



# **How to Promote Gendered Innovations in Global S&T Landscapes**

**:Gendered Innovations Index (GII) Project**

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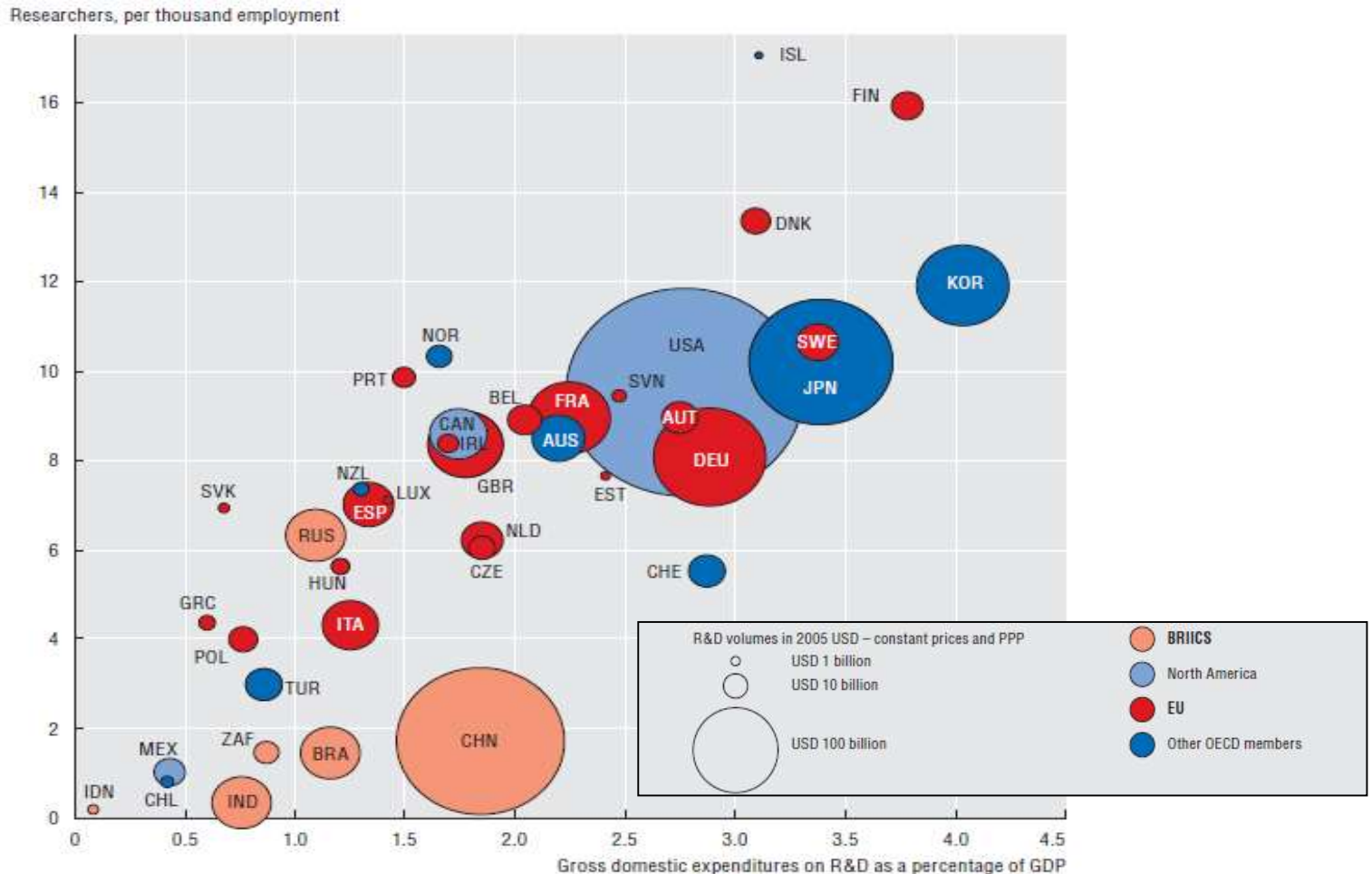
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# Global S&T Landscapes and **Innovation Policy**

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# Global Science and Technology Landscapes



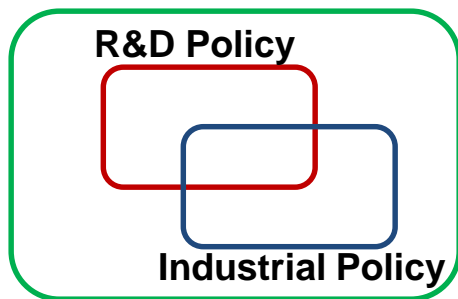
Source : OECD (2013)

Global R&D remains highly concentrated in North America and Europe

However, new players are set to compete with developed countries

# New Trends in Science and Technology Policy

## Innovation Policy



## Integrated Innovation Policy

- ✓ From 'R&D' and 'industrial' policy to 'innovation' policy
- ✓ Emphasizing on flow of knowledge, network, and institutional factor

## Collaboration on policy making

- ✓ S&T became vital measure to address global issues (environmental sustainability, development, health, etc.)
- ✓ Global share of policy context and best practice

## Evidence-based policy

- ✓ Systematic approach to policy making based on scientific evaluation
- ✓ Data and indicators are most powerful tools for capturing policy context and for benchmarking (e.g. OECD STI Scoreboard, EC IUS)



# Gendered Innovations for **Science, Innovation and Growth**

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# The Impact of Gendered Innovations

## Better Knowledge

By considering sex and gender dimension in research, we can accumulate **more and better knowledge**

### Gendered Innovations in Research



## Better Innovation

Product development that incorporates **gender aspects** can open **new markets** and enable innovation in products or services



## Sustaining Growth

Raising **women's economic participation** is key to improve **potential growth rate** and **economic creativity**

### Relationship among Employment, GDP, and Birth Rate



Source : Institute for Global Economics (2015)

# Trends and Challenges in Gendered Innovations

## »» *Global Trends in Gendered Innovations*

### Policy

- ✓ (~2000) Gender issue in S&T addressed in limited area (equal opportunities, health)
- ✓ (2000~) Better understanding of gender issues in S&T and started to build broad policy (EU FP, Case development etc.)

### R&D Funding

- ✓ EC-DGRI : Horizon 2020
- ✓ Bill & Melinda Gates Foundation (2013): Agricultural Development
- ✓ Austrian Research Promotion Agency (2010)
- ✓ Research Council of Norway (2010)
- ✓ WHO (2002)

### Academic Journal

- ✓ Journal of the American College of Cardiology
- ✓ American Journal of Physiology
- ✓ Canadian Medical Association Journal
- ✓ The Lancet
- ✓ Nature

## »» *Global Challenges in Gendered Innovations*

### **Lack of Policy Study and Development**

Many research cases developed, but limited systematic policy package including budgeting and evaluation have been developed

### **Lack of Policy Evidence**

limited gender-sensitive statistics provided and this leads to the lack of policy evidence in science, technology and innovation policy

# Previous Data Sources Related to Gendered Innovations

## » *Indices focusing on gender gap*

Title	Published by	Key areas	Country coverage
The Global Gender Gap Index	World Economic Forum	Relative gaps between women and men across health, education, economy, and politics.	142
Gender Inequality Index	UNDP	Measuring gender inequality across birth, politics, education, and labor force	187

## » *Indices focusing on Science, Technology, and Innovation*

Title	Published by	Key areas	Country coverage
OECD STI Scoreboard	OECD	Trends and features of science, technology, and industry as future sources of long-term sustainable growth	61
The Global Innovation Index	Cornell Univ. INSEAD WIPO	Multidimensional facets of innovation as a driver of economic growth and well-being	143

**There is no index considering both gender and innovation in S&T**

**Building up an index regarding gendered innovations is imperative**





# Investigating Policy Context: **Gendered Innovations Index (GII)**

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# Development of Gendered Innovations Index (GII)

## »» *Aim of the Project*

Develop indicator framework and indicators to capture and measure gender aspects in national innovation systems and to find implications in STI policy

## »» *Conceptual Indicators Development Framework of GI*

### Flow of Knowledge

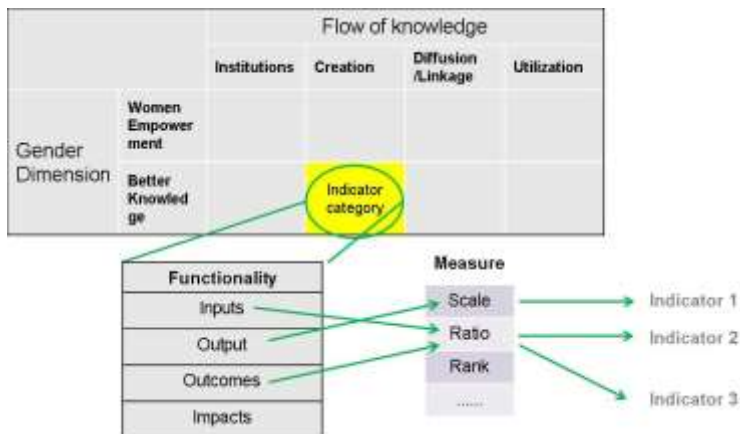
- ✓ Science & technology is not a closed system but an interactive system.
- ✓ Institution / Creation / Diffusion & Linkage / Utilization

### Functionality

- ✓ Functionality leads directly to policy context and system evaluation
- ✓ Input / Output / Outcome / Impact

### Gender Policy in S&T

- ✓ Development of gender issues in STI directly leads to conceptual elements of gendered innovations
- ✓ Women Empowerment / Better Knowledge



### <Selecting Criteria>

- ✓ Temporal and peer comparability
- ✓ Data collection and management cost
- ✓ Not overlapped
- ✓ Aggregation & disaggregation

**16 Indicators  
in Gendered  
Innovations index  
(GII)**

# Development of Gendered Innovations Index (GII)

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## »» *Framework for Indicators in GI*

- Framework for indicators must be intuitive and reflect policy relevance.
- Three categories: Social Foundation, Women Empowerment, Better knowledge
  - Social Foundation: culture, institution
  - Women Empowerment: education, participation, linkage
  - Better Knowledge: knowledge infrastructure, R&D activities

## »» *Indicators detail*

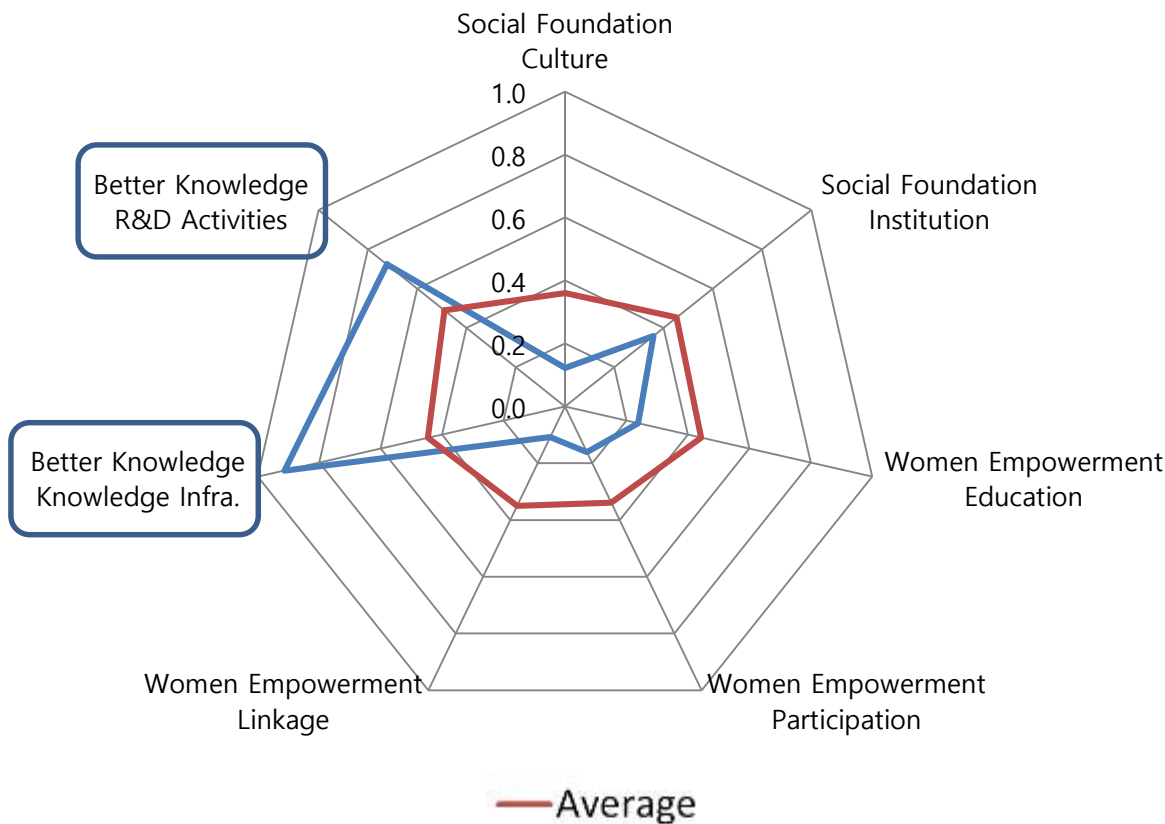
- Total 16 Indicators: 6 hard data, 8 survey data, 2 bibliometric measurement
- (Survey) 10,000 researchers were selected in five Asian countries
  - Selected countries: China, Japan, Korea, Malaysia, and Singapore
  - Average response rate in 5 countries: 2.5%
- (Patent Analysis) USPTO patent for the last 10 years (2005~2014)
  - Keyword: sex- and gender-related words (male, female, gender, etc.)
  - Keywords that are unrelated to human & patent classification were excluded
- (SCIE Analysis) Thomson Reuter Web of Science for the last 10 years (2005~2014)
  - Keyword: sex- and gender-related word (male, female, gender, etc.)
  - Keywords that are unrelated to human & science subject classification were excluded

# Structure of Gendered Innovations Index (GII)

Category	Sub-category	Indicators	Description
<b>Social Foundation</b>	<b>Culture</b>	Female estimated earned income over male value	Gender Gap Index (Female to Male Ratio)
		Openness towards accepting and applying new research methods and gender analysis	Survey(1-7 Scale)*
		Level of discrimination against women's participation in R&D	Survey(1-7 Scale)*
	<b>Institution</b>	Effectiveness of the government policy for development and employment of women researchers	Survey(1-7 Scale)*
		Effectiveness of the government policy for development and the spread of R&D methods based on gendered innovations	Survey(1-7 Scale)*
		Importance in public distribution of financial and other resources whether research proposal adopts gender analysis	Survey(1-7 Scale)*
<b>Women Empowerment</b>	<b>Education</b>	Percentage of students enrolled in science programs in tertiary education who are female	UNESCO(% of Female)
		Percentage of students enrolled in Engineering, Manufacturing and Construction programs in tertiary education who are female	UNESCO(% of Female)
	<b>Participation</b>	Total R&D personnel	UNESCO(Head Count, % of Female)
		Increase rate of Female R&D personnel	UNESCO (Head Count, CAGR for 4 years)
	<b>Linkage</b>	Women researchers' mobility (professional experience in foreign countries, more than 6 months)	Survey(Female to Male Ratio)*
		Existence of helpful policies to encourage and promote networking for women researchers	Survey(1-7 Scale)*
<b>Better Knowledge</b>	<b>Knowledge Infra.</b>	Gross domestic expenditure on R&D	UNESCO(as a Percentage of GDP)
		Existence of educational programs or research projects for gender-based analysis	Survey(1-7 Scale)*
	<b>R&amp;D Activities</b>	Percentage of SCI papers based on gendered analysis	Analysis Thomson Reuters DB (% of total SCIE papers)
		Number of US patents based on gendered analysis	Analysis USPTO DB (# of total patents for 10years)

# Pilot Study Results for Selected Asian Countries

Korea, Rep.



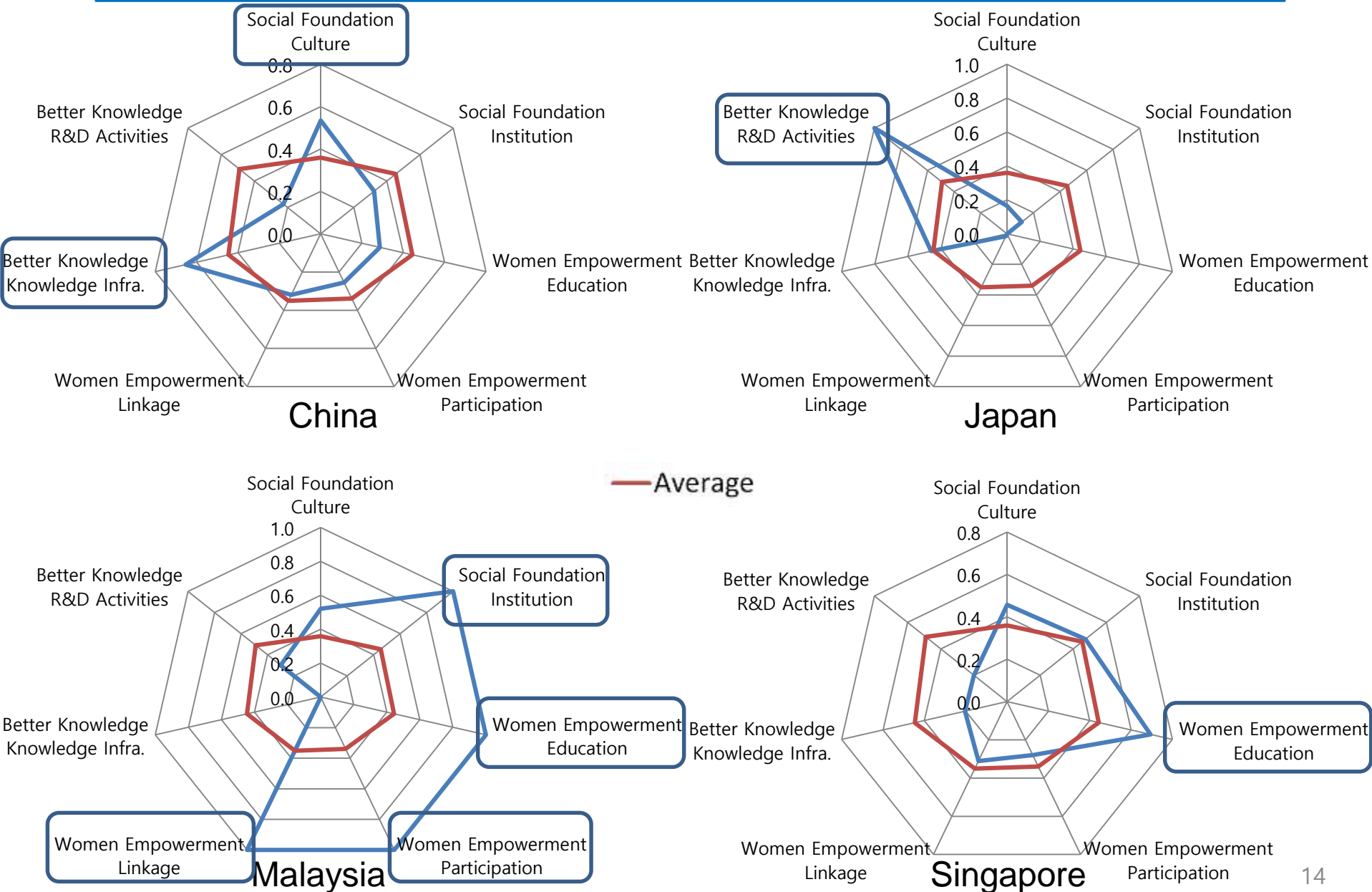
## Strengths

- Better Knowledge\_Knowledge Infra(1)
- Better Knowledge\_R&D Activities(2)

## Weaknesses

- Social Foundation\_Culture(5)
- Women Empowerment\_Linkage(4)

# Pilot Study Results for Selected Asian Countries



# Pilot Study Results for Selected Asian Countries

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<b>Country</b>	<b>Total Rank (Out of 5)</b>	<b>Total Score (0-1)</b>	<b>Social Foundation Score (0-1)</b>	<b>Women Empowerment Score (0-1)</b>	<b>Better Knowledge Score (0-1)</b>
<b>China</b>	3	0.39	0.43	0.29	0.44
<b>Japan</b>	5	0.29	0.14	0.01	0.73
<b>Korea, Rep.</b>	2	0.41	0.24	0.17	0.82
<b>Malaysia</b>	1	0.64	0.76	1.00	0.15
<b>Singapore</b>	4	0.37	0.47	0.43	0.20



# **Future Agenda** for Gendered Innovations Index

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# Conclusion

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## »» *Achievements and Limitations of Pilot Study*

- This study tries to develop indicators measuring national gendered innovations from innovation policy context
- Due to the limited availability of detailed policy and statistics in each country, there are limitations in developing indicators

## »» *Future Collaboration Agenda*

- Build **gender policy research networks** to investigate policy context and collect basic gender-sensitive statistics
- Improve **statistical quality** of **Gendered Innovations Index (GII)**
- Generate **systematic policy evaluation report** on gendered innovations and share with global networks



## Acknowledgement

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## Reference

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