Adjustments to the Global Innovation Index Framework and Year-on-Year Comparability of Results

Although the Global Innovation Index (GII) is a year-on-year performance assessment, it also seeks to update/improve the way innovation is measured. The report pays special attention to making accessible the statistics used, providing data sources and definitions, and detailing the computation methodology (Appendices II, III, and IV, respectively). This annex is aimed at summarizing the changes made and providing an assessment of the impact of these changes in the comparability of rankings.

Adjustments to the Global Innovation Index framework

The GII model is revised every year in a transparent exercise. This year, the Infrastructure pillar was reorganized to single out ecological sustainability in a new sub-pillar. The title of the sixth pillar was changed to Knowledge and technology outputs to better reflect its component indicators. A new sub-pillar on online digital creativity was also added to the rankings.

In addition, beyond the use of WIPO data, we collaborate with both public international bodies (such as the International Labour Organization, UNESCO, and the World Bank) and private organizations (such as the International Organization for Standardization (ISO), the Graduate Management Admission Council, Thomson Reuters, ZookNIC, and Google) to obtain the best data on innovation measurement globally.

While the reasons/rationale for the adjustments made to the GII framework are explained in detail in Annex 1, Table 1 provides a summary of changes made at the pillar, sub-pillar, and indicator level for quick referencing.

Some scaling factors were also adjusted this year and a couple of indicators had methodological breaks in their series. For instance, the Press Freedom Index can now take negative values, when in the

Table 1: Changes to the Global Innovation Index framework

	GII 2011		GII 2012
1.2.3	Rigidity of employment	1.2.3	Cost of redundancy dismissal
1.3.1	Time to start a business	1.3.1	Ease of starting a business
1.3.2	Cost to start a business		
		1.3.2	Ease of resolving insolvency
1.3.3	Total tax rate	1.3.3	Ease of paying taxes
2.2.2	Graduates in science	2.2.2	Graduates in science & engineering
2.2.3	Graduates in engineering		
2.2.5	Tertiary outbound mobility ratio	2.2.4	Gross tertiary outbound enrolment ratio
2.2.6	Gross tertiary outbound enrolment ratio		
3.2	Energy	3.2.	General infrastructure
3.3	General infrastructure	3.3.	Ecological sustainability
3.3.1	Quality of trade and transport-related infrastructure	3.2.3	Quality of trade and transport-related infrastructure
3.3.2	Gross capital formation	3.2.4	Gross capital formation
3.2.3	GDP per unit of energy use	3.3.1	GDP per unit of energy use
3.2.4	Share of renewables in energy use	3.3.2	Environmental performance index
3.3.3	Ecological footprint and biocapacity	3.3.3	ISO 14001 environmental certificates
4.1.1	Strength of legal rights to get credit	4.1.1	Ease of getting credit
4.1.2	Depth of credit information		
4.2.1	Strength of investor protection index	4.2.1	Ease of protecting investors
4.3.2	Market access trade restrictiveness	4.3.2	Market access for non-agricultural exports
		5.1.5	GMAT mean score
		5.1.6	GMAT test takers
6.	Scientific outputs	6.	Knowledge and technology outputs
		6.2.4	ISO 9001 quality certificates
		7.3.	Online creativity
		7.3.1	Generic top-level domains (gTLDs)
		7.3.2	Country-code top-level domains (ccTLDs)
		7.3.3	Wikipedia monthly edits
		7.3.4	Video uploads on YouTube

Note: Dark shades indicate changes at the pillar and sub-pillar level, light shades indicate changes in the positioning only of the indicator.

Table 2: Source of changes in the rankings: 2012 compared with 2011

Country/Economy	GII 2012 rank (A)	GII 2012 rank among 2011 economies (B)	GII 2011 rank (C)	Change in ranking between GII 2011 and 2012 (D)	Change due to improved or worsening performance on the basis of the 2011 framework (E)	Change due to adjustments to the GII framework (F)	Change due to the inclusion of additional countries/ economies (G)
Switzerland	1	1	1	0	0	0	0
Sweden	2	2	2	0	0	0	0
Singapore	3	3	3	0	0	0	0
Finland	4	4	5	1	1	0	0
United Kingdom	5	5	10	5	1	4	0
Netherlands	6	6	9	3	3	0	0
Denmark	7	7	6	−1	−1	0	0
Hong Kong (China)	8	8	4	−4	−1	−3	0
Ireland	9	9	13	4	3	1	0
United States of America	10	10	7	−3	−4	1	0
Luxembourg	11	11	17	6	9	−3	0
Canada	12	12	8	−4	−5	1	0
New Zealand	13	13	15	2	1	1	0
Norway	14	14	18	4	0	4	0
Germany	15	15	12	−3	0	−3	0
Malta	16	n/a	n/a	n/a	n/a	n/a	n/a
Israel	17	16	14	−3	−2	0	−1
Iceland	18	17	11	−7	−6	0	−1
Estonia	19	18	23	4	4	1	−1
Belgium	20	19	24	4	2	3	−1
Korea, Rep.	21	20	16	−5	1	−5	−1
Austria	22	21	19	−3	−2	0	−1
Australia	23	22	21	−2	−2	1	−1
France	24	23	22	−2	−2	1	−1
Japan	25	24	20	−5	0	−4	−1
Slovenia	26	25	30	4	2	3	−1
Czech Republic	27	26	27	0	1	0	−1
Cyprus	28	27	28	0	−1	2	−1
Spain	29	28	32	3	−1	5	−1
Latvia	30	29	36	6	2	5	−1
Hungary	31	30	25	−6	−5	0	−1
Malaysia	32	31	31	−1	0	0	−1
Qatar	33	32	26	−7	1	−7	−1
China	34	33	29	−5	2	−6	−1
Portugal	35	34	33	−2	1	−2	−1
Italy	36	35	35	−1	−3	3	−1
United Arab Emirates	37	36	34	−3	−2	0	−1
Lithuania	38	37	40	2	1	2	−1
Chile	39	38	38	−1	−2	2	−1
Slovakia	40	39	37	−3	−6	4	−1
Bahrain	41	40	46	5	9	−3	−1
Croatia	42	41	44	2	−2	5	−1
Bulgaria	43	42	42	−1	−6	6	−1
Poland	44	43	43	−1	−1	1	−1
Montenegro	45	n/a	n/a	n/a	n/a	n/a	n/a
Serbia	46	44	55	9	8	3	−2
Oman	47	45	57	10	7	5	−2
Saudi Arabia	48	46	54	6	12	−4	−2
Mauritius	49	47	53	4	18	−12	−2
Moldova, Rep.	50	48	39	−11	−6	−3	−2
Russian Federation	51	49	56	5	−2	9	−2
Romania	52	50	50	−2	−10	10	−2
Brunei Darussalam	53	51	75	22	18	6	−2
South Africa	54	52	59	5	−6	13	−2
Kuwait	55	53	52	−3	11	−12	−2
Jordan	56	54	41	−15	−11	−2	−2
Thailand	57	55	48	−9	−5	−2	−2
Brazil	58	56	47	−11	−14	5	−2
Tunisia	59	57	66	7	2	7	−2
Costa Rica	60	58	45	−15	−9	−4	−2
Lebanon	61	59	49	−12	−7	−3	−2
Macedonia, FYR	62	60	67	5	5	2	−2
Ukraine	63	61	60	−3	−6	5	−2
India	64	62	62	−2	3	−3	−2
Colombia	65	63	71	6	−4	12	−2
Greece	66	64	63	−3	−6	5	−2
Uruguay	67	65	64	−3	1	−2	−2
Mongolia	68	66	68	0	13	−11	−2
Armenia	69	67	69	0	1	1	−2
Argentina	70	68	58	−12	−12	2	−2
Georgia	71	69	73	2	2	2	−2

Table 2: Source of changes in the rankings: 2012 compared with 2011 (continued)

Country/Economy	GII 2012 rank (A)	GII 2012 rank among 2011 economies (B)	GII 2011 rank (C)	Change in ranking between GII 2011 and 2012 (D)	Change due to improved or worsening performance on the basis of the 2011 framework (E)	Change due to adjustments to the GII framework (F)	Change due to the inclusion of additional countries/ economies (G)
Bosnia and Herzegovina	72	70	76	4	2	4	−2
Namibia	73	71	78	5	−2	9	−2
Turkey	74	72	65	−9	−2	−5	−2
Peru	75	73	83	8	7	3	−2
Viet Nam	76	74	51	−25	0	−23	−2
Guyana	77	75	61	−16	12	−26	−2
Belarus	78	n/a	n/a	n/a	n/a	n/a	n/a
Mexico	79	76	81	2	−3	8	−3
Belize	80	n/a	n/a	n/a	n/a	n/a	n/a
Trinidad and Tobago	81	77	72	−9	−6	1	−4
Swaziland	82	78	101	19	28	−5	−4
Kazakhstan	83	79	84	1	2	3	−4
Paraguay	84	80	74	−10	−3	−3	−4
Botswana	85	81	79	−6	0	−2	−4
Dominican Republic	86	n/a	n/a	n/a	n/a	n/a	n/a
Panama	87	82	77	−10	5	−10	−5
Morocco	88	83	94	6	6	5	−5
Azerbaijan	89	84	88	−1	5	−1	−5
Albania	90	85	80	−10	−7	2	−5
Jamaica	91	86	92	1	6	0	−5
Ghana	92	87	70	−22	−11	−6	−5
El Salvador	93	88	90	−3	−2	4	−5
Sri Lanka	94	89	82	−12	−3	−4	−5
Philippines	95	90	91	−4	1	0	−5
Kenya	96	91	89	−7	0	−2	−5
Senegal	97	92	100	3	5	3	−5
Ecuador	98	93	93	−5	−3	3	−5
Guatemala	99	94	86	−13	−13	5	−5
Indonesia	100	95	99	−1	8	−4	−5
Fiji	101	n/a	n/a	n/a	n/a	n/a	n/a
Rwanda	102	96	109	7	15	−2	−6
Egypt	103	97	87	−16	−6	−4	−6
Iran, Islamic Rep.	104	98	95	−9	−2	−1	−6
Nicaragua	105	99	110	5	−11	22	−6
Gabon	106	n/a	n/a	n/a	n/a	n/a	n/a
Zambia	107	100	114	7	13	1	−7
Tajikistan	108	101	116	8	5	10	−7
Kyrgyzstan	109	102	85	−24	−17	0	−7
Mozambique	110	n/a	n/a	n/a	n/a	n/a	n/a
Honduras	111	103	98	−13	−8	3	−8
Bangladesh	112	104	97	−15	−1	−6	−8
Nepal	113	n/a	n/a	n/a	n/a	n/a	n/a
Bolivia, Plurinational St.	114	105	112	−2	8	−1	−9
Zimbabwe	115	106	119	4	3	10	−9
Lesotho	116	n/a	n/a	n/a	n/a	n/a	n/a
Uganda	117	107	106	−11	−8	7	−10
Venezuela, Bolivarian Rep.	118	108	102	−16	−3	−3	−10
Mali	119	109	107	−12	7	−9	−10
Malawi	120	110	108	−12	5	−7	−10
Cameroon	121	111	103	−18	−5	−3	−10
Burkina Faso	122	112	120	−2	5	3	−10
Nigeria	123	113	96	−27	−11	−6	−10
Algeria	124	114	125	1	12	−1	−10
Benin	125	115	118	−7	−1	4	−10
Madagascar	126	116	113	−13	3	−6	−10
Uzbekistan	127	n/a	n/a	n/a	n/a	n/a	n/a
Tanzania, United Rep.	128	117	104	−24	−5	−8	−11
Cambodia	129	118	111	−18	−6	−1	−11
Gambia	130	n/a	n/a	n/a	n/a	n/a	n/a
Ethiopia	131	119	121	−10	3	−1	−12
Syrian Arab Rep.	132	120	115	−17	−5	0	−12
Pakistan	133	121	105	−28	−7	−9	−12
Côte d'Ivoire	134	122	117	−17	−5	0	−12
Angola	135	n/a	n/a	n/a	n/a	n/a	n/a
Togo	136	n/a	n/a	n/a	n/a	n/a	n/a
Burundi	137	n/a	n/a	n/a	n/a	n/a	n/a
Lao PDR	138	n/a	n/a	n/a	n/a	n/a	n/a
Yemen	139	123	123	−16	0	0	−16
Niger	140	124	122	−18	−3	1	−16
Sudan	141	125	124	−17	0	−1	−16

past it was bounded from below by zero; there was a break in series for WIPO indicators (refer to Box 1 in Annex 1), among others. For details please refer to Appendices III and IV.

Sources of changes in the rankings

Scores and rankings from one year to the other are therefore not entirely comparable. An effort was made, however, this year for the first time, at being transparent regarding the sources of changes in rankings.

Table 2 details the source of the changes in rankings, and includes six columns:

1. The GII 2012 ranking out of 141 economies (A).

2. The GII 2012 ranking among the economies included in the GII 2011 ranking (B).

3. The GII 2011 ranking (out of 125 economies (C)).

4. For the 125 economies included in the 2011 ranking, we provide the difference between the GII 2011 and the GII 2012 ranking (D = A − C). There are three sources of changes in rankings:

   a. The changes in rankings due to improved or worsening performance on the basis of the 2011 model. These are calculated by comparing the GII 2011 ranking with the rankings obtained with the 2011 framework and updated data—that is, the data available in 2012 (E).

   b. The changes in rankings due to adjustments made to the GII framework in 2012 compared with 2011. These correspond to the comparison of rankings with the GII 2011 and GII 2012 frameworks with updated data only

(G = B − F); they can also be calculated as a residual (F = D − G − E).

   c. The changes in rankings due to the inclusion of 16 additional countries/economies. These are calculated by comparing the GII 2012 ranking with the same ranking among the 125 economies included in GII 2011. This source is independent of the GII ranking, only the sample of countries matters (G = B − A).

How to interpret this chart

Estonia gained four positions this year, rising from rank 23 in the GII 2011 to 19 in the GII 2012. Estonia lost one position because of the inclusion of additional economies in the GII 2012. If only those economies included in the GII 2011 are considered, it gained five positions; four positions were gained because of its improved performance on the basis of the 2011 model, and one position was gained because of adjustments made to the GII framework in 2012.

Yet these sources of changes in rankings are only an approximation at best; for some countries, some weaknesses or strengths were also revealed through better data coverage. A different approach could have been adopted, such as evaluating performance by recalculating last year's rankings with this year's framework. Moreover, the statistical treatment of indicators—a modelling choice that has no relation to the conceptual framework—also has an impact on scores and rankings. The expansion of the sample of countries (16 countries added this year) has a direct impact on the rankings as well (E above), but also an indirect impact through, among others, the min–max normalization.

Although this exercise adds some layers of complexity to the interpretation of results, it allows analysts to refine their assessment of the changes in rankings. To that end, they are also encouraged to look carefully at the underlying components of the rankings and at the country profiles.

The primary message of this annex is that making inferences about performance on the basis of year-on-year differences in rankings alone can be misleading. For example, note that while Viet Nam fell 25 positions in the rankings, this is not at all an indicator of relatively improving or worsening performance: two positions were lost because of the addition of economies, and 23 were lost because of adjustments to the GII framework in 2012. In other words, Viet Nam would have kept its ranking among the 125 economies of 2011 had we maintained the GII 2011 framework unchanged.