead of researchers. Data for Brazil and Tunisia are based on estimations.

(Source: UNESCO Institute for Statistics, October 2015)

Figure. 2-3 shows the representation of women as a share of total researchers around the world by region using different colors. Vivid colors represent a higher ratio of female researchers, while grey denotes no statistical data available.

<Table 2-21 UIS ratio of female researcher by region (2013)>

(unit: %)

UIS Region	Ratio of female researcher	
	2011	2013
World average	**30.0**	**28.4**
Central Asia	45.5	47.1
Latin America / Caribbean	43.8	44.3
Central and Eastern Europe	40.4	39.9
United Arab Republic	37.9	36.8
North America / Western Europe	32.1	32.0
Africa of Southern Sahara	29.2	30.0
Southern and Western Asia	20.0	18.9
Eastern Asia and Pacific	19.7	22.6

(Source: UNESCO Institute for Statistics, October 2015)

Table 2-22 gives the ratios of female researchers as provided by UIS for APNN member countries; data for recent years, however, are irregular. Compared to 2011, Mongolia and Pakistan had a slight decrease, while Japan and Korea increased by 0.8%p and 1.5%p, 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 actual ratios of female researchers in pure natural sciences and engineering would be significantly lower than the UIS figures.

<Table 2-22 Female researcher ratio of APNN member countries>

(unit: %)

Country (year)	Ratio of female researcher
New Zealand (2001)	52.0
Mongolia (2013)	48.9
Bangladesh (1997)*	14.0
Vietnam (2011)	41.7
Sri Lanka (2010)	36.9
Japan (2013)	14.6
Malaysia (2012)	49.9
Nepal (2010)	7.8
India (2010)	14.3
Korea (2013)	**18.2**
Pakistan (2013)	29.8

* Bangladesh has been an INWES APNN member country since 2015

(Data do not exist for Australia and Taiwan)

(Source: UNESCO Institute for Statistics, October 2015)

3. Survey of APNN Member Countries on Gender Barrier

3. Survey of APNN Member Countries on Gender Barrier

3.1 Discussions of gender barriers

This section examines various gender-related challenges experienced by female scientists and engineers of APNN member countries. Emerging industries such as ICT convergence, new energy, new materials and biohealth have an increasing demand for female human resources. However, these industrial needs remain unmet because the supply falls short of the demand. This shortage is due to the gender barriers prevalent in all stages, from talent nurturing and job-seeking to re-entry after a career break.

Gender barriers refers to the experiences of gender discriminations, which function as hindrances to gender equality. These include institutional/customary barriers and conscious/unconscious barriers. Specific examples are gender role stereotypes, unfairness in employment and promotion, work-life balance and responsibility for family, and other unfair treatment.

3.1.1 Gender role ideology

Despite the increase in the number of female scientists around the world, the stereotypical notion is that men are more suited for jobs in science and engineering. Gender role ideology is a set of beliefs about the proper roles of men and women. It is exhibited as an assertion on the roles that men and women should assume, and involves gender stereotypes regarding characteristics, interests and behavior of men and women. An individual's gender role ideology reflects his or her tendency to uphold gender equality or gender discrimination. As such, those with a more traditional gender role ideology are often regarded as sexists (Campbell, Schellenberg, & Senn, 1997)[1].

Overt sexism has mostly disappeared thanks to the recent implementation of gender equality policies and expanded discourse on gender issues. This, on the other hand, has led to more widespread occurrences of covert sexism and subtle sexism. For instance, women are employed only in certain professions and kept below a certain rank, or assigned less important tasks so that they have lower chances of promotion. Benevolent sexism is a chivalrous attitude toward women that appears favorable but is in fact discriminatory (Glick & Fiske, 1997)[2]. We can see that attitudes toward gender are multi-dimensional and varying over time (Kim & Chung, 1999)[3].

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1 Campbell, B., Schellenberg, E.G., & Senn, C.Y. (1997). Evaluating measures of contemporary sexism. Psychology of Women Quarterly, 21, 89-102.

2 Glick, P., & Fiske, S.T. (1997). Hostile and benevolent sexism: Measuring Ambivalent sexist toward women. Psychology of Women Quarterly, 21, 119-135.

3 Yang-hee Kim, Kyung-ah Chung. (1999). Development of the Korean Gender Egalitarianism Scale. Korean Women's Development Institute

3.1.2 Unfairness in employment, wages and promotion (glass ceiling)

According to the Ministry of Science, ICT and Future Planning,[1] the number of women, at 43,662, accounts for only 18.9% of the total human resources in the fields of science and technology research in Korea. The ratio of female R&D human resources in domestic companies is a mere 17.5%. Developed countries such as the United Kingdom, Germany and France have higher ratios of 37.7%, 26.7% and 25.6%, respectively. A possible cause is that Korea has fewer female students majoring in science and engineering. The number of female students, at 228,473, is only 28.4% of the total number of students in science and engineering. The ratio of female students in natural sciences is 51.1%, higher than the male ratio, but is extremely low in engineering majors at 18.2%. This ratio drops even further in graduate programs. In the natural sciences, this ratio is 51.2% in master's programs and 36.7% in doctoral programs. In engineering, it is 18.6% in master's programs and 10.4% in doctoral programs. In most Asian countries, boys rather than girls are encouraged to pursue majors in STEM.

In science and engineering, the manufacturing-based industrial structure has centered on men for a long time, making it difficult for women to survive amidst stiff competition. The preference of companies for male candidates is exhibited in the employment gender gap. In 2014, the gender gap in the employment of graduates of four-year universities was 4.8% in engineering, 2.1% in natural science, 0.9% in the humanities, 0.5% in social sciences and –0.6% in medical and pharmaceutical fields. In all fields except medical and pharmaceutical, more men were employed than women. The gender gap in engineering fields was wider by as much as 4.3%p compared to gender gaps in the humanities and social sciences.

According to data on the employment of science and technology research personnel by gender given in the 2014 Report on the Utilization of Female Scientists and Engineers (Ministry of Science, ICT and Future Planning, 2015), the percentages of men and women were 81.3% and 18.7%, respectively. By employment contract, 55.0% of women were hired as regular/permanent employees, and 45.0% as non-regular/temporary employees. As for men, 78.7% were hired as regular/permanent employees, and 21.3% as non-regular/temporary employees. These figures indicate that women have less job stability. The wages received by female employees reflect their shorter years of experience and lower status. In the aforementioned survey, new female employees on regular contracts earning at least 35 million won a year accounted for 53.2%, which is lower than the ratio of their male counterparts at 61.4%. In the case of new non-regular/temporary employees, 41.1% of men and 44.0% of women earn less than 20 million won a year. In the 2014 survey, the ratio of women holding managerial positions

1 Ministry of Science, ICT and Future Planning (2015). 2014 Survey on the Utilization of Female Scientists and Engineers. Korea Center for Women in Science, Engineering and Technology (WISET).

was only 7.3%, and the ratio of women who advanced to higher positions was 12.9%, demonstrating the presence of a glass ceiling in the fields of science and technology.

"Glass ceiling"[1] is a term used to refer to an invisible barrier that prevents women from assuming high-ranking positions regardless of their levels of achievement or strengths.[2] "Glass" means that the barrier is not visible but clearly present, while "ceiling" implies that women cannot easily advance to higher positions.[3] In 1989, the term came under the spotlight when Secretary Elizabeth Dole of the US Department of Labor created the Glass Ceiling Commission[4]. This commission found in 1991 that the glass ceiling persisted in companies with federal government contracts even though gender equality principles were supposed to be followed in employment. The report defines glass ceiling as "those artificial barriers based on attitudinal or organizational bias that prevent qualified individuals from advancing upward in their organization into management-level positions." The federal government introduced the Office of Federal Contract Compliance Programs (OFCCP) in 1992, so as to remove obstacles that prevent women and minority groups from rising to management-level positions in government agencies and companies with federal government contracts[5].

In the United States, where women hold 50% of mid-level managerial positions, the glass ceiling mostly applies to high-ranking executive positions. However, in Korea, it is present from middle-level management. Among OECD member countries, Korea has the highest glass ceiling. Women remain at low ranks in organizations, while men dominate higher ranks, resulting in vertical segregation. Due to the glass ceiling, women are discouraged to make efforts to climb the ladder and can adopt a pessimistic attitude toward their careers as they do not feel valued.

3.1.3 Work-life balance and career break

Most APNN member countries stick to traditional gender role ideology, under which women have responsibility for taking care of children and family. Women face a greater burden of maintaining work-life balance since they end up playing a more active role in childbirth, childrearing and housework. In Korea, many women voluntarily quit their jobs to concentrate on family. In Korea, the female employment rate is 68% for

1 Morrison, A.M (1992). *The New Leaders.* San Francisco: Jossey-Bass. Morrison, A.M., White, R.P., Van Velsor, E. (1987). *Breaking the Glass Ceiling.* Reading, MA: Addison Wesley.

2 Lampe, A, (2001). Review of the book Gender in the Workplace: A Case Study Approach. *Gender, Work and Organization.* 8(3), pp.346-351.

3 Davies-Netzley, S. A. (1998). Women above the Glass Ceiling: Perceptions on Corporate Mobility and Strategies for Success. *Gender and Society*, Vol. 12, No. 3, p. 340

4 Federal Glass Ceiling Commission. *Solid Investments: Making Full Use of the Nation's Human Capital.* Washington, D.C.: U.S. Department of Labor, November 1995.

5 Korea's employment policies implemented in 2006 were based on the US OFCCP, but have been extremely ineffective in comparison.

women in their late 20s (25-29) but it drops to 54% among women in their 30s. This is in stark contrast to the increase in male employment, to as high as 92.1%, in their 30s. One out of every five married women in Korea gives up her career due to marriage, childbirth or childrearing. The number of women resuming their careers after childbirth and childrearing is significantly low in the fields of science and engineering. A graph of economic participation rate of women belonging to the productive population follows an M-shape, indicating a return to the workplace in their 40s. However, a graph of women in science and engineering follows an L-shape. That is, they fail to return once they give up their careers.

Social costs incurred due to career breaks by the female workforce amount to 15.5 trillion won, which is similar to the annual government budget for research and development. Worse still, women with career breaks find it extremely difficult to become re-employed in a decent job. Even if they manage to become re-employed, most receive lower wages or assume lower ranks. Only 47.3% of women managed to return as regular/permanent employees, and 22.2% were hired as temporary employees. Among women who used to earn a monthly average of two million won, 50.3% were employed in positions paying 1-2 million won a month, and 34.0% received less than 1 million (Yun, 2015)[1].

A career break is a period of time out from one's career. In Korea, women with career breaks are defined as "women unable to continuously gain years of career experience due to marriage, pregnancy, childbirth and childrearing"[2]. This definition has been criticized for neglecting resignation arising from dissatisfaction with working conditions or gender discrimination, and for assigning women the role of primary caregiver in the family (E.g.: Oh, 2015)[3]. In fact, many women leave their jobs to concentrate on their children or family because they do not see a future in the discriminatory structure. Against this backdrop, it is essential to examine the causes of career breaks, so as to prevent such occurrences among women. If we consider career with a continuous growth without breaks as normal, the typical female career in Korea can be seen as deviating from the normal career path. Recently, some men are also experiencing career breaks caused by frequent job changes and increasing cases of early/honorary retirement. Instead of perceiving female career breaks as abnormal, we

1 Jong-tae Yun (2015). The Need to Establish the Busan Wemenomics Center. Wemenomics Center Forum to Support the Nurturing of Busan's Female Talents in Science and Engineering. Organized by the Federation of Busan Science and Technology. 2015.12.

2 Minister of Gender Equality and Family (2009). The First Basic Plan to Promote Economic Activities of Women with Career Breaks.

3 Eun-jin Oh (2015). The Re-employment of Women with Career Breaks and Related Policies: Exploration of New Strategies, Organized by the Korean Women's Development Institute, presentation material for Issues in Supporting Policies for the Re-employment of Women with Career Breaks at the 96th Gender Equality Policy Forum. 2015.8.28.

should implement policies that support their re-entry into the labor market under more favorable conditions.

3.1.4 Other unfair treatment

Female scientists and engineers face unfair treatment such as exclusion from various decision-making processes, disadvantages in research funding or project management, and sexual harassment. In the aforementioned survey by the Ministry of Science, ICT and Future Planning (2015), the ratio of women participating in human resources committees in public research institutions was only 5.7%. That is, most decisions on hiring and promoting human resources are left to men. In addition, the ratio of women overseeing R&D projects was a mere 7.8%. This ratio dropped even further for R&D projects with larger budgets.

There are illusions such as: “There is no gender discrimination among professional vocations,” and “All practices in the fields of science and technology are rational.” Women who have gained reputations in their professions after beating off stiff competition from men are often told to rely on their individual capacity, demonstrating the society’s lack of interest in resolving structural gender discrimination. However, a study by MIT[1] showed that the most important reason for discrimination against women in terms of wages/rewards/external funding and exclusion from leadership positions is the collective ignorance of discriminatory practices. The low ratio of female employees despite the increase in female students majoring in mathematics or science can be attributed to the poor working conditions for women and to various forms of sexual discrimination in the workplace. Many female scientists and engineers, working in laboratories that are not woman-friendly, face the dilemma of whether to give up their research or to pay less attention to family.

1 MIT (1999). A Study on the Status of Women Faculty in Science at MIT.

3.2 Survey method

3.2.1 Survey respondents, method and period

The survey was conducted in 13 member countries (Nepal, New Zealand, Malaysia, Mongolia, Bangladesh, Vietnam, Sri Lanka, India, Japan, Taiwan, Pakistan, Korea, and Australia) of the APNN, asking female science and engineering professionals about their perception of the gender barriers. Of the 13 countries in which the survey was performed, 12 countries except Australia agreed to participate in the survey via e-mail. The respective networks (WISE-Nepal, IPENZ, IEM, WSTEM, WISE-Bangladesh, VAFIW, WISE-Sri Lanka, WISE-India, JNWES, TWiST, WISTEP, KWSE) were utilized to ask respondents to take either online or offline surveys. In most countries, respondents were able to choose either Korean or English as the primary language, while Japan and Mongolia distributed offline surveys in their mother tongues.

The survey period, during which the instructional e-mail was sent, was from May 15 to June 30, 2016. An instructional e-mail was first sent to member countries on April 18, about one month prior to the survey period. Countries that participated in offline surveys compiled and submitted their results by e-mail, while the results of online surveys were downloaded via Google Forms. Statistical analysis was performed on both online and offline results for Korea and Japan. Malaysia and New Zealand only responded online. While India, Bangladesh, Sri Lanka, Pakistan and Vietnam only responded offline, online results were combined if such nationalities were also present among offline respondents.

3.2.2 Survey tool: Questionnaire composition

The survey consisted of questions on general characteristics of respondents and their perception of the gender barriers. The nine questions on general characteristics were similar to those of the previous survey, covering year of birth, year of college admission, major, career, position/rank, duration of career break, marital status, number of children and nationality (see Table 3-1).

The 12 questions on the gender barriers were comprised of three sub-scales. First, there were four questions on the perception of the discriminatory reality in the relevant society. For instance, respondents were asked whether boys are more actively encouraged than girls to pursue majors in STEM, and whether it is more difficult for women to find jobs in STEM than men. Second, there were four questions on the discriminatory experiences of respondents. The respondents were asked whether they have experienced discriminations or disadvantages because of their gender in participating or supervising research projects, and whether the struggle to maintain a healthy work-life balance functioned as a career handicap. Third, there were four questions on the gender role ideology of respondents. The questions covered the role of breadwinner in the family, the capacity to take care of children, and the balance of power between husband and wife.

Finally, there were three questions on career prospects, policy demands, and the concept of gender equality.

3.2.3 Analysis of survey data

Responses were coded excluding invalid or insufficient answers. For open-ended questions, similar or common answers were combined together and pre-coded. To ensure that the responses were properly coded, 20 questionnaires were randomly selected and checked. Any errors, if detected, were corrected. Next, SPSS Statistics version 23.0 was used to perform the following analyses.

① Basic analysis: Frequency and descriptive statistical analysis

- Frequency and descriptive statistical analysis were performed to examine the general characteristics of respondents.
- Frequency and descriptive statistical analysis were again performed for each question on the gender barriers, career prospects, policy demands, and the concept of gender equality.

② Differential and correlational analysis

- An independent t-test and one-way ANOVA were employed to analyze the general characteristics of respondents and differences in perceptions of the gender barriers. The analyses were performed on the individual items as well as sub-scales such as the perception of discriminatory reality, discriminatory experiences and gender role ideology. Duncan test was performed to allow multiple comparisons between groups if required.
- An independent t-test and one-way ANOVA were employed to analyze the general characteristics of respondents, career prospects by country, policy demands and the concept of gender equality. Duncan's test was performed to allow comparison between groups if required.
- Pearson's correlation was used to examine the relationships between continuous variables, including the perception of discriminatory reality, discriminatory experiences, gender role ideology, career prospects and policy demands.

③ Comprehensive analysis

- Variables influencing major dependent variables were examined and multiple regression analyses were performed to determine their relative contributions.

<Table 3-1. Survey questions>

Classifications		Question
Personal Information		① Year of birth
		② Year entering college
		③ Major field
		④ Occupation
		⑤ Position/status
		⑥ Duration of career break
		⑦ Marital status
		⑧ Number of children
		⑨ Nationality
Gender barriers	**Perception of discrimination**	① Boys are encouraged more than girls to go into the STEM field.
		② It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.
		③ Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.
		④ Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.
	Experiences of discrimination	① I have experienced disadvantages in leading or participating in research projects because I am a woman.
		② I have experienced disadvantages in receiving research funds or scholarships because I am a woman.
		③ I have experienced sexual harassment or unfair treatments sometime in my career.
		④ Balancing work and life (marriage and family) has been a handicap for me.
	Gender role stereotype	① Primary breadwinners (who take care of financial obligations) of households should be men.
		② Women are born to have a way of caring children that men are not capable of in the same way.
		③ In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.
		④ In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.
Career outlook		I believe things will turn out fine in my future career.
Policy needs		It is crucial to have strong policy support to solve gender inequality in the STEM field.
Equality concept		I believe gender equality will be fully achieved only if women are given equal opportunities as men.

4. Results of the Survey on Gender barriers Among APNN Member Countries

4. Results of the Survey on Gender barriers Among APNN Member Countries

4.1 General respondent profiles

In total, 1,379 valid responses were collected from 12 member countries up to June 30, 2016. With the exception of New Zealand and Taiwan, each country recorded about 100 female respondents belonging to science and engineering professions. Table 4-1 gives the profile of respondents by nationality, age, marital status, number of children, profession, major, and duration of career break. Details are provided below.

① Nationality

Out of the 1,379 respondents, Malaysia had the highest number of participants at 175, followed by Mongolia at 161, Japan at 138, and Korea at 135. Vietnam, Sri Lanka, Pakistan, Bangladesh, Nepal and India had about 100 participants each. The number of respondents from New Zealand and Taiwan were 68 and 79, respectively. Those with unspecified nationalities was 32 (2.3%).

② Age

By age, a large proportion of respondents was in their 20s, amounting to 541 (39.3%). This was followed by 414 in their 30s (30.1%), 211 in their 40s (15.3%), and 211 in their 50s (15.3%). The average age of respondents was 35.36.

③ Marital status

The number of married respondents at 714 (51.8%) was greater than that of single respondents at 577 (41.8%). The number of divorced or separated respondents was 52 (3.8%), while 36 were in the ‘other’ status (2.6%). Those who selected divorced/separated/other under marital status were combined into the ‘single’ group in the analysis.

④ Number of children

A large proportion of respondents, or 723 persons (53.1%), did not have any children. This was followed by 306 with two children (22.5%), 233 with one child (17.1%), and 100 with three or more children (7.3%). The average number of children was 0.84.

⑤ Occupation

The available options provided were student, teacher/professor, researcher, healthcare professional, engineer (company or research institute), and other. The top answer was teacher/professor at 358 (26.0%), followed by engineer at 337 (24.5%), researcher at 227 (16.5), healthcare professional at 87 (6.3%), and other at 149 (10.8%).

⑥ Major field of study

The question on major was given in open-ended form, and assigned codes based on a college major classifications provided by the Ministry of Education. As a result, engineering majors accounted for 47.9% at 647. This was followed by natural sciences at 319 (23.6%), medical and pharmaceutical at 190 (14.1%), social sciences at 130 (9.6%), teaching at 39 (2.9%), and humanities at 15 (1.1%).

⑦ Duration of career break

The respondents were asked if they had a career break due to pregnancy, childbirth or any other reason. There were 665 respondents (49.5%) without any career break. 271 (20.2%) had rested for 3 years or more, 156 (11.6%) for 1~2 years, 138 for 2~3 years (10.3%), and 113 (8.4%) for less than a year. The average duration of a career break was 18.07 months.

<Table 4-1. Participants of the survey>

(unit: Person, %)

Classifications	Number of Respondents	%
Nationality	**1,379**	
Nepal	94	6.8
New Zealand	68	4.9
Malaysia	175	12.7
Mongolia	161	11.7
Vietnam	100	7.3
Sri Lanka	101	7.3
India	93	6.7
Japan	138	10.0
Taiwan	79	5.7
Pakistan	102	7.4
Republic of Korea	135	9.8
Bangladesh	101	7.3
Others	32	2.3
Age		
29 or below	541	39.3
30 ~ 39	414	30.1
40 ~ 49	211	15.3
50 or above	211	15.3
Average	35.36 years	
Marital status		
Single	577	41.8
Married	714	51.8
Divorced	52	3.8
Other	36	2.6

No. of children		
None	723	53.1
1	233	17.1
2	306	22.5
3 or more	100	7.3
Average	0.84 person	
Occupation		
Student	219	15.9
Teacher/professor	358	26.0
Researcher	227	16.5
Medical personnel	87	6.3
Engineer	337	24.5
Other	149	10.8
Major field of study		
Humanities	15	1.1
Social Science	130	9.6
Natural Science	319	23.6
Medicine & Pharmacology	190	14.1
Arts & Physical Ed.	11	.8
Teaching Profession	39	2.9
Engineering Science	647	47.9
Duration of career break		
None	665	49.5
Less than 1 year	113	8.4
1~2 years	156	11.6
2~3 years	138	10.3
3 years or more	271	20.2
Average	18.07 months	

4.2 Cross-country comparison of the gender barriers in 12 APNN member countries

4.2.1 Descriptive statistical analysis

<Table 4-2. Average on each item>

(unit: Points)

Classifications			① Question	Average	Standard deviation
Gender barriers	② Perception of discrimination	1	Boys are encouraged more than girls to go into the STEM field.	2.46	1.219
		2	It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.51	1.180
		3	Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.50	1.235
		4	Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.93	1.318
			Average	**2.60**	
	③ Experiences of discrimination	5	I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.00	1.272
		6	I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.32	1.221
		7	I have experienced sexual harassment or unfair treatments sometime in my career.	3.30	1.356
		8	Balancing work and life (marriage and family) has been a handicap for me.	2.60	1.217
			Average	**3.05**	
	④ Gender role ideologie	9	Primary breadwinners (who take care of financial obligations) of households should be men.	3.55	1.343
		10	Women are born to have a way of caring children that men are not capable of in the same way.	3.34	1.347
		11	In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.78	1.327
		12	In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.92	1.387
			Average	**3.40**	
⑤Career outlook		13	I believe things will turn out fine in my future career.	**3.70**	1.044
⑥Policy needs		14	It is crucial to have strong policy support to solve gender inequality in the STEM field.	**4.07**	1.070
Equality concept		15	I believe gender equality will be fully achieved only if women are given equal opportunities as men.	**2.13**	1.149

note : ① The responses to questions were measured with a five-point Likert scale (1.Strongly agree, 2.Somewhat agree, 3.Neutral, 4. Somewhat disagree, 5. Strongly disagree)

② Perception of discrimination : Lower score means higher perception of discrimination

③ Experience of discrimination : Lower score means more discrimination experienced

④ Gender role ideologies : Higher score means more progressive

⑤ Career outlook : Higher score means a more positive outlook

⑥ Policy needs : Higher score means higher needs for policy support

All of the 15 questions excluding those on the general characteristics of respondents, were evaluated on a five-point Likert scale (see Table 4-2). Among those, 12 questions on the gender barriers were comprised of three sub-scales: perception of the discriminatory reality, discriminatory experiences, and gender role ideology. A lower score on perception of discriminatory reality and discriminatory experiences indicates a higher level of discrimination. A higher score on gender role ideology indicates a more progressive attitude. The survey included one question each on career prospects, policy demands, and the concept of gender equality. The responses to career prospects were reverse coded such that a higher score implies a more positive attitude. Similarly, a higher score for policy demands indicates greater demands. Figure. 4-1 presents the average value by question.

The average score of 2.60 for the perception of discriminatory reality indicates that respondents do not feel severe discrimination existed. Out of the four questions, the most severe discrimination was felt for “Boys are more actively encouraged than girls to pursue majors in STEM” (2.46). This was closely followed by “Female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators” (2.50) and “Women face more difficulties than men in finding jobs in STEM despite having the same competence as their male counterparts” (2.51). Less discrimination was felt for “Women receive lower wages than male colleagues having the same qualifications in the fields of science and technology” (average of 2.93).

The average response to the four questions on discriminatory experiences was 3.05, which can be interpreted as a medium-level of discrimination. Here, a lower score indicates a higher level of discrimination. More severe discrimination was experienced in “Maintaining work-life balance (marriage, family) has been a handicap in my career” (2.60). This was followed by “I have faced disadvantages in participating in a research project or becoming a principal investigator because I am female” (3.00), “I have been sexually harassed or received unfair treatment at work” (3.30), and “I have experienced disadvantages in receiving research funds or scholarships because I am female” (3.32).

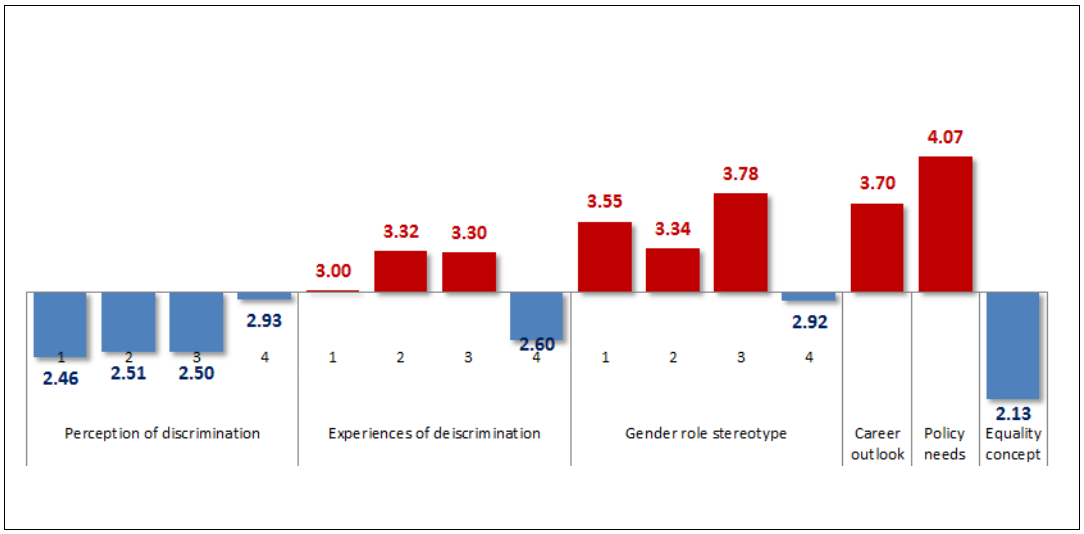
The average response to the four questions on gender role ideology sub-scale was on the progressive side at 3.40. The most progressive attitude was found in “Husbands must have more power and authority than wives for peace and order in the household” (average of 3.78), representing that most respondents opposed patriarchal power relations within the family. The second most progressive attitude was shown toward “Men must be the breadwinner of households” (3.55). That is, the respondents were somewhat negative when it came to the belief that ‘breadwinner = men’. In response to “Women have an innate ability to take care of children, but men do not” (3.34), the respondents were somewhat opposed to the idea regarding the fundamental differences in the ability to take care of children based on biological sex. Lastly, in response to “Men and women

must assume adequate roles because the former tend to be more rational and the latter more emotional" (2.92), the average response fell in the middle of the scale but was relatively more conservative than other items in the same sub-scale.

Career prospects were examined through the question stated "I believe my career will go well." The responses were reverse coded such that a higher score indicates a more positive outlook. The average response at 3.70 was optimistic. The responses to "Strong policies are necessary to overcome gender inequality in STEM fields" were also reverse coded, and the average of 4.07 reflected a high demand.

Questions on the concept of gender equality were used to determine whether the respondents would be satisfied with having just equal opportunities. The average response was 2.13 on a 5-point scale (the lower the score, the greater the affirmation), and most agreed with the statement. Throughout the modern history, the concept of equality had developed from 'equality in opportunities' to 'equality in conditions' and to 'equality in results'. The belief that it suffices to have just equal opportunities is a liberalist stance, and it overlooks the fact that equal opportunities cannot be enjoyed by persons who are under different conditions. For instance, the Act on Equal Employment guarantees equality in employment, but women have to engage in economic activities while assuming the primary responsibility for childrearing. This condition is different from that of men, making it difficult for women to enjoy equal opportunities. That's why the equality in conditions is needed. However, it is an idealistic notion to have equality in conditions. Thus, it is now considered that discrimination to be present if there is no equality in outcome. Most respondents are likely to have answered this question without fully comprehending this conceptual differences regarding equality.

<Figure 4-1. Average on each item>



4.2.2 Cross-country comparison

4.2.2.1 Respondent profiles by country

Table 4-3 compares the respondent profiles by country. The different perception toward the gender barriers may be related to differences in general characteristics such as age, marital status, duration of career break, major field of study and occupation. The average age of respondents was 35.36, but the average age by country varied from the 20s to 50s. Malaysian respondents were the youngest (25.59) among the three countries whose respondents were of an average age falling in the 20s. This was followed by Bangladesh (25.65) and India (26.82). The six countries whose respondents showed an average age falling in the 30s included Nepal, Pakistan and New Zealand. The respondents from Taiwan and Korea were of an average age of 40s while Japan, of 50.89, the oldest average age.

The marital status of respondents is presumed to be related to average age. As expected, the country with the highest proportion of single respondents was Malaysia at 76.6%. This was followed by Bangladesh at 74.3% and India at 52.7%. The country with the highest proportion of married respondents was Vietnam at 87%. This was followed by Mongolia (72.0%), Japan (70.3%) and Korea (61.5%).

The average number of children for all respondents was 0.84. Only Vietnam (1.66), Mongolia (1.65) and Japan (1.01) had an average exceeding 1. The country with the lowest number of children was Bangladesh (0.15) followed by Malaysia (0.36) and India (0.48).

By major field of study, 47.9% of the respondents were in engineering. This was followed by natural sciences (23.6%), medical and pharmaceutical (14.1%) and social sciences (9.6%). The distribution of respondents by major differed by country. In New Zealand, a large majority, or 89.7%, were in engineering. Other countries with a high proportion of engineering majors were Malaysia (75.4%) and Pakistan (76%). On the other hand, most Japanese were in the natural sciences (54%), while those in engineering and medical/pharmaceutical accounted for 19.7% each. Countries with a high proportion of natural science majors were Taiwan (45.6%), Sri Lanka (43%) and Korea (38.8%). In Bangladesh, the most common major was medical and pharmaceutical at 46.9%, followed by natural sciences (35.7%). Among Vietnamese respondents, the most common major was engineering (39%) followed by social sciences (35%).

By occupation, 26% were professors/teachers, 24.5% were engineers, 16.5% were researchers, 15.9% were students, and healthcare professionals were 6.3%. This distribution again varied by country. New Zealand had the highest proportion of engineers at 85.3%. This was followed by Nepal (44.1%) and Mongolia (42.9%). The country with the highest proportion of professors/teachers was Vietnam (82%), followed by Pakistan

(43.1%). Researchers were the most common in Korea (50%), and healthcare professionals (35.6%) in Bangladesh.

The average duration of career break was 18.07 months. By country, Vietnam had the longest average career break of 52.04 months (average age of 37.28 and 1.66 children). Mongolia had the second longest average of 36.71 months (average age of 37.37 and 1.65 children). In other words, Vietnam had a much longer average career break than Mongolia despite their respondents having a similar average age and number of children. Japan had the third longest average of 27.03 months (average age of 50.89 and 1.01 children). The country with the shortest average, at 4.56 months, was Malaysia. This was because Malaysian respondents had an average age of 25.59 and 0.36 children, and 61.1% of those were students. The country with the second shortest average was Bangladesh (5.99 months), which is related to its respondents having an average age of 25.65 and 0.15 children. Korean respondents, with an average age of 42.59 and 0.96 children, had a career break of 9.12 months. Compared to the average career break of 27.03 months among Japanese respondents with 1.01 children on average, Korean scientists and engineers had shorter career breaks.

<Table 4-3 Respondents profile by nation>

(unit: Person, %)

Nationality	Average age	Marital status		No. of children	Major field of study		Occupation		Average duration
Nepal	32.14	Single	46.8	0.61	Humanities	0.0	student	6.5	13.10
					Social Science	5.4	teacher/professor	11.8	
		Married	52.1		Natural Science	18.5	researcher	12.9	
					Medicine& Pharmacology	14.1	Medical professional	9.7	
					Arts & Physical Ed.	0.0	engineer	44.1	
		Others	1.1		Teaching Profession	5.4			
					Engineering Science	56.5	Others	15.1	
New Zealand	33.72	Single	32.4	0.63	Humanities	0.0	student	1.5	17.18
					Social Sciences	1.5	teacher/professor	1.5	
		Married	42.6		Natural Science	8.8	researcher	1.5	
					Medicine& Pharmacology	0.0	medical professional	0.0	
		Others	25.0		Arts & Physical Ed.	0.0	engineer	85.3	
					Teaching Profession	0.0	Others	10.3	
					Engineering Science	89.7			

Nationality	Average age	Marital status		No. of children	Major field of study		Occupation		Average duration
Malaysia	25.59	Single	76.6	0.36	Humanities	0.6	student	61.1	4.56
					Social Science	10.3	teacher/profession	11.4	
		Married	19.4		Natural Science	6.9	researcher	1.1	
					Medicine& Pharmacology	5.1	medical professional	0.6	
		Others	4.0		Arts & Physical Ed.	1.7	engineer	21.7	
					Teaching Profession	0.0	Others	4.0	
					Engineering Science	75.4			
Mongolia	37.37	Single	19.3	1.65	Humanities	2.5	student	6.8	36.71
					Social Science	19.5	teacher/professor	34.8	
		Married	72.0		Natural Science	17.0	researcher	15.5	
					Medicine&	3.1	medical professional	0.0	
		Others	8.7		Arts & Physical Ed.	0.0	engineer	42.9	
					Teaching Profession	9.4	Others	0.0	
					Engineering Science	48.4			
Vietnam	37.28	Single	1.0	1.66	Humanities	7.0	student	0.0	52.04
					Social Science	35.0	teacher/professor	72.0	
		Married	87.0		Natural Science	7.0	researcher	17.0	
					Medicine&	8.0	medical professional	0.0	
		Others	12.0		Arts & Physical Ed.	1.0	engineer	11.0	
					Teaching Profession	3.0	Others	0.0	
					Engineering Science	39.0			
Sri Lanka	37.71	Single	42.6	0.70	Humanities	0.0	student	8.9	16.39
					Social Science	3.0	teacher/professor	19.8	
		Married	45.5		Natural Science	43.0	researcher	18.8	
					Medicine&	28.0	medical professional	14.9	
		Others	11.9		Arts & Physical Ed.	0.0	engineer	14.9	
					Teaching Profession	2.0	Others	22.8	
					Engineering Science	24.0			
India	26.82	Single	52.7	0.48	Humanities	0.0	student	6.5	8.39
					Social Science	9.0	teacher/professor	11.8	
		Married	47.3		Natural Science	0.0	researcher	1.1	
					Medicine&	11.5	medical professional	9.7	
		Others	0.0		Arts & Physical Ed.	3.8	engineer	32.3	
					Teaching Profession	16.7	Others	38.7	
					Engineering Science	59.0			

Nationality	Average age	Marital status		No. of children	Major field of study		Occupation		Average duration
Japan	50.89	Single	23.9	1.01	Humanities	0.7	student	1.4	27.03
					Social Science	5.1	teacher/professor	34.8	
		Married	70.3		Natural Science	54.0	researcher	28.3	
					Medicine&	19.7			
					Arts & Physical Ed.	0.7	medical professional	3.6	
		Others	5.8		Teaching Profession	0.0	engineer	18.8	
					Engineering Science	19.7	Others	13.0	
Taiwan	41.52	Single	44.3	0.78	Humanities	1.3	student	26.6	11.12
					Social Science	8.9	teacher/professor	30.4	
		Married	48.1		Natural Science	45.6	researcher	16.5	
					Medicine&	20.3	medical professional	5.1	
		Others	7.6		Arts & Physical Ed.	2.5	engineer	7.6	
					Teaching Profession	1.3	Others	13.9	
					Engineering Science	20.3			
Pakistan	32.40	Single	40.2	0.79	Humanities	1.0	student	6.9	9.83
					Social Science	7.0	teacher/professor	43.1	
		Married	56.9		Natural Science	9.0	researcher	16.7	
					Medicine&	16.0	medical professional	6.9	
		Others	2.9		Arts & Physical Ed.	0.0	engineer	15.7	
					Teaching Profession	0.0	Others	10.8	
					Engineering Science	67.0			
Republic of Korea	42.59	Single	37.0	0.96	Humanities	0.0	student	6.0	9.12
					Social Science	0.7	teacher/professor	32.1	
		Married	61.5		Natural Science	38.8	researcher	50.0	
					Medicine&	9.7	medical professional	0.7	
		Others	1.5		Arts & Physical Ed.	0.7	engineer	4.5	
					Teaching Profession	0.0	Others	6.7	
					Engineering Science	50.0			
Bangla-Desh	25.65	Single	74.3	0.15	Humanities	0.0	student	29.7	5.99
					Social Science	2.0	teacher/professor	6.9	
		Married	25.7		Natural Science	35.7	researcher	13.9	
					Medicine&	46.9	medical professional	35.6	
		Others	0.0		Arts & Physical Ed.	0.0	engineer	5.9	
					Teaching Profession	0.0	Others	7.9	
					Engineering Science	15.3			
Total	35.36	Single	41.8	0.84	Humanities	1.1	student	15.9	18.07
					Social Science	9.6	teacher/professor	26.0	
		Married	51.8		Natural Science	23.6	researcher	16.5	
					Medicine&	14.1	medical professional	6.3	
		Others	6.4		Arts & Physical Ed.	0.8	engineer	24.5	
					Teaching Profession	2.9	Others	10.8	
					Engineering Science	47.9			

4.2.2.2 Cross-country comparison of the gender barriers by sub-scales

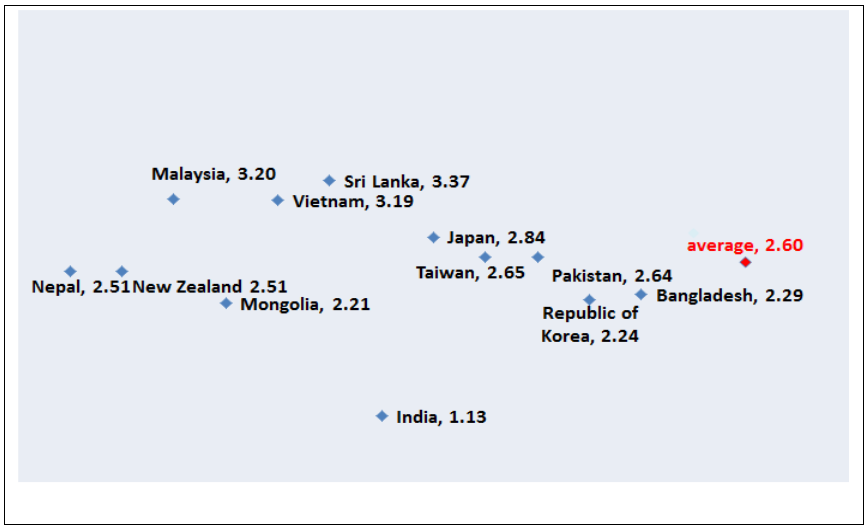
The following is a cross-country comparison of the perception of the gender barriers by sub-scales (see Table 4-4). First, for the perception of discriminatory reality, the overall average of 2.60 is slightly below the median (a lower score indicates greater discrimination). Indian respondents showed the highest awareness of gender discrimination at 1.13, setting it far apart from respondents from the other countries. This was followed by Mongolia (2.21), Korea (2.24), Bangladesh (2.29), Nepal and New Zealand (both 2.51), Pakistan (2.64) and Taiwan (2.65). The country which showed the least awareness of discrimination was Sri Lanka, with a score of 3.37 out of 5. This was followed by Malaysia (3.20), Vietnam (3.19) and Japan (2.84). The only three countries with a level of perception falling below the median score (3) were Sri Lanka, Malaysia and Vietnam (see Figure. 4-2).

<Table 4-4. Comparison of average scores of participating nations by scales>

(unit: Points)

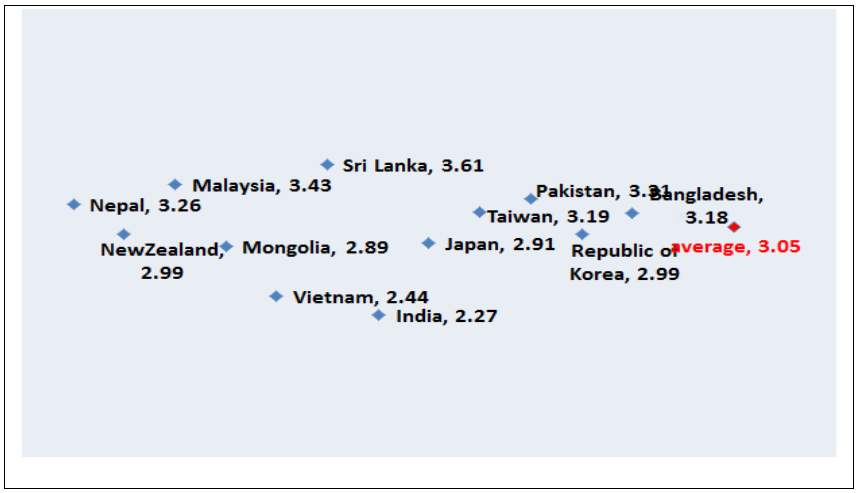
Classifications	**Perception of discrimination**	**Experience of discrimination**	**Gender role stereotype**	**Career outlook**	**Policy needs**	**Equality concept**
Nepal	2.51	3.26	4.14	3.83	4.55	1.56
New Zealand	2.51	2.99	4.28	3.68	4.25	1.78
Malaysia	3.20	3.43	3.15	3.62	3.69	2.25
Mongolia	2.21	2.89	2.81	3.99	4.26	2.06
Vietnam	3.19	2.44	3.07	3.37	4.77	1.85
Sri Lanka	3.37	3.61	3.47	4.11	4.09	2.37
India	1.13	2.27	4.68	3.55	4.30	1.01
Japan	2.84	2.91	3.22	2.96	3.15	3.26
Taiwan	2.65	3.19	3.87	3.78	3.87	2.24
Pakistan	2.64	3.31	2.40	4.02	4.07	1.71
Republic of	2.24	2.99	3.61	3.39	4.19	3.12
Bangladesh	2.29	3.18	3.06	4.37	4.23	1.41
Others	2.92	3.15	3.65	3.63	3.91	1.88
Total	2.60	3.05	3.40	3.70	4.07	2.13
F	57.321	22.784	55.032	16.588	19.734	49.809
P ***(p<.001)*	***	***	***	***	***	***

<Figure 4-2. Perception of discrimination by nation>



The results for discriminatory experiences (see Fig. 4-3) showed that the average of 3.05 is slightly higher than the median score. Similarly, a lower score indicates greater experiences of gender discriminations. The country that showed the most discriminatory experiences was India (2.27). This was followed by Vietnam (2.44), Mongolia (2.89) and Japan (2.91). Korea, having the same score as New Zealand at 2.99, ranked the fifth highest among the 12 countries. Sri Lanka had the lowest scores for both the perception of discriminatory reality and the actual discriminatory experiences. Malaysia had the second lowest scores for both the perception of discriminatory reality and discriminatory experiences.

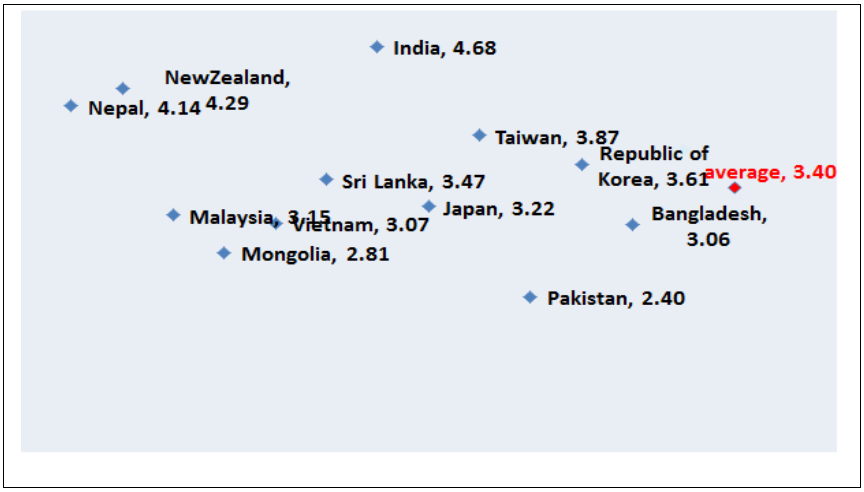
<Figure 4-3. Experience of discrimination by nation>



As shown in Fig. 4-4, female scientists and engineers showed a progressive attitude toward gender roles with an average of 3.40. The country with the most progressive attitude toward gender roles was India, with an average of 4.68 on a 5-point

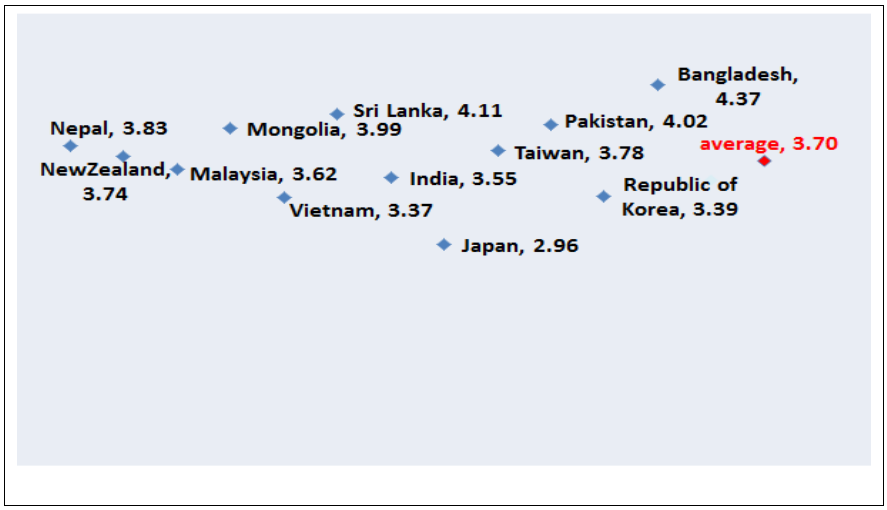
scale. This was followed by New Zealand (4.28), Nepal (4.14), Taiwan (3.87), Korea (3.61), Sri Lanka (3.47) and Japan (3.22). Similar scores were obtained for Malaysia (3.15), Vietnam (3.07) and Bangladesh (3.06). Mongolia (2.81) and Pakistan (2.40), with scores slightly below the average, were relatively conservative toward gender roles.

<Figure 4-4. Gender role stereotype s by nation>



The average score of 3.70 for career prospects, after reverse coding, was somewhat positive (see Fig. 4-5). Female scientists and engineers in Bangladesh were the most optimistic (4.37), while those in Japan were the least optimistic (2.96). Bangladesh was followed by Sri Lanka (4.11), Pakistan (4.02) and Mongolia (3.99). In increasing order of optimism, Japan (2.96) was followed by Vietnam (3.37), Korea (3.39) and India (3.55). Japan had a score close to the median, and Vietnam and Korea had scores higher than the median, but were relatively less positive compared to the other countries.

<Figure 4-5. Career outlook by nation>



As shown in Fig. 4-6, the average for policy demands was relatively high at 4.07 (after reverse coding). The scores for all countries in this area were higher than the median. Vietnam had the highest average (4.77), and Japan the lowest (3.15). Vietnam was followed by Nepal (4.55), India (4.30), Mongolia (4.26) and New Zealand (4.24). In increasing order, Japan was followed by Malaysia (3.69), Taiwan (3.87), Pakistan (4.07) and Sri Lanka (4.09). Korea (4.19) was the seventh highest among the 12 countries.

<Figure 4-6. Policy needs by nation>

<Figure 4-7. Equality concept by nation>

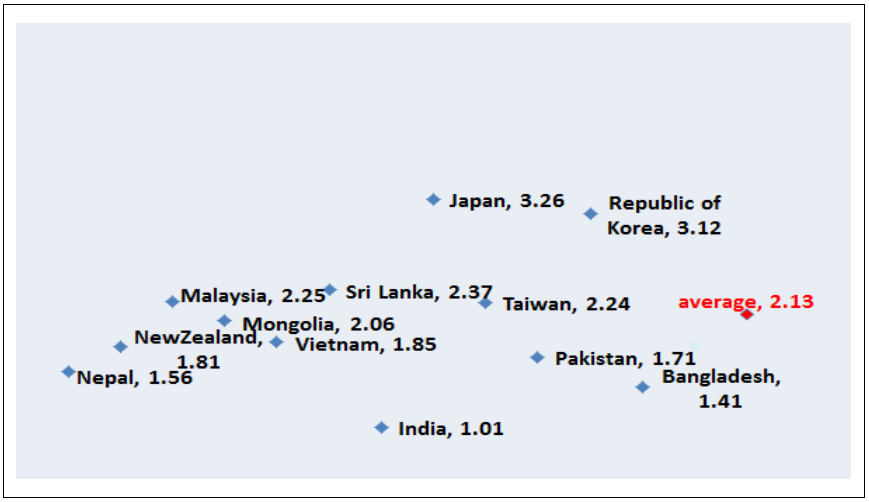


Fig. 4-7 shows the equality concept by country. The overall average of 2.13 showed that the respondents generally adopted a liberalist stance. A lower score for the statement “I believe that gender equality will be fully achieved if only women are given the same opportunities as men” indicates greater affirmation. The country with the highest average was Japan (3.26) followed by Korea (3.12). That is, female scientists and engineers in Japan and Korea feel that it is insufficient simply to have equal opportunities.

On the other hand, those in India (1.01) strongly agreed that equal opportunities were sufficient. India was followed by Bangladesh (1.41), Nepal (1.56), Pakistan (1.71), New Zealand (1.81), Vietnam (1.85), Mongolia (2.06), Taiwan (2.24) and Malaysia (2.25). The respondents were likely to have provided answers without fully comprehending the difference between equality in opportunities, equality in conditions and equality in outcome. As such, greater caution must be exercised in interpreting these results.

4.2.3 Analysis by item

This section provides an analysis of how the respondents' general characteristics such as age, marital status, number of children, occupation, and duration of career break influence the perception of gender barriers, career prospects, policy demands and gender role ideology. ANOVA was employed for the analysis, and Duncan's post hoc test was used to pinpoint where the differences lied when differences were statistically significant.

1. Boys rather than girls are encouraged to pursue majors in STEM.

The first question on the perception of discriminatory reality was "Boys rather than girls are encouraged to pursue majors in STEM." The responses to this question are summarized in Table 4-5. The overall average of 2.46 indicated slight agreement (the lower the score, the greater the affirmation). An analysis of responses by age showed that the differences were statistically significant. The lowest score of 2.32 was given by the age group younger than 29, who were more inclined to believe that gender discrimination exists since childhood in pursuing science and technology majors. This was followed by respondents in the 40-49 age group (2.43), followed by 50 or older, and 30-39 ($F=5.659$, $p\leq.001$). Duncan's post hoc test found significant differences between the age group younger than 29 and the 30-39 group. By marital status, the scores were similarly low between married (2.44) and single (2.46) respondents, but higher at 2.69 for those classified as other (divorced, separated, etc.). These differences, however, were not statistically significant. Differences arising from the number of children and period of career break were also not significant.

On the other hand, the differences were found to be significant by occupation. The group having the lowest average was healthcare professionals (2.18), followed by engineers (2.22). These two groups are likely to have been aware, from an early age, of gender discrimination in pursuing majors in STEM. The other groups (except "other,") in increasing order, were researchers (2.56), professors/teachers (2.64) and students (2.72) ($F=8.457$, $p\leq.000$). Post hoc analysis showed that the differences were significant between students and healthcare professionals, between students and engineers, and between students and jobs classified as other.

<Table 4-5. Boys are encouraged more than girls to go into the STEM field: Total>

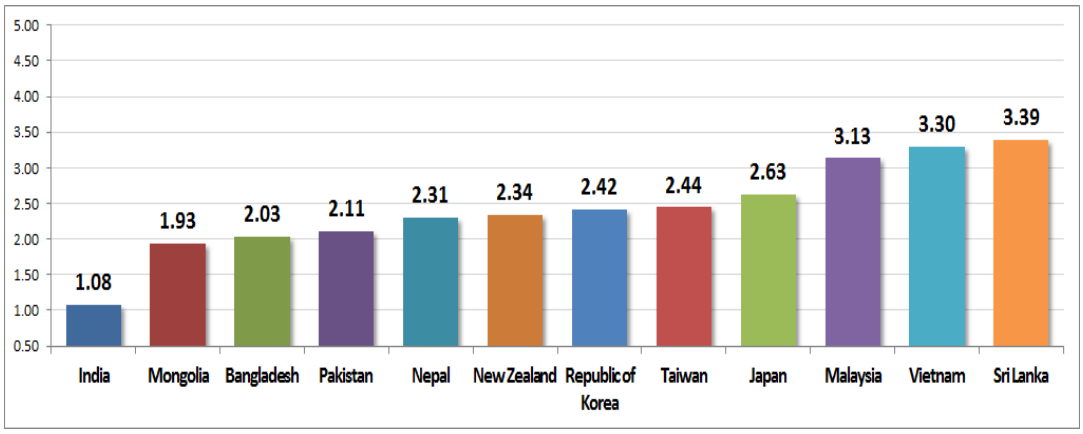
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.46	1.219		
Age				5.659	***(.001)
29 or below	541	2.32	1.199		
30~39	414	2.64	1.221		
40~49	210	2.43	1.189		
50 or above	206	2.54	1.255		
Marital status				1.714	(.180)
Single	576	2.46	1.234		
Married	709	2.44	1.201		
Other	88	2.69	1.254		
No. of children				1.993	(.113)
None	720	2.43	1.235		
1	231	2.44	1.188		
2	305	2.61	1.196		
3 or above	100	2.34	1.208		
Occupation				8.457	***(.000)
Student	219	2.72	1.189		
Teacher/professor	357	2.64	1.230		
Researcher	224	2.56	1.177		
Medical personnel	87	2.18	1.317		
Engineer	336	2.22	1.167		
Other	148	2.24	1.199		
Duration of career break				0.620	(.648)
None	665	2.45	1.214		
Less than 1 year	112	2.59	1.234		
1~2 years	155	2.40	1.236		
2~3 years	138	2.38	1.109		
3 years or more	270	2.49	1.281		

As shown in Fig. 4-8, India had the lowest average among countries, showing that female scientists and engineers in India strongly agreed with “Boys rather than girls are encouraged to pursue majors in STEM.” This was followed by Mongolia (1.93), Bangladesh (2.03), Pakistan (2.11) and Nepal (2.31). The country that disagreed most with the existence of gender discrimination in pursuing majors in STEM since childhood was Sri Lanka (3.39), followed by Vietnam (3.30). Korea, with an average of 2.42, fell in the middle of the 12 countries.

<Figure 4-8. Boys are encouraged more than girls to go into the STEM field: Average by nation>

(Lower scores mean more agreed unit: points)



2. Women face more difficulties than men in finding jobs in STEM despite having the same competence as their male counterparts.

The second question on the perception of discriminatory reality was “Women face more difficulties than men in finding jobs in STEM despite having the same competence as their male counterparts.” The overall average of respondents was 2.51, indicating that they acknowledged the presence of discrimination (see Table 4-6). An analysis of the results by age showed that the 40-49 age group had the lowest score. The 30-39 group and the group older than 50 had scores of 2.59 and 2.57, respectively, but the differences across age groups were not statistically significant. By marital status, married respondents had the lowest score (2.45), followed by single respondents (2.45) and respondents classified as other (divorced, separated, etc.) at 2.72. The differences arising from marital status and duration of career break were not significant.

On the other hand, differences arising from the number of children and occupation were significant. The group with three or more children had the lowest average of 2.35 (most aware of discrimination), and the group with no children had the highest average of 2.60 (least aware of discrimination). The group with one child had an average of 2.40, similar to that of the group with two children at 2.44 ($F=3.188$, $p\leq.023$). The post-hoc analysis showed statistically significant differences between the group with three or more children and the group with no children.

By occupation, healthcare professionals were the most aware of discrimination with the lowest average of 2.36. This was followed by researchers (2.41), engineers (2.50) and professors/teachers (2.51). Students had the highest average of 2.80. While this is lower than the median, they were relatively less aware of the discriminatory reality than other groups due to their lack of experience. The post-hoc analysis found significant differences between students and those in other occupation groups.

<Table 4-6. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications: Total>

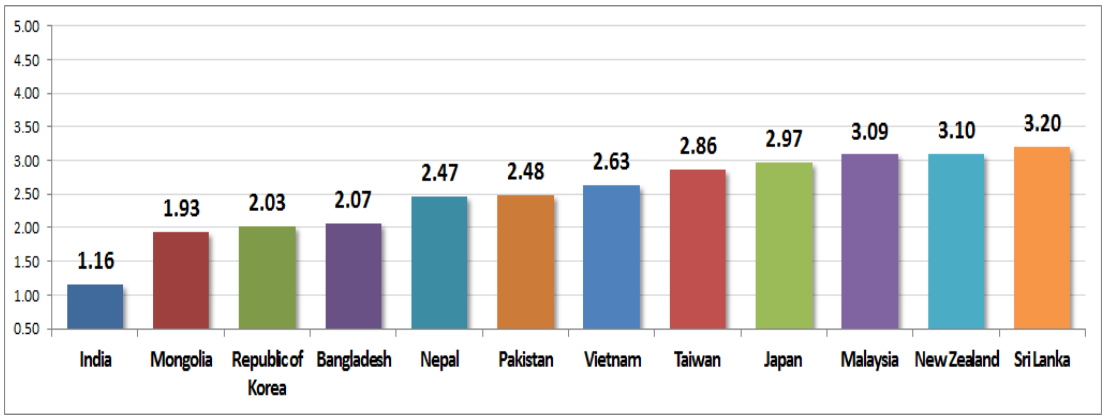
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.51	1.180		
Age				2.049	(.105)
29 or below	541	2.48	1.207		
30 ~ 39	414	2.59	1.152		
40 ~ 49	209	2.36	1.144		
50 or above	210	2.57	1.197		
Marital status				2.583	(.076)
Single	577	2.55	1.200		
Married	712	2.45	1.150		
Other	87	2.72	1.273		
No. of children				3.188	*(.023)
None	721	2.60	1.221		
1	232	2.40	1.080		
2	306	2.44	1.161		
3 or above	100	2.35	1.104		
Occupation				3.822	**(.002)
Student	219	2.80	1.162		
Teacher/professor	358	2.51	1.087		
Researcher	226	2.41	1.101		
Medical personnel	87	2.36	1.312		
Engineer	335	2.50	1.264		
Other	149	2.37	1.210		
Duration of career break				1.878	(.112)
None	664	2.51	1.188		
Less than 1 year	113	2.61	1.242		
1~2 years	156	2.59	1.223		
2~3 years	138	2.59	1.118		
3 years or more	270	2.34	1.132		

By country (see Fig. 4-9), India had the lowest average (1.16), which is similar to the results for the first question. In other words, female scientists and engineers in India strongly agreed that women face difficulties in finding jobs in STEM. This was followed by Mongolia (1.93) and Korea (2.03). That is, Korea was the third highest among the 12 countries to acknowledge that women face more difficulties than men in finding jobs in STEM despite having the same competence as their male counterparts. Sri Lanka, with the highest average of 2.30, was the least aware of discrimination. This was followed by New Zealand (3.10), Malaysia (3.09) and Japan (2.97).

<Figure 4-9. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications: Average by nation>

(Lower scores mean more agreed unit: points)



3. Female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators.

The third question on the perception of discriminatory reality was "Female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators." The overall average of 2.50 (a lower score indicates greater awareness of discrimination) indicates that the presence of discrimination is somewhat acknowledged (see Table 4-7). The analysis looked at whether the respondents showed any difference in perception according to individual variables. By age, the 40-49 group had the lowest average (2.44), while the age group younger than 29 had the highest (2.54). However, this difference was not significant. The difference arising from the duration of career break was also not significant.

On the other hand, differences arising from marital status, number of children and occupation were significant. By marital status, similar high scores were obtained for married respondents (2.42) and those classified as other (2.47). Single respondents had the highest average (2.61) ($F=4.062$, $p\leq.017$). That is, single women were the least aware that female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators. This can be attributed to the fact that single respondents, who are mostly students, have the least experience of gender discrimination. By the number of children, the group with three or more children had the lowest score (2.32), followed by the group with one child (2.34) and the group with two children (2.37). The group with no children had the highest average (2.63) ($F=5.735$, $p\leq.001$). This coincides with the results for differences arising from marital status. The post-hoc analysis found statistically significant differences between the group with no children and each of the other groups.

Differences arising from occupation were also statistically significant. Engineers (2.42) and healthcare professionals (2.43) had similarly low scores (indicating a high awareness of discrimination). This was followed by professors/teachers and researchers, which groups had the same score of 2.47. Similar to the results for the first two questions, students had the highest average (2.92) ($F=6.615$, $p\leq.000$). That is, students were the least aware of discrimination because of their lack of experience. The post-hoc analysis found significant differences between students and each of the other occupation groups.

<Table 4-7. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists: Total>

(Lower scores mean more agreed unit: person, points)

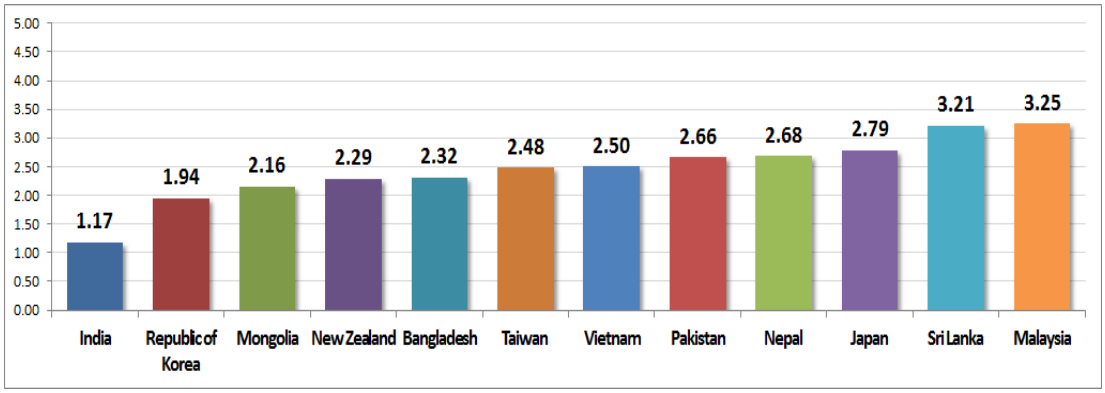
Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.50	1.235		
Age				0.499	(.683)
29 or below	541	2.54	1.274		
30 ~ 39	414	2.51	1.174		
40 ~ 49	209	2.44	1.192		
50 or above	209	2.46	1.297		
Marital status				4.062	*(.017)
Single	576	2.61	1.242		
Married	712	2.42	1.240		
Other	87	2.47	1.098		
No. of children				5.735	**(.001)
None	721	2.63	1.262		
1	231	2.34	1.212		
2	306	2.37	1.172		
3 or above	100	2.32	1.145		
Occupation				6.615	***(.000)
Student	219	2.92	1.211		
Teacher/professor	357	2.47	1.200		
Researcher	226	2.47	1.215		
Medical personnel	87	2.43	1.491		
Engineer	335	2.42	1.208		
Other	149	2.28	1.163		
Duration of career break				1.099	(.355)
None	663	2.52	1.238		
Less than 1 year	113	2.55	1.302		
1~2 years	155	2.47	1.316		
2~3 years	138	2.30	1.175		
3 years or more	270	2.44	1.145		

By country (see Fig. 4-10), female scientists and engineers in India had the lowest average (1.17), meaning they strongly agreed that female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators. Korea (1.94)

was the second highest, indicating that its female scientists and engineers were highly aware of gender discrimination. This was followed by Mongolia (2.16), New Zealand (2.29) and Bangladesh (2.32). On the other hand, Malaysia had the highest average of 3.25, followed by Sri Lanka (3.21). These two countries slightly disagreed that female scientists face more difficulties than male scientists in becoming full-time faculty or principal investigators.

<Figure 4-10. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists: Average by nation>

(Lower scores mean more agreed unit: points)



4. Women receive less wages than male colleagues having the same qualifications in the fields of science and technology.

The fourth question in the perception of discriminatory reality was “Women receive less wages than male colleagues having the same qualifications in the fields of science and technology.” The amount of wages received for the same work by gender is an important indicator showing the perception of discriminatory reality faced by women. For this reason, the gender wage gap is included in international indices related to gender equality (e.g. WEF’s GGI).

This question was used to determine the perception of respondents of gender discrimination in the amount of wages. The overall average of 2.93 was close to the median (see Table 4-8). The age group most aware of gender discrimination was aged 29 or younger (2.90), and the group least aware was in the range of 40-49 (3.07). This difference was not statistically significant. Differences arising from marital status, number of children and period of career break were also not significant.

On the other hand, the difference arising from occupation was statistically significant. Engineers were the most aware of the discriminatory reality faced by women in the amount of wages (2.54), followed by healthcare professionals (2.78), researchers

(3.08), students (3.15) and teachers/professors (3.30) (F=18.647, p≤.000). The post hoc analysis found no statistically significant differences between students, teachers/professors and researchers, but these groups showed significant differences with healthcare professionals, engineers and those classified as other.

<Table 4-8. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues: Total>

(Lower scores mean more agreed unit: person, points)

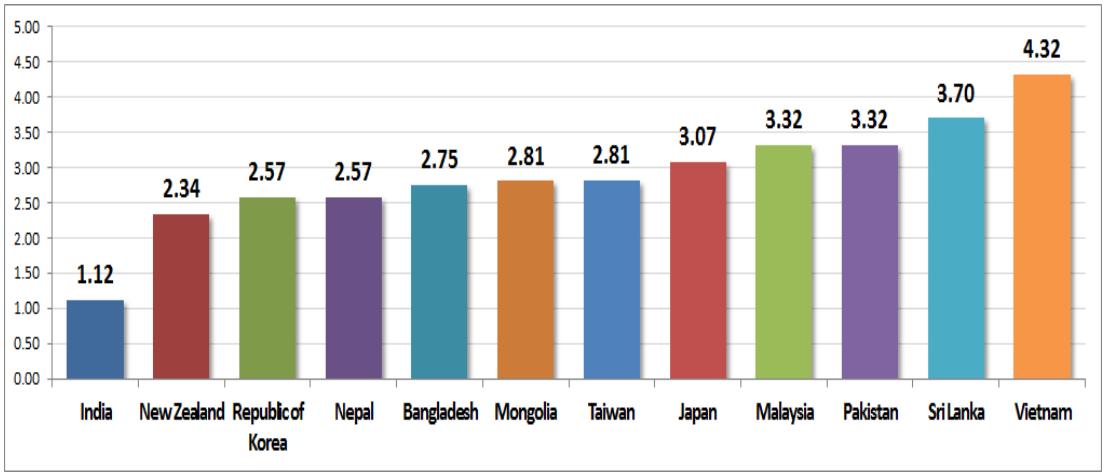
Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.93	1.318		
Age				2.569	(.053)
29 or below	541	2.82	1.316		
30 ~ 39	414	3.01	1.332		
40 ~ 49	209	3.07	1.354		
50 or above	210	2.90	1.247		
Marital status				1.805	(.165)
Single	577	2.85	1.292		
Married	712	2.99	1.318		
Other	87	2.95	1.470		
No. of children				1.902	(.127)
None	721	2.88	1.299		
1	232	2.95	1.347		
2	306	3.08	1.337		
3 or above	100	2.82	1.282		
Occupation				18.647	***(.000)
Student	219	3.15	1.189		
Teacher/professor	358	3.30	1.278		
Researcher	226	3.08	1.236		
Medical personnel	87	2.78	1.376		
Engineer	335	2.54	1.294		
Other	149	2.44	1.367		
Duration of career break				1.600	(.172)
None	664	2.85	1.301		
Less than 1 year	113	2.94	1.325		
1~2 years	156	2.90	1.314		
2~3 years	138	3.02	1.375		
3 years or more	270	3.07	1.349		

By country (see Fig. 4-11), female scientists and engineers in India (average of 1.12) were extremely aware of the gender wage gap, indicating that women in science and technology face a high level of discrimination in terms of wages. However, it should be noted that the average age of Indian respondents was 26.83, much lower than the overall average of 35.36. New Zealand ranked second (2.34), followed by Korea and Nepal in the third place (both 2.57). This shows that Korean scientists and engineers have a relatively high awareness of the gender wage gap. Vietnam (4.32) was the least aware

of this discriminatory reality, followed by Sri Lanka (3.70), Pakistan and Malaysia (3.32) and Japan (3.07). These five countries had scores lower than the median of 3.

<Figure 4-11. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues: Average by nation>

(Lower scores mean more agreed unit: points)



5. I have experienced disadvantages in participating in a research project or becoming a principal investigator because I am female.

The next four questions centered on the respondents' discriminatory experiences. The first was "I have experienced disadvantages in participating in a research project or becoming a principal investigator because I am female." The overall average was 3.00, which falls in the middle of the scale (see Table 4-9). There were no significant differences by age, marital status and number of children.

On the other hand, the differences arising from occupation and duration of career break were found to be significant. By occupation, healthcare professionals had experienced the most disadvantages (2.78), followed by engineers (2.83), teachers/professors (3.01), researchers (3.20) and students (3.35). Female healthcare professionals and engineers had faced more disadvantages in research projects, while students lacked such experiences ($F=8.601$, $p\leq.000$). This can be attributed to students having less project experience and their ineligibility as principal investigators compared to female scientists and engineers. The post hoc analysis found statistically significant differences between students and each of the other occupation groups, and between researchers and the other groups.

By duration of career break, a majority of respondents had taken a career break of 3 years or longer (2.77). This was followed by no career break (2.97), a break of 1-2

years and a break of 2-3 years (F=3.864, p≤.004). The post hoc analysis showed that the differences were significant between the group with a career break of 2-3 years, those without and those with a career break of 3 years or longer.

<Table 4-9. I have experienced disadvantages in leading or participating in research projects because I am a woman: Total>

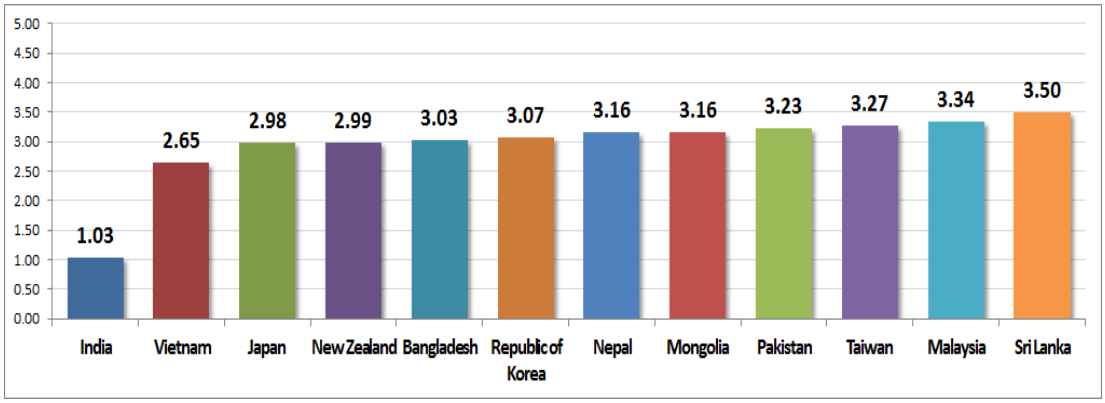
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.00	1.272		
Age				0.122	(.947)
29 or below	541	2.99	1.337		
30~39	412	3.00	1.253		
40~49	210	3.03	1.163		
50 or above	210	2.96	1.252		
Marital status				1.056	(.348)
Single	577	3.01	1.338		
Married	710	2.96	1.219		
Other	88	3.16	1.240		
No. of children				1.728	(.159)
None	722	3.03	1.326		
1	230	2.82	1.291		
2	306	3.00	1.158		
3 or above	100	3.07	1.112		
Occupation				8.601	***(.000)
Student	219	3.35	1.196		
Teacher/professor	356	3.01	1.222		
Researcher	226	3.20	1.222		
Medical personnel	87	2.78	1.298		
Engineer	336	2.83	1.281		
Other	149	2.66	1.369		
Duration of career break				3.864	**(.004)
None	665	2.97	1.307		
Less than 1 year	111	3.18	1.259		
1~2 years	156	3.07	1.340		
2~3 years	138	3.22	1.145		
3 years or more	270	2.77	1.203		

By country (see Fig. 4-12), the average of Indian respondents (1.03) was much lower than that of other countries. In other words, female scientists and engineers in India strongly agreed with this question, indicating a high level of gender inequality. This was followed by Vietnam (2.65), Japan (2.98), New Zealand (2.99), Bangladesh (3.03) and Korea (3.07). The level of discrimination experienced by female scientists and engineers in Korea was slightly below the median, but Korea was ranked 6th out of 12 countries. Sri Lanka had the least experience (3.50), followed by Malaysia (3.34), Taiwan (3.27) and Pakistan (3.23).

<Figure 4-12. I have experienced disadvantages in leading or participating in research projects because I am a woman: Average by nation>

(Lower scores mean more agreed unit: points)



6. I have experienced disadvantages in receiving research funds or scholarships because I am female.

The second question on discriminatory experiences was “I have experienced disadvantages in receiving research funds or scholarships because I am female.” The overall average for this question was 3.32 (the lower the score, the more acknowledgement of disadvantages), which was lower than the median (see Table 4-10). The difference arising from age was not significant. On the other hand, the difference arising from marital status was significant. Married respondents (3.21) had experienced the most disadvantages in receiving research funds or scholarships, followed by separated or divorced (3.39) and, finally, single respondents (3.43) ($F=5.245$, $p\leq.005$). The results of the post hoc analysis were not significant.

The difference arising from the number of children was also significant. Respondents with only one child faced the most disadvantages (3.06), followed by those with two children (3.14), those with three or more children (3.35) and those with no children (3.45) ($F=8.563$, $p\leq.000$). The post hoc analysis showed significant differences between the group with no children and the group with one child, and between the group with no children and the group with two children.

The respondents’ occupations were related to experiences of disadvantages in receiving research funds or scholarships. The group that faced the most disadvantages was healthcare professionals (3.08). This was followed by engineers (3.20), teachers/professors (3.22), researchers (3.63) and students (3.68) ($F=11.672$, $p\leq.000$). The post hoc analysis showed that students and researchers experienced fewer disadvantages compared to other occupation groups.

<Table 4-10. I have experienced disadvantages in receiving research funds or scholarships because I am a woman: Total>

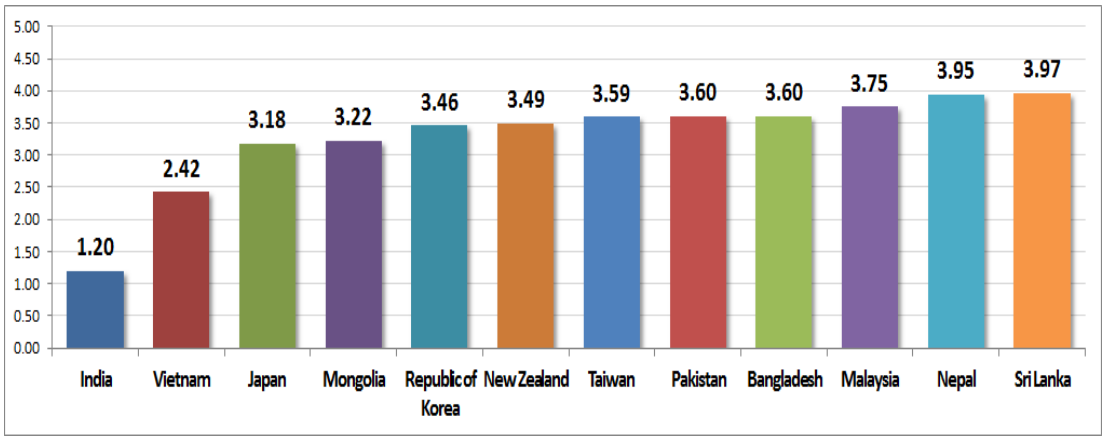
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.32	1.221		
Age					
29 or below	541	3.40	1.326		
30~39	414	3.24	1.199	1.539	(.203)
40~49	209	3.33	1.084		
50 or above	209	3.25	1.107		
Marital status					
Single	576	3.43	1.259		
Married	712	3.21	1.192	5.245	**(.005)
Other	87	3.39	1.145		
No. of children					
None	721	3.45	1.261		
1	231	3.06	1.248	8.563	***(.000)
2	306	3.14	1.107		
3 or above	100	3.35	1.038		
Occupation					
Student	219	3.68	1.176		
Teacher/professor	358	3.22	1.165		
Researcher	226	3.63	1.145	11.672	***(.000)
Medical personnel	87	3.08	1.241		
Engineer	334	3.20	1.182		
Other	149	2.96	1.394		
Duration of career break					
None	663	3.36	1.271		
Less than 1 year	113	3.58	1.209		
1~2 years	156	3.46	1.188	9.468	***(.000)
2~3 years	138	3.43	1.107		
3 years or more	270	2.92	1.130		

The duration of career break was also related to experiences of disadvantages in receiving research funds or scholarships. The group with a career break of 3 years or longer had an average (2.92) falling below the median, while the other groups had a score of at least 3. Those without career breaks experienced the most disadvantages (3.36), while those with a career break of less than a year faced the fewest disadvantages (3.58) ($F=9.468$, $p\leq.000$). The post hoc analysis showed that the group with a career break of three years or longer experienced significantly greater disadvantages than the other groups.

<Figure 4-13. I have experienced disadvantages in receiving research funds or scholarships because I am a woman: Average by nation>

(Lower scores mean more agreed unit: points)



Next, the experiences of discriminations or disadvantages in receiving research funds or scholarships were examined by country (see Fig. 4-13). The country where female scientists and engineers faced significantly greater disadvantages was India (1.20). This is consistent with the results for experiences of disadvantages in participating in research projects or becoming principal investigators. Vietnam was the second highest in terms of disadvantages experienced by female scientists and engineers in receiving research funds or scholarships (2.42). This was followed by Japan (3.18), Mongolia (3.22) and Korea (3.46). Female scientists and engineers in Sri Lanka faced the fewest disadvantages (3.97), followed by Nepal and Malaysia. All countries except India and Vietnam had scores higher than the median of 3, indicating that disadvantages in receiving research funds or scholarships were not that extensive.

7. I have been sexually harassed or received unfair treatment at work.

The third question on discriminatory experiences was “I have been sexually harassed or received unfair treatment at work.” The overall average for this question was 3.30 (a lower score indicating more experience of discrimination), which was lower than the median (see Table 4-11). By age, the average was higher for lower age groups (3.64 for respondents younger than 20, 3.26 for 30-39, 2.96 for 40-49 and 2.88 for 50 or older). The increase in experiences of sexual harassment or other unfair treatment with age can be interpreted as the result of having greater exposure to such incidents ($F=23.715$, $p\leq.000$). The post hoc analysis found significant differences between the age group younger than 29 and other groups, and between the 30-39 group and the 50 or older group. The difference arising from marital status was also significant. Single respondents had the highest average (3.45, least discriminatory experiences), followed by married (3.22) and those classified as other (3.01) ($F=6.876$, $p\leq.001$). The post hoc analysis found

significant differences between the single group and other groups. The difference arising from the number of children was found to be significant. The group with no children had the highest average (3.45), followed by the group with one child (3.33), the group with two children (3.17) and the group with three or more children (2.78). This is because older groups, who have had more exposure to unfair treatment with age, are likely to be parents to more children (F=8.070, p≤000). The post hoc analysis found significant differences between the group with three or more children and each of the other groups.

The difference arising from occupation was significant. Engineers were the most experienced in terms of sexual harassment or other unfair treatment (3.15), followed by researchers (3.17) and healthcare professionals (3.18). Groups with relatively fewer experiences of sexual harassment and unfair treatment were teachers/professors (3.29) and students (3.55) (F=4.518, p≤.000). The post hoc analysis found that students had experienced significantly fewer disadvantages compared to each of the other occupation groups: researchers, engineers and healthcare professionals. Lastly, the difference arising from the period of career break was also significant. The group with a career break of 3 or more years (3.04) had experienced the most sexual harassment or unfair treatment, followed by the group with a career break of 2-3 years (3.03), the group with a career break of 1-2 years (3.35), the group with a career break of less than 1 year (3.35) and the group with no career break (3.46) (F=6.308, p≤.000). In the post hoc analysis, the group with no career break, the group with a career break of less than 1 year and the group with a career break of 1-2 years showed significant differences compared to each of the remaining two groups (2-3 years, 3 or more years).

The experiences of sexual harassment and other unfair treatment among female scientists and engineers were examined by country (see Fig. 4-14). The country with the most experience of gender discrimination was New Zealand (2.57), followed by Mongolia (22.61), Korea (2.86) and Japan (2.91). On the other hand, the country with the highest score, indicating the least experience of sexual harassment or other unfair treatment, was India (4.91). This is in contrast to the results for perception of discriminatory reality and discriminatory experiences, for which India obtained the lowest scores (indicating high levels of discrimination). Female scientists and engineers in India experienced more discrimination than their counterparts in other countries, but less discrimination in terms of sexual harassment or other unfair treatment. This was followed by Sri Lanka (3.74), Vietnam (3.61), Pakistan (3.60), Bangladesh (3.50) and Malaysia (3.45). Korea, with an average of 2.86, was the third highest among countries. The two countries with more sexual harassment and unfair treatment than Korea were Mongolia (2.61) and New Zealand (2.57).

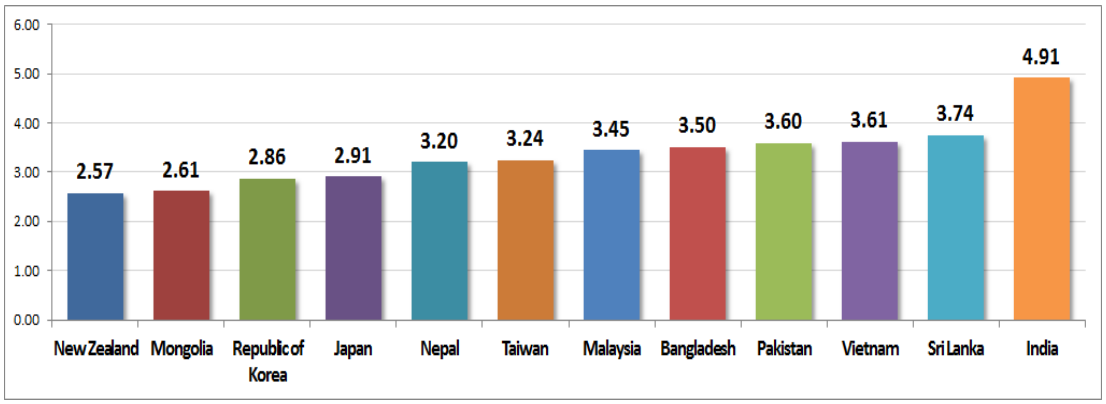
<Table 4-11. I have experienced sexual harassment or unfair treatments sometime in my career: Total>

(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.30	1.356		
Age					
29 or below	541	3.64	1.331	23.715	***(.000)
30 ~ 39	414	3.26	1.315		
40 ~ 49	211	2.96	1.303		
50 or above	210	2.88	1.338		
Marital status					
Single	577	3.45	1.377	6.876	**(.001)
Married	713	3.22	1.331		
Other	88	3.01	1.326		
No. of children					
None	723	3.42	1.398	8.070	***(.000)
1	232	3.33	1.350		
2	306	3.17	1.253		
3 or above	100	2.78	1.160		
Occupation					
Student	219	3.55	1.208	4.518	***(.000)
Teacher/professor	358	3.29	1.275		
Researcher	226	3.17	1.295		
Medical personnel	87	3.18	1.559		
Engineer	337	3.15	1.424		
Other	149	3.62	1.469		
Duration of career break					
None	665	3.46	1.391	6.308	***(.000)
Less than 1 year	113	3.35	1.374		
1~2 years	156	3.28	1.444		
2~3 years	138	3.03	1.226		
3 years or more	270	3.04	1.235		

<Figure 4-14. I have experienced sexual harassment or unfair treatments sometime in my career: Average by nation>

(Lower scores mean more agreed unit: points)



8. Maintaining work-life balance (marriage, family) has been a handicap in my career.

The last question on discriminatory experiences was "Maintaining work-life balance (marriage, family) has been a handicap in my career." Similar to the other questions on the gender barriers, a lower score indicates more discriminatory experiences. The overall average was 2.60, which means the respondents struggled to maintain work-life balance (see Table 4-12). By age, the 39-39 group had the lowest average (2.30). This can be attributed to this group having children of an age demanding more attention and caretaking. This was followed by the 40-49 group (2.45), the 40 or older group (2.54) and the 29 or younger group (2.91). That is, maintaining work-life balance was most difficult for the 30-39 group and the least difficult for the 29 or younger group ($F=22.334$, $p\leq.000$). The post hoc analysis found significant differences between the 29 or younger group and each of the remaining age groups.

The struggle to maintain work-life balance varied significantly with marital status. Married respondents (2.31) and divorced/separated respondents (2.32) faced more difficulties than respondents who were single (3.01) ($F=60.113$, $p\leq.000$). The post hoc analysis obtained consistent results. In addition, the difference arising from the number of children was significant. That is, the group with two children faced the most difficulties (2.11), followed by the group with one child (2.26), the group with three or more children (2.40) and the group without children (2.94) The post hoc analysis showed significant differences between the group without children and each of the remaining groups ($F=46.465$, $p\leq.000$).

The difference arising from occupation was significant as well. Teachers/professors struggled the hardest to maintain work-life balance (2.24). This was followed by healthcare professionals (2.48), researchers (2.56), engineers (2.70) and students (3.07) ($F=14.258$, $p\leq.000$). It is expected that students, who are younger and single, face the fewest challenges in maintaining work-life balance. The post hoc analysis found significant differences between students and each of the other groups.

Finally, the difference arising from the duration of career break was significant. The group with a career break of more than 3 years expressed the strongest agreement to the given statement (1.99). This was followed by the group with a career break of 2-3 years (2.38), a career break of less than 1 year (2.53), a career break of 1-2 years (2.74) and no career break (2.86) ($F=28.237$, $p\leq.000$). The post hoc analysis found significant differences between the group with a career break of 3 or more years and each of the remaining groups.

<Table 4-12. Balancing work and life has been a handicap for me: Total>

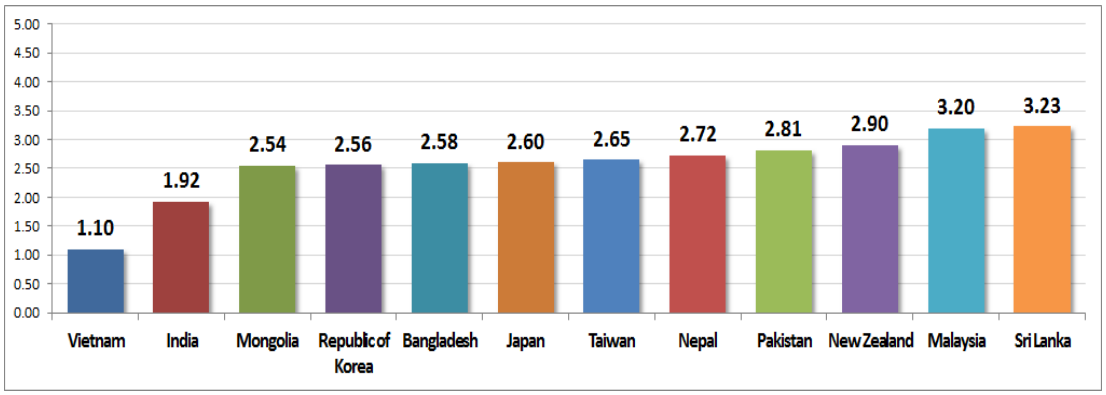
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.60	1.217		
Age				22.334	***(.000)
29 or below	541	2.91	1.146		
30~39	414	2.30	1.250		
40~49	210	2.45	1.210		
50 or above	210	2.54	1.154		
Marital status				60.113	***(.000)
Single	577	3.01	1.143		
Married	712	2.31	1.188		
Other	88	2.32	1.170		
No. of children				46.465	***(.000)
None	722	2.94	1.136		
1	232	2.26	1.210		
2	306	2.11	1.169		
3 or above	100	2.40	1.155		
Occupation				14.258	***(.000)
Student	219	3.07	1.121		
Teacher/professor	358	2.24	1.213		
Researcher	226	2.56	1.154		
Medical personnel	87	2.48	1.363		
Engineer	336	2.70	1.149		
Other	149	2.70	1.256		
Duration of career break				28.237	***(.000)
None	665	2.86	1.131		
Less than 1 year	113	2.53	1.150		
1~2 years	156	2.74	1.358		
2~3 years	138	2.38	1.167		
3 years or more	270	1.99	1.174		

The career handicap caused by maintaining work-life balance among female scientists and engineers was examined by country (see Fig. 4-15). Among the 12 countries, Vietnam had the lowest score (1.10), indicating the most struggle to maintain work-life balance. This was followed by India (1.92), Mongolia (2.54), Korea (2.56), Bangladesh (2.58), Japan (2.60) and Taiwan (2.65). The country with the highest average was Sri Lanka (3.23), followed by Malaysia (3.20). Female scientists and engineers in Sri Lanka and Malaysia gave scores lower than the median. The two countries were followed by New Zealand (2.90), Pakistan (2.81) and Nepal (2.72). Among the 12 countries, Korea was the fourth highest in terms of difficulties associated with maintaining work-life balance.

<Figure 4-15. Balancing work and life has been a handicap for me: Average by nation>

(Lower scores mean more agreed unit: points)



9. Men must be the breadwinner of households

The next four questions were used to examine the gender role ideology of respondents. The overall average for the first statement "Men must be the breadwinner of households" was 3.55 (see Table 4-13). A higher score indicates a more progressive attitude. As such, we can see that the respondents generally adopted a progressive stance toward the role of men as breadwinners. By age, the 29 or younger group (2.62) and the 30-39 group (2.63) had similarly high scores, followed by the 49-49 group (3.43) and the 50 or older group (3.33) ($F=3.409$, $p\leq.017$). Younger respondents were more progressive when it came to the role of breadwinner. The post hoc analysis found no significant differences between the 29 or younger group and the 30-39 group, and between the 40-49 group and the 50 or older group.

The difference arising from marital status was significant. Single respondents had a higher average (3.68) than married (3.46) or divorced/separated respondents (3.46), indicating that respondents who were single had a more progressive attitude toward the role of breadwinner ($F=4.306$, $p\leq.014$). The difference arising from the number of children was also significant. That is, the group with no children had the highest average (3.65), followed by the group with one child (3.57), the group with two children (3.553) and the group with three or more children (2.94). Those with more children had a more conservative gender role ideology toward the role of breadwinner ($F=8.410$, $p\leq.000$). The post hoc analysis found significant differences between the group with three or more children and each of the other groups.

The difference arising from occupation was significant. The group with the highest score was researchers (3.78), and the group with the lowest was healthcare professionals (3.28) ($F=5.113$, $p\leq.000$). The post hoc analysis found significant differences between students/teachers/professors/healthcare professionals and

researchers/engineers/others. Lastly, the difference arising from the period of career break was not significant.

<Table 4-13. Primary breadwinners of households should be men: Total>

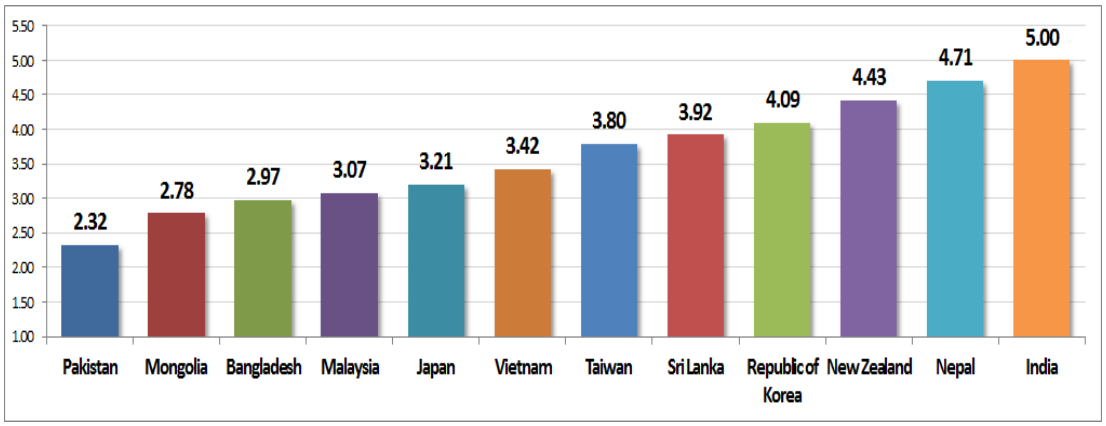
(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.55	1.343		
Age				3.409	*(.017)
29 or below	541	3.62	1.357		
30 ~ 39	413	3.63	1.303		
40 ~ 49	211	3.43	1.348		
50 or above	210	3.33	1.353		
Marital status				4.306	*(.014)
Single	577	3.68	1.315		
Married	712	3.46	1.358		
Other	88	3.45	1.347		
No. of children				8.410	***(.000)
None	723	3.65	1.357		
1	232	3.57	1.314		
2	305	3.53	1.251		
3 or above	100	2.94	1.391		
Occupation				5.113	***(.000)
Student	219	3.43	1.215		
Teacher/professor	358	3.36	1.255		
Researcher	226	3.78	1.187		
Medical personnel	87	3.28	1.654		
Engineer	336	3.66	1.414		
Other	149	3.77	1.485		
Duration of career break				1.558	(.183)
None	665	3.59	1.383		
Less than 1 year	113	3.62	1.429		
1~2 years	155	3.68	1.352		
2~3 years	138	3.50	1.245		
3 years or more	270	3.40	1.253		

The responses to “Men must be the breadwinner of households” were examined by country (see Fig. 4-16). India, at 5 out of 5, had the highest average. This means that all Indian respondents disagreed with the given statement. Again, this is related to Indian respondents having a younger average age of 26.82 than the overall average of 35.36. The countries that followed were Nepal (4.71), New Zealand (4.43), Korea (4.09), Sri Lanka (3.93) and Taiwan (3.80). The country with the lowest average was Pakistan (2.32), followed by Mongolia (2.78) and Bangladesh (2.97). Female scientists and engineers in these countries had a relatively conservative outlook on the role of the breadwinner. Korea had an average of 4.09, and Japan was lower at 3.21. This means that Korean respondents adhered less strongly than Japanese respondents to the belief that men must be the breadwinner of households.

<Figure 4-16. Primary breadwinners of households should be men: Average by nation>

(Lower scores mean more agreed unit: points)



10. Women have an innate ability to take care of children, but men do not.

The second question used to examine gender role ideology was "Women have an innate ability to take care of children, but men do not." The purpose of this question was to determine whether respondents associated the role of caretaking to an innate gender-based ability. The overall average was 3.34, which indicates a slightly progressive attitude (see Table 4-14). The female scientists and engineers who participated in this study had a level of gender sensibility that enabled them to distinguish between the biological function of childbirth (sex) and the social role of childcare (gender).

By age, the 30-39 group had the highest average (3.44), followed by the 29 or younger group (3.39), the 40-49 group (3.26) and the 50 or older group (3.07) ($F=4.148$, $p\leq.006$). The post hoc analysis found significant differences between the 50 or older group, the 29 or younger group and the 30-39 group. The differences arising from marital status or period of career break were not significant. The group with one child had the highest average (3.42), followed by the group with two children (3.38), no children (3.36) and three or more children (2.89) ($F=4.204$, $p\leq.006$). The post hoc analysis found significant differences between the group with three or more children and each of the remaining groups.

The difference arising from occupation was also significant. Excluding the respondents having jobs classified as other, engineers had the highest average (3.49). This was followed by students and teachers/professors (both 3.29), healthcare professionals (3.22) and researchers (3.11) ($F=3.721$, $p\leq.002$). The post hoc analysis found significant differences between researchers and engineers, and between researchers and other groups.

<Table 4-14. Women are born to have a way of caring children that men are not capable of in the same way: Total>

(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.34	1.347		
Age				4.148	**(.006)
29 or below	540	3.39	1.415		
30 ~39	413	3.44	1.322		
40 ~ 49	211	3.26	1.273		
50 or above	210	3.07	1.259		
Marital status				.296	(.744)
Single	576	3.37	1.383		
Married	712	3.32	1.324		
Other	88	3.28	1.304		
No. of children				4.204	**(.006)
None	722	3.36	1.390		
1	232	3.42	1.330		
2	305	3.38	1.225		
3 or above	100	2.89	1.270		
Occupation				3.721	**(.002)
Student	219	3.29	1.287		
Teacher/professor	358	3.29	1.239		
Researcher	226	3.11	1.385		
Medical personnel	87	3.22	1.536		
Engineer	335	3.49	1.329		
Other	149	3.61	1.464		
Duration of career break				1.484	(.205)
None	664	3.33	1.418		
Less than 1 year	113	3.13	1.424		
1~2 years	155	3.28	1.390		
2~3 years	138	3.34	1.310		
3 years or more	270	3.48	1.123		

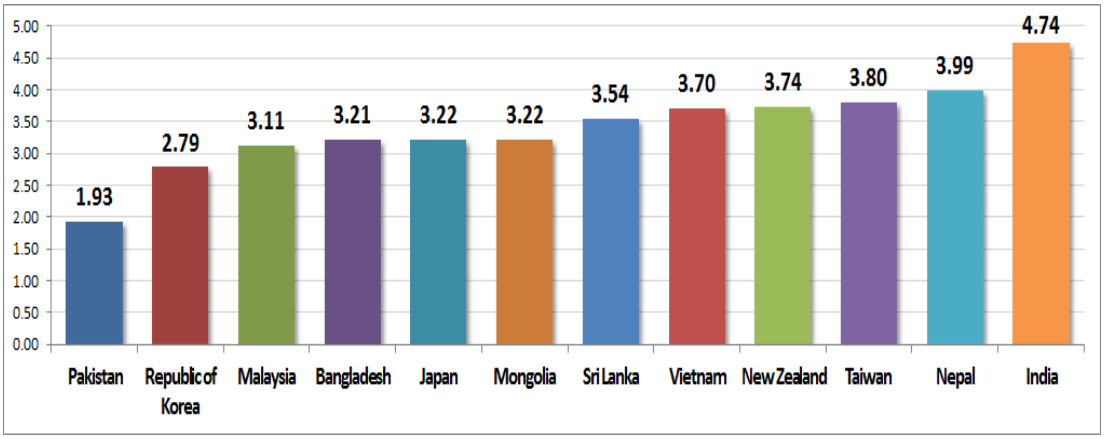
The responses to “Women have an innate ability to take care of children, but men do not” were analyzed by country (see Fig. 4-17). Female scientists and engineers in India had the highest average, meaning that they were the most progressive (4.74). This was followed by Nepal (3.99), Taiwan (3.80), New Zealand (3.74) and Vietnam (3.70). The country with the lowest average was Pakistan (1.93). Female scientists and engineers in Pakistan were highly conservative, believing that women have an innate ability to take care of children.

Korea, with a score slightly lower than the median, was a distant second to Sri Lanka (2.79). Compared to other APNN member countries, Korea has a conservative attitude toward the role of childcare. Korean mothers are increasingly burdened with the responsibility for childcare and private education. Women’s career breaks have grown more severe in spite of improved policies for work-life balance. In the process of

expanding work-life balance policies, the government has associated work-life balance mostly with women. This social atmosphere may have influenced Korean respondents to be more conservative.

<Figure 4-17. Women are born to have a way of caring children that men are not capable of in the same way: Average by nation>

(Lower scores mean more agreed unit: points)



11. Husbands must have more power and authority than wives for peace and order in the household.

The third question to determine gender role ideology was “Husbands must have more power and authority than wives for peace and order in the household.” This question was used to assess the respondents’ perception regarding patriarchal gender relations, which is a factor driving inequality between genders. The overall average was 3.78, meaning that the respondents generally disagreed (see Table 4-15). That is, the respondents had a fairly progressive attitude.

The difference arising from age was significant. The 29 or younger group had the highest average (3.94), followed by the 30-39 group (3.77), the 40-49 group (3.72) and the 50 or older group (3.43). That is, younger respondents were more inclined to be progressive ($F=7.845$, $p\leq.000$). The post hoc analysis found no significant difference between the 30-39 group and the 40-49 group, but the differences between other groups were significant.

The difference arising from marital status was significant. Single respondents (3.92) had a higher average than married respondents (3.68), indicating that the former group was more progressive ($F=5.333$, $p\leq.005$). Similar trends were observed for the difference arising from the number of children. That is, the respondents with no children had the highest average (3.92), followed by those with one child (3.81), those with two children (3.62) and those with three or more children (3.62). The more the number of

children, the more conservative (F=9.305, p≤.000). The post hoc analysis found significant differences between the group with three or more children and each of the other groups.

<Table 4-15. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife: Total>

(Lower scores mean more agreed unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.78	1.327		
Age				7.845	***(.000)
29 or below	541	3.94	1.275		
30~39	413	3.77	1.346		
40~49	211	3.72	1.259		
50 or above	210	3.43	1.420		
Marital status				5.333	**(.005)
Single	577	3.92	1.274		
Married	712	3.68	1.354		
Other	88	3.72	1.373		
No. of children				9.305	***(.000)
None	723	3.92	1.294		
1	232	3.81	1.308		
2	305	3.62	1.333		
3 or above	100	3.27	1.325		
Occupation				6.399	***(.000)
Student	219	3.80	1.183		
Teacher/professor	358	3.47	1.263		
Researcher	226	3.97	1.254		
Medical personnel	87	3.63	1.549		
Engineer	336	3.92	1.367		
Other	149	3.97	1.430		
Duration of career break				9.011	***(.000)
None	665	3.87	1.328		
Less than 1 year	113	4.02	1.295		
1~2 years	155	3.99	1.294		
2~3 years	138	3.83	1.194		
3 years or more	270	3.38	1.319		

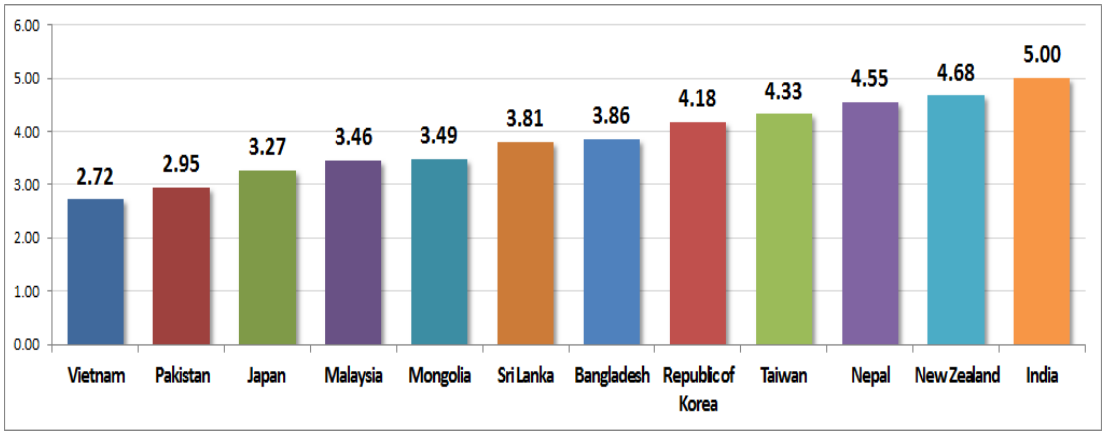
The difference arising from occupation was also significant. Researchers had the highest average (3.97), followed by engineers (3.92), students (3.80), healthcare professionals (3.63) and teachers/professors (3.47) (F=6.399, p≤.000). That is, researchers were the most progressive and teachers/professors the most conservative when it came to power relations between husband and wife. Similarly, the difference arising from the period of career break was found to be significant. The group with a career break of less than 1 year had the highest average (4.02), followed by the group with a career break of 1-2 years (3.99), the group without any career break (3.87), the

group with a career break of 2-3 years (3.83) and the group with a career break of 3 or more years (3.38) (F=9.011, p≤.000). The post hoc analysis found significant differences between the group with a career break of 3 or more years and each of the other groups.

The statement "Husbands must have more power and authority than wives for peace and order in the household" was used to examine how the respondents' perception of patriarchy and gender relations varied by country (see Fig. 4-18). India, with an average of 5, expressed the strongest disagreement. This was consistent with the results for the role of breadwinner. India was followed by New Zealand (4.68), Nepal (4.55), Taiwan (4.33) and Korea (4.18). The country with the lowest score was Vietnam (2.72), followed by Pakistan (2.95) and Japan (3.27). Compared to their counterparts in Japan and Korean scientists and engineers were more progressive regarding the power relationship between husbands and wives.

<Figure 4-18. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife: Average by nation>

(Lower scores mean more agreed unit: points)



12. Men and women must assume adequate roles because the former tend to be more rational and the latter more emotional.

The last question to determine gender role ideology was "Men and women must assume adequate roles because the former tend to be more rational and the latter more emotional." This question was used to examine the stereotype that men are more rational and women more emotional. The overall average was 2.92, slightly lower than the median (see Table 4-16). The respondents gave the most conservative responses to this question out of the four questions on gender role ideology.

By age, the 40-49 group had the lowest average (2.67), and the 29 or younger group the highest (2.99) (F=2.848, p≤.036). Both groups had an average below 3, but we can see that the 49-49 group was more conservative than the 29 or younger group. The

post hoc analysis found significant differences between the 40-49 group and the other groups. The difference arising from marital status was also significant. That is, single respondents (3.03) were more progressive than married (2.83) and divorced/separated respondents (2.93) (F=3.460, p≤.036). By the number of children, the group with no children had the highest average (3.10), followed by the group with one child (2.86), the group with two children (2.73) and the group with three or more children (2.48). That is, the higher the number of children, the more conservative the attitude (F=9.338, p≤.000). The post hoc analysis found significant differences between the group with three or more children and the group without, between the group with three or more children and the group with one child, and between the group with two children and the group without.

<Table 4-16. Men are rational while women are emotional and they ought to complement each other: Total>

(Lower scores mean more agreed, unit: person, points)

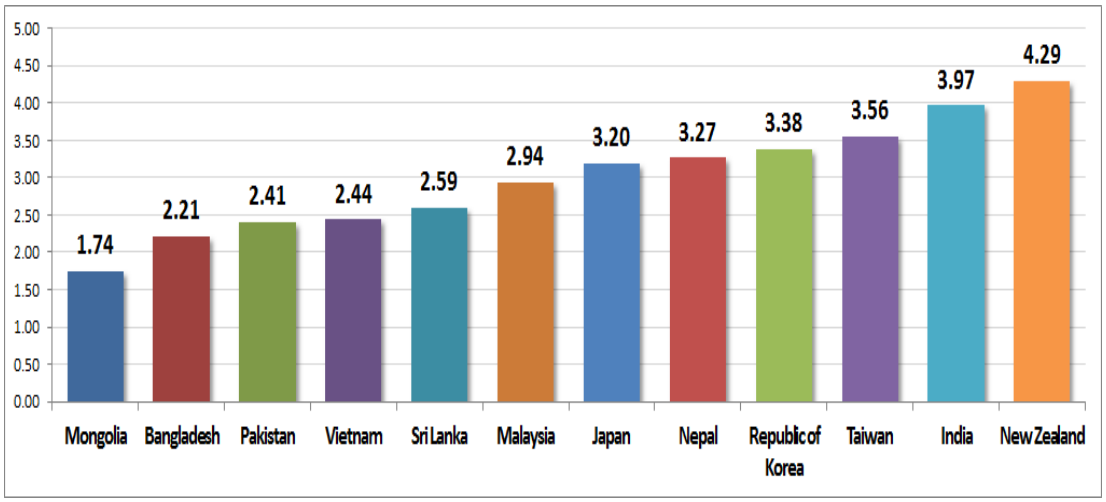
Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.92	1.387		
Age				2.848	*(.036)
29 or below	541	2.99	1.387		
30 ~ 39	413	2.95	1.362		
40 ~ 49	211	2.67	1.371		
50 or above	210	2.95	1.434		
Marital status				3.460	*(.032)
Single	577	3.03	1.382		
Married	712	2.83	1.371		
Other	88	2.93	1.515		
No. of children				9.338	***(.000)
None	723	3.10	1.394		
1	232	2.86	1.421		
2	305	2.73	1.266		
3 or above	100	2.48	1.439		
Occupation				3.559	**(.003)
Student	219	2.95	1.298		
Teacher/professor	358	2.76	1.263		
Researcher	226	3.02	1.405		
Medical personnel	87	2.53	1.539		
Engineer	336	3.02	1.436		
Other	149	3.11	1.509		
Duration of career break				8.699	***(.000)
None	665	3.09	1.400		
Less than 1 year	113	2.96	1.426		
1~2 years	155	3.03	1.468		
2~3 years	138	2.73	1.412		
3 years or more	270	2.54	1.215		

The difference arising from occupation was significant as well. Researchers and engineers (both 3.02) had the highest average, followed by students (2.95), teachers/professors (2.76) and healthcare professionals (2.53) (F=3.559, p≤.003). That is, healthcare professionals were most inclined to associate rational and emotional characteristics with specific genders. Finally, the difference arising from the period of career break was also significant. The group without any career break had the highest average (3.09), followed by the group with a career break of 1-2 years (3.03), the group with a career break less than 1 year (2.96), the group with a career break of 2-3 years (2.73) and the group with a career break of 3 or more years (2.54) (F=8.699, p≤.000). The post hoc analysis found no significant difference between those without any career break, those with a career break less than 1 year and those with a career break of 1-2 years. However, significant differences were found between the group with a career break of 3 or more years, the group with a career break of 1-2 years and the group without any career break.

The responses to "Men and women must assume adequate roles because the former tend to be more rational and the latter more emotional" were examined by country (see Fig. 4-19). New Zealand had the highest average (4.29), meaning that it was the most progressive. This was followed by India (3.97), Taiwan (3.56), Korea (3.38), Nepal (3.27) and Japan (3.20). The country with the lowest average was Mongolia (1.74), followed by Bangladesh (2.21), Pakistan (2.41) and Vietnam (2.44). That is, Mongolian scientists and engineers were the most conservative when it came to stereotypes of men being more rational and women being more rational, followed by their peers in Bangladesh, Pakistan and Vietnam.

<Figure 4-19. Men are rational while women are emotional and they ought to complement each other: Average by nation>

(Lower scores mean more agreed, unit: points)



13. I believe my career will go well.

This question examines how female scientists and engineers of APNN member countries regard their career prospects. The overall average for the statement "I believe my career will go well" was 3.70 (see Table 4-17), indicating a fairly positive outlook. The difference was significant by age. The 29 or younger group had the highest score (3.88), followed by the 30-39 group (3.64), the 40-49 group (3.62) and the 50 or younger group (3.43). That is, younger respondents envisioned more gloomy career prospects (F=11.241, p≤.000). The post hoc analysis found significant differences between the 50 or older group and each of the remaining groups and between the 29 or younger group and each of the remaining groups.

<Table 4-17. I believe things will turn out fine in my future career: Total>

(Higher scores mean more agreed, unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	3.70	1.044		
Age				11.241	***(.000)
29 or below	541	3.88	1.047		
30~39	412	3.64	1.027		
40~49	211	3.62	.971		
50 or above	210	3.43	1.066		
Marital status				5.126	**(.006)
Single	577	3.80	1.104		
Married	711	3.64	.985		
Other	88	3.50	1.050		
No. of children				2.982	*(.030)
None	723	3.76	1.090		
1	231	3.69	1.042		
2	305	3.54	.928		
3 or above	100	3.72	.944		
Occupation				5.547	***(.000)
Student	219	3.78	1.125		
Teacher/professor	356	3.63	.951		
Researcher	226	3.53	1.038		
Medical personnel	87	4.17	.979		
Engineer	337	3.73	1.033		
Other	149	3.65	1.121		
Duration of career break				3.250	*(.012)
None	665	3.76	1.077		
Less than 1 year	113	3.61	1.114		
1~2 years	156	3.69	1.139		
2~3 years	136	3.83	.865		
3 years or more	270	3.53	.919		

By marital status, single respondents had the brightest career prospects (3.80), followed by married respondents (3.64) and respondents classified as other (3.50)

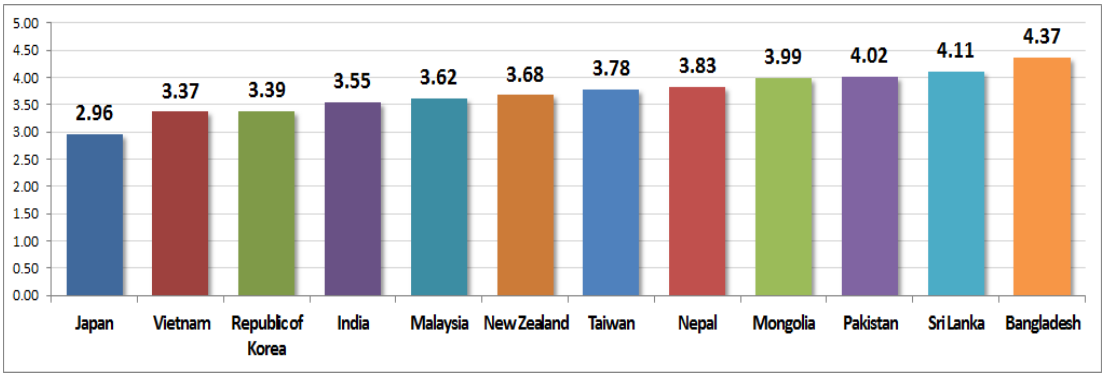
(F=5.126, p≤.006). The post hoc analysis found no significant difference between married respondents and those classified as other. However, the difference between single respondents and each of the other two groups was significant. Career prospects were also related to the number of children. That is, the group without children and the group with three or more children (3.72) had brighter prospects than the group with one child (3.69) and the group with two children (3.54) (F=2.982, p≤.030). The post hoc analysis found no significant difference between groups.

Career prospects differed according to the respondents' occupations. Healthcare professionals had the brightest career prospects (4.17), followed by students (3.78), engineers (3.73), teachers/professors (3.63) and engineers (3.53) (F=5.547, p≤.000). The post hoc analysis found significant differences between healthcare professionals and each of the remaining groups. The difference arising from the period of career break was also significant. The group with a career break of 2-3 years had the brightest career prospects (3.83), followed by students (3.76), the group with a career break of 1-2 years (3.69) and the group with a career break less than 1 year (3.61) (F=3.250, p≤.012). The post hoc analysis found significant differences between the group with a career break of 3 or more years and the group with a career break of 2-3 years and between the group with a career break of 3 or more years and the group without any career break.

The career prospects of female scientists and engineers were examined by country (see Fig. 4-20). Among the 12 countries, Bangladesh had the highest score (4.37), indicating that its female scientists and engineers were the most positive. This was followed by Sri Lanka (4.11), Pakistan (4.02) and Mongolia (3.99). Meanwhile, female scientists and engineers in Japan had the gloomiest outlook (2.96). This can be attributed to Japanese respondents having a higher-than-average age of 50.89, which was also the oldest among the 12 APNN member countries. The countries that followed were Vietnam (3.37) and Korea (3.39). Female scientists and engineers in Korea cannot be seen as being highly positive toward their career prospects.

<Figure 4-20. I believe things will turn out fine in my future career: Average by nation>

(Higher scores mean more agreed, unit: points)



14. Strong policies are necessary to overcome gender inequality in STEM fields.

This question examined the policy demands of female scientists and engineers. The overall average for the statement "Strong policies are necessary to overcome gender inequality in STEM fields" was 4.07 (see Table 4-18). Since the scores were reverse coded, we can consider the respondents as having high policy demands. The difference arising from age was significant. That is, the 30-39 age group had the highest policy demands (4.20), followed by the 29 or younger group (4.10), the 40-49 group (4.03) and the 50 or older group (3.80) ($F=6.981$, $p\leq.000$). The post hoc analysis found that the 50 or older group had significantly lower policy demands than other age groups. The differences arising from marital status or the number of children were not significant.

<Table 4-18. It is crucial to have strong policy support to solve gender inequality in the STEM field: Total>

(Higher scores mean more agreed, unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	1,379	4.07	1.070		
Age					
29 or below	541	4.10	1.015		
30~39	414	4.20	.955	6.981	***(.000)
40~49	210	4.03	1.124		
50 or above	210	3.80	1.302		
Marital status					
Single	577	4.02	1.080		
Married	712	4.09	1.044	1.188	(.305)
Other	88	4.18	1.209		
No. of children					
None	722	4.02	1.098		
1	232	4.11	1.071	1.782	(.149)
2	306	4.18	1.022		
3 or above	100	4.05	.957		
Occupation					
Student	219	3.85	1.156		
Teacher/professor	358	4.12	1.000		
Researcher	226	4.09	1.110	3.112	**(.008)
Medical personnel	87	4.18	.947		
Engineer	336	4.17	1.083		
Other	149	3.95	1.045		
Duration of career break					
None	665	4.04	1.070		
Less than 1 year	113	3.90	1.217		
1~2 years	156	3.91	1.183	4.820	**(.001)
2~3 years	138	4.21	.916		
3 years or more	270	4.27	.963		

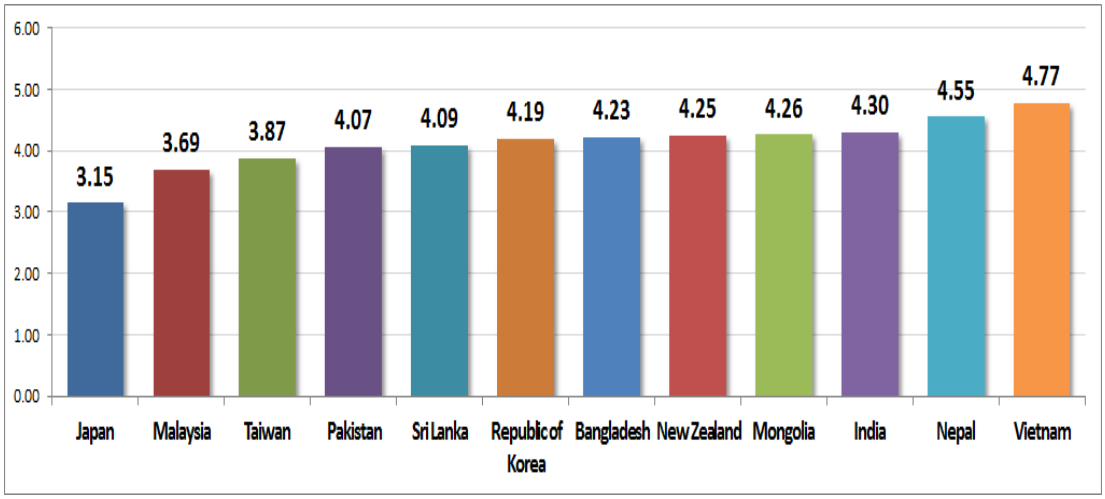
On the other hand, the differences arising from occupation and the duration of career break were significant. By occupation, healthcare professionals (4.18) and engineers (4.17) had the highest policy demands, followed by teachers/professors (4.12), researchers (4.09), other (3.95) and students (3.85). The post hoc analysis found that students, after excluding respondents classified as other, had significantly lower policy demands than the other career groups.

By the duration of career break, the group with a career break of 3 years or more had the highest policy demands (4.27), followed by the group with 2-3 years (4.21) the group without any career break (4.04), the group with a career break of 1-2 years (3.91) and the group with a career break less than 1 year (3.90). The post hoc analysis found significant differences between the group without any career break, the group with a career break less than 1 year, the group with a career break of 1-2 years, the group with a career break of 2-3 years and the group with a career break of 3 or more years.

The policy demands of female scientists and engineers were examined by country (see Fig. 4-21). The overall average was 4.07 out of 5. Among the 12 countries surveyed, 9 countries had an average higher than 4. Vietnam had the highest average (4.77), indicating that its female scientists and engineers felt a strong need for government policies. Single respondents among Vietnamese respondents accounted only for 1%, and most were married or divorced. As seen in the analysis of discriminatory experiences by country, Vietnam was the most highly ranked in terms of the struggle to maintain work-life balance. Such circumstances are likely to have contributed to the high demand for policies among Vietnamese respondents. The countries that followed were Nepal (4.55), India (4.30) and Mongolia (4.26).

<Figure 4-21. It is crucial to have strong policy support to solve gender inequality in the STEM field: Average by nation>

(Higher scores mean more agreed, unit: points)



On the other hand, Japan had the lowest policy demands (3.15), followed by Malaysia (3.69) and Taiwan (3.87). Korea, with an average of 4.19, was the seventh highest among the 12 countries. Female scientists and engineers in certain countries may have lower policy demands either because they are already satisfied with existing policies or they do not find policies to be reliable.

15. I believe that gender equality will be fully achieved once women are given the same opportunities as men.

The statement "I believe that gender equality will be fully achieved once women are given the same opportunities as men" was used to examine the concept of equality as perceived by female scientists and engineers. As explained earlier, this statement fails to reflect the concept of equality at present which stresses the equality in results as it concentrates only on the equality of opportunity. The overall average for this statement was 2.13, meaning that the respondents were generally satisfied with having the equality of opportunity (see Table 4-19).

The difference arising from age was significant. The 29 or younger group had the lowest score (1.84), followed by the 30-39 group (2.04), the 40-49 group (2.47) and the 50 or older group (2.72). Younger respondents agreed more with the liberal concept of equality ($F=40.422$, $p\leq.000$). Duncan's test found significant differences between all possible pairs.

The difference arising from marital status was also significant. Single respondents had the lowest average (2.03), while married respondents (2.20) and those classified as other (2.22) had similar scores ($F=3.795$, $p\leq.023$). The post hoc analysis found no significant differences. The difference arising from the number of children was significant. Female scientists and engineers with two or more children had the highest score (2.26) and those without children the lowest (2.05) ($F=2.954$, $p\leq.032$). The post hoc analysis found no significant difference.

The difference arising from occupation was significant. Healthcare professionals (1.64) had the lowest average, followed by engineers (1.94), students (2.05) and others (2.05), teachers/professors (2.20) and researchers (2.60) ($F=13.667$, $p\leq.000$). The post hoc analysis found significant differences between researchers and the remaining occupational groups. The difference arising from the duration of career break was not significant.

<Table 4-19. I believe gender equality will be fully achieved only if women are given equal opportunities as men: Total>

(Lower scores mean more agreed, unit: person, points)

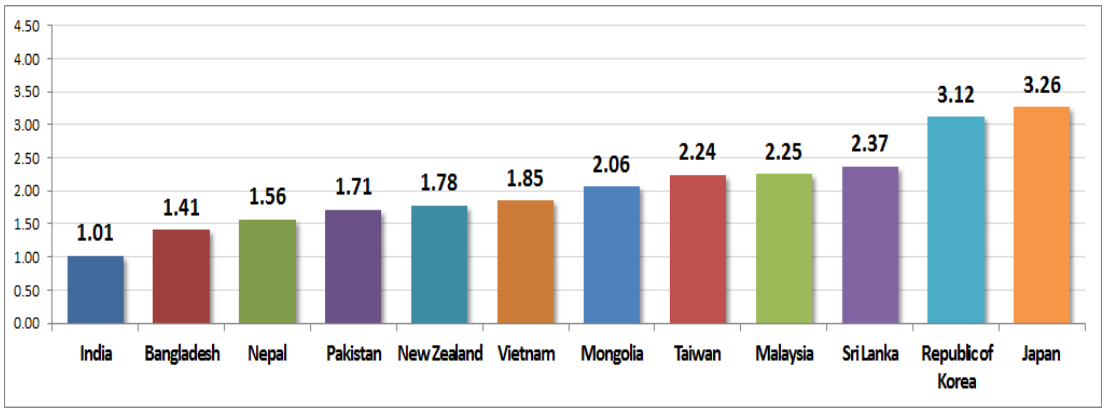
Classifications	Cases	Average	SD	F	*p*
Total	1,379	2.13	1.149		
Age				40.422	***(.000)
29 or below	541	1.84	1.044		
30~39	413	2.04	1.048		
40~49	211	2.47	1.148		
50 or above	210	2.72	1.291		
Marital status				3.795	*(.023)
Single	577	2.03	1.162		
Married	712	2.20	1.131		
Other	88	2.22	1.169		
No. of children				2.954	*(.032)
None	723	2.05	1.179		
1	232	2.21	1.200		
2	305	2.26	1.068		
3 or above	100	2.22	1.011		
Occupation				13.667	***(.000)
Student	219	2.05	1.122		
Teacher/professor	358	2.20	1.045		
Researcher	226	2.60	1.215		
Medical personnel	87	1.64	1.000		
Engineer	336	1.94	1.099		
Other	149	2.05	1.272		
Duration of career break				1.483	(.205)
None	665	2.06	1.177		
Less than 1 year	113	2.25	1.278		
1~2 years	155	2.24	1.223		
2~3 years	138	2.22	1.038		
3 years or more	270	2.11	.984		

The perceptions of female scientists and engineers of the concept of equality were examined by country (see Fig. 4-22). India had the lowest average (1.01), followed by Bangladesh (1.41), Nepal (1.56) and Pakistan (1.71). Meanwhile, Japan (3.26) had the highest average followed by Korea (3.12). That is, female scientists and engineers in India, Bangladesh and Nepal were inclined to believe that gender equality was fully achieved simply with equality in opportunity. This may imply the lack of laws and policies ensuring the equality of opportunity for female scientists and engineers in these countries.

On the other hand, female scientists and engineers in Japan and Korea were more inclined to believe that gender equality could not be achieved simply with equality in opportunity. This can be attributed to the harsh reality faced by female scientists and engineers despite improvements to related laws and policies in the two countries. It should be noted that de jure equality does not necessarily result in de facto equality.

<Figure 4-22. I believe gender equality will be fully achieved only if women are given equal opportunities as men: Average by nation>

(Lower scores mean more agreed, unit: points)



4.3 Results of comprehensive analysis

The earlier section examined whether the responses were influenced by the individual variables of respondents. In this section, we perform Pearson's correlational analysis to determine how the sub-scales of the perception of discriminatory reality, experiences of discriminations, gender role ideology, career prospects and policy demands are related to the other variables.

4.3.1 Correlational analysis

Table 4-20 gives the results of correlational analysis with a focus on continuous variables. Age was directly proportionate to the number of children (r=.528, p≤.000). Similarly, the duration of career break was longer for older respondents (r=.288, p≤.000). There was no significant relationship between age and the awareness of discriminatory reality. On the other hand, older respondents were more likely to have experienced greater discrimination (r=-.079, p≤.004). Older respondents also adopted a more conservative ideology toward gender roles (r=-.099, p≤.000). The older the age, the gloomier the career prospects (r=-.159, p≤.000).

<Table 4-20. Correlations Matrix>

Classifications		1. Age	2. No. of children	3. Duration of career break	4. Perception of discrimination	5. Experience of discrimination	6. Gender role stereotypes
1. Age	Pearson Correlation						
	Sig. (2-tailed)						
	N						
2.No. of children	Pearson Correlation	.528**					
	Sig. (2-tailed)	.000					
	N	1360					
3.Duration of career break	Pearson Correlation	.288**	.369**				
	Sig. (2-tailed)	.000	.000				
	N	1342	1329				
4.Perception of discrimination	Pearson Correlation	.000	-.035	.054*			
	Sig. (2-tailed)	.991	.204	.048			
	N	1368	1353	1337			
5.Experience of discrimination	Pearson Correlation	-.079**	-.147**	-.097**	.527**		
	Sig. (2-tailed)	.004	.000	.000	.000		
	N	1371	1356	1338	1367		
6.Gender role stereotypes	Pearson Correlation	-.099**	-.143**	-.116**	-.199**	-.042	
	Sig. (2-tailed)	.000	.000	.000	.000	.117	
	N	1374	1359	1340	1368	1371	
7.Career outlook	Pearson Correlation	-.159**	-.059*	-.079**	-.019	.152**	.019
	Sig. (2-tailed)	.000	.029	.004	.490	.000	.473
	N	1374	1359	1340	1368	1371	1374

note: Correlation is significant at the 0.05 level (2-tailed).

An analysis of the relationship between the number of children and other variables showed that respondents with more children had longer career breaks (r=.369, p≤.000). While the number of children was not related to the perception of discriminatory reality, it had a significant relationship to discriminatory experiences. That is, respondents with more children had more discriminatory experiences (r=-.147, p≤.000). Those with more children had a more conservative gender role ideology, and this is presumed to be caused by the correlation between the number of children and age (-.143, p≤.000). The number of children and career prospects showed a weak negative correlation (r=-.059, p≤.029). That is, those with more children had a tendency to have less positive career prospects.

As for the relationship between career break and the awareness of discriminatory reality, those with longer career breaks were less aware of the discriminatory reality (r=.054, p≤.048). The duration of career break was more strongly correlated to discriminatory experiences than the awareness of the discriminatory reality. That is, those with longer career breaks had more discriminatory experiences (r=-.097, p≤.000). In addition, the longer the career break, the more conservative the gender role ideology (r=-.116, p=.000); this is presumed to be related to the relationship between age and the period of career break. Career prospects were also gloomier among respondents with longer career breaks (r=-.079, p≤.004).

An extremely high correlation was found between the awareness of discriminatory reality and discriminatory experiences (r=.527, p≤.000). That is, the higher the level of awareness, the more experiences of discrimination. Meanwhile, the awareness of the discriminatory reality (a lower score indicates higher awareness) had a negative correlation to gender role ideology (a higher score indicates a more progressive attitude) (r-.199, p≤.000). This shows that individuals with a more conservative gender role ideology do not perceive acts of gender discrimination as discrimination.

The awareness of the discriminatory reality was not correlated to career prospects. The relationship between gender role ideology and the awareness of the discriminatory reality was not significant, unlike the significant negative relationship between gender role ideology and the perception of discriminatory reality. On the other hand, there was a negative correlation between discriminatory experiences and career prospects. That is, the greater the discriminatory experiences, the gloomier the career prospects (r=.152, p≤.000). Lastly, there was no significant relationship between gender role ideology and career prospects.

4.3.2 Multiple regression analysis

4.3.2.1 Predictor variables of career prospects

Multiple regression analysis was performed to examine the variables influencing the career prospects of female scientists and engineers in STEM fields. The eight independent variables were age, number of children, duration of career break, the perception of discriminatory reality, discriminatory experiences, gender role ideology, concept of equality and policy demands. The dependent variable was career prospects. The analysis found that the variable having the greatest influence on career prospects was the concept of equality. That is, the higher the adherence to the concept of equality, the brighter the career prospects (β=-.258, p≤.000). The next most influential variable was discriminatory experiences (β=.254, p≤.000). Female scientists and engineers with fewer discriminatory experiences were more positive about their careers (β=.250, p≤.000). Gender role ideology also had an influence on career prospects. The more conservative the gender role ideology, the brighter the career prospects (β=-.063, p≤.013). As explained above, the four significant variables in predicting career prospects were the concept of equality, discriminatory experiences, policy demands and gender role ideology. Their total variance was 18.9%, indicating a high explanatory power (R^2=.189, F=76.283, p≤.000). Other variables such as age, number of children, period of career break and awareness of the discriminatory reality were not significant.

<Table 4-21. Stepwise multiple regression analysis in Career outlook>

Independence variable	**The dependent variable : Career outlook**			
	B	***B***	**t**	***p***
(Constant)	2.495		12.673	***(.000)
Equality concept	-.235	-.258	-9.591	***(.000)
Experience of discrimination	.303	.254	9.862	***(.000)
Policy needs	.246	.250	9.010	***(.000)
Gender role stereotypes	-.063	-.063	-2.477	*(.013)
R^2	.189			
F	76.283			
p	***(.000)			

4.3.2.2 Predictor variables of policy demands

Multiple regression analysis was performed to examine the variables influencing respondents' policy demands, with the aim of eliminating gender discrimination in STEM fields. The eight independent variables were age, number of children, duration of career break, the perception of discriminatory reality, discriminatory experiences, gender role ideology, concept of equality and career prospects. The dependent variable was policy demands. The analysis found that the variable having the greatest influence on policy demands was the concept of equality. That is, the higher the awareness of the concept of equality, the greater the demands (β=-.238, p≤.000). The next most influential variable

was career prospects. The better the career prospects, the greater the demands (β=.226, p≤.000). The third was discriminatory experiences. That is, female scientists and engineers with more discriminatory experiences felt a greater need for policies (β=-.172, p≤.000). Next, a greater awareness of the discriminatory reality led to more policy demands (β=-.146, p≤.000). The fifth most influential variable was gender role ideology. The more progressive the ideology, the greater the demands (β=.097, p≤.000). Finally, policy demands were also related to the number of children. The higher the number of children, the greater the demands (β=.061, p≤.013). As explained, the six significant variables in predicting policy demands were the concept of equality, career prospects, discriminatory experiences, the awareness of the discriminatory reality, gender role ideology and the number of children. With a total variance of 25.8%, these variables had a high explanatory power (R^2=.258, F=75.721, p≤.000). Other variables such as age and the duration of career break were not significant.

<Table 4-22. Stepwise multiple regression analysis in Policy needs>

Independence variable	**The dependent variable :Policy needs**			
	B	***B***	**t**	***p***
(Constant)	4.361		24.512	***(.000)
Equality concept	-.220	-.238	-9.118	***(.000)
Perception of discrimination	-.159	-.146	-4.995	***(.000)
Career outlook	.230	.226	8.782	***(.000)
Experience of discrimination	-.209	-.172	-5.886	***(.000)
Gender role stereotypes	.100	.097	3.910	***(.000)
No. of children	.063	.061	2.485	*(.013)
R^2	.258			
F	75.721			
p	***(.000)			

4.4 Analysis of survey results by participating nation

4.4.1 Nepal

4.4.1.1 Respondent profile

A total of 94 respondents participated in Nepal. Those in their 20s accounted for 47.8%, followed by those in their 30s at 39.1%, those in their 40s at 10.9%, and those in their 50s at 2.2%. By marital status, those married took up 52.1%, while single respondents and others took up 46.8% and 1.1%, respectively. Among the respondents, 62% had no children; 22.8% of them had two children; 15.2% had one child; and no respondent had three or more children. By occupation, 44.1% of the respondents were reported to be engineers, followed by researchers (12.9%) and teachers/professors (11.8%). The respondents who had not experienced career interruption accounted for 48.3%, and those who had experienced career interruption of less than one year and three years or more accounted for 16.9% and 15.7%, respectively (see Table 4-23).

<Table 4-23. Profile of participants from Nepal>

(unit: person, %)

Classifications	N	%
Age		
29 or below	44	47.8
30~39	36	39.1
40~49	10	10.9
50 or above	2	2.2
Marital status		
Single	44	46.8
Married	49	52.1
Other	1	1.1
No. of children		
None	57	62.0
1	14	15.2
2	21	22.8
3 or above	92	0.0
Occupation		
Student	6	6.5
Teacher/professor	11	11.8
Researcher	12	12.9
Medical personnel	9	9.7
Engineer	41	44.1
Other	14	15.1
Duration of career break		
None	43	48.3
Less than 1 year	15	16.9
1~2 years	7	7.9
2-3 years	10	11.2
3 years or more	14	15.7

4.4.1.2 Difference of gender barriers in Nepal and other countries: Overview

<Table 4-24. Gap between Nepal & others on gender barriers>

(unit: points)

Item		Nepal (n=94)	Except Nepal (n=1,285)	t	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.31	2.48	-1.282	(.200)
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.47	2.51	-.352	(.725)
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.68	2.49	1.320	(.190)
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.57	2.95	-2.700	** (.007)
	Sub-scales	2.51	2.60	-0.94	(0.35)
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.16	2.98	1.189	(.237)
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.95	3.27	6.417	*** (.000)
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.20	3.31	-.760	(.447)
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.72	2.59	1.014	(.311)
	Sub-scales	3.26	3.04	2.36	*(.018)
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	4.71	3.47	15.117	*** (.000)
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.99	3.29	4.879	*** (.000)
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	4.55	3.72	7.801	*** (.000)
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	3.27	2.89	2.882	** (.005)
	Sub-scales	4.14	3.34	9.14	*** (.000)
Career outlook	13. I believe things will turn out fine in my future career.	3.83	3.69	1.247	(.213)
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.55	4.04	5.664	*** (.000)
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.56	2.17	-6.242	*** (.000)

* Perception of discrimination: Lower score means higher perception of discrimination
* Experience of discrimination: Lower score means more discrimination experienced
* Gender role stereotypes: Higher score means more progressive
* Career outlook: Higher score means a more positive outlook
* Policy needs: Higher score means higher needs for policy support

Table 4-24 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Nepal with that perceived by their counterparts in the other 11 countries. First, the scale of the perception of a discriminatory reality was 2.51 on the average, indicating no significant difference from the average of 2.60 from the other 11 nations. Examining each of the four questions contained in this scale, we observed that the respondents in Nepal reported a significantly higher score in perception of a discriminatory reality ($t=-2.700$, $p\leq.007$) only for the question about equal pay for equal work. Although slight differences were found for the remaining three questions, they did reach a statistically significant level

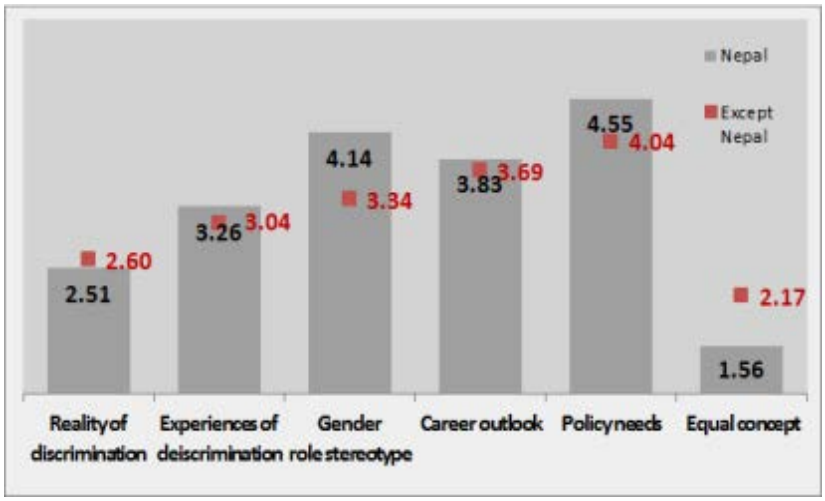
The t-test to identify whether the Nepali respondents had a different discriminatory experience compared with the respondents from the other countries resulted in an average score of 3.26, which is significantly higher than the average score of 3.04 of the other countries ($t=2.36$, $p\leq.018$). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Nepal had less discriminatory experience than their counterparts in the other 11 countries surveyed. We analyzed the four questions for this sub-scale and observed a significant difference only in the question about disadvantage in winning research grants or scholarships. In other words, the score of the Nepali respondents with respect to experiencing disadvantage in winning research grants and scholarships (3.95) was lower than the average score (3.27) of the other countries ($t=6.417$, $p\leq.007$). No statistically significant difference was found in the other three questions.

The sub-scale for gender roles ideology produced a significant difference in terms of both the sub-scale average and individual item average scores. The average for Nepal had a value of 4.14, significantly higher than the average of 3.34 of the other countries ($t=9.14$, $p\leq.000$). A higher score refers to a stronger tendency of progressiveness. For each question under in this sub-scale, the average score in Nepal was higher than the average of the other 11 countries, suggesting a more progressive attitude toward gender roles.

The result for career prospects among the Nepali respondents did not show any significant difference from the average score of the other 11 countries. On the other hand, a statistically significant difference was observed for policy demand. The score for policy demand in Nepal (4.55) was significantly higher than the score (4.04) of the other countries ($t=5.664$, $p\leq.000$). In the case of gender equality, women in Nepal (1.56) demonstrated a greater tendency, compared with women in the other countries (2.17), to believe that full gender equality would be realized once women were granted equal opportunity ($t=-6.242$, $p\leq.000$). Figure 4-23 illustrates the overall difference in perception of gender barriers between the respondents in Nepal and those in the other countries.

<Figure 4-23. Gap between Nepal & others on gender barriers>

(unit: Points)



4.4.1.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in Nepal according to the personal variables of the respondents and compare the results with those obtained in the other countries.

Perception of Discriminatory reality

For this scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-25 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Nepali respondents. Whereas a significant difference was observed by age and occupation, variables such as marital status, number of children and duration of career interruption did not show a significant difference. By age group, those in their 30s most strongly agreed with the statement that gender inequality existed in Nepali society, followed by those in their 50s and 20s; the respondents in their 40s agreed least with the statement ($F=4.399$, $p\leq.006$).

By marital status, the perception of discriminatory reality was most strongly perceived by the single respondents, but no statistically significant difference was observed, as with the cases of the number of children and period of career interruption. On the other hand, the difference by occupation was statistically significant. The strongest perception of gender inequality was reported by healthcare/medical professionals and least by teachers/professors ($F=2.985$, $p\leq.016$).

<Table 4-25. Perception of discrimination of Nepal: Demographic differences>

(unit: person, points)

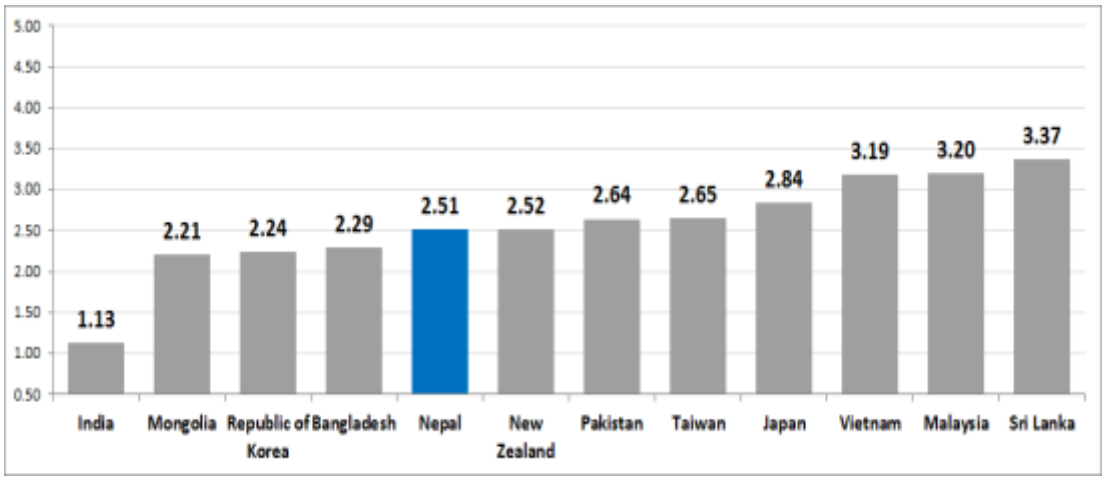
Classifications	Cases	Average	SD	F	*p*
Total	94	2.51			
Age					
29 or below	44	2.52	0.70	4.399	.006
30~39	36	2.28	0.80		
40~49	10	3.40	1.48		
50 or above	2	2.38	1.59		
Marital status					
Single	44	2.47	0.78	.092	.912
Married	49	2.54	1.02		
Other	1	2.75	-		
No. of children					
None	57	2.48	0.68	.923	.401
1	14	2.80	1.01		
2	21	2.39	1.34		
3 or above	-	-	-		
Occupation					
Student	6	2.63	0.63	2.985	.016
Teacher/professor	11	3.39	1.34		
Researcher	12	2.65	0.86		
Medical personnel	9	2.22	1.03		
Engineer	41	2.38	0.64		
Other	14	2.25	0.97		
Duration of career break					
None	43	2.47	0.76	1.761	.144
Less than 1 year	15	3.02	0.83		
1~2 years	7	2.46	1.06		
2-3 years	10	2.48	1.10		
3 years or more	14	2.14	1.19		

* Lower score means higher perception of discrimination

Figure 4-24 compares the perception of a discriminatory reality by the respondents in Nepal and by those from the other countries. The level of perception of gender inequality in society ranked fifth, following that in India, Mongolia, Korea and Bangladesh (average score of 2.51 on the five-point scale).

<Figure 4-24. Average of Nepal & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-26 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Nepali respondents. By age, those in their 30s reported the strongest discriminatory experience, as in the case of the perception of discriminatory reality, and the score was lowest among those in their 40s, but without statistical significance. No significant difference was found for the variables of marital status, the number of children, and career interruption. On the other hand, similar to the case of perception of a discriminatory reality, respondents of different occupational groups produced a statistically significant difference. The strongest experience was reported among healthcare/medical professionals (2.31); the lowest was found among teachers/professors (3.70) ($F=2.500$, $p\leq.036$). The scores of researchers and engineers were found in between.

Figure 4-25 compares the discriminatory experience among the Nepali respondents and among respondents from the other countries. Unlike the fifth-ranking level of the perception of discriminatory reality perceived by the respondents in Nepal, the actual experience of discrimination was the fourth lowest, following Sri Lanka, Malaysia, and Pakistan (average score of 3.26 on the five-point scale).

<Table 4-26. Experience of discrimination of Nepal : Demographic differences>

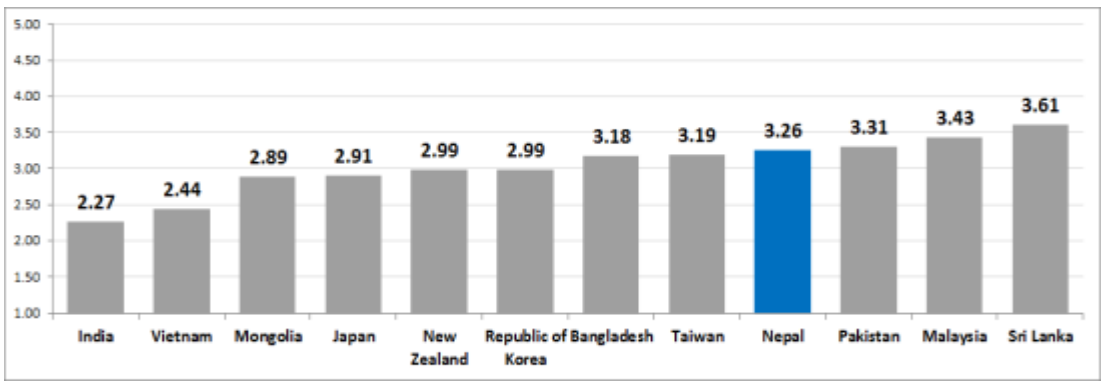
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	94	3.26			
Age					
29 or below	44	3.44	.817	2.554	.061
30~39	36	2.94	.968		
40~49	10	3.65	1.281		
50 or above	2	3.25	1.061		
Marital status					
Single	44	3.45	.841	1.766	.177
Married	49	3.08	1.048		
Other	1	3.25			
No. of children					
None	57	3.41	.850	1.963	.147
1	14	3.13	1.176		
2	21	2.94	1.101		
3 or above					
Occupation					
Student	6	3.50	.837	2.500	.036
Teacher/professor	11	3.70	1.024		
Researcher	12	3.31	.724		
Medical personnel	9	2.31	.917		
Engineer	41	3.30	.890		
Other	14	3.25	1.152		
Duration of career break					
None	43	3.52	.856	1.664	.166
Less than 1 year	15	3.27	.571		
1~2 years	7	3.04	1.220		
2-3 years	10	2.88	1.022		
3 years or more	14	2.93	1.378		

* Lower score means more discrimination experienced

<Figure 4-25. Average of Nepal & others on Experiences. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Table 4-27 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Nepali respondents. By age group, the highest score was observed among the respondents in their 50s and the score was lowest among those in their 40s; however, the difference was not statistically significant. The differences according to the marital status, the number of children, occupation, and duration of career interruption were not significant either.

<Table 4-27. Gender role stereotypes of Nepal : Demographic differences>

(unit: person, points)

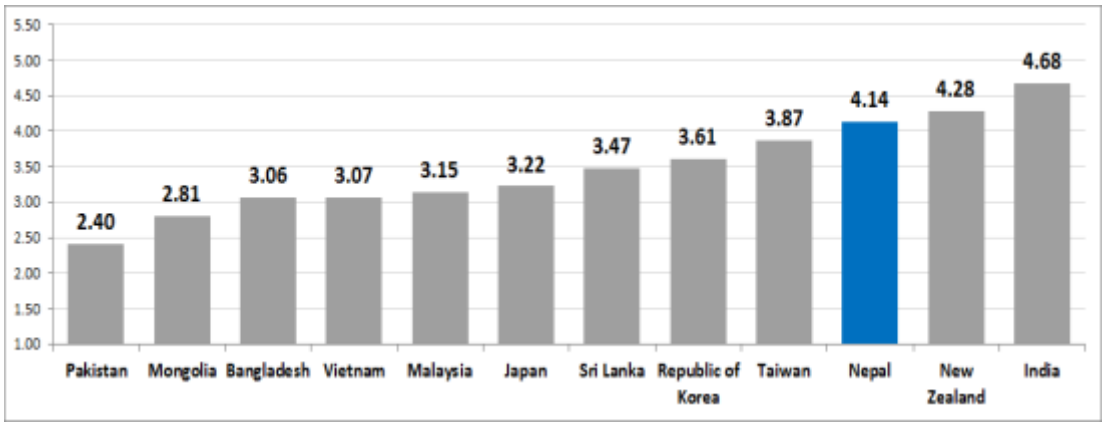
Classifications	Cases	Average	SD	F	*p*
Total	94	4.14			
Age					
29 or below	43	4.10	0.744	.165	.920
30~39	36	4.18	0.935		
40~49	10	4.23	0.595		
50 or above	2	3.88	0.177		
Marital status					
Single	43	4.19	0.766	.282	.755
Married	49	4.09	0.824		
Other	1	4.50			
No. of children					
None	56	4.08	.827	1.060	.351
1	14	4.00	1.074		
2	21	4.35	.407		
3 or above					
Occupation					
Student	6	3.83	.753	.983	.433
Teacher/professor	11	4.11	.479		
Researcher	12	4.48	.695		
Medical personnel	9	4.22	.605		
Engineer	40	4.06	.894		
Other	14	4.34	.585		
Duration of career break					
None	42	4.08	.800	.238	.916
Less than 1 year	15	4.13	.767		
1~2 years	7	4.21	.585		
2-3 years	10	4.30	.815		
3 years or more	14	4.25	.803		

* Higher score means more progressive

Figure 4-26 compares the gender role in Nepal and other countries. The average score for gender role attitudes among Nepali scientists and engineers recorded a high score of 4.14 out of 5 points, which shows that the country is the third most progressive after India and New Zealand.

<Figure 4-26. Average of Nepal & others on Gender role stereotypes>

(unit: points)



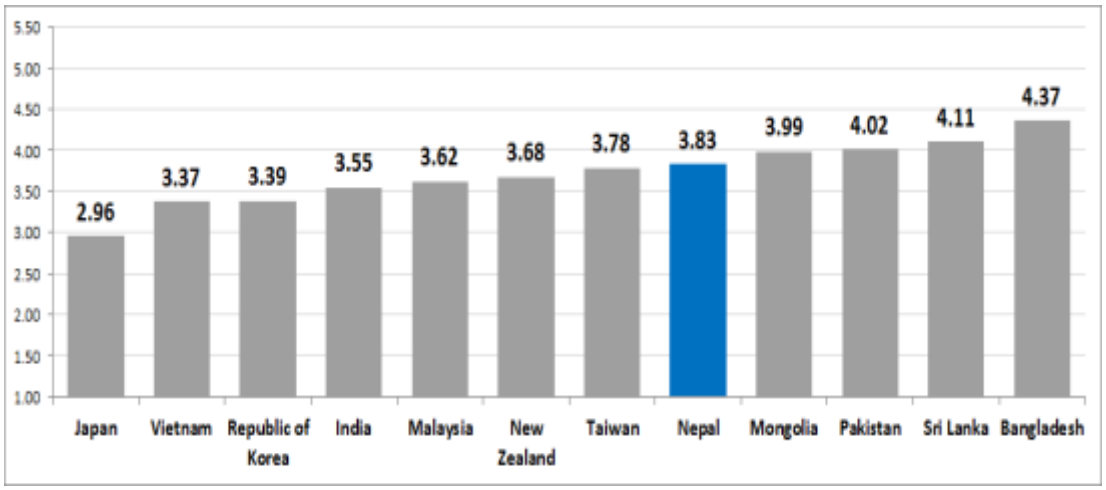
* Higher score means more progressive

Career prospects

As can be seen in Figure 4-27, the respondents in Nepal demonstrated relative optimism about their career prospects, with an average score of 3.83. This puts the country in fifth place, following Bangladesh, Sri Lanka, Pakistan, and Mongolia.

<Figure 4-27. Average of Nepal & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

Table 4-28 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Nepali respondents. Although the score among those in their 30s was the lowest, the age differences were not statistically significant. In addition, the differences due to marital status were not big enough to be statistically significant either. On the other hand, significant differences were found according to the number of children. Those with one child marked the highest score for career prospects (4.38), followed by the group without children (3.89); the lowest score (3.48) was observed among those with two or more children (F=3.627, p≤.031). The differences by occupation and the duration of career interruption were not significant.

<Table 4-28. Career outlook of Nepal : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	94	3.83			
Age					
29 or below	44	3.98	0.88	.858	.466
30~39	35	3.63	1.11		
40~49	10	4.00	1.33		
50 or above	2	4.00	0.00		
Marital status					
Single	44	4.00	0.94	2.668	.075
Married	48	3.71	1.05		
Other	1	2.00			
No. of children					
None	57	3.89	.939	3.627	.031
1	13	4.38	.870		
2	21	3.48	1.078		
3 or above					
Occupation					
Student	6	4.33	0.82	.424	.831
Teacher/professor	10	3.70	1.16		
Researcher	12	3.75	0.75		
Medical personnel	9	4.00	0.71		
Engineer	41	3.76	1.04		
Other	14	3.79	1.31		
Duration of career break					
None	43	3.95	0.97	.967	.430
Less than 1 year	15	3.40	1.18		
1~2 years	7	3.86	0.69		
2-3 years	9	4.00	0.87		
3 years or more	14	3.93	1.00		

* Higher score means a more positive outlook

Policy demand

Table 4-29 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Nepali respondents. The variables most relevant to policy demand were age and occupation. By age group, policy demand was the highest score among those in their 30s (4.75) and lowest among those in their 40s (3.60) (F=6.624, p≤.000). By occupation, healthcare/medical professionals presented the strongest policy demand (an average of 5.0, which represents a complete level of agreement), followed by students and engineers with similar scores. The score for policy demand was the lowest (3.45) among teachers/professors (F=6.403, p≤.000). However, policy demand showed no relation with the other variables such as the marital status, the number of children, and duration of career interruption.

<Table 4-29. Policy needs of Nepal : Demographic differences>

(unit: person, points)

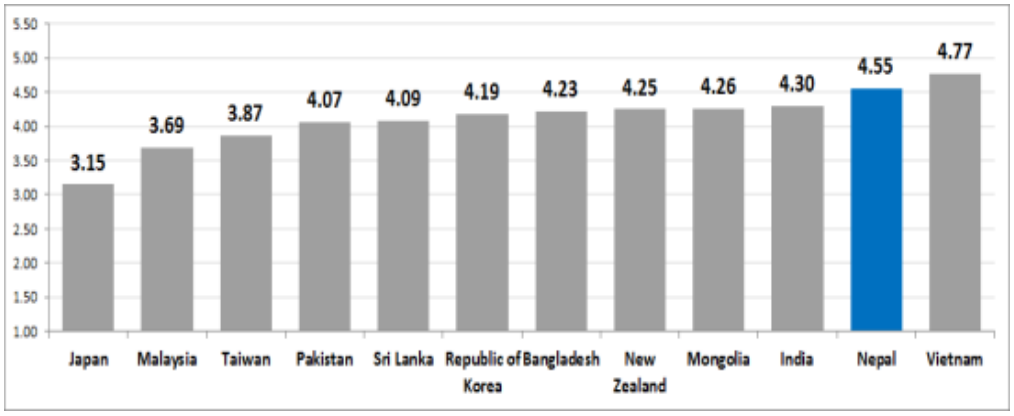
Classifications	Cases	Average	SD	F	*p*
Total	94	4.55			
Age					
29 or below	44	4.68	.740	6.624	.000
30~39	36	4.75	.439		
40~49	10	3.60	1.430		
50 or above	2	4.50	.707		
Marital status					
Single	44	4.64	.838	.570	.567
Married	49	4.49	.845		
Other	1	4.00			
No. of children					
None	57	4.68	.711	2.208	.116
1	14	4.57	.852		
2	21	4.24	1.091		
3 or above					
Occupation					
Student	6	4.83	.408	6.403	.000
Teacher/professor	11	3.45	1.293		
Researcher	12	4.42	.793		
Medical personnel	9	5.00	0.000		
Engineer	41	4.76	.538		
Other	14	4.50	.941		
Duration of career break					
None	43	4.63	.817	.234	.918
Less than 1 year	15	4.47	.743		
1~2 years	7	4.43	.787		
2-3 years	10	4.70	.675		
3 years or more	14	4.50	1.160		

* Higher score means higher needs for policy support

The average score for policy demand among the Nepali respondents amounted to 4.55 out of 5 points, which places Nepal second only to Vietnam, as illustrated in Figure 4-28.

<Figure 4-28. Average of Nepal & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

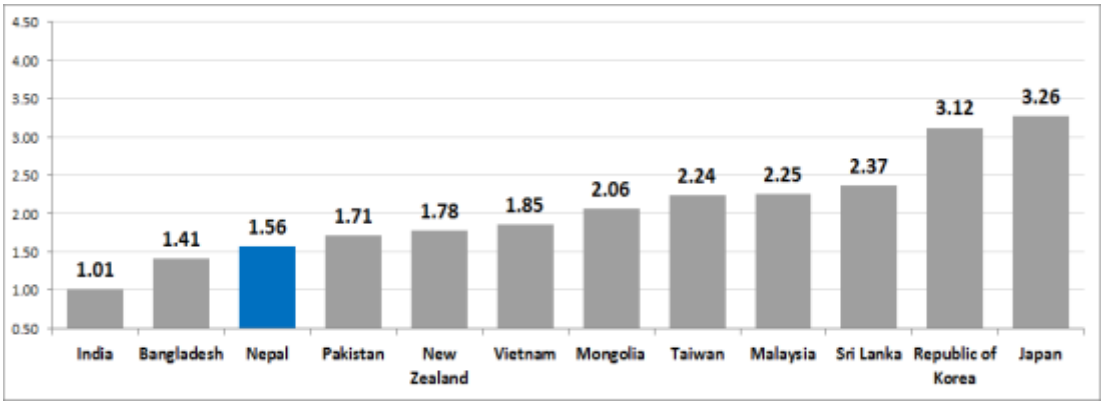
Gender equality

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency to believe that equal opportunity was a sufficient factor of gender equality. Table 4-30 suggests that such a belief was not affected by personal variables.

As can be seen in Figure 4-29, the respondents in Nepal revealed a strong belief that equal opportunity would result in perfect equality (the average score was 1.56; lower scores represent stronger agreement). Nepal ranked third after India and Bangladesh.

<Figure 4-29. Average of Nepal & others on Equality concept>

(unit: points)



<Table 4-30. Equality concept of Nepal : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	94	1.56			
Age					
29 or below	44	1.59	1.019	1.040	.379
30~39	36	1.58	.732		
40~49	10	1.30	.483		
50 or above	2	2.50	2.121		
Marital status					
Single	44	1.61	1.017	.301	.741
Married	49	1.53	.767		
Other	1	1.00			
No. of children					
None	57	1.56	.926	.164	.849
1	14	1.50	.855		
2	21	1.67	.856		
3 or above					
Occupation					
Student	6	1.17	.408	1.583	.173
Teacher/professor	11	1.36	.505		
Researcher	12	2.17	1.115		
Medical personnel	9	1.44	.726		
Engineer	41	1.51	.870		
Other	14	1.64	1.082		
Duration of career break					
None	43	1.53	.855	.719	.581
Less than 1 year	15	1.67	1.113		
1~2 years	7	1.43	.787		
2-3 years	10	1.40	.516		
3 years or more	14	1.93	1.072		

4.4.2 New Zealand

4.4.2.1 Respondent profile

A total of 68 respondents participated in the survey in New Zealand, representing the smallest number among the surveyed nations. By age, those in their 30s accounted for the largest portion at 44.1%, followed by those in their 20s (36.8%), and those in their 40s and 50s.

By marital status, married respondents accounted for 42.6%, single respondents for 32.4%, and the others took up the rest. Among the respondents, 66.2% had no children; 20.6% had two children; 8.8% had one child; and 4.4% had three or more children. Most respondents in New Zealand belong to the group of healthcare/medical professionals, taking up 85.3%. Seven respondents (10.3%) were engineers, and each of the remaining three was categorized as teacher/professor, researcher, and student. It is therefore of no significance to analyze the difference in the perception of gender barriers by using the

occupation of respondents as a variable.

With respect to the duration of career interruption, 45.6% of the respondents had no experience, while 19% had an interruption between one and two years. Those with two to three years accounted for 16.2%, those with three or more years for 13.2%, and those with less than one year for 2.9%.

<Table 4-31. Profile of participants from New Zealand>

(unit: person, %)

Classifications	N	%
Age		
29 or below	25	36.8
30~39	30	44.1
40~49	10	14.7
50 or above	3	4.4
Marital status		
Single	22	32.4
Married	29	42.6
Other	17	25.0
No. of children		
None	45	66.2
1	6	8.8
2	14	20.6
3 or above	3	4.4
Occupation		
Student	1	1.5
Teacher/professor	1	1.5
Researcher	1	1.5
Medical personnel	58	85.3
Engineer	7	10.3
Other		
Duration of career break		
None	31	45.6
Less than 1 year	2	2.9
1~2 years	13	19.1
2~3 years	11	16.2
3 years or more	9	13.2

4.4. 2.2 Difference of gender barriers in New Zealand and other countries: Overview

Table 4-32 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in New Zealand with that perceived by their counterparts in the other 11 countries. For the sub-scale on the perception of the reality of discrimination against women, the average score of women scientists and engineers in New Zealand was 2.52, showing no significant difference from the average of 2.60 in the other 11 countries. Analyzing each of the four questions under this sub-scale, we observed a significant difference in the questions about whether women have more difficulty finding a job in the STEM fields and whether women earn equal pay for equal work. For

the former question, the average score in New Zealand had a value of 3.10, much higher than the average score of 2.48 in the other 11 countries. In other words, the respondents in New Zealand agreed to a lesser degree with the statement that women scientists and engineers have greater difficulty finding a job than their male counterparts ($t=4.279$, $p\leq.000$).

In the meantime, the respondents in New Zealand had an average score of 2.52, compared with 2.96 for the other 11 countries, with regard to the statement that women earn less pay for equal work conducted by their male counterparts. This shows that the participants in New Zealand agreed more with the wage discrimination by gender than did the respondents in the other 11 countries surveyed ($t=-3.802$, $p\leq.000$). Although slight differences were found for the remaining two questions, they did reach a statistically significant level.

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in New Zealand with that experienced by respondents in the other countries, the average score for New Zealand was 2.99, which is slightly higher than the average of 3.06 of the 11 countries (lower scores represent more discriminatory experience); however, the difference was not statistically significant. Examining the differences for each of the four questions constituting this sub-scale, we found more experience of sexual harassment and unfair treatment among the respondents in New Zealand than among those in the other 11 countries ($t=-4.594$, $p\leq.007$). On the other hand, the experience of having work-life balance as a handicap was reported less in New Zealand compared with the other nations ($t=2.063$, $p\leq.039$). This is perhaps because New Zealand has established more sound systems and culture for work-life balance than most member states of APNN.

With respect to the scale of the gender role ideology (higher scores refer to more progressive attitudes), significant differences were observed in the average scores of both the sub-scale and individual questions, as was the case with Nepal. The average score of 4.28 for this sub-scale in New Zealand proved significantly higher than 3.35 in the remaining 11 countries ($t=9.065$, $p\leq.000$). For each question under this criterion, the average score in New Zealand was higher than the average of the other 11 countries, suggesting a more progressive attitude toward gender roles.

<Table 4-32. Gap between New Zealand & others on gender barriers>

(unit: points)

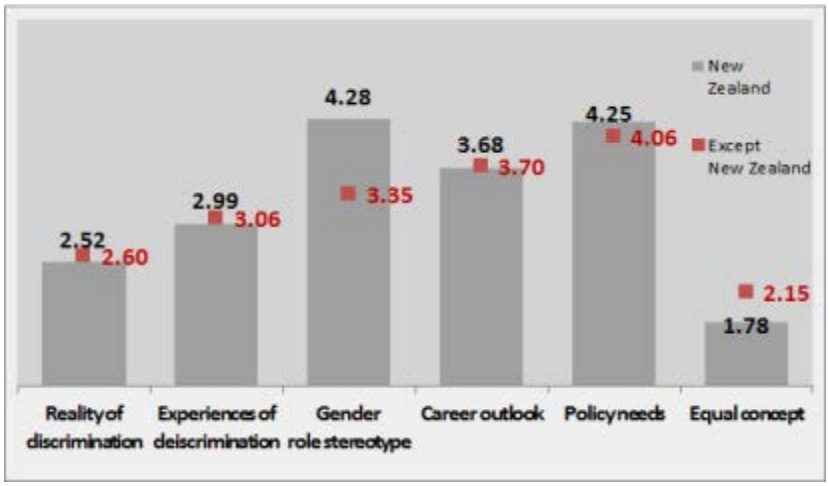
Item		New Zealand (n=94)	Except New Zealand (n=1,285)	t	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.34	2.47	-.995	.323
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	3.10	2.48	4.279	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.29	2.51	-1.900	.061
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.34	2.96	-3.802	.000
	Sub-scales	2.52	2.60	-.700	.484
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	2.99	3.00	-.069	.945
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.49	3.31	1.651	.102
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	2.57	3.34	-4.594	.000
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.90	2.59	2.063	.039
	Sub-scales	2.99	3.06	-.676	.499
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	4.43	3.51	7.486	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.74	3.32	2.509	.012
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	4.68	3.73	8.442	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	4.29	2.85	10.145	.000
	Sub-scales	4.28	3.35	9.065	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.68	3.70	-.172	.864
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.25	4.06	1.419	.156
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.78	2.15	-2.571	.010

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

For career prospects, the respondents in New Zealand showed results similar to those in the other 11 countries. Policy demand in the country was slightly higher than in the other participating nations, but no significant difference was found. In the case of equality, the tendency to believe that full gender equality would be realized once women were granted equal opportunity was significantly higher in New Zealand (1.78) than in the other countries (2.15) ($t=-2.571$, $p\leq.010$). Figure 4-30 illustrates the overall difference in perception of gender barriers between the respondents in New Zealand and those in the other countries

<Figure 4-30. Gap between New Zealand & others on gender barriers>

(Unit: Points)



4.4.2.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in New Zealand according to the personal variables of the respondents and compare the results with those obtained in the other countries.

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-33 provides the results of ANOVA of whether this perception varies depending on the personal variables of the respondents in New Zealand. By age, the perception of a discriminatory reality was highest among those in their 40s and lowest among those in their 50s; however, the difference did reach statistical significance. Marital status and the number of children did not result in a significant difference, either. By occupation, the perception of a discriminatory reality was highest among teachers/professors and lowest among engineers; however, the difference was not of statistical significance. The difference depending on the duration of career interruption was not significant, either.

<Table 4-33. Perception of discrimination of New Zealand: Demographic differences>

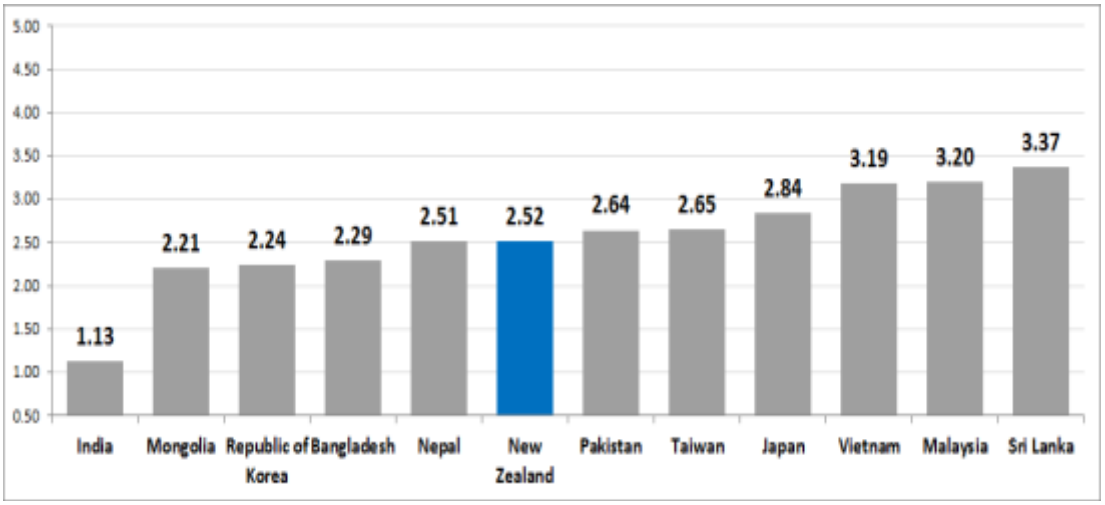
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	68	2.52			
Age					
29 or below	25	2.72	0.79	2.739	.051
30~39	30	2.48	0.87		
40~49	10	1.93	0.74		
50 or above	3	3.17	1.42		
Marital status					
Single	22	2.42	0.75	.800	.454
Married	29	2.46	1.01		
Other	17	2.75	0.77		
No. of children					
None	45	2.51	0.81	.103	.958
1	6	2.67	0.86		
2	14	2.46	1.10		
3 or above	3	2.67	1.13		
Occupation					
Student	1	2.25		.485	.747
Teacher/professor	1	2.00			
Researcher	1	2.50			
Medical personnel					
Engineer	58	2.58	0.91		
Other	7	2.14	0.67		
Duration of career break					
None	31	2.53	0.86	1.145	.344
Less than 1 year	2	3.13	0.18		
1~2 years	13	2.21	0.71		
2~3 years	11	2.89	1.22		
3 years or more	9	2.42	0.71		

* Lower score means higher perception of discrimination

<Figure 4-31. Average of New Zealand & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

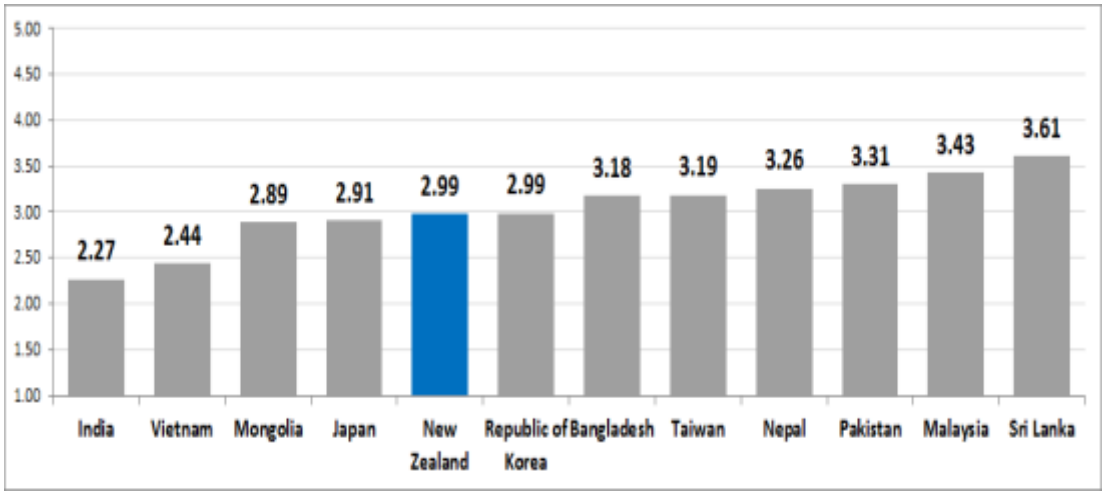
Figure 4-31 compares the perception of a discriminatory reality by the respondents in New Zealand and by those from the other countries. The level of perception of gender discrimination in society ranked sixth, following that in India, Mongolia, Korea, Bangladesh, and Nepal (average score of 2.52 on the five-point scale).

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-32 compares the discriminatory experience among the respondents in New Zealand and among respondents from the other countries. As mentioned above, the level of perception of a discriminatory reality among the respondents in New Zealand was sixth highest, and the actual experience of discrimination was fifth highest, following India, Vietnam, Mongolia, and Japan (average score of 2.99 on the five-point scale).

<Figure 4-32. Average of New Zealand & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

Table 4-34 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the respondents in New Zealand. By age, the score for discriminatory experience was highest among those in their 30s (2.73) and lowest among those in their 50s (3.58) ($F=4.463$, $p\leq.007$). The difference according to marital status was of statistical significance: the discriminatory experience resulted in the highest score (2.66) among the married respondents and lowest (3.37) among the other group ($F=4.446$, $p\leq.015$).

<Table 4-34. Experience of discrimination of New Zealand : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	68	2.99			
Age					
29 or below	25	3.39	0.69	4.463	.007
30~39	30	2.68	0.82		
40~49	10	2.73	1.07		
50 or above	3	3.58	0.38		
Marital status					
Single	22	3.13	0.77	4.446	.015
Married	29	2.66	0.92		
Other	17	3.37	0.71		
No. of children					
None	45	3.11	0.81	1.034	.383
1	6	2.92	0.77		
2	14	2.64	0.92		
3 or above	3	2.92	1.61		
Occupation					
Student	1	3.25		.597	.666
Teacher/professor	1	1.75			
Researcher	1	3.25			
Medical personnel					
Engineer	58	2.98	0.88		
Other	7	3.14	0.91		
Duration of career break					
None	31	3.05	0.85	.854	.497
Less than 1 year	2	3.50	0.00		
1~2 years	13	2.63	0.79		
2~3 years	11	3.16	1.08		
3 years or more	9	2.89	0.94		

* Lower score means more discrimination experienced

Conversely, no significant differences were observed in terms of the number of children, occupation, and career interruption. As mentioned above with respect to the respondent profile of New Zealand, most of the respondents in the country were engineers and therefore it is not practical to consider occupation as a meaningful variable for analysis.

Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Table 4-35 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the respondents in New Zealand. By age group, the highest score (conservative) was observed

among the respondents in their 50s, and the score was lowest among those in their 40s; however, the difference was not statistically significant. Although married respondents revealed a more conservative tendency compared with the other group, the difference in terms of the marital status did not prove statistically significant. Next, the number of children resulted in a significant difference: the respondents with three or more children were found to be notably more conservative than other respondents. The difference between the other groups was not significant (F=3.007, p≤.037), and the differences in terms of occupation and duration of career interruption were not significant, either.

<Table 4-35. Gender role stereotypes of New Zealand : Demographic differences>

(unit: person, points)

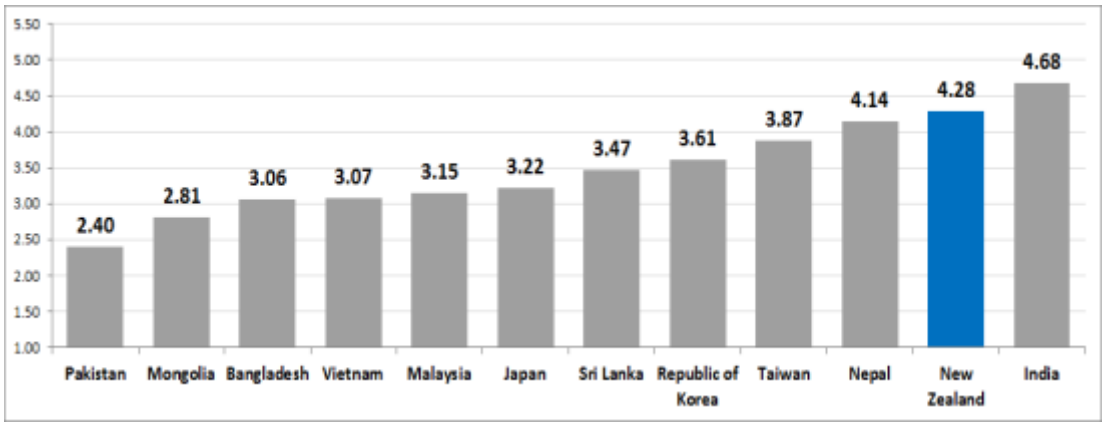
Classifications	Cases	Average	SD	F	*p*
Total	68	4.28			
Age					
29 or below	25	4.29	0.79	.321	.810
30~39	30	4.30	0.84		
40~49	10	4.35	0.65		
50 or above	3	3.83	1.59		
Marital status					
Single	22	4.33	0.67	1.372	.261
Married	29	4.11	0.92		
Other	17	4.51	0.77		
No. of children					
None	45	4.29	0.80	3.007	.037
1	6	4.42	0.52		
2	14	4.46	0.83		
3 or above	3	3.00	0.66		
Occupation					
Student	1	5.00		.530	.714
Teacher/professor	1	5.00			
Researcher	1	4.50			
Medical personnel					
Engineer	58	4.23	0.84		
Other	7	4.46	0.67		
Duration of career break					
None	31	4.31	0.75	.177	.950
Less than 1 year	2	4.63	0.53		
1~2 years	13	4.33	0.69		
2~3 years	11	4.18	1.15		
3 years or more	9	4.17	0.98		

* Higher score means more progressive

Figure 4-33 compares attitudes toward gender roles among the respondents in New Zealand and among respondents from the other countries. The average score for gender role attitudes had a value of 4.28 out of 5, making the country second most progressive following India.

<Figure 4-33. Average of New Zealand & others on Gender role stereotypes>

(unit: points)



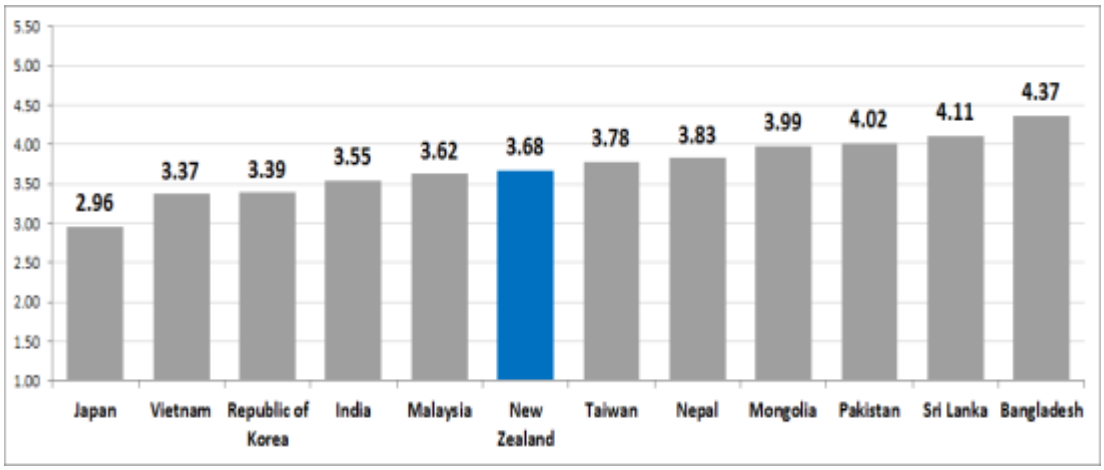
* Higher score means more progressive

Career prospects

As can be seen in Figure 4-34, the respondents in New Zealand demonstrated relative optimism about their career prospects, with an average score of 3.68. This puts the country in seventh place, following Bangladesh, Sri Lanka, Pakistan, Mongolia, Nepal, and Taiwan.

<Figure 4-34. Average of New Zealand & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

Table 4-36 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the respondents in New Zealand. By age, the career prospects were most optimistic among those in their 50s and least optimistic among those in their 30s, but no significant difference was observed. Marital status did not result in a statistically significant difference, either, although the score among the single respondents was higher than that among the married and the other group. In addition, no significant difference was found in terms of the number of children, the occupation of career interruption, or occupation.

<Table 4-36. Career outlook of New Zealand : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	68	3.68			
Age					
29 or below	25	3.88	1.13	.712	.549
30~39	30	3.47	1.07		
40~49	10	3.70	1.25		
50 or above	3	4.00	1.00		
Marital status					
Single	22	3.91	1.06	.925	.402
Married	29	3.48	1.12		
Other	17	3.71	1.16		
No. of children					
None	45	3.73	1.07	.524	.667
1	6	4.00	0.89		
2	14	3.43	1.28		
3 or above	3	3.33	1.53		
Occupation					
Student	1	4.00		.932	.451
Teacher/professor	1	2.00			
Researcher	1	4.00			
Medical personnel					
Engineer	58	3.64	1.13		
Other	7	4.14	0.90		
Duration of career break					
None	31	3.74	1.00	.274	.894
Less than 1 year	2	4.00	1.41		
1~2 years	13	3.38	1.12		
2~3 years	11	3.64	1.57		
3 years or more	9	3.67	1.00		

* Higher score means a more positive outlook

Policy demand

The respondents in New Zealand had a relatively higher average of 4.25 out of 5 for policy demand. Table 4-37 provides the results of ANOVA of whether policy demand

varies depending on the personal variables of the respondents in New Zealand. The correlations between policy demand and personal variables all proved statistically insignificant. By age, the score for policy demand was lowest among those in their 50s. However, the difference was not significant because the number of the respondents older than 50 was only three.

<Table 4-37. Policy needs of New Zealand : Demographic differences>

(unit: person, points)

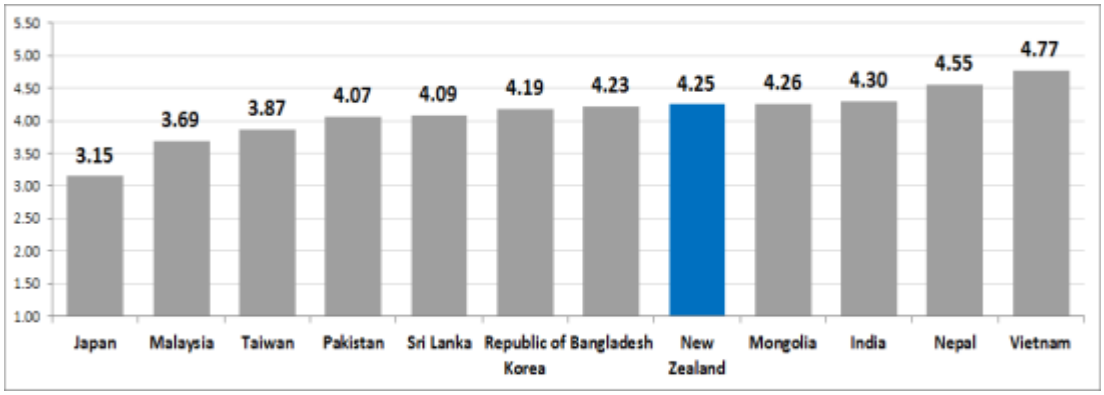
Classifications	Cases	Average	SD	F	*p*
Total	68	4.25			
Age					
29 or below	25	4.28	0.98	1.653	.186
30~39	30	4.33	0.88		
40~49	10	4.30	1.06		
50 or above	3	3.00	2.00		
Marital status					
Single	22	4.36	0.85	.814	.448
Married	29	4.07	1.19		
Other	17	4.41	0.87		
No. of children					
None	45	4.44	0.81	2.092	.110
1	6	3.83	0.75		
2	14	4.00	1.47		
3 or above	3	3.33	1.15		
Occupation					
Student	1	4.00		.382	.820
Teacher/professor	1	5.00			
Researcher	1	5.00			
Medical personnel					
Engineer	58	4.26	1.07		
Other	7	4.00	0.58		
Duration of career break					
None	31	4.61	0.80	2.231	.076
Less than 1 year	2	4.00	0.00		
1~2 years	13	4.15	0.80		
2~3 years	11	3.73	1.56		
3 years or more	9	3.89	0.93		

* Higher score means higher needs for policy support

As can be seen in Figure 4-35, these results place the country in the fifth rank, following Vietnam, Nepal, India, and Mongolia.

<Figure 4-35. Average of New Zealand & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

Gender equality

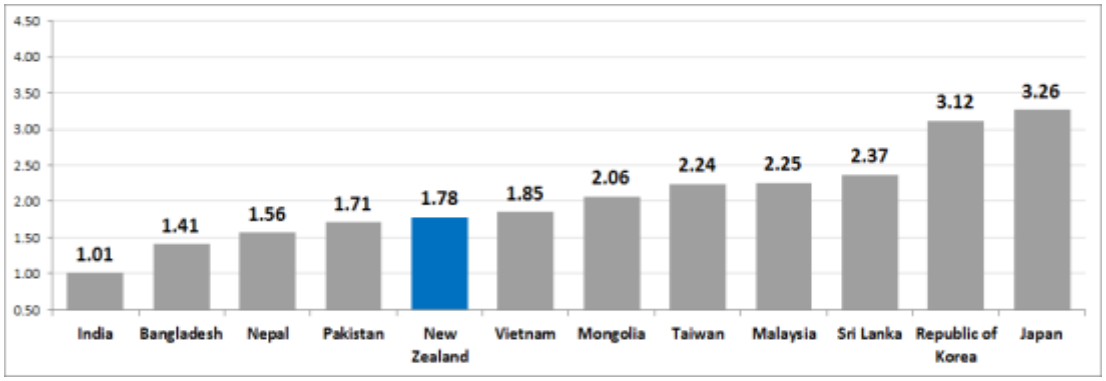
Table 4-38 shows the ANOVA conducted to identify whether personal variables resulted in a different level of tendency among the respondents in New Zealand to believe that equal opportunity was a sufficient factor of gender equality.

The result indicates that a significant difference was observed only for the number of children, and no statistical significance was found for the other variables. The average among the respondents with three or more children was highest, followed by that among the women with one child. The difference between the remaining two groups was not notable (F=4.193, p≤.009).

As can be seen in Figure 4-36, the respondents in New Zealand showed a tendency to believe that full gender equality would be realized once women were granted equal opportunity (average of 1.78; lower scores represent stronger agreement). This ranks the country in fourth place, following India, Bangladesh, and Nepal.

<Figure 4-36. Average of New Zealand & others on Equality concept>

(unit: points)



<Table 4-38. Equality concept of New Zealand : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	68	1.78			
Age					
29 or below	25	1.84	1.07	.505	.680
30~39	30	1.63	0.96		
40~49	10	2.10	1.45		
50 or above	3	1.67	1.15		
Marital status					
Single	22	1.77	0.97	.209	.812
Married	29	1.86	1.19		
Other	17	1.65	1.06		
No. of children					
None	45	1.67	0.98	4.193	.009
1	6	2.17	0.75		
2	14	1.57	1.16		
3 or above	3	3.67	1.15		
Occupation					
Student	1	1.00		.577	.680
Teacher/professor	1	1.00			
Researcher	1	3.00			
Medical personnel Engineer	58	1.78	1.11		
Other	7	1.86	0.90		
Duration of career break					
None	31	1.71	0.94	1.188	.325
Less than 1 year	2	2.00	0.00		
1~2 years	13	1.38	0.65		
2~3 years	11	2.00	1.61		
3 years or more	9	2.33	1.32		

4.4.3 Malaysia

4.4.3.1 Respondent profile

A total of 175 respondents participated in Malaysia, recording the highest number in this survey. Table 4-39 is the respondent profile, by age, marital status, number of children, occupation, and the duration of career interruption.

Those in their 20s accounted for 72.6%, followed by those in their 30s at 22.9%, those in their 40s at 3.4%, and those in their 50s at 1.1%. This indicates that the age distribution among Malaysian respondents was highly biased, with their average age being the youngest among the 12 countries at 25.59 years of age. Therefore, this characteristic must be considered in analyzing the differences by age. By marital status, single respondents accounted for 76.6%; those married for 19.4%; and others for 4.0%, reflecting the biased distribution of age groups. Likewise, those without children

accounted for 83.4%, followed by those with three or more children (7.4%), those with two children (5.1%), and those with one child (2.9%).

By occupation, 61.1% of the respondents reported themselves to be students, followed by engineers (21.7%), teachers/professors (11.4%), researchers (1.1%), and healthcare/medical professionals (0.6%). The respondents who had not experienced career interruption accounted for as much as 72%, whereas 7.4% of them reported having had an interruption of less than one year and 6.3% an interruption between 1-2 years. For analysis of Malaysian surveys, it is important to factor in that the respondents were fairly young and most of them were students.

<Table 4-39. Profile of participants from Malaysia>

(unit: person, %)

Classifications	N	%
Age		
29 or below	127	72.6
30~39	40	**22.9**
40~49	6	3.4
50 or above	2	1.1
Marital status		
Single	134	76.6
Married	34	19.4
Other	7	4.0
No. of children		
None	146	83.4
1	5	2.9
2	9	5.1
3 or above	13	7.4
Occupation		
Student	107	61.1
Teacher/professor	20	11.4
Researcher	2	1.1
Medical personnel	1	.6
Engineer	38	21.7
Other	7	4.0
Duration of career break		
None	126	72.0
Less than 1 year	13	7.4
1~2 years	11	6.3
2~3 years	5	2.9
3 years or more	5	2.9

4.4.3.2 Difference of gender barriers in Malaysia and other countries: Overview

Table 4-40 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Malaysia with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 3.20 in Malaysia, showing a significant

difference from the score of 2.51 among the other 11 countries (t=2.36, p≤.018). For this sub-scale, a lower score translates into a higher agreement with the idea of the perception of discriminatory reality. It is therefore concluded that Malaysian women tend to perceive a discriminatory reality less strongly than do their counterparts in other countries.

Analyzing each of the four questions under this sub-scale, we observed weaker perception of a discriminatory reality by Malaysian women in all four questions. A significant difference in the questions was about whether women have more difficulty finding a job in the STEM fields and whether women earn equal pay for equal work. For the former question, the average score in Malaysia had a value of 3.10, much higher than the average score of 2.48 in the other 11 countries. In other words, the respondents in Malaysia agreed to a lesser degree with the statement that women scientists and engineers have greater difficulty finding a job than their male counterparts (t=4.279, p≤.000). With regard to the statement "Boys are more encouraged than girls to choose the STEM fields," the respondents in Malaysia demonstrated less agreement, with an average of 3.13, compared with the average (2.37) of the other countries (t=8.301, p≤.000). In addition, Malaysian women agreed less strongly (3.09), compared with their counterparts in the other countries (2.42), with the statement "Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields" (t=7.106, p≤.000). On the other hand, for the statement "Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers," the Malaysian respondents (3.25) revealed a weaker perception than in other countries (2.40) (t=8.734, p≤.000). Lastly, regarding the statement "Women receive less wages for the same work in the STEM fields than men with the same qualifications," women in Malaysia agreed less strongly (3.32) compared with the respondents in the other countries (2.87) (t=4.776, p≤.000).

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Malaysia with that experienced by respondents in the other countries, the average score in Malaysia was 3.43, significantly higher than the average of 3.00 in the other countries (t=6.288, p≤.000). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Malaysia had less discriminatory experience than their counterparts in the other 11 countries surveyed. Examining the differences for each of the four questions constituting this sub-scale, we found a significant difference in all questions other than that about the experience of sexual harassment and other unfair treatment. With respect to the difficulty in participating in research projects or becoming research managers, the respondents in Malaysia (3.34) had a lower average score than those in the other countries (2.95) (t=4.430, p≤.000). The likelihood of experiencing disadvantage in winning research grants or scholarships was significantly lower among Malaysian women (3.75) than it was for the others (3.25) (t=5.769, p≤.000). The respondents in Malaysia also showed a

significantly lower average (3.20) than the others (2.51) regarding whether work-life balance worked as a handicap (t=7.449, p≤.000).

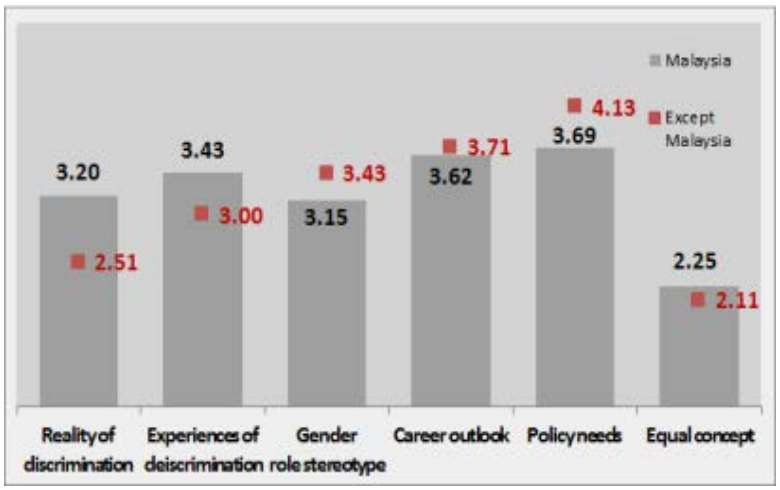
With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Malaysia had an average score of 3.15, significantly lower than the average score of 3.43 among the other countries (t=-3.944, p≤.000). This suggests that Malaysian women tend to be more conservative. For individual questions, the Malaysian women proved more conservative (t=-3.944, p≤.000) compared with the respondents in the other countries, regarding the ideas that men are bread-winners of a household (t=-5.559, p≤.000), that women have an inherent ability to take care of babies (t=-2.553, p≤.011), and that husbands should have more power than their wives to maintain order within the family (t=-3.805, p≤.000). They did not, however, show a difference with respect to the idea that men and women should have respectively suitable jobs since men are rational and women emotional.

With respect to career prospects, the respondents in Malaysia showed no difference from those in the other 11 countries surveyed. However, Malaysian women had a significantly lower average (3.69) for policy demand, compared with their counterparts in the other countries (4.13) (t=-4.672, p≤.000). Lastly, the tendency to believe that full gender equality would be realized once women were granted equal opportunity proved similar in Malaysia and other countries.

Figure 4-37 illustrates the overall difference in perception of gender barriers between the respondents in Malaysia and those in the other countries. >

<Figure 4-37. Gap between Malaysia & others on gender barriers>

(Unit: Points)



<Table 4-40. Gap between Malaysia & others on gender barriers>

(unit: points)

Item		Malaysia (n=175)	Except Malaysia (n=1,024)	t	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	3.13	2.37	8.301	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	3.09	2.42	7.106	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	3.25	2.40	8.734	.000
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	3.32	2.87	4.776	.000
	Sub-scales	3.20	2.51	9.134	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.34	2.95	4.430	.000
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.75	3.25	5.769	.000
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.45	3.28	1.608	.109
	8. Balancing work and life (marriage and family) has been a handicap for me.	3.20	2.51	7.449	.000
	Sub-scales	3.43	3.00	6.288	1371
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	3.07	3.62	-5.559	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.11	3.37	-2.553	.011
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.46	3.83	-3.805	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.94	2.92	.198	.843
	Sub-scales	3.15	3.43	-3.944	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.62	3.71	-.925	
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	3.69	4.13	-4.672	
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	2.25	2.11	1.524	

* Perception of discrimination : Lower score means higher perception of discrimination

* Experience of discrimination : Lower score means more discrimination experienced

* Gender role stereotypes : Higher score means more progressive

* Career outlook : Higher score means a more positive outlook

* Policy needs : Higher score means higher needs for policy support

4.4.3.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in Malaysia according to the personal variables of the respondents and compare the results with those obtained in the other countries.

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-41 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Malaysian respondents.

<Table 4-41. Perception of discrimination of Malaysia: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	175	3.20			
Age					
29 or below	127	3.27	0.86	1.165	.325
30~39	40	3.00	1.10		
40~49	6	2.88	0.52		
50 or above	2	3.25	0.71		
Marital status					
Single	134	3.22	0.92	.420	.657
Married	34	3.07	0.89		
Other	7	3.32	1.09		
No. of children					
None	146	3.22	0.91	1.109	.347
1	5	3.30	0.82		
2	9	3.28	1.28		
3 or above	13	2.75	0.65		
Occupation					
Student	107	3.27	0.87	1.270	.279
Teacher/professor	20	3.29	0.74		
Researcher	2	3.75	0.35		
Medical personnel	1	4.00			
Engineer	38	3.00	1.11		
Other	7	2.68	0.89		
Duration of career break					
None	126	3.11	0.92	1.038	.389
Less than 1 year	13	3.33	1.06		
1~2 years	11	3.64	1.17		
2~3 years	5	3.30	0.69		
3 years or more	5	3.45	0.51		

* Lower score means higher perception of discrimination

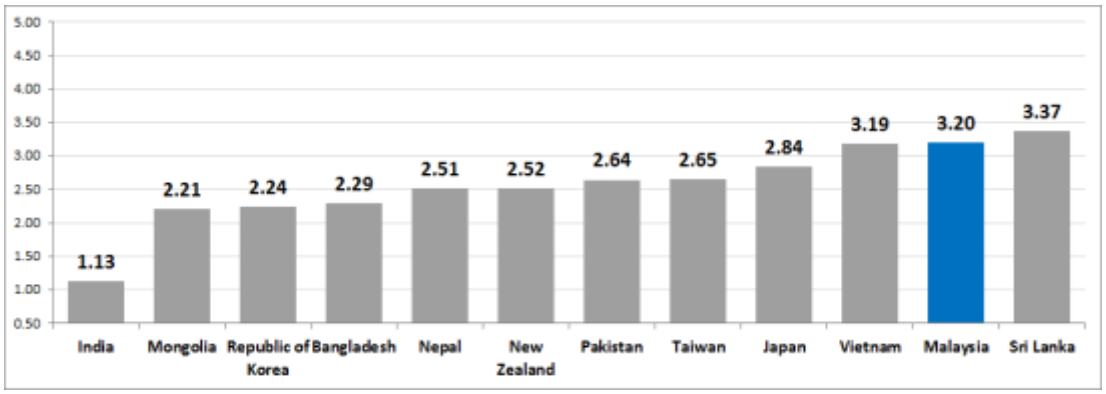
Since only eight respondents in their 40s and 50s participated in the survey, with most of the respondents being single or without children, no significant implication can be drawn from the analysis of differences by age, marital status, and the number of

children. ANOVA found no significant difference according to personal variables. By age, the respondents in their 20s, representing the largest share of the survey participants, had an average score of 3.27, which suggests that young women in Malaysia tend to have weak awareness of discrimination. Albeit statistically insignificant, awareness of discrimination was found to be higher among those in their 30s and 40s, rather than those in their 20s. Unlike in the past, women of today seem to experience stronger discrimination when they have a job and get married after graduating from school. No significant difference was found for the variables of marital status, number of children, occupation, and duration of career interruption.

Figure 4-38 compares the perception of a discriminatory reality by the respondents in Malaysia and by those from the other countries. The level of perception of gender discrimination in society was below the median level, only higher than Sri Lanka (average score of 3.20 on the five-point scale).

<Figure 4-38. Average of Malaysia & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-42 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Malaysian respondents. By age, most discriminatory experience was reported by those in their 40s (2.71), and least by those in their 50s (4.13). Between those two extremes, those in their 30s (3.26) reported slightly more experience of discrimination than those in their 20s (3.51) ($F=3.241$, $p\leq.024$). By marital status, discriminatory experience was less among single respondents than among the married or the other group, but this difference was not statistically significant. In addition, no significant difference was found for the number of children, duration of career interruption, or occupation.

<Table 4-42. Experience of discrimination of Malaysia : Demographic differences>

(unit: person, points)

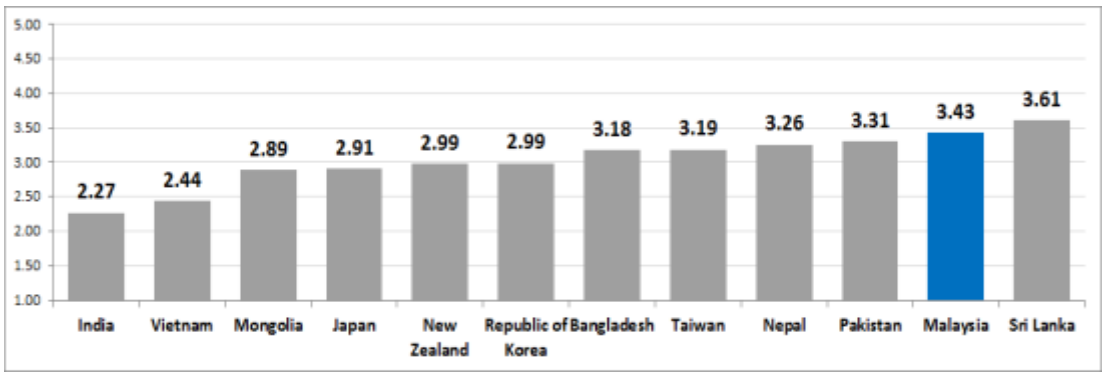
Classifications	Cases	Average	SD	F	*p*
Total	175	3.43			
Age					
29 or below	127	3.51	0.81	3.241	.024
30~39	40	3.26	0.77		
40~49	6	2.71	0.70		
50 or above	2	4.13	0.88		
Marital status					
Single	134	3.50	0.81	1.899	.153
Married	34	3.23	0.77		
Other	7	3.18	0.90		
No. of children					
None	146	3.47	0.80	.737	.531
1	5	3.15	0.80		
2	9	3.31	1.01		
3 or above	13	3.19	0.81		
Occupation					
Student	107	3.50	0.82	1.436	.214
Teacher/professor	20	3.41	0.72		
Researcher	2	4.13	1.24		
Medical personnel	1	2.00			
Engineer	38	3.29	0.81		
Other	7	3.21	0.71		
Duration of career break					
None	126	3.43	0.77	.830	.508
Less than 1 year	13	3.17	0.81		
1~2 years	11	3.77	1.25		
2~3 years	5	3.30	0.86		
3 years or more	5	3.45	0.87		

* Lower score means more discrimination experienced

Figure 4-39 compares the discriminatory experience among the respondents in Malaysia and among respondents from the other countries. Just as the awareness of a discriminatory reality was second lowest among women in science and engineering in Malaysia, the actual experience of discrimination in this country was also second lowest after Sri Lanka (average score of 3.43 on the five-point scale). In other words, scientists and engineers in Malaysia tend to report less perception and experience of discrimination against women than do their counterparts in other APNN member nations. This is probably because the respondents had a low level of sensitization to perceiving discrimination as discrimination, or because no notable discrimination exists in reality.

<Figure 4-39. Average of Malaysia & others on Exp. of discrimination>

(unit: points)



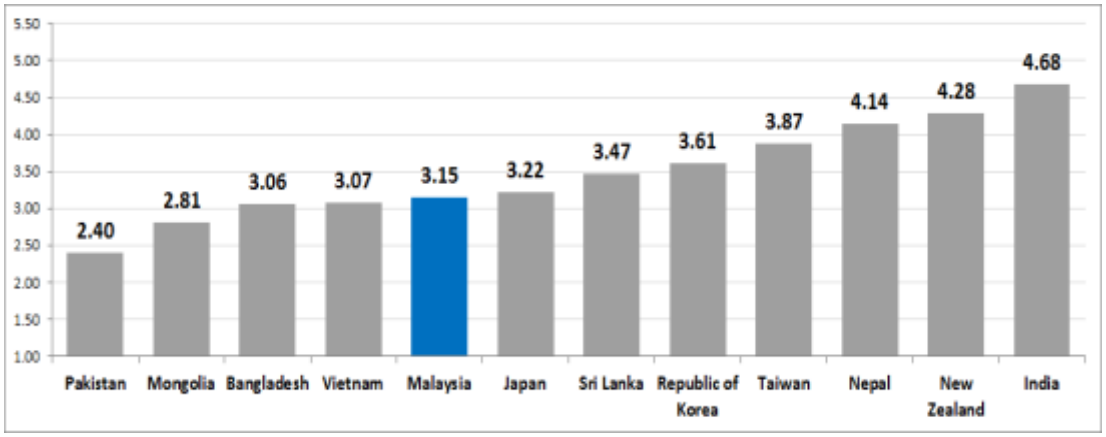
* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-40 compares attitudes toward gender roles among the respondents in Malaysia and among respondents from the other countries. The Malaysian respondents scored 3.15 out of 5 in the scale of gender role ideology, representing a slightly higher level than the median. Compared with other countries, this average score in Malaysia was higher only than that in Pakistan, Mongolia, Bangladesh, and Vietnam.

<Figure 4-40. Average of Malaysia & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

Table 4-43 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Malaysian respondents. By age group, the highest score was observed among the respondents in their 20s, and the score was

lowest among those in their 50s; however, the difference was not statistically significant. Marital status produced a statistically significant difference, suggesting a more progressive attitude toward gender roles among the single respondents (3.25), compared with the married (2.88) and the other group (2.39) (F=5.350, p≤.006). According to the number of children, the attitude toward gender roles was more progressive among the women with two children (3.31) than among the women without children (3.22), with one child (3.05), or with three or more children (2.46). In particular, the average score obtained for the respondents with three or more children produced a significant difference from the other groups (F=3.252, p≤.023). No significant difference was observed for occupation or duration of career interruption.

<Table 4-43. Gender role stereotypes of Malaysia : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	175	3.15			
Age					
29 or below	127	3.19	0.84	1.305	.274
30~39	40	3.09	0.98		
40~49	6	3.04	0.80		
50 or above	2	2.00	1.06		
Marital status					
Single	134	3.25	0.84	5.350	.006
Married	34	2.88	0.93		
Other	7	2.39	0.76		
No. of children					
None	146	3.22	0.83	3.252	.023
1	5	3.05	0.89		
2	9	3.31	1.01		
3 or above	13	2.46	0.93		
Occupation					
Student	107	3.21	0.84	1.139	.342
Teacher/professor	20	3.01	0.97		
Researcher	2	4.00	1.41		
Medical personnel	1	2.00			
Engineer	38	3.07	0.89		
Other	7	2.86	0.93		
Duration of career break					
None	126	3.22	0.88	.701	.593
Less than 1 year	13	2.88	0.78		
1~2 years	11	2.89	1.24		
2~3 years	5	3.20	1.24		
3 years or more	5	3.20	0.62		

* Higher score means more progressive

Career prospects

Table 4-44 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Malaysian respondents. No significant difference was found for age, marital status, number of children, or duration of career interruption. By occupation, students reported less optimistic career prospects than teachers/professors or engineers; however, the difference was not significant.

<Table 4-44. Career outlook of Malaysia : Demographic differences>

(unit: person, points)

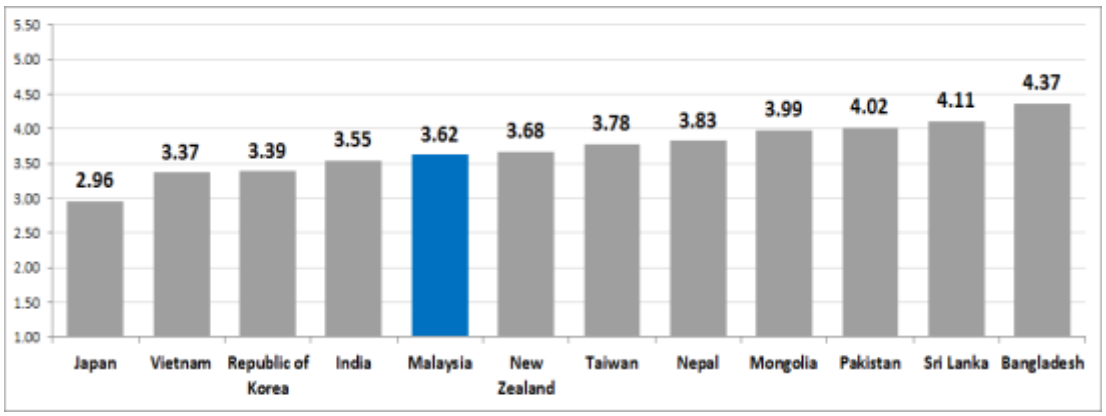
Classifications	Cases	Average	SD	F	*p*
Total	175	3.62			
Age					
29 or below	127	3.61	1.15	.258	.855
30~39	40	3.70	1.22		
40~49	6	3.33	1.21		
50 or above	2	4.00	1.41		
Marital status					
Single	134	3.61	1.15	1.386	.253
Married	34	3.79	1.09		
Other	7	3.00	1.63		
No. of children					
None	146	3.60	1.14	.536	.658
1	5	4.00	1.41		
2	9	4.00	1.00		
3 or above	13	3.54	1.27		
Occupation					
Student	107	3.61	1.14	.843	.521
Teacher/professor	20	3.85	0.99		
Researcher	2	2.50	2.12		
Medical personnel	1	5.00			
Engineer	38	3.55	1.29		
Other	7	3.71	1.11		
Duration of career break					
None	126	3.58	1.15	1.186	.319
Less than 1 year	13	3.92	1.19		
1~2 years	11	3.18	1.60		
2~3 years	5	4.40	0.89		
3 years or more	5	3.80	1.30		

* Higher score means a more positive outlook

As can be seen in Figure 4-41, the respondents in Malaysia demonstrated relative optimism about their career prospects, with an average score of 3.62. However, this indicates that the country had the fifth lowest average, following Japan, Vietnam, Korea, and India.

<Figure 4-41. Average of Malaysia & others on Career outlook>

(unit: points)



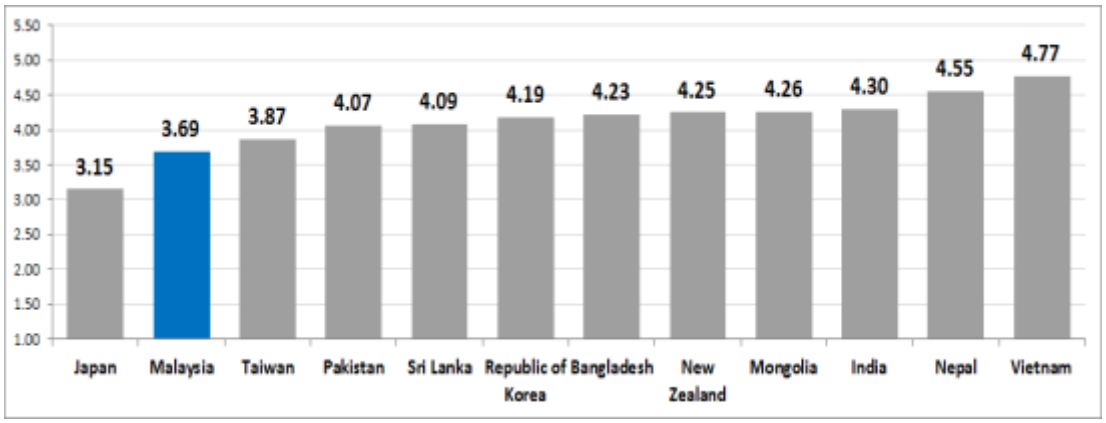
* Higher score means a more positive outlook

Policy demand

With respect to policy demand, women scientists and engineers in Malaysia had an average score of 3.69 out of 5, suggesting a level higher than the median. However, this score is lower than that in the other countries. As can be seen in Figure 4-42, policy demand by Malaysian women was second lowest after Japan.

<Figure 4-42. Average of Malaysia & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

Table 4-45 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Malaysian respondents. No personal variables suggested a statistical relevance to policy demand. This result is partially because the personal variables were not evenly distributed among the respondents. By marital status, the single respondents reported more policy demand than the married respondents; however, the difference was not significant.

<Table 4-45. Policy needs of Malaysia : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	175	3.69			
Age					
29 or below	127	3.69	1.18	.508	.677
30~39	40	3.70	1.16		
40~49	6	3.33	1.03		
50 or above	2	4.50	0.71		
Marital status					
Single	134	3.75	1.15	.948	.390
Married	34	3.53	1.08		
Other	7	3.29	1.80		
No. of children					
None	146	3.74	1.16	.764	.516
1	5	3.00	1.41		
2	9	3.67	1.32		
3 or above	13	3.54	0.78		
Occupation					
Student	107	3.70	1.15	1.747	.126
Teacher/professor	20	3.80	1.11		
Researcher	2	1.50	0.71		
Medical personnel	1	5.00			
Engineer	38	3.68	1.19		
Other	7	3.71	1.11		
Duration of career break					
None	126	3.79	1.12	2.197	.072
Less than 1 year	13	3.62	1.45		
1~2 years	11	2.82	1.60		
2~3 years	5	3.60	0.89		
3 years or more	5	3.00	0.00		

* Higher score means higher needs for policy support

Gender equality

Table 4-46 shows the ANOVA conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Malaysia to believe that equal opportunity was a sufficient factor of gender equality. As a result, age proved not to be a meaningful variable. By marital status, although the single respondents had a stronger belief that equal opportunity was sufficient than the married or the other group, the difference was not statistically significant. The results according to the number of children were not consistent, either. By occupation (excluding the only respondent categorized as healthcare/medical professional), engineers (1.97) tend to most strongly accept the concept of equal opportunity, followed by students (2.26) and teachers/professors (2.40) ($F=3.249$, $p\leq.008$). No significant difference was found for the length of career interruption.

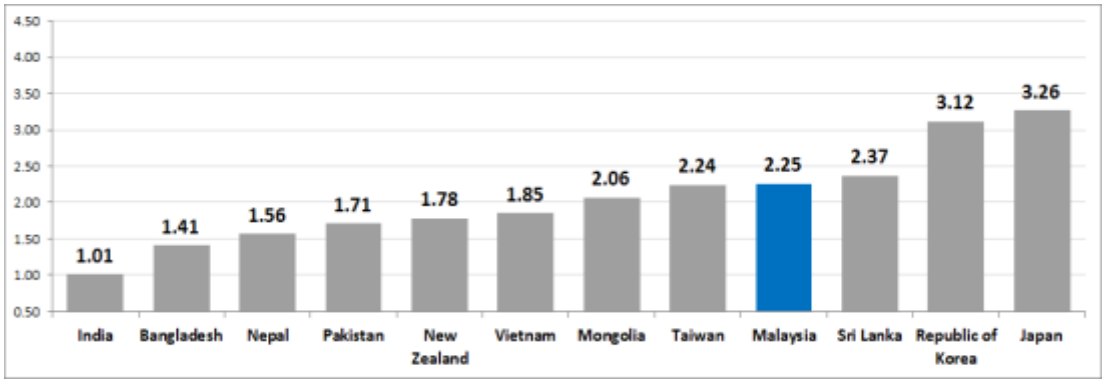
<Table 4-46. Equality concept of Malaysia : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	175	2.25			
Age					
29 or below	127	2.23	1.17	.547	.651
30~39	40	2.23	1.17		
40~49	6	2.83	0.98		
50 or above	2	2.50	2.12		
Marital status					
Single	134	2.17	1.15	1.364	.258
Married	34	2.53	1.13		
Other	7	2.43	1.51		
No. of children					
None	146	2.22	1.18	.444	.722
1	5	2.60	1.14		
2	9	2.22	1.09		
3 or above	13	2.54	1.20		
Occupation					
Student	107	2.26	1.12	3.249	.008
Teacher/professor	20	2.40	1.10		
Researcher	2	5.00	0.00		
Medical personnel	1	1.00			
Engineer	38	1.97	1.22		
Other	7	2.57	0.98		
Duration of career break					
None	126	2.18	1.20	2.217	.070
Less than 1 year	13	2.31	1.32		
1~2 years	11	1.82	0.75		
2~3 years	5	3.00	0.71		
3 years or more	5	3.40	0.55		

<Figure 4-43. Average of Malaysia & others on Equality concept>

(unit: points)



As can be seen in Figure 4-43, the tendency to believe that full gender equality would be realized once women were granted equal opportunity proved slightly higher

than the median level in Malaysia (average of 2.25; a lower score represents stronger agreement). This score is fourth highest following the averages in Japan, Korea, and Sri Lanka.

4.4.4 Mongolia

4.4.4.1 Respondent profile

A total of 161 respondents participated in the survey in Mongolia (see Table 4-47), the second largest number after Malaysia. The age distribution was relatively even, with 32.3% in 40s, 28% in 30s, 26.7% in 20s, and 13% in 50s. By marital status, married respondents represented 72%, single 19.3%, and the other group 8.7%. The largest group of respondents had two children (37.9%), followed by those with three or more children (23%), those with one child (20.5%), and those without children (18.6%). By occupation, engineers were largest in number (42.9%), followed by teachers/professors (34.8%), researchers (15.5%), and students (6.8%). Most of the respondents (46%) had at least three years of career interruption, 24.8% had two to three years of interruption, and 18% had experienced no career interruption.

4.4.4.2 Difference of gender barriers in Mongolia and other countries: Overview

Table 4-48 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Mongolia with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.21 in Mongolia, showing a significant difference from the value of 2.65 among the other 11 countries ($t=-6.832$, $p\leq.000$). This implies that women in Mongolia tend to more strongly perceive discrimination against women in their society, compared with their counterparts in the other countries. As a result of analyzing each of the four questions included in this sub-scale, we observed a significant difference in all three questions, except for the question about the same wages for the same work. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Mongolia demonstrated more agreement, with an average of 1.93, compared with the average (2.53) of the other countries ($t=-7.408$, $p\leq.000$).

In addition, Mongolian women more strongly agreed (1.93), compared with their counterparts in the other countries (2.59), with the statement “Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields” ($t=-7.408$, $p\leq.000$). Furthermore, for the statement “Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers,” the Mongolian respondents (2.16) revealed a stronger perception than in other countries (2.55) ($t=-4.499$, $p\leq.007$).

<Table 4-47. Profile of participants from Mongolia>

(unit: person, %)

Classifications	N	%
Age		
29 or below	43	26.7
30~39	45	28.0
40~49	52	32.3
50 or above	21	13.0
Marital status		
Single	31	19.3
Married	116	72.0
Other	14	8.7
No. of children		
None	30	18.6
1	33	20.5
2	61	37.9
3 or above	37	23.0
Occupation		
Student	11	6.8
Teacher/professor	56	34.8
Researcher	25	15.5
Medical personnel	-	-
Engineer	69	42.9
Other		
Duration of career break		
None	29	18.0
Less than 1 year	4	2.5
1~2 years	13	8.1
2~3 years	40	24.8
3 years or more	74	46.0

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Mongolia with that experienced by respondents in the other countries, the average score in Mongolia was 2.89, significantly different from the average of 3.08 in the other countries ($t=-3.236$, $p\leq.001$). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Mongolia had more discriminatory experiences than their counterparts in the other 11 countries surveyed. Examining the differences for each of the four questions constituting this sub-scale, we found a significant difference with respect to participating in research projects or becoming a project manager, and the experience of sexual harassment and other unfair treatment. In other words, compared with their counterparts in the other countries (2.97), women scientists and engineers in Mongolia experienced less difficulty (average of 3.16) in participating in research projects or becoming research managers ($t=2.113$, $p\leq.036$). This indicates that the difference for this question headed in a direction opposite to those of the remaining questions. On the other hand, the experience of sexual harassment or other disadvantage was reported as more prevalent among Mongolian women (2.61)

compared with their counterparts in the other countries (3.40) (t=-8.782, p≤.000). For the remaining two questions, Mongolian women reported slightly more experience of discrimination; however, the difference was not statistically significant.

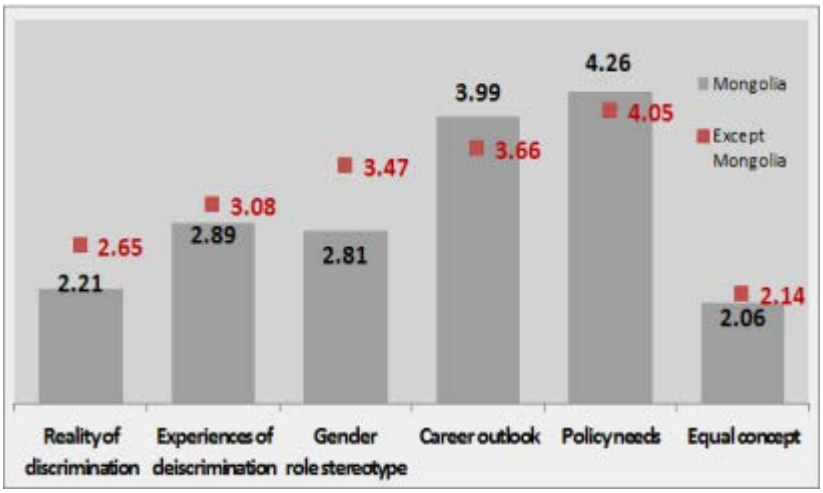
With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Mongolia had an average score of 2.81, significantly lower than the average score of 3.47 among the other countries (t=-10.678, p≤.000). This suggests that women in Mongolia tend to be more conservative. By individual questions, except for the one that women have an inherent ability to take care of babies, the remaining three questions produced significant differences. Mongolian women tend to be more conservative with regard to the ideas that men are bread-winners of a household that husbands should have more power than their wives to maintain order within the family, and that men and women should have respectively suitable jobs since men are rational and women emotional.

For career prospects, the respondents in Mongolia (3.99) reported themselves as more optimistic than those in the other 11 countries (3.66) (t=5.307, p≤.000). In addition, the women scientists and engineers in Mongolia expressed a significantly higher policy demand, compared with the respondents in the other countries (t=3.075, p≤.002). Lastly, the tendency to believe that full gender equality would be realized once women were granted equal opportunity proved similar in Mongolia and other countries.

Figure 4-44 illustrates the overall difference in perception of gender barriers between the respondents in Mongolia and those in the other countries.

<Figure 4-44. Gap between Mongolia & others on gender barriers>

(Unit: Points)



<Table 4-48. Gap between Mongolia & others on gender barriers>

(unit: points)

Item		Mongolia (n=161)	Except Mongolia (n=1,218)	t	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	1.93	2.53	-7.408	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	1.93	2.59	-7.959	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.16	2.55	-4.499	.000
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.81	2.94	-1.368	.173
	Sub-scales	2.21	2.65	-6.832	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.16	2.97	2.113	.036
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.22	3.33	-1.298	.195
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	2.61	3.40	-8.782	.000
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.54	2.61	-.780	.436
	Sub-scales	2.89	3.08	-3.236	.001
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	2.78	3.65	-8.922	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.22	3.35	-1.408	.161
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.49	3.82	-3.400	.001
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	1.74	3.08	-16.151	.000
	Sub-scales	2.81	3.47	-10.678	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.99	3.66	5.307	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.26	4.05	3.075	.002
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	2.06	2.14	-1.140	.255

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

4.4.4.3 Analysis of individual questions

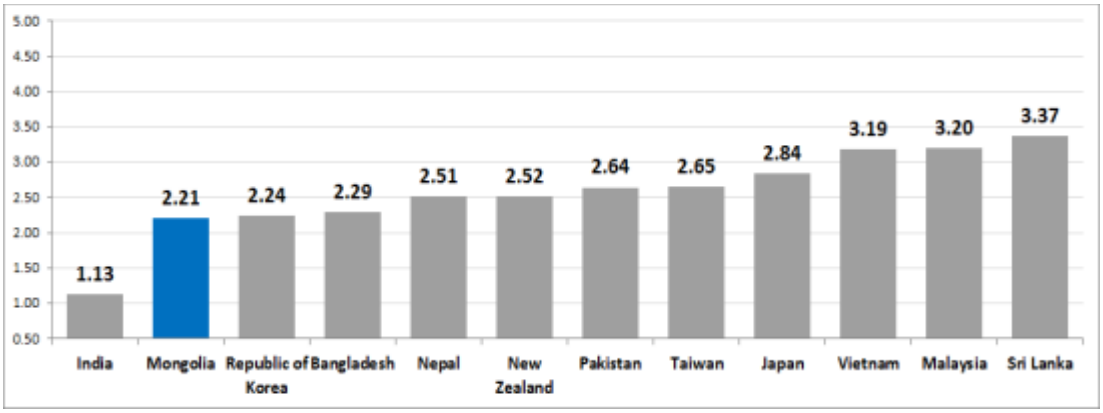
Here, we will examine the gender barriers perceived by women scientists and engineers in Mongolia according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Figure 4-45 compares the perception of a discriminatory reality by the respondents in Mongolia and by those from the other countries. The level of perception of gender discrimination in society was second highest only to India (average score of 2.21 on the five-point scale).

<Figure 4-45. Average of Mongolia & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Table 4-49 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Mongolian respondents. By marital status, married respondents reported stronger perception of a discriminatory reality than did their single counterparts (F=3.253, p≤.041). Although no significant difference was found for the number of children, occupation resulted in a significant difference: researchers (2.05) and engineers (2.07) more strongly perceived a discriminatory reality than did students (2.73) and teachers/professors (2.35) (a lower score represents more discriminatory reality) (F=3.881, p≤.010). Lastly, career interruption suggested a significant difference as well. Specifically, the respondents experiencing at least three years of career interruption perceived a discriminatory reality most strongly (2.03), followed by those with a career interruption period of two to three years, those with one to two years, and those experiencing no interruption (2.59). This suggests a consistent correlation between longer interruption period and a stronger perception of a discriminatory reality (F=3.448, p≤.010).

<Table 4-49. Perception of discrimination of Mongolia: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	161	2.21			
Age					
29 or below	43	2.31	0.83	2.554	.057
30~39	45	2.37	0.73		
40~49	52	2.00	0.67		
50 or above	21	2.15	0.67		
Marital status					
Single	31	2.42	0.81	3.253	.041
Married	116	2.20	0.73		
Other	14	1.82	0.57		
No. of children					
None	30	2.38	0.85	1.112	.346
1	33	2.27	0.75		
2	61	2.17	0.68		
3 or above	37	2.07	0.74		
Occupation					
Student	11	2.73	0.68	3.881	.010
Teacher/professor	56	2.35	0.57		
Researcher	25	2.05	0.77		
Medical personnel					
Engineer	69	2.07	0.82		
Other					
Duration of career break					
None	29	2.59	0.74	3.448	.010
Less than 1 year	4	2.44	1.16		
1~2 years	13	2.40	0.77		
2~3 years	40	2.16	0.64		
3 years or more	74	2.03	0.72		

* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-50 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Mongolian respondents. No significant correlation with the perception of discriminatory reality was observed for variables such as age, number of children, occupation, and career interruption. Still, the average score was highest among those in their 20s (2.97), followed by those in their 30s and 40s (2.88 each), and those in their 50s (2.73), implying a tendency that younger generations have less discriminatory experience. By occupation, a discriminatory reality was reported at the lowest level among students (3.20) and highest

among researchers (2.78); however, the difference was not significant.

<Table 4-50. Experience of discrimination of Mongolia : Demographic differences>

(unit: person, points)

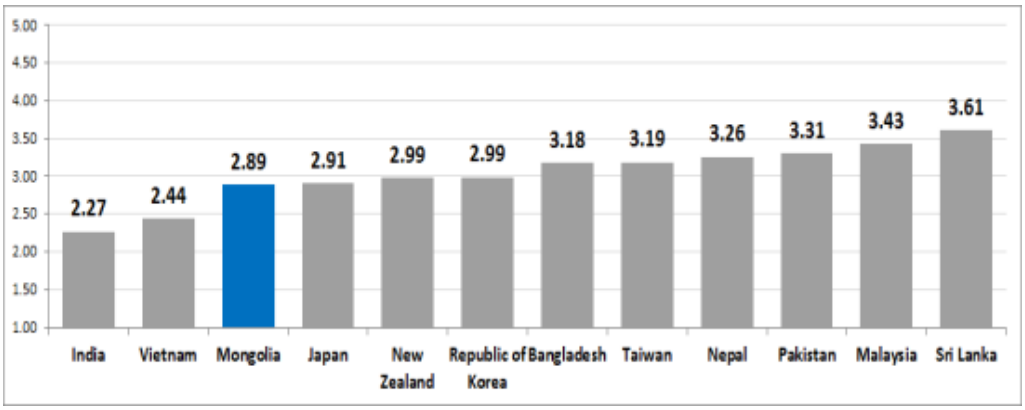
Classifications	Cases	Average	SD	F	*p*
Total	161	2.89			
Age					
29 or below	43	2.97	0.81	.608	.611
30~39	45	2.88	0.68		
40~49	52	2.88	0.57		
50 or above	21	2.73	0.66		
Marital status					
Single	31	2.83	0.72	.940	.393
Married	116	2.92	0.66		
Other	14	2.68	0.73		
No. of children					
None	30	2.90	0.61	.570	.635
1	33	2.79	0.82		
2	61	2.96	0.64		
3 or above	37	2.83	0.68		
Occupation					
Student	11	3.20	0.60	1.023	.384
Teacher/professor	56	2.87	0.74		
Researcher	25	2.78	0.72		
Medical personnel Engineer	69	2.89	0.63		
Other					
Duration of career break					
None	29	2.94	0.57	.374	.827
Less than 1 year	4	2.69	1.20		
1~2 years	13	2.92	1.10		
2~3 years	40	2.96	0.68		
3 years or more	74	2.83	0.61		

* Lower score means more discrimination experienced

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-46 compares the discriminatory experience among the respondents in Mongolia and among respondents from the other countries. The average score for this sub-scale was slightly higher than the median (average score of 2.89 on the five-point scale). Just as the awareness of discriminatory reality was second highest among women in science and engineering in Mongolia, the actual experience of discrimination in this country was also third highest after India and Vietnam.

<Figure 4-46. Average of Mongolia & others on Exp. of discrimination>

(unit: points)



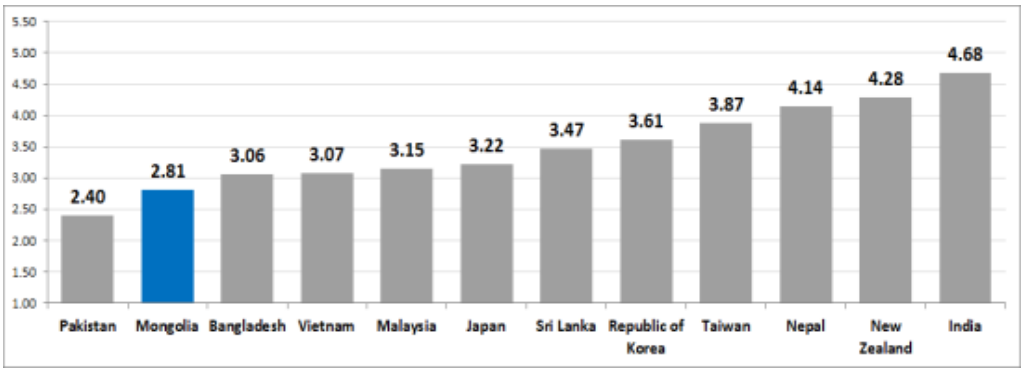
* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-47 compares attitudes toward gender roles among the respondents in Mongolia and among respondents from the other countries. The average score for this sub-scale of gender role attitudes was 2.81 out of 5, below the median level. This implies that Mongolian women have the second most conservative attitude toward gender roles, after only women in Pakistan.

<Figure 4-47. Average of Mongolia & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

Table 4-51 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Mongolian respondents. Whereas no significant results were found for variables such as age, marital status, number of children, occupation, and duration of career interruption, married respondents tend to be more progressive toward gender roles than the single respondents. By occupation, teachers/professors reported themselves to be more progressive than students.

<Table 4-51. Gender role stereotypes of Mongolia : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	161	2.81			
Age					
29 or below	43	2.74	0.66	1.344	.262
30~39	45	2.96	0.72		
40~49	52	2.70	0.72		
50 or above	21	2.88	0.58		
Marital status					
Single	31	2.69	0.70	.851	.429
Married	116	2.85	0.67		
Other	14	2.70	0.86		
No. of children					
None	30	2.70	0.77	1.862	.138
1	33	3.03	0.51		
2	61	2.82	0.72		
3 or above	37	2.68	0.70		
Occupation					
Student	11	2.64	0.39	.391	.760
Teacher/professor	56	2.87	0.72		
Researcher	25	2.76	0.88		
Medical personnel					
Engineer	69	2.81	0.64		
Other					
Duration of career break					
None	29	2.74	0.74	.610	.656
Less than 1 year	4	3.19	0.31		
1~2 years	13	2.88	0.70		
2~3 years	40	2.88	0.65		
3 years or more	74	2.76	0.72		

* Higher score means more progressive

Career prospects

Table 4-52 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Mongolian respondents. By age, younger respondents tended to have more optimistic career prospects; however, the difference by age did reach a significant level. Although married respondents reported career prospects more optimistic than those of the other group, with the single being more optimistic than the married, the difference by marital status was of no statistical significance. The number of children did not result in a significant difference, either. Although students held the most optimistic and engineers the least optimistic attitudes toward career prospects, the difference was not significant. In addition, the variable of career interruption did not produce a significant difference.

<Table 4-52. Career outlook of Mongolia : Demographic differences>

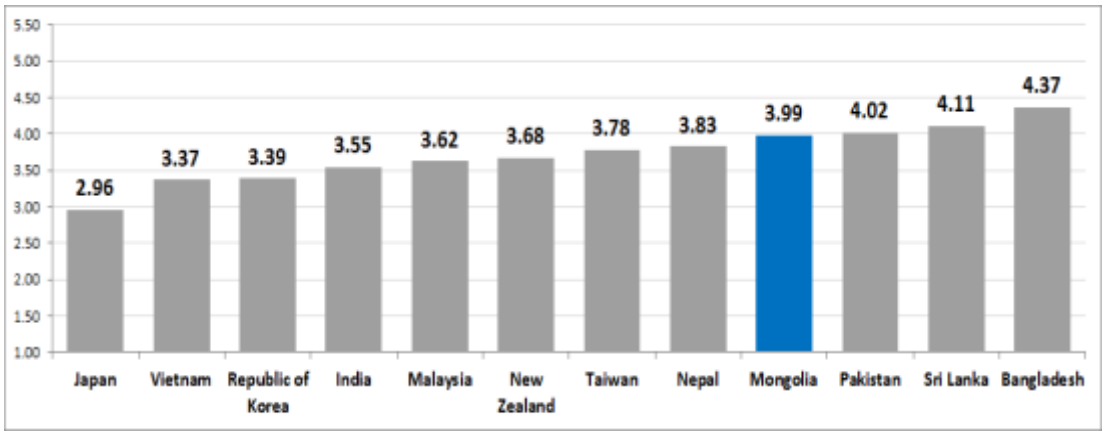
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	161	3.99			
Age					
29 or below	43	4.14	0.71	1.512	.214
30~39	45	4.02	0.62		
40~49	52	3.90	0.69		
50 or above	21	3.81	0.68		
Marital status					
Single	31	4.16	0.64	1.705	.185
Married	116	3.97	0.70		
Other	14	3.79	0.58		
No. of children					
None	30	4.23	0.57	1.862	.138
1	33	3.88	0.74		
2	61	3.98	0.72		
3 or above	37	3.89	0.61		
Occupation					
Student	11	4.36	0.50	1.382	.250
Teacher/professor	56	3.96	0.66		
Researcher Medical personnel	25	4.04	0.73		
Engineer Other	69	3.93	0.69		
Duration of career break					
None	29	4.24	0.58	2.269	.064
Less than 1 year	4	4.00	0.82		
1~2 years	13	4.15	0.80		
2~3 years	40	4.05	0.55		
3 years or more	74	3.84	0.72		

* Higher score means a more positive outlook

<Figure 4-48. Average of Mongolia & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

As can be seen in Figure 4-48, the respondents in Mongolia demonstrated relative optimism about their career prospects, with an average score of 3.99. This puts the country in fourth place, following Bangladesh, Sri Lanka, and Pakistan.

Policy demand

Table 4-53 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Mongolian respondents. No personal variables suggested a statistical relevance to policy demand. This result is partially because the respondents in Mongolia mostly reported strong policy demand. By occupation, policy demand was strongest among researchers (4.48) and least strong among teachers/professors (4.18).

<Table 4-53. Policy needs of Mongolia : Demographic differences>

(unit: person, points)

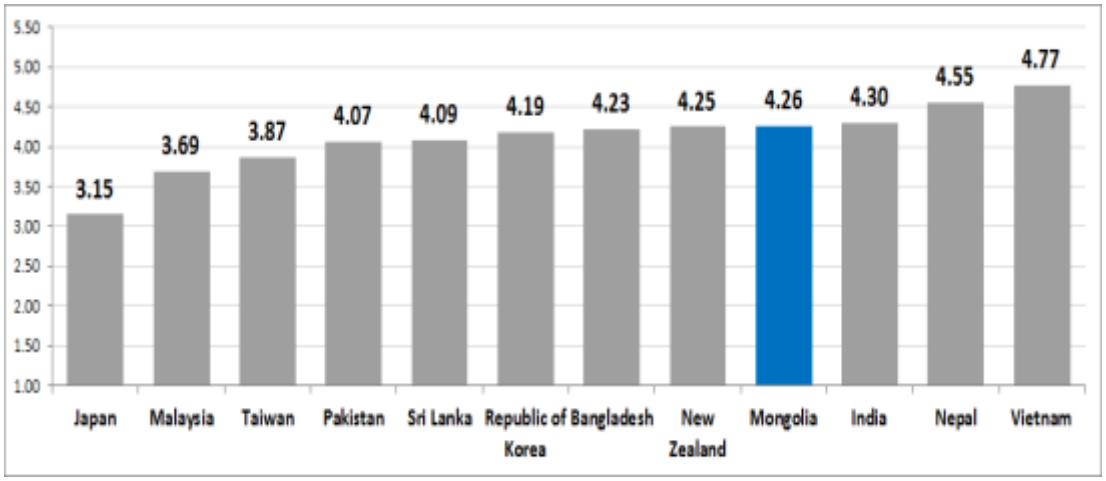
Classifications	Cases	Average	SD	F	*p*
Total	161	4.26			
Age					
29 or below	43	4.40	0.73	1.662	.178
30 ~ 39	45	4.04	0.80		
40 ~ 49	52	4.31	0.83		
50 or above	21	4.33	0.80		
Marital status					
Single	31	4.23	0.80	.696	.500
Married	116	4.24	0.81		
Other	14	4.50	0.65		
No. of children					
None	30	4.23	0.82	.030	.993
1	33	4.27	0.76		
2	61	4.28	0.80		
3 or above	37	4.24	0.83		
Occupation					
Student	11	4.36	0.50	.924	.430
Teacher/professor	56	4.18	0.74		
Researcher	25	4.48	0.87		
Medical personnel					
Engineer	69	4.23	0.84		
Other					
Duration of career break					
None	29	4.21	0.77	2.040	.091
Less than 1 year	4	3.75	0.96		
1~2 years	13	4.38	0.77		
2~3 years	40	4.53	0.68		
3 years or more	74	4.15	0.84		

* Higher score means higher needs for policy support

As can be seen in Figure 4-49, the respondents in Mongolia had a relatively high average of 4.26 in policy demand, ranking fourth after Vietnam, New Zealand, and India.

<Figure 4-49. Average of Mongolia & others on Policy needs>

(unit: points)



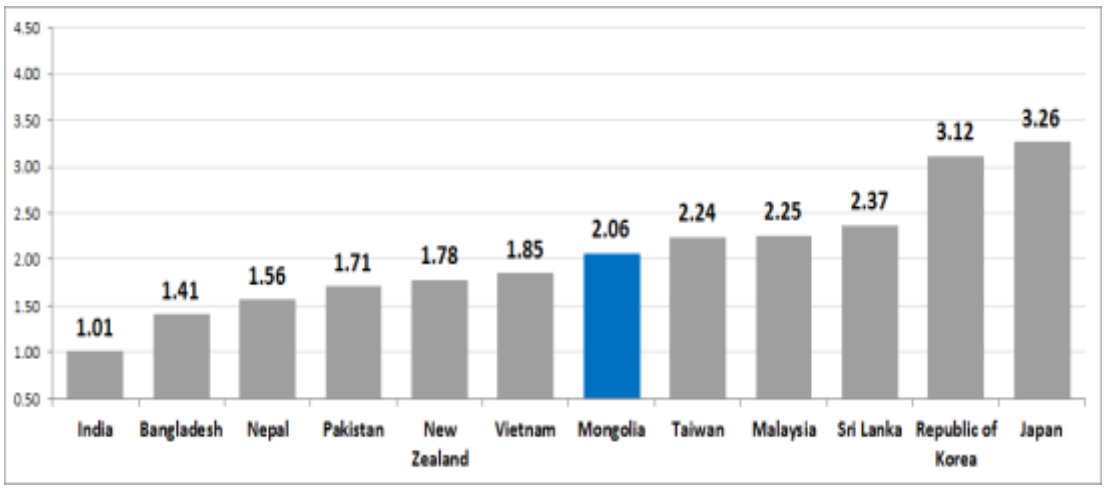
* Higher score means higher needs for policy support

Gender equality

As can be seen in Figure 4-50, the tendency of Mongolian women to believe that full gender equality would be realized once women were granted equal opportunity was slightly stronger than the median level (average of 2.06; a lower score represents stronger agreement). This ranks Mongolia in seventh place, following India, Bangladesh, New Zealand, Pakistan, Nepal, and Vietnam.

<Figure 4-50. Average of Mongolia & others on Equality concept>

(unit: points)



ANOVA analysis was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Mongolia to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-54). The results show that such belief was not correlated to personal variables. Still, the single respondents tended to agree more with this statement, compared with the married and the other group. By occupation, students agreed most with the idea, followed by researchers, teachers/professors, and engineers; however, the difference was not sufficiently significant. Career interruption did not produced a statistically significant result, either.

<Table 4-54. Equality concept of Mongolia : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	161	2.06			
Age					
29 or below	43	2.05	0.84	.101	.959
30~39	45	2.07	0.65		
40~49	52	2.10	0.66		
50 or above	21	2.00	0.63		
Marital status					
Single	31	1.87	0.72	1.442	.239
Married	116	2.11	0.73		
Other	14	2.07	0.27		
No. of children					
None	30	1.83	0.70	1.794	.151
1	33	2.18	0.68		
2	61	2.15	0.73		
3 or above	37	2.00	0.67		
Occupation					
Student	11	1.73	0.65	1.333	.266
Teacher/professor	56	2.07	0.50		
Researcher	25	1.96	0.89		
Medical personnel					
Engineer	69	2.14	0.77		
Other					
Duration of career break					
None	29	1.90	0.67	1.857	.121
Less than 1 year	4	2.75	0.50		
1~2 years	13	1.85	0.69		
2~3 years	40	2.15	0.58		
3 years or more	74	2.08	0.77		

4.4.5 Vietnam

4.4.5.1 Respondent profile

In Vietnam, a total of 100 respondents participated in the survey (see Table 4-55). A large majority of them were in their 30s (71%) and 40s (23%), leaving those in their 50s (5%) and 20s (1%) in extremely small numbers. By marital status, most

respondents were married (87%), followed by the other group (12%), and only one respondent was single. It is therefore of no significance to analyze the survey results by the respondents' marital status. Most of the Vietnamese respondents had two children (61%), followed by those with one child (35%) and with three or more children (3%). By occupation, teachers/professors constituted the majority (72%), followed by researchers (17%) and engineers (11%). All of the respondents in Vietnam were in employment at the time of the survey, and no students or healthcare/medical professionals were included among the respondents. By length of career interruption, most respondents had at least three years of interruption (79%), followed by those with two to three years (15%); the other respondents represented only a slight share. Compared with other countries, those in Vietnam experienced relatively longer career interruption.

<Table 4-55. Profile of participants from Vietnam>

(unit: person, %)

Classifications	N	%
Age		
29 or below	1	1.0
30~39	71	71.0
40~49	23	23.0
50 or above	5	5.0
Marital status		
Single	1	1.0
Married	87	87.0
Other	12	12.0
No. of children		
None	1	1.0
1	35	35.0
2	61	61.0
3 or above	3	3.0
Occupation		
Student		
Teacher/professor	72	72.0
Researcher	17	17.0
Medical personnel		
Engineer	11	11.0
Other		
Duration of career break		
None	1	1.0
Less than 1 year	2	2.0
1~2 years	3	3.0
2~3 years	15	15.0
3 years or more	79	79.0

4.4.5.2 Difference of gender barriers in Vietnam and other countries: Overview

The table below shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Vietnam with that perceived by their

counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 3.19 in Vietnam, showing a significant difference from the score of 2.55 among the other 11 countries (t=15.602, p≤.000; a lower score is translated as stronger agreement with the perception of discriminatory reality). In other words, compared with women in the other countries, Vietnamese women tend to less strongly perceive discrimination against women in their society. As a result of analyzing each of the four questions included in this sub-scale, a significant difference was observed in three questions, except for the statement "Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers." With regard to the statement "Boys are more encouraged than girls to choose the STEM fields," the respondents in Vietnam demonstrated less agreement, with an average of 3.30, compared with the average (2.40) of the other countries (t=10.969, p≤.000). This may be because Vietnamese women are less aware of discriminatory reality or because discrimination is actually less prevalent in Vietnam.

In addition, Vietnamese women agreed less strongly (2.63), compared with their counterparts in the other countries (2.50), with the statement "Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields" (t=-7.408, p≤.000.) This indicates that women in Vietnam tend to less strongly perceive a discriminatory reality. Lastly, regarding the statement "Women receive less wages for the same work than men," women in Vietnam significantly agreed less strongly (4.32) compared with the respondents in the other countries (2.82). This implies that the respondents in Vietnam strongly denied the presumption that such discrimination existed in their society (t=23.364, p≤.000).

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Vietnam with that experienced by respondents in the other countries, the average score in Vietnam was 2.44, significantly higher than the average of 3.10 in the other countries (t=-14.695, p≤.000). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Vietnam had more discriminatory experience than their counterparts in the other 11 countries surveyed. Examining the differences for each of the four questions constituting this sub-scale, we found a significantly higher score in the discriminatory experience of Vietnamese women in all questions than was the case for the respondents in the other countries. First, Vietnamese women (2.65) reported more difficulty in participating in research projects or becoming research managers, compared with the respondents in the other countries (3.02) (t=-3.551, p≤.001). They (2.42) also experienced more disadvantage in winning research grants or scholarships than their counterparts in the other countries (3.39) (t=-11.849, p≤.000).

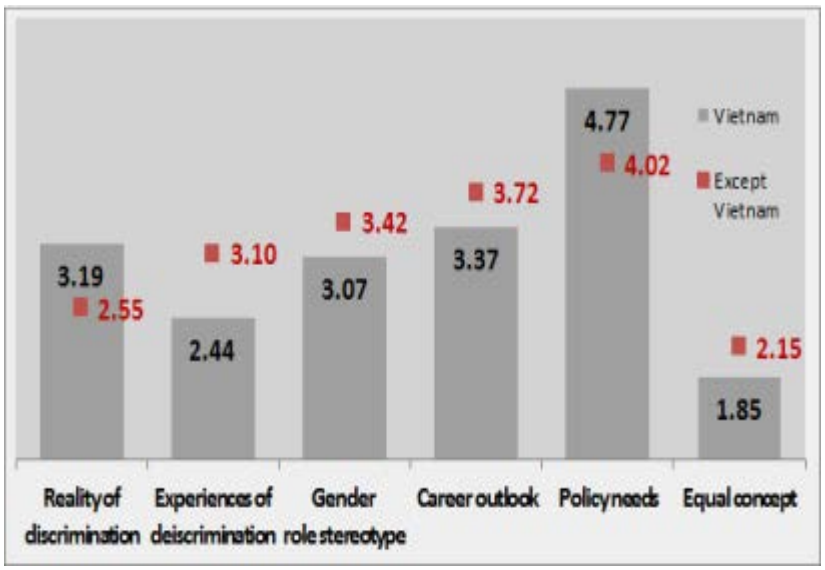
Likewise, a significant result was observed for sexual harassment and other

disadvantages. The women scientists and engineers in Vietnam (3.61) had more experience of sexual harassment and other disadvantages than those in the other countries (3.28) (t=4.343, p≤.000). Lastly, the Vietnamese respondents (1.10) also reported more tendency of experiencing work-life balance as a handicap, compared with women in the other countries (2.72) (t=-34.449, p≤.000). This result seems relevant to the abovementioned fact that 79% of the Vietnamese respondents had career interruption for three years or longer, which is notably long compared with other countries.

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Vietnam had an average score of 3.07, significantly lower than the average score of 3.42 among the other countries (t=-8.141, p≤.000). This implies that women in Vietnam tend to be more conservative about gender roles. All four individual questions for this sub-scale resulted in significant differences. First, the participants in Vietnam proved to be more conservative regarding the ideas that men are bread-winners of a household that husbands should have more power than their wives to maintain order within the family, and that men and women should have respectively suitable jobs since men are rational and women emotional. On the other hand, with respect to the idea that women have an inherent ability to take care of babies, Vietnamese women (3.70) reported a more progressive tendency than did the respondents in the other countries (3.31) (t=5,522, p≤.000).

<Figure 4-51. Gap between Vietnam & others on gender barriers>

(Unit: Points)



<Table 4-56. Gap between Vietnam & others on gender barriers>

(unit: points)

Item		Vietnam (n=100)	Except Vietnam (n=1,279)	t	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	3.30	2.40	10.989	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.63	2.50	1.978	.049
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.50	2.50	-.046	.963
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	4.32	2.82	23.364	.000
	Sub-scales	3.19	2.55	15.602	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	2.65	3.02	-3.551	.001
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	2.42	3.39	-11.849	.000
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.61	3.28	4.343	.000
	8. Balancing work and life (marriage and family) has been a handicap for me.	1.10	2.72	-34.449	.000
	Sub-scales	2.44	3.10	-14.695	.000
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	3.42	3.56	-2.007	.046
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.70	3.31	5.522	.000
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	2.72	3.86	-11.613	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.44	2.96	-7.897	.000
	Sub-scales	3.07	3.42	-8.141	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.37	3.72	-4.871	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.77	4.02	14.483	.000
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.85	2.15	-5.671	.000

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

For career prospects, the average score obtained by women in Vietnam (3.37) was above the median level, but lower than the average in the other countries (3.72) (t=4.871, p≤.000). As discussed earlier, whereas Vietnamese women less strongly perceived a discriminatory reality relatively, they reported more personal experience of discrimination. This suggests that the discriminatory experience affected the career prospects of Vietnamese women. As a result of analyzing the difference of policy demand, the respondents in Vietnam (4.77) expressed stronger policy demand than did their counterparts in the other surveyed countries (4.02) (t=14.483, p≤.000). Lastly, Vietnamese women (1.85) also more strongly agreed with the idea that equal opportunity was a sufficient factor of gender equality, compared with the respondents in the other countries (2.15) (t=-5.671, p≤.000).

Figure 4-51 illustrates the overall difference in perception of gender barriers between the respondents in Vietnam and those in the other countries.

4.4.5.3 Analysis of individual questions

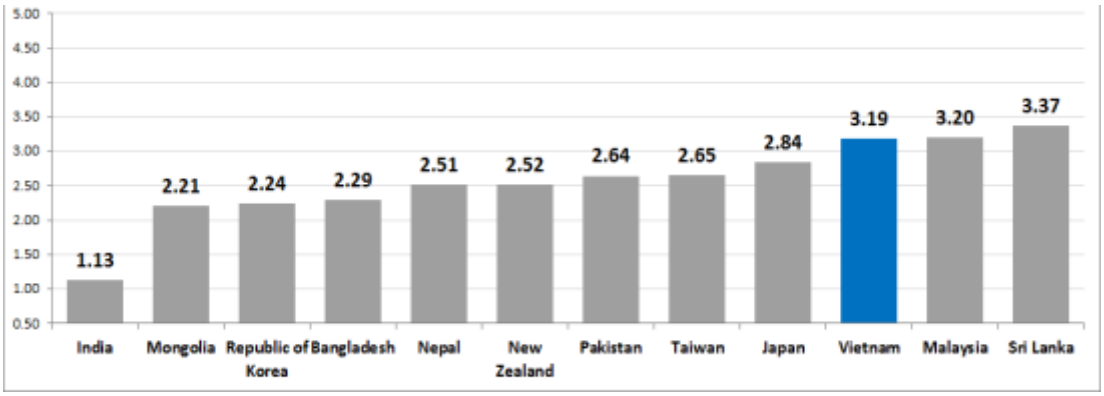
Here, we will examine the gender barriers perceived by women scientists and engineers in Vietnam according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality.

<Figure 4-52. Average of Vietnam & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Figure 4-52 compares the perception of a discriminatory reality by the respondents in Vietnam and by those from the other countries. The level of perception of gender discrimination in society had a score of 3.19, lower than the median level and higher only than Sri Lanka and Malaysia.

<Table 4-57. Perception of discrimination of Vietnam: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	100	3.19			
Age					
29 or below	1	3.00		1.069	.366
30 ~ 39	71	3.21	0.34		
40 ~ 49	23	3.15	0.15		
50 or above	5	3.00	0.00		
Marital status					
Single	1	3.00		.218	.805
Married	87	3.19	0.32		
Other	12	3.21	0.10		
No. of children					
None	1	3.00		2.425	.070
1	35	3.09	0.36		
2	61	3.25	0.26		
3 or above	3	3.17	0.14		
Occupation					
Student				.382	.683
Teacher/professor	72	3.19	0.32		
Researcher	17	3.15	0.27		
Medical personnel					
Engineer	11	3.25	0.19		
Other					
Duration of career break					
None	1	3.00		18.892	.000
Less than 1 year	2	2.00	0.00		
1~2 years	3	3.25	0.43		
2~3 years	15	2.97	0.16		
3 years or more	79	3.26	0.23		

* Lower score means higher perception of discrimination

Table 4-57 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Vietnamese respondents. No significant difference was found for different age groups. By marital status, no statistical significance was observed, although married respondents more strongly perceived a discriminatory reality than did the single participants. According to the number of children, the respondents with more children tended to perceive a discriminatory reality less strongly; however, the difference was not significant. Although occupation did not result in a significant difference, the duration of career interruption produced a statistically significant difference. The awareness of a discriminatory reality was highest among those with less than one year of career interruption (2.00), followed by those with one to two years, those with two to three years, and those without experience of career interruption (3.00) ($F=18.892$, $p\leq.010$).

Discriminatory experience

Table 4-58 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Vietnamese respondents. By age, no significant difference, statistical or not, was found, except for the difference between those in their 20s and the other age groups. By marital status, the single respondents (2.75) reported less discriminatory experience than the married (2.48) or the other group (2.13) (F=5.679, p≤.005). The number of children and occupation did reach a significant difference. However, women with at least one child reported more discriminatory experience than did those without children. Lastly, career interruption produced a significant difference: discriminatory experience was reported most among those experiencing at least three years of interruption (2.35), and least among those experiencing one to two years of interruption (F=13.619, p≤.000).

<Table 4-58. Experience of discrimination of Vietnam : Demographic differences>

(unit: person, points)

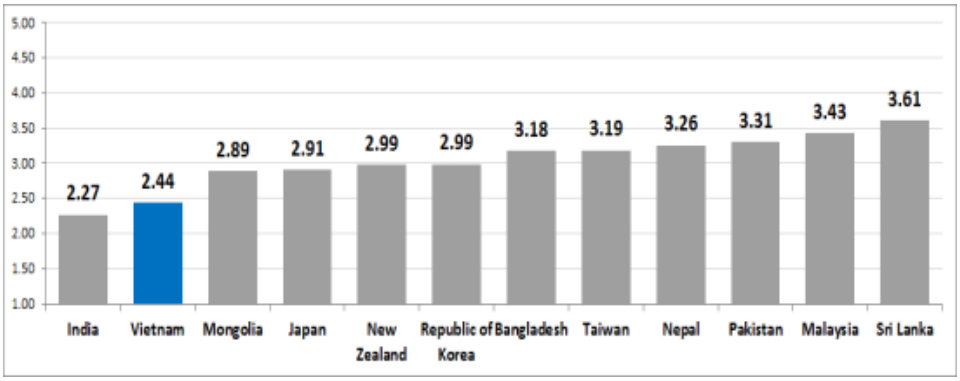
Classifications	Cases	Average	SD	F	*p*
Total	100	2.44			
Age					
29 or below	1	2.75		.408	.747
30~39	69	2.44	0.43		
40~49	23	2.41	0.19		
50 or above	5	2.55	0.11		
Marital status					
Single	1	2.75		5.679	.005
Married	85	2.48	0.35		
Other	12	2.13	0.38		
No. of children					
None	1	2.75		.317	.813
1	33	2.43	0.53		
2	61	2.45	0.25		
3 or above	3	2.33	0.63		
Occupation					
Student				.502	.607
Teacher/professor	70	2.46	0.38		
Researcher	17	2.43	0.33		
Medical personnel					
Engineer	11	2.34	0.39		
Other					
Duration of career break					
None	1	2.75		13.619	.000
Less than 1 year					
1~2 years	3	3.33	1.01		
2~3 years	15	2.70	0.19		
3 years or more	79	2.35	0.30		

* Lower score means more discrimination experienced

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-53 compares discriminatory experience among the respondents in Vietnam and among respondents from the other countries. The average score (2.44) of the Vietnamese respondents was below the median level, representing higher discriminatory experience than the overall average. Whereas the respondents in Vietnam reported the third lowest perception of discriminatory reality, the actual experience of discrimination was second highest after India. This suggests that Vietnam has a gap between the perception of a discriminatory reality and experience of discrimination.

<Figure 4-53. Average of Vietnam & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

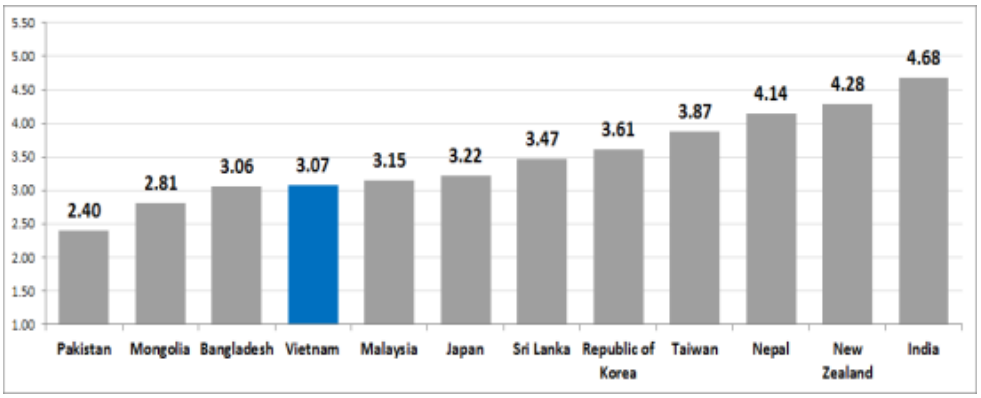
Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-54 compares attitudes toward gender roles among the respondents in Vietnam and among respondents from the other countries. The average score for gender role ideology was 3.01 out of 5, reaching the median level. Relatively speaking, Vietnamese women's attitude toward gender roles was the third most conservative after the respondents in Pakistan and Mongolia.

Table 4-59 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Vietnamese respondents. Except for career interruption, variables such as age, marital status, number of children, and occupation did not produce a significant difference. Certainly, the average scores by age suggest that those in their 20s had the most progressive attitude toward gender roles. By marital status, the single respondents tended to be more progressive than the married and the other group. In terms of the duration of career interruption, those who experienced at least three years of interruption were more conservative than the other respondents ($F=10.375$, $p\leq.000$).

<Figure 4-54. Average of Vietnam & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

<Table 4-59. Gender role stereotypes of Vietnam : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	100	3.07			
Age					
29 or below	1	3.50		2.134	.101
30~39	71	3.03	0.32		
40~49	23	3.12	0.29		
50 or above	5	3.30	0.11		
Marital status					
Single	1	3.50		1.479	.233
Married	87	3.08	0.32		
Other	12	2.98	0.27		
No. of children					
None	1	3.50		.939	.425
1	35	3.05	0.31		
2	61	3.08	0.32		
3 or above	3	2.92	0.14		
Occupation					
Student				.244	.784
Teacher/professor	72	3.08	0.31		
Researcher	17	3.04	0.32		
Medical personnel					
Engineer	11	3.02	0.33		
Other					
Duration of career break					
None	1	3.50		10.375	.000
Less than 1 year	2	3.50	0.00		
1~2 years	3	3.17	0.58		
2~3 years	15	3.42	0.22		
3 years or more	79	2.98	0.26		

* Higher score means more progressive

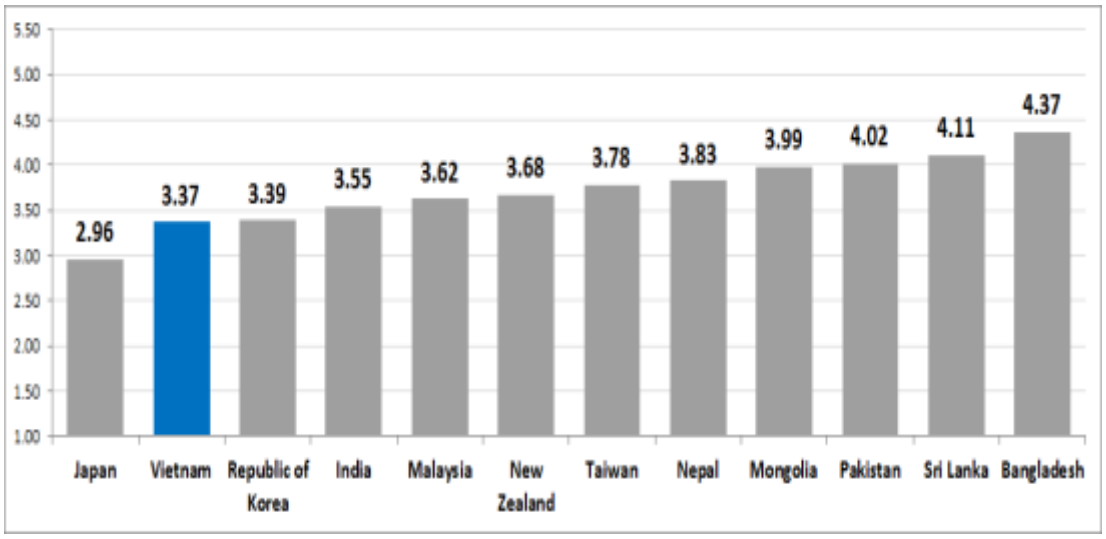
Career prospects

Table 4-60 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Vietnamese respondents. The difference by age was not significant. By marital status, the single respondents had more optimistic career prospects than the married and the other group, but this difference was not statistically significant. Likewise, no significant relevance was found for the number of children, although the respondents with more children tended to be more conservative. Occupation was not a statistically significant variable, either. Lastly, the length of career interruption resulted in a significant difference. As discussed earlier, because most respondents disproportionately experienced at least two years of career interruption, a significant difference was observed between those experiencing two to three years of interruption (3.93) and those experiencing at least three years of interruption (3.25). This implies that the respondents with at least three years of interruption were most conservative ($F=9.934$, $p\leq.000$).

As can be seen in Figure 4-55, the respondents in Vietnam demonstrated relative optimism about their career prospects, with an average score of 3.37. However, this indicates that the country had the second lowest average, following Japan. This result seems related to Vietnamese women's strong experience of discrimination and conservative attitude toward gender roles.

<Figure 4-55. Average of Vietnam & others on Career outlook>

(unit: points)



<Table 4-60. Career outlook of Vietnam : Demographic differences>

(unit: person, points)

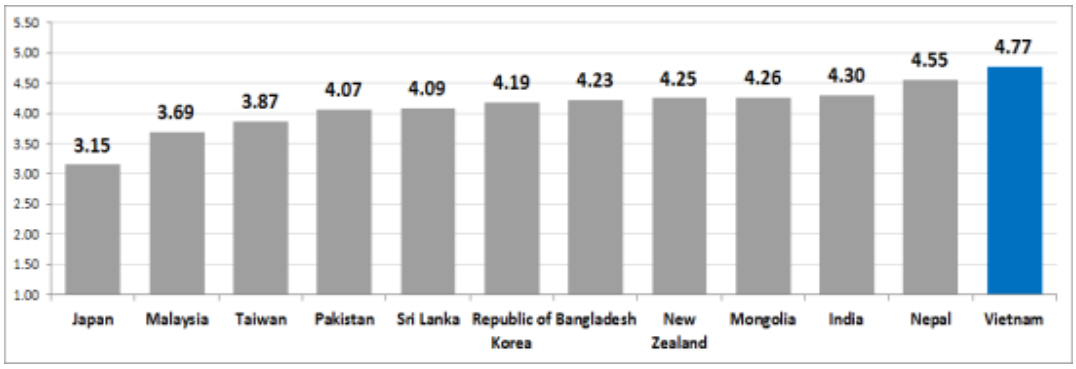
Classifications	Cases	Average	SD	F	*p*
Total	100	3.37			
Age					
29 or below	1	4.00		1.996	.120
30~39	71	3.32	0.71		
40~49	23	3.35	0.49		
50 or above	5	4.00	0.00		
Marital status					
Single	1	4.00		1.065	.349
Married	87	3.39	0.69		
Other	12	3.17	0.39		
No. of children					
None	1	4.00		.898	.445
1	35	3.46	0.85		
2	61	3.33	0.54		
3 or above	3	3.00	0.00		
Occupation					
Student				.534	.588
Teacher/professor	72	3.40	0.69		
Researcher	17	3.35	0.70		
Medical personnel					
Engineer	11	3.18	0.40		
Other					
Duration of career break					
None	1	4.00		9.934	.000
Less than 1 year	2	2.00	0.00		
1~2 years	3	4.33	0.58		
2~3 years	15	3.93	0.46		
3 years or more	79	3.25	0.59		

* Higher score means a more positive outlook

Policy demand

<Figure 4-56. Average of Vietnam & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

As can be seen in Figure 4-56, the Vietnamese respondents had an average score of 4.77 out of 5 for policy demand, the highest score among all 12 countries surveyed. This reflects the increasing interest in policy of women in Vietnamese society amidst the vigorous economic development.

The table below provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Vietnamese respondents. The only personal variable statistically relevant to policy demand was the duration of career interruption. According to the number of children, the respondents with three or more children had a higher average than those without children or those with one or two children; however, the difference was not significant. Career interruption produced a significant difference. It is necessary to analyze this result with a focus on those with two to three years of interruption and those experiencing at least three years of interruption, the two groups taking up the most share of the respondents. As a result, those with at least three years of interruption had an average score of 4.91 for policy demand, higher than those with two to three years of interruption (4.20) ($F=24.157$, $p\leq.000$).

<Table 4-61. Policy needs of Vietnam : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	100	4.77			
Age					
29 or below	1	4.00		1.270	.289
30~39	71	4.76	0.43		
40~49	23	4.83	0.39		
50 or above	5	4.80	0.45		
Marital status					
Single	1	4.00		1.821	.167
Married	87	4.77	0.42		
Other	12	4.83	0.39		
No. of children					
None	1	4.00		1.418	.242
1	35	4.77	0.43		
2	61	4.77	0.42		
3 or above	3	5.00	0.00		
Occupation					
Student				.197	.822
Teacher/professor	72	4.76	0.43		
Researcher	17	4.82	0.39		
Medical personnel					
Engineer	11	4.73	0.47		
Other					
Duration of career break					
None	1	4.00		24.157	.000
Less than 1 year	2	5.00	0.00		
1~2 years	3	4.00	0.00		
2~3 years	15	4.20	0.41		
3 years or more	79	4.91	0.29		

* Higher score means higher needs for policy support

Gender equality

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Vietnam to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-62).

<Table 4-62. Equality concept of Vietnam : Demographic differences>

(unit: person, points)

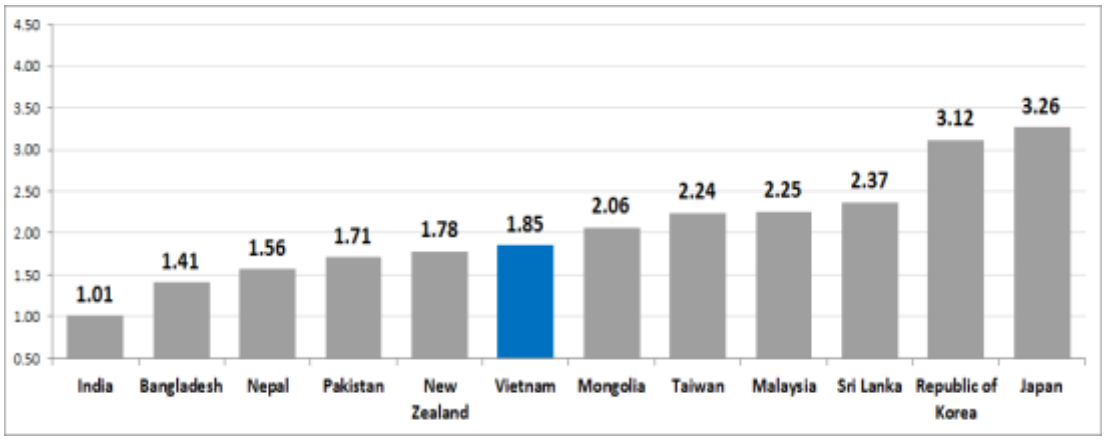
Classifications	Cases	Average	SD	F	*p*
Total	100	1.85			
Age					
29 or below	1	2.00		5.003	.003
30~39	71	1.87	0.41		
40~49	23	1.91	0.29		
50 or above	5	1.20	0.45		
Marital status					
Single	1	2.00		.993	.374
Married	87	1.83	0.44		
Other	12	2.00	0.00		
No. of children					
None	1	2.00		2.068	.109
1	35	1.71	0.52		
2	61	1.92	0.33		
3 or above	3	2.00	0.00		
Occupation					
Student				.982	.378
Teacher/professor	72	1.82	0.42		
Researcher	17	1.88	0.49		
Medical personnel					
Engineer	11	2.00	0.00		
Other					
Duration of career break					
None	1	2.00		3.050	.021
Less than 1 year	2	1.00	0.00		
1~2 years	3	1.67	0.58		
2~3 years	15	2.00	0.38		
3 years or more	79	1.85	0.40		

The results suggest that such a belief is related to the respondents' age. The tendency to agree with the belief that equal opportunity was a sufficient factor of gender equality was lowest among those in their 20s (2.00; but not significant because the respondent was only one), followed by those in their 40s (1.91) and 30s (1.87) with the similar scores, and highest among those in their 50s (1.20). The difference arising from the number of children and occupation was not significant. However, the length of career interruption produced a significant difference. Those with less than one year of interruption (1.00) agreed most with the statement that equal opportunity was a sufficient factor of gender equality, followed by those with one to two years of interruption (1.67)

and with at least three years (1.85). The scores reported by those with at least three years of interruption and by those without any interruption (take into account that this respondent was only one) were the lowest (2.00) (F=3.050, p≤.021).

<Figure 4-57. Average of Vietnam & others on Equality concept>

(unit: points)



As can be seen in Figure 4-57, the Vietnamese respondents showed a strong tendency to believe that full gender equality would be realized once women were granted equal opportunity (average of 1.81; a lower score represents stronger agreement). This places Vietnam in the sixth rank, following India, Bangladesh, New Zealand, Pakistan, and Nepal.

4.4.6 Sri Lanka

4.4.6.1 Respondent profile

A total of 101 respondents in Sri Lanka participated in this survey (see Table 4-63). Most of them were in their 30s (37.6%), followed by those in their 20s (26.7%), and those in their 40s and 50s (17.8% each). The largest group by marital status was married respondents (45.5%), followed by the single participants (42.5%) and the other group (11.9%). According to the number of children, those without any child accounted for 59.4%; those with one child for 17.8%; those with two children for 15.8%; and those with at least three children for 6.9%.

By occupation, teachers/professors accounted for 19.8%; researchers for 18.8%; healthcare/medical professionals and engineers for 14.9% each; and students for 8.9%. The other group accounted for 22.8%, higher than that of any other country. The majority of the respondents had no career interruption (47.5%), followed by those with one to two years of interruption (20.8%), those with at least three years of interruption (15.8%), and those experiencing interruption of less than one year (4%).

<Table 4-63. Profile of participants from Sri Lanka>

(unit: person, %)

Classifications	N	%
Age		
29 or below	27	26.7
30~39	38	37.6
40~49	18	17.8
50 or above	18	17.8
Marital status		
Single	43	42.6
Married	46	45.5
Other	12	11.9
No. of children		
None	60	59.4
1	18	17.8
2	16	15.8
3 or above	7	6.9
Occupation		
Student	9	8.9
Teacher/professor	20	19.8
Researcher	19	18.8
Medical personnel	15	14.9
Engineer	15	14.9
Other	23	22.8
Duration of career break		
None	48	47.5
Less than 1 year	4	4.0
1~2 years	21	20.8
2~3 years	12	11.9
3 years or more	16	15.8

4.4.6.2 Difference of gender barriers in Sri Lanka and other countries: Overview occupation

Table 4-64 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Sri Lanka with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 3.37 in Sri Lanka, showing a significant difference from the score of 2.54 among the other 11 countries ($t=8.694$, $p\leq.000$; a lower score is translated as stronger agreement with the perception of discriminatory reality). In other words, compared with women in the other countries, Sri Lankan women tend to less strongly perceive discrimination against women in their society. As a result of analyzing each of the four questions included in this sub-scale, the awareness of discrimination among Sri Lankan women was consistently low in all questions. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Sri Lanka demonstrated less agreement, with an average of 3.39, compared with the average (2.39) of the other countries ($t=7.202$, $p\leq.000$). The reason is either that

Sri Lankan women are relatively less aware of this discriminatory reality, or that actual discrimination is not prevalent in Sri Lanka.

In addition, Sri Lankan women agreed less strongly (3.20), compared with their counterparts in the other countries (2.45), with the statement "Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields" ($t=6.172$, $p\leq.000$) This implies that women in Sri Lanka tend to less strongly perceive a discriminatory reality. Furthermore, for the statement "Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers," the Sri Lankan respondents (3.21) revealed a weaker perception than in other countries (2.45) ($t=6.027$, $p\leq.000$). Lastly, regarding the statement "Women receive less wages for the same work than men," women in Sri Lanka agreed less strongly (3.70) compared with the respondents in the other countries (2.87), indicating that they relatively strongly denied the existence of such discrimination ($t=23.364$, $p\leq.000$).

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Sri Lanka with that experienced by respondents in the other countries, The average score in Sri Lanka was 3.61, significantly higher than the average of 3.10 in the other countries ($t=9.034$, $p\leq.000$). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Sri Lanka had less discriminatory experience than their counterparts in the other 11 countries surveyed. Examining the differences for each of the four questions constituting this sub-scale, we found a significantly lower score in the discriminatory experience of Sri Lankan women in all questions than was the case for the respondents in the other countries. First, the respondents in Sri Lanka (3.50) experienced less difficulty in participating in research projects or becoming research managers than their counterparts in the other countries (2.96) ($t=4.124$, $p\leq.001$). They (3.97) also reported less experience of disadvantage in winning research grants or scholarships than the respondents in the other countries (3.27) ($t=6.449$, $p\leq.000$).

Likewise, a significant result was observed for sexual harassment and other disadvantages: the respondents in Sri Lanka (3.74) experienced less sexual harassment or other disadvantage than their counterparts in the other countries (3.27) ($t=3.383$, $p\leq.001$). Lastly, the experience of having work-life balance as a handicap was significantly less prevalent among the respondents in Sri Lanka (3.23), compared with their counterparts in the other countries (2.55) ($t=5.435$, $p\leq.000$).

<Table 4-64. Gap between Sri Lanka & others on gender barriers>

(unit: points)

Item		Sri Lanka (n=101)	Except Sri Lanka (n=1,278)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	3.39	2.39	7.202	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	3.20	2.45	6.172	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	3.21	2.45	6.027	.000
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	3.70	2.87	7.187	.000
	Sub-scales	3.37	2.54	8.694	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.50	2.96	4.124	.000
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.97	3.27	6.449	.000
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.74	3.27	3.383	.001
	8. Balancing work and life (marriage and family) has been a handicap for me.	3.23	2.55	5.435	.000
	Sub-scales	3.61	3.01	9.034	.000
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	3.92	3.52	3.232	.002
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.54	3.32	1.614	.107
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.81	3.78	.263	.793
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.59	2.95	-2.253	.026
	Sub-scales	3.47	3.39	.723	.470
Career outlook	13. I believe things will turn out fine in my future career.	4.11	3.67	5.164	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.09	4.07	.182	.856
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	2.37	2.11	2.171	.030

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Sri Lanka had an average score of 3.47, representing a relatively more progressive attitude. This is not significantly different from the average of 3.39 in the other countries. Among the questions included in this sub-scale, the questions that produced a significant difference between the respondents in Sri Lanka and those in other countries are: that men are bread-winners of a household and that men and women should have respectively suitable jobs since men are rational and women emotional.

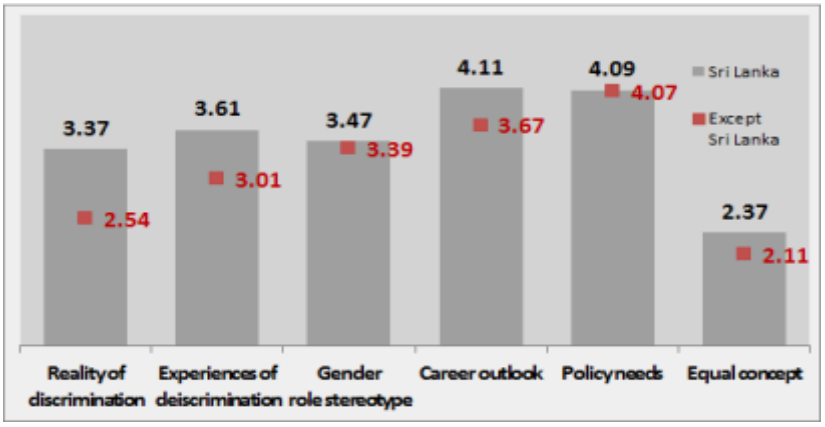
With respect to the former question, the average (3.92) in Sri Lanka was higher than that (3.52) in the other countries ($t=3.232$, $p\leq.002$). On the other hand, the Sri Lankan average (2.59) for the latter question was lower than that (2.95) in the other countries ($t=-2.253$, $p\leq.026$). In other words, whereas the women scientists and engineers in Sri Lanka were relatively progressive about the idea of men being bread-winners to support the family, they were relatively conservative to the idea of regarding women and men as emotional and rational, respectively, as the basis for different job selection.

With respect to career prospects, the respondents in Sri Lanka reported themselves as more optimistic (4.11), higher than the average obtained by the others (3.67) ($t=5.164$, $p\leq.000$). The analysis of any difference between Sri Lanka and the other countries for policy demand did not find any significant difference. Lastly, the respondents in Sri Lanka (2.37) agreed more to the statement that equal opportunity was a sufficient factor of gender equality than the respondents in the other countries (2.11) ($t=2.171$, $p\leq.000$).

Figure 4-58 illustrates the overall difference in perception of gender barriers between the respondents in Sri Lanka and those in the other countries.

<Figure 4-58. Gap between Sri Lanka & others on gender barriers>

(Unit: Points)



4.4.6.3 Analysis of individual questions

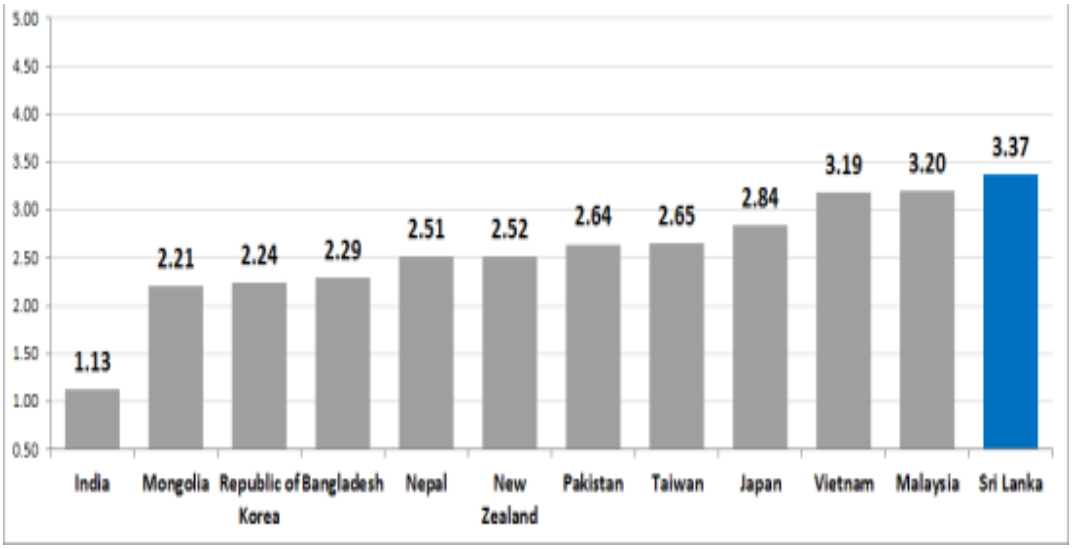
Here, we will examine the gender barriers perceived by women scientists and engineers in Sri Lanka according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-65 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Sri Lankan respondents. Age did not produce statistical significance, although younger generations tended to more strongly perceive a discriminatory reality. In addition, differences based on marital status also did not suggest statistical significance, although the married respondents more strongly perceived a discriminatory reality than did the single participants in the survey. The respondents with fewer children tended to more strongly perceive a discriminatory reality; however, the difference arising from the number of children was not significant. The other variables such as occupation and duration of career interruption did not prove significant, either.

<Figure 4-59. Average of Sri Lanka & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

<Table 4-65. Perception of discrimination of Sri Lanka: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	3.37			
Age					
29 or below	27	3.18	0.74	.776	.510
30~39	38	3.41	0.85		
40~49	18	3.47	0.85		
50 or above	18	3.49	0.77		
Marital status					
Single	43	3.25	0.75	.938	.395
Married	46	3.48	0.85		
Other	12	3.40	0.84		
No. of children					
None	60	3.26	0.78	1.434	.238
1	18	3.43	0.96		
2	16	3.52	0.67		
3 or above	7	3.86	0.83		
Occupation					
Student	9	3.47	0.69	1.246	.294
Teacher/professor	20	3.55	1.08		
Researcher	19	3.42	0.83		
Medical personnel	15	3.63	0.73		
Engineer	15	3.15	0.70		
Other	23	3.12	0.60		
Duration of career break					
None	48	3.22	0.73	1.120	.351
Less than 1 year	4	3.25	0.74		
1~2 years	21	3.44	0.82		
2~3 years	12	3.71	0.95		
3 years or more	16	3.52	0.89		

* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-60 compares the discriminatory experience among the respondents in Sri Lanka and among participants from the other countries. The average of Sri Lanka for this sub-scale (3.61) was above the median level, suggesting that the country reported less discriminatory experience than average. As is the case with perception of a discriminatory reality, discriminatory experience by the respondents in Sri Lanka was lower than that in any other country. This is probably because discrimination does not exist in the country, or because the respondents do not sensitively perceive discrimination.

Table 4-66 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Sri Lankan respondents. Different ages did not result in a notable difference; this was the case with differences based on marital status and the number of children. By occupation, engineers reported more discriminatory experience than teachers/professors; however, the difference was not significant. Lastly, although the difference resulting from the duration of career interruption suggests that those who experienced interruption for less than one year or did not experience any interruption tended to experience discrimination relatively more than the other groups, this result also did reach statistical relevance.

<Table 4-66. Experience of discrimination of Sri Lanka : Demographic differences>

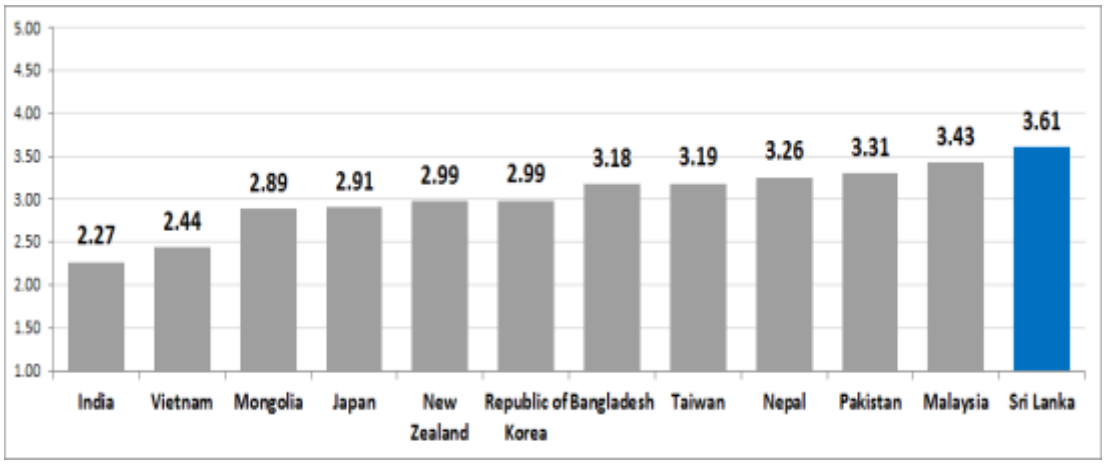
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	3.61			
Age					
29 or below	27	3.59	0.61	1.077	.363
30~39	38	3.74	0.59		
40~49	18	3.53	0.73		
50 or above	18	3.44	0.57		
Marital status					
Single	43	3.62	0.57	.030	.971
Married	46	3.59	0.68		
Other	12	3.63	0.56		
No. of children					
None	60	3.63	0.60	.066	.978
1	18	3.56	0.62		
2	16	3.59	0.70		
3 or above	7	3.64	0.69		
Occupation					
Student	9	3.75	0.78	1.496	.198
Teacher/professor	20	3.78	0.62		
Researcher	19	3.74	0.65		
Medical personnel	15	3.62	0.72		
Engineer	15	3.55	0.54		
Other	23	3.34	0.46		
Duration of career break					
None	48	3.48	0.61	2.329	.062
Less than 1 year	4	3.25	0.46		
1~2 years	21	3.73	0.62		
2~3 years	12	4.00	0.44		
3 years or more	16	3.63	0.68		

* Lower score means more discrimination experienced

<Figure 4-60. Average of Sri Lanka & others on Exp. of discrimination>

(unit: points)



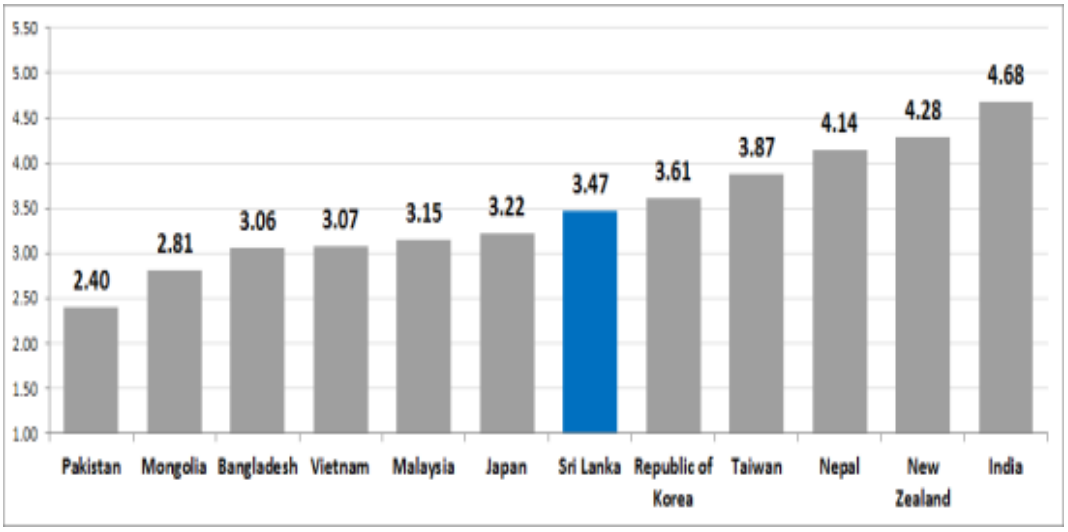
* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role attitudes, a higher score translates into a more progressive attitude toward gender roles. Figure 4-61 compares attitudes toward gender roles among the respondents in Sri Lanka and among respondents from the other countries. The average for gender role ideology sub-scale in Sri Lanka was 3.47 out of 5, above the median level. In relative terms, Sri Lankan women were the sixth most progressive toward gender roles, following India, Nepal, New Zealand, Taiwan, and Korea.

<Figure 4-61. Average of Sri Lanka & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

<Table 4-67. Gender role stereotypes of Sri Lanka : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	3.47			
Age					
29 or below	27	3.41	1.15	2.472	.066
30~39	38	3.77	0.88		
40~49	18	3.07	0.83		
50 or above	18	3.32	0.91		
Marital status					
Single	43	3.65	1.08	3.618	.030
Married	46	3.47	0.87		
Other	12	2.81	0.75		
No. of children					
None	60	3.53	1.05	.860	.464
1	18	3.61	0.90		
2	16	3.20	0.80		
3 or above	7	3.14	0.94		
Occupation					
Student	9	3.44	1.04	1.799	.120
Teacher/professor	20	3.13	0.65		
Researcher	19	3.93	0.94		
Medical personnel	15	3.70	1.06		
Engineer	15	3.43	0.85		
Other	23	3.26	1.15		
Duration of career break					
None	48	3.44	1.06	1.245	.297
Less than 1 year	4	4.00	0.79		
1~2 years	21	3.63	1.02		
2~3 years	12	3.65	0.84		
3 years or more	16	3.06	0.71		

* Higher score means more progressive

Table 4-67 provides the results of ANOVA whether gender role ideology varies depending on the personal variables of the Sri Lankan respondents. Except for marital status, the variables such as age, number of children, occupation, and career interruption did not produce a significant difference. By marital status, the single respondents (3.65) reported more progressive attitude toward gender roles than the married (3.47) and the other group (2.81) ((F=3.618, p≤.030). By occupation, teachers/professors tended to be most conservative and researchers most progressive; however, the difference was not statistically relevant.

Career prospects

As can be seen in Figure 4-62, the respondents in Sri Lanka demonstrated relative optimism about their career prospects, with an average score of 4.11. This puts the country in second place, following Bangladesh. This result seems related to Sri Lankan women's weaker perception of a discriminatory reality and discriminatory experience.

<Table 4-68. Career outlook of Sri Lanka : Demographic differences>

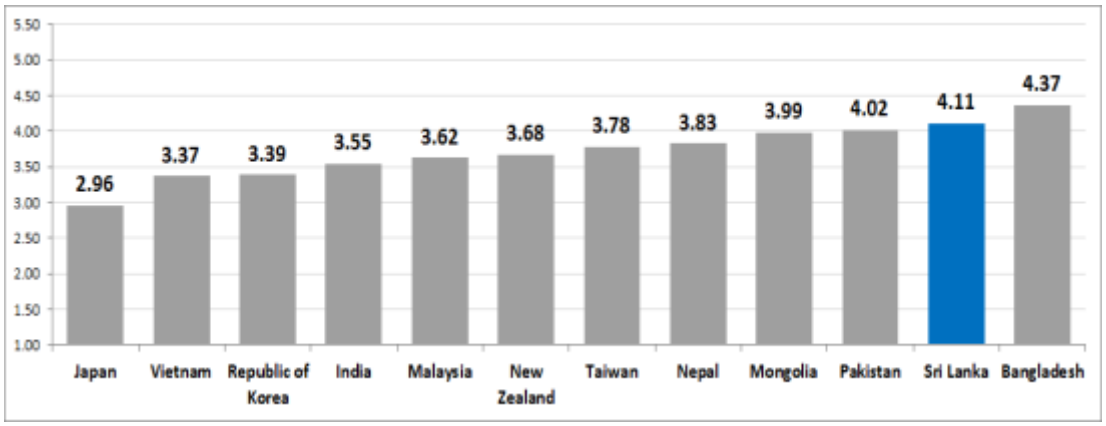
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	4.11			
Age					
29 or below	27	4.15	1.06	1.350	.263
30~39	38	4.24	0.71		
40~49	18	4.11	0.58		
50 or above	18	3.78	0.73		
Marital status					
Single	43	4.23	0.78	3.166	.047
Married	46	4.13	0.69		
Other	12	3.58	1.16		
No. of children					
None	60	4.13	0.85	1.127	.342
1	18	4.17	0.71		
2	16	4.19	0.66		
3 or above	7	3.57	0.98		
Occupation					
Student	9	3.78	1.72	1.247	.294
Teacher/professor	20	3.90	0.72		
Researcher	19	4.32	0.67		
Medical personnel	15	4.13	0.74		
Engineer	15	4.40	0.51		
Other	23	4.04	0.64		
Duration of career break					
None	48	4.08	0.77	.493	.741
Less than 1 year	4	4.50	0.58		
1~2 years	21	4.24	1.00		
2~3 years	12	4.00	0.74		
3 years or more	16	4.00	0.82		

* Higher score means a more positive outlook

<Figure 4-62. Average of Sri Lanka & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

Table 4-68 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Sri Lankan respondents. The difference resulting from age did not prove significant, although those in their 50s reported a relatively negative career prospects than the respondents in the other age groups. By marital status, the single respondents (4.23) had more optimistic view with respect to career prospects than the married (4.13) and the other group (3.58) ($F=3.166$, $p\leq.047$). The respondents with three or more children tended to have less optimistic career prospects; however, the difference was not of statistical significance. Occupation was not a statistically relevant variable, but the average score was highest among engineers and lowest among students. Lastly, no significant difference was observed for the duration of career interruption.

Policy demand

Table 4-69 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Sri Lankan respondents. Career interruption was the only personal variable that showed statistically significant relevance to policy demand. By marital status, the single respondents had a higher average for policy demand, followed by the married and the other group; however, the difference was not significant. By occupation, teachers/professors had the highest average, and students the lowest; however, the difference was not significant. Conversely, the difference from career interruption was statistically significant. The respondents with one year of interruption had the highest average (5.00), followed by those with at least three years of interruption (4.63). The group with least policy demand was the respondents with one to two years of interruption (3.67) ($F=3.139$, $p\leq.018$).

As can be seen in Figure 4-63, the Sri Lankan respondents had an average score of 4.09 for policy demand, which is relatively high. However, when compared with the other countries, this result places Sri Lanka in the fifth lowest rank, following Japan, Malaysia, Taiwan, and Pakistan. This appears to be related to the relatively low perception of a discriminatory reality and experience of discrimination against women in Sri Lanka.

<Table 4-69. Policy needs of Sri Lanka : Demographic differences>

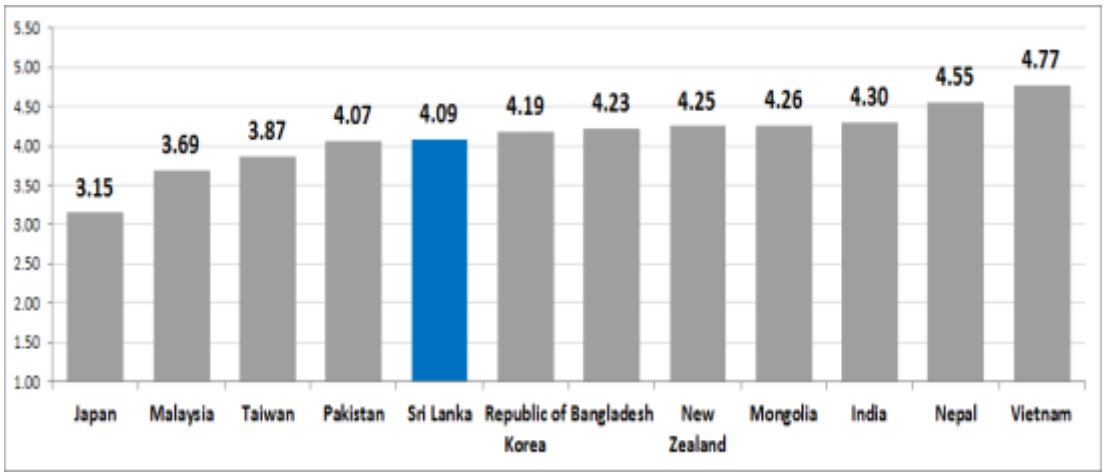
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	4.09			
Age					
29 or below	27	3.89	1.19	2.351	.077
30~39	38	4.39	0.86		
40~49	18	3.72	1.02		
50 or above	18	4.11	0.96		
Marital status					
Single	43	4.23	0.95	.900	.410
Married	46	4.02	1.04		
Other	12	3.83	1.19		
No. of children					
None	60	4.13	1.03	.275	.843
1	18	4.11	1.08		
2	16	3.88	1.02		
3 or above	7	4.14	0.90		
Occupation					
Student	9	3.67	1.80	1.724	.137
Teacher/professor	20	4.45	0.76		
Researcher	19	4.32	0.82		
Medical personnel	15	3.73	0.96		
Engineer	15	4.27	1.16		
Other	23	3.87	0.81		
Duration of career break					
None	48	4.06	1.04	3.139	.018
Less than 1 year	4	5.00	0.00		
1~2 years	21	3.67	1.11		
2~3 years	12	3.92	0.90		
3 years or more	16	4.63	0.72		

* Higher score means higher needs for policy support

<Figure 4-63. Average of Sri Lanka & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

Gender equality

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Sri Lanka to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-70). First of all, this belief proved to be related to the respondents' age. With respect to the statement that equal opportunity alone was sufficient for achieving gender equality, the respondents in their 30s (1.96) agreed least; those in their 20s (2.44) and in 40s (2.56) followed; and those in their 50s (2.94) agreed most ($F=3.210$, $p\leq.026$). By marital status, the average score (2.26) of the single and married respondents showed no difference, and the other group had a higher average (3.17). However, the difference was not significant.

The differences according to the number of children and duration of career interruption were not significant. On the other hand, the difference by occupation proved significant. Except for the other occupational groups, agreement with the statement that equal opportunity alone was sufficient was the strongest among teachers/professors (2.85), followed by students (2.33) and healthcare/medical professionals (2.27). The next lowest score was reported by engineers (1.87), and researchers (1.68) reported the lowest score ($F=3.689$, $p\leq.004$).

As can be seen in Figure 4-64, the respondents in Sri Lanka demonstrated a relatively strong tendency to believe that full gender equality would be realized once women were granted equal opportunity (average of 2.37; a lower score represents stronger agreement). This ranks the country in third place after Japan and Korea.

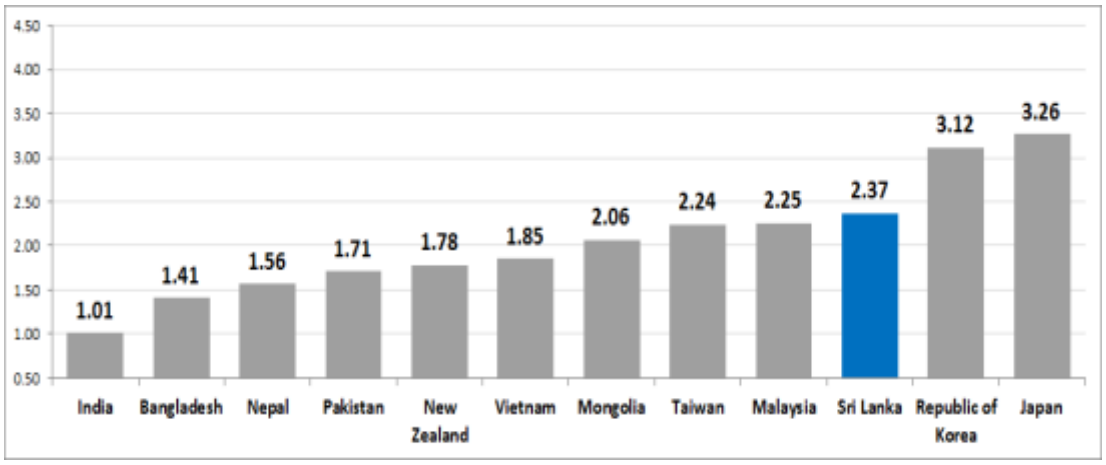
<Table 4-70. Equality concept of Sri Lanka : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	2.37			
Age					
29 or below	27	2.44	1.22	3.210	.026
30~39	38	1.95	1.06		
40~49	18	2.56	1.50		
50 or above	18	2.94	1.00		
Marital status					
Single	43	2.26	1.22	3.037	.052
Married	46	2.26	1.14		
Other	12	3.17	1.34		
No. of children					
None	60	2.38	1.26	.242	.867
1	18	2.17	1.38		
2	16	2.44	1.03		
3 or above	7	2.57	0.98		
Occupation					
Student	9	2.33	1.80	3.689	.004
Teacher/professor	20	2.85	1.18		
Researcher	19	1.68	0.67		
Medical personnel	15	2.27	1.03		
Engineer	15	1.87	1.06		
Other	23	2.91	1.24		
Duration of career break					
None	48	2.31	1.17	1.104	.359
Less than 1 year	4	1.25	0.50		
1~2 years	21	2.43	1.12		
2~3 years	12	2.67	1.50		
3 years or more	16	2.50	1.37		

<Figure 4-64. Average of Sri Lanka & others on Equality concept>

(unit: points)



4.4.7 India

4.4.7.1 Respondent profile

A total of 93 respondents participated in the survey in India (see Table 4-71). By age, those in their 20s accounted for 75.3% and those in 30s for 24.7%; no respondents were over the age of 40. The average age of the participants stood at 26.82, third youngest among the 12 countries after Malaysia and Bangladesh. By marital status, 52.7% of the respondents were single, and 47.3% were married. A majority of the respondents (64.5%) had no child; 22.6% had one child; 12.9% had two children; and no respondents had three or more children.

Except for the occupations classified as others, most respondents were engineers (32.3%), followed by teachers/professors (11.8%), healthcare/medical professionals (9.7%), students (6.5%), and researchers (1.1%). With respect to career interruption, most respondents reported no experience of interruption (64.5%); 16.1% had at least three years of interruption, followed by one to two years (9.7%), less than one year (6.5%), and two to three years (3.2%).

<Table 4-71. Profile of participants from India>

(unit: person, %)

Classifications	N	%
Age		
29 or below	70	75.3
30~39	23	24.7
40~49	-	-
50 or above	-	-
Marital status		
Single	49	52.7
Married	44	47.3
Other	-	-
No. of children		
None	60	64.5
1	21	22.6
2	12	12.9
3 or above	-	-
Occupation		
Student	6	6.5
Teacher/professor	11	11.8
Researcher	1	1.1
Medical personnel	9	9.7
Engineer	30	32.3
Other	36	38.7
Duration of career break		
None	60	64.5
Less than 1 year	6	6.5
1~2 years	9	9.7
2~3 years	3	3.2
3 years or more	15	16.1

4.4.7.2 Difference of gender barriers in India and other countries: Overview

Table 4-72 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in India with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 1.13 in India, showing a significant difference from the score of 2.70 among the other 11 countries (t=-38.383, p≤.000; a lower score is translated as stronger agreement with the perception of discriminatory reality). This result implies that Indian women quite more strongly perceive gender discrimination in their society, compared with women in the other countries, which is presumably related to the fact that the average age of the Indian respondents was only 26.82.

As a result of analyzing each of the four questions included in this sub-scale, we observed a consistently high awareness of discrimination among Indian women in all questions. With regard to the statement "Boys are more encouraged than girls to choose the STEM fields," the respondents in India demonstrated more agreement, with an average of 1.08, compared with the average (2.56) of the other countries (t=-32.411, p≤.000). In addition, Indian women significantly more strongly agreed (1.16), compared with their counterparts in the other countries (2.61), with the statement "Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields" (t=-28.818, p≤.000.) This implies that Indian women tend to perceive a discriminatory reality more strongly. For the statement "Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers," the Indian respondents (1.17) revealed a stronger perception than in other countries (2.60) (t=-26.342, p≤.000). Lastly, regarding the statement "Women receive less wages for the same work than men," women in India more strongly agreed (1.12) compared with the respondents in the other countries (3.06) (t=-39.769, p≤.000). These results illustrate that Indian women expressed stronger agreement with the existence of various types of gender discrimination.

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in India with that experienced by respondents in the other countries, the average score in India was 2.27, which was relatively high, although it was lower than the score for the perception of a discriminatory reality. This represents a significantly higher average than the score of 3.11 in the other countries (t=-21.476, p≤.000). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in India had more discriminatory experience than their counterparts in the other 11 countries surveyed. Examining the differences for each of the four questions constituting this sub-scale, we found a significant difference in the discriminatory experience of Indian women in all questions. First, the survey participants in India (1.03) reported more experience of difficulty in participating in research projects

or becoming research managers than the respondents in the other countries (3.14), and the difference was quite significant (t=-51.240, p≤.000). The Indian respondents (1.03) also experienced more disadvantage in winning research grants or scholarships than their counterparts in the other countries (3.47) (t=-31.148, p≤.000).

Likewise, a significant result was observed for sexual harassment and other disadvantages. Interestingly, however, the difference between the discriminatory experience in India and the other countries showed an opposite trend. In other words, the respondents in India (4.91) reported significantly less experience of sexual harassment and other disadvantages than the respondents in the other countries (3.19) (t=28.688, p≤.000). Lastly, the Indian women (1.92) reported significantly more experience of having work-life balance as a handicap than women in the other countries (2.65) (t=-8.913, p≤..000).

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in India had an average score of 4.68, representing a highly progressive attitude. This is significantly higher than the average of 3.30 in the other 11 countries (t=27.576, p≤.000). When examined for individual items, the Indian respondents demonstrated a significant difference of progressiveness in all four questions included in the sub-scale of sexual role attitudes. Indian women absolutely disagreed with the idea that men are bread-winners of a household (average of 5.00), which represents a significantly more progressive attitude compared with the average of the other countries (3.45) (t=41.844, p≤.000). The average score in India for the idea that women have an inherent ability to take care of babies was 4.74, which is also more progressive than the average of 3.23 in the other countries (t=15.856, p≤.000).

Regarding the idea that husbands should have more power and authority than their wives to maintain order and peace within the family, the Indian respondents expressed an absolute disagreement (5.00), being more progressive than their counterparts in the other countries (t=35.269, p≤.000). Lastly, compared with women in the other 11 countries (2.84), the Indian women (3.97) proved significantly more progressive for the idea that men and women should have respectively suitable jobs since men are rational and women emotional (t=9.674, p≤.000).

For career prospects, the women scientists and engineers in India produced a relatively optimistic view (3.55), offering no statistically significant difference from women in the other countries (3.71). With regard to policy demand, the Indian respondents had a significantly higher average (4.30) than the other respondents (4.05) (t=4.204, p≤.000). Lastly, in relation to the concept of equality, the Indian women (1.01) had less tendency to believe that equal opportunity was a sufficient factor of gender equality than their counterparts (2.21) (t=-35.457, p≤.000).

<Table 4-72. Gap between India & others on gender barriers>

(unit: points)

Item		India (n=93)	Except India (n=1,286)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	1.08	2.56	-32.411	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	1.16	2.61	-28.818	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	1.17	2.60	-26.342	.000
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	1.12	3.06	-39.769	.000
	Sub-scales	1.13	2.70	-38.383	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	1.03	3.14	-51.240	.000
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	1.20	3.47	-31.148	.000
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	4.91	3.19	28.668	.000
	8. Balancing work and life (marriage and family) has been a handicap for me.	1.92	2.65	-8.913	.000
	Sub-scales	2.27	3.11	-21.476	.000
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	5.00	3.45	41.844	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	4.74	3.23	15.846	.000
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	5.00	3.69	35.269	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	3.97	2.84	9.674	.000
	Sub-scales	4.68	3.30	27.576	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.55	3.71	-1.429	.153
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.30	4.05	4.204	.000
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.01	2.21	-35.457	.000

* Perception of discrimination : Lower score means higher perception of discrimination

* Experience of discrimination : Lower score means more discrimination experienced

* Gender role stereotypes : Higher score means more progressive

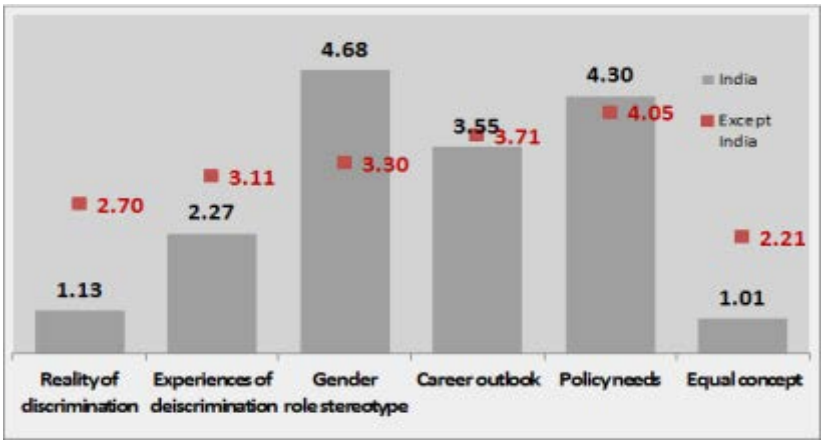
* Career outlook : Higher score means a more positive outlook

* Policy needs : Higher score means higher needs for policy support

Figure 4-65 illustrates the overall difference in perception of gender barriers between the respondents in India and those in the other countries.

<Figure 4-65. Gap between India & others on gender barriers>

(Unit: Points)



4.4.6.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in India according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

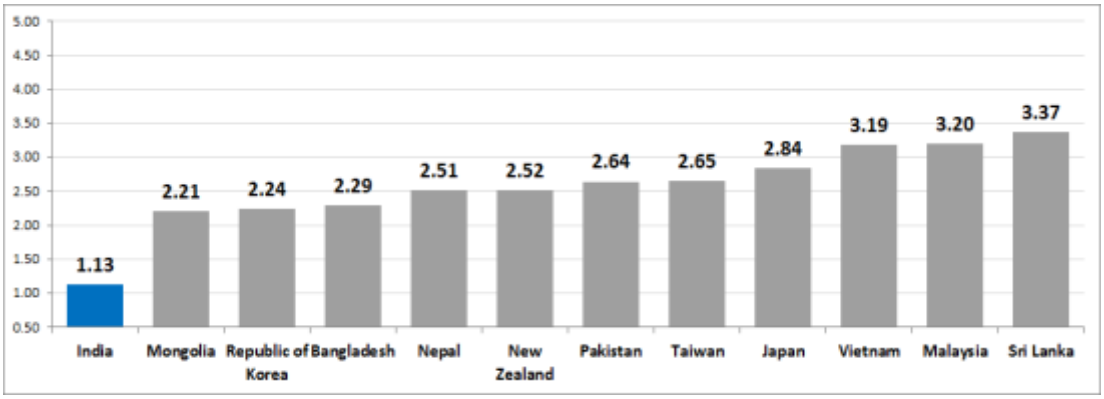
For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Figure 4-66 compares the perception of a discriminatory reality by the respondents in India and by those from the other countries. The level of perception of gender discrimination in society had a score of 1.13, which represents almost a full assent and is the highest among the 12 surveyed countries. The high sensitivity to discrimination against women in their society appears correlated with the relatively young age of the Indian respondents.

Table 4-73 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Indian respondents. The difference by age did not prove significant. (It is essential to consider that the Indian respondents were all in their 20s or 30s.) On the other hand, the difference by marital status was significant: married respondents more strongly perceived a discriminatory reality than did their single counterparts ($F=5.028$, $p\leq.027$). Whereas the number of children and duration of career interruption did not produce a statistically significant difference, occupation resulted in a significant difference. The average score for the perception of discriminatory reality was

lowest (average of 1.00 each) among teachers/professors and healthcare/medical professionals, and highest (2.00) among researchers (F=2.806, p≤.021).

<Figure 4-66. Average of India & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

<Table 4-73. Perception of discrimination of India: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	93	1.13			
Age					
29 or below	70	1.16	0.34	3.158	.079
30~39	23	1.03	0.16		
40~49					
50 or above					
Marital status					
Single	49	1.20	0.37	5.028	.027
Married	44	1.06	0.21		
Other					
No. of children					
None	60	1.18	0.36	2.214	.115
1	21	1.07	0.23		
2	12	1.00	0.00		
3 or above					
Occupation					
Student	6	1.25	0.39	2.806	.021
Teacher/professor	11	1.00	0.00		
Researcher	1	2.00			
Medical personnel	9	1.00	0.00		
Engineer	30	1.18	0.38		
Other	36	1.13	0.28		
Duration of career break					
None	60	1.18	0.36	1.476	.216
Less than 1 year	6	1.00	0.00		
1~2 years	9	1.17	0.33		
2~3 years	3	1.00	0.00		
3 years or more	15	1.00	0.00		

* Lower score means higher perception of discrimination

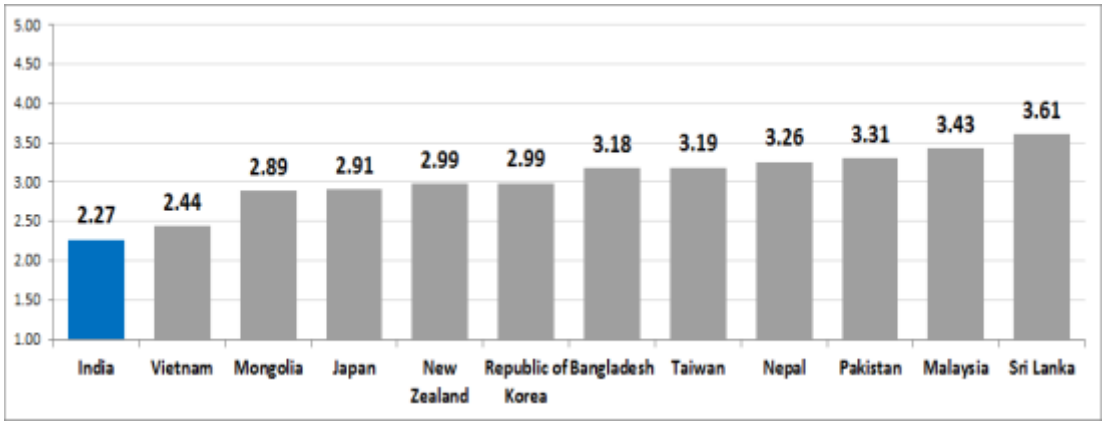
Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-67 compares the perception of discriminatory reality as perceived by the respondents in India and by those from the other countries. The average of 2.27 for this sub-scale indicates that the Indian respondents had a relatively prevalent experience of discrimination. As mentioned earlier, the perception of a discriminatory reality was strongest in India, and so was the actual experience of discrimination among all 12 countries surveyed.

Table 4-74 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Indian respondents. Different ages resulted in a significant difference: those in their 30s experienced more discrimination than the younger respondents (2.01 versus 2.35) (F=30.225, p≤.000). By marital status, married respondents had more discriminatory experience than did their single counterparts (2.40 versus 2.13) (F=24.455, p≤.000). A similar trend was found with the difference according to the number of children: more discriminatory experience was reported by the respondents with one child (2.05) or two children (2.02) than those without children (2.40) (F=22.690, p≤.000).

<Figure 4-67. Average of India & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

The variable of occupation also produced a significant difference. Most discriminatory experience was reported by teachers/professors (2.00) (excluding the occupations classified as others), followed by healthcare/medical professionals (2.25), students (2.42) and engineers (2.45), and researchers (3.25) (F=9.239, p≤.000). Lastly, the respondents with at least three years of career interruption (1.93) reported more discriminatory experience than the others, and those without career interruption reported

the least experience (F=13.045, p≤.000).

<Table 4-74. Experience of discrimination of India : Demographic differences>

(unit: person, points)

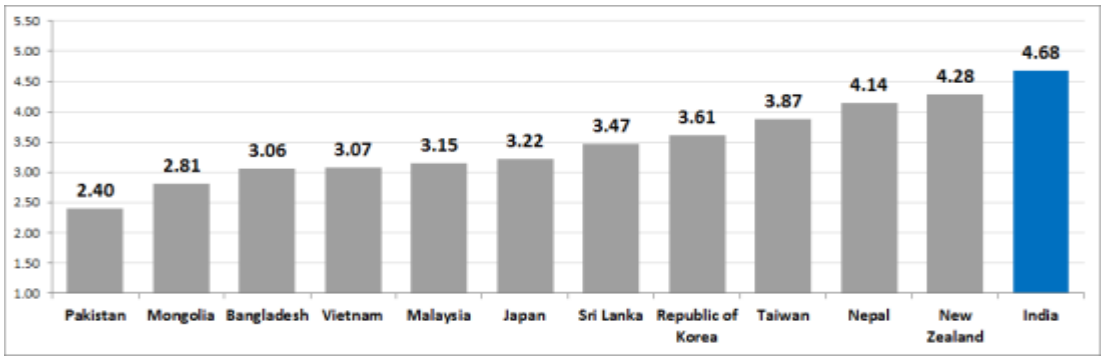
Classifications	Cases	Average	SD	F	*p*
Total	93	2.27			
Age					
29 or below	70	2.35	0.28	30.225	.000
30~39	23	2.01	0.16		
40~49					
50 or above					
Marital status					
Single	49	2.40	0.28	24.455	.000
Married	44	2.13	0.24		
Other					
No. of children					
None	60	2.40	0.28	22.690	.000
1	21	2.05	0.19		
2	12	2.02	0.07		
3 or above					
Occupation					
Student	6	2.42	0.26	9.239	.000
Teacher/professor	11	2.00	0.00		
Researcher	1	3.25			
Medical personnel	9	2.25	0.31		
Engineer	30	2.42	0.32		
Other	36	2.18	0.19		
Duration of career break					
None	60	2.40	0.28	13.045	.000
Less than 1 year	6	2.13	0.14		
1~2 years	9	2.11	0.13		
2~3 years	3	2.17	0.14		
3 years or more	15	1.93	0.11		

* Lower score means more discrimination experienced

Gender role ideology

<Figure 4-68. Average of India & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-68 compares attitudes toward gender roles by the respondents in India and by those from the other countries. The average score for the sub-scale of gender role ideology was as high as 4.68 out of 5, suggesting that the Indian respondents had the more progressive attitude toward gender roles than those in any other countries.

Table 4-75 provides the results of ANOVA of whether gender role attitudes vary depending on the personal variables of the Indian respondents. Except for occupation, variables such as age, marital status, number of children, and career interruption did not produce a significant difference. In the case of the number of children, those without child (4.71) and fewer children (4.65 for one child; 4.54 for two children) tended to be more progressive; however, the difference did reach statistical significance.

<Table 4-75. Gender role stereotypes of India : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	93	4.68			
Age					
29 or below	70	4.66	0.44	.306	.582
30~39	23	4.72	0.25		
40~49					
50 or above					
Marital status					
Single	49	4.67	0.37	.010	.920
Married	44	4.68	0.44		
Other					
No. of children					
None	60	4.71	0.37	.964	.385
1	21	4.65	0.54		
2	12	4.54	0.14		
3 or above					
Occupation					
Student	6	5.00	0.00	6.800	.000
Teacher/professor	11	4.50	0.00		
Researcher	1	5.00			
Medical personnel	9	4.28	0.70		
Engineer	30	4.57	0.40		
Other	36	4.86	0.23		
Duration of career break					
None	60	4.71	0.37	2.165	.079
Less than 1 year	6	4.25	0.82		
1~2 years	9	4.78	0.26		
2~3 years	3	4.75	0.43		
3 years or more	15	4.63	0.23		

* Higher score means more progressive

The difference by occupation implies that students and researchers were more progressive (average of 5.00 each, excluding the occupations classified as others), followed by engineers (4.57) and teachers/professors (4.50), and healthcare/medical professionals (4.28) (F=6.800, p≤.000).

Career prospects

As can be seen in Figure 4-69, the respondents in India demonstrated relative optimism about their career prospects, with an average score of 3.55. However, this indicates that the country had the fourth lowest average, following Japan, Vietnam, and Korea. This result seems related to the highest perception of a discriminatory reality and discriminatory experience among the Indian respondents.

<Table 4-76. Career outlook of India : Demographic differences>

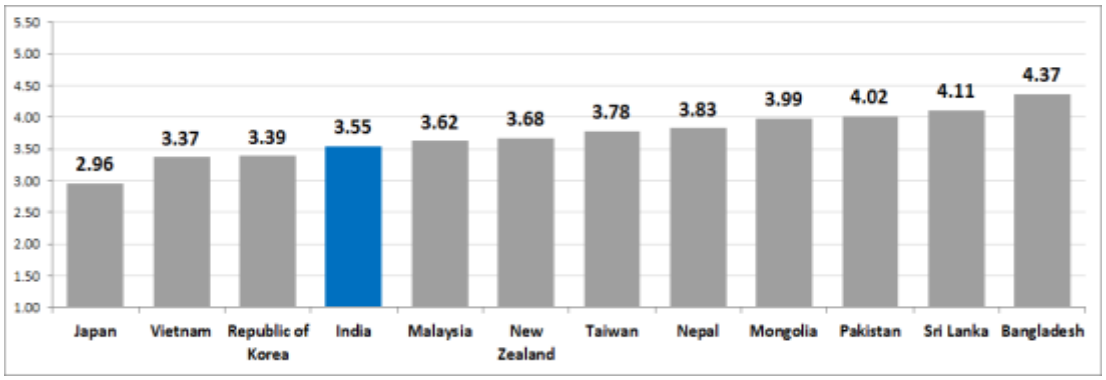
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	93	3.55			
Age					
29 or below	70	3.77	0.92	15.829	.000
30~39	23	2.87	1.01		
40~49					
50 or above					
Marital status					
Single	49	3.92	0.91	15.956	.000
Married	44	3.14	0.98		
Other					
No. of children					
None	60	3.83	0.87	7.633	.001
1	21	3.00	1.34		
2	12	3.08	0.29		
3 or above					
Occupation					
Student	6	3.67	1.03	3.423	.007
Teacher/professor	11	3.00	0.00		
Researcher	1	3.00			
Medical personnel	9	4.11	1.05		
Engineer	30	3.97	0.81		
Other	36	3.22	1.15		
Duration of career break					
None	60	3.83	0.87	8.943	.000
Less than 1 year	6	4.17	0.98		
1~2 years	9	3.33	0.87		
2~3 years	3	2.67	0.58		
3 years or more	15	2.47	0.92		

* Higher score means a more positive outlook

<Figure 4-69. Average of India & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

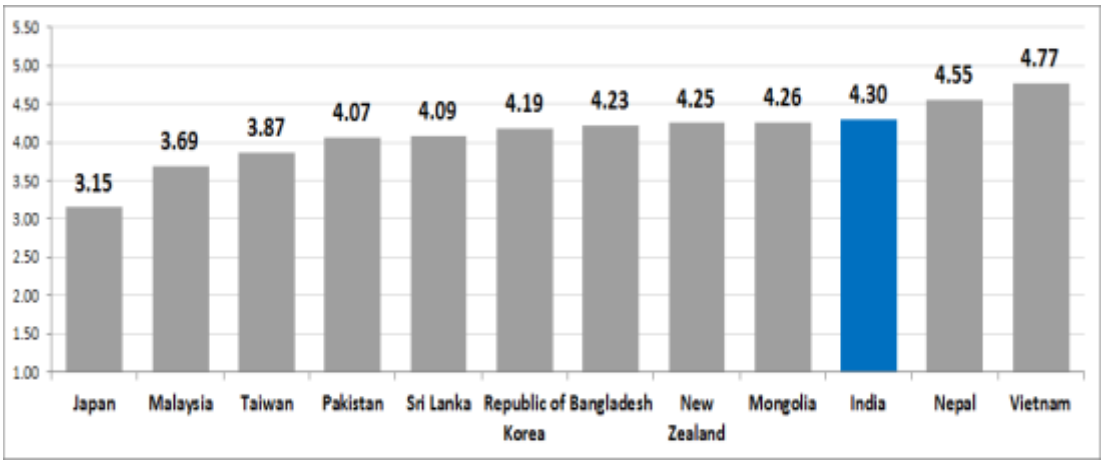
Table 4-76 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Indian respondents. The difference by age suggests that those in their 20s (3.77) had more optimistic views than those in their 30s (2.87) (F=15.829, p≤.047). By marital status, the single respondents (3.92) held more optimistic career prospects than their married counterparts (3.14) (F=15.956, p≤.000). The number of children also produced a significant difference: the average score among those without child (3.83) was considerably higher than that of the respondents with children (3.00 for one child; 3.08 for two children) (F=7.633, p≤.001). Occupation also proved a meaningful variable. The average was highest among healthcare/medical professionals (4.11), followed by engineers (3.97) and students (3.67); the score was lowest among teachers/professors and researchers (3.00 each), except for the other occupations (F=3.423, p≤.007). Lastly, a significant difference was observed for the duration of career interruption. The average score was highest among the respondents who experienced interruption of less than one year (4.17), followed by those without any interruption (3.83), with one to two years (3.33), two to three years (2.67), and three years or more (2.47) (F=8.943, p≤.000).

Policy demand

As can be seen in Figure 4-70, the average score for policy demand in India was 4.30, placing the country in third highest place after Vietnam and Nepal. This result seems related with the high perception of a discriminatory reality and prevalent experience of discrimination reported by the Indian respondents.

<Figure 4-70. Average of India & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

<Table 4-77. Policy needs of India : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	93	4.30			
Age					
29 or below	70	4.34	0.51	2.133	.148
30~39	23	4.17	0.39		
40~49					
50 or above					
Marital status					
Single	49	4.41	0.54	5.303	.024
Married	44	4.18	0.39		
Other					
No. of children					
None	60	4.35	0.52	1.548	.218
1	21	4.29	0.46		
2	12	4.08	0.29		
3 or above					
Occupation					
Student	6	4.33	0.52	1.283	.279
Teacher/professor	11	4.00	0.00		
Researcher	1	4.00			
Medical personnel	9	4.22	0.44		
Engineer	30	4.40	0.56		
Other	36	4.33	0.48		
Duration of career break					
None	60	4.35	0.52	2.496	.048
Less than 1 year	6	4.17	0.41		
1~2 years	9	4.56	0.53		
2~3 years	3	4.33	0.58		
3 years or more	15	4.00	0.00		

* Higher score means higher needs for policy support

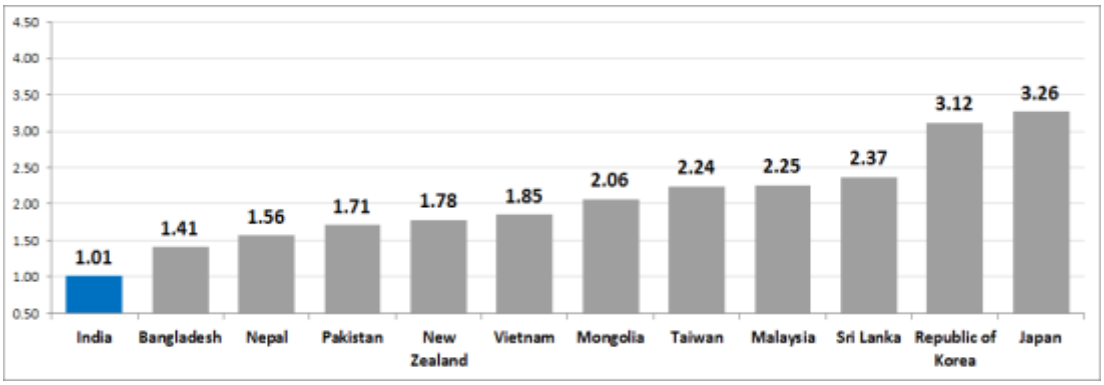
Table 4-77 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Indian respondents. The personal variables with statistically significant relevance to policy demand were marital status and career interruption. By age, those in their 20s (4.34) had stronger policy demand than those in their 30s (4.17); however, the difference was not significant. By marital status, the single respondents' average (4.41) was higher than that of the married (4.18) ($F=5.303$, $p\leq.024$). According to the number of children, the highest average was reported by those without children (4.35), followed by those with one child (4.29) and those with two children (4.08); however, the difference did reach a statistically significant level. Occupation did not result in a significant difference, but occupation did: the average was highest (4.56) among those experiencing one to two years of career interruption and lowest (4.00) among those with at least three years of interruption ($F=2.496$, $p\leq.048$).

Gender equality

As can be seen in Figure 4-71, the Indian respondents showed a strong tendency to believe that full gender equality would be realized once women were granted equal opportunity (average of 1.01; a lower score represents stronger agreement). This score was higher than that in any other countries.

<Figure 4-71. Average of India & others on Equality concept>

(unit: points)



ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in India to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-78). Such a belief was found to be unrelated to respondent age. The differences by marital status, number of children, occupation, and duration of career interruption were not significant, either. Since the average score among the Indian women is close to 1.00, which means absolute agreement, no distinctive results were observed.

<Table 4-78. Equality concept of India : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	93	1.01			
Age					
29 or below	70	1.01	0.12	.326	.569
30~39	23	1.00	0.00		
40~49					
50 or above					
Marital status					
Single	49	1.02	0.14	.897	.346
Married	44	1.00	0.00		
Other					
No. of children					
None	60	1.02	0.13	.271	.764
1	21	1.00	0.00		
2	12	1.00	0.00		
3 or above					
Occupation					
Student	6	1.00	0.00	.406	.843
Teacher/professor	11	1.00	0.00		
Researcher	1	1.00			
Medical personnel	9	1.00	0.00		
Engineer	30	1.03	0.18		
Other	36	1.00	0.00		
Duration of career break					
None	60	1.02	0.13	.132	.970
Less than 1 year	6	1.00	0.00		
1~2 years	9	1.00	0.00		
2~3 years	3	1.00	0.00		
3 years or more	15	1.00	0.00		

4.4.8 Japan

4.4.8.1 Respondent profile

A total of 138 respondents participated in the survey in Japan (see Table 4-79). Those in their 50s accounted for 55.1%, followed by those in 40s (24.6%), 30s (17.4%), and 20s (2.9%). The average age was highest at 50.89. By marital status, a majority of the participants were married (70.3%), followed by single (23.9%) and the other group (5.8%). Most of the respondents (41.3%) did not have any children; 23.9% had one child; 26.8% had two; and 8.0% had three or more children.

By occupation, the largest group was teachers/professors (34.8%), followed by researchers (28.3%), engineers (18.8%), others (13.0%), healthcare/medical professionals (3.6%), and students (1.4%). Most respondents had no career interruption (37.7%); while 17.4% had less than one year of interruption; 16.7% had one to two years; 15.2% had three years or longer; and 10.1% had two to three years.

<Table 4-79. Profile of participants from Japan>

(unit: person, %)

Classifications	N	%
Age		
29 or below	4	2.9
30~39	24	17.4
40~49	34	24.6
50 or above	76	55.1
Marital status		
Single	33	23.9
Married	97	70.3
Other	8	5.8
No. of children		
None	57	41.3
1	33	23.9
2	37	26.8
3 or above	11	8.0
Occupation		
Student	2	1.4
Teacher/professor	48	34.8
Researcher	39	28.3
Medical personnel	5	3.6
Engineer	26	18.8
Other	18	13.0
Duration of career break		
None	52	37.7
Less than 1 year	24	17.4
1~2 years	23	16.7
2~3 years	14	10.1
3 years or more	21	15.2

4.4.8.2 Difference of gender barriers in Japan and other countries: Overview

Table 4-80 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Japan with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.84 in Japan, showing a significant difference from the score of 2.57 among the other 11 countries ($t=2.995$, $p\leq.003$; a lower score is translated as stronger agreement with the perception of a discriminatory reality). This result implies that Japanese women quite weakly perceive gender discrimination in their society, compared with women in the other countries, which is presumably related to the fact that the average age of the Japanese respondents was quite high at 50.89.

<Table 4-80. Gap between Japan & others on gender barriers>

(unit: points)

Item		Japan (n=138)	Except Japan (n=1,241)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.63	2.45	1.636	.102
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.97	2.46	4.816	1374
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.79	2.47	2.523	.013
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	3.07	2.91	1.465	.145
	Sub-scales	2.84	2.57	2.995	.003
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	2.98	3.00	-.171	.864
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.18	3.33	-1.377	.169
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	2.91	3.35	-3.246	.001
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.60	2.60	.024	.981
	Sub-scales	2.91	3.07	-2.029	.043
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	3.21	3.59	-2.792	.006
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.22	3.35	-1.057	.291
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.27	3.83	-3.822	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	3.20	2.89	2.476	.013
	Sub-scales	3.22	3.42	-1.790	.075
Career outlook	13. I believe things will turn out fine in my future career.	2.96	3.78	-9.014	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	3.15	4.17	-8.056	.000
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	3.26	2.00	10.789	.000

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

As a result of analyzing each of the following questions included in this sub-scale, we found that, for the statement "Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers," the Japanese respondents (2.79) revealed a weaker perception than in other countries (2.47) ($t=2.523$, $p\leq.013$). The average of Japanese respondents was slightly higher than the other countries' average in the remaining three questions as well; however, the difference was not statistically significant.

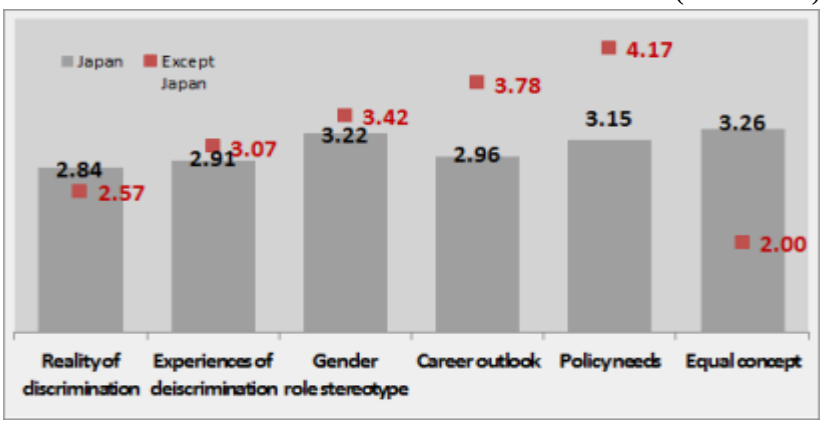
As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Japan with that experienced by respondents in the other countries, the average score in Japan was 2.91, which is lower than the average of 3.07 in the other countries ($t=-2.029$, $p\leq.043$). Since lower scores refer to greater discriminatory experience, the result suggests that the respondents in Japan had more discriminatory experience than their counterparts in the other 11 countries surveyed. This contrasts with the lower awareness of a discriminatory reality among Japanese women in science and technology, compared with the other countries. Examining the differences for each of the four questions constituting this sub-scale, we found a significant difference only with respect to the experience of sexual harassment and other unfair treatment. The average score of the Japanese respondents was 2.91, lower than 3.35 in the other countries. This suggests that Japanese women had significantly more experience of sexual harassment and other disadvantages ($t=-3.246$, $p\leq.001$). No significant difference was found for the other three questions.

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Japan had an average score of 3.22, representing a relatively progressive attitude. This is slightly lower than the average of 3.42 in the other 11 countries; however, the difference was not significant. By individual questions, a significant difference was found for the three statements, except for the idea that women have an inherent ability to take care of babies. First, the respondents in Japan (3.21) were more conservative than the other respondents (3.59) to the idea that men are bread-winners of a household ($t=-2.792$, $p\leq.006$). Compared with the others (3.83), the Japanese women (3.27) were also conservative in the belief that husbands should have more power and authority than their wives to maintain order and peace within the family ($t=-3.822$, $p\leq.000$). On the other hand, with respect to the statement that men and women should have respectively suitable jobs since men are rational and women emotional, the Japanese respondents (3.20) were significantly more progressive than their counterparts in the other countries (2.89) ($t=2.476$, $p\leq.013$).

For career prospects, Japans had an average (2.96) below the median level, significantly lower than the average in the other countries (3.78) (t=-9.014, p≤.000). Next, we examined the difference of average score for policy demand, and found a significantly lower average in Japan (3.15) than in the other countries (4.17) (t=-8.056, p≤.000). Lastly, with respect to the concept of equality, the Japanese women (3.20) tended to agree less with the idea that equal opportunity was a sufficient factor of gender equality than women in the other countries surveyed (2.89) (t=2.476, p≤.013).

<Figure 4-72. Gap between Japan & others on gender barriers>

(Unit: Points)



4.4.8.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in Japan according to the personal variables of the respondents and compare the results with those obtained in the other countries

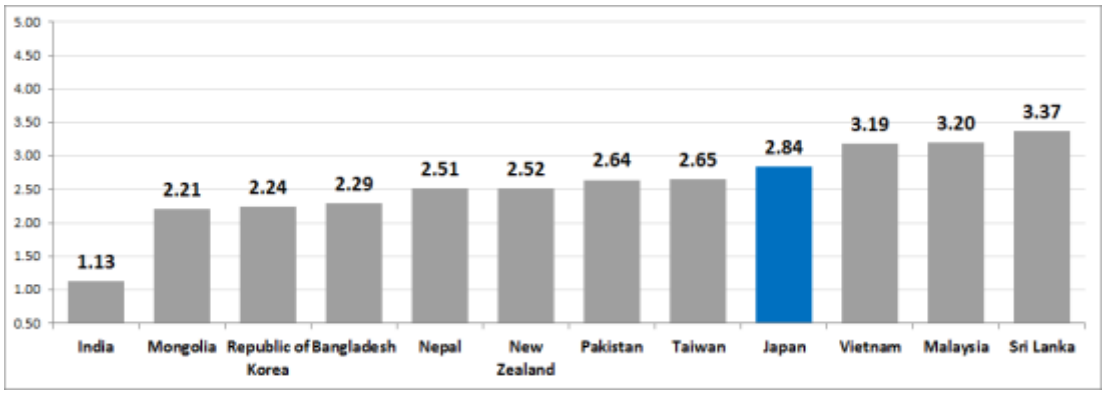
Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-81 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Japanese respondents. No significant difference was observed in relation to age, marital status, number of children, occupation, and duration of career interruption. However, older respondents had a consistent tendency to perceive a discriminatory reality less strongly.

Figure 4-73 compares the perception of a discriminatory reality by the respondents in Japan and by those from the other countries. The level of perception of gender discrimination in society had a score of 2.84, slightly lower than the median level and higher only than the scores for Sri Lanka, Malaysia, and Vietnam. Women in Japan were not substantially sensitive to discrimination against women in their society, which is probably related to the relatively old age of the Japanese respondents.

<Figure 4-73. Average of Japan & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

<Table 4-81. Perception of discrimination of Japan: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	138	2.84			
Age					
29 or below	4	3.38	1.01	2.013	.115
30~39	24	3.16	0.86		
40~49	31	2.90	0.91		
50 or above	70	2.67	1.03		
Marital status					
Single	31	2.78	0.96	2.732	.069
Married	91	2.92	0.99		
Other	7	2.04	0.70		
No. of children					
None	52	2.96	1.02	.542	.654
1	30	2.78	0.95		
2	36	2.79	0.93		
3 or above	11	2.59	1.16		
Occupation					
Student	2	3.38	0.88	.187	.967
Teacher/professor	46	2.79	1.06		
Researcher	36	2.88	0.98		
Medical personnel	5	2.85	0.74		
Engineer	23	2.89	0.95		
Other	17	2.75	1.02		
Duration of career break					
None	50	2.92	1.03	.518	.722
Less than 1 year	23	2.74	1.02		
1~2 years	21	2.99	0.87		
2~3 years	14	2.59	0.67		
3 years or more	20	2.74	1.17		

* Lower score means higher perception of discrimination

Discriminatory experience

For the scale of discriminatory experience, a lower score represents more experience of gender discrimination. Figure 4-74 compares the discriminatory experience among the respondents in Japan and among respondents from the other countries. The average score of the Japanese respondents (2.91) was slightly lower than the median level, placing Japan in fourth place after India, Vietnam, and Mongolia in terms of discriminatory experience.

<Table 4-82. Experience of discrimination of Japan : Demographic differences>

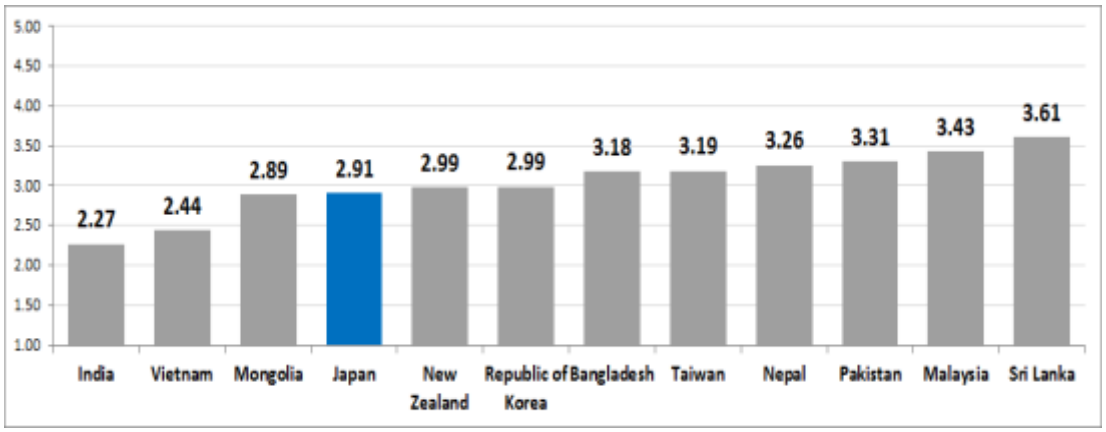
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	138	2.91			
Age					
29 or below	4	4.06	0.69	3.067	.030
30~39	24	3.16	0.88		
40~49	32	2.88	0.90		
50 or above	74	2.78	0.97		
Marital status					
Single	32	2.82	1.02	.978	.379
Married	95	2.97	0.95		
Other	7	2.50	0.72		
No. of children					
None	55	2.98	1.03	.886	.450
1	31	2.85	0.99		
2	37	2.98	0.82		
3 or above	11	2.50	0.92		
Occupation					
Student	2	3.00	0.35	.306	.909
Teacher/professor	48	2.91	0.96		
Researcher	38	3.04	1.00		
Medical personnel	5	2.60	1.05		
Engineer	23	2.80	0.91		
Other	18	2.86	1.02		
Duration of career break					
None	50	2.97	1.00	.636	.638
Less than 1 year	24	2.90	1.06		
1~2 years	23	3.08	0.78		
2~3 years	14	2.80	0.73		
3 years or more	20	2.65	0.98		

* Lower score means more discrimination experienced

<Figure 4-74. Average of Japan & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

Table 4-82 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Japanese respondents. Different ages resulted in a significant difference. Discriminatory experience was reported consistently more by older respondents (4.06 for 20s; 3.16 for 30s; 2.88 for 40s; 2.78 for 50s) ($F=3.067$, $p\leq.030$). This tendency is opposite to the result of perception of a discriminatory reality discussed earlier. No significant difference was observed for marital status, number of children, occupation, and duration of career interruption.

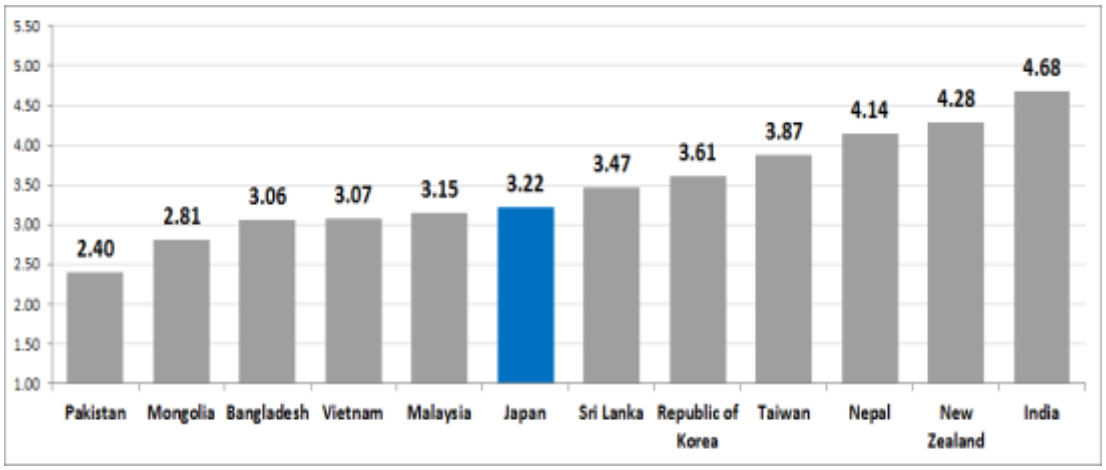
Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-75 compares attitudes toward gender roles among the respondents in Japan and among respondents from the other countries. The average score for the sub-scale of gender role attitudes was 3.22 out of 5, slightly higher than the median, placing Japan in sixth place after Pakistan, Mongolia, Bangladesh, Vietnam, and Malaysia.

Table 4-83 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Japanese respondents. Except for occupation, variables such as age, marital status, number of children, and career interruption did not produce a significant difference. Still, we observed a consistently more progressive attitude toward gender roles among younger respondents. By marital status, the other group was most progressive, followed by the married and single respondents; however, the difference did reach statistical significance. By occupation, students (4.25) proved most progressive, followed by teachers/professors (3.58), researchers (3.28), healthcare/medical professionals (2.95), and engineers (2.71) ($F=2.620$, $p\leq.027$).

<Figure 4-75. Average of Japan & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

<Table 4-83. Gender role stereotypes of Japan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	138	3.22			
Age					
29 or below	4	4.13	0.32	2.100	.103
30~39	23	3.61	1.10		
40~49	34	3.24	1.12		
50 or above	75	3.05	1.26		
Marital status					
Single	33	2.99	1.34	.871	.421
Married	95	3.29	1.14		
Other	8	3.44	1.30		
No. of children					
None	57	3.04	1.25	.829	.480
1	32	3.41	1.26		
2	36	3.30	1.09		
3 or above	11	3.39	1.09		
Occupation					
Student	2	4.25	0.35	2.620	.027
Teacher/professor	48	3.58	1.09		
Researcher	38	3.28	1.09		
Medical personnel	5	2.95	1.82		
Engineer	25	2.71	1.22		
Other	18	2.85	1.27		
Duration of career break					
None	52	3.16	1.26	.436	.782
Less than 1 year	24	3.48	1.24		
1~2 years	22	3.15	1.27		
2~3 years	14	3.46	0.75		
3 years or more	20	3.29	1.13		

* Higher score means more progressive

Career prospects

As can be seen in Figure 4-76, the respondents in Japan demonstrated a relatively low average score of 2.96, which represents the lowest score among all the surveyed countries. This is probably because the Japanese respondents were relatively old.

<Table 4-84. Career outlook of Japan : Demographic differences>

(unit: person, points)

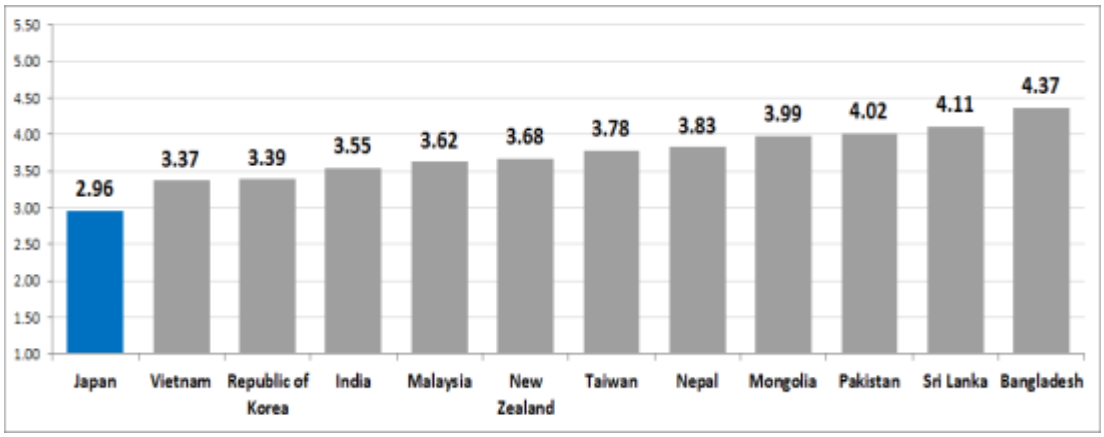
Classifications	Cases	Average	SD	F	*p*
Total	138	2.96			
Age					
29 or below	4	3.50	0.58	.595	.619
30~39	24	3.13	1.30		
40~49	34	2.85	1.10		
50 or above	75	2.92	1.12		
Marital status					
Single	33	2.70	1.21	1.224	.297
Married	96	3.05	1.08		
Other	8	2.88	1.46		
No. of children					
None	57	2.79	1.13	.903	.442
1	32	3.19	1.26		
2	37	3.03	1.07		
3 or above	11	2.91	1.04		
Occupation					
Student	2	3.00	0.00	.128	.986
Teacher/professor	48	2.96	1.01		
Researcher	38	2.97	1.15		
Medical personnel	5	2.60	1.14		
Engineer	26	2.92	1.32		
Other	18	3.06	1.30		
Duration of career break					
None	52	2.94	1.11	.434	.784
Less than 1 year	24	3.08	1.25		
1~2 years	23	3.04	1.15		
2~3 years	14	3.21	0.97		
3 years or more	20	2.75	1.16		

* Higher score means a more positive outlook

Table 4-84 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Japanese respondents. The difference by age was insignificant; so were the differences by marital status, number of children, and duration of career interruption. By occupation (except for the others), the group most optimistic about career prospects were students, and healthcare/medical professionals were most pessimistic; however, the difference was not significant.

<Figure 4-76. Average of Japan & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

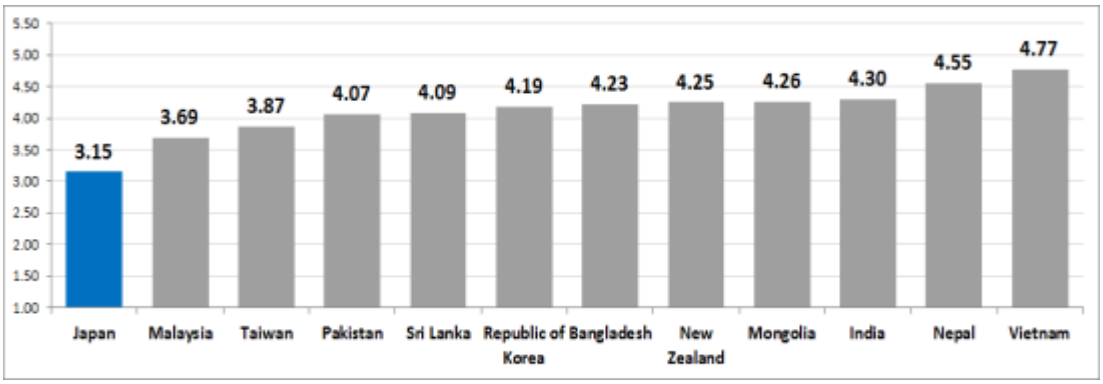
Policy demand

As can be seen in Figure 4-77, the average score of the Japanese respondents for policy demand was 3.15 out of 5, slightly higher than the median level. However, considering that this score is lowest of all 12 countries, the scientists and engineers in Japan seem to have a poor understanding of or a skeptical view about the importance of policy.

Table 4-85 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Japanese respondents. In Japan, no personal variables had a statistically significant relevance to policy demand. By age, the older the respondents, the lower policy demand becomes. Likewise, those with more children tended to voice more policy demands; however, the difference was not significant.

<Figure 4-77. Average of Japan & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

<Table 4-85. Policy needs of Japan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	138	3.15			
Age					
29 or below	4	4.00	0.00	.642	.589
30~39	24	3.29	1.08		
40~49	33	3.15	1.58		
50 or above	75	3.05	1.52		
Marital status					
Single	33	3.15	1.33	.022	.978
Married	95	3.14	1.48		
Other	8	3.25	1.75		
No. of children					
None	56	3.05	1.38	.307	.820
1	32	3.09	1.53		
2	37	3.24	1.46		
3 or above	11	3.45	1.63		
Occupation					
Student	2	4.00	0.00	.512	.767
Teacher/professor	48	3.29	1.29		
Researcher	38	3.21	1.40		
Medical personnel	5	3.00	1.87		
Engineer	25	2.84	1.70		
Other	18	3.00	1.61		
Duration of career break					
None	52	3.13	1.40	2.157	.078
Less than 1 year	24	3.29	1.46		
1~2 years	23	2.91	1.53		
2~3 years	14	4.14	1.03		
3 years or more	20	2.85	1.46		

* Higher score means higher needs for policy support

Gender equality

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Japan to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-86). First of all, such a belief was correlated to the respondents' age. Those in their 20s agreed most with the statement that equal opportunity was a sufficient factor of gender equality, and those in their 40s agreed least ($F=2.703$, $p \leq .048$). The average by marital status was insignificant; so were the difference according to the number of children, occupation, and duration of career interruption.

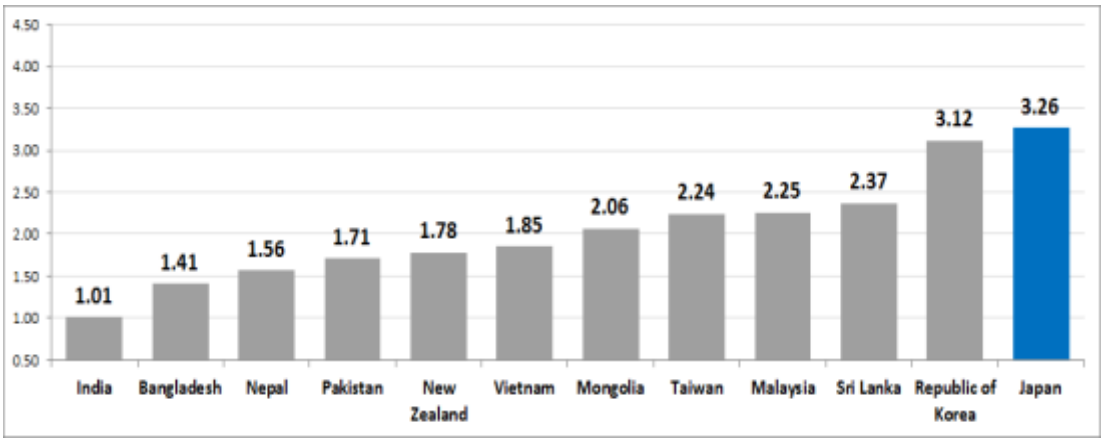
<Table 4-86. Equality concept of Japan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	138	3.26			
Age					
29 or below	4	1.50	0.58	2.703	.048
30~39	23	3.39	0.99		
40~49	34	3.41	1.23		
50 or above	75	3.25	1.42		
Marital status					
Single	33	3.39	1.25	.766	.467
Married	95	3.26	1.31		
Other	8	2.75	1.75		
No. of children					
None	57	3.25	1.23	1.706	.169
1	32	3.44	1.39		
2	36	3.39	1.29		
3 or above	11	2.45	1.51		
Occupation					
Student	2	3.00	1.41	1.736	.131
Teacher/professor	48	3.04	1.30		
Researcher	38	3.13	1.30		
Medical personnel	5	3.60	1.14		
Engineer	25	3.92	1.04		
Other	18	3.17	1.62		
Duration of career break					
None	52	3.15	1.26	.790	.534
Less than 1 year	24	3.00	1.41		
1~2 years	22	3.55	1.44		
2~3 years	14	3.00	1.18		
3 years or more	20	3.45	1.28		

<Figure 4-78. Average of Japan & others on Equality concept>

(unit: points)



As can be seen in Figure 4-78, the Japanese respondents agreed less strongly than the median level with the statement that full gender equality would be realized once women were granted equal opportunity (average of 3.26; a lower score represents stronger agreement), with the highest average score among the 12 countries.

4.4.9 Taiwan

4.4.9.1 Respondent profile

A total of 79 respondents participated in the survey in Taiwan (see Table 4-87. Most of them were in their 50s (39.2%), followed by 20s (31.6%), 30s (16.5%), and 40s (12.7%). By marital status, the single participants accounted for 44.3%, the married for 48.1%, and the other group for 7.6%. In terms of the number of children, 63.3% of all respondents in Taiwan had no children; 21.5% had two children; 10.1% had three or more; and 65.1% had one child. By occupation, teachers/professors were majority (30.4%), followed by students (26.6%), researchers (16.5%), others (13.9%), engineers (7.6%), and healthcare/medical professionals (5.1%). Most of the respondents did not have any career interruption (67.1%); 12.7% had at least three years of interruption; and 7.6% had one to two years. Those experiencing an interruption of less than one year and two to three years accounted for 5.1% each.

4.4.9.2 Difference of gender barriers in Taiwan and other countries: Overview

Table 4-88 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Taiwan with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.65 in Taiwan, showing a significant difference from the score of 2.59 among the other 11 countries (a lower score is translated as stronger agreement with the perception of discriminatory reality). We analyzed each of the four questions included in this sub-scale. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Taiwan showed no significant difference from the result in the other countries. Conversely, Taiwanese women agreed less strongly (2.89), compared with their counterparts in the other countries (2.49), with the statement “Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields” ($t=2.984$, $p\leq.004$.) This result implies that Taiwanese women tend to less strongly perceive a discriminatory reality. For the statements “Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers” and “Women receive less wages compared with the men doing the same work,” the Taiwanese respondents did not produce a significant difference.

<Table 4-87. Profile of participants from Taiwan>

(unit: person, %)

Classifications	N	%
Age		
29 or below	25	31.6
30~39	13	16.5
40~49	10	12.7
50 or above	31	39.2
Marital status		
Single	35	44.3
Married	38	48.1
Other	6	7.6
No. of children		
None	50	63.3
1	4	5.1
2	17	21.5
3 or above	8	10.1
Occupation		
Student	21	26.6
Teacher/professor	24	30.4
Researcher	13	16.5
Medical personnel	4	5.1
Engineer	6	7.6
Other	11	13.9
Duration of career break		
None	53	67.1
Less than 1 year	4	5.1
1~2 years	6	7.6
2~3 years	4	5.1
3 years or more	10	12.7

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Taiwan with that experienced by respondents in the other countries, the average score in Taiwan was 3.19, representing no significant difference from the average of 3.05 in the other countries (lower scores refer to more experience of discrimination). Examining the differences for each of the four questions constituting this sub-scale, we found no particular difference with respect to the discriminatory experience of Taiwanese women in all questions from the respondents in the other countries. The Taiwanese respondents had relatively less difficulty in participating in research projects or becoming research managers and less disadvantage in winning research grants or scholarships; however, the difference did reach statistical significance.

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Taiwan had an average score of 3.87, representing a relatively progressive attitude. This score represents a significantly more

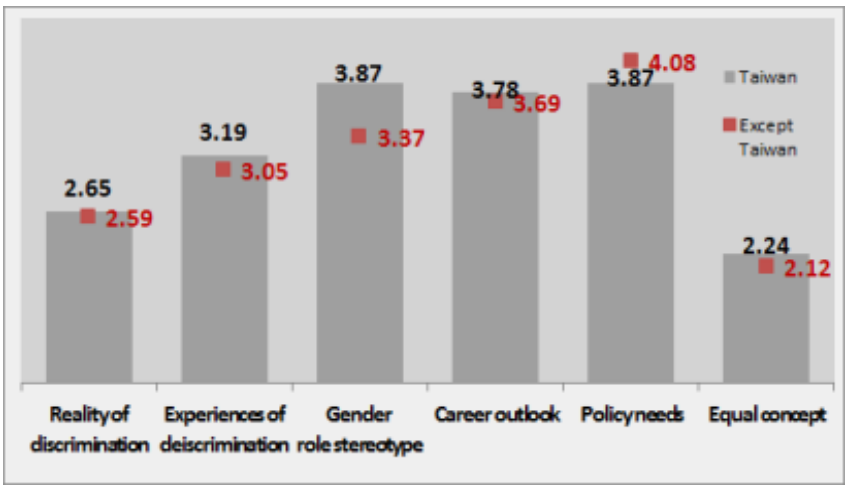
progressive attitude, compared with the average of 3.37 in the other countries (t=5.034, p≤.000). The Taiwanese respondents had a more progressive attitude toward gender roles than the participants in the other countries with regard to the questions included in this sub-scale, except for the idea that men are bread-winners of a household. Regarding this question, the average in Taiwan was slightly higher, but without a significant difference. The Taiwanese respondents (3.80) agreed less strongly than the other respondents (3.31) with the idea that women have an inherent ability to take care of babies (t=3.375, p≤.001). For the statement that husbands should have more power and authority than their wives to maintain order and peace within the family, women in Taiwan (4.33) expressed less agreement than the others (3.74) (t=5.261, p≤.000). Lastly, the Taiwanese women (3.56) were more progressive than those in the other countries (2.88) with respect to the idea that men and women should have respectively suitable jobs since men are rational and women emotional (t=4.233, p≤.000).

For career prospects, the Taiwanese respondents had an average score of 3.78, above the median level, showing only a slight difference from the average of women in the other 11 countries (3.69). Next, as a result of analysis of differences between Taiwan and the other countries, the Taiwanese participants had a slightly lower average (3.87) for policy demand than the respondents in the other countries (4.08); however, the difference was not significant. Lastly, the perception of the concept of equality among the women surveyed in Taiwan was not notably different from that among the other participants.

Figure 4-79 illustrates the overall difference in perception of gender barriers between the respondents in Taiwan and those in the other countries.

<Figure 4-79. Gap between Taiwan & others on gender barriers>

(Unit: Points)



<Table 4-88. Gap between Taiwan & others on gender barriers>

(unit: points)

Item		Taiwan (n=94)	Except Taiwan (n=1,285)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.44	2.47	-.157	.875
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.86	2.49	2.984	.004
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.48	2.51	-.170	.865
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.81	2.94	-.960	.339
	Sub-scales	2.65	2.59	.489	.625
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.27	2.98	1.947	.052
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.59	3.30	2.492	.014
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.24	3.31	-.490	.625
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.65	2.60	.338	.735
	Sub-scales	3.19	3.05	1.395	.163
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	3.80	3.54	1.978	.051
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.80	3.31	3.375	.001
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	4.33	3.74	5.261	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	3.56	2.88	4.233	.000
	Sub-scales	3.87	3.37	5.034	.000
Career outlook	13. I believe things will turn out fine in my future career.	3.78	3.69	.764	.445
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	3.87	4.08	-1.686	.092
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	2.24	2.12	.898	.369

* Perception of discrimination : Lower score means higher perception of discrimination
* Experience of discrimination : Lower score means more discrimination experienced
* Gender role stereotypes : Higher score means more progressive
* Career outlook : Higher score means a more positive outlook
* Policy needs : Higher score means higher needs for policy support

4.4.9.3 Analysis of individual questions

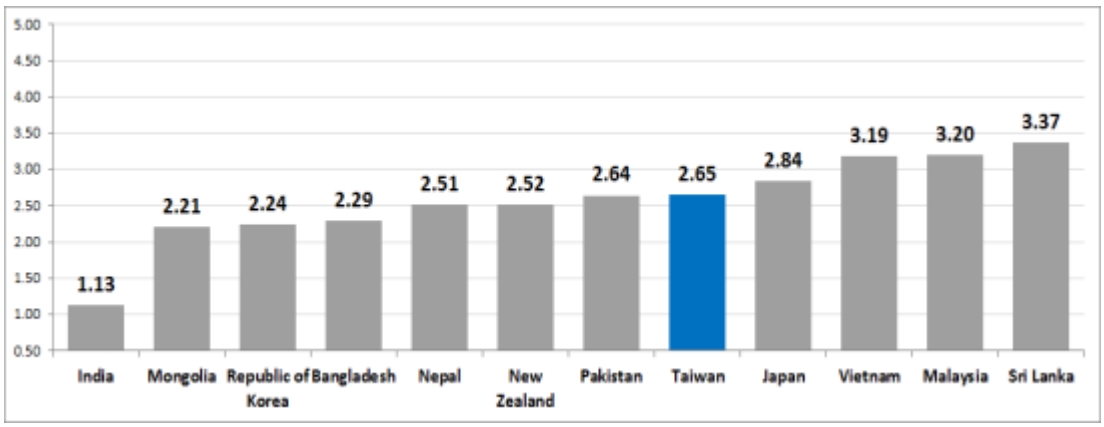
Here, we will examine the gender barriers perceived and experienced by women scientists and engineers in Taiwan according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Figure 4-80 compares the perception of a discriminatory reality by the respondents in Taiwan and by those from the other countries. The level of perception of gender discrimination in Taiwanese society had a score of 2.65, ranking fifth lowest after Sri Lanka, Malaysia, Vietnam, and Japan.

<Figure 4-80. Average of Taiwan & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Table 4-89 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Taiwanese respondents. By age, younger respondents tended to more strongly perceive a discriminatory reality; however, the difference not did reach statistical significance. The difference by marital status was not significant, either. Whereas the respondents with more children tended to more strongly perceive a discriminatory reality, the difference was not significant. No statistical relevance was observed either for differences by occupation and duration of career interruption.

<Table 4-89. Perception of discrimination of Taiwan: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	79	2.65			
Age					
29 or below	25	2.74	0.54	.337	.799
30~39	13	2.71	0.92		
40~49	10	2.73	1.02		
50 or above	31	2.52	1.05		
Marital status					
Single	35	2.69	0.75	2.443	.094
Married	38	2.51	0.86		
Other	6	3.33	1.41		
No. of children					
None	50	2.75	0.84	.741	.531
1	4	2.50	1.40		
2	17	2.57	0.98		
3 or above	8	2.28	0.54		
Occupation					
Student	21	2.64	0.54	.440	.819
Teacher/professor	24	2.59	1.15		
Researcher	13	2.73	1.00		
Medical personnel	4	2.13	0.32		
Engineer	6	2.92	0.58		
Other	11	2.73	0.88		
Duration of career break					
None	53	2.67	0.93	.419	.794
Less than 1 year	4	2.13	0.75		
1~2 years	6	2.71	1.20		
2~3 years	4	2.88	0.14		
3 years or more	10	2.63	0.70		

* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-90 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Taiwanese respondents. Different ages did not result in a notable difference in the experiences of gender discrimination. The same was the case with the differences by marital status and the number of children. Still, we were able to find a tendency for a more experiences of discrimination among those who had more children. By occupation, healthcare/medical professionals reported the most discriminatory experience; the least was reported by students; however, the difference was not significant. Lastly, no statistical significance was observed from the difference by the length of career interruption.

<Table 4-90. Experience of discrimination of Taiwan : Demographic differences>

(unit: person, points)

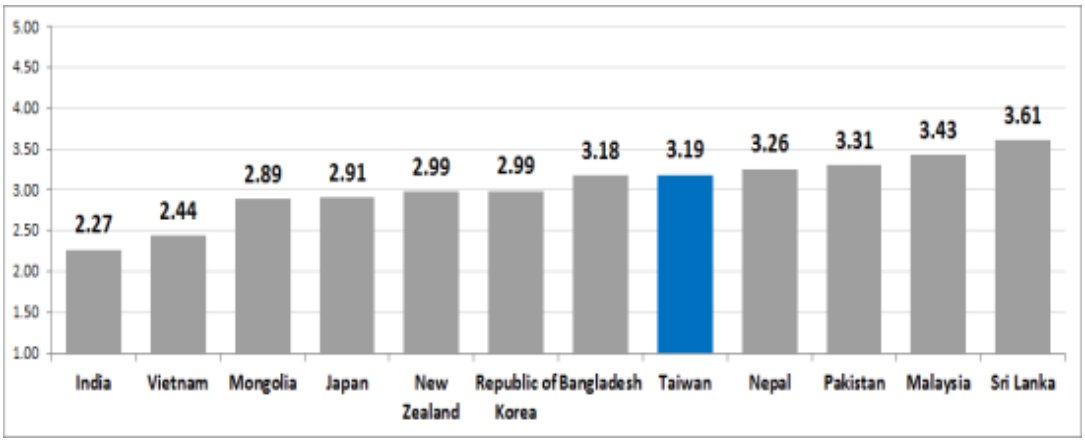
Classifications	Cases	Average	SD	F	*p*
Total	79	3.19			
Age					
29 or below	25	3.40	0.60	1.344	.267
30~39	13	3.13	1.11		
40~49	10	3.43	1.12		
50 or above	31	2.96	0.96		
Marital status					
Single	35	3.30	0.83	1.665	.196
Married	38	3.01	0.95		
Other	6	3.63	1.08		
No. of children					
None	50	3.34	0.89	2.390	.075
1	4	3.19	1.13		
2	17	3.10	1.02		
3 or above	8	2.44	0.26		
Occupation					
Student	21	3.39	0.61	1.159	.338
Teacher/professor	24	3.09	0.98		
Researcher	13	3.29	1.11		
Medical personnel	4	2.25	0.20		
Engineer	6	3.13	0.61		
Other	11	3.25	1.19		
Duration of career break					
None	53	3.12	0.90	1.499	.212
Less than 1 year	4	3.50	1.14		
1~2 years	6	3.96	1.01		
2~3 years	4	3.19	1.05		
3 years or more	10	2.90	0.79		

* Lower score means more discrimination experienced

The average score of the Taiwanese participants (2.65) was above the median level (see Figure 4-81). Just like the perception of a discriminatory reality, experience of gender discrimination among the women scientists and engineers in Taiwan placed them in the fifth lowest rank, following Sri Lanka, Malaysia, Pakistan, and Nepal.

<Figure 4-81. Average of Taiwan & others on Exp. of discrimination>

(unit: points)



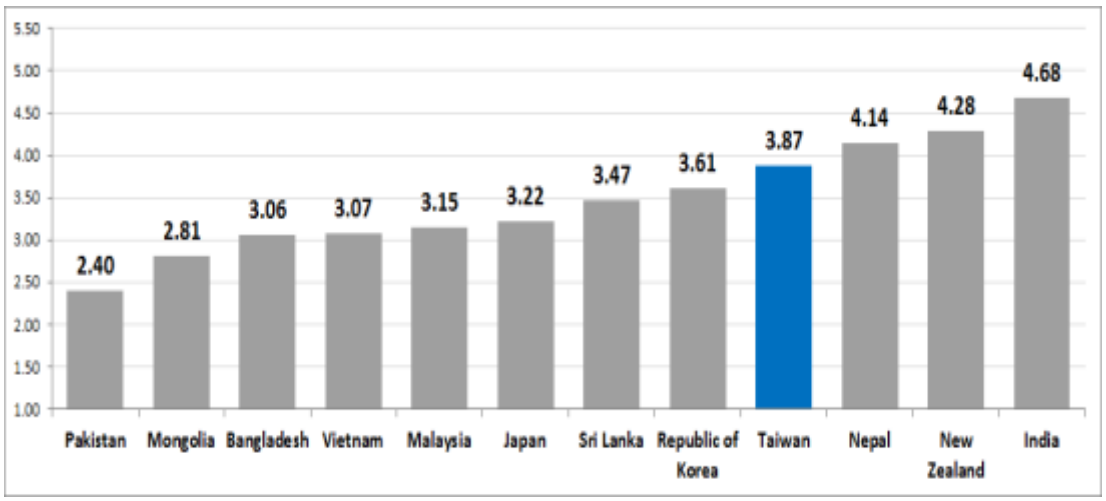
* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role beliefs, a higher score translates into a more progressive attitude toward gender roles. Figure 4-82 compares attitudes toward gender roles among the respondents in Taiwan and among respondents from the other countries. The average score in the sub-scale of gender role ideology was 3.87 out of 5, above the median level. Relatively speaking, the respondents in Taiwan had the fourth most progressive attitude toward gender roles, following India, New Zealand, and Nepal.

<Figure 4-82. Average of Taiwan & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

Table 4-91 provides the results of ANOVA whether gender role ideology varies depending on the personal variables of the Taiwanese respondents. Except for occupation, variables such as age, marital status, number of children and career interruption did not produce a significant difference. By age, those in their 20s and 30s tended to be more progressive than those in their 40s and 50s. Also with marital status, the single respondents proved more progressive than the married or the other group. A significant difference was found with the variable of occupation. Engineers (4.33) were most progressive toward gender roles, followed by researchers (4.29), teachers/professors (3.91), students (3.86), and healthcare/medical professionals (3.44) ($F=2.736$, $p\leq.025$).

<Table 4-91. Gender role stereotypes of Taiwan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	79	3.87			
Age					
29 or below	25	4.00	0.69	.559	.644
30~39	13	4.00	1.07		
40~49	10	3.75	0.89		
50 or above	31	3.75	0.87		
Marital status					
Single	35	4.12	0.72	3.121	.050
Married	38	3.70	0.95		
Other	6	3.46	0.40		
No. of children					
None	50	3.93	0.81	1.631	.189
1	4	4.38	1.09		
2	17	3.82	0.79		
3 or above	8	3.34	1.03		
Occupation					
Student	21	3.86	0.65	2.735	.025
Teacher/professor	24	3.91	0.84		
Researcher	13	4.29	0.53		
Medical personnel	4	3.44	1.14		
Engineer	6	4.33	0.58		
Other	11	3.23	1.18		
Duration of career break					
None	53	3.89	0.85	.150	.963
Less than 1 year	4	3.69	0.94		
1~2 years	6	4.08	0.98		
2~3 years	4	3.88	1.05		
3 years or more	10	3.80	0.90		

* Higher score means more progressive

Career prospects

Table 4-92 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Taiwanese respondents. The difference by age showed that those in their 40s and 50s held more optimistic views as to career prospects than younger respondents; however, the difference was not significant. The results examined by marital status, number of children, and occupation were not statistically significant, either. However, the average score obtained by healthcare/medical professionals and engineers implies their optimistic view to career prospects, while students and researchers were relatively less optimistic. Lastly, the difference by the duration of career interruption was not significant.

<Table 4-92. Career outlook of Taiwan : Demographic differences>

(unit: person, points)

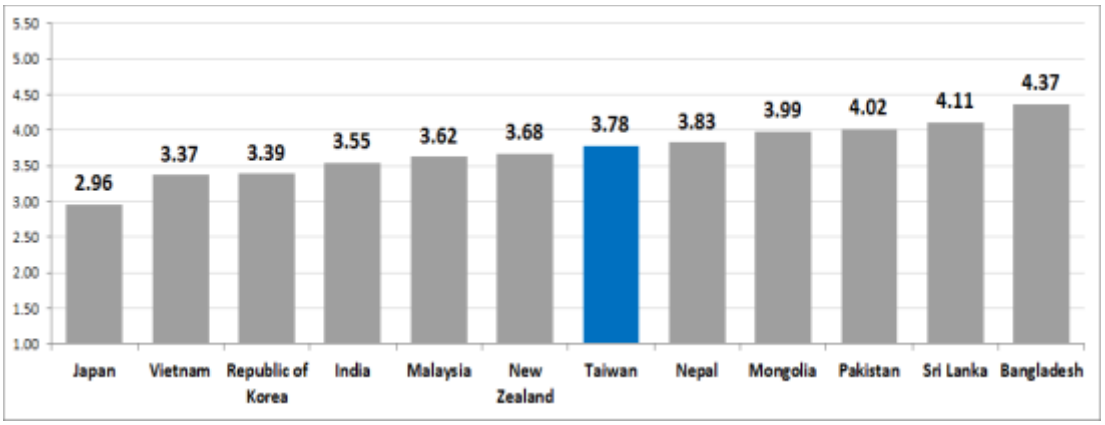
Classifications	Cases	Average	SD	F	*p*
Total	79	3.78			
Age					
29 or below	25	3.60	1.08	.446	.721
30~39	13	3.77	1.17		
40~49	10	3.90	0.99		
50 or above	31	3.90	0.94		
Marital status					
Single	35	3.63	1.19	1.881	.159
Married	38	4.00	0.84		
Other	6	3.33	0.82		
No. of children					
None	50	3.68	1.06	1.398	.250
1	4	4.25	0.96		
2	17	3.71	0.92		
3 or above	8	4.38	0.92		
Occupation					
Student	21	3.52	1.12	.877	.501
Teacher/professor	24	3.88	1.03		
Researcher	13	3.54	0.88		
Medical personnel	4	4.00	0.82		
Engineer	6	4.00	1.10		
Other	11	4.18	0.98		
Duration of career break					
None	53	3.72	1.06	.578	.680
Less than 1 year	4	4.25	0.96		
1~2 years	6	3.67	0.82		
2~3 years	4	4.25	0.50		
3 years or more	10	4.00	1.15		

* Higher score means a more positive outlook

As can be seen in Figure 4-83, the respondents in Taiwan demonstrated relative optimism about their career prospects, with an average score of 3.78. This puts the country in sixth place, following Bangladesh, Sri Lanka, Pakistan, Mongolia, and Nepal.

<Figure 4-83. Average of Taiwan & others on Career outlook>

(unit: points)



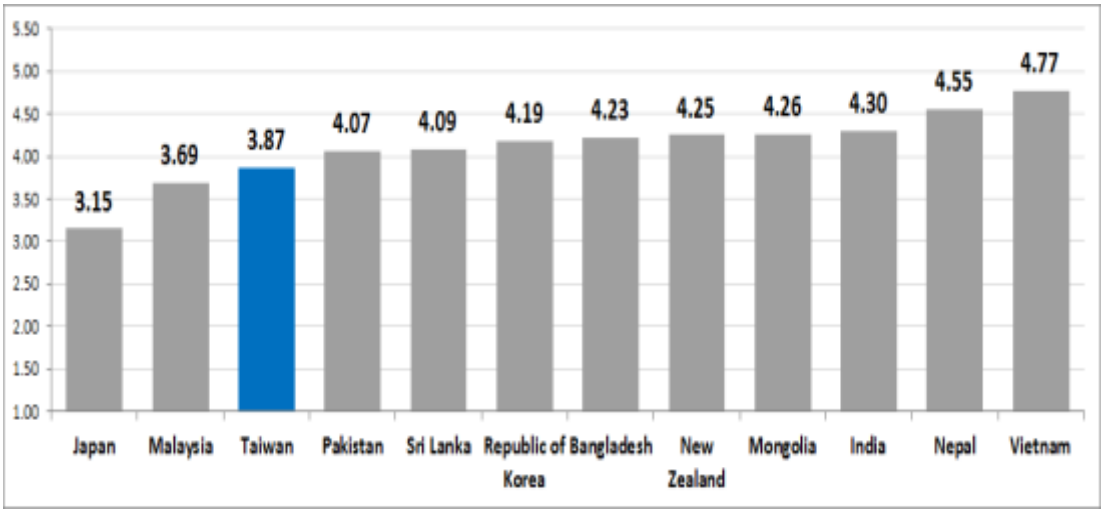
* Higher score means a more positive outlook

Policy demand

As can be seen in Figure 4-84, the average score of the scientists and engineers in Taiwan was 3.87 out of 5, which places the country in the third lowest rank after Japan and Malaysia.

<Figure 4-84. Average of Taiwan & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

Table 4-93 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Taiwanese respondents. With regard to policy demand, no statistical significance was found for any of the personal variables such as age, marital status, number of children, occupation, and the length of career interruption. By occupation, the average was highest among healthcare/medical professionals and lowest among students; however, the difference was not significant. This was also the case with career interruption: those with no interruption or interruption of less than one year had higher policy demand than the other respondents; however, the difference did not reach statistical significance.

<Table 4-93. Policy needs of Taiwan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	79	3.87			
Age					
29 or below	25	3.80	1.08	.113	.953
30~39	13	4.00	1.22		
40~49	10	3.80	0.92		
50 or above	31	3.90	1.16		
Marital status					
Single	35	3.89	1.13	.804	.451
Married	38	3.95	0.90		
Other	6	3.33	1.97		
No. of children					
None	50	3.84	1.22	.178	.911
1	4	4.00	0.82		
2	17	3.82	0.95		
3 or above	8	4.13	0.83		
Occupation					
Student	21	3.76	1.14	.204	.960
Teacher/professor	24	3.79	1.14		
Researcher	13	4.00	1.41		
Medical personnel	4	4.25	0.96		
Engineer	6	4.00	0.63		
Other	11	3.91	0.94		
Duration of career break					
None	53	4.06	1.12	1.116	.356
Less than 1 year	4	4.00	1.15		
1~2 years	6	3.50	1.22		
2~3 years	4	3.50	0.58		
3 years or more	10	3.40	1.07		

* Higher score means higher needs for policy support

Gender equality

As can be seen in Figure 4-85, the participants in Taiwan had a greater tendency to believe that full gender equality would be realized once women were granted an equal opportunity (average of 2.24; a lower score represents stronger agreement). This ranks the country in fifth place after Japan, Korea, Sri Lanka, and Malaysia.

<Table 4-94. Equality concept of Taiwan : Demographic differences>

(unit: person, points)

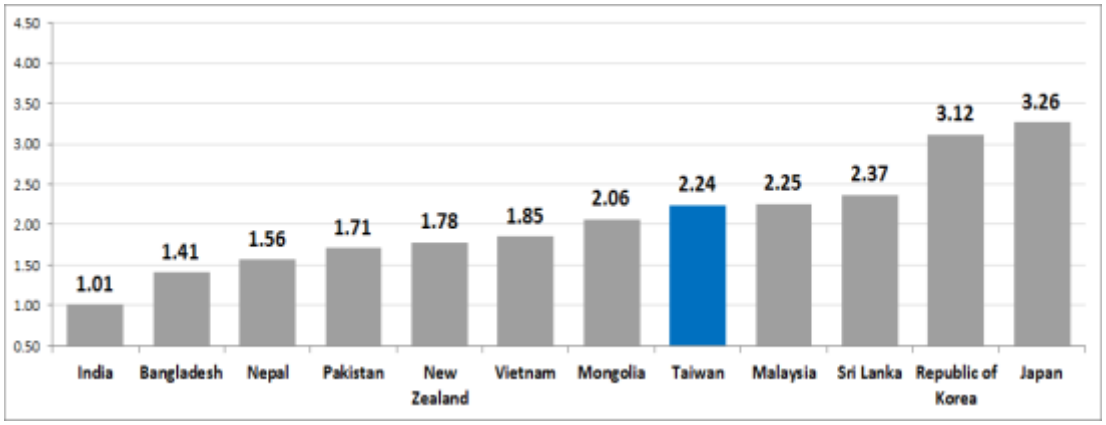
Classifications	Cases	Average	SD	F	*p*
Total	79	2.24			
Age					
29 or below	25	2.28	1.02	.225	.879
30~39	13	2.38	1.50		
40~49	10	2.00	1.05		
50 or above	31	2.23	1.12		
Marital status					
Single	35	2.23	1.24	.465	.630
Married	38	2.18	0.98		
Other	6	2.67	1.51		
No. of children					
None	50	2.32	1.22	.746	.528
1	4	1.50	1.00		
2	17	2.12	0.99		
3 or above	8	2.38	0.92		
Occupation					
Student	21	2.43	1.12	.551	.737
Teacher/professor	24	2.29	1.16		
Researcher	13	2.31	1.44		
Medical personnel	4	1.50	0.58		
Engineer	6	2.00	0.63		
Other	11	2.09	1.14		
Duration of career break					
None	53	2.30	1.23	.404	.805
Less than 1 year	4	1.75	0.96		
1~2 years	6	2.33	1.03		
2~3 years	4	1.75	0.50		
3 years or more	10	2.20	1.03		

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Taiwan to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-94). First, such a belief did not prove to be correlated to the respondents' age. No significant difference was observed for the average scores by marital status. The difference according to the number of children and duration of career interruption was not significant, either. By occupation,

the concept of equal opportunity was accepted most by healthcare/medical professionals and least by students; however, the difference was not statistically significant.

<Figure 4-85. Average of Taiwan & others on Equality concept>

(unit: points)



4.4.10 Pakistan

4.4.10.1 Respondent profile

A total of 102 participants responded to the survey in Pakistan (see Table 4-95). Most respondents were in their 20s (47.1%), followed by 30s (37.3%), 50s (8.8%), and 40s (6.9%). By marital status, the single respondents accounted for 40.2%, the married for 56.9%, and the other group for 2.9%. In terms of the number of children, most participants did not have children (54.9%), followed by those with one child (19.6%), two children (16.7%), and three or more children (8.8%). By occupation, most were teachers/professors (43.1%), followed by researchers (16.7%), engineers (15.7%), and the other group (10.8%; students and healthcare/medical students accounted for the smallest share (6.9% each). Those without any career interruption accounted for 54.9%, followed by those experiencing interruption for less than one year and one to two years (13.7% each), two to three years (9.8%), and three years or longer (7.8%).

4.4.10.2 Difference of gender barriers in Pakistan and other countries: Overview

Table 4-96 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Pakistan with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.64 in Pakistan, showing a significant difference from the score of 2.59 among the other 11 countries (a lower score is translated as a stronger perception of discriminatory reality). We analyzed each of the four questions included in this sub-scale. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Pakistan demonstrated more agreement with a significantly lower average of 2.11, compared with the average (2.49)

of the other countries (t=-3.564, p≤.001.). Conversely, Pakistani women showed no significant difference, compared with their counterparts in the other countries, for the statement “Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields.” Also, for the statement “Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers,” the Pakistani respondents did not produce a significant difference from the other countries. Lastly, regarding the statement “Women receive less wages for the same work than men,” women in Pakistan agreed less strongly (3.32) compared with the respondents in the other countries (2.90), showing a significant difference (t=3.159, p≤.002).

<Table 4-95. Profile of participants from Pakistan>

(unit: person, %)

Classifications	N	%
Age		
29 or below	48	47.1
30~39	38	37.3
40~49	7	6.9
50 or above	9	8.8
Marital status		
Single	41	40.2
Married	58	56.9
Other	3	2.9
No. of children		
None	56	54.9
1	20	19.6
2	17	16.7
3 or above	9	8.8
Occupation		
Student	7	6.9
Teacher/professor	44	43.1
Researcher	17	16.7
Medical personnel	7	6.9
Engineer	16	15.7
Other	11	10.8
Duration of career break		
None	56	54.9
Less than 1 year	14	13.7
1~2 years	14	13.7
2~3 years	10	9.8
3 years or more	8	7.8

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Pakistan with that experienced by respondents in the other countries, the average score in Pakistan was 3.31, significantly lower than the

average of 3.03 in the other countries (lower scores represent more experience of discrimination). We examined the differences for each of the four questions constituting this sub-scale. First, between the Pakistani respondents and those in the other countries, no significant difference was found with respect to experiencing more difficulty as women in participating in research projects or becoming research managers. However, women in Pakistan reported significantly less experience of disadvantage of winning research grants or scholarships (3.60 versus 3.29) ($t=2.419$, $p\leq.016$). The experience of sexual harassment or other disadvantage at work was reported significantly less by the Pakistani respondents (3.60) than by the other participants in the survey (3.28) ($t=2.273$, $p\leq.023$). Lastly, the experience of having work-life balance as a handicap showed no significant difference.

With respect to the sub-scale of gender role ideology (higher scores refer to more progressive attitudes), the respondents in Pakistan had an average score of 2.40, representing a relatively conservative attitude. This demonstrates a significantly more conservative attitude compared with the average of 3.48 in the other countries ($t=-10.501$, $p\leq.000$). The scientists and engineers surveyed in Pakistan expressed a relatively more conservative attitude toward gender roles in all of the four questions included in this sub-scale. First, the Pakistani respondents (2.32) agreed more with the statement that men are bread-winners of a household, compared with women in the other countries (3.65) ($t=-9.931$, $p\leq.000$). They (1.93) expressed relatively stronger agreement with the idea that women have an inherent ability to take care of babies than the others (3.45) ($t=-13.395$, $p\leq.000$). In addition, the Pakistani women (2.95) agreed more than the others (3.84) with the idea that husbands should have more power and authority than their wives to maintain peace within the family ($t=-6.649$, $p\leq.000$). Lastly, with regard to the statement that men and women should have respectively suitable jobs since men are rational and women emotional, the Pakistani women (2.41) were more conservative than the respondents in the other countries (2.96) ($t=-4.367$, $p\leq.000$).

The average score in Pakistan for career prospects were 4.02 out of 5, which is significantly higher than the average of 3.67 in the 11 other countries ($t=3.233$, $p\leq.001$). We examined whether Pakistan had a different attitude toward policy demand to address the problem of gender inequality in the STEM areas. As a result, we observed an almost similar result to that found in the other countries. Lastly, regarding the concept of equality, the Pakistani respondents (1.71) tended to believe, significantly more than the others (2.16), that equal opportunity was a sufficient factor of gender equality ($t=-5.444$, $p\leq.000$).

Figure 4-86 illustrates the overall difference in perception of gender barriers between the respondents in Pakistan and those in the other countries.

<Table 4-96. Gap between Pakistan & others on gender barriers

(unit: points)

Item		Pakistan (n=94)	Except Pakistan (n=1,285)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.11	2.49	-3.564	.001
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.48	2.51	-.290	.773
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.66	2.49	1.299	.194
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	3.32	2.90	3.159	.002
	Sub-scales	2.64	2.59	.605	.547
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.23	2.98	1.899	.058
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.60	3.29	2.419	.016
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.60	3.28	2.273	.023
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.81	2.58	1.840	.066
	Sub-scales	3.31	3.03	3.087	.002
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	2.32	3.65	-9.931	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	1.93	3.45	-13.395	.000
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	2.95	3.84	-6.649	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.41	2.96	-4.367	.000
	Sub-scales	2.40	3.48	-10.501	.000
Career outlook	13. I believe things will turn out fine in my future career.	4.02	3.67	3.233	.001
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.07	4.07	-.018	.986
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.71	2.16	-5.444	.000

* Perception of discrimination : Lower score means higher perception of discrimination

* Experience of discrimination : Lower score means more discrimination experienced

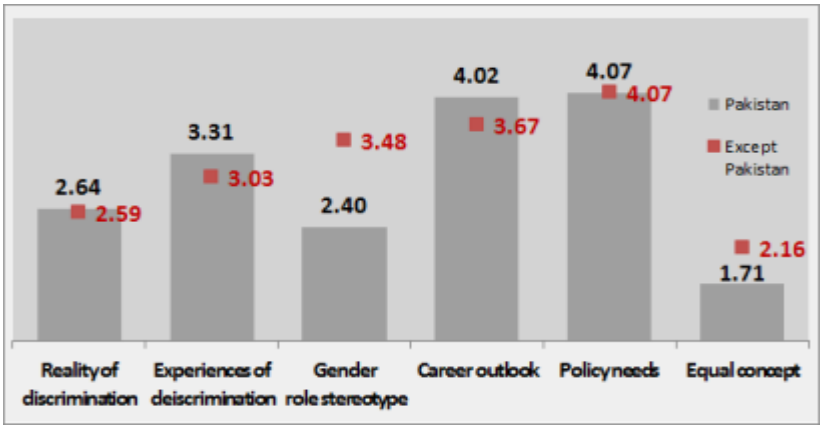
* Gender role stereotypes : Higher score means more progressive

* Career outlook : Higher score means a more positive outlook

* Policy needs : Higher score means higher needs for policy support

<Figure 4-86. Gap between Pakistan & others on gender barriers>

(Unit: Points)



4.4.10.3 Analysis of individual questions

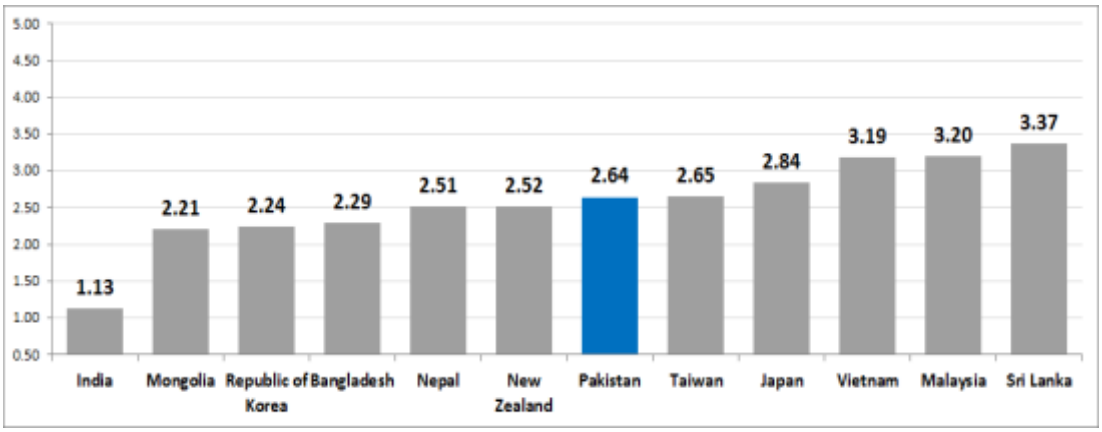
Here, we will examine the gender barriers perceived by women scientists and engineers in Pakistan according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of Discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Figure 4-87 compares the perception of a discriminatory reality by the respondents in Pakistan and by those from the other countries. The level of perception of gender discrimination in Pakistan society had a score of 2.64, ranking sixth lowest after Sri Lanka, Malaysia, Vietnam, Japan, and Taiwan.

<Figure 4-87. Average of Pakistan & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Table 4-97 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Pakistani respondents. No significant difference was observed in terms of age, marital status, and the number of children. By occupation, the perception of discriminatory reality was highest among engineers and lowest among healthcare/medical professionals; however, the difference was not of statistical significance. The difference depending on the duration of career interruption was not significant, either.

<Table 4-97. Perception of discrimination of Pakistan: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	102	2.64			
Age					
29 or below	48	2.71	0.72	.321	.810
30~39	38	2.55	0.87		
40~49	7	2.71	0.55		
50 or above	9	2.61	0.64		
Marital status					
Single	41	2.73	0.76	1.175	.313
Married	58	2.61	0.75		
Other	3	2.08	0.76		
No. of children					
None	56	2.66	0.72	1.364	.258
1	20	2.43	0.70		
2	17	2.91	0.86		
3 or above	9	2.53	0.81		
Occupation					
Student	7	2.39	0.75	2.241	.056
Teacher/professor	44	2.70	0.76		
Researcher	17	2.50	0.74		
Medical personnel	7	3.32	0.72		
Engineer	16	2.33	0.68		
Other	11	2.80	0.70		
Duration of career break					
None	56	2.75	0.73	1.824	.130
Less than 1 year	14	2.70	0.87		
1~2 years	14	2.30	0.64		
2~3 years	10	2.28	0.70		
3 years or more	8	2.88	0.81		

* Lower score means higher perception of discrimination

Discriminatory experience

For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-98 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Pakistani respondents.

<Table 4-98. Experience of discrimination of Pakistan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	102	3.31			
Age					
29 or below	48	3.48	0.79	1.825	.148
30~39	38	3.09	0.76		
40~49	7	3.18	0.59		
50 or above	9	3.39	1.07		
Marital status					
Single	41	3.43	0.87	1.055	.352
Married	58	3.24	0.75		
Other	3	2.92	0.95		
No. of children					
None	56	3.38	0.82	.429	.733
1	20	3.18	0.77		
2	17	3.21	0.82		
3 or above	9	3.36	0.77		
Occupation					
Student	7	3.57	0.94	1.927	.097
Teacher/professor	44	3.36	0.61		
Researcher	17	3.28	0.97		
Medical personnel	7	3.71	0.64		
Engineer	16	2.81	0.88		
Other	11	3.45	0.93		
Duration of career break					
None	56	3.44	0.84	1.741	.147
Less than 1 year	14	3.41	0.66		
1~2 years	14	3.18	0.65		
2~3 years	10	3.08	0.47		
3 years or more	8	2.75	1.10		

* Lower score means more discrimination experienced

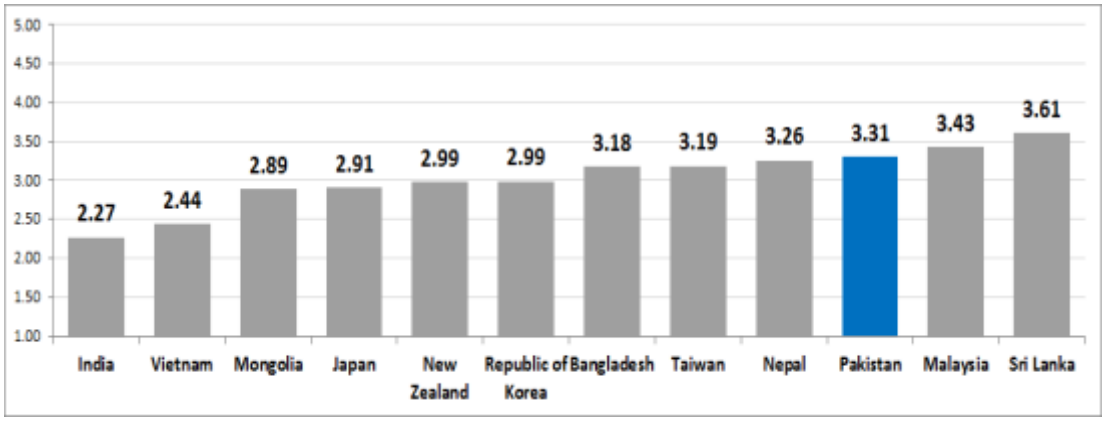
No notable difference was found in terms of age. By marital status, whereas the single respondents reported slightly less experience of discrimination than the married and the other group; however, the difference was not significant. No statistical significance was observed in differences according to the number of children. By occupation, discriminatory experience was reported most by engineers, least by

healthcare/medical professionals; however, the difference was not significant. Further, although a longer duration of career interruption was associated with a higher tendency of experiencing discrimination, the difference did reach the statistical significance level.

The average score in Pakistan for this sub-scale (3.31) was below the median level (see Figure 4-88). This leaves the country in third lowest place after Sri Lanka and Malaysia.

<Figure 4-88. Average of Pakistan & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

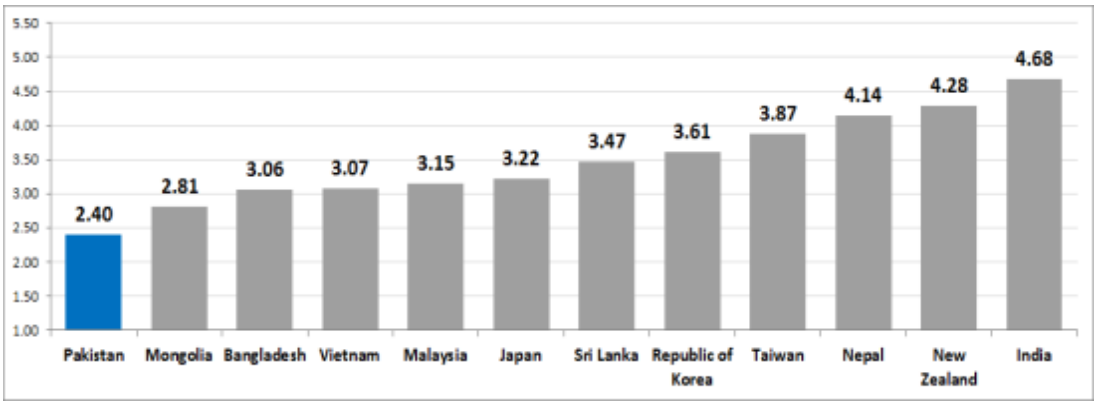
Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Figure 4-89 compares attitudes toward gender roles among the respondents in Pakistan and among respondents from the other countries. The average score for the sub-scale of gender role beliefs was 2.40 out of, indicating a relatively more conservative attitude. Indeed, the Pakistani respondents demonstrated the most conservative attitude among all 12 countries.

Table 4-99 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Pakistani respondents. No significant difference was found in terms of age, marital status, number of children, occupation, and the length of career interruption. By marital status, the single respondents tended to be more progressive than the married; however, the difference was not significant. By occupation, healthcare/medical professionals proved most conservative, and students most progressive; however, the difference was not significant.

<Figure 4-89. Average of Pakistan & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

<Table 4-99. Gender role stereotypes of Pakistan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	102	2.40			
Age					
29 or below	48	2.59	0.93	1.460	.230
30~39	38	2.17	0.82		
40~49	7	2.36	1.16		
50 or above	9	2.42	1.22		
Marital status					
Single	41	2.51	0.84	.600	.551
Married	58	2.35	1.02		
Other	3	2.00	0.43		
No. of children					
None	56	2.46	0.88	.324	.808
1	20	2.45	0.98		
2	17	2.21	0.96		
3 or above	9	2.36	1.24		
Occupation					
Student	7	2.57	0.84	1.753	.130
Teacher/professor	44	2.49	0.89		
Researcher	17	2.72	0.99		
Medical personnel	7	1.79	0.85		
Engineer	16	2.34	0.97		
Other	11	1.93	0.96		
Duration of career break					
None	56	2.46	0.89	.657	.623
Less than 1 year	14	2.46	0.93		
1~2 years	14	2.45	0.86		
2~3 years	10	1.95	0.95		
3 years or more	8	2.38	1.43		

* Higher score means more progressive

Career prospects

Table 4-100 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Pakistani respondents. Age did not produce a significant difference. Whereas the single respondents held a relatively more optimistic view regarding career prospects than the married and the other group; the difference was not significant. By occupation, students were most optimistic, and teachers/professors held the least optimistic view, but once again the difference was not significant enough. Lastly, the difference in terms of the length of career interruption was not significant, either.

<Table 4-100. Career outlook of Pakistan : Demographic differences>

(unit: person, points)

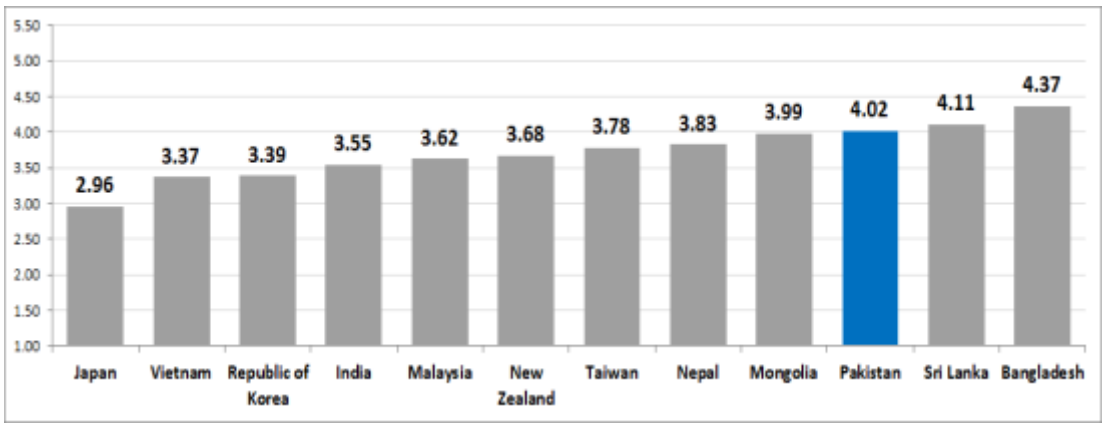
Classifications	Cases	Average	SD	F	*p*
Total	102	4.02			
Age					
29 or below	48	4.15	1.03	1.633	.187
30~39	37	3.92	1.06		
40~49	7	4.43	0.79		
50 or above	9	3.44	1.13		
Marital status					
Single	41	4.07	1.15	.088	.916
Married	57	3.98	1.01		
Other	3	4.00	0.00		
No. of children					
None	56	4.11	1.06	.346	.792
1	20	3.85	1.09		
2	16	4.00	1.10		
3 or above	9	3.89	0.93		
Occupation					
Student	7	4.71	0.76	1.402	.231
Teacher/professor	43	3.84	1.13		
Researcher	17	3.88	1.17		
Medical personnel	7	4.57	0.53		
Engineer	16	4.00	0.97		
Other	11	4.18	0.87		
Duration of career break					
None	56	4.07	1.13	.183	.947
Less than 1 year	14	3.93	0.83		
1~2 years	14	4.07	1.27		
2~3 years	9	3.78	0.97		
3 years or more	8	4.00	0.53		

* Higher score means a more positive outlook

As can be seen in Figure 4-90, the respondents in Pakistan demonstrated relative optimism about their career prospects, with an average score of 4.02. This puts the country in third place, following Bangladesh, and Sri Lanka.

<Figure 4-90. Average of Pakistan & others on Career outlook>

(unit: points)



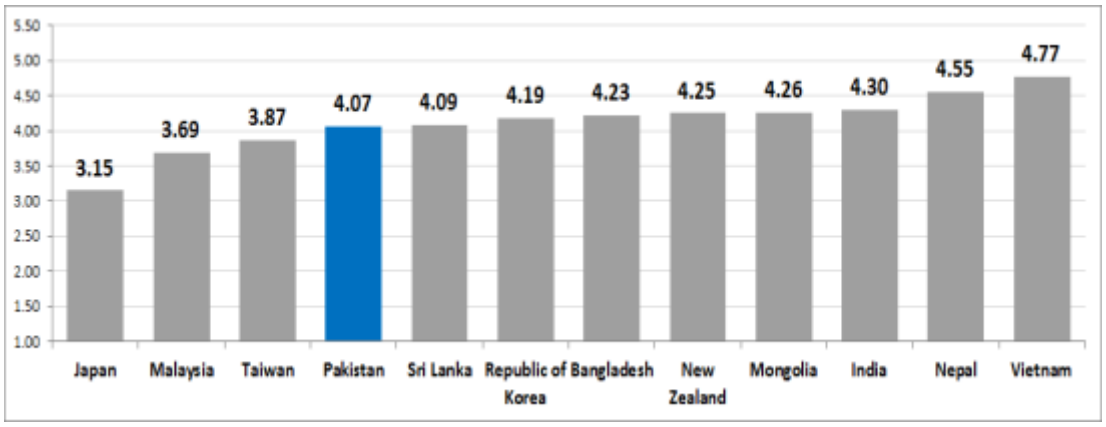
* Higher score means a more positive outlook

Policy demand

As can be seen in Figure 4-91, the average score in Pakistan for policy demand was 4.07 out of 5, but the score was still fourth lowest after Japan, Malaysia, and Taiwan.

<Figure 4-91. Average of Pakistan & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

Table 4-101 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Pakistani respondents. No statistical significance was observed in relation to policy demand in terms of any personal variables such as age, marital status, number of children, occupation, and duration of career

interruption. By marital status, the single respondents had less policy demand than the married and the other group; however, the difference was not significant. By occupation, the average score was highest among engineers (except for the other group), and lowest among teachers/professors, but once again the difference was not significant enough. This was also the case with career interruption: those without any interruption or interruption of less than one year had less policy demand than the remaining groups; however, the difference did reach statistical significance.

<Table 4-101. Policy needs of Pakistan : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	102	4.07			
Age					
29 or below	48	4.13	1.00	.474	.701
30~39	38	3.92	1.17		
40~49	7	4.29	0.76		
50 or above	9	4.22	0.67		
Marital status					
Single	41	3.80	1.17	2.606	.079
Married	58	4.22	0.90		
Other	3	4.67	0.58		
No. of children					
None	56	3.95	1.17	.640	.591
1	20	4.15	1.04		
2	17	4.29	0.69		
3 or above	9	4.22	0.44		
Occupation					
Student	7	4.29	0.95	.853	.516
Teacher/professor	44	3.93	1.07		
Researcher	17	4.00	1.12		
Medical personnel	7	4.14	1.07		
Engineer	16	4.50	0.89		
Other	11	3.91	0.94		
Duration of career break					
None	56	3.93	1.13	.852	.496
Less than 1 year	14	4.00	1.18		
1~2 years	14	4.36	0.63		
2~3 years	10	4.30	0.95		
3 years or more	8	4.38	0.52		

* Higher score means higher needs for policy support

Gender equality

As can be seen in Figure 4-92, the tendency to believe that full gender equality would be realized once women were granted equal opportunity was relatively strong among the Pakistani women (average of 1.71; a lower score represents stronger agreement). This ranks the country in fourth place after India, Bangladesh, and Nepal.

<Table 4-102. Equality concept of Pakistan : Demographic differences>

(unit: person, points)

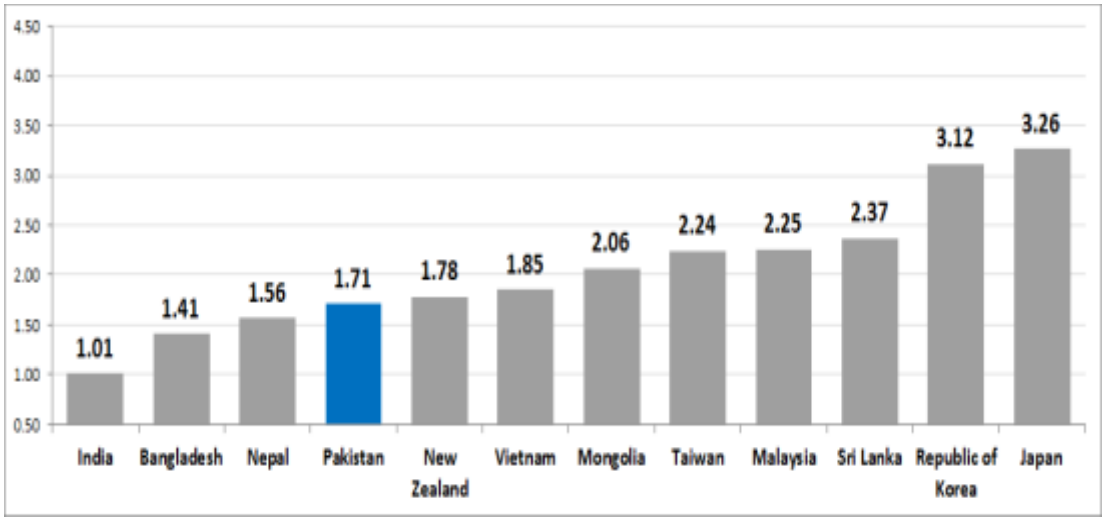
Classifications	Cases	Average	SD	F	*p*
Total	102	1.71			
Age					
29 or below	48	1.63	0.73	.943	.423
30~39	38	1.68	0.87		
40~49	7	2.00	0.82		
50 or above	9	2.00	0.50		
Marital status					
Single	41	1.73	0.78	.038	.962
Married	58	1.69	0.80		
Other	3	1.67	0.58		
No. of children					
None	56	1.68	0.77	1.111	.348
1	20	1.55	0.69		
2	17	2.00	1.00		
3 or above	9	1.67	0.50		
Occupation					
Student	7	1.71	0.76	1.657	.153
Teacher/professor	44	1.75	0.84		
Researcher	17	2.06	0.66		
Medical personnel	7	1.57	1.13		
Engineer	16	1.31	0.48		
Other	11	1.64	0.67		
Duration of career break					
None	56	1.66	0.77	.582	.676
Less than 1 year	14	1.64	0.74		
1~2 years	14	2.00	0.88		
2~3 years	10	1.70	0.95		
3 years or more	8	1.63	0.52		

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Pakistan to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-102). As a result of analysis of such a belief by age, those in their 20s and 30s tended more to believe that equal opportunity was sufficient than those in their 40s and 50s; however, the difference was not statistically significant. No significant difference was observed in terms of marital status, as was the case with the number of children and duration of career interruption.

By occupation, the concept of equal opportunity was accepted most by engineers and least by researchers; however, the difference was not statistically significant.

<Figure 4-92. Average of Pakistan & others on Equality concept>

(unit: points)



4.4.11 Republic of Korea

4.4.11.1 Respondent profile

A total of 135 respondents participated in the survey in Korea. Table 4-103 demonstrates the respondent profile in the nation. The respondents were evenly distributed in all age groups: Those in their 20s accounted for 15.6%, 30s for 26.73%, 40s for 28.1%, and 50s for 19.6%. The average age was 42.59. By marital status, the single respondents accounted for 37%, the married for 61.5%, and the other for 1.5%. The respondents without children accounted for 40.7%; those with one or two children accounted for 26.7% each, and 5.2% of the respondents had three or more children.

By occupation, a majority was researchers (49.6%, followed by teachers/professors (31.9%), the other (6.7%), students (5.9%), engineers (4.4%), and healthcare/medical professionals (0.7%). This shows that, compared with the other countries, Korea had a small rate of engineers and healthcare/medical professionals. In the meantime, those without any career interruption occupied the largest share (54.1%), followed by those with interruption of one to two years (17.0%), those with less than one year of interruption (12.6%); those with two to three years of interruption and three or more years accounted for 7.4% each.

<Table 4-103. Profile of participants from Republic of Korea>

(unit: person, %)

Classifications	N	%
Age		
29 or below	21	15.6
30~39	36	26.7
40~49	38	28.1
50 or above	40	29.6
Marital status		
Single	50	37.0
Married	83	61.5
Other	2	1.5
No. of children		
None	55	40.7
1	36	26.7
2	36	26.7
3 or above	7	5.2
Occupation		
Student	8	5.9
Teacher/professor	43	31.9
Researcher	67	49.6
Medical personnel	1	.7
Engineer	6	4.4
Other	9	6.7
Duration of career break		
None	73	54.1
Less than 1 year	17	12.6
1~2 years	23	17.0
2~3 years	10	7.4
3 years or more	10	7.4

4.4.11.2 Difference of gender barriers in Korea and other countries: Overview

Table 4-104 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in South Korea with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.24 in Korea, showing a significant difference from the score of 2.64 among the other 11 countries ($t=-3.564$, $p\leq.001$). A lower score refers to a higher perception of discriminatory reality. We analyzed each of the four questions included in this sub-scale. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Korea (2.42) demonstrated no meaningful difference from the respondents from other countries (2.47). Conversely, Korean women more strongly agreed (2.03), compared with their counterparts in the other countries (2.56), with the statement “Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields.” This significant difference indicates that the respondents in Korea

strongly assented to the idea that discrimination existed (t=-6.259, p≤.000).

For the statement “Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers,” the Korean respondents (1.94) revealed a significantly stronger perception than in other countries (2.57). Lastly, regarding the statement “Women receive less wages for the same work than men,” women in Korea more strongly agreed (2.57) compared with the respondents in the other countries (2.97), resulting in a significant difference (t=-3.332, p≤.001).

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Korea with that experienced by respondents in the other countries, unlike the perception of a discriminatory reality, experience of discrimination among the Korean respondents was not significantly different from those in the other countries. We examined the differences for each of the four questions constituting this scale. To begin with, no significant difference was observed between Koreans and women in the other 11 countries, with regard to the experience of difficulty in participating in research projects or becoming research managers. In addition, no notable difference was found in terms of the experience of advantage in winning research grants or scholarships. On the other hand, experience of sexual harassment or other unfair treatment at work was significantly more reported by the Korean respondents (2.86) than by the others (3.35) (t=-4.350, p≤.000). Lastly, the experience of having work-life balance as a handicap showed no significant difference.

For the sub-scale of gender role belief, a higher score represents more progressive attitude. The average score obtained by the survey respondents in Korea was 3.61, representing more progressiveness than the median level. This is significantly higher than the average of 3.37 in the other countries (t=3.138, p≤.001). We examined each of the four questions constituting this sub-scale. First, the Korean women (4.09) tended to be more progressive than those in the other countries (3.39) regarding the statement that men are bread-winners of a household (t=7.132, p≤.000). Conversely, for the idea that women have an inherent ability to take care of babies, the Koreans (2.79) proved significantly more conservative than the others (3.40) (t=-5.051, p≤.000).

In the meantime, the Korean respondents (4.18) tended to be more progressive than the others (3.74) with respect to the idea that husbands should have more power and authority than their wives to maintain peace within the family (t=4.762, p≤.000). Lastly, the Koreans (3.38) were more progressive than the others (2.87) about the statement that men and women should have respectively suitable jobs since men are rational and women emotional (t=4.065, p≤.000).

<Table 4-104. Gap between Republic of Korea & others on gender barriers>

(unit: points)

Item		Republic of Korea (n=94)	Except Republic of Korea (n=1,285)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.42	2.47	-.465	.643
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.03	2.56	-6.259	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	1.94	2.57	-6.901	.000
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.57	2.97	-3.332	.001
	Sub-scales	2.24	2.64	-5.951	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.07	2.99	.755	.451
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.46	3.30	1.646	.102
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	2.86	3.35	-4.350	.000
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.56	2.61	-.510	.611
	Sub-scales	2.99	3.06	-.954	.340
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	4.09	3.49	7.132	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	2.79	3.40	-5.051	.000
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	4.18	3.74	4.762	.000
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	3.38	2.87	4.065	.000
	Sub-scales	3.61	3.37	3.138	.002
Career outlook	13. I believe things will turn out fine in my future career.	3.39	3.73	-3.679	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.19	4.06	1.564	.119
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	3.12	2.02	11.003	.000

* Perception of discrimination : Lower score means higher perception of discrimination

* Experience of discrimination : Lower score means more discrimination experienced

* Gender role stereotypes : Higher score means more progressive

* Career outlook : Higher score means a more positive outlook

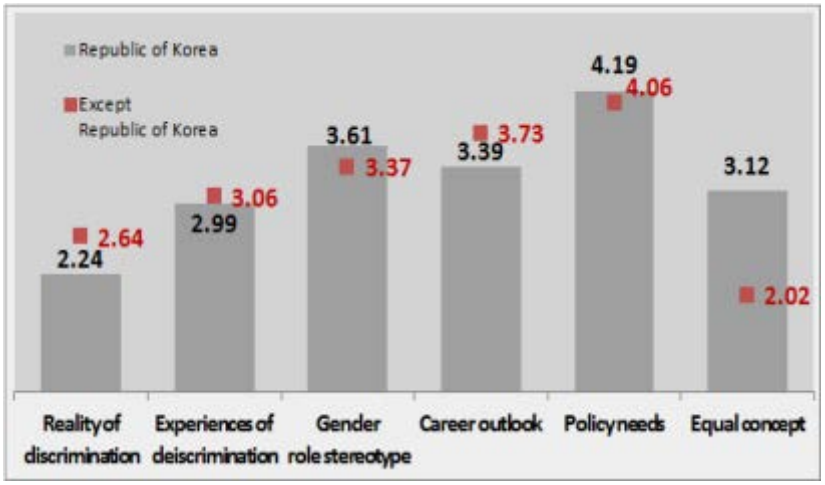
* Policy needs : Higher score means higher needs for policy support

The average score of the Korean respondents was 3.39 for career prospects, which is slightly above the median level. This is significantly lower than the average of 3.67 in the other 11 countries (t=-3.679, p≤.001). We examined whether Korea had a different attitude toward policy demand to address the problem of gender inequality in the STEM areas. As a result, we observed an almost similar result to that found in the other countries. Lastly, regarding the concept of equality, the Korean respondents (3.12) tended to believe significantly less than the others (2.02) that equal opportunity was a sufficient factor for achieving gender equality (t=11.033, p≤.000).

Figure 4-93 illustrates the overall difference in perception of gender barriers between the respondents in Korea and those in the other countries.

Figure 4-93. Gap between Republic of Korea & others on gender barriers

(Unit: Points)



4.4.11.3 Analysis of individual questions

Here, we will examine the gender barriers perceived by women scientists and engineers in Korea according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this scale, a lower score translates into a stronger perception of a discriminatory reality. Table 4-105 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Korean respondents. No significant difference was observed in terms of age and marital status. According to the number of children, the respondents without children or with one child tended to perceive a discriminatory reality less strongly than those with two or more children; however, the

difference was not significant. By occupation, the perception of a discriminatory reality was highest among engineers and lowest among researchers; however, the difference was not of statistical significance. The difference depending on the length of career interruption was not significant, either.

<Table 4-105. Perception of discrimination of Republic of Korea: Demographic differences>

(unit: person, points)

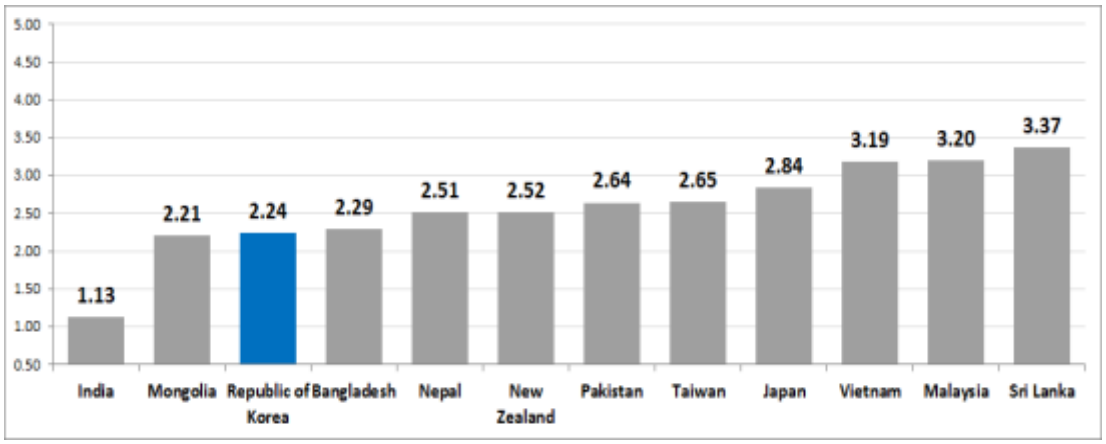
Classifications	Cases	Average	SD	F	*p*
Total	135	2.24			
Age					
29 or below	21	2.24	0.71	.254	.859
30~39	36	2.33	0.77		
40~49	38	2.20	0.69		
50 or above	40	2.20	0.66		
Marital status					
Single	50	2.24	0.74	.032	.969
Married	83	2.25	0.69		
Other	2	2.13	0.18		
No. of children					
None	55	2.28	0.77	.818	.486
1	36	2.30	0.62		
2	36	2.17	0.67		
3 or above	7	1.89	0.78		
Occupation					
Student	8	1.91	0.74	1.622	.159
Teacher/professor	43	2.14	0.69		
Researcher	67	2.39	0.66		
Medical personnel	1	2.25			
Engineer	6	1.83	0.56		
Other	9	2.33	0.92		
Duration of career break					
None	73	2.33	0.80	.918	.456
Less than 1 year	17	2.21	0.63		
1~2 years	23	2.07	0.60		
2~3 years	10	2.30	0.59		
3 years or more	10	2.03	0.36		

* Lower score means higher perception of discrimination

Figure 4-94 compares the perception of a discriminatory reality by the respondents in Korea and by those from the other countries. The level of perception of gender discrimination in society had a score of 2.64, higher than the median level and third highest after India and Mongolia.

<Figure 4-94. Average of Republic of Korea & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Discriminatory experience

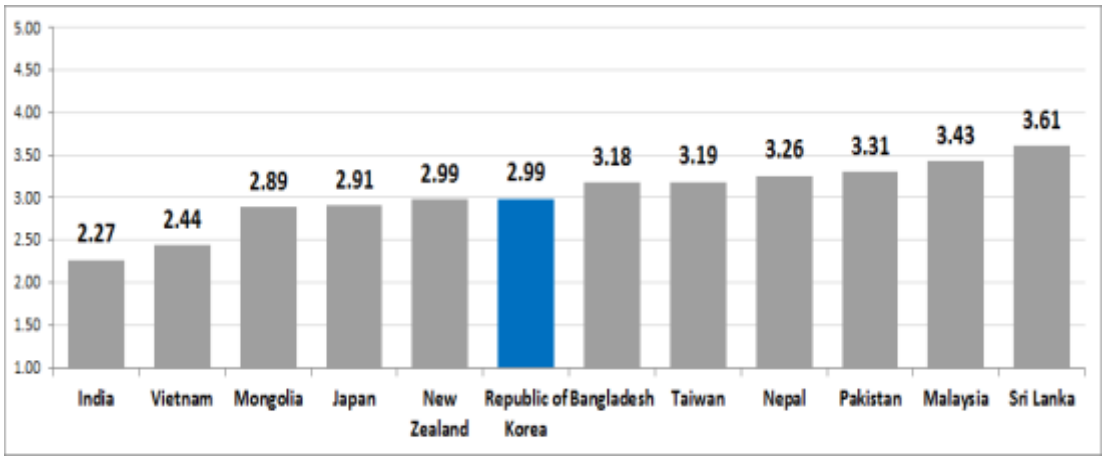
For the sub-scale of discriminatory experience, a lower score represents more experience of gender discrimination. As illustrated in Figure 4-95, the average score of the Korean women (2.99) was around the median level. Experience of discrimination against women ranked Korea in fifth place after India, Vietnam, Mongolia and Japan.

Table 4-106 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Korean respondents. By age, experience of discrimination was reported most by the respondents in their 40s and 50s (2.80 and 2.81, respectively), followed by 30s (3.01), and least by those in their 20s (3.62) ($F=5.902$, $p\leq.001$). By marital status, most discriminatory experience was reported by the other group (1.63), followed by the married (2.89) and single respondents (3.21) ($F=5.444$, $p\leq.005$). Although those with more children tended to report more discriminatory experience, the difference was not statistically significant.

A significant difference was found according to the respondents' occupation. Experience of discrimination was most prevalent among engineers (1.88), followed by healthcare/medical professionals (2.50), (excluding the other group) teachers/professors (2.76), researchers (3.20), and students (3.59) ($F=5.424$, $p\leq.005$). With frequently reported experience of discrimination, the occupations of engineer and healthcare/medical professional in Korea represent the most notable male-dominated areas. In terms of career interruption, more experience of discrimination was reported by those experiencing longer interruptions ($F=3.276$, $p\leq.014$).

<Figure 4-95. Average of Republic of Korea & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

<Table 4-106. Experience of discrimination of Republic of Korea: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	135	2.99			
Age					
29 or below	21	3.62	0.66	5.902	.001
30~39	36	3.01	0.71		
40~49	38	2.80	0.82		
50 or above	40	2.81	0.88		
Marital status					
Single	50	3.21	0.91	5.444	.005
Married	83	2.89	0.74		
Other	2	1.63	0.18		
No. of children					
None	55	3.18	0.94	2.455	.066
1	36	2.97	0.63		
2	36	2.76	0.78		
3 or above	7	2.61	0.75		
Occupation					
Student	8	3.59	0.63	5.424	.000
Teacher/professor	43	2.76	0.85		
Researcher	67	3.20	0.75		
Medical personnel	1	2.50			
Engineer	6	1.88	0.54		
Other	9	2.92	0.59		
Duration of career break					
None	73	3.18	0.91	3.276	.014
Less than 1 year	17	2.96	0.54		
1~2 years	23	2.84	0.69		
2~3 years	10	2.83	0.60		
3 years or more	10	2.28	0.72		

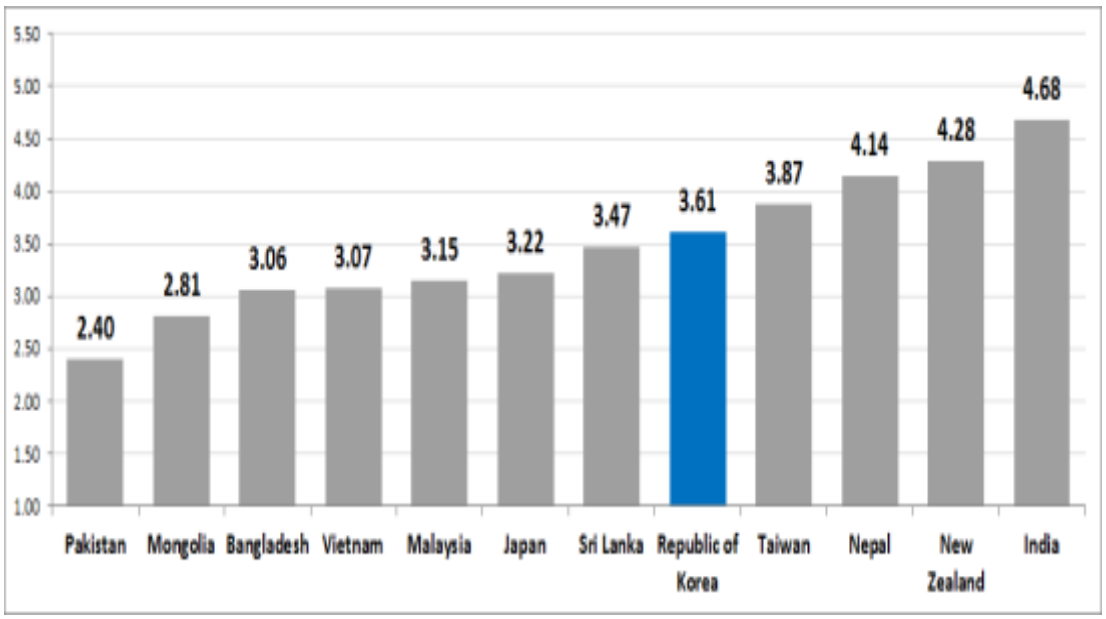
* Lower score means more discrimination experienced

Gender role ideology

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. Table 4-107 provides the results of ANOVA of whether perceived gender role ideology varies depending on the personal variables of the Korean respondents. The difference according to age was significant: the attitude toward gender roles became more conservative among older respondents ($F=3.708$, $p\leq.013$). No significant difference was found for marital status and the number of children. By occupation, students proved relatively most progressive, and (excluding the other group) researchers and teachers/professors were similarly most conservative; however, the difference was not statistically significant. The difference by the duration of career interruption was not significant.

<Figure 4-96. Average of Republic of Korea & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

Figure 4-96 compares attitudes toward gender roles among the respondents in Korea and among respondents from the other countries. The average score for gender role ideology in Korea was 3.61 out of 5, representing a fairly progressive attitude. This makes Korea the fifth most progressive nation after India, New Zealand, Nepal, and Taiwan.

<Table 4-107. Gender role stereotypes of Republic of Korea: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	135	3.61			
Age					
29 or below	21	3.80	0.69	3.708	.013
30~39	36	3.76	0.69		
40~49	38	3.72	0.84		
50 or above	40	3.27	0.81		
Marital status					
Single	50	3.66	0.75	.221	.802
Married	83	3.57	0.83		
Other	2	3.75	0.71		
No. of children					
None	55	3.68	0.75	1.314	.273
1	36	3.56	0.80		
2	36	3.46	0.84		
3 or above	7	4.04	0.83		
Occupation					
Student	8	4.06	0.69	1.039	.398
Teacher/professor	43	3.60	0.89		
Researcher	67	3.59	0.76		
Medical personnel	1	3.75			
Engineer	6	3.92	0.68		
Other	9	3.28	0.57		
Duration of career break					
None	73	3.65	0.80	.331	.857
Less than 1 year	17	3.66	0.71		
1~2 years	23	3.62	0.74		
2~3 years	10	3.50	0.91		
3 years or more	10	3.38	1.00		

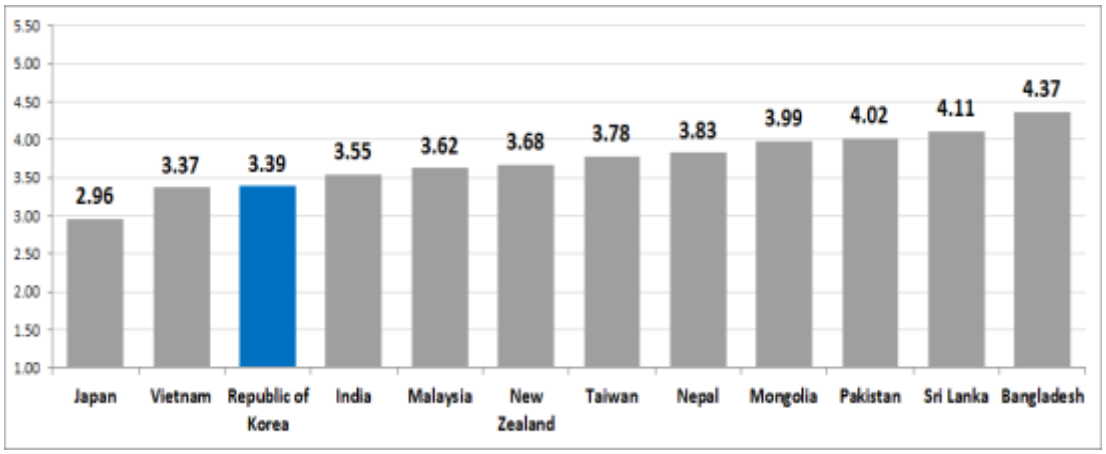
* Higher score means more progressive

Career prospects

As can be seen in Figure 4-97, the respondents in Korea demonstrated relative optimism about their career prospects, with an average score of 3.39. When compared to the other countries, however, Korea had the third lowest average, following Japan and Vietnam.

<Figure 4-97. Average of Republic of Korea & others on Career outlook>

(unit: points)



* Higher score means a more positive outlook

<Table 4-108. Career outlook of Republic of Korea : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	135	3.39			
Age					
29 or below	21	3.14	0.85	.527	.664
30~39	36	3.42	1.00		
40~49	38	3.45	0.89		
50 or above	40	3.43	1.06		
Marital status					
Single	50	3.26	0.99	.671	.513
Married	83	3.46	0.95		
Other	2	3.50	0.71		
No. of children					
None	55	3.29	1.03	2.663	.051
1	36	3.64	0.83		
2	36	3.17	0.94		
3 or above	7	4.00	0.82		
Occupation					
Student	8	3.63	1.06	3.827	.003
Teacher/professor	43	3.86	1.01		
Researcher	67	3.13	0.87		
Medical personnel	1	3.00			
Engineer	6	3.00	0.63		
Other	9	3.11	0.78		
Duration of career break					
None	73	3.41	1.00	.154	.961
Less than 1 year	17	3.29	0.92		
1~2 years	23	3.43	1.20		
2~3 years	10	3.40	0.52		
3 years or more	10	3.20	0.63		

* Higher score means a more positive outlook

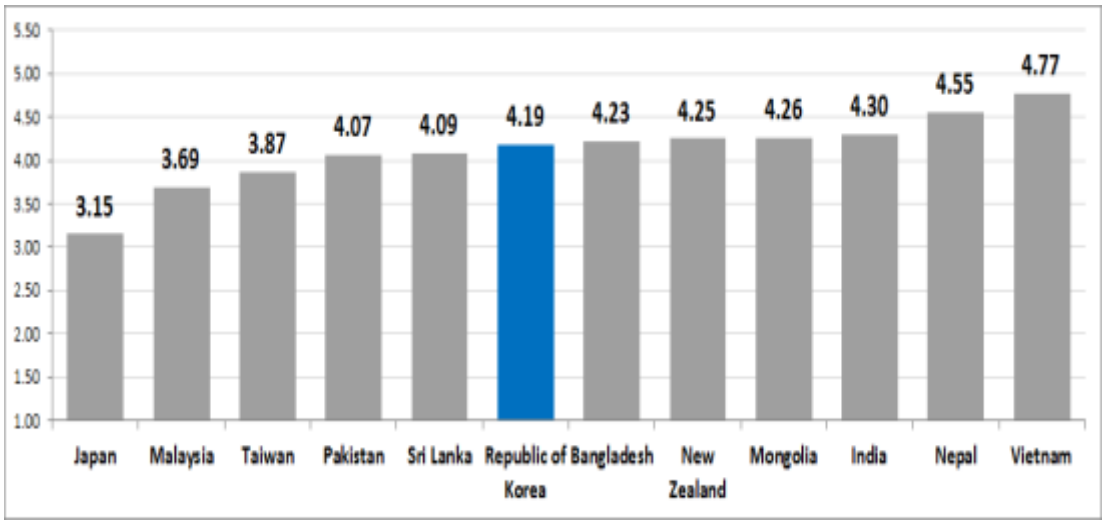
Table 4-108 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Korean respondents. Age did not produce a significant difference. Whereas the group of single respondents held a relatively more optimistic view regarding career prospects than the married and the other group, the difference was not significant. The difference according to the number of children was not significant as well. By occupation, teachers/professors (3.86) held the most optimistic view to career prospects, followed by students (3.63) and researchers (3.13). Healthcare/medical professionals and engineers proved least optimistic (3.00 each) ($F=3.827$, $p\leq.003$). Lastly, no significant difference was found in terms of the duration of career interruption.

Policy demand

Table 4-109 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Korean respondents. No statistical significance was observed in relation to policy demand in terms of any personal variables such as age, marital status, number of children, occupation, and duration of career interruption. By marital status, the group of single respondents had less policy demand than the married and the other group; however, the difference was not significant. By occupation, the average score was highest among healthcare/medical professionals and lowest among researchers, but once again the difference was not significant. No significant difference was found in terms of the duration of career interruption.

<Figure 4-98. Average of Republic of Korea & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

<Table 4-109. Policy needs of Republic of Korea : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	135	4.19			
Age					
29 or below	21	3.86	1.20	1.652	.180
30~39	36	4.19	0.79		
40~49	38	4.16	0.86		
50 or above	40	4.38	0.74		
Marital status					
Single	50	4.04	0.99	1.831	.164
Married	83	4.25	0.79		
Other	2	5.00	0.00		
No. of children					
None	55	4.07	0.96	.990	.400
1	36	4.19	0.82		
2	36	4.31	0.82		
3 or above	7	4.57	0.53		
Occupation					
Student	8	3.75	1.58	.910	.477
Teacher/professor	43	4.33	0.71		
Researcher	67	4.12	0.88		
Medical personnel	1	5.00			
Engineer	6	4.33	0.82		
Other	9	4.11	0.78		
Duration of career break					
None	73	4.05	0.94	1.552	.191
Less than 1 year	17	4.29	0.77		
1~2 years	23	4.48	0.59		
2~3 years	10	3.90	1.20		
3 years or more	10	4.40	0.52		

* Higher score means higher needs for policy support

As can be seen in Figure 4-98, the average score obtained by the scientists and engineers surveyed in Korea was 4.19 out of 5, which was quite a high score. However, relatively compared with the other countries, Korea ranked sixth lowest after Japan, Malaysia, Taiwan, Pakistan, and Sri Lanka.

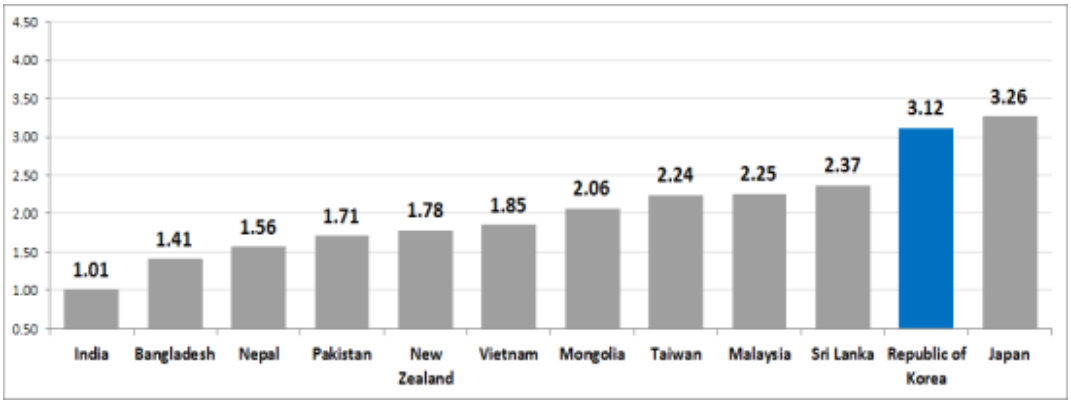
Gender equality

As can be seen in Figure 4-99, the Korean respondents' agreement with the idea that full gender equality would be realized once women were granted equal opportunity was below the median level (average of 3.12; a lower score represents stronger agreement). This places Korea in the second lowest rank after Japan. In other words, compared with the other countries, the respondents in Korea tended to believe that equal

opportunity was not sufficient in achieving gender equality in the field of science and technology.

<Figure 4-99. Average of Republic of Korea & others on Equality concept>

(unit: points)



<Table 4-110. Equality concept of Republic of Korea : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	135	3.12			
Age					
29 or below	21	3.14	0.96	.443	.723
30~39	36	3.28	1.14		
40~49	38	3.08	1.05		
50 or above	40	3.00	1.11		
Marital status					
Single	50	3.14	1.07	.152	.859
Married	83	3.10	1.09		
Other	2	3.50	0.71		
No. of children					
None	55	3.15	1.10	1.084	.358
1	36	3.22	1.02		
2	36	3.11	1.04		
3 or above	7	2.43	1.40		
Occupation					
Student	8	2.75	1.04	3.187	.010
Teacher/professor	43	2.77	1.17		
Researcher	67	3.42	0.96		
Medical personnel	1	1.00			
Engineer	6	3.00	0.89		
Other	9	3.22	0.97		
Duration of career break					
None	73	3.12	1.05	.129	.972
Less than 1 year	17	3.06	1.20		
1~2 years	23	3.04	1.15		
2~3 years	10	3.30	0.67		
3 years or more	10	3.20	1.03		

ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Korea to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-110). As a result of analyzing this belief according to respondent age, no significant difference was observed. Personal variables such as marital status, number of children, and duration of career interruption did not produce any significant difference in average scores. On the other hand, the difference by occupation was significant. The concept of equal opportunity was accepted most by healthcare/medical professionals (1.00), followed by students (2.75), teachers/professors (2.77), engineers (3.00), and researchers (3.42) ($F=3.187$, $p\leq.010$).

4.4.12 Bangladesh

4.4.12.1 Respondent profile

A total of 101 respondents participated in the survey in Bangladesh.

Table 4-111 provides the respondent profile of the country. The age distribution was notably uneven among the participants, with those in their 20s accounting for 87.1% and 30s for 10.9%. By marital status, the single respondents accounted for 74.3% and the married for 25.7%. In terms of the number of children, 78.2% had no children; 6.9% had one; and 3.0% had two children. By occupation, a majority (35.6%) were healthcare/medical professionals, and the second largest group was students (29.7%). Researchers accounted for 13.9%, the other group for 7.9%, teachers/professors for 6.9%, and engineers for 5.9%. In terms of career interruption, 73.3% of the respondents reported no interruption; those with one to two years of interruption accounted for 9.9%; those with interruption of less than one year and three years or longer accounted for 5.9% each, and the smallest group (1.0%) had two to three years of interruption.

4.4.12.2 Difference of gender barriers in Bangladesh and other countries: Overview

Table 4-112 shows the results of a t-test comparing the gender barriers perceived by women scientists and engineers in Bangladesh with that perceived by their counterparts in the other 11 countries. To begin with, the sub-scale of the perception of discriminatory reality against women had an average score of 2.29 in Bangladesh, which is significantly lower than the average (2.62) of the other 11 countries ($t=-4.037$, $p\leq.000$). A lower score means higher perception of discriminatory reality. We analyzed each of the four questions included in this sub-scale. With regard to the statement “Boys are more encouraged than girls to choose the STEM fields,” the respondents in Bangladesh demonstrated more agreement with a significantly higher average of 2.03, compared with the average (2.50) of the other countries ($t=-3.890$, $p\leq.000$). In addition, women in Bangladesh more strongly agreed (2.07), compared with their counterparts in the other countries (2.54), with the statement “Compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields.” This significant difference indicates that the respondents in Bangladesh strongly assented to the idea that discrimination existed ($t=-4.071$, $p\leq.000$).

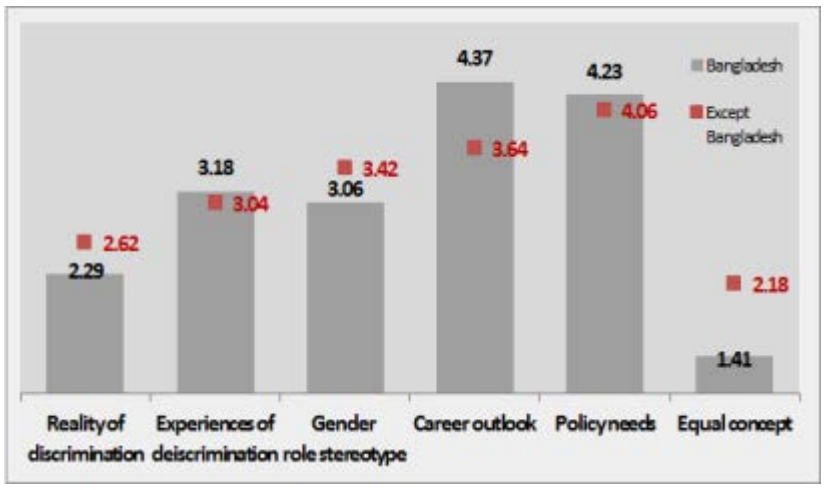
<Table 4-111. Profile of participants from Bangladesh>

(unit: person, %)

Classifications	N	%
Age		
29 or below	88	87.1
30~39	11	10.9
40~49	1	1.0
50 or above	1	1.0
Marital status		
Single	75	74.3
Married	26	25.7
Other		
No. of children		
None	79	78.2
1	7	6.9
2	3	3.0
3 or above		
Occupation		
Student	30	29.7
Teacher/professor	7	6.9
Researcher	14	13.9
Medical personnel	36	35.6
Engineer	6	5.9
Other	8	7.9
Duration of career break		
None	74	73.3
Less than 1 year	6	5.9
1~2 years	10	9.9
2~3 years	1	1.0
3 years or more	6	5.9

<Figure 4-100. Gap between Bangladesh & others on gender barriers>

(Unit: Points)



<Table 4-112. Gap between Bangladesh & others on gender barriers>

(unit: points)

Item		Bangladesh (n=101)	Except Bangladesh (n=1,278)	*t*	*(p)*
Perception of discrimination	1. Boys are encouraged more than girls to go into the STEM field.	2.03	2.50	-3.890	.000
	2. It is more difficult for a woman to get a job in the STEM field than for a man even with the same qualifications.	2.07	2.54	-4.071	.000
	3. Becoming a tenured professor, being promoted or becoming a principal investigator is more difficult for female scientists than for male scientists.	2.32	2.52	-1.583	.114
	4. Women in STEM generally receive less pay for equal work, compared with their equally-qualified male colleagues.	2.75	2.94	-1.391	.164
	Sub-scales	2.29	2.62	-4.037	.000
Experience of discrimination	5. I have experienced disadvantages in leading or participating in research projects because I am a woman.	3.03	2.99	.280	.780
	6. I have experienced disadvantages in receiving research funds or scholarships because I am a woman.	3.60	3.29	2.457	.014
	7. I have experienced sexual harassment or unfair treatments sometime in my career.	3.50	3.29	1.391	.167
	8. Balancing work and life (marriage and family) has been a handicap for me.	2.58	2.60	-.141	.888
	Sub-scales	3.18	3.04	1.316	.191
Gender role stereotypes	9. Primary breadwinners (who take care of financial obligations) of households should be men.	2.97	3.60	-4.549	.000
	10. Women are born to have a way of caring children that men are not capable of in the same way.	3.21	3.35	-.870	.386
	11. In order to maintain the order and peace of a family, the husband should have greater power and authority than the wife.	3.86	3.77	.576	.566
	12. In a relative sense, men are rational while women are emotional and thus, they ought to complement each other by doing what is appropriate for themselves.	2.21	2.98	-5.409	.000
	Sub-scales	3.06	3.42	-3.403	.001
Career outlook	13. I believe things will turn out fine in my future career.	4.37	3.64	6.797	.000
Policy needs	14. It is crucial to have strong policy support to solve gender inequality in the STEM field.	4.23	4.06	1.535	.125
Equality concept	15. I believe gender equality will be fully achieved only if women are given equal opportunities as men.	1.41	2.18	-10.371	.000

* Perception of discrimination : Lower score means higher perception of discrimination

* Experience of discrimination : Lower score means more discrimination experienced

* Gender role stereotypes : Higher score means more progressive

* Career outlook : Higher score means a more positive outlook

* Policy needs : Higher score means higher needs for policy support

For the statement “Women scientists have more difficulty than their male counterparts in becoming full-time professors or managers,” the respondents in Bangladesh did not produce a significant difference from the other countries. Lastly, regarding the statement “Women receive less wages for the same work than men,” women in Bangladesh did not produce a statistically significant difference, either.

As a result of conducting a t-test to compare the gender discrimination experienced by the respondents in Bangladesh with that experienced by respondents in the other countries, unlike the perception of a discriminatory reality, experience of discrimination among the Bangladeshi respondents was not significantly different from those in the other countries. We examined the differences for each of the four questions constituting this sub-scale. First, no significant difference was found for Bangladeshi women’s experience of the difficulty in participating in research projects or becoming research managers. However, the respondents in Bangladesh (3.60) reported a significantly less experience of disadvantage in winning research grants or scholarships than women in the other 11 countries (3.29) ($t=2.457$, $p\leq.014$). No notable difference was observed between those in Bangladesh and the other countries with respect to sexual harassment and other unfair treatment at work. Lastly, the experience of having work-life balance as a handicap showed no significant difference.

In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. The average score of the women scientists and engineers in Bangladesh was 3.06, near the median level. This indicates that women in Bangladesh are significantly more conservative compared with the average of 3.42 among respondents in the other countries surveyed. We examined each of the four questions for this sub-scale. First, the Bangladeshi respondents (2.97) proved to be more conservative than the other respondents (3.60) regarding the statement that men are bread-winners of a household ($t=-4.549$, $p\leq.000$). No particular difference was found, however, for the idea that women have an inherent ability to take care of babies. In addition, no significant difference in the average score was observed with respect to the statement that husbands should have more power and authority than their wives to maintain peace within the family. Lastly, for the idea that men and women should have respectively suitable jobs since men are rational and women emotional, women in Bangladesh (2.21) were more conservative than the others (2.98) ($t=-5.409$, $p\leq.000$).

In terms of career prospects, the average score in Bangladesh was 4.37 out of 5, which was significantly higher than the average of 3.64 in the other countries ($t=6.797$, $p\leq.000$). Next, we examined whether Bangladesh had a different attitude toward policy demand to address the problem of gender inequality in the STEM areas. As a result, we observed an almost similar result to that found in the other countries. Lastly, regarding the concept of equality, the Bangladeshi respondents (1.41) tended to believe,

significantly more than the others (2.18), that equal opportunity was a sufficient factor for achieving gender equality (t=-10.371, p≤.000).

Figure 4-100 illustrates the overall difference in perception of gender barriers between the respondents in Bangladesh and those in the other countries.

4.4.12.3 Analysis of individual questions

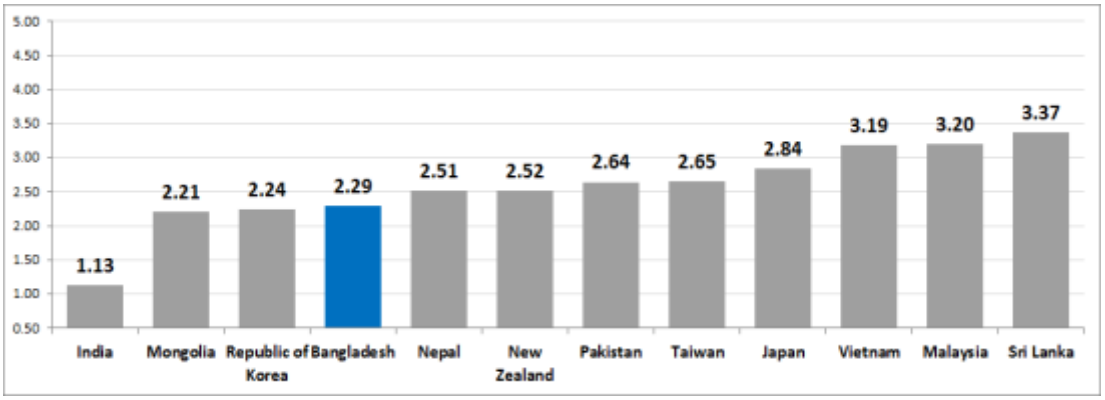
Here, we will examine the gender barriers perceived by women scientists and engineers in Bangladesh according to the personal variables of the respondents and compare the results with those obtained in the other countries

Perception of discriminatory reality

For this sub-scale, a lower score translates into a stronger perception of a discriminatory reality. Figure 4-101 compares the perception of a discriminatory reality by the respondents in Bangladesh and by those from the other countries. The level of perception of gender discrimination in society had a score of 2.29, which is fourth highest after India, Mongolia and Korea.

<Figure 4-101. Average of Bangladesh & others on Perception of discrimination>

(unit: points)



* Lower score means higher perception of discrimination

Table 4-113 provides the results of ANOVA of whether this perception varies depending on the personal variables of the Bangladeshi respondents. No significant difference was found based on age. By marital status, the group of single respondents reported weaker perception of a discriminatory reality; however, the difference was of no statistical significance. The number of children did not result in a significant difference, either. By occupation, the perception of a discriminatory reality was highest among healthcare/medical professionals and lowest among engineers; however, the difference was not of statistical significance. The difference depending on the duration of career

interruption was not significant, either.

<Table 4-113. Perception of discrimination of Bangladesh: Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	2.29			
Age					
29 or below	88	2.24	0.75	1.465	.229
30~39	11	2.55	0.94		
40~49	1	3.50			
50 or above	1	2.75			
Marital status					
Single	75	2.28	0.73	.070	.792
Married	26	2.33	0.90		
Other					
No. of children					
None	79	2.26	0.76	.685	.507
1	7	2.43	0.93		
2	3	2.75	1.30		
3 or above					
Occupation					
Student	30	2.38	0.83	.762	.579
Teacher/professor	7	2.46	1.06		
Researcher	14	2.23	0.87		
Medical personnel	36	2.12	0.64		
Engineer	6	2.50	0.96		
Other	8	2.53	0.51		
Duration of career break					
None	74	2.22	0.75	1.056	.383
Less than 1 year	6	2.88	1.00		
1~2 years	10	2.30	0.88		
2~3 years	1	2.25			
3 years or more	6	2.46	0.84		

* Lower score means higher perception of discrimination

Discriminatory experience

For the scale of discriminatory experience, a lower score represents more experience of gender discrimination. Table 4-114 provides the results of ANOVA of whether discriminatory experience varies depending on the personal variables of the Bangladeshi respondents. No significant difference was found for the personal variable of age, but it is important to remember that 87% of the respondents in Bangladesh was in their 20s. Marital status and the number of children did not produce a significant difference, either. By occupation, discriminatory experience was reported most by researchers and least by engineers; however, the difference did reach statistical significance. In terms of career interruption, experience of discrimination was reported

most by those with interruption of three years or more (3.00) and those without any interruption (3.01), and least by those experiencing interruption for less than one year (4.54) (F=3.979, p≤.005). As illustrated in Figure 4-102, the average score (3.18) for this sub-scale in Bangladesh was below the median level. In terms of discriminatory experience, Bangladesh was in the sixth lowest place after Sri Lanka, Malaysia, Pakistan, Nepal, and Taiwan.

<Table 4-114. Experience of discrimination of Bangladesh : Demographic differences>

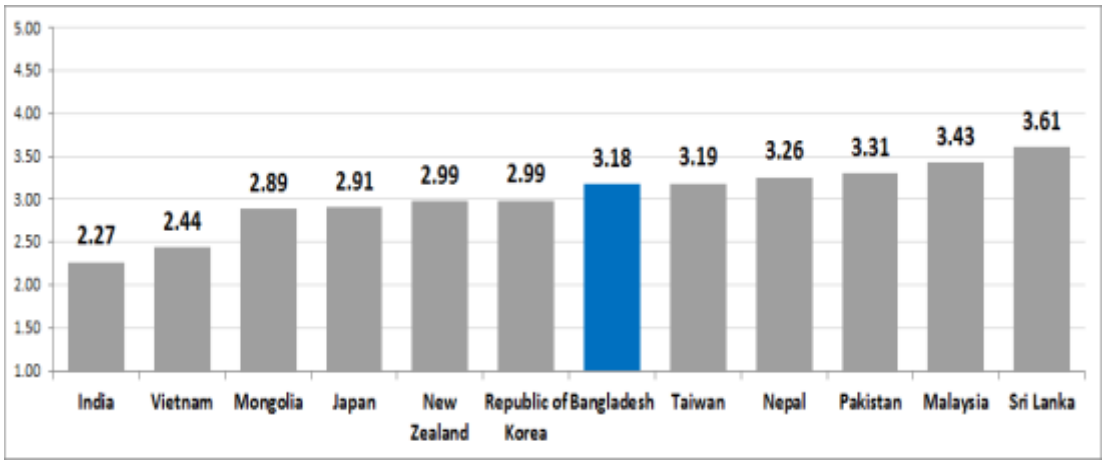
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	3.18			
Age					
29 or below	88	3.09	0.99	2.568	.059
30~39	11	3.80	0.95		
40~49	1	4.75			
50 or above	1	2.75			
Marital status					
Single	75	3.16	0.99	.163	.687
Married	26	3.25	1.09		
Other					
No. of children					
None	79	3.10	0.98	2.254	.111
1	7	3.82	1.04		
2	3	3.75	1.15		
3 or above					
Occupation					
Student	30	3.29	1.05	1.692	.144
Teacher/professor	7	3.21	1.06		
Researcher	14	3.20	1.08		
Medical personnel	36	2.86	0.94		
Engineer	6	3.79	0.95		
Other	8	3.69	0.78		
Duration of career break					
None	74	3.01	0.97	3.979	.005
Less than 1 year	6	4.54	0.29		
1~2 years	10	3.43	1.01		
2~3 years	1	4.00			
3 years or more	6	3.00	1.08		

* Lower score means more discrimination experienced

<Figure 4-102. Average of Bangladesh & others on Exp. of discrimination>

(unit: points)



* Lower score means more discrimination experienced

Gender role ideology

Table 4-115 provides the results of ANOVA of whether gender role ideology varies depending on the personal variables of the Bangladeshi respondents. Whereas age did not produce a significant difference, marital status resulted in a significant difference: the group of single respondents (3.18) were significantly more progressive than the married (2.73) ($F=4.6308$, $p\leq.034$). The number of children was not associated with a significant difference. In the meantime, researchers (3.59) proved most progressive, and teachers/professors (2.50) most conservative ($F=3.828$, $p\leq.003$). The difference in terms of career interruption was significant as well. Regarding gender role stereotypes, the respondents who experienced interruption of less than one year expressed the most conservative attitude, while most progressive attitude was observed among those experiencing two to three years of interruption ($F=2.740$, $p\leq.033$).

Figure 4-103 compares attitudes toward gender roles among the respondents in Bangladesh and among respondents from the other countries. In the sub-scale of gender role ideology, a higher score translates into a more progressive attitude toward gender roles. The average score of Bangladesh for gender role beliefs was 3.06 out of 5, which makes Bangladesh the third most conservative country after Pakistan and Mongolia.

<Table 4-115. Gender role stereotypes of Bangladesh : Demographic differences>

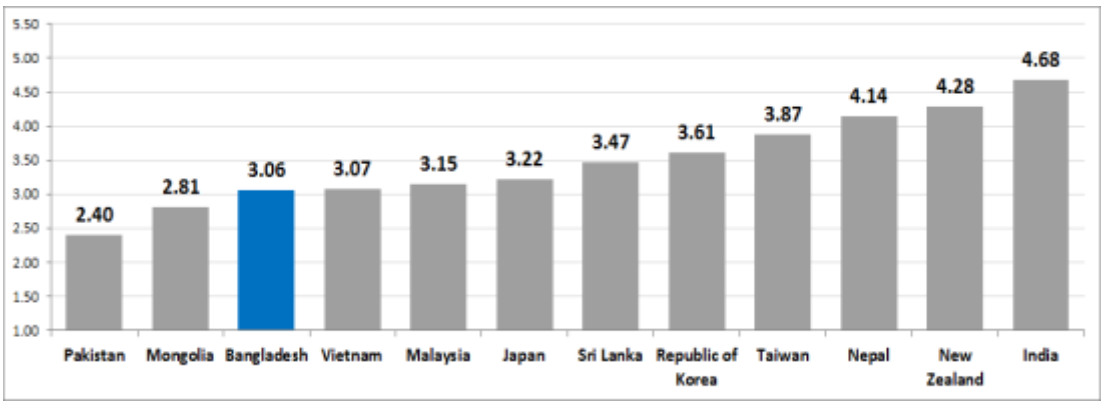
(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	3.06			
Age					
29 or below	88	3.11	0.92	1.445	.234
30~39	11	2.59	0.95		
40~49	1	3.50			
50 or above	1	4.00			
Marital status					
Single	75	3.18	0.92	4.630	.034
Married	26	2.73	0.89		
Other					
No. of children					
None	79	3.17	0.83	2.030	.138
1	7	2.54	1.06		
2	3	2.75	1.15		
3 or above					
Occupation					
Student	30	3.38	0.71	3.828	.003
Teacher/professor	7	2.50	0.96		
Researcher	14	3.59	0.52		
Medical personnel	36	2.68	1.12		
Engineer	6	3.21	0.49		
Other	8	3.06	0.66		
Duration of career break					
None	74	2.95	0.95	2.740	.033
Less than 1 year	6	2.46	0.49		
1~2 years	10	3.50	0.67		
2~3 years	1	4.25			
3 years or more	6	3.67	0.38		

* Higher score means more progressive

<Figure 4-103. Average of Bangladesh & others on Gender role stereotypes>

(unit: points)



* Higher score means more progressive

Career prospects

As can be seen in Figure 4-104, the respondents in Bangladesh demonstrated relative optimism about their career prospects, with an average score of 4.37. This puts the country in first place among all 12 countries.

<Table 4-116. Career outlook of Bangladesh : Demographic differences>

(unit: person, points)

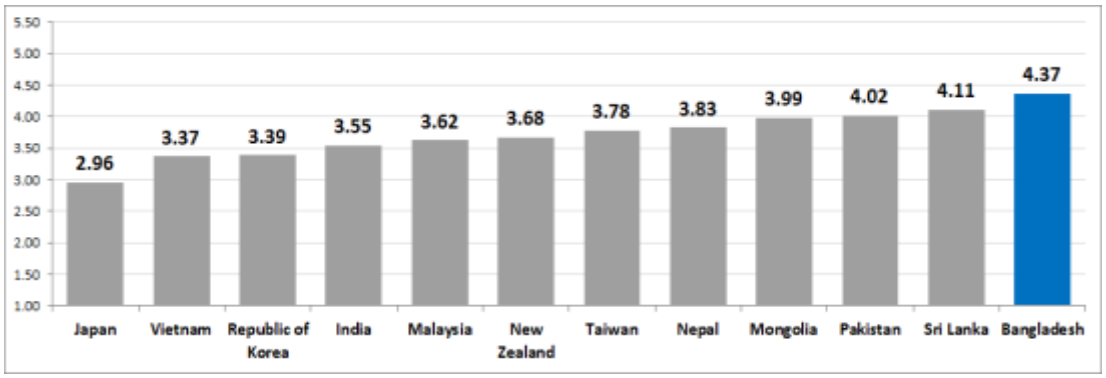
Classifications	Cases	Average	SD	F	*p*
Total	101	4.37			
Age					
29 or below	88	4.35	0.98	.299	.826
30~39	11	4.36	0.67		
40~49	1	5.00			
50 or above	1	5.00			
Marital status					
Single	75	4.36	0.92	.013	.910
Married	26	4.38	1.02		
Other					
No. of children					
None	79	4.33	1.00	.387	.680
1	7	4.57	0.53		
2	3	4.00	1.00		
3 or above					
Occupation					
Student	30	4.20	1.00	.444	.816
Teacher/professor	7	4.29	0.76		
Researcher	14	4.64	0.84		
Medical personnel	36	4.42	1.00		
Engineer	6	4.33	0.82		
Other	8	4.38	1.06		
Duration of career break					
None	74	4.32	1.04	.403	.806
Less than 1 year	6	4.17	0.75		
1~2 years	10	4.50	0.53		
2~3 years	1	5.00			
3 years or more	6	4.67	0.52		

* Higher score means a more positive outlook

Table 4-116 provides the results of ANOVA of whether career prospects vary depending on the personal variables of the Bangladeshi respondents. No significant difference in average score was observed for personal variables of age, marital status, number of children, occupation, and career interruption.

<Figure 4-104. Average of Bangladesh & others on Career outlook>

(unit: points)



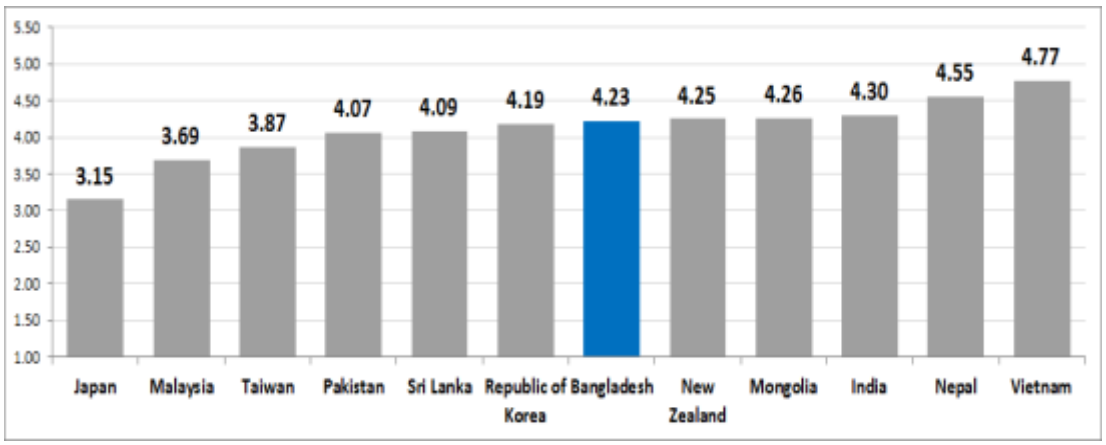
* Higher score means a more positive outlook

Policy demand

Table 4-117 provides the results of ANOVA of whether policy demand varies depending on the personal variables of the Bangladeshi respondents. No significant difference was found for variables such as age, marital status, number of children, and occupation. In terms of the average score by occupation, policy demand was most strongly reported by teachers/professors, and (excluding the other group) engineers had the weakest policy demand; however, the difference was not statistically significant. The variable of career interruption period resulted in varying policy demand. The average score for policy demand was highest among those with interruption of two to three years (5.00), followed by those with one to two years of interruption (4.40), those without any interruption (4.30), and those with at least three years of interruption (4.17). The lowest average belonged to those with less than one year of interruption (2.67) ($F=4.238$, $p\leq.003$).

<Figure 4-105. Average of Bangladesh & others on Policy needs>

(unit: points)



* Higher score means higher needs for policy support

As can be seen in Figure 4-105, the average for policy demand in Bangladesh was 4.23 out of 5, which is fairly high. Compared with the other countries, however, the country is in only seventh place after Japan, Malaysia, Taiwan, Pakistan, Sri Lanka, and Korea.

<Table 4-117. Policy needs of Bangladesh : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	4.23			
Age					
29 or below	88	4.27	0.92	1.339	.266
30~39	11	3.73	1.62		
40~49	1	5.00			
50 or above	1	5.00			
Marital status					
Single	75	4.25	1.01	.183	.670
Married	26	4.15	1.05		
Other					
No. of children					
None	79	4.23	0.95	1.823	.168
1	7	3.71	1.60		
2	3	5.00	0.00		
3 or above					
Occupation					
Student	30	4.03	1.16	2.288	.052
Teacher/professor	7	4.86	0.38		
Researcher	14	4.71	0.61		
Medical personnel	36	4.28	0.78		
Engineer	6	3.83	1.17		
Other	8	3.63	1.69		
Duration of career break					
None	74	4.30	0.92	4.238	.003
Less than 1 year	6	2.67	1.63		
1~2 years	10	4.40	0.97		
2~3 years	1	5.00			
3 years or more	6	4.17	0.75		

* Higher score means higher needs for policy support

Gender equality

As can be seen in Figure 4-106, the Bangladeshi women agreed less strongly than the median level with the idea that full gender equality would be realized once women were granted equal opportunity (average of 1.41; a lower score represents stronger

agreement). This places the country in the second highest rank after India. This suggests that, compared with the other countries, those surveyed in Bangladesh strongly believed that equal opportunity was sufficient to address the problem of gender inequality in the field of science and technology.

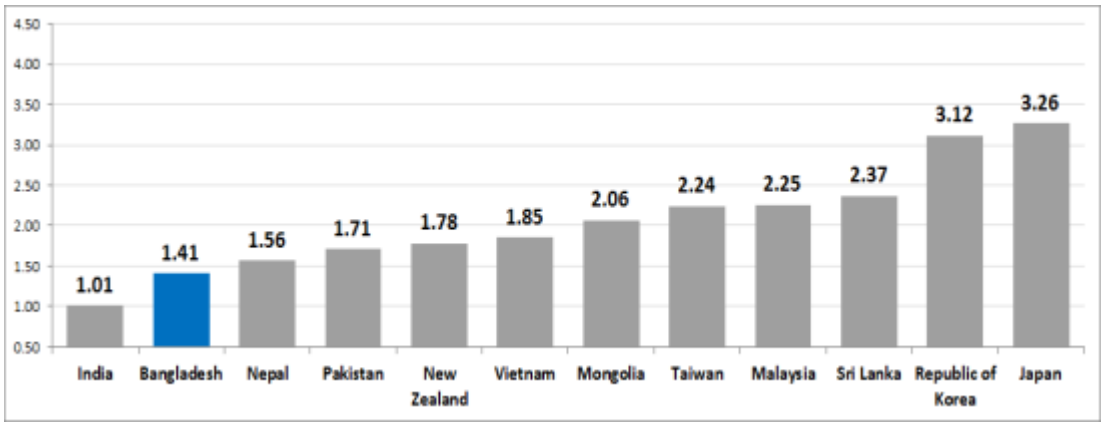
<Table 4-118. Equality concept of Bangladesh : Demographic differences>

(unit: person, points)

Classifications	Cases	Average	SD	F	*p*
Total	101	1.41			
Age					
29 or below	88	1.40	0.65	.388	.762
30~39	11	1.55	0.93		
40~49	1	1.00			
50 or above	1	1.00			
Marital status					
Single	75	1.40	0.62	.022	.882
Married	26	1.42	0.86		
Other					
No. of children					
None	79	1.44	0.67	1.102	.337
1	7	1.29	0.49		
2	3	2.00	1.73		
3 or above					
Occupation					
Student	30	1.27	0.58	.638	.671
Teacher/professor	7	1.71	1.11		
Researcher	14	1.50	0.52		
Medical personnel	36	1.39	0.77		
Engineer	6	1.50	0.55		
Other	8	1.50	0.53		
Duration of career break					
None	74	1.41	0.68	1.388	.244
Less than 1 year	6	2.00	1.10		
1~2 years	10	1.40	0.52		
2~3 years	1	1.00			
3 years or more	6	1.17	0.41		

<Figure 4-106. Average of Bangladesh & others on Equality concept>

(unit: points)



ANOVA was conducted to identify whether personal variables resulted in a different level of tendency among the respondents in Bangladesh to believe that equal opportunity was a sufficient factor of gender equality (see Table 4-118). As a result of analyzing this belief according to respondents' age, no statistically significant difference was observed. Personal variables such as marital status, number of children, duration of career interruption, and occupation did not produce a significant difference. The reasons behind this lack of difference by personal variables are partially explained by the strong belief in the concept of equal opportunity. In addition, the results were probably affected by the disproportionate concentration of the respondents in terms of age and the number of children.

5. Conclusion and Suggestions

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Various international indices related to human resource development can be summarized as follows for APNN members. In terms of the Human Development Index (HDI) and the Gender Development Index (GDI) of the United Nations Development Program, Australia, New Zealand, South Korea, and Japan all remain as countries with "outstanding" performance in human development, although these countries, except for Australia, saw their ranks fall slightly from 2013. Meanwhile, Malaysia, Sri Lanka, and Mongolia were among the countries with "excellent" human development performance, and Mongolia particularly climbed in rank from 103rd in 2013 to 90th in 2014, moving from the "average" to the "excellent" category. Vietnam and India remained in the "average" category, and yet they still climbed in rank from 121st and 135th in 2013 to 116th and 130th in 2014, respectively. As new APNN member state that joined the APNN last year, Bangladesh belongs to the "average" category. Nepal and Pakistan remained quite the same as in 2013, classified as countries with "low" human development. In particular, these two countries had less than five years of average training period. Korea is ranked 17th for the HDI, while it is ranked 104th for the GDI, which means that the country's women's development (HDI 0.861) is substantially lower than its men's development (HDI 0.926), despite the high overall HDI level. Considering that Korea's GDI ranked 85th in 2013, the 104th position in 2014 suggests a widened gap in men-women development. Mongolia's GDI value was larger than one, which means men's development fell short of women's development.

The UNDP's Gender Inequality Index (GII) demonstrates that gender inequality was significant in Bangladesh as well as in Nepal, Pakistan, and India. Korea's GII ranked 23rd, slightly higher than that of Japan (ranked 26th), but the country's maternal mortality rate remained at the level of developing countries, with 27 deaths out of 100,000 births, which is notably higher than the value of 6 out of 100,000 in Japan. Considering the definition of maternal mortality rate as "the annual number of female deaths per 100,000 live births from any cause related to or aggravated by pregnancy, childbirth, or related complications, the statistics do not match the level of economic development Korea has achieved. Since this can also be interpreted as a result of loopholes in social welfare policy tailored for marginalized women, this result must be factored in when developing and implementing policy related to women's welfare in the future.

The Gender Gap Index (GGI) of the World Economic Forum in 2015 suggested that New Zealand and Australia had no gender gap in educational attainment, ranking 1st in this section again after 2014. Meanwhile, New Zealand's gender gap in political empowerment improved 39%; Australia improved only 19.3%. As a result, New Zealand ranked 10th on the list, while Australia was far below in 36th place. Among the Asian countries, most nations remained in the lower side of the GGI ranking, except for

Mongolia in 56th place. Particularly, Mongolia and Sri Lanka took first place in health and survival, but it is worth emphasizing again that this does not necessarily suggest that the people in these countries live longer and in a more healthy fashion than those in other countries; rather, it suggests that each of these countries showed the less gap in values for health and survival for both genders. Japan, India, Nepal, Malaysia, Korea, and Pakistan did not belong in the top 100 list for GGI ranking, and Malaysia, Mongolia, Japan, and Korea had particularly wide gender gaps in political empowerment. India's GGI value in political empowerment was 0.433, indicating the narrowest gender gap among the APNN member nations.

According to OECD, Korea's female labor-force participation rate rose from 55.6% in 2013 to 57.9% in 2015, increasing at a higher rate than the OECD's average rate of increase. However, the value was still lower than the OECD average by 5.1% point and 27.6% point lower than Iceland's average, resulting in Korea's ranking 30th out of 34 countries in 2015. In Japan, the female labor-force participation rate increased from 65.0% in 2013 to 66.7% in 2015. Although the gender gap was still large, the value is 8.8% point higher than that of Korea, indicating that women's economic activity was higher in Japan than in Korea. The highest rate in labor participation for both genders was observed in Iceland, constantly rising from 86.6% in 2013 to 87.9% in 2015. Unlike other countries, the gap between men and women was extremely small in Iceland, with both genders reaching a participation rate of over 80%. In addition to Iceland, all other Scandinavian countries had a narrow gap between male-female labor-force participation rates and both genders participated in childcare based on highly flexible gender roles. Parental leave is mandatorily assigned to fathers as well as mothers, and wages were more likely to be retained during the period of parental leave. In Iceland, each parent must take five months of mandatory parental leave out of the 12-month leave, and the remaining two months can be taken by either parent. The high labor-force participation rate and narrow gender gap in Iceland evidently resulted from such policy support. Meanwhile, Japan and Korea demonstrate a unique trend in which the gender gap tends to widen among more educated people. Whereas the labor-force participation rate among more educated men significantly rose to 95.6% in Japan and 92.4% in Korea in 2013, that among more educated women stood at 71.3% and 64.1% in Japan and Korea, respectively, only a slight increase from the overall female labor-force participation rate. This trend further widened the gender gap. For several years, Korea has recorded a lower labor-force participation rate among more educated women than any other OECD member nation, which shows Korea's highly inefficient use of its labor force.

Following this analysis of the current status of international human resource development, this study examined how personal variables affected perception or experiences of gender barriers including the perception of gender discrimination, actual experience of discrimination, and gender role ideology in women in the STEM fields in

APNN member countries. Furthermore, it explored how such gender barriers were associated with career prospects and policy demand as reported by women in science and technology. Analysis was conducted to observe the results encompassing all respondents across nations and within individual nations, and to compare the results among nations.

From the viewpoint of recognizing discrimination, women in science and technology generally admitted that boys were more encouraged than girls to choose the STEM fields; compared with men, women with the same abilities face greater difficulty finding a job in the STEM fields; and women scientists have more difficulty than men becoming full-time professors or managers in their societies.

Compared with the perception of the discriminatory experience, direct experience of discrimination was reported less overall. The highest prevalence of discriminatory experience was found in maintaining the balance between work and life (marriage, family). The average scores were slightly below the median level for experiences of discrimination or disadvantage in participating in research projects or becoming research managers or in winning research grants or scholarships, or for sexual harassment or other unfair treatment because of the gender.

Individual attitudes toward gender role stereotypes may work as internal gender barriers. When measured in terms of gender role ideology regarding the role of household's breadwinner, inherent ability to take care of children, and power relations between wives and husbands, the respondents' attitudes toward gender roles proved slightly or relatively progressive. The only statement that drew a relatively conservative attitude was that men and women should have respectively suitable jobs since men are rational and women emotional.

The survey respondents overall held an optimistic view of future career prospects. They also tended to believe that powerful policy support is necessary to address the problem of gender inequality in the STEM areas. As a result of comprehensive multiple regression analysis of the factors influencing policy demand by women in science and technology, it was revealed that the demand was higher among the respondents who believed in the importance of equal opportunity more strongly; who had more optimistic views of their future career; who reported more discriminatory experience; and who held more progressive attitudes toward gender roles.

If significant discrepancies exist in the distribution of the respondents by age, marital status, and occupation, it is difficult to draw out meaningful interpretations on the differences found in gender barriers reported by women scientists and engineers in each country through comparative analysis. In fact, the respondent profile varied greatly among the countries. In terms of age, the average age of the respondents in Bangladesh

was only 25.65, while that in Japan was 50.89. That was also the case with marital status. In Malaysia, the single respondents accounted for 76.6%, the highest ratio, but those in Vietnam accounted for only 1%. When classified into majors, engineering graduates constituted an overwhelming share of 89.7% in New Zealand, whereas those in Japan only accounted for 19.7%. Unlike the other countries, Bangladesh had the largest proportion at 46.9% for medicine/pharmacy graduates, but social science graduates (35%) were second only to engineering (39%) in Vietnam. Occupation also demonstrated a significant disproportion. Although the respondents in New Zealand were overwhelmingly engineers (85.3%), those in Vietnam were mostly teachers/professors (72%). In Korea, researchers accounted for 50%; healthcare/medical professionals accounted for the largest share of 35.6% in Bangladesh.

For future surveys, allocation of a rough quota requirement for certain variables such as age, marital status, and occupation is advisable, in the process of selecting survey respondents in each country. Lastly, it is essential to conduct a parallel survey to collect objective data and statistics on women in the STEM fields as well as to include studies on supportive policy measures implemented in member countries, in addition to the survey on women themselves. A combination of such objective data and data obtained through analysis of the awareness and experience of the respondents will lay a more solid foundation for the development of an index system that can periodically examine the status of women scientists and engineers in each APNN member country.

References

Kong-Ju-Bock Lee & Jung Sun Kim (2014), 2014 Policy Report on Balanced Development of Human Resources for the Future: UNDP HDI/GII and WEF GGI Status and Joint Survey of INWES APNN Member Nations.

Association of Korean Woman Scientists and Engineers, International Cooperation Policy Research Team (2015), The Glass Ceiling for Asian Women in STEM: The 2015 INWES APNN Joint Survey Report.

Campbell, B., Schellenberg, E.G., & Senn, C.Y. (1997). Evaluating measures of contemporary sexism. Psychology of Women Quarterly, 21, 89-102.

Glick, P., & Fiske, S.T. (1997). Hostile and benevolent sexism: Measuring Ambivalent sexist toward women. Psychology of Women Quarterly, 21, 119-135.

Yang-hee Kim & Gyeong-ah Jeong (1999). Development of Korean-Style Assessment of Awareness of Gender Equality. Korean Women's Development Institute.

Ministry of Science, ICT and Future Planning (2015). Fact-Finding Survey of Use of Female Workforce in Science and Technology in 2014. Korea Center for Women in Science, Engineering, and Technology.

Morrison, A.M (1992). *The New Leaders.* San Francisco: Jossey-Bass. Morrison, A.M., White, R.P., Van Velsor, E. (1987). *Breaking the Glass Ceiling.* Reading, MA: Addison Wesley.

Lampe, A, (2001). Review of the book Gender in the Workplace: A Case Study Approach. *Gender, Work and Organization.* 8(3), pp.346-351.

Davies-Netzley, S. A. (1998). Women above the Glass Ceiling: Perceptions on Corporate Mobility and Strategies for Success. *Gender and Society,* Vol. 12, No. 3, p. 340

Federal Glass Ceiling Commission. *Solid Investments: Making Full Use of the Nation's Human Capital.* Washington, D.C.: U.S. Department of Labor, November 1995.

Jong-tae Yun (2015). Necessity to Establish Busan Womenomics Center. Womenomics Center Forum to Support Women in Science and Technology in Busan, held by Federation of Busan Science and Technology and others. December 2015.

Ministry of Gender Equality and Family (2009). First Master Plan to Facilitate Economic Activity of Women Experiencing Career Interruption.

Eun-jin Oh (2015). ‘Current Status and Policy Issues of Re-Employment of Women Experiencing Career Interruption: Seeking New Strategies in Response to Changing Policy Environment.’ 96th Policy Forum on Gender Equality held by Korean Women’s Development Institute. Presentation materials. August 28, 2015.

MIT (1999). A Study on the Status of Women Faculty in Science