

# The Executive Opinion Survey: The Voice of the Business Community

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*The Global Competitiveness Report* provides a useful portrait of a nation's economic environment and its ability to achieve sustained levels of prosperity and growth. In doing so, the *Report* continues to be one of the most respected assessments of national competitiveness. To mirror countries' economic performance, the World Economic Forum draws its data from two sources: international organizations and national sources, and its own annual Executive Opinion Survey (Survey). The Survey is a tool that aims to capture crucial information that is not otherwise available on a global scale. The data gathered thus provide a unique source of insight into each nation's economic and business environment. The Survey data are used to calculate the Global Competitiveness Index (GCI) and are also used as a prime data source for the Forum's other industry-specific reports, including *The Global Information Technology Report*, *The Travel & Tourism Competitiveness Report*, *The Global Enabling Trade Report*, *The Gender Gap Report*, and *The Financial Development Report*. The data are also employed for regional studies. Furthermore, the Executive Opinion Survey data have long served a number of international and national organizations, government bodies, academia, and private-sector companies for their policy or strategy review. For example, the data are used for the elaboration of the renowned Corruption Perceptions Index and the International Bribe Payers Index published by Transparency International as well as a number of academic publications. Finally, an increasing number of national competitiveness reports draw on or refer to the Survey data.

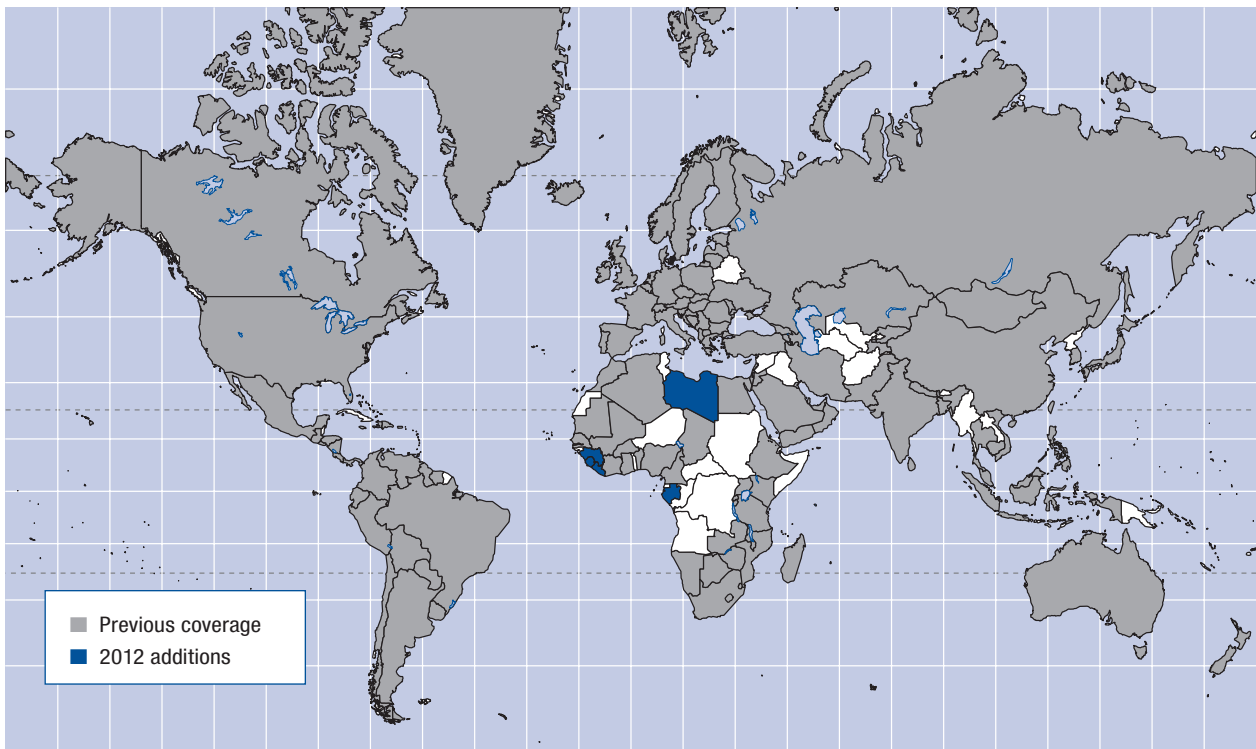
The World Economic Forum has conducted its annual Survey for over 40 years, modifying it over time to capture new data points essential to the GCI and other Forum indexes. It has also expanded the scope of its sample, achieving this year a record of over 15,000 surveys almost 150 economies between January and June 2012.

Following the data editing process (see below), a total of 14,059 surveys were retained.<sup>1</sup> This represents an average of 100 respondents per country. Given the extent of the Survey's country coverage and in order to maximize its outreach, it is translated into over 30 languages.

## Geographic expansion

Since the first edition of the World Economic Forum report on competitiveness in 1979, the country coverage has expanded from 16 European countries to 144 economies worldwide, which together account for 98 percent of the world's gross domestic product (see Figure 1). In this edition, five new economies are included: Gabon, Guinea, Liberia, Sierra Leone, and Seychelles; also Libya, which has been reinstated following a year of non-inclusion. On the flip side,

Figure 1: Country/Economy coverage of the Executive Opinion Survey



Angola and Belize are not included in this year’s edition because of a lack of a sufficient number of surveys. Furthermore, it was not possible to conduct the Survey in Syria because of the difficult security situation in that country. Finally, the World Economic Forum decided not to use the data collected in Tunisia this year because of a structural break in the data, making comparisons with past years impossible. The Forum’s Global Benchmarking Network hopes to re-include the above countries in future editions of the *Report*.

**SURVEY STRUCTURE AND METHODOLOGY**

The Survey is divided into 14 sections.

- I. About Your Company
- II. Overall Perceptions of Your Economy
- III. Government and Public Institutions
- IV. Infrastructure
- V. Innovation and Technology
- VI. Financial Environment
- VII. Foreign Trade and Investment
- VIII. Domestic Competition
- IX. Company Operations and Strategy
- X. Education and Human Capital
- XI. Corruption, Ethics and Social Responsibility
- XII. Travel & Tourism
- XIII. Environment
- XIV. Health

**Box 1: Example of a typical Survey question**

**To what extent is the judiciary in your country independent from influences of members of government, citizens, or firms?**

Heavily influenced < 1 2 3 4 5 6 7 > Entirely independent

- Circling 1...** means you agree completely with the answer on the left-hand side
- Circling 2...** means you largely agree with the left-hand side
- Circling 3...** means you somewhat agree with the left-hand side
- Circling 4...** means your opinion is indifferent between the two answers
- Circling 5...** means you somewhat agree with the right-hand side
- Circling 6...** means you largely agree with the right-hand side
- Circling 7...** means you agree completely with the answer on the right-hand side

Most questions in the Survey ask respondents to evaluate, on a scale of 1 to 7, one particular aspect of their operating environment. At one end of the scale, 1 represents the worst possible situation; at the other end of the scale, 7 represents the best (see Box 1 for an example).

The yearly administration of the Survey could not be carried out without the strong network of over 160 Partner Institutes worldwide. The Partner Institutes are typically recognized research institutes, universities, business organizations, and in some cases survey consultancies, which are listed in the front section of the *Report*.<sup>2</sup> The Partner Institutes are selected because of their understanding and expertise of the national business environment as well as their capacity to reach out to leading business executives and also for their commitment to the Forum's research on competitiveness. The Partner Institutes are tasked to follow detailed sampling guidelines in view of capturing a strong and representative sample.

After building a sample frame of potential respondents, the Partner Institutes administer the Survey. This valuable collaboration helps to ensure that the Survey is conducted according to the sampling guidelines and therefore in a consistent and timely manner across the globe.

The Survey sampling follows a dual stratification procedure based on the size of the company and the sector of activity. Specifically, the Survey sampling guidelines ask the Partner Institutes to carry out the following steps:

1. Prepare a "sample frame," or large list of potential respondents, which includes firms representing the main sectors of the economy (agriculture, manufacturing industry, non-manufacturing industry, and services).
2. Separate the frame into two lists: one that includes only large firms, and a second list that includes all other firms (both lists representing the various economic sectors).<sup>3</sup>
3. Based on these lists, and in view of reducing survey bias, choose a random selection of these firms to receive the Survey.

Furthermore, the sampling guidelines specify that the Partner Institute should aim to collect a combination of random respondents with some repeat respondents for further comparative analysis.<sup>4</sup> The administration of the Survey may take a variety of formats including face-to-face interviews, with business executives, telephone interviews and mailings, with an online survey as an alternative. Deciding which of these differing methodologies to use may be based on the particular country's infrastructure, distance between cities, cultural preferences, and other such issues.

For energy, time, and cost considerations, the Forum encourages the use of the online survey tool, which was available this year in 18 languages. The share of online participation has significantly increased

over the years and now represents almost 37 percent of all responses, with an increase of nearly 40 percent in the last three years. This year, 9 countries used the online tool for 100 percent of respondents (Argentina, Belgium, Bolivia, Czech Republic, Estonia, Iceland, Israel, Lebanon, and Venezuela), and 28 economies participated with more than 90 percent online (see Table 1).

The Partner Institutes also take an active and essential part in disseminating the findings of *The Global Competitiveness Report* and additional reports published by The Global Benchmarking Network by holding press events and workshops to highlight the results at the national level to the business community, the public sector, and other stakeholders.

The guidelines and Survey administration process underwent a stringent review in 2007, with the consultation of a renowned survey consultancy. The improved sampling guidelines have now been adopted in all countries for the last five years of the Survey administration process, implementing a best practice procedure and thus ensuring greater data accuracy and allowing for more robust comparison across economies. The entire Survey process will undergo a second audit in 2012 with the aim of implementing those recommendations in the 2013 edition of the Survey.

## DATA TREATMENT AND SCORE COMPUTATION

This section details the process whereby individual survey responses are edited and aggregated in order to produce the scores of each economy on each individual question of the Survey. These results, together with other indicators obtained from other sources, feed into the GCI and other projects.<sup>5</sup>

### Data editing

Prior to aggregation, the respondent-level data are subjected to a careful editing process. The first editing rule consists of excluding those surveys with a completion rate inferior to 50 percent.<sup>6</sup> This is because a partially completed survey likely demonstrates a lack of sufficient focus on the part of the respondent. In a second step, a multivariate outlier analysis is applied to the data using the Mahalanobis distance technique. This test assesses whether each individual survey is representative, given the overall sample of survey responses in the specific country, and allows for the deletion of clear outliers.

More specifically, the Mahalanobis distance test estimates the likelihood that one particular point of  $N$  dimensions belongs to a set of such points. One single survey made up of  $N$  answers can be viewed as the point of  $N$  dimensions, while a particular country sample  $c$  is the set of points. The Mahalanobis distance is used to compute the probability that any survey  $i$  does not belong to the sample  $c$ . If the probability is high

Table 1: Executive Opinion Survey: Descriptive statistics and weightings

Country/Economy	First component*			Second component: 2012 Survey*		
	Survey edition	No. of respondents	Weight (%)	No. of respondents	Use of online tool (%)	Weight (%)
Albania	2011	79	44.7	81	0.0	55.3
Algeria	2011	39	47.1	33	3.0	52.9
Argentina	2011	86	43.2	99	100.0	56.8
Armenia	2011	83	45.5	80	8.8	54.5
Australia	2011	72	45.7	68	69.1	54.3
Austria	2011	46	35.2	105	53.3	64.8
Azerbaijan	2011	96	45.1	95	0.0	54.9
Bahrain	2011	80	47.6	65	96.9	52.4
Bangladesh	2011	69	42.3	86	0.0	57.7
Barbados	2011	37	37.0	72	77.8	63.0
Belgium	2011	68	42.5	83	100.0	57.5
Benin	2011	105	46.9	90	0.0	53.1
Bolivia	2011	79	46.2	72	100.0	53.8
Bosnia and Herzegovina†	2010	100	45.0	100	0.0	55.0
Botswana	2011	114	49.4	80	31.3	50.6
Brazil	2011	185	48.2	143	93.7	51.8
Brunei Darussalam	2011	91	53.7	44	59.1	46.3
Bulgaria	2011	126	45.6	120	0.0	54.4
Burkina Faso	2011	40	44.7	41	0.0	55.3
Burundi	2011	77	42.8	92	0.0	57.2
Cambodia	2011	100	48.2	77	0.0	51.8
Cameroon	2011	83	48.6	62	0.0	51.4
Canada	2011	98	44.4	103	97.1	55.6
Cape Verde	2011	83	41.7	108	24.1	58.3
Chad	2011	113	45.9	105	0.0	54.1
Chile	2011	75	44.5	78	26.9	55.5
Colombia	2011	137	36.2	286	83.9	63.8
Costa Rica	2011	99	45.6	94	96.8	54.4
Côte d'Ivoire	2011	132	49.5	92	0.0	50.5
Croatia	2011	97	43.8	107	47.7	56.2
Cyprus	2011	99	47.8	79	0.0	52.2
Czech Republic	2011	153	44.2	163	100.0	55.8
Denmark	2011	33	30.2	128	0.0	69.8
Dominican Republic	2011	54	38.6	91	3.3	61.4
Timor-Leste	2011	31	43.5	35	0.0	56.5
Ecuador††	2011	134	100.0	n/a	n/a	n/a
Egypt	2011	121	51.2	73	0.0	48.8
El Salvador	2011	90	56.3	34	79.4	43.7
Estonia	2011	93	46.1	85	100.0	53.9
Ethiopia	2011	100	51.3	60	0.0	48.8
Finland	2011	33	43.9	36	97.2	56.1
Macedonia, FYR	2011	115	48.2	89	1.1	51.8
France	2011	109	42.9	129	0.8	57.1
Gabon†††	n/a	n/a	n/a	48	0.0	100.0
Gambia, The	2011	91	45.6	87	0.0	54.4
Georgia††	2011	95	100.0	n/a	n/a	n/a
Germany	2011	95	41.4	127	79.5	58.6
Ghana	2011	84	45.8	79	21.5	54.2
Greece	2011	85	45.3	83	63.9	54.7
Guatemala	2011	78	44.2	83	1.2	55.8
Guinea†††	n/a	n/a	n/a	60	0.0	100.0
Guyana	2011	84	44.3	89	0.0	55.7
Haiti	2011	146	54.3	67	0.0	45.7
Honduras	2011	85	44.9	86	12.8	55.1
Hong Kong SAR	2011	51	41.3	69	75.4	58.8
Hungary	2011	50	36.3	103	66.0	63.7
Iceland	2011	81	43.3	93	100.0	56.7
India	2011	248	53.5	122	33.6	46.5
Indonesia	2011	86	44.7	88	1.1	55.3
Iran, Islamic Rep.	2011	328	38.0	585	36.6	62.0
Ireland	2011	49	42.1	62	93.5	57.9
Israel	2011	47	44.0	51	100.0	56.0
Italy	2011	92	45.7	87	3.4	54.3
Jamaica	2011	53	40.7	75	0.0	59.3
Japan	2011	105	44.3	111	4.5	55.7
Jordan	2011	96	39.0	156	16.0	61.0
Kazakhstan†	2010	122	47.1	103	0.0	52.9
Kenya	2011	104	44.1	112	0.0	55.9
Kuwait	2011	49	48.2	38	31.6	51.8
Kyrgyz Republic	2011	99	45.0	99	0.0	55.0
Latvia	2011	176	52.1	98	91.8	47.9
Lebanon	2011	48	47.9	38	100.0	52.1

(Cont'd.)

Table 1: Executive Opinion Survey: Descriptive statistics and weightings (cont'd.)

Country/Economy	First component*			Second component: 2012 Survey*		
	Survey edition	No. of respondents	Weight (%)	No. of respondents	Use of online tool (%)	Weight (%)
Lesotho	2011	79	43.5	89	0.0	56.5
Liberia <sup>†††</sup>	n/a	n/a	n/a	85	0.0	100.0
Libya <sup>†††</sup>	n/a	n/a	n/a	72	45.8	100.0
Lithuania	2011	178	46.9	153	63.4	53.1
Luxembourg	2011	35	41.9	45	93.3	58.1
Madagascar	2011	86	44.2	92	0.0	55.8
Malawi	2011	64	45.6	61	11.5	54.4
Malaysia	2011	87	46.2	79	38.0	53.8
Mali	2011	129	47.9	102	0.0	52.1
Malta	2011	52	43.6	58	77.6	56.4
Mauritania	2011	71	43.2	82	0.0	56.8
Mauritius	2011	95	45.5	91	39.6	54.5
Mexico	2011	354	48.0	278	91.0	52.0
Moldova	2011	108	44.5	112	0.0	55.5
Mongolia	2011	84	44.9	85	0.0	55.1
Morocco <sup>†</sup>	2010	94	55.1	40	0.0	44.9
Mozambique	2011	112	47.6	91	0.0	52.4
Namibia	2011	75	43.9	82	0.0	56.1
Nepal	2011	102	46.2	93	0.0	53.8
Netherlands	2011	87	45.7	82	98.8	54.3
New Zealand	2011	51	44.1	55	96.4	55.9
Nicaragua	2011	93	47.4	77	84.4	52.6
Nigeria	2011	110	45.7	104	1.0	54.3
Norway	2011	47	39.3	75	97.3	60.7
Oman	2011	70	43.6	78	50.0	56.4
Pakistan	2011	130	47.1	110	23.6	52.9
Panama	2011	134	45.1	133	63.2	54.9
Paraguay	2011	94	47.0	80	7.5	53.0
China	2011	370	45.0	371	0.3	55.0
Peru	2011	88	45.7	83	30.1	54.3
Philippines	2011	93	40.7	132	0.8	59.3
Poland	2011	198	44.5	206	93.7	55.5
Portugal	2011	136	47.1	115	55.7	52.9
Puerto Rico	2011	63	43.5	71	98.6	56.5
Qatar <sup>†</sup>	2010	75	38.9	123	16.3	61.1
Korea, Rep.	2011	112	46.7	98	3.1	53.3
Montenegro	2011	78	45.3	76	0.0	54.7
Serbia	2011	81	42.5	99	0.0	57.5
Romania	2011	94	44.5	98	0.0	55.5
Russian Federation	2011	377	43.8	414	0.7	56.2
Rwanda <sup>††</sup>	2011	40	100.0	n/a	n/a	n/a
Saudi Arabia <sup>†</sup>	2010	152	50.8	95	96.8	49.2
Senegal	2011	90	44.5	94	0.0	55.5
Seychelles <sup>†††</sup>	n/a	n/a	n/a	32	34.4	100.0
Sierra Leone <sup>†††</sup>	n/a	n/a	n/a	99	0.0	100.0
Singapore	2011	152	43.0	178	56.2	57.0
Slovak Republic	2011	78	46.7	68	80.9	53.3
Slovenia <sup>†</sup>	2010	101	43.9	110	0.0	56.1
South Africa	2011	57	47.9	45	82.2	52.1
Spain	2011	103	46.5	91	83.5	53.5
Sri Lanka <sup>††</sup>	2011	105	100.0	n/a	n/a	n/a
Suriname	2011	34	43.9	37	0.0	56.1
Swaziland	2011	40	42.0	51	68.6	58.0
Sweden	2011	32	34.7	77	97.4	65.3
Switzerland	2011	90	46.6	79	93.7	53.4
Taiwan, China	2011	68	44.6	70	50.0	55.4
Tajikistan	2011	101	45.5	97	0.0	54.5
Tanzania	2011	92	44.1	99	1.0	55.9
Thailand	2011	55	41.2	75	73.3	58.8
Trinidad and Tobago	2011	116	41.7	151	80.1	58.3
Turkey	2011	79	44.1	85	21.2	55.9
Uganda	2011	94	45.5	90	0.0	54.5
Ukraine	2011	104	44.4	109	1.8	55.6
United Arab Emirates	2011	108	39.5	169	7.1	60.5
United Kingdom	2011	93	43.8	102	96.1	56.2
United States	2011	422	45.8	397	98.2	54.2
Uruguay	2011	82	45.2	81	0.0	54.8
Venezuela	2011	45	46.8	39	100.0	53.2
Vietnam	2011	96	45.0	96	2.1	55.0
Yemen	2011	52	44.8	53	0.0	55.2
Zambia	2011	88	44.2	94	0.0	55.8
Zimbabwe	2011	56	43.3	64	40.6	56.7
<b>Grand total/Average</b>				<b>14,059</b>	<b>36.6</b>	

Note: All statistics were computed following the edited process. See text for details.

\* The table reports information about the two Survey editions used in the computation of the two-year weighted average score. See Box 2 for details.

Survey edition(s) used for the computation of the two-year weighted average score: <sup>†</sup> 2010 and 2012; <sup>††</sup> 2011; <sup>†††</sup> 2012. See Box 2 for details about exceptions.

enough—we use 99.9 percent as the threshold—we conclude that the survey is a clear outlier and does not “belong” to the sample. The implementation of this test requires that the number of responses in a country be greater than the number of answers,  $N$ , used in the test. The test uses 66 questions, selected by their relevance and placement in the Survey instrument.

A univariate outlier test is then applied at the country level for each question of each survey. We use the standardized score—or “z-score”—method, which indicates by how many standard deviations any one individual answer deviates from the mean of the country sample. Individual answers with a standardized score  $Z_{i,q,c}$  greater than 3 are dropped.

#### Data weighting: Sector-weighted country averages

Once the data have been edited, individual answers are aggregated at the country level. We compute sector-weighted country averages to obtain a more representative average that takes into account the structure of a country’s economy. The structure is defined by the estimated contributions to a country’s gross domestic product of each of the four main economic sectors: agriculture, manufacturing industry, non-manufacturing industry, and services (see Table 2).<sup>7</sup>

An additional step is taken to prevent individual responses within a sample from receiving an excessive weight when the structure of the sample and the underlying economy differ greatly. As an extreme example, imagine the case of a country where just 3 percent of responses come from the services sector, but that sector actually represents 90 percent of the country’s economy. By applying the above sector-weighting scheme, we would be giving a very high weight to a very few surveys. This is avoided by trimming the sector weights. When for a country the ratio of the weight of one sector in the economy to the percentage of surveys from that sector in the country sample exceeds 5, the sector weight used for the weighted average is capped to five times the percentage of surveys from that sector in the sample. The weights of the other sectors are then adjusted proportionally to their weight in the country’s GDP.

Formally, the sector-weighted average of a Survey indicator  $i$  for country  $c$ , denoted  $q_{i,c}$ , is computed as follows:

$$q_{i,c} = \sum_s w_{s,c} \times q_{i,s,c}$$

with

$$q_{i,s,c} = \sum_j \frac{q_{i,j,s,c}}{N_{s,c}},$$

where

$w_{s,c}$  is sector  $s$ ’s contribution to the economy of country  $c$ ;

$q_{i,s,c}$  is the mean of the answers to question  $i$  from sector  $s$  in country  $c$ ;

$q_{i,j,s,c}$  is the answer to question  $i$  from respondent  $j$  in sector  $s$  in country  $c$ ; and

$N_{s,c}$  is the number of responses from sector  $s$  in country  $c$ .

When for a given country the sample size is too small or the sectoral representation of the sample is too different from the actual structure in the economy, the mechanism described above might not be sufficient to prevent an individual response from receiving a disproportionate weight.<sup>8</sup> In such a case the economic sector stratification average is abandoned and a simple average of the surveys is applied, where all individual responses contribute equally to the country score regardless the sector of activity of the respondents’ companies. In 2012, this was the case for seven countries: Algeria, Burkina Faso, Kuwait, Morocco, Timor-Leste, Venezuela, and Yemen. Going forward, we will work closely with our Partner Institutes to increase the sample size and improve the sector representation in these countries.

#### Data weighting: Moving average

As a final step, the sector-weighted country averages for 2012 are combined with the 2011 averages to produce the country scores that are used for the computation of the GCI 2012–2013 and for other projects.

This moving average technique, introduced in 2008, consists of taking a weighted average of the most recent year’s Survey results together with a discounted average of the previous year. There are several reasons for doing this. First, it makes results less sensitive to the specific point in time when the Survey is administered. Second, it increases the amount of available information by providing a larger sample size. Additionally, because the Survey is carried out during the first quarter of the year, the average of the responses in the first quarter of 2011 and first quarter of 2012 better aligns the Survey data with many of the data indicators from sources other than the Survey, which are often year-average data. For newly introduced questions, for which no time series exists, the final country score simply corresponds to the country score in 2012. Such is the case for indicator 1.13, which is derived from the new Survey question about the provision of government services aiming at improving business performance.

To calculate the moving average, we use a weighting scheme composed of two overlapping elements. On one hand, we want to give each response an equal weight and, therefore, place more weight on the year with the larger sample size. At the same time, we would like to give more weight to the most recent responses because

Table 2: Sectoral value-added as a share (%) of GDP, most recent year available

Country/Economy	Agriculture	Manu- facturing industry	Non- manufac- ing industry	Services	Country/Economy	Agriculture	Manu- facturing industry	Non- manufac- ing industry	Services
Albania	20	20*	n/a	60	Lesotho	8	16	19	58
Argentina	9	22	9	60	Liberia	61	13	4	22
Armenia	20	15	18	47	Libya	2	4	74	20
Australia	3	10	19	68	Lithuania	3	16	11	70
Austria	2	19	11	69	Luxembourg	0	6	7	87
Azerbaijan	6	4	65	24	Macedonia, FYR	11	23	13	52
Bahrain	0	66*	n/a	33	Madagascar	29	14	2	55
Bangladesh	19	18	11	53	Malawi	31	10	6	53
Barbados	4	7	11	78	Malaysia	10	25	19	46
Belgium	1	14	8	78	Mali	37	3	21	39
Benin	32	8	6	54	Malta	2	14	19	65
Bolivia	14	14	22	50	Mauritania	20	4	33	43
Bosnia and Herzegovina	8	13	16	63	Mauritius	4	19	10	67
Botswana	3	3	42	52	Mexico	4	18	17	61
Brazil	6	16	10	68	Moldova	10	12	0	78
Brunei Darussalam	1	10	61	28	Mongolia	18	7	29	45
Bulgaria	5	16	14	64	Montenegro	10	6	14	70
Burundi	35	9	11	45	Mozambique	32	13	10	45
Cambodia	35	15	8	42	Namibia	8	8	12	73
Cameroon	19	17	14	50	Nepal	33	7	9	52
Canada	2	14	18	67	Netherlands	2	13	11	74
Cape Verde	9	7	13	71	New Zealand	6	15	10	69
Chad	14	7	42	38	Nicaragua	18	19	9	53
Chile	3	13	30	54	Nigeria	32	3	39	26
China	10	32	12	46	Norway	1	10	31	58
Colombia	7	14	18	61	Oman	2	8	47	43
Costa Rica	7	19	8	66	Pakistan	22	17	7	55
Côte d'Ivoire	23	19	8	50	Panama	5	6	11	78
Croatia	7	17	12	63	Paraguay	19	12	8	62
Cyprus	2	8	12	78	Peru	7	14	18	62
Czech Republic	2	23	14	60	Philippines	12	21	11	55
Denmark	1	13	9	77	Poland	4	16	14	66
Dominican Republic	6	22	5	67	Portugal	2	13	10	75
Ecuador	7	11	15	67	Puerto Rico	1	40	3	56
Egypt	10	14	15	61	Qatar	0	68*	n/a	32
El Salvador	13	22	6	59	Romania	7	22	4	67
Estonia	3	17	12	68	Russian Federation	5	15	18	62
Ethiopia	48	5	9	38	Rwanda	34	6	8	52
Finland	3	18	10	69	Saudi Arabia	3	10	52	35
France	2	11	8	79	Senegal	17	13	9	61
Gabon	4	4	50	42	Serbia	11	19*	n/a	70
Gambia, The	27	5	11	57	Seychelles	2	11	8	79
Georgia	10	9	12	69	Sierra Leone	47	4	21	29
Germany	1	19	7	73	Singapore	0	22	6	72
Ghana	30	6	12	51	Slovak Republic	3	19	15	63
Greece	3	10	8	79	Slovenia	2	22	12	64
Guatemala	12	19	8	61	South Africa	3	15	16	66
Guinea	13	5	43	40	Spain	3	13	13	71
Guyana	19	7	29	46	Sri Lanka	14	16	11	60
Haiti	25	16*	n/a	59	Suriname	5	20	19	56
Honduras	11	17	8	64	Swaziland	7	45	5	42
Hong Kong SAR	0	2	6	93	Sweden	2	16	9	73
Hungary	4	22	8	66	Switzerland	1	19	8	72
Iceland	6	13	14	66	Taiwan, China	2	30*	n/a	69
India	16	16	12	55	Tajikistan	21	10	13	57
Indonesia	16	26	23	35	Tanzania	28	10	15	47
Iran, Islamic Rep.	10	11	34	45	Thailand	11	34	9	45
Ireland	1	24	8	67	Trinidad and Tobago	0	6	46	47
Israel	3	32*	n/a	64	Turkey	9	17	9	65
Italy	2	16	9	73	Uganda	24	8	17	50
Jamaica	6	9	13	71	Ukraine	8	18	11	63
Japan	1	20	8	71	United Arab Emirates	2	12	48	38
Jordan	3	19	11	66	United Kingdom	1	11	10	78
Kazakhstan	5	12	31	52	United States	1	13	8	77
Kenya	19	8	6	67	Uruguay	12	17	8	63
Korea, Rep.	3	28	9	61	Vietnam	20	20	20	39
Kyrgyz Republic	29	13	7	51	Zambia	9	9	28	54
Latvia	4	12	10	74	Zimbabwe	17	15	14	53
Lebanon	5	8	8	78					

Sources: World Bank, *World Development Indicators* (accessed December 8, 2011); Economist Intelligence Unit, *CountryData database* (accessed December 9, 2011); US Central Intelligence Agency, *The World Factbook* (accessed December 9, 2011).

Note: The simple average was used to compute the country scores of Algeria, Burkina Faso, Kuwait, Morocco, Timor-Leste, Venezuela, and Yemen. The values for these countries are therefore not reported. See text for details.

\* Combined share of manufacturing and non-manufacturing industries.

## Box 2: Country score calculation

This box presents the method applied to compute the country scores for the vast majority of economies included in *The Global Competitiveness Report 2012–2013* (see text for exceptions).

For any given Survey question  $i$ , country  $c$ 's final score,  $q_{i,c}^{2011-12}$ , is given by:

$$q_{i,c}^{2011-12} = w_c^{2011} \times q_{i,c}^{2011} + w_c^{2012} \times q_{i,c}^{2012} \quad (1)$$

where

$q_{i,c}^t$  is country  $c$ 's score on question  $i$  in year  $t$ , with  $t = 2011, 2012$ , as computed following the approach described in the text;

$q_{i,n,c}^t$  is respondent  $n$ 's response (on a 1–7 scale) to question  $i$  in year  $t$ ; and

$w_c^t$  is the weight applied to country  $c$ 's score in year  $t$  (see below).

The weights for each year are determined as follows:

$$w_c^{2011} = \frac{(1-\alpha) + \frac{N_c^{2011}}{N_c^{2011} + N_c^{2012}}}{2} \quad (2a) \quad \text{and} \quad w_c^{2012} = \frac{\alpha + \frac{N_c^{2012}}{N_c^{2011} + N_c^{2012}}}{2} \quad (2b)$$

where  $N_c^t$  is the sample size (i.e., the number of respondents) for country  $c$  in year  $t$ , with  $t = 2011, 2012$ .

Plugging Equations (2a) and (2b) into (1) and rearranging yields:

$$q_{i,c}^{2011-12} = \frac{1}{2} \times \left[ \underbrace{(1-\alpha) \times q_{i,c}^{2011} + \alpha \times q_{i,c}^{2012}}_{\text{discounted-past weighted average}} \right] + \frac{1}{2} \times \left[ \underbrace{\frac{N_c^{2011}}{N_c^{2011} + N_c^{2012}} \times q_{i,c}^{2011} + \frac{N_c^{2012}}{N_c^{2011} + N_c^{2012}} \times q_{i,c}^{2012}}_{\text{sample-size weighted average}} \right]. \quad (3)$$

In Equation (3), the first component of the weighting scheme is the discounted-past weighted average. The second component is the sample-size weighted average. The two components are given half-weight each. The value for  $\alpha$  is 0.6, which corresponds to a discount factor of 2/3. That is, the 2011 score of country  $c$  is given 2/3 of the weight given to the 2012 score. One additional characteristic of this approach is that it prevents a country sample that is much larger in one year from overwhelming the smaller sample from the other year.

The formula is easily generalized. For any two consecutive editions  $t_1$  and  $t_2$  of the Survey, country  $c$ 's final score on question  $i$  is computed as follows:

$$q_{i,c}^{t_1-t_2} = \frac{1}{2} \times \left[ (1-\alpha) \times q_{i,c}^{t_1} + \alpha \times q_{i,c}^{t_2} \right] + \frac{1}{2} \times \left[ \frac{N_c^{t_1}}{N_c^{t_1} + N_c^{t_2}} \times q_{i,c}^{t_1} + \frac{N_c^{t_2}}{N_c^{t_1} + N_c^{t_2}} \times q_{i,c}^{t_2} \right]. \quad (4)$$

### Exceptions

As described in the text, there are a number of exceptions to the approach described above. In describing them below, we use actual years—rather than letters—in equations for the sake of concreteness.

In the case of Survey questions that were introduced in 2012, where, by definition, no past data exist, the weight applied is  $w_c^{2011} = 0$  and  $w_c^{2012} = 1$ . Equation (1) simply is  $q_{i,c}^{2011-12} = q_{i,c}^{2012}$ . The same is true for those countries that are newly covered (Gabon, Guinea, Liberia, Seychelles, and Sierra Leone) and reinstated (Libya) in 2012. For these countries too we use  $q_{i,c}^{2011-12} = q_{i,c}^{2012}$ .

In the case of countries that failed the inter-year robustness check, the weight applied is  $w_c^{2011} = 1$  and  $w_c^{2012} = 0$ , so that Equation (1) simply becomes  $q_{i,c}^{2011-12} = q_{i,c}^{2011}$ . In the case of countries that failed the inter-year robustness check last year and for which the 2011 data were discarded, we use the Survey data from 2010 instead, and combine them with those of 2012 to compute the scores. Equation (1) then becomes  $q_{i,c}^{2010,2012} = w_c^{2010} \times q_{i,c}^{2010} + w_c^{2012} \times q_{i,c}^{2012}$ .

### Example

For this example, we compute the score of Australia for indicator 6.01 on the intensity of local competition, which is *not* a newly introduced question. Also, Australia did not fail the inter-year robustness test either this year or last year. Therefore, the general case of Equation (1) applies. Australia's score was 6.03 in 2011 and 5.70 in 2012. The weighting scheme described above indicates how the two scores are combined. In Australia, the size of the sample was 72 in 2011 and 68 in 2012. Using  $\alpha = 0.6$

(Cont'd.)



**Box 2: Country score calculation (cont'd.)**

and applying Equations (2a) and (2b) yields weights of 45.7 percent for 2011 and 54.3 percent for 2012 (see Table 1). The final country score for this question is given by Equation (1):

$$\underbrace{0.457 \times 6.03}_{2011} + \underbrace{0.543 \times 5.70}_{2012} = 5.85$$

This is the final score used in the computation of the GCI and reported in Table 6.01 (see page 450). Although numbers are rounded to two decimal places in this example and to one decimal place in the data tables, exact figures are used in all calculations.

they contain more updated information. That is, we also “discount the past.” Table 1 reports the exact weights used in the computation of the scores of each country, while Box 2 details the methodology and provides a clarifying example.

**Inter-year robustness test**

The two tests described above address variability issues among individual responses in a country. Yet they were not designed to track the evolution of country scores across time. Therefore, we use an additional test to assess the reliability and consistency of the Survey data. The inter-quartile range test, or IQR test, is used to identify large swings—positive and negative—in the country scores. More specifically, for each country we compute  $c$  as the average difference in country scores across all the Survey questions from one year to another. We then compute the inter-quartile range (i.e., the difference between the 25th percentile and the 75th percentile), denoted  $iq$ , of the sample of 144 economies with respect to the previous year. Any value  $c$  lying outside the range bounded by the 25th percentile minus 1.5 times  $iq$  and the 75th percentile plus 1.5 times  $iq$  is identified as a potential outlier. Formally, we have:

$$\begin{cases} \text{lower bound} = Q1 - 1.5 \times IQR \\ \text{upper bound} = Q3 + 1.5 \times IQR \end{cases}$$

where

$Q1$  and  $Q3$  correspond to the 25th and 75th percentiles of the sample, respectively, and  $IQR$  is the difference between these two values.

This test is complemented by an analysis of the evolution in the results over the past five editions and by a comparison with the evolution in the data used in the GCI that are not derived from the Survey. In addition, we examine the latest developments in all the countries identified as outliers by the tests that might help to explain such large swings.

Based on the IQR test, the 2012 Survey data collected in Ecuador, Georgia, Rwanda, and Sri Lanka deviate significantly from the 2011 results. The subsequent analysis revealed that this departure was not accompanied by a similar trend in indicators taken from other sources, and the recent developments in these countries do not seem to provide enough justification for the large swings observed. For these four countries, we therefore use only the 2011 Survey data in the computation of this year’s GCI. While this remains a remedial measure, we will continue to investigate the situation in an effort to improve the reliability of the Survey data in these countries. Last year, the same analysis resulted in the Survey data of six countries—Bosnia and Herzegovina, Kazakhstan, Morocco, Qatar, Saudi Arabia, and Slovenia—not being included in the analysis. This year, as an intermediate step toward the re-establishment of the standard computation method, we used a weighted average of the Survey data of 2010 and 2012 for these countries.

**CONCLUSION**

The Executive Opinion Survey remains the largest poll of its kind, collecting this year the insight of more than 14,000 executives into their business operating environment. This scale could not be achieved without the tremendous efforts of the Forum’s network of over 160 Partner Institutes in carrying out the Survey at a national level. It gathers valuable information on a broad range of variables for which data sources are scarce or nonexistent. For this reason, and for the integrity of our publications and related research, improving the sampling methodology and comparability of data across the globe remain an essential and ongoing endeavor of The Global Benchmarking Network.

**NOTES**

- 1 Although data were collected for almost 150 economies in 2012, following the editing process we used the 2012 data for 140 economies. Please see the data editing section for further details.

- 2 The World Economic Forum's Global Benchmarking Network would like to acknowledge e-Rewards Market Research for carrying out the Executive Opinion Survey 2012 in the United States, collecting over 450 surveys following the detailed sampling guidelines. Furthermore, e-Rewards supplemented the sample in Germany.
- 3 *Company size* is defined as the number of employees of the firm in the country of the Survey respondent. The company size value used for delineating the large and small company sample frames varies across countries. The size value tracks closely with the overall size of the economy. Adjustments were made to the value based on searches in company directories and data gathered through the administration of the Survey in past years.
- 4 In order to reach the required number of surveys in each country (80 for most economies and 300 for the BRIC countries and the United States), a Partner Institute uses the response rate from previous years.
- 5 The *results* are the *scores* obtained by each economy in the various questions of the Survey. The two terms are used interchangeably throughout the text.
- 6 The *completion rate* is the proportion of answered questions among the 130 core questions in the Survey instrument.
- 7 In some cases, the information about the company's sector of activity is missing. In these cases, for any given country when the sample includes at least one survey without sector information, the average response values across the surveys are apportioned to the other sectors according to the sample sizes in those other sectors. This has the effect of including these surveys on a one-for-one basis as they occur in the sample—that is, with no adjustment for sector.
- 8 Concretely, if the weight of an individual response exceeds 10 percent of the country sample, the sector-weighted average is abandoned for the benefit of a simple average.