



2018 ASEM Eco-innovation Index



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The PDF version is available on the ASEIC website www.aseic.org



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(Source: ASEIC Website)

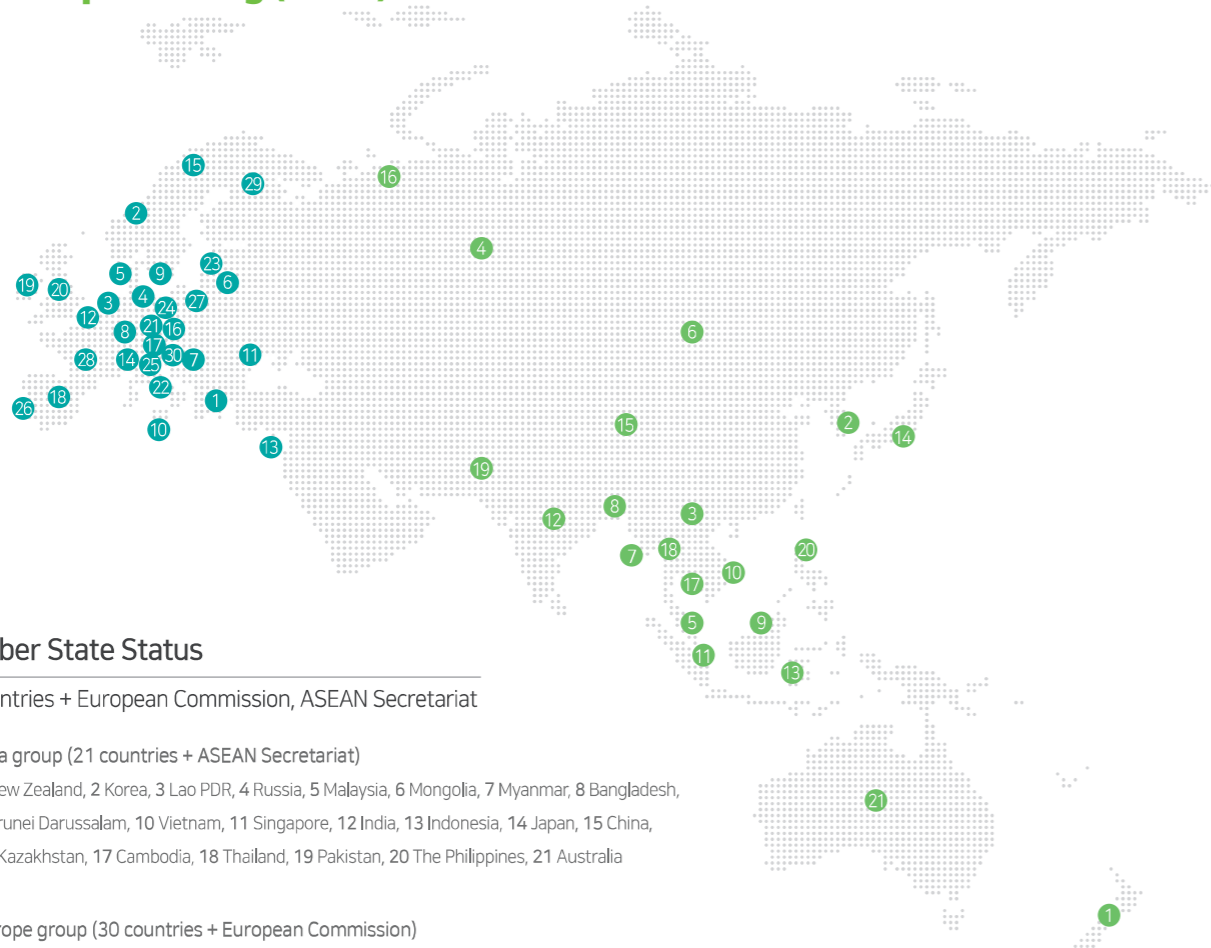
The ASEM SMEs Eco-innovation Center (ASEIC) was established in 2011 as a part of joint effort between Europe and Asia to enhance their cooperation for eco-innovative growth of small- to medium-sized enterprises (SMEs).

Established in 1996, the Asia-Europe Meeting (ASEM) initiated its intergovernmental partnership among member countries in Asia and Europe. Consisting of 51 member countries at the current status, the ASEM member countries were deeply empathetic with the importance of SMEs as a core driver of innovation and growth. For instance, SMEs accounts for 99 percent of all business in Europe while being core essence of various industries in Asia.

In order for the sustainable growth of SMEs, the ASEM attempts to define eco-innovation as an idea to achieve environmental improvements, to enhance competitiveness of enterprises and to provide new business opportunities by means of using low cost and non-technology-intensive methods.

The ASEIC, thus, an international cooperative organization, was established to widespread the principles of eco-friendly growth to SMEs as well as to support those SMEs for new business strategy by utilizing those principles.

Asia-Europe Meeting (ASEM) Members



Member State Status

51 countries + European Commission, ASEAN Secretariat

- Asia group (21 countries + ASEAN Secretariat)
 - 1 New Zealand, 2 Korea, 3 Lao PDR, 4 Russia, 5 Malaysia, 6 Mongolia, 7 Myanmar, 8 Bangladesh, 9 Brunei Darussalam, 10 Vietnam, 11 Singapore, 12 India, 13 Indonesia, 14 Japan, 15 China, 16 Kazakhstan, 17 Cambodia, 18 Thailand, 19 Pakistan, 20 The Philippines, 21 Australia
- Europe group (30 countries + European Commission)
 - 1 Greece, 2 Norway, 3 Netherlands, 4 Germany, 5 Denmark, 6 Latvia, 7 Rumania, 8 Luxembourg, 9 Lithuania, 10 Malta, 11 Bulgaria, 12 Belgium, 13 Cyprus, 14 Switzerland, 15 Sweden, 16 Slovakia, 17 Slovenia, 18 Spain, 19 Ireland, 20 United Kingdom, 21 Austria, 22 Italy, 23 Estonia, 24 Czech Republic, 25 Croatia, 26 Portugal, 27 Poland, 28 France, 29 Finland, 30 Hungary

Vision and Activities

Figure 1 ASEIC Vision

ASEIC Vision

To serve as an international platform to promote eco-innovation by providing support for technology cooperation of SMEs in ASEM member countries.



Strengthening international relations



Promoting eco-innovation related ideas and practices



Enhancing competitiveness of SMEs through technology cooperation



Achieving sustainable development goals

The ASEIC's primary vision is "to serve as an international platform to promote eco-innovation by providing support for technology cooperation of SMEs in ASEM member countries." (Refer to Figure 1 ASEIC Vision). In order to better serve the purpose of its vision, the ASEIC performs key activities can be categorized into 1) Advisory Services, 2) Knowledge Sharing and 3) Outreach and Communications



Advisory Services

Implement, facilitate and support environmental consulting services between consultants and SMEs in ASEM member countries, while providing necessary information and guidance for eco-friendly, innovative business practices. Operate the Green Business Center for SMEs in ASEM member countries desiring to expand their businesses in specific countries by providing office facilities and possible local consulting services.



Knowledge Sharing

Provide up-to-date global environmental news and issues to SMEs of ASEM member countries by operating an online web page. Share eco-innovation cases in technology, policy, and business as well as supply chain management.

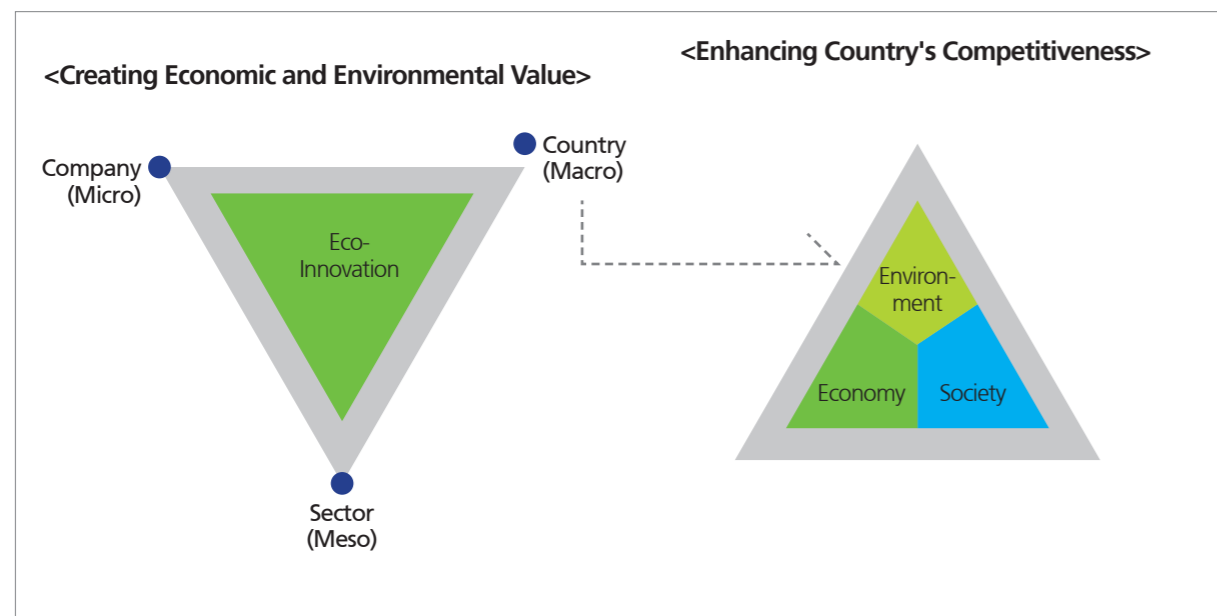


Outreach and Communications

Hold international conferences designed to exchange the best policy and business practices from ASEM member countries. Strengthen economic and institutional partnerships among ASEM member countries. Publish reports on the best examples in eco-innovation and to promote eco-friendly products and appropriate technology. Release publicity materials and publications to maximize awareness of our key activities.

One of major activities of the ASEIC includes the development and consistent reformation of the ASEI, the ASEM Eco-Innovation Index, which fundamentally assesses the sustainability of Asia and Europe. The ASEI is a comprehensive index that measures policies as well as performance of SMEs in 31 European and 20 Asian member countries.

Figure 2 Why Eco-innovation is needed



According to the OECD's report on "The Future of Eco-Innovation: The Role of Business Models in Green Transformation, eco-innovation is a "key pre-requisite for sustainable development" at macro level as it brings positive synergetic effects towards economic, social and environmental conditions of a country. International organizations, research institutes, academia, etc. are continuously emphasizing the importance of eco-innovation, highlighting the role of public and private sector to create enabling conditions.

ASEM Eco-innovation Index (ASEI) Framework

The ASEI attempts to measure the actual eco-innovation of ASEM member countries in both quantitative and qualitative perspectives by utilizing data sources gathered and computed from a variety of international organizations to increase its reliability as a universal measure of eco-innovation performance. Ultimately, the ASEI further plans to become an active means of communications between Asia and Europe while promoting reformation of respective government's rules and regulations associated with eco-innovation.

The ASEI measures nation's eco-innovation level in four grouped criteria: 1) Eco-Innovation Capacity, 2) Eco-Innovation Supporting Environment, 3) Eco-Innovation Activity and 4) Eco-Innovation Performance. Eco-Innovation Capacity measures competitive potential of nation's eco-innovation level in terms of both social, economic and human resources. Eco-Innovation Supporting Environment measures nation's political and financial support on eco-innovation based on government spending, political priorities and etc. Eco-Innovation Activity reflects actual level of actions taken by government, academy and companies with respect to enhancing level of nation's eco-innovational growth. Eco-Innovation performance demonstrates what nation has accomplished in order to tackle environmental, economic and social standpoint of eco-innovation

Table 1 ASEI 2018 Framework

Categories	1. Eco-Innovation Capacity	2. Eco-Innovation Supporting Environment	3. Eco-Innovation Activity	4. Eco-Innovation Performance
Indicators	1.1 Potential to improve national competitiveness	2.1 Government expenditure on green R&D	3.1 Number of companies with green technology	4.1 Quality of life related to environmental impacts
	1.2 General Innovation capacity of nation	2.2 Impacts of environmental regulations on corporate competitiveness	3.2 Participation level in environmental management	4.2 Greenhouse gas emission intensity
	1.3 R&D capacity for Environmental Science	2.3 Corporate priority level of sustainable development	3.3 Industry-Academic cooperation on environmental R&D	4.3 Environmental sustainability level
	1.4 Awareness level of company's sustainable management	2.4 Generation Capacity of Renewable Energy	3.4 Share of Green Patents	4.4 Employment rate in green technology industry
	1.5 Awareness level of company's sustainable management		3.5 Level of renewable energy distribution	4.5 Green industry trade market size

2018 ASEM Eco-Innovation Index (ASEI) Overview

2018 ASEI Scoring Methodology

In order to construct 2018 ASEI score, the total of 19 indicators are gathered to measure 4 sub-categories as the table below.

Table 2 Scoring Methodologies for 2018 ASEI

Area	Index Name	Scoring Method
Eco-Innovation Capacity	1.1. Potential to improve national competitiveness	WEF GCI of the year
	1.2. General innovation capacity of nation	INSEAD GII of the year
	1.3. R&D Capacity for Environmental Science	No. of environmental sciences articles for the past 5 years (total) per 10,000 persons
	1.4. Number of Researchers in Environmental Science	No. of environmental sciences article authors (Duplicate if names are indicated differently)
	1.5. Awareness level of company's sustainable management	No. of companies engaging in sustainable management for the past 5 years (total), 2018 (2014~2018)
Eco-Innovation Supporting Environment	2.1. Government expenditure on green R&D	Gov't environmental R&D expenditure ratio of the year
	2.2. Impacts of environmental regulations on corporate competitiveness	IMD survey index value of the year
	2.3. Corporate priority level of sustainable development	IMD survey index value of the year
	2.4. Generation Capacity of Renewable Energy	Renewable energy generation capacity of the year per 10,000 persons
Eco-Innovation Activities	3.1. Number of companies with green technology	Number of companies with patent applications for the past 5 years, 2017 (2013~2017)
	3.2. Participation level in environmental management	Number of environmental certification of the year per GDP (based on conversion point)
	3.3. Industry- academic cooperation on environmental R&D	Average ratio of cooperation for the past 5 year, 2016 (2012~2016)
	3.4. Share of Green patents	Share of green patent of the year
	3.5. Level of renewable energy distribution	Share of renewable energy of the year from the total of primary energy
Eco-Innovation Performances	4.1. Quality of life related to environmental impacts	Quality of life index of the year
	4.2. Greenhouse gas emission intensity	CO2 concentration per GDP of the year
	4.3. Environmental sustainability level	Indexed value of environmental sustainability rank of the year
	4.4. Employment rate in green technology industry	Number of employees of the year per 10,000 persons
	4.5. Green Industry Trade Market Size	Amount of wastes wasted of the year

Those 4 sub-categories, 1) Eco-Innovation Capacity, 2) Eco-Innovation Supporting Environment, 3) Eco-Innovation Activities and 4) Eco-Innovation Performance consist of 5, 4, 5 and 5 indicators average, respectively. In order to develop indices for each indicators between 0 and 1, the corresponding country's score was divided into the gap between the minimum score and the maximum score. However, one should note that some of those indicators may lack specific countries' data, hence sub-category scores for some countries may not represent the whole indicator scores in average.

In addition, some indicators and source data were modified from 2017 ASEI due to data availability, and hence the exact comparison analysis on time-series between 2018 ASEI and previous years are bound to some extent of limitations. The table below demonstrates the overall scores of 2018 ASEI, and the scores indicated as 2015 means the score part of 2016 ASEI of which data was developed in 2015. This goes the same to all scores indicated as 2016 and 2017 as being the score part of 2017 ASEI and 2018 ASEI respectively.

Table 3 2018 ASEI Score Overview

국가	ASEI			1. Capacity			2. Supporting Environment			3. Activity			4. Performance		
	'17	'16	'15	'17	'16	'15	'17	'16	'15	'17	'16	'15	'17	'16	'15
Norway	0.62	0.64	0.63	0.72	0.72	0.72	0.80	0.80	0.75	0.35	0.39	0.42	0.60	0.64	0.64
Denmark	0.60	0.62	0.65	0.73	0.73	0.75	0.59	0.57	0.59	0.41	0.40	0.49	0.69	0.76	0.78
Sweden	0.60	0.63	0.66	0.77	0.78	0.76	0.57	0.60	0.62	0.38	0.42	0.52	0.66	0.74	0.75
Switzerland	0.57	0.59	0.59	0.79	0.78	0.78	0.51	0.55	0.51	0.35	0.40	0.40	0.65	0.63	0.67
Germany	0.53	0.54	0.55	0.57	0.56	0.56	0.51	0.51	0.48	0.33	0.34	0.37	0.73	0.75	0.80
United Kingdom	0.51	0.48	0.50	0.57	0.58	0.59	0.42	0.33	0.35	0.34	0.33	0.34	0.72	0.70	0.73
Finland	0.51	0.54	0.56	0.71	0.73	0.74	0.50	0.56	0.52	0.28	0.29	0.38	0.54	0.58	0.59
Japan	0.51	0.50	0.53	0.46	0.46	0.47	0.53	0.50	0.52	0.41	0.45	0.47	0.63	0.61	0.66
France	0.49	0.51	0.50	0.61	0.62	0.62	0.37	0.40	0.31	0.29	0.33	0.36	0.69	0.70	0.73
Netherlands	0.48	0.47	0.48	0.62	0.62	0.61	0.42	0.41	0.38	0.27	0.27	0.31	0.63	0.59	0.63
Austria	0.46	0.48	0.49	0.49	0.51	0.49	0.47	0.45	0.43	0.31	0.34	0.38	0.58	0.63	0.65
New Zealand	0.46	0.48	0.50	0.58	0.60	0.61	0.54	0.58	0.65	0.24	0.24	0.24	0.49	0.51	0.49
Singapore	0.44	0.45	0.45	0.55	0.54	0.54	0.53	0.55	0.50	0.11	0.12	0.11	0.56	0.59	0.63
Spain	0.43	0.44	0.45	0.50	0.53	0.55	0.40	0.37	0.32	0.25	0.26	0.30	0.58	0.60	0.62
Estonia	0.43	0.44	0.39	0.49	0.50	0.49	0.55	0.54	0.46	0.32	0.39	0.28	0.35	0.33	0.32
Ireland	0.42	0.40	0.44	0.46	0.49	0.49	0.40	0.35	0.37	0.22	0.20	0.32	0.60	0.58	0.58
Portugal	0.41	0.44	0.43	0.45	0.46	0.48	0.48	0.44	0.40	0.16	0.25	0.21	0.56	0.62	0.63
Luxembourg	0.41	0.42	0.40	0.50	0.51	0.51	0.44	0.48	0.43	0.27	0.25	0.23	0.44	0.44	0.45
Australia	0.41	0.39	0.42	0.62	0.63	0.64	0.46	0.36	0.42	0.17	0.18	0.21	0.38	0.39	0.41
Belgium	0.40	0.40	0.41	0.49	0.50	0.51	0.39	0.39	0.35	0.19	0.17	0.19	0.54	0.53	0.58
Slovenia	0.39	0.38	0.37	0.44	0.44	0.44	0.45	0.35	0.31	0.14	0.21	0.21	0.52	0.51	0.53

국가	ASEI			1. Capacity			2. Supporting Environment			3. Activity			4. Performance		
	'17	'16	'15	'17	'16	'15	'17	'16	'15	'17	'16	'15	'17	'16	'15
Italy	0.38	0.37	0.38	0.38	0.37	0.37	0.32	0.27	0.30	0.25	0.25	0.28	0.58	0.57	0.56
Latvia	0.38	0.35	0.37	0.31	0.27	0.31	0.34	0.39	0.36	0.23	0.21	0.30	0.64	0.54	0.53
Lithuania	0.37	0.38	0.38	0.30	0.31	0.32	0.36	0.31	0.42	0.25	0.35	0.33	0.57	0.53	0.45
Republic of Korea	0.34	0.33	0.37	0.43	0.44	0.45	0.34	0.29	0.35	0.26	0.31	0.34	0.32	0.29	0.36
Czech Republic	0.33	0.32	0.37	0.42	0.43	0.42	0.29	0.24	0.25	0.18	0.22	0.33	0.41	0.41	0.46
Malta	0.31	0.27	0.26	0.30	0.30	0.31	0.04	0.04	0.03	0.36	0.22	0.20	0.54	0.51	0.52
Malaysia	0.31	0.33	0.36	0.36	0.35	0.35	0.43	0.42	0.48	0.09	0.13	0.14	0.36	0.41	0.46
Greece	0.30	0.31	0.34	0.29	0.30	0.31	0.26	0.22	0.26	0.15	0.21	0.28	0.50	0.50	0.51
China	0.30	0.28	0.29	0.36	0.34	0.32	0.40	0.27	0.33	0.27	0.30	0.33	0.17	0.21	0.20
Slovakia	0.29	0.34	0.36	0.30	0.31	0.29	0.17	0.23	0.31	0.21	0.34	0.32	0.48	0.48	0.50
Cyprus	0.28	0.31	0.31	0.37	0.36	0.36	0.23	0.27	0.31	0.08	0.13	0.08	0.46	0.47	0.49
Croatia	0.28	0.31	0.36	0.28	0.28	0.27	0.11	0.13	0.18	0.24	0.30	0.47	0.50	0.52	0.52
Hungary	0.28	0.28	0.32	0.26	0.24	0.27	0.23	0.18	0.24	0.14	0.21	0.22	0.48	0.49	0.53
Poland	0.28	0.27	0.29	0.31	0.31	0.29	0.31	0.26	0.31	0.11	0.12	0.17	0.38	0.40	0.39
Romania	0.27	0.32	0.32	0.21	0.22	0.23	0.17	0.16	0.17	0.23	0.40	0.45	0.48	0.49	0.43
Thailand	0.25	0.26	0.26	0.21	0.21	0.21	0.34	0.33	0.32	0.12	0.13	0.12	0.34	0.37	0.39
Bulgaria	0.23	0.28	0.33	0.22	0.22	0.21	0.13	0.20	0.34	0.20	0.31	0.37	0.37	0.38	0.40
Philippines	0.22	0.23	0.24	0.14	0.14	0.15	0.13	0.16	0.22	0.12	0.12	0.12	0.49	0.51	0.49
Indonesia	0.20	0.21	0.21	0.16	0.15	0.15	0.22	0.24	0.27	0.06	0.06	0.07	0.37	0.41	0.36
Brunei Darussalam	0.20	0.19	0.17	0.25	0.24	0.15	0.00	0.00	0.00	0.00	0.01	0.01	0.55	0.50	0.54
Russian Federation	0.18	0.20	0.21	0.22	0.21	0.20	0.15	0.18	0.24	0.12	0.15	0.18	0.23	0.27	0.22
Kazakhstan	0.17	0.21	0.19	0.15	0.17	0.15	0.34	0.45	0.39	0.04	0.05	0.04	0.14	0.17	0.16
India	0.16	0.13	0.17	0.19	0.19	0.16	0.20	0.05	0.23	0.06	0.06	0.06	0.19	0.21	0.21
Cambodia	0.14	0.15	0.15	0.08	0.08	0.09	0.01	0.01	0.01	0.23	0.24	0.26	0.26	0.27	0.25
Viet Nam	0.14	0.16	0.16	0.16	0.16	0.15	0.03	0.03	0.03	0.16	0.18	0.17	0.22	0.27	0.27
Myanmar	0.14	0.12	0.13	0.04	0.05	0.06	0.01	0.01	0.01	0.19	0.14	0.15	0.33	0.30	0.28
Lao PDR	0.13	0.16	0.09	0.06	0.07	0.08	0.12	0.12	0.10	0.16	0.28	0.14	0.18	0.19	0.06
Pakistan	0.10	0.10	0.09	0.06	0.04	0.03	0.01	0.01	0.01	0.08	0.08	0.08	0.24	0.27	0.26
Bangladesh	0.09	0.10	0.10	0.07	0.06	0.06	0.00	0.00	0.00	0.02	0.03	0.02	0.29	0.30	0.31
Mongolia	0.08	0.06	0.07	0.14	0.13	0.13	0.05	0.02	0.09	0.01	0.01	0.01	0.12	0.10	0.07

Regional Analysis

The purpose of the regional analysis is to overlook the trends of the ASEI 2018 scores and sub-category scores(① Capacity, ②Environment, ③Activities and ④Performance) by two distinct geographic regions: Asian and European regions. The regional analysis will first present time-series graph of each score from 2016 to 2018 to figure out overall three-year score pattern. It will then take a close look at comparison between previous year as well as the size of gap between each score and the regional average to discover if there was any drastic change.

Asian Region

ASEI 2018 Score

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Japan	0.53	0.50	0.51	0.51 (-)	0.27
New Zealand	0.50	0.48	0.46	0.46 (▼0.02)	0.22
Singapore	0.45	0.45	0.44	0.44 (▼0.01)	0.20
Australia	0.42	0.39	0.41	0.41 (△0.02)	0.17
Republic of Korea	0.37	0.33	0.34	0.34 (△0.01)	0.10
Malaysia	0.36	0.33	0.31	0.31 (▼0.02)	0.07
China	0.29	0.28	0.30	0.30 (△0.02)	0.06
Thailand	0.29	0.28	0.30	0.25 (▼0.01)	0.01
Philippines	0.24	0.23	0.22	0.22 (▼0.02)	-0.02
Indonesia	0.21	0.21	0.20	0.20 (▼0.01)	-0.04
Brunei Darussalam	0.17	0.19	0.20	0.20 (△0.02)	-0.04
Kazakhstan	0.19	0.21	0.17	0.17 (▼0.04)	-0.07
India	0.17	0.13	0.16	0.16 (△0.03)	-0.08
Cambodia	0.53	0.50	0.51	0.14 (△0.02)	-0.10
Viet Nam	0.15	0.15	0.14	0.14 (▼0.01)	-0.10
Myanmar	0.13	0.12	0.14	0.14 (▼0.02)	-0.10

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Lao PDR	0.09	0.16	0.13	0.13 (▼0.03)	-0.11
Pakistan	0.09	0.10	0.10	0.09 (-)	-0.14
Bangladesh	0.10	0.10	0.09	0.09 (-)	-0.15
Mongolia	0.07	0.06	0.08	0.08 (▲0.01)	-0.16

With respect to three-year ASEI score pattern, 6 countries (China, Brunei Darussalam, Myanmar, Lao PDR, Pakistan, and Mongolia) demonstrates increasing trends in time series graphs, while 14 other countries shows descending pattern between 2016 and 2018. When comparing ASEI 2018 score to the previous year, however, 7 countries (Australia, Republic of Korea, China, Brunei Darussalam, India, Cambodia and Mongolia) displays increase while there were 10 countries showing decrease in ASEI score. This means that China, Brunei Darussalam and Mongolia only maintained consistent ascending pattern between 2016 and 2018. Especially, India exhibits the largest increase with score difference of 0.03, and Kazakhstan shows the largest decrease with score difference of 0.04. In addition, the average ASEI 2018 score for Asian region is 0.24, and this is relatively lower than the average ASEI 2018 score for European region of 0.40. Out of 20 countries, 8 countries (Japan, New Zealand, Singapore, Australia, Republic of Korea, Malaysia, China and Thailand) exhibits ASEI 2018 score exceeding the regional average, while revealing much wider gaps between the maximum/minimum score and the regional average from European region.

Sub-Category 1. Eco-innovation Capacity

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Australia	0.64	0.63	0.62	0.62 (▼0.01)	0.37
New Zealand	0.61	0.60	0.58	0.58 (▼0.02)	0.32
Singapore	0.54	0.54	0.55	0.55 (▲0.01)	0.29
Japan	0.47	0.46	0.46	0.46 (-)	0.21
Republic of Korea	0.45	0.44	0.43	0.43 (▼0.01)	0.18
Malaysia	0.35	0.35	0.36	0.36 (▲0.02)	0.11
China	0.32	0.34	0.36	0.36 (▲0.02)	0.10
Brunei Darussalam	0.15	0.24	0.25	0.25 (▲0.01)	0.00
Thailand	0.21	0.21	0.21	0.21 (-)	-0.04

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
India	0.16	0.19	0.19	0.19 (▲0.01)	-0.06
Viet Nam	0.15	0.16	0.15	0.16 (-)	-0.09
Indonesia	0.15	0.15	0.16	0.16 (▲0.01)	-0.09
Kazakhstan	0.15	0.17	0.15	0.15 (▼0.02)	-0.11
Mongolia	0.13	0.13	0.14	0.14 (-)	-0.12
Philippines	0.15	0.14	0.14	0.14 (▼0.01)	-0.12
Cambodia	0.09	0.08	0.08	0.08 (▼0.01)	-0.18
Bangladesh	0.06	0.06	0.07	0.07 (-)	-0.19
Lao PDR	0.08	0.07	0.06	0.06 (▼0.01)	-0.19
Pakistan	0.03	0.04	0.06	0.06 (▲0.01)	-0.20
Myanmar	0.06	0.05	0.04	0.04 (-)	-0.21

While 6 countries (China, Brunei Darussalam, Myanmar, Lao PDR, Pakistan and Mongolia) showed increase in three-year time series graph in overall ASEI score, this sub-category of Eco-Innovation Capacity score displays 10 countries (Singapore, Malaysia, China, Brunei Darussalam, India, Viet Nam, Indonesia, Mongolia, Bangladesh and Pakistan) with overall increase from 2016 to 2018 score. This means that China, Brunei Darussalam, Pakistan and Mongolia's increasing trends in Eco-Innovation Capacity score may have influenced on the overall ASEI score trends. On the other hand, when comparing 2018 Eco-Innovation Capacity score with the previous year, 7 countries (Singapore, Malaysia, China, Brunei Darussalam, India, Indonesia, Pakistan) shows increase in score and excludes Viet Nam, Mongolia and Bangladesh from corresponding with three-year ascending pattern. In terms of the difference between the 2017 and 2018 score, Malaysia shows the largest increase of 0.20 and New Zealand with the largest decrease of 0.20. Moreover, the average Eco-Innovation Capacity score is 0.25, which is 0.01 score higher than the regional average of ASEI 2018 score. Out of 20 countries, 7 countries (Australia, New Zealand, Singapore, Japan, Republic of Korea, Malaysia and China) displays Eco-Innovation Capacity score exceeding the regional average, showing comparable dependency of a few countries (8 countries for ASEI 2018 score) leading regional scores with ASEI 2018 score.

Sub-Category 2. Eco-Innovation Supporting Environment

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
New Zealand	0.65	0.58	0.54	0.54 (▼0.04)	0.31
Japan	0.52	0.50	0.53	0.53 (△0.03)	0.29
Singapore	0.50	0.55	0.53	0.53 (▼0.02)	0.29
Australia	0.42	0.36	0.46	0.46 (△0.10)	0.23
Malaysia	0.48	0.42	0.43	0.43 (△0.01)	0.19
China	0.33	0.27	0.40	0.40 (△0.13)	0.17
Kazakhstan	0.39	0.45	0.34	0.34 (▼0.10)	0.11
Republic of Korea	0.35	0.29	0.34	0.34 (△0.05)	0.11
Thailand	0.32	0.33	0.34	0.34 (△0.01)	0.10
Indonesia	0.27	0.24	0.22	0.22 (▼0.02)	-0.02
India	0.23	0.05	0.20	0.20 (△0.15)	-0.04
Philippines	0.22	0.16	0.13	0.13 (▼0.03)	-0.10
Lao PDR	0.10	0.12	0.12	0.12 (-)	-0.11
Mongolia	0.09	0.02	0.05	0.05 (△0.03)	-0.18
Viet Nam	0.03	0.03	0.03	0.03 (-)	-0.20
Cambodia	0.01	0.01	0.01	0.01 (-)	-0.22
Myanmar	0.01	0.01	0.01	0.01 (-)	-0.22
Pakistan	0.01	0.01	0.01	0.01 (-)	-0.23
Brunei Darussalam	0.00	0.00	0.00	0.00 (-)	-0.23
Bangladesh	0.00	0.00	0.00	0.00 (-)	-0.23

In case with Sub-category of Eco-Innovation Supporting Environment, 6 countries (Japan, Singapore, Australia, China, Thailand and Lao PDR) illustrates increase in three-year time series graph, and this show corresponding pattern with China and Lao PDR in overall ASEI score. Note that for some countries (eg. Viet Nam, Cambodia, Myanmar, Pakistan, Brunei Darussalam and Bangladesh) showing either slight descending or ascending pattern despite of no change in figures, and the report will disregard this difference since it means that the change has occurred outside the perceptible boundary of more than 0.01. When comparing 2018 Eco-Innovation Supporting Environment Score with the previous year, 8 countries (Japan, Australia, Malaysia, China, Republic of Korea, Thailand, India and Mongolia) illustrates increases in score, and Japan, Australia, China and Thailand shows the same ascending pattern with three-year time series. 5 countries shows decrease in score between 2017 and 2018. In addition, the difference between the 2017 and 2018 is the largest for India in increase and Kazakhstan in decrease for 0.15 and 0.10 respectively. The regional average Eco-Innovation Supporting Environment score is 0.23, and this is 0.01 score lower than the regional average of ASEI 2018 score. Also, 9 (New Zealand, Japan, Singapore, Australia, Malaysia, China, Kazakhstan, Republic of Korea and Thailand) out of 20 countries exhibits Eco-Innovation Supporting Environment score over the regional average, representing relatively even distribution of score than ASEI 2018 score.

Sub-Category 3. Eco-Innovation Activity

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Japan	0.47	0.45	0.41	0.41 (▼0.04)	0.27
China	0.33	0.30	0.27	0.27 (▼0.03)	0.13
Republic of Korea	0.34	0.31	0.26	0.26 (▼0.04)	0.12
New Zealand	0.24	0.24	0.24	0.24 (▼0.01)	0.10
Cambodia	0.26	0.24	0.23	0.23 (▼0.01)	0.09
Myanmar	0.15	0.14	0.19	0.19 (△0.05)	0.05
Australia	0.22	0.18	0.17	0.17 (▼0.01)	0.03
Viet Nam	0.17	0.18	0.16	0.16 (▼0.02)	0.02
Lao PDR	0.14	0.28	0.16	0.16 (▼0.12)	0.02
Thailand	0.12	0.13	0.12	0.12 (▼0.01)	-0.02
Philippines	0.12	0.12	0.12	0.12 (-)	-0.02

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Singapore	0.11	0.12	0.11	0.11 (-)	-0.03
Malaysia	0.14	0.13	0.09	0.09 (▼0.03)	-0.05
Pakistan	0.08	0.08	0.08	0.08 (-)	-0.06
India	0.06	0.06	0.06	0.06 (-)	-0.08
Indonesia	0.07	0.06	0.06	0.06 (-)	-0.08
Kazakhstan	0.04	0.05	0.04	0.04 (▼0.01)	-0.10
Bangladesh	0.02	0.03	0.02	0.02 (-)	-0.12
Mongolia	0.01	0.01	0.01	0.01 (-)	-0.13
Brunei Darussalam	0.00	0.00	0.00	0.00 (-)	-0.14

For Sub-Category of Eco-Innovation Activity score, only Myanmar and Lao PDR displays overall increase in three-year score, when overall ASEI score showed 6 countries (China, Brunei Darussalam, Myanmar, Lao PDR, Pakistan and Mongolia) with increasing pattern. This may imply that countries in Asian region endeavors less efforts towards Eco-Innovation Activity than other sub-categories. Furthermore, only Myanmar displays increase when 2018 Eco-Innovation Activity score is compared to the previous year, and 11 countries demonstrated decrease in Eco-Innovation Activity score between 2017 and 2018. As in the case of Eco-Innovation Supporting Environment score, in addition, figures less than 0.01 will be disregarded hence the slight descending or ascending pattern in time series graph despite the same number will not be considered as changes in score. With respect to the regional average score, the score is 0.14 with much smaller number than ASEI 2018 regional average of 0.24. Out of 20 countries, 9 countries (Japan, China, Republic of Korea, New Zealand, Cambodia, Myanmar, Australia, Viet Nam and Lao PDR) exceeds the regional average score, suggests even distribution of scores. Overall, Asia region appears to lack in Eco-Innovation Activity.

Sub-Category 4. Eco-Innovation Performance

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Asia Average
	2016	2017	2018		
Japan	0.66	0.61	0.63	0.63 (Δ0.02)	0.30
Singapore	0.63	0.59	0.56	0.56 (▼0.02)	0.23
Brunei Darussalam	0.54	0.50	0.55	0.55 (Δ0.05)	0.22
Philippines	0.49	0.51	0.49	0.49 (▼0.02)	0.16
New Zealand	0.49	0.51	0.49	0.49 (▼0.02)	0.16
Australia	0.41	0.39	0.38	0.38 (▼0.01)	0.05
Indonesia	0.36	0.41	0.37	0.37 (▼0.03)	0.04
Malaysia	0.46	0.41	0.36	0.36 (▼0.05)	0.03
Thailand	0.39	0.37	0.34	0.34 (▼0.04)	0.01
Myanmar	0.28	0.30	0.33	0.33 (Δ0.02)	-0.00
Republic of Korea	0.36	0.29	0.35	0.32 (Δ0.04)	-0.01
Bangladesh	0.31	0.30	0.29	0.29 (▼0.01)	-0.04
Cambodia	0.25	0.27	0.26	0.26 (▼0.01)	-0.07
Pakistan	0.26	0.27	0.24	0.24 (▼0.03)	-0.09
Viet Nam	0.27	0.27	0.22	0.22 (▼0.05)	-0.11
India	0.21	0.21	0.19	0.19 (▼0.03)	-0.14
Lao PDR	0.06	0.19	0.18	0.18 (▼0.01)	-0.16
China	0.20	0.21	0.17	0.17 (▼0.04)	-0.16
Kazakhstan	0.16	0.17	0.14	0.14 (▼0.03)	-0.19
Mongolia	0.07	0.10	0.12	0.12 (Δ0.02)	-0.21

ASEM Eco-Innovation Index (ASEI)

Out of 20 countries, 6 countries (Brunei Darussalam, Indonesia, Myanmar, Cambodia, Lao PDR and Mongolia) exhibits increase in time series trends in Eco-Innovation Performance score, which is similar to 6 countries (China, Brunei Darussalam, Myanmar, Lao PDR, Pakistan and Mongolia) for overall ASEI score. Additionally, when comparing 2018 Eco-Innovation Performance score with 2017 score, 5 countries (Japan, Brunei Darussalam, Myanmar, Republic of Korea and Mongolia) displays increase and rest of 15 countries in Asian regions illustrates decrease in score. Regarding the size of increase and decrease, Brunei Darussalam shows the largest increase of 0.05 and Malaysia with the largest decrease of 0.05. Furthermore, the regional average of Eco-Innovation Performance score is 0.33, which is 0.09 score higher than the regional average of overall ASEI score, and Eco-Innovation Performance scores of 9 countries (Japan, Singapore, Brunei Darussalam, Philippines, New Zealand, Australia, Indonesia, Malaysia and Thailand) are more than the regional average.

European Region

ASEI 2018 Score

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Norway	0.63	0.64	0.62	0.62 (▼0.02)	0.22
Denmark	0.65	0.62	0.60	0.60 (▼0.01)	0.20
Sweden	0.66	0.63	0.60	0.60 (▼0.04)	0.19
Switzerland	0.59	0.59	0.57	0.57 (▼0.02)	0.17
Germany	0.55	0.54	0.53	0.53 (▼0.01)	0.13
United Kingdom	0.50	0.48	0.51	0.51 (▲0.03)	0.11
Finland	0.56	0.54	0.51	0.51 (▼0.03)	0.11
France	0.50	0.51	0.49	0.49 (▼0.02)	0.09
Netherlands	0.48	0.47	0.48	0.48 (▲0.01)	0.08
Austria	0.49	0.48	0.46	0.46 (▼0.02)	0.06
Spain	0.45	0.44	0.43	0.43 (▼0.01)	0.03
Estonia	0.39	0.44	0.43	0.43 (▼0.01)	0.03
Ireland	0.44	0.40	0.42	0.42 (▲0.02)	0.02

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Portugal	0.43	0.44	0.41	0.41 (▼0.03)	0.01
Luxembourg	0.40	0.42	0.41	0.41 (▼0.01)	0.01
Belgium	0.41	0.40	0.40	0.40 (-)	0.00
Slovenia	0.37	0.38	0.39	0.39 (▲0.02)	-0.01
Italy	0.38	0.37	0.38	0.38 (▲0.02)	-0.02
Latvia	0.37	0.35	0.38	0.38 (▲0.03)	-0.02
Lithuania	0.38	0.38	0.37	0.37 (▼0.01)	-0.03
Czech Republic	0.37	0.32	0.33	0.33 (-)	-0.08
Malta	0.26	0.27	0.31	0.31 (▲0.04)	-0.09
Greece	0.34	0.31	0.30	0.30 (▼0.01)	-0.10
Slovakia	0.36	0.34	0.29	0.29 (▼0.05)	-0.11
Cyprus	0.31	0.31	0.28	0.28 (▼0.03)	-0.12
Croatia	0.36	0.31	0.28	0.28 (▼0.02)	-0.12
Hungary	0.32	0.28	0.28	0.28 (-)	-0.12
Poland	0.29	0.27	0.28	0.28 (▲0.01)	-0.12
Romania	0.32	0.32	0.27	0.27 (▼0.04)	-0.13
Bulgaria	0.33	0.28	0.23	0.23 (▼0.05)	-0.17
Russian Federation	0.21	0.20	0.18	0.18 (▼0.02)	-0.22

Pertaining to the three-year ASEI score pattern, 6 countries (United Kingdom, Estonia, Luxembourg, Slovenia, Latvia and Malta) displays rise in their time series graphs, while 25 countries shows downhill trends. When this ASEI 2018 score is compared to 2017 ASEI score, 8 countries (United Kingdom, Netherlands, Ireland, Slovenia, Italy, Latvia, Malta and Poland) displays increase in its score, and only 4 countries (United Kingdom, Slovenia, Latvia and Malta) shares the same consistent uphill trends. 20 countries shows decrease and 3 countries maintained the same score when compared to the previous year. While Greece showing the largest decrease of 0.05 in ASEI score between 2017 and 2018, Malta shows the largest increase in score of 0.04. In addition, the average ASEI 2018 score for

ASEM Eco-Innovation Index (ASEI)

European region is 0.40, and this is relatively higher than the average ASEI 2018 score for Asian region of 0.24. 17 countries out of 31 countries exhibit 2018 ASE scores over the regional average, displaying even distribution between minimum and maximum overall ASEI 2018 scores.

Sub-Category 1. Eco-Innovation Capacity

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Switzerland	0.78	0.78	0.79	0.79 (Δ0.01)	0.33
Sweden	0.76	0.78	0.77	0.77 (▼0.01)	0.31
Denmark	0.75	0.73	0.73	0.73 (-)	0.27
Norway	0.72	0.72	0.72	0.72 (-)	0.27
Finland	0.74	0.73	0.71	0.71 (▼0.02)	0.26
Netherlands	0.61	0.62	0.62	0.62 (-)	0.17
France	0.62	0.62	0.61	0.61 (▼0.01)	0.16
United Kingdom	0.59	0.58	0.57	0.57 (▼0.01)	0.12
Germany	0.56	0.56	0.57	0.57 (Δ0.01)	0.11
Spain	0.55	0.53	0.50	0.50 (▼0.03)	0.04
Luxembourg	0.51	0.51	0.50	0.50 (▼0.01)	0.04
Estonia	0.49	0.50	0.49	0.49 (▼0.01)	0.04
Austria	0.49	0.51	0.49	0.49 (▼0.02)	0.04
Belgium	0.51	0.50	0.49	0.49 (▼0.02)	0.03
Ireland	0.49	0.49	0.46	0.46 (▼0.02)	0.01
Portugal	0.48	0.46	0.45	0.45 (▼0.01)	-0.00
Slovenia	0.44	0.44	0.44	0.44 (▼0.01)	-0.02
Czech Republic	0.42	0.43	0.42	0.42 (-)	-0.03
Italy	0.37	0.37	0.38	0.38 (Δ0.01)	-0.07
Cyprus	0.36	0.36	0.37	0.37 (-)	-0.09

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Poland	0.29	0.31	0.31	0.31 (-)	-0.15
Latvia	0.31	0.27	0.31	0.31 (Δ0.04)	-0.15
Slovakia	0.29	0.31	0.30	0.30 (-)	-0.15
Lithuania	0.32	0.31	0.30	0.30 (▼0.01)	-0.15
Malta	0.31	0.30	0.30	0.30 (-)	-0.15
Greece	0.31	0.30	0.29	0.29 (▼0.01)	-0.16
Croatia	0.27	0.28	0.28	0.28 (Δ0.01)	-0.17
Hungary	0.27	0.24	0.26	0.26 (Δ0.02)	-0.19
Russian Federation	0.20	0.21	0.22	0.22 (Δ0.01)	-0.24
Bulgaria	0.21	0.22	0.22	0.22 (-)	-0.24
Romania	0.23	0.22	0.21	0.21 (▼0.01)	-0.24

While 6 countries (United Kingdom, Estonia, Luxembourg, Slovenia, Latvia and Malta) displayed uphill trends in three-year time series graph of overall ASEI score, 11 countries (Switzerland, Sweden, Netherlands, Germany, Italy, Cyprus, Poland, Slovakia, Croatia, Russian Federation and Bulgaria) indicated ascending patterns in such time series graph for sub-category of Eco-Innovation Capacity score, and those overall ASEI score and Eco-Innovation Capacity score do not share any corresponding country for this time series trends. Also, when 2018 Eco-Innovation Capacity score is compared to the previous year, 7 countries (Switzerland, Germany, Italy, Latvia, Croatia, Hungary and Russian Federation) indicated increases, and this means that 5 of these countries (Switzerland, Germany, Italy, Croatia and Russian Federation) share the consistent increasing pattern between 2016 and 2018. 15 countries displays decrease in scores and 9 countries maintained the same score from the previous year, and the largest increase in score between 2017 and 2018 was Czech Republic of 0.04 and the largest decrease was Greece with 0.05 in score. Additionally, the regional average score for Eco-Innovation Capacity is 0.45, which is 0.05 score higher than overall ASEI 2018 score. Out of 31 countries, approximately half (15 countries) displays exceeding score than the regional average Eco-Innovation Capacity score, reflecting even distribution between scores.

Sub-Category 2. Eco-Innovation Supporting Environment

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Norway	0.75	0.80	0.80	0.80 (-)	0.43
Denmark	0.59	0.57	0.59	0.59 (Δ0.01)	0.22
Sweden	0.62	0.60	0.57	0.57 (▼0.03)	0.21
Estonia	0.46	0.54	0.55	0.55 (Δ0.01)	0.18
Switzerland	0.51	0.55	0.51	0.51 (▼0.05)	0.14
Germany	0.48	0.51	0.51	0.51 (-)	0.14
Finland	0.52	0.56	0.50	0.50 (▼0.05)	0.14
Portugal	0.40	0.44	0.48	0.48 (Δ0.04)	0.11
Austria	0.43	0.45	0.47	0.47 (Δ0.02)	0.10
Slovenia	0.31	0.35	0.45	0.45 (Δ0.11)	0.09
Luxembourg	0.43	0.48	0.44	0.44 (▼0.03)	0.07
United Kingdom	0.35	0.33	0.42	0.42 (Δ0.09)	0.06
Netherlands	0.38	0.41	0.42	0.42 (-)	0.05
Ireland	0.37	0.35	0.40	0.40 (Δ0.05)	0.03
Spain	0.32	0.37	0.40	0.40 (Δ0.02)	0.03
Belgium	0.35	0.39	0.39	0.39 (-)	0.02
France	0.31	0.40	0.37	0.37 (▼0.03)	0.01
Lithuania	0.42	0.31	0.36	0.36 (Δ0.04)	-0.01
Latvia	0.36	0.39	0.34	0.34 (▼0.04)	-0.02
Italy	0.30	0.27	0.32	0.32 (Δ0.05)	-0.04
Poland	0.31	0.26	0.31	0.31 (Δ0.05)	-0.06
Czech Republic	0.25	0.24	0.29	0.29 (Δ0.05)	-0.08
Greece	0.26	0.22	0.26	0.26 (Δ0.04)	-0.11

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Hungary	0.24	0.18	0.23	0.23 (Δ0.05)	-0.13
Cyprus	0.31	0.27	0.23	0.23 (▼0.05)	-0.14
Romania	0.17	0.16	0.17	0.17 (Δ0.01)	-0.20
Slovakia	0.31	0.23	0.17	0.17 (▼0.06)	-0.20
Russian Federation	0.24	0.18	0.15	0.15 (▼0.03)	-0.22
Bulgaria	0.34	0.20	0.13	0.13 (▼0.06)	-0.23
Croatia	0.18	0.13	0.11	0.11 (▼0.02)	-0.26
Malta	0.03	0.04	0.04	0.04 (Δ0.01)	-0.32

In terms of sub-category Eco-Innovation Supporting Environment score, 15 countries (Norway, Estonia, Germany, Portugal, Austria, Slovenia, United Kingdom, Netherlands, Ireland, Spain, Belgium, France, Italy, Czech Republic and Malta) demonstrate rising trends in three-year time series graph, while 4 countries (United Kingdom, Estonia, Slovenia, Malta) shares same ascending pattern with overall ASEI score. This means that overall ASEI score and Eco-Innovation Supporting Environment do not share much correlation for three-year score patterns. When comparing 2018 Eco-Innovation Supporting Environment score with the previous year, 16 countries (Denmark, Estonia, Portugal, Austria, Slovenia, United Kingdom, Ireland, Spain, Lithuania, Italy, Poland, Czech Republic, Greece, Hungary, Romania and Malta) illustrates increase in its score, while 11 countries showing decrease and 4 countries remaining the same score from the previous year. Moreover, the regional average of Eco-Innovation Supporting Environment score is 0.37, which is 0.03 score lower than the regional average of overall ASEI score, and 17 countries shows scores beyond the regional average.

Sub-Category 3. Eco-Innovation Activity

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Denmark	0.75	0.80	0.80	0.80 (-)	0.43
Sweden	0.59	0.57	0.59	0.59 (Δ0.01)	0.22
Malta	0.62	0.60	0.57	0.57 (▼0.03)	0.21
Norway	0.46	0.54	0.55	0.55 (Δ0.01)	0.18
Switzerland	0.51	0.55	0.51	0.51 (▼0.05)	0.14

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
United Kingdom	0.48	0.51	0.51	0.51 (-)	0.14
Germany	0.52	0.56	0.50	0.50 (▼0.05)	0.14
Estonia	0.40	0.44	0.48	0.48 (Δ0.04)	0.11
Austria	0.43	0.45	0.47	0.47 (Δ0.02)	0.10
France	0.31	0.35	0.45	0.45 (Δ0.11)	0.09
Finland	0.43	0.48	0.44	0.44 (▼0.03)	0.07
Luxembourg	0.35	0.33	0.42	0.42 (Δ0.09)	0.06
Netherlands	0.38	0.41	0.42	0.42 (-)	0.05
Lithuania	0.37	0.35	0.40	0.40 (Δ0.05)	0.03
Spain	0.32	0.37	0.40	0.40 (Δ0.02)	0.03
Italy	0.35	0.39	0.39	0.39 (-)	0.02
Croatia	0.31	0.40	0.37	0.37 (▼0.03)	0.01
Romania	0.42	0.31	0.36	0.36 (Δ0.04)	-0.01
Latvia	0.36	0.39	0.34	0.34 (▼0.04)	-0.02
Ireland	0.30	0.27	0.32	0.32 (Δ0.05)	-0.04
Slovakia	0.31	0.26	0.31	0.31 (Δ0.05)	-0.06
Bulgaria	0.25	0.24	0.29	0.29 (Δ0.05)	-0.08
Belgium	0.26	0.22	0.26	0.26 (Δ0.04)	-0.11
Czech Republic	0.24	0.18	0.23	0.23 (Δ0.05)	-0.13
Portugal	0.31	0.27	0.23	0.23 (▼0.05)	-0.14
Greece	0.17	0.16	0.17	0.17 (Δ0.01)	-0.20
Hungary	0.31	0.23	0.17	0.17 (▼0.06)	-0.20
Slovenia	0.24	0.18	0.15	0.15 (▼0.03)	-0.22
Russian Federation	0.34	0.20	0.13	0.13 (▼0.06)	-0.23

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Poland	0.18	0.13	0.11	0.11 (▼0.02)	-0.26
Cyprus	0.03	0.04	0.04	0.04 (Δ0.01)	-0.32

16 countries (Denmark, Norway, United Kingdom, Estonia, Austria, France, Finland, Luxembourg, Netherlands, Lithuania, Spain, Italy, Croatia, Ireland, Bulgaria and Cyprus) out of 31 countries illustrates rising patterns in three-year time series graph for Eco-Innovation Activity score from 2016 to 2018, and among those 16 countries, 3 countries (United Kingdom, Estonia and Luxembourg) share corresponding uphill patterns with overall ASEI score. While comparison between 2017 and 2018 scores of Eco-Innovation Activity showing 16 countries (Sweden, Norway, Estonia, Austria, France, Luxembourg, Lithuania, Spain, Romania, Ireland, Slovakia, Bulgaria, Belgium, Czech Republic, Greece and Cyprus) with increase in score, 9 countries (Norway, Estonia, Austria, France, Luxembourg, Lithuania, Spain, Ireland and Cyprus) exhibits the steady increase in Eco-Innovation Activity scores from 2016 and 2018. 11 countries displays decrease in score between 2017 and 2018, and 4 countries maintained the same score between 2017 and 2018 with the largest increase of Belgium with 0.02 and the largest decrease of Romania with 0.17. Also, the regional average of Eco-Innovation Activity score is 0.25, which is the lowest score among sub-categories, and 17 countries shows scores beyond the regional average.

Sub-Category 4. Eco-Innovation Performance

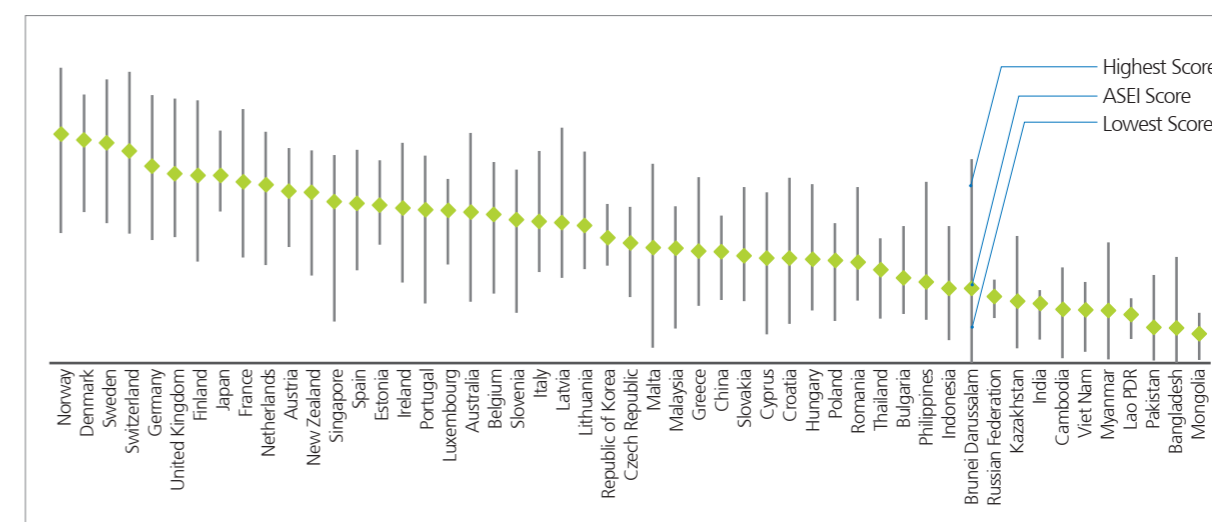
Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Germany	0.80	0.75	0.73	0.73 (▼0.03)	0.19
United Kingdom	0.73	0.70	0.72	0.72 (Δ0.01)	0.18
Denmark	0.78	0.76	0.69	0.69 (▼0.07)	0.15
France	0.73	0.70	0.69	0.69 (▼0.01)	0.15
Sweden	0.75	0.74	0.66	0.66 (▼0.08)	0.12
Switzerland	0.67	0.63	0.65	0.65 (Δ0.01)	0.11
Latvia	0.53	0.54	0.64	0.64 (Δ0.10)	0.10
Netherlands	0.63	0.59	0.63	0.63 (Δ0.04)	0.09
Norway	0.64	0.64	0.60	0.60 (▼0.03)	0.06
Ireland	0.58	0.58	0.60	0.60 (Δ0.02)	0.06

Country	Graphs			ASEI 2018 (vs. 2017)	Gap from Europe Average
	2016	2017	2018		
Austria	0.65	0.63	0.58	0.58 (▼0.04)	0.04
Spain	0.62	0.60	0.58	0.58 (▼0.02)	0.04
Italy	0.56	0.57	0.58	0.58 (-)	0.04
Lithuania	0.45	0.53	0.57	0.57 (Δ0.04)	0.03
Portugal	0.63	0.62	0.56	0.56 (▼0.05)	0.02
Belgium	0.58	0.53	0.57	0.54 (Δ0.01)	0.01
Malta	0.52	0.51	0.54	0.54 (Δ0.03)	0.00
Finland	0.59	0.58	0.54	0.54 (▼0.05)	0.00
Slovenia	0.53	0.51	0.52	0.52 (Δ0.01)	-0.01
Greece	0.51	0.50	0.50	0.50 (-)	-0.04
Croatia	0.52	0.52	0.50	0.50 (▼0.01)	-0.04
Hungary	0.53	0.49	0.48	0.48 (▼0.01)	-0.05
Slovakia	0.50	0.48	0.48	0.48 (-)	-0.06
Romania	0.43	0.49	0.48	0.48 (▼0.02)	-0.06
Cyprus	0.49	0.47	0.46	0.46 (▼0.01)	-0.08
Luxembourg	0.45	0.44	0.44	0.44 (-)	-0.10
Czech Republic	0.46	0.41	0.41	0.41 (-)	-0.13
Poland	0.39	0.40	0.38	0.38 (▼0.02)	-0.16
Bulgaria	0.40	0.38	0.37	0.37 (▼0.01)	-0.17
Estonia	0.32	0.33	0.35	0.35 (Δ0.02)	-0.19
Russian Federation	0.22	0.27	0.23	0.23 (▼0.04)	-0.31

With respect to the Eco-Innovation Performance score, 7 countries (Latvia, Ireland, Italy, Lithuania, Malta, Romania and Estonia) shows ascending pattern in three-year time series graph between 2016 and 2018, while 6 countries (United Kingdom, Estonia, Luxembourg, Slovenia, Latvia and Malta) illustrates rising trends for overall ASEI score. In addition, when 2018 Eco-Innovation performance score is compared to the previous year, 9 countries (United

Kingdom, Switzerland, Latvia, Netherlands, Ireland, Lithuania, Belgium, Malta and Slovenia) shows increase in its score, meaning 4 countries (Latvia, Ireland, Lithuania and Malta) exhibiting consistent increasing trends between 2016 and 2018. 13 countries displays decrease in score while 9 countries remained the same. Furthermore, the largest increase in gap between 2017 and 2018 was Latvia with 0.1, and the largest decrease was Denmark with 0.07 difference. The regional average for Eco-Innovation performance score was the highest among sub-categories with score of 0.54, and 18 countries illustrates scores beyond the regional average. This may represent that European region shows strong endeavor towards Eco-Innovation Performance.

Gap Analysis by Countries



The purpose of Gap Analysis is to visualize the distance between highest- and lowest- sub-category scores from ASEI score, in order to examine the volatility of one country's endeavor on each sub-category. This Gap analysis is developed in reference to the Distance to Frontier scoring method from the World Bank's measurement of Doing Business. While Distance to Frontier measures the gap between scores of the current status and scores of the maximum and minimum performance regardless of the time and era, this report only considered the maximum and minimum performance for the time period of 2018 since there is a limitation of time series analysis as mentioned in <2018 ASEM Eco-innovation (ASEI) Measurement> section. Also, the report attempts to lean more on taking a snapshot of ASEI 2018 score and refer to other time series scores as mere references for trends, hence it appears to be more suitable for this report to consider 2018 scores only.

The analysis represents the gaps between the ASEI 2018 score and one of the maximum and minimum scores consisting ASEI 2018 (ie. One of Capacity, Supporting Environment, Activity and Performance score). The length of the bar means there is a large volatility in scoring aspects. Among ASEI member countries, Brunei Darussalam exhibits the largest gap of 0.55 between maximum and minimum sub-category scores, while Eco-Innovation Performance score being 0.55 and Eco-Innovation Supporting Environment score being 0.00. Top 5 countries with the largest volatility among different sub-categories are Brunei Darussalam, Malta, Australia, Singapore, and Norway with score gap of 0.55, 0.50, 0.46, 0.45 and 0.45 respectively. These countries may need some measures

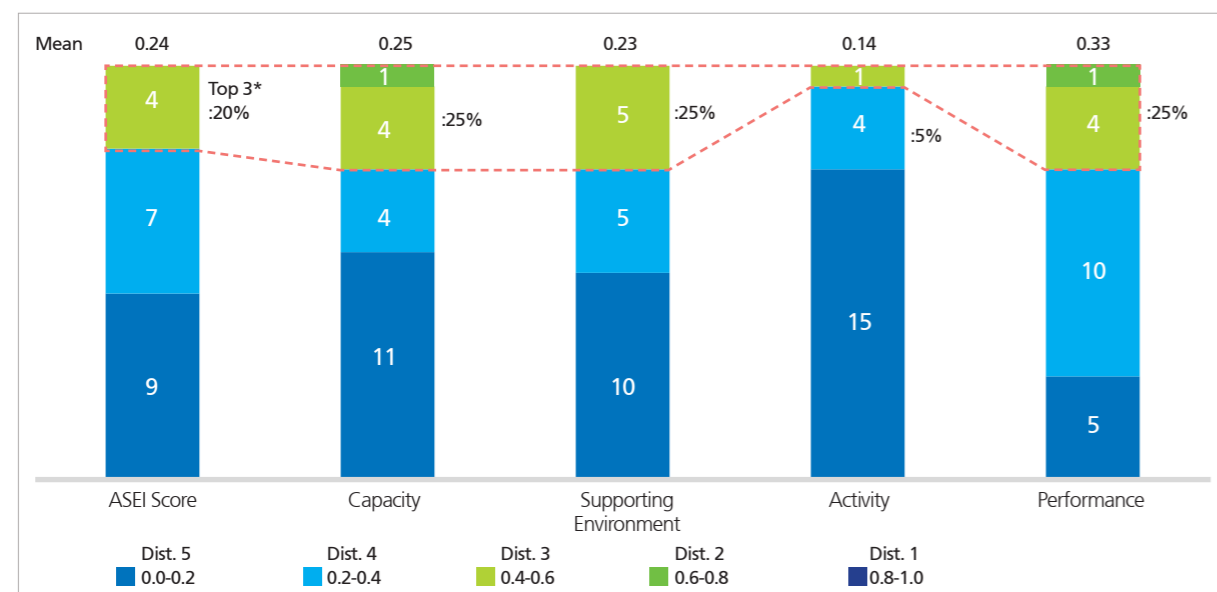
to stabilize gaps among different sub-categories. On the other hand, Russian Federation displays the smallest gap of 0.10 between maximum and minimum sub-category scores, while Eco-Innovation Activity score being 0.12 and Eco-Innovation Performance being 0.23. Top 5 countries with the most stability among different sub-categories are Russian Federation, Lao PDR, Mongolia, India and Republic of Korea with score gap of 0.10, 0.11, 0.13, 0.13 and 0.17 respectively.

As opposed to the overall volatility trends in minimum and maximum sub-category score, one side of tails being longer than the other side (i.e. either gap between maximum score and ASEI score or gap between minimum score and ASEI score) represents there is an outlying sub-category score that is distant from other sub-category score levels. For instance, Brunei Darussalam shows relatively longer tail from maximum sub-category score to ASEI score than minimum sub-category score to ASEI score, and this means that the maximum sub-category score, which is Eco-Innovation Performance, is not corresponding with other sub-category score trends. However, Singapore displays comparatively longer tail for minimum sub-category score to ASEI score than maximum sub-category score to ASEI score, representing the minimum sub-category score, Eco-Innovation Activity, is an outlying sub-category score from other three sub-categories.

Distribution Analysis

The purpose of Distribution Analysis is to determine overall performance level of each ASEI score category by counting countries classified within band of scores. Distribution analysis divided ASEI score into 5 categories based on even score range of 0.2 and counted the number of countries belonging to each range. Each analysis was performed based on its two regions: Asia and Europe. In spite of the fact that the analysis allows each region's score distribution and how each sub-category is showing better performance than other sub-categories, it is not an indication of direct comparison between each sub-categories based on scores since their score deduction methodologies differ from one another.

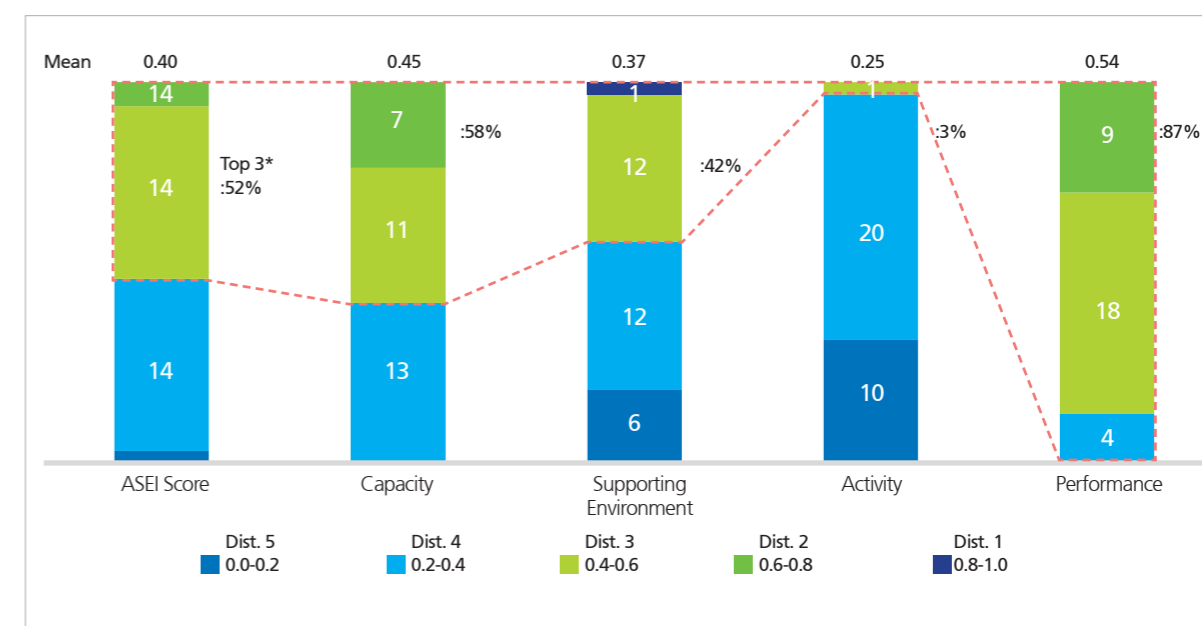
Asia Distribution Analysis on ASEI Score



*The percentage of top 3 means how much portion the top three distribution area consist of

With respect to the ASEI 2018 score in overall, only 20% of Asian countries displays score over 0.40, which is above the average Asian ASEI 2018 score of 0.24. When considering sub-category scores, Eco-Innovation Capacity score exhibits 25% of the Asian countries with score over 0.40, which is the average Asian Eco-Innovation Capacity score of 0.25. In case of Eco-Innovation Supporting Environment score, 25% of the countries showed score over 0.4, which is above the average Asian Eco-Innovation Supporting Environment score of 0.23. However, only 5% of the countries demonstrates score over 0.40, while the average Asian Eco-Innovation Activity score is 0.14. For Eco-Innovation Performance score, 25% of the countries illustrates score over 0.40, while the average Asian Eco-Innovation Performance score shows the highest amount regional sub-category average of 0.33. Overall, it is noticeable that Eco-Innovation Performance shows larger number of countries consisting higher score bands, while only 5 countries shows score below 0.20. On the other hand, Eco-Innovation Activity shows the lowest number of countries consisting higher score bands, while only 1 country belongs to score higher than 0.80.

Europe Distribution Analysis on ASEI Score



*The percentage of top 3 means how much portion the top three distribution area consist of

In terms of overall ASEI 2018 score, 52% of European countries shows score over 0.40, while the average ASEI 2018 score for European region being 0.40. As opposed to Asian region, European region displays larger number of countries with higher ASEI 2018 score bands. This trend is analogous to four sub-categories, and 58% of European countries indicates score over 0.40 while the average European Eco-Innovation Capacity score being 0.45. Also, it is noticeable that there is no country with Eco-Innovation Capacity score below 0.20. With respect to the case of Eco-Innovation Supporting Environment score, 42% of European countries demonstrates score over 0.40, which is more than the average European Eco-Innovation Supporting Environment score of 0.37. However, Eco-Innovation Activity score shows that only 1 country (3%) shows score over 0.4, and the European average Eco-Innovation Activity score is 0.25. Eco-Innovation Performance Score displays the highest performance among other

sub-categories since 87% of the countries belong to score bands over 0.40 with the highest average regional sub-category score of 0.54. Accordingly, Eco-Innovation Activity score exhibits the lowest number of countries belong to score bands over 0.40 among other sub-categories in European region, while Eco-Innovation Performance score displays only 4 countries below the score of 0.40.

Development Stage Profile Analysis

Table 4 Country Development Stages

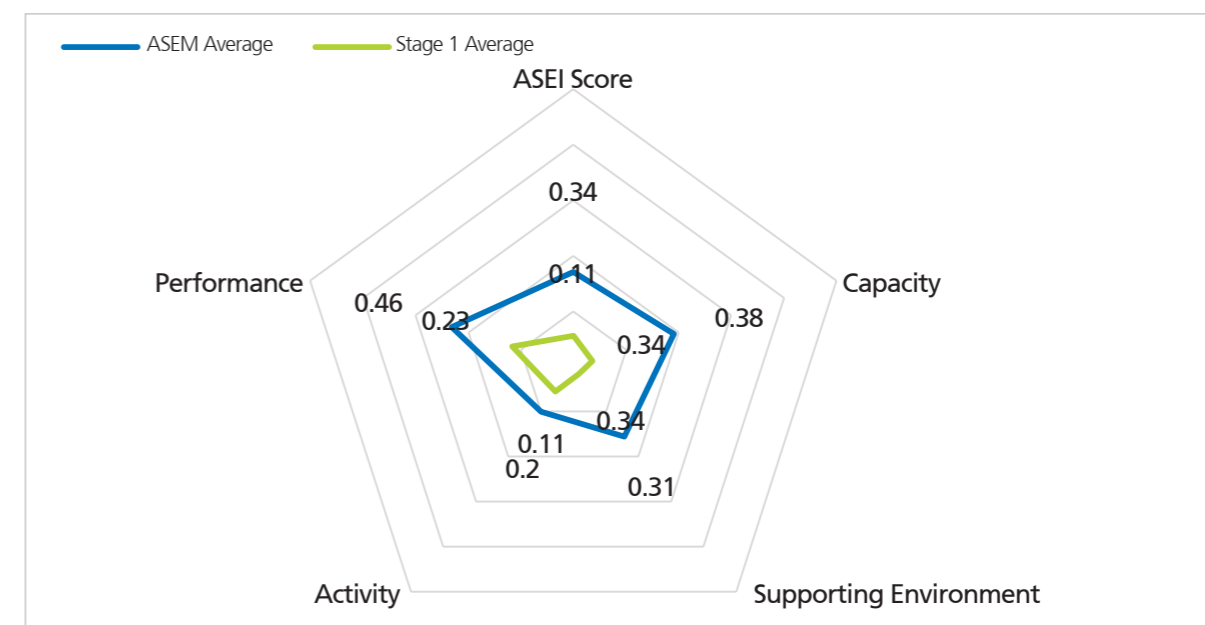
Development Stage	Asia	Europe
1	Myanmar*, Cambodia, Lao PDR, Bangladesh, Mongolia, Pakistan	
2	Viet Nam, Philippines, Kazakhstan	Slovenia, Bulgaria, Latvia, Slovakia, Hungary, Cyprus, Romania, Croatia, Greece
3	Thailand, Indonesia, India, Brunei Darussalam	Estonia, Czech Republic, Spain, Malta, Russian Federation, Poland, Lithuania, Portugal, Italy
4	Japan, New Zealand, Australia, Malaysia, Republic of Korea, China	Finland, Norway, Denmark, Austria, Luxembourg, Belgium, France, Ireland
5	Singapore	Switzerland, Netherlands, Germany, Sweden, United Kingdom

*The score for Myanmar was not available, hence the development stage was arbitrarily set as stage 1.

The purpose of Development Stage Profile Analysis is to grasp understanding on ASEI score trends, not only on overall ASEI trends for the whole ASEM member countries, but also on further spread groups for countries with analogous development stages.

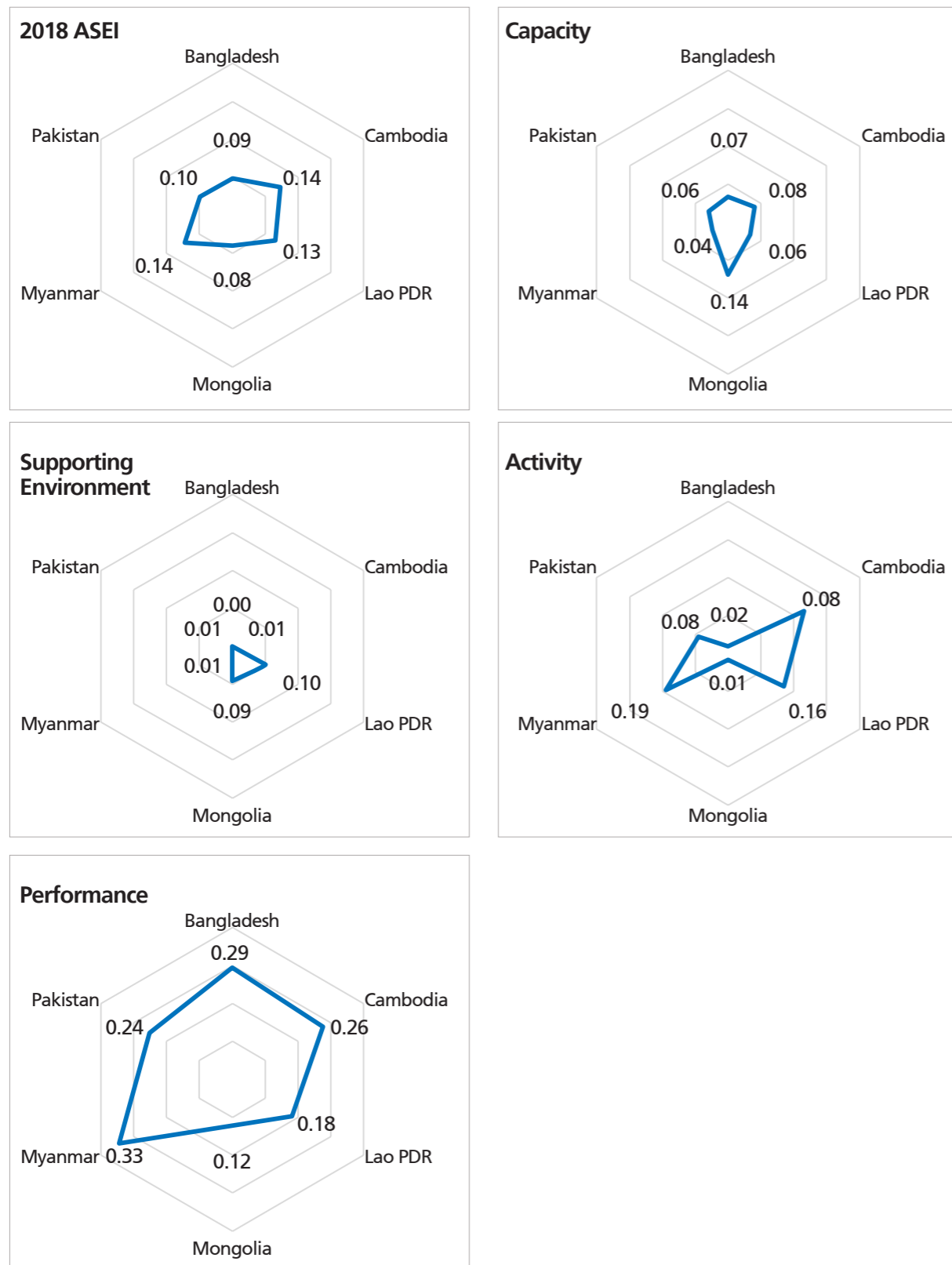
Based on the World Economic Forum's report on the Global Competitiveness Index (GCI), ASEM member countries are classified into 5 different development stage. Each stages were classified based on its GCI score range. Stage 1 represents the countries with its GCI score ranging from 3.5 to 4.0, and stage 2 represents the countries with its GCI score ranging from 4.0 to 4.5. Stage 3 represents the countries with its GCI score ranging from 4.5 to 5.0, while stage 4 representing the countries with its GCI score ranging from 5.0 to 5.5. Finally, stage 5 represents the countries with its GCI score ranging from 5.0 to 6.0

Development Stage 1 Profile Analysis

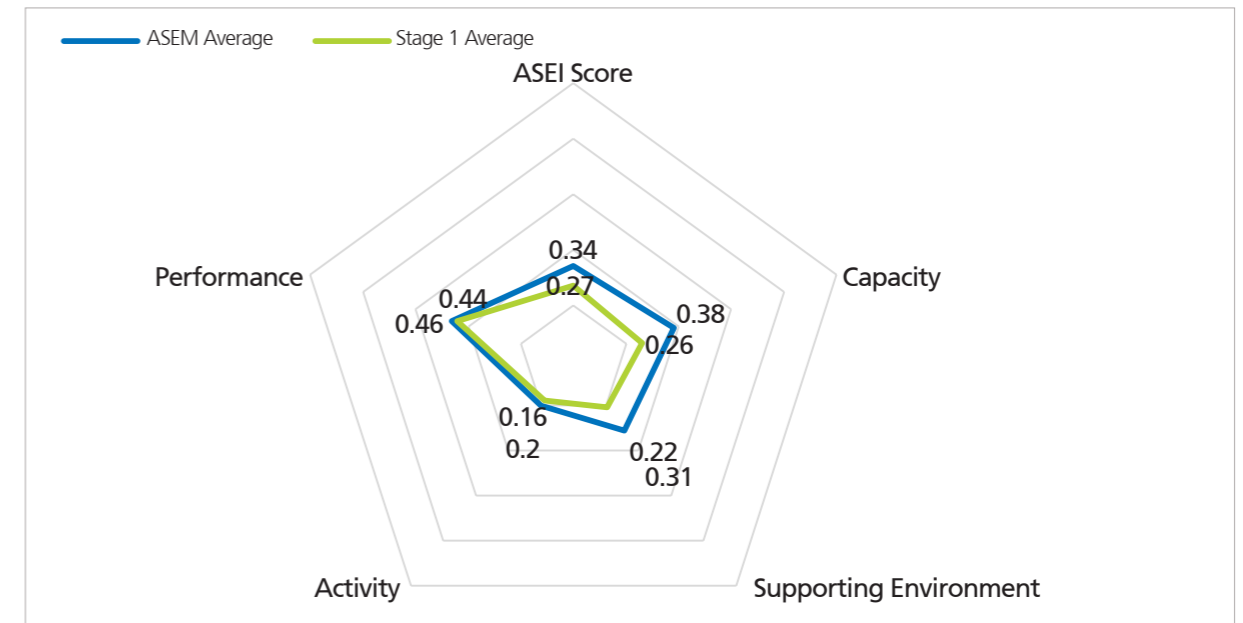


Development stage 1 includes 6 Asian countries (Myanmar, Cambodia, Lao PDR, Bangladesh, Mongolia and Pakistan). Development stage 1 exhibits significantly lower score trends than the average ASEI 2018 scores. Especially, the gap between ASEI 2018 and its stage 1 equivalent is 0.23 in score gap. When considering each sub-category, it is noticeable that Eco-Innovation Capacity shows the widest gap between ASEM average score and development stage 1 equivalent with score gap of 0.31, and Eco-Innovation Activity score illustrating the narrowest gap between ASEM average score and stage 1 equivalent with 0.09 score gap. For other scores, Eco-Innovation Supporting Environment score gap and Eco-Innovation Performance score gap between ASEM average and stage 1 equivalent are 0.28 and 0.23 respectively. Stage 1 countries, in overall, display the highest performance in Eco-Innovation Activity and the lowest in Eco-Innovation Capacity.

The below diagram demonstrates details of 2018 ASEI and four sub-categories for countries in stage 1.



Development Stage 2 Profile Analysis

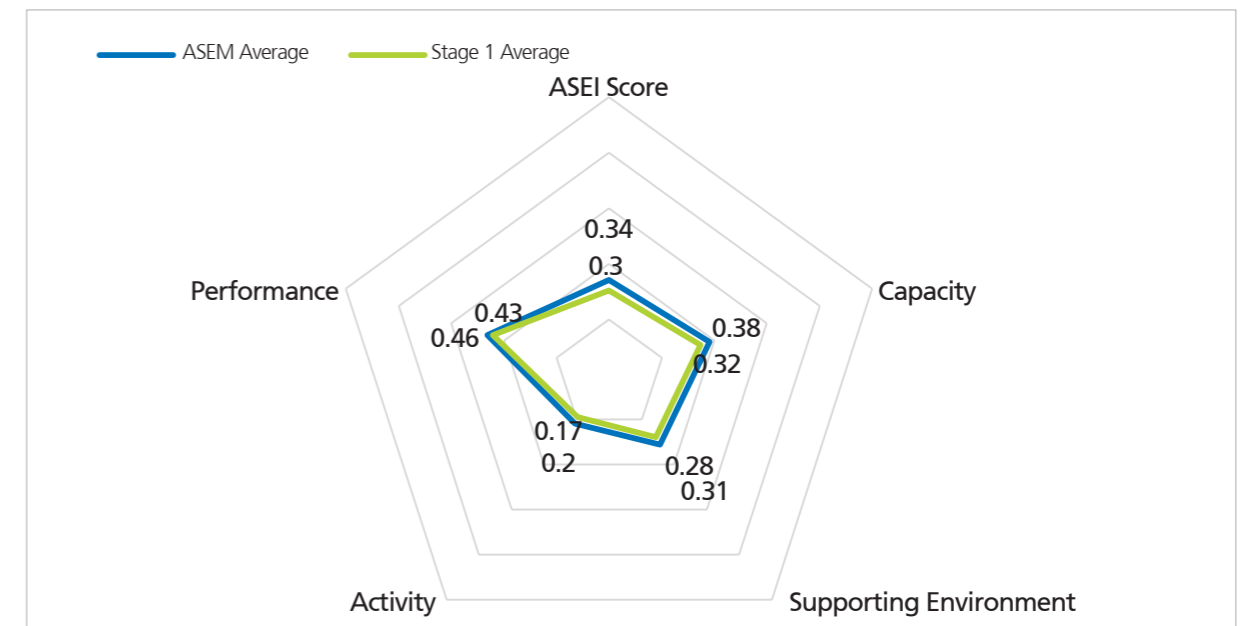


Development stage 2 includes 3 Asian countries (Viet Nam, Philippines and Kazakhstan) and 9 European countries (Slovenia, Bulgaria, Latvia, Slovakia, Hungary, Cyprus, Romania, Croatia and Greece). The overall stage 2 scores show relatively lower score trends than the average ASEM scores, while the gaps are much narrower than stage 1 scores. The gap between 2018 ASEI and its stage 2 equivalent is 0.07 in score gap, whereas stage 1 equivalent was 0.23 in score gap. In terms of sub-categories, the gap between Eco-Innovation Supporting Environment shows the widest gap between ASEM average and stage 2 equivalent of 0.09 in score gap, while the gap between Eco-Innovation Performance demonstrates the narrowest gap between ASEM average and stage 2 equivalent of 0.02 in score gap. Moreover, the gap between Eco-Innovation Capacity and its stage 2 equivalent is 0.08 in score gap, while the gap between Eco-Innovation Activity and its stage 2 equivalent is 0.04 in score gap. Countries in development stage 2 shows the highest performance in Eco-Innovation Performance with the narrowest gap.

The below diagram demonstrates details of 2018 ASEI and four sub-categories for countries in stage 2.

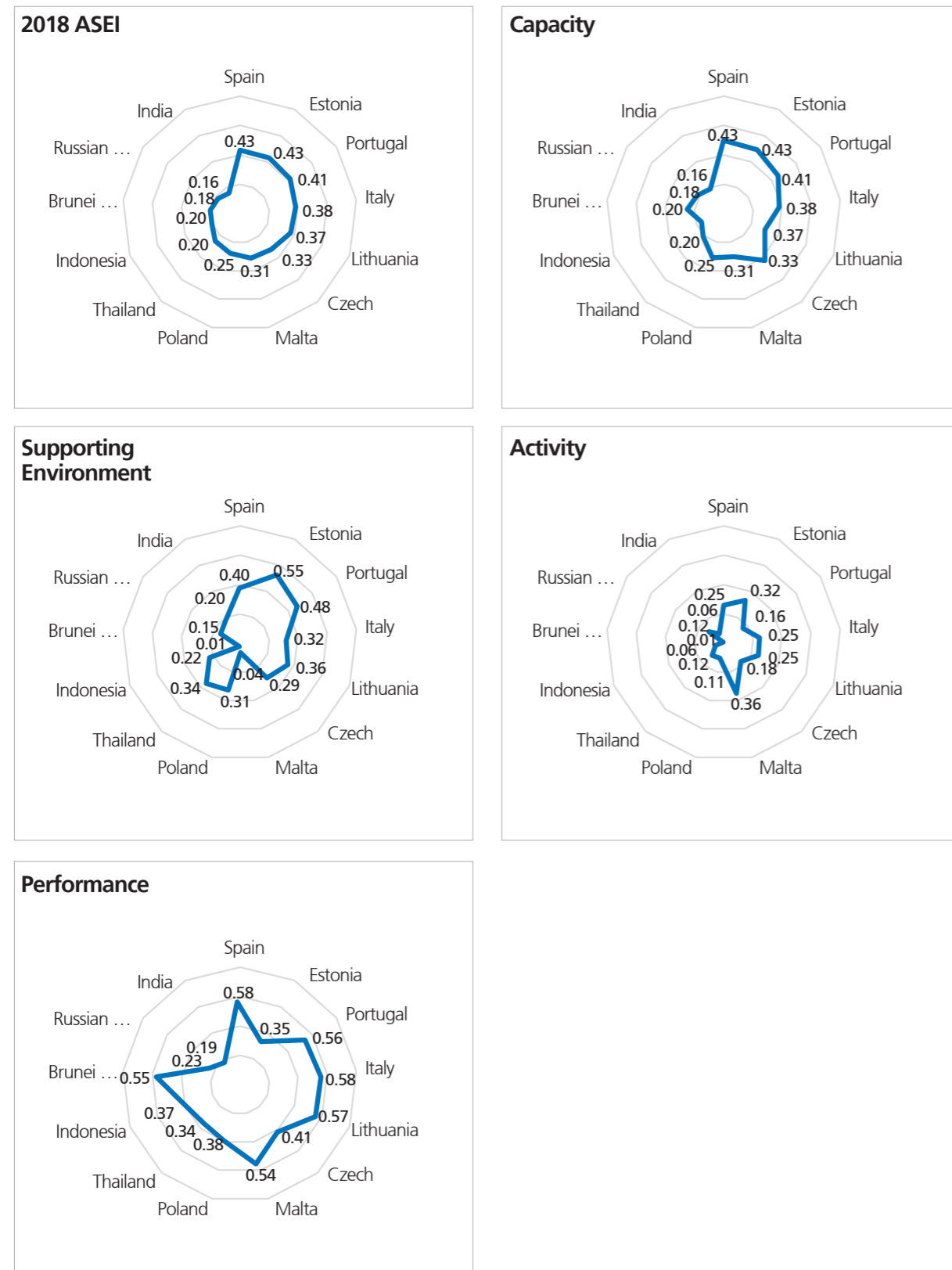


Development Stage 3 Profile Analysis

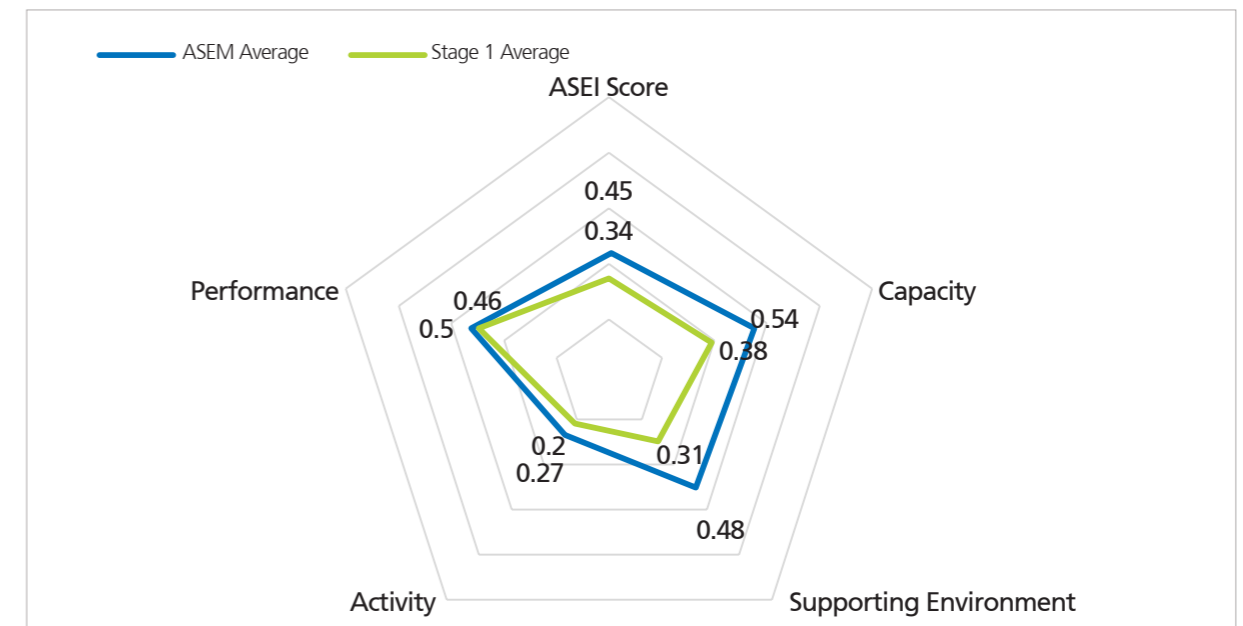


Development stage 3 consist of 4 Asian countries (Thailand, Indonesia, India and Brunei Darussalam) and 7 European countries (Estonia, Czech Republic, Spain, Malta, Russian Federation, Poland, Lithuania, Portugal and Italy). The overall stage 3 scores shows very close yet lower score trends than the average ASEM scores, while the gaps are much narrower than stage 1 and 2 scores. The gap between 2018 ASEI and its stage 3 equivalent is 0.04 in score gap, and sub-categories share similar score gap size with the overall 2018 ASEI score. The gap between Eco-Innovation Capacity and its stage 3 equivalent is the widest with 0.06 in gap score, while the gap between Eco-Innovation Supporting Environment, Eco-Innovation Activity and Eco-Innovation Performance and its stage 3 equivalent are all 0.03 in score gap. Therefore, the countries in development stage 3 shows the highest performance in Eco-Innovation Capacity.

The below diagram demonstrates details of 2018 ASEI and four sub-categories for countries in stage 3.

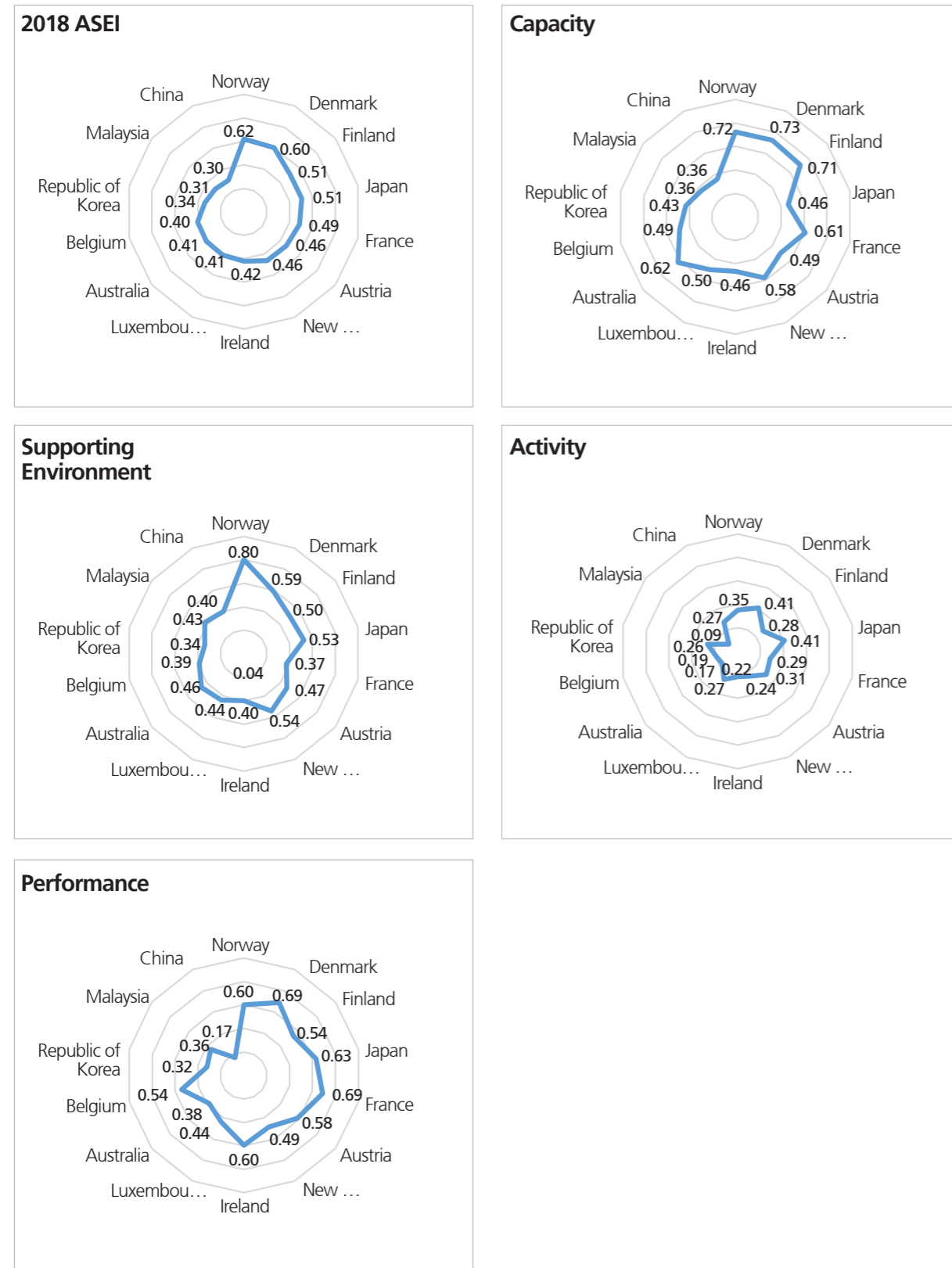


Development Stage 4 Profile Analysis

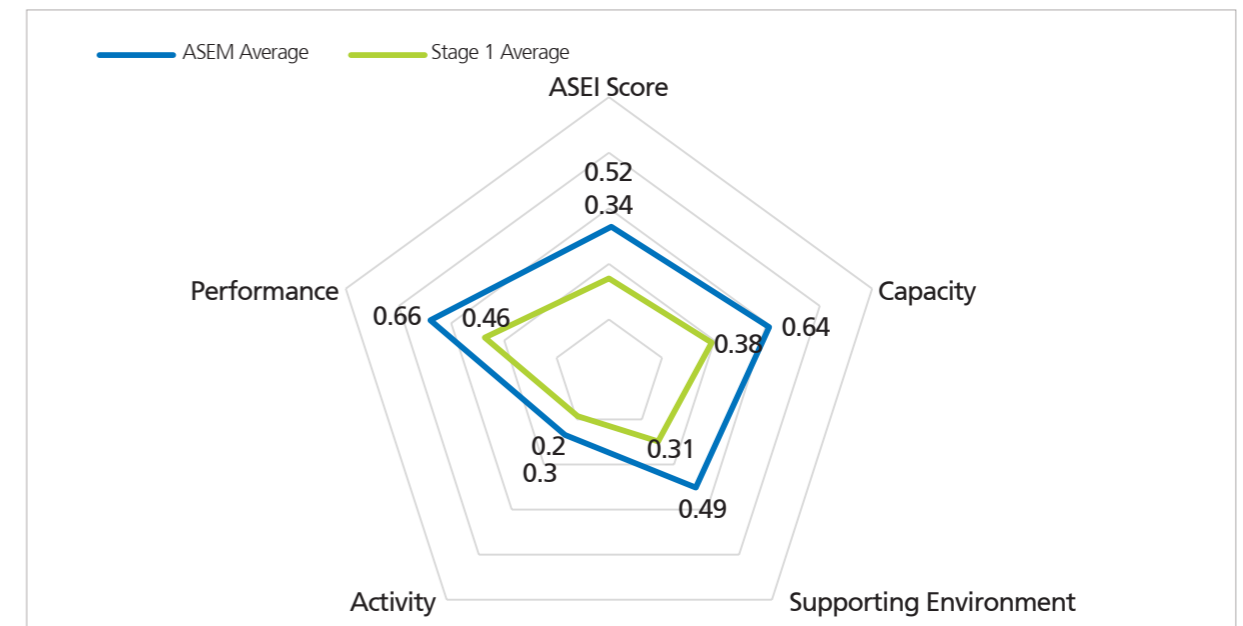


Development stage 4 includes 6 Asian countries (Japan, New Zealand, Australia, Malaysia, Republic of Korea and China) and 8 European countries (Finland, Norway, Denmark, Austria, Luxembourg, Belgium, France and Ireland). The stage 4 scores are relatively higher than the average ASEM scores, ranging from 0.04 to 0.17, and the gap between 2018 ASEI and its stage 4 equivalent is 0.11 in score. The widest gap between four sub-category scores and the ASEM average scores is the gap between Eco-Innovation Supporting Environment and its stage 4 equivalent of 0.17 in score gap, and the narrowest gap is the gap between Eco-Innovation Performance and its stage 4 equivalent with 0.04 in score gap. In terms of other sub-category score gaps, the gap between Eco-Innovation Capacity and its stage 4 equivalent is 0.16 in score gap while the gap between Eco-Innovation Activity and its stage 4 equivalent is 0.07 in score gap. For the countries in development stage 4, the Eco-Innovation Supporting Environment shows the highest performance among other sub-categories.

The below diagram demonstrates details of 2018 ASEI and four sub-categories for countries in stage 3.

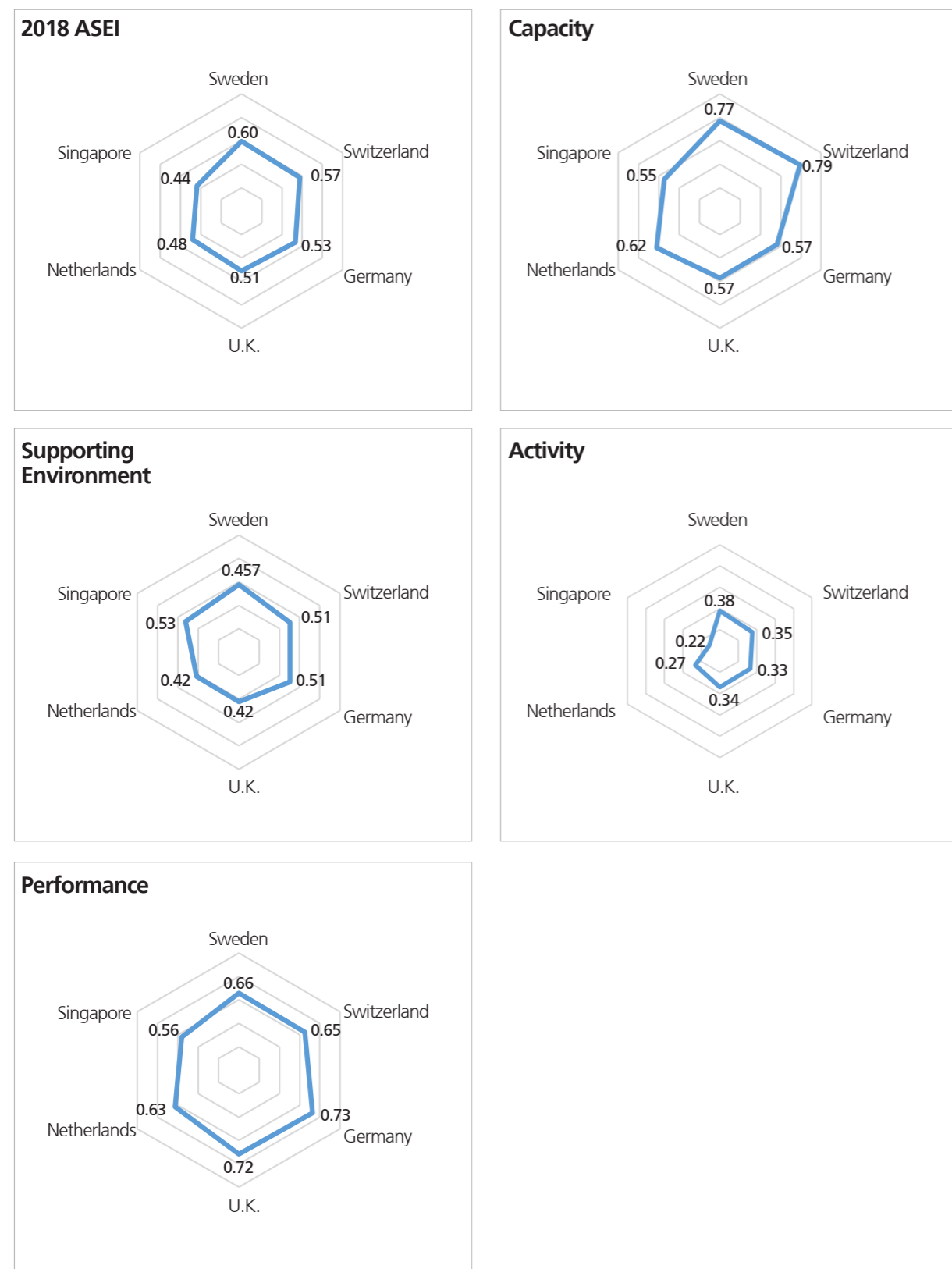


Development Stage 5 Profile Analysis



For development stage 5, there are 1 Asian country (Singapore) and 5 European countries (Switzerland, Netherlands, Germany, Sweden and United Kingdom). The stage 5 scores in general displays relatively highest scores among other development stage, and the gap between 2018 ASEI and its stage 5 score equivalent is 0.18 in score gap. For each sub-category, the gap between Eco-Innovation Capacity and its stage 5 equivalent shows the widest gap of 0.28 in score gap, and the gap between Eco-Innovation Activity and its stage 5 equivalent displays the narrowest gap of 0.10 in score gap among other sub-categories. In addition, the gap between Eco-Innovation Supporting Environment and its stage 5 equivalent is 0.18 in score gap, while the gap between Eco-Innovation Activity and its stage 5 equivalent is 0.10 in score gap. It is noticeable that Eco-Innovation Capacity score for the countries in development stage 5 shows the highest performance among other sub-categories and other development stages.

The below diagram demonstrates details of 2018 ASEI and four sub-categories for countries in stage 3.



Conclusion

The report attempts to take a closer look at ASEM Eco-Innovation (ASEI) Index in multiple perspectives by performing different types of analyses.

As a microscopic effort, the report first conducted regional analysis to discover overall ASEI score changes in time-series. The Regional Analysis provided individual snapshot of country performance in ASEI and four sub-category scores, by comparing with the regional averages, as well as time-series representation by visualizing the data in three-year time series graph and indicating difference from the previous year. While there are generally even distribution of ASEI and all four sub-category scores when comparing it with the regional average, three-year time series trends of each country appeared to not exactly correlating with two-year comparison (i.e. 2017 vs. 2018 data).

The Gap Analysis on this report was to visualize the volatility between sub-categories for each country. The analysis exhibited the gap between the highest sub-category score and ASEI score as well as the gap between the lowest sub-category score and ASEI score as two-sided tails. With respect to the gap between the maximum and the minimum scores, there were no specific patterns found in larger gaps but Asian countries with smaller gaps generally showed lower ASEI scores. In addition, Asian countries (Brunei Darussalam for the highest and Singapore for the lowest) displayed the largest outlying sub-category scores by its longest tails.

For more macroscopic analysis, the report performed the Distribution Analysis for two different regions. The analysis counted the number of countries for each score bands and identified overall performance of each sub-category. Overall, Asian countries showed less distribution on higher score bands with the Eco-Innovation Performance showing the highest regional average and country frequency on higher score bands, while European countries showing higher distribution on higher score bands with Eco-Innovation Performance score demonstrating the highest proportion of higher score bands.

While the Distribution Analysis categorized based on score bands, the Development Stage Profile Analysis classified countries in 5 different development stage and determined how they are performing compared to the ASEM average. The countries in development stages 1-3 demonstrates lower score trends than the ASEM average score equivalents, while the countries development stage 4-5 indicated higher score trends than the ASEM average score equivalents.

Appendix 1. Limitations

The report is bound to some extent of limitations as the table below, and these limitations should be taken into account when interpreting all results of the above analyses.equivalents.

List of Limitations

1. Some indicators, in the process of developing sub-category indices, may not contain several country data due to data availability, and all of the non-available score was considered as 0
2. The exact time-series comparisons are not applicable between 2018 ASEI and previous years due to change in scoring indicators.
3. Numbers below 1/00th digit were not considered.
4. In the process of scoring indicators, outliers may set some in-bound scores to be skewed at either lower or higher scores.
5. Reports is bound to quantitative aspects of eco-innovational approach ASEM member countries taking.

