

Chapter 6

Overall Evaluation and Comparative Analysis on GEC

What the tide of globalization brings is unprecedented impact on humankind by global environmental problems and these problems have become the economic, political and cultural problems that restrict human existence and development. It can be said that the humankind is entering the era when the competition begins to focus on environment. This book for the first time introduces Global Environment Competitiveness (GEC) as a new way of weighing competitiveness and demonstrates a nation's environment competitiveness through five elements, ecological environment, resource environment, environment carrying, environmental management and environment harmony, in the hope of providing reference for all countries to do complete and scientific analysis on environmental situation and to propose environmental development strategy. This part selects 133 countries of the world (See Fig. 6.1) as samples to analyze the distribution and rankings of global and regional environment competitiveness in 2012 so that the development changes, influencing factors and future trends of global competitiveness can be revealed, which will provide helpful reference for realization of sustainable development around the globe.

6.1 Overall Evaluation of GEC

6.1.1 GEC Evaluation Results

The research group completes the evaluation and analysis on the Global Environment Competitiveness in 2012 based on the GEC Evaluation Indicator System and mathematical model. Table 6.1 gives the environment competitiveness rankings and scores of the countries in 2012 and Fig. 6.2 shows the environment competitiveness scores of the six continents of the world and the top 3 countries in each continent.

Table 6.1 GEC primary & sub-index scores and rankings 2012

Country	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Switzerland	1	58.7	63	17.9	2	70.3	7	74.7	12	59.6	30	71.0
Germany	2	58.5	72	16.9	1	73.0	6	75.2	11	60.3	74	66.9
Norway	3	58.2	6	30.4	25	58.1	21	71.5	23	57.1	15	73.9
New Zealand	4	57.7	12	28.6	6	67.6	55	68.0	29	56.1	56	68.1
Brazil	5	57.5	14	28.2	14	61.4	43	69.2	43	54.2	8	74.4
Japan	6	57.2	31	22.5	19	59.8	35	70.2	4	65.4	55	68.2
Costa Rica	7	57.2	7	30.1	47	52.5	107	64.1	9	62.4	2	77.0
Austria	8	56.7	55	18.5	5	67.9	28	70.8	21	57.3	49	68.8
United Kingdom	9	56.6	96	14.3	10	63.4	14	72.5	5	63.7	48	69.1
France	10	56.3	65	17.8	18	60.0	2	77.6	20	57.4	51	68.7
Ecuador	11	55.9	30	22.8	9	63.6	113	63.4	40	54.4	7	75.3
Venezuela, RB	12	55.8	25	23.9	4	68.7	53	68.2	86	46.6	26	71.6
Slovak	13	55.7	85	15.8	3	69.1	10	73.6	57	51.5	50	68.7
Sweden	14	55.3	45	19.8	28	57.3	15	72.4	25	56.8	36	70.1
Bolivia	15	55.2	28	22.8	41	53.6	94	65.2	2	67.9	77	66.6
Honduras	16	55.2	22	24.9	70	47.5	98	64.9	1	68.0	32	70.7
Guatemala	17	55.2	34	21.2	49	52.3	38	69.9	13	59.4	19	73.1
Canada	18	55.0	13	28.3	35	55.0	32	70.2	46	54.0	69	67.4
Gabon	19	54.9	3	32.5	72	47.3	42	69.5	80	48.4	3	76.9
Colombia	20	54.9	26	23.1	36	54.7	56	68.0	27	56.2	21	72.5
Australia	21	54.8	16	27.4	8	65.7	73	66.7	36	55.0	108	59.4
Nicaragua	22	54.7	5	30.9	11	62.8	68	66.9	104	43.0	37	70.0
Panama	23	54.5	10	29.1	60	49.4	95	65.1	38	54.9	13	74.1
Chile	24	54.3	47	19.7	26	57.7	57	67.9	52	52.3	16	73.6

(continued)

Table 6.1 (continued)

Country	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Belgium	25	54.0	103	13.3	16	60.5	12	73.1	26	56.4	76	66.6
United States	26	53.8	39	20.4	23	58.7	11	73.4	17	57.8	110	58.8
Slovenia	27	53.8	17	26.5	68	48.0	20	71.6	30	56.1	72	67.0
Finland	28	53.2	43	20.0	32	56.5	46	68.8	35	55.3	85	65.6
Philippines	29	53.2	11	29.0	81	45.6	72	66.8	56	51.6	20	72.8
Denmark	30	53.1	68	17.5	42	53.4	23	71.3	42	54.2	46	69.2
Albania	31	53.1	35	21.1	93	44.7	39	69.8	41	54.4	6	75.6
Italy	32	53.0	82	16.1	24	58.3	27	70.8	24	57.0	94	63.1
Greece	33	53.0	94	14.4	33	55.9	24	71.2	31	55.6	59	68.0
Peru	34	52.9	18	26.3	79	46.2	60	67.3	61	50.6	12	74.2
Jamaica	35	52.9	33	21.2	56	50.3	88	65.6	15	58.6	52	68.6
Latvia	36	52.8	41	20.3	46	52.7	89	65.5	22	57.3	54	68.3
Netherlands	37	52.8	84	15.9	22	58.8	22	71.5	64	50.0	62	67.7
Poland	38	52.8	88	15.1	17	60.1	100	64.9	10	60.8	93	63.1
Sri Lanka	39	52.6	32	21.3	91	44.8	80	66.3	28	56.1	10	74.3
Zambia	40	52.5	29	22.8	7	66.2	79	66.4	66	50.0	114	57.2
Myanmar	41	52.5	1	36.6	121	36.8	33	70.2	106	42.7	5	76.0
Botswana	42	52.4	92	14.6	12	62.2	111	63.6	47	54.0	66	67.5
Portugal	43	52.1	95	14.3	38	53.9	37	70.0	49	53.2	44	69.4
Cambodia	44	52.0	15	27.9	74	46.7	54	68.1	65	50.0	68	67.4
Mauritius	45	51.8	20	25.7	43	53.4	4	76.0	32	55.6	126	48.4
Indonesia	46	51.7	8	29.7	110	40.6	44	69.2	60	51.0	58	68.1
Czech Republic	47	51.7	87	15.6	27	57.6	62	67.2	45	54.0	91	64.0
Luxembourg	48	51.7	102	13.4	13	61.6	70	66.9	37	55.0	99	61.4
Cuba	49	51.6	71	16.9	62	49.1	67	67.0	53	52.2	22	72.5

Malaysia	50	51.5	9	29.6	37	53.9	123	59.4	84	47.1	64	67.6
Ireland	51	51.4	90	14.7	52	51.6	34	70.2	58	51.4	47	69.2
Tanzania	52	51.4	49	19.3	67	48.0	58	67.6	44	54.1	60	68.0
Croatia	53	51.4	57	18.4	75	46.6	19	71.7	70	49.3	31	70.9
Saudi Arabia	54	51.3	109	11.0	20	59.4	64	67.1	3	66.3	120	52.8
Lithuania	55	51.3	73	16.8	21	59.1	90	65.5	78	48.6	78	66.5
Nepal	56	51.1	21	25.3	71	47.4	48	68.7	81	48.2	84	65.7
Congo, Rep.	57	50.9	2	34.8	92	44.8	114	63.3	121	37.8	14	74.0
Georgia	58	50.8	60	18.3	113	39.1	63	67.2	34	55.4	11	74.2
El Salvador	59	50.6	61	18.3	109	41.0	16	72.2	83	47.3	9	74.3
Dominican Republic	60	50.6	54	18.6	44	52.9	31	70.3	117	38.9	23	72.2
Mexico	61	50.5	93	14.4	69	47.6	50	68.3	50	52.9	43	69.4
Senegal	62	50.5	76	16.4	84	45.4	81	66.2	39	54.7	42	69.8
Benin	63	50.3	66	17.7	39	53.8	45	69.1	77	48.6	96	62.2
Korea, Rep.	64	50.3	51	19.0	57	49.7	76	66.6	63	50.2	83	65.8
Hungary	65	50.0	83	16.0	48	52.3	51	68.3	102	43.3	38	70.0
Argentina	66	49.9	100	13.5	55	50.3	18	72.0	100	43.5	35	70.1
Spain	67	49.7	97	14.1	51	51.8	26	70.8	94	44.1	63	67.7
Romania	68	49.5	79	16.3	65	48.9	29	70.7	92	45.2	79	66.5
Israel	69	49.5	127	7.3	29	56.9	92	65.5	67	49.9	61	67.9
Uruguay	70	49.5	78	16.4	118	38.2	9	74.5	110	41.7	4	76.7
Estonia	71	49.5	64	17.9	30	56.6	130	57.0	14	59.1	115	56.8
Cyprus	72	49.4	122	8.3	34	55.5	91	65.5	54	52.0	86	65.6
Namibia	73	49.3	104	13.1	82	45.5	97	64.9	7	63.6	109	59.3
Ghana	74	49.2	67	17.6	101	42.5	61	67.3	55	51.9	75	66.8
Cameroon	75	49.2	23	24.7	129	34.8	40	69.8	90	45.3	27	71.4
Paraguay	76	49.2	58	18.4	104	41.9	47	68.7	98	43.7	18	73.3
Armenia	77	49.2	111	10.3	95	43.9	36	70.1	68	49.8	25	71.6
Zimbabwe	78	49.0	75	16.6	15	60.7	118	62.3	33	55.5	124	49.8

(continued)

Table 6.1 (continued)

Country	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Thailand	79	48.7	48	19.7	100	43.0	109	63.7	74	48.7	53	68.5
Nigeria	80	48.5	37	20.9	114	39.1	71	66.9	73	48.7	70	67.1
Russia	81	48.5	24	24.3	61	49.4	85	65.7	107	42.1	103	60.8
Tunisia	82	48.5	118	8.7	58	49.6	105	64.3	69	49.8	40	70.0
Belarus	83	48.4	77	16.4	31	56.6	120	61.3	87	46.1	98	61.8
Togo	84	48.4	69	17.5	87	45.0	41	69.6	75	48.7	101	61.3
Bulgaria	85	48.2	86	15.6	63	49.1	101	64.9	16	57.8	118	53.8
Singapore	86	48.1	42	20.0	45	52.8	133	43.1	124	35.5	1	80.3
China	87	48.0	89	14.8	124	36.1	87	65.6	6	63.6	106	60.1
Angola	88	48.0	27	23.0	108	41.2	119	61.7	113	40.9	17	73.4
Turkey	89	48.0	106	12.7	112	39.5	66	67.1	76	48.6	24	72.1
Kenya	90	47.8	107	12.3	99	43.6	59	67.4	62	50.6	88	64.9
Mongolia	91	47.7	59	18.4	83	45.5	128	57.3	8	63.4	117	53.9
Sudan	92	47.6	38	20.8	130	32.9	52	68.2	88	46.1	39	70.0
Macedonia	93	47.6	101	13.4	98	43.8	104	64.5	82	48.0	57	68.1
Lebanon	94	47.5	105	12.8	54	50.4	115	63.2	101	43.3	65	67.6
Morocco	95	47.5	119	8.5	102	42.0	13	72.9	97	43.7	33	70.2
Ukraine	96	47.4	40	20.3	94	44.1	110	63.6	19	57.6	122	51.4
South Africa	97	47.2	112	9.8	96	43.9	30	70.6	59	51.2	104	60.5
Haiti	98	47.0	52	18.9	119	37.9	17	72.0	116	39.2	73	67.0
Bangladesh	99	47.0	4	32.3	132	27.9	74	66.6	119	38.3	41	69.8
Guinea	100	46.8	62	18.2	122	36.5	3	77.6	96	43.9	112	57.9
Vietnam	101	46.8	19	26.2	126	35.2	121	60.8	85	47.0	89	64.7
Cote d'Ivoire	102	46.5	46	19.7	86	45.3	65	67.1	51	52.6	127	47.9
Bosnia and Herzegovina	103	46.5	50	19.2	115	39.0	102	64.7	71	49.1	105	60.4

Algeria	104	46.5	123	7.9	77	46.5	82	66.2	114	40.5	28	71.4
Mozambique	105	46.4	44	19.9	80	45.6	106	64.2	99	43.6	111	58.5
Azerbaijan	106	46.2	98	14.0	78	46.5	84	65.8	120	37.8	71	67.0
Egypt	107	46.1	132	4.7	66	48.1	75	66.6	112	41.0	34	70.1
Serbia	108	46.1	81	16.1	88	45.0	83	65.9	48	53.3	123	50.0
Oman	109	46.0	128	7.2	59	49.5	49	68.5	91	45.2	107	59.7
Iran	110	45.9	116	9.1	64	48.9	78	66.5	95	43.9	102	61.0
Ethiopia	111	45.7	80	16.1	97	43.9	25	70.8	115	39.9	113	57.8
Pakistan	112	45.2	108	11.7	128	34.9	69	66.9	79	48.5	90	64.1
Syria	113	45.0	129	6.5	85	45.3	108	63.8	108	42.1	67	67.4
United Arab Emirates	114	45.0	110	11.0	73	47.1	132	47.9	18	57.6	100	61.4
Moldova	115	44.9	53	18.8	106	41.4	127	57.5	111	41.3	87	65.4
Tajikistan	116	44.7	115	9.4	105	41.5	117	62.5	118	38.8	29	71.4
India	117	44.3	36	21.1	133	23.8	93	65.2	72	49.1	95	62.5
Qatar	118	44.3	56	18.5	50	52.2	131	51.9	89	45.3	119	53.6
Madagascar	119	44.1	91	14.7	117	38.2	1	82.4	109	41.8	131	43.2
Jordan	120	43.9	133	4.0	40	53.8	126	58.1	126	34.6	45	69.2
Eritrea	121	43.5	114	9.7	120	37.4	77	66.5	122	37.6	81	66.4
Turkmenistan	122	43.3	113	9.8	53	50.7	112	63.4	105	42.9	125	49.6
Kyrgyz Republic	123	42.5	117	9.0	107	41.3	103	64.6	128	34.0	92	63.8
Kuwait	124	42.4	70	17.0	90	44.9	125	58.7	93	44.4	129	46.9
Yemen, Rep.	125	41.6	131	6.0	123	36.3	99	64.9	125	34.8	82	65.9
Libya	126	40.3	99	13.9	76	46.6	116	63.0	133	11.7	80	66.4
Uzbekistan	127	40.3	126	7.5	111	39.7	86	65.7	123	36.4	121	52.2
Kazakhstan	128	39.8	74	16.7	103	42.0	124	59.2	127	34.4	128	46.9
Mauritania	129	39.3	124	7.9	89	44.9	8	74.5	132	23.7	130	45.4
Mali	130	38.9	121	8.4	131	30.7	5	75.7	131	24.5	116	55.4
Iraq	131	38.0	130	6.2	125	35.2	122	59.7	130	27.2	97	61.8
Lesotho	132	35.7	125	7.7	116	39.0	96	65.0	103	43.1	133	23.8

(continued)

Table 6.1 (continued)

Country	Indicator											
	GEC		REC		EEC		ECC		EMC		EHC	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Niger	133	32.3	120	8.5	127	34.9	129	57.1	129	31.7	132	29.2
Highest score	-	58.7	-	36.6	-	73.0	-	82.4	-	68.0	-	80.3
Lowest score	-	32.3	-	4.0	-	23.8	-	43.1	-	11.7	-	23.8
Average score	-	49.6	-	17.8	-	49.1	-	67.0	-	49.1	-	65.1
Standard deviation	-	4.8	-	6.8	-	9.3	-	5.3	-	9.1	-	8.9

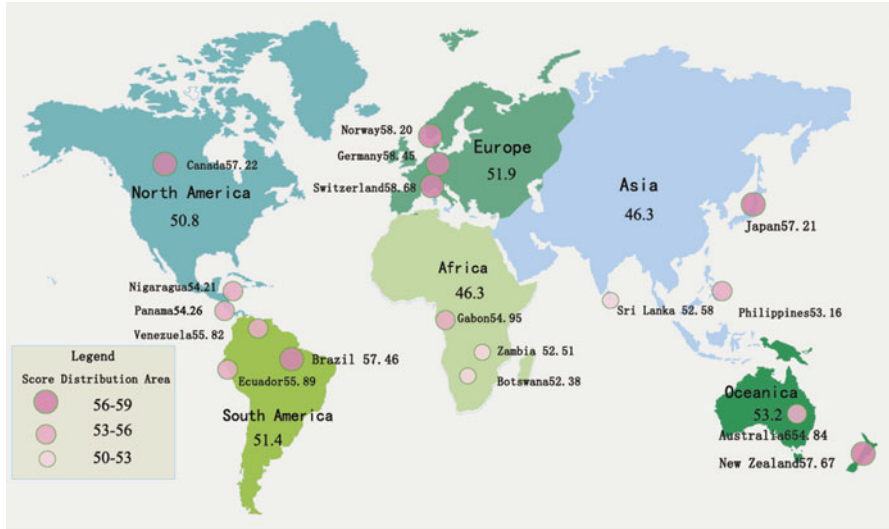


Fig. 6.2 Environment competitiveness scores of six continents and top 3 countries in each continent

between 30 and 35 points; and no country scored below 30 points. It is obvious that most countries scored above 45 points and only a few countries obtained scores lower than 45 points. Furthermore, the standard deviation of GEC scores was as small as 4.8, which means the difference between the environment competitiveness in the countries are not large, and particularly the difference between countries with close rankings was very small.

Countries with higher scores are mainly developed countries and there are 17 developed countries among the top 30 rankings, accounting for a ratio of 56.7 %, and 8 developed countries among the top 10 rankings, accounting for a ratio of 80.0 %. Countries with lower scores are mostly developing countries, mainly because of the long-existing wide gap in socioeconomic development foundation, environmental protection input, environment management and environmental technology between developed and developing countries.

In order to intuitively make a comparative analysis on the environment competitiveness of the countries, the environment competitiveness scores in 2012 are presented in Fig. 6.3. As the figure shows, there are 67 countries that scored higher than the average score, accounting for 50.38 % of total countries. As a whole, the difference between all countries was not large, but the scores of bottom ten countries were left far behind other countries, especially Niger ranking the last, whose score was 32.3, leaving 26.4 points of gap from the highest score and even 17.3 points of gap from the average score. Among developed countries, the highest score 58.7 goes to Switzerland, ranking the 1st place; the lowest score 44.3 goes to Qatar, ranking 118th place. Among developing countries, the highest score 57.5 goes to Brazil, ranking the 5th and the lowest score 32.3 goes to Niger, ranking the 133rd.

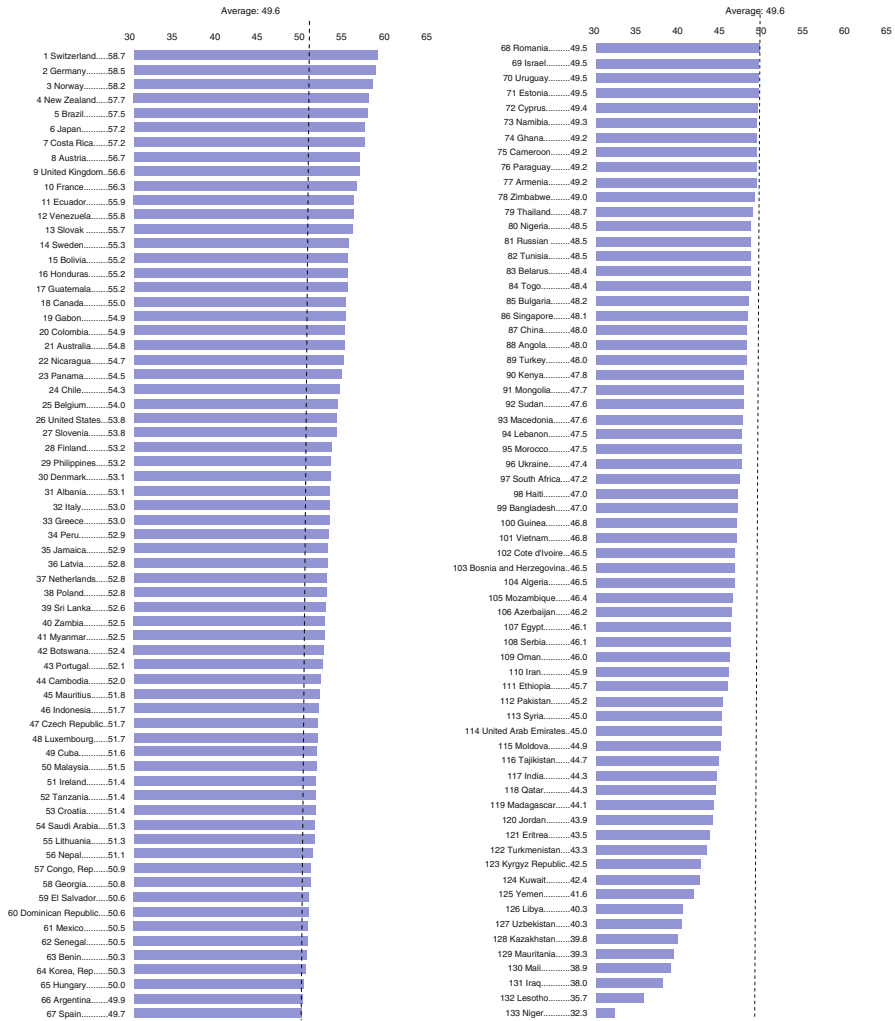


Fig. 6.3 GEC rankings and scores 2012

6.1.2 GEC Factor Scores and Contribution Rate

Table 6.1 is the evaluation result of the sub-indexes for GEC in 2012 and shows the scores and rankings of the five sub-indexes.

The standard deviation of Ecological Environment Competitiveness (EEC) in 2012 is 9.3, indicating that the indicator demonstrates the largest difference between countries and it is the key factor leading to the difference in environment

competitiveness among the countries. Besides, the standard deviation values of Environmental Management Competitiveness (EMC) and Environmental Harmony Competitiveness (EHC) are also as high as 9.1 and 8.9, which are also the important causes of competitiveness difference. As for the standard deviation values of Resource Environment Competitiveness (REC) and Environment Carrying Competitiveness (ECC) are relatively small. ECC's standard deviation is the smallest, at 5.3, which means that ECC has little influence on the environment competitiveness difference between the countries. Basically, the overall environment competitiveness of the countries shows no big difference, while the major causes for competitiveness difference are reflected in EEC, EMC and EHC; of course, REC and ECC also exert certain influence, but at lesser degree. Therefore, countries with weak environment competitiveness need to especially strengthen the efforts in EEC, EMC and EHC, so as to narrow the gap between them and other countries and to significantly enhance their environmental competitiveness.

In order to better analyze sub-indexes' contribution to primary indicator, the scores of sub-indexes are multiplied by respective weights and converted to the scores reflected on primary indicator; after divided by the total score of primary indicator, the contribution rates of each sub-index can be obtained. In this way, each sub-index's contribution to the primary indicator will be straightforward, as shown in Fig. 6.4.

Figure 6.4 shows that ECC made the greatest contribution to GEC, with an average contribution rate of 27.0 %; EHC was the second greatest contributor, at a rate of 26.2 %; the contribution rate of REC and EMC were both 19.8 %; REC made the least contribution, at a rate of 7.2 %. Therefore, ECC and EHC are the two indicators that deserve special attention for all countries in their process of enhancing environmental competitiveness. Of course, the effects of REC, EEC and EMC must not be neglected.

6.1.3 GEC Echelon Scores

Table 6.2 lists the average scores of the five echelons (First Echelon: countries ranking 1st–10th; Second Echelon: countries ranking 11th–30th; Third Echelon: countries ranking 31st–60th; Fourth Echelon: countries ranking 61st–100th; Fifth Echelon: countries ranking 101st–133rd) of GEC in 2012.

As shown in the table, the average environmental competitiveness scores of first, second and third echelons are close with small difference, presenting a ratio of 1.11:1.05:1. The difference between the fourth and fifth echelons and the previous three echelons are larger and the score of First Echelon is 1.33 times that of Fifth Echelon, leaving a gap of 14.1 points.

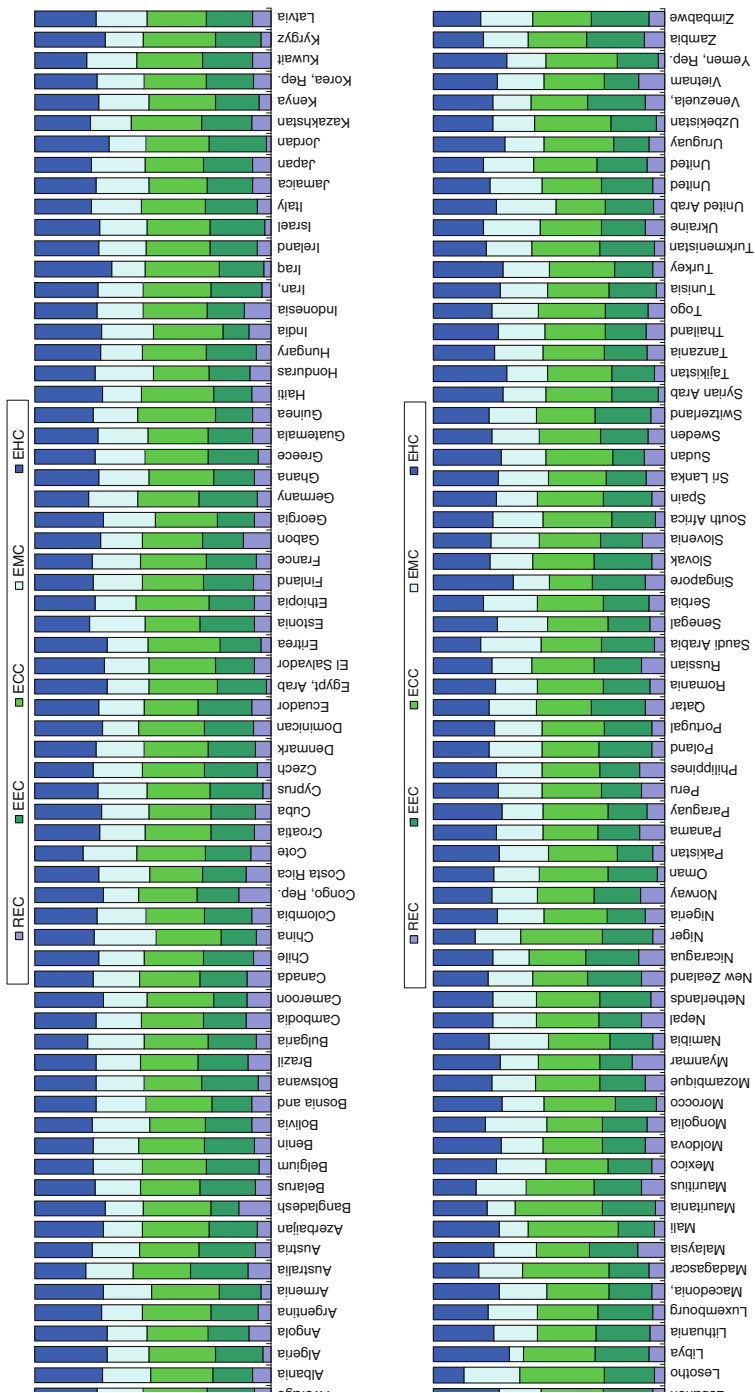


Fig. 6.4 Contribution rates of GEC sub-indices 2012

Table 6.2 Average environmental competitiveness scores of each echelon 2012

Average score	Indicator					
	Environmental competitiveness	REC	EEC	ECC	EMC	EHC
First echelon	57.4	22.5	63.4	71.4	59.3	70.6
Second echelon	54.6	23.4	56.4	68.8	55.0	69.5
Third echelon	51.9	20.5	51.5	68.0	52.1	67.7
Fourth echelon	48.7	16.4	45.7	66.4	48.8	65.8
Fifth echelon	43.3	12.2	42.3	64.3	40.0	57.6

The average REC score of each echelon shows very big difference, presenting a ratio of 1.83:1.91:1.67:1.34:1.

The average EEC score of each echelon also shows big difference, presenting a ratio of 1.50:1.33:1.22:1.08:1.

The difference of average ECC scores between the echelons is slight, presenting a ratio of 1.11:1.07:1.06:1.03:1.

The average EMC score of each echelon shows big difference, presenting a ratio of 1.48:1.38:1.30:1.22:1.

The difference of average EHC scores between the echelons is small, presenting a ratio of 1.23:1.21:1.18:1.14:1.

Table 6.2 and Fig. 6.5 together may better describe the scores of the primary indicator and sub-indexes in each echelon and it is each to find that, except for REC, the scores of environmental competitiveness and the other four sub-indexes diminishes from first to fifth echelon; the REC score of each echelon is the lowest and the highest case is only 23.4 points; the difference between the EEC scores of first and fifth echelons is most distinct, while the difference of ECC scores among all echelons is the least.

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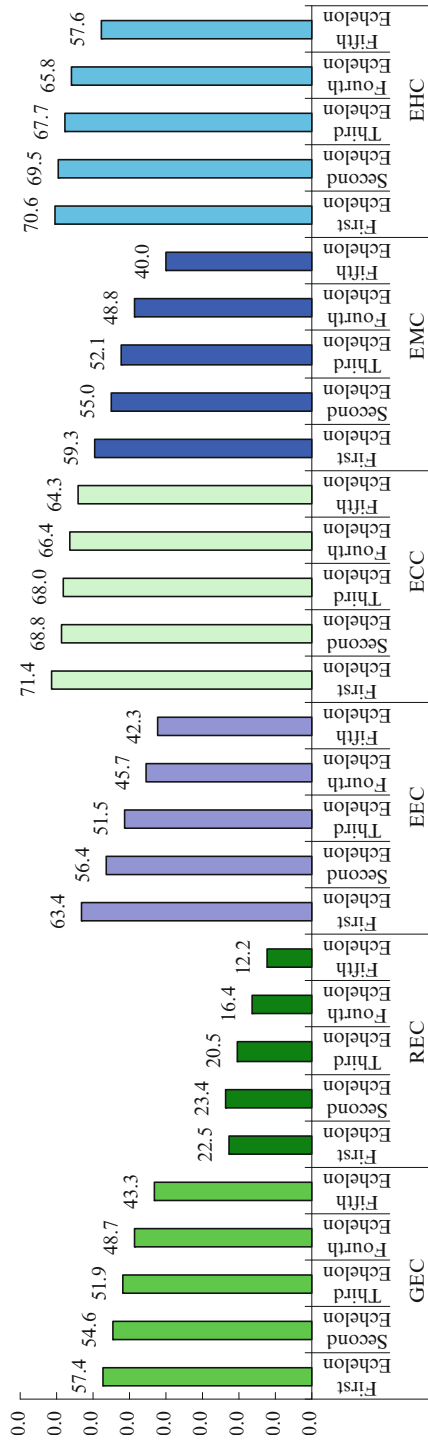


Fig. 6.5 2012 GEC and sub-index scores by echelon