

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

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Since its first publication in 1979, *The Global Competitiveness Report* has been used by policymakers, business executives, and academics as a development tool that contributes a valuable portrait of an economy's productivity and its ability to achieve sustained levels of prosperity and growth. Key to this study, the Executive Opinion Survey (the Survey) is the longest-running and most extensive survey of its kind, capturing the opinions of business leaders around the world on a broad range of topics for which data sources are scarce or, frequently, nonexistent on a global scale. Hence the Survey aims to capture data in particular domains—such as the appetite for entrepreneurial risk, the extent of collaboration within a company or with external entities, and the level of corruption—which makes it an essential complement to the more traditional data provided by international organizations and national statistical offices.

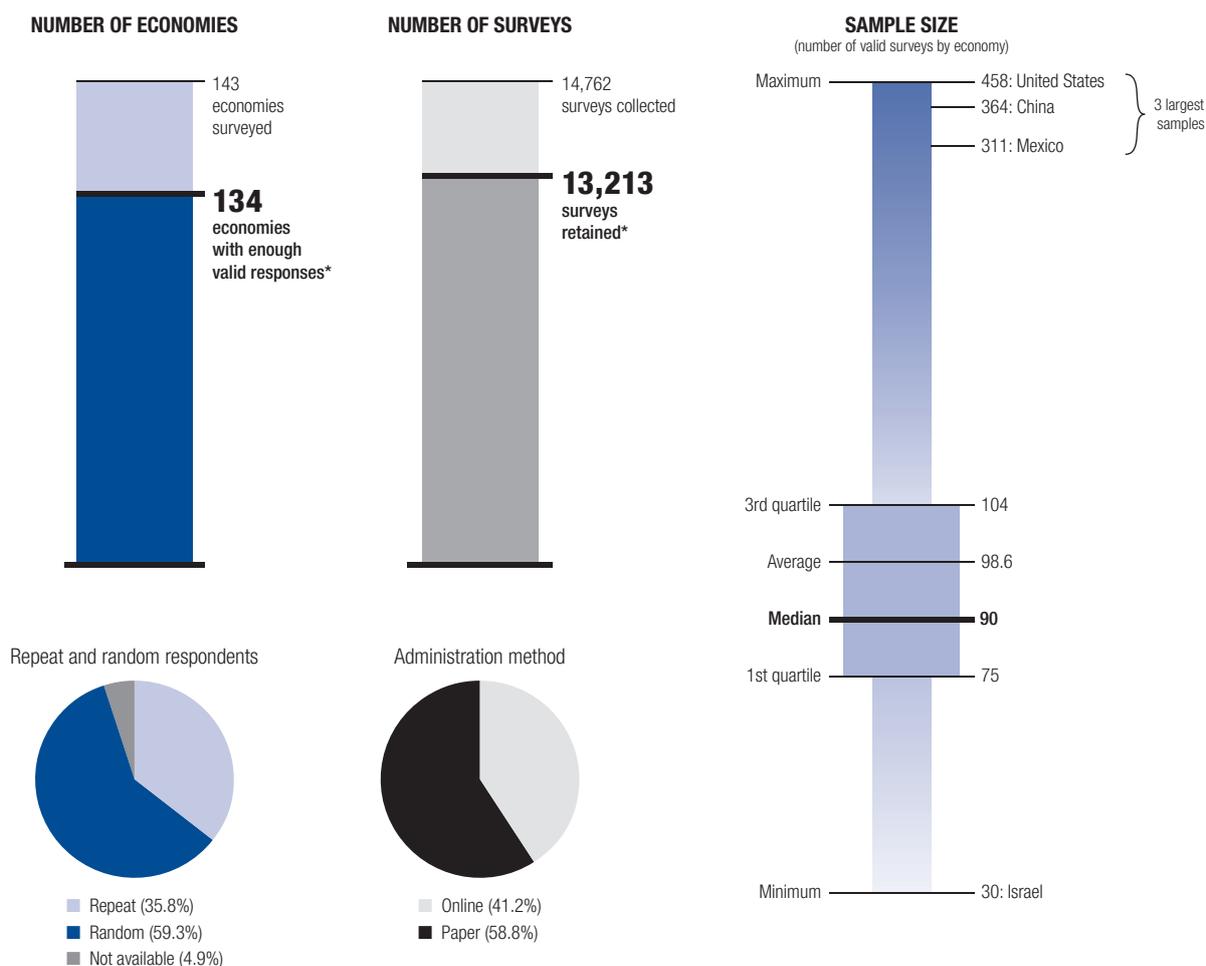
The indicators derived from the Survey are used in the calculation of the Global Competitiveness Index (GCI) and other World Economic Forum indexes and reports, including the Networked Readiness Index, the Enabling Trade Index, the Travel & Tourism Competitiveness Index, the Gender Gap Index, and the Human Capital Index as well as in *The Inclusive Economic Growth and Development Report* and a number of regional competitiveness studies.

A truly unique source of data, the Survey has also long been used by a number of international and nongovernmental organizations, think tanks, and academia for empirical and policy work. For example, Transparency International has been using the Survey data for the elaboration of its Corruption Perceptions Index. Institutions such as the Organisation for Economic Co-operation and Development (OECD), the World Bank, the Mo Ibrahim Foundation, and the International Monetary Fund (IMF) also refer to the Forum's Survey data in their publications, as do a number of academic publications. Finally, an increasing number of countries publish national competitiveness reports that draw on, or refer to, the Survey data.

## THE SURVEY IN NUMBERS

The Executive Opinion Survey 2015 captured the opinions of over 14,000 business leaders in 144 economies between February and June 2015 (see Figure 1). Because of issues of data quality or quantity, the results from this year's edition of the Survey were used for 134 economies. Data from previous years were used for 6 additional countries, for a total 140 economies covered in the GCR (see the data treatment section below for further details). The Survey is available in 41 languages (see Table 1), of which 21 are available online. This year over 40 percent of participants took the Survey online. In 27 economies the Survey was administered entirely online, while in a further 11 over 90 percent of respondents completed online (see Table 2 for statistics about the method of administration).

Figure 1: Descriptive statistics of the Executive Opinion Survey 2015



Source: International Monetary Fund, *World Economic Outlook* database, April 2015 edition.

Note: Not all charts are drawn to scale.

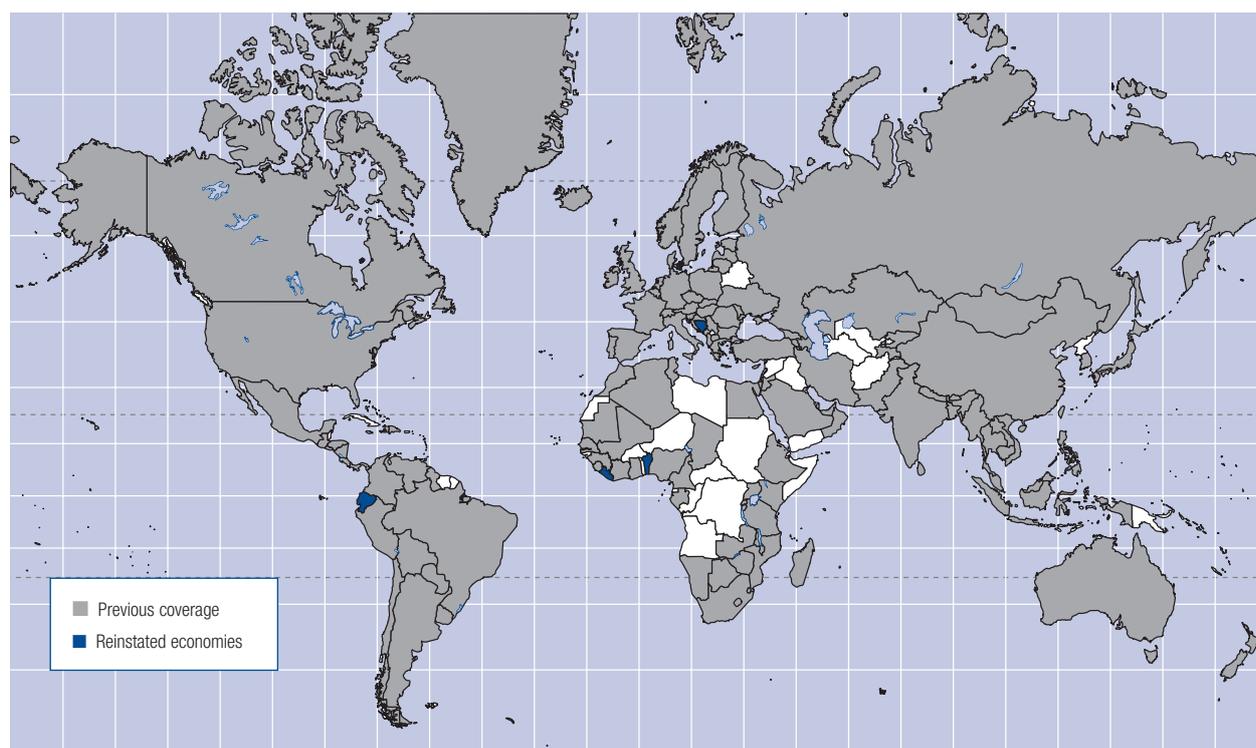
\* Following data treatment. See text for details.

Table 1: The 41 languages in which the 2015 Survey was available

Albanian	Croatian*	Italian	Montenegrin	Spanish*
Arabic*	Czech*	Japanese	Persian*	Thai
Armenian	Danish	Khmer	Polish*	Turkish*
Azeri	English*	Korean	Portuguese*	Urdu
Bosnian	Estonian*	Lao	Romanian	Vietnamese
Bulgarian	French*	Latvian*	Russian*	
Burmese	German*	Lithuanian*	Serbian	
Chinese*	Greek*	Macedonian	Slovak*	
Chinese traditional*	Hungarian*	Mongolian	Slovenian*	

\* Language also available in the online Survey tool (21 languages).

Figure 2: Coverage of the Executive Opinion Survey



### Geographic coverage

Following a year of non-inclusion, Benin, Bosnia and Herzegovina, Ecuador, and Liberia are reinstated in the 2015 edition. However, the Survey was not administered this year in Angola, Burkina Faso, or Timor-Leste and was not completed to minimum requirements in Barbados or Suriname. In the cases of Libya and Yemen, the uncertain security situation did not allow the Survey to be conducted. Furthermore, because of missing data from international sources and the resulting impossibility of ensuring international comparability, Puerto Rico was not included this year in the calculation of the Survey results. No new economy was added this year (Figure 2); however, the Forum's Global Competitiveness and Risks Team will continue its efforts to reinstate economies and increase country coverage year on year.

### SURVEY STRUCTURE, ADMINISTRATION, AND METHODOLOGY

The Survey is divided into 15 sections:

- I. About Your Company
- II. Most Problematic Factors for Doing Business
- III. Infrastructure
- IV. Technology
- V. Financial Environment
- VI. Foreign Trade and Investment
- VII. Domestic Competition
- VIII. Business Operations and Innovation

### IX. Security

### X. Governance

### XI. Education and Human Capital

### XII. Health

### XIII. Travel and Tourism

### XIV. Environment

### XV. Risks

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 administration of the Survey could not be carried out without the network of over 160 Partner Institutes worldwide. Partner Institutes are recognized research or academic institutes, business organizations, national competitiveness councils, or other established professional entities and, in some cases, survey consultancies, that have the network and capacity to reach out to the business community, are reputable organizations, and have a firm commitment to improving the competitiveness conditions of their economies (for the full list, see the Partner Institutes section at the beginning of this *Report*).<sup>1</sup>

In administering the Survey, Partner Institutes are asked to follow detailed sampling guidelines to ensure that the sample of respondents is the most representative possible and comparable across the

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

In your country, to what extent is intellectual property protected?

Not at all < 1 2 3 4 5 6 7 > To a great extent

**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

globe and in a specific timeframe. The sampling guidelines were developed based on best practices in the field of survey administration and on discussions with survey experts. In view of comparability across countries and time, the sampling guidelines have remained the same since their revision and the improvements implemented in 2012. The Survey sampling guidelines specify that the Partner Institute build a “sample frame”—that is, a list of potential business executives from small- and medium-sized enterprises and large companies—from the various sectors of activity, as detailed below. It then applies a dual stratification procedure based on these two criteria of company size and sector. Specifically, the Partner Institutes are asked 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 one that includes all other firms (both lists representing the various economic sectors).<sup>2</sup>
3. Based on these lists, and in view of reducing survey bias, choose a random selection of these firms from both lists 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>3</sup> The Survey is administered in a variety of formats, including face-to-face or telephone interviews with business executives, mailed paper forms, and online surveys. For energy, time, and cost considerations, the Forum encourages the use of the online survey tool. However, 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.

The Partner Institutes also play an active and essential role in disseminating the findings of *The Global Competitiveness Report* and other reports published by the World Economic Forum by holding press events and workshops to highlight the results at the national level to the business community, the public sector, and other stakeholders.

### Striving for excellence

The World Economic Forum has, over the years, always given great importance to reflecting the newest thinking in matters of development and measurement of economic growth as well as to applying surveying best practices. To this end, it has undertaken two audits since 2008 as well as yearly reviews of the Survey.

An initial audit by a team of survey experts from Gallup was performed in 2008, following which a number of recommendations were implemented. A second audit was conducted in 2012 by Gallup, during which the Survey instrument, the sampling guidelines, and the administration process underwent a thorough review. The review took a twofold approach, analyzing the recommendations and their impact on the process as well as keeping up to date on best practices in the field of surveying. Overall, the outcomes of both reviews were very positive. The Executive Opinion Survey process has implemented all the needed improvements with regard to the Survey tool, translations, and sampling quality as well as following international best practices in surveying. Box 2 presents some statistics about the Survey’s demographics and reveals that the sample of respondents is very diverse.

The 2012 audit addressed an important aspect related to the impact of national culture—the so-called cultural bias—that may impact interviewee responses. The Global Competitiveness and Risks Team recognizes this as a possibility; nonetheless, following international best practices and upon Gallup’s recommendation, it was decided not to re-weight the data using vignettes because of the limited effectiveness of such a procedure and to prevent introducing additional noise into the data that can occur with such an approach. In view of aiming to prevent national bias, the Partner Institutes are reminded to complete the survey according to guidelines and to ask the respondents to answer the survey in view

### Box 2: Insights from the Executive Opinion Survey 2015

The sampling guidelines for the Executive Opinion Survey aim to reflect in the composition of surveyed companies the economic structure of the country while maintaining a 50 percent share of respondents from previous years. Figure 1 summarizes respondent demographics from the 2015 edition, demonstrating the relative success of the Partner Institutes in following the sampling guidelines.

Because small- and medium-sized enterprises (SMEs) account for a large share of economic activity in most countries, Partner Institutes are asked to collect the opinions from SMEs as well as from large companies (Figure 1a). In 2015, small enterprises, defined here as those with fewer than 50 employees, account for 27 percent of the sample in *Advanced Economies* and *Emerging and Developing Asia* and for 47 percent in *Sub-Saharan Africa*, reflecting the respective economic structure of these regions.

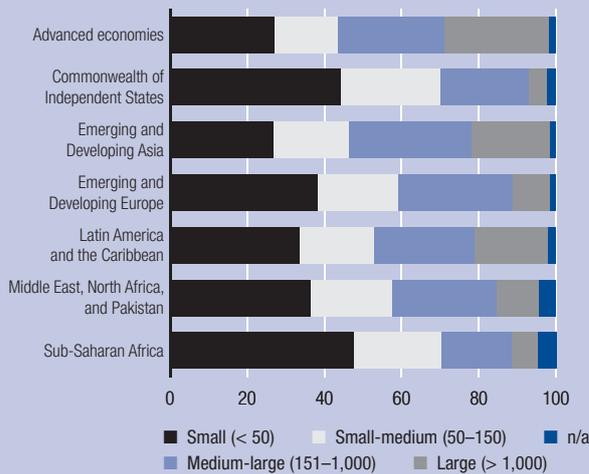
In order to maintain a panel of constant respondents and improve the comparability of data across years, almost 4 questionnaires out of 10 have been filled by executives who

have previously taken part in the Survey (Figure 1b).

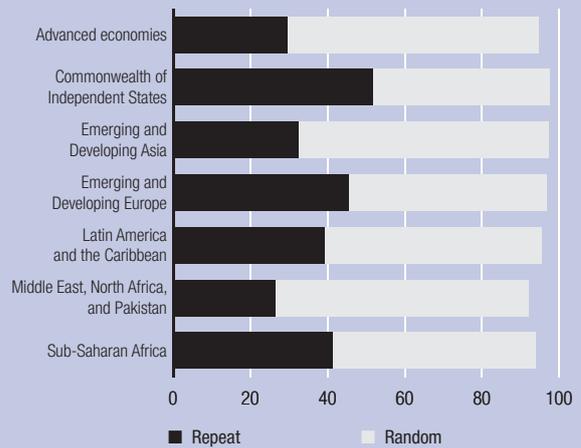
The Survey also aims to capture the diversity of companies in terms of ownership and economic sector (Figure 1c). On average, 18 percent of the surveyed companies' equity is owned by foreigners (as either minority or majority shareholders). This number increases to 22 percent and 21 percent in *Sub-Saharan Africa* and *Advanced Economies*, respectively. The share of foreign ownership also varies according to the economic sector. The manufacturing sector is the one with highest presence of foreign-owned companies in most regions, except for *Sub-Saharan Africa* and *Latin America and the Caribbean*, where it is preceded by other industrial activities (including mining), and the *Commonwealth of Independent States*, where the service sector comes in first. The agriculture sector is the one with lowest share of foreign ownership—around 10 percent across regions—with a peak of 17 percent in *Sub-Saharan Africa* and a minimum of 7.5 percent in the *Commonwealth of Independent States* and *Middle East, North Africa, and Pakistan*.

Figure 1: Executive Opinion Survey: Respondent profile

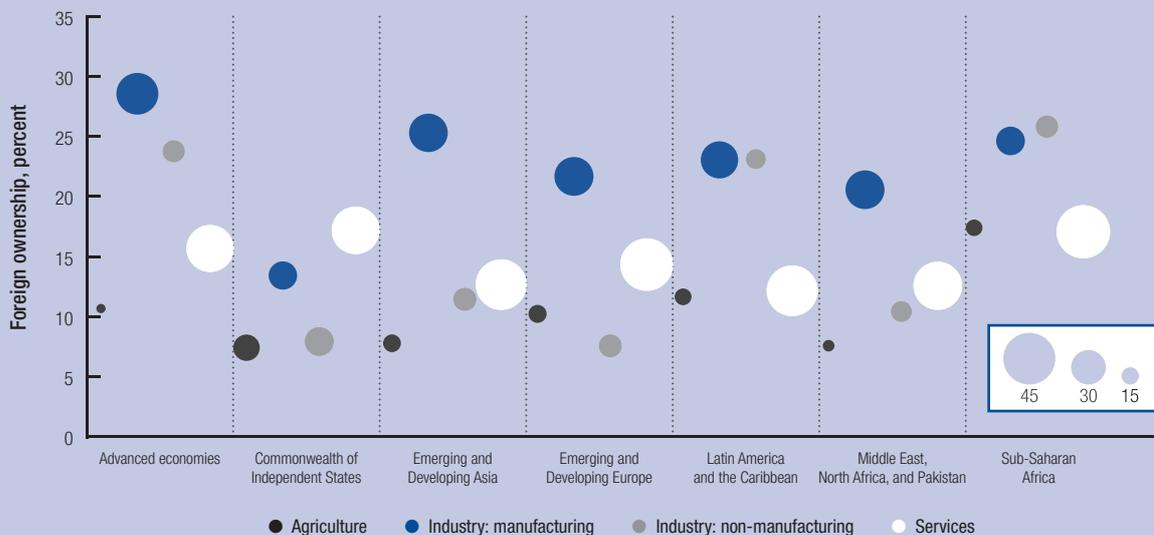
1a: Company size by number of employees, percent



1b: Repeat and random respondents, percent



1c: Foreign ownership and sector distribution



Note: The size of the bubble reflects the share of the total respondents for the region falling within that sector.

Table 2: Executive Opinion Survey: Descriptive statistics and weightings

Country/Economy	Period 1			Period 2			
	Survey edition	No. of respondents	Weight (%)*	Survey edition	No. of respondents	Weight (%)*	Online (%) 2015 only
Albania	2014	79	47.62	2015	64	52.38	—
Algeria	2014	97	45.13	2015	96	54.87	—
Argentina	2014	104	46.00	2015	96	54.00	100.00
Armenia	2014	76	45.17	2015	75	54.83	1.33
Australia	2014	66	38.44	2015	113	61.56	21.24
Austria	2014	71	40.64	2015	101	59.36	41.58
Azerbaijan	2013	85	44.57	2014	88	55.43	n/a
Bahrain	2014	51	45.25	2015	50	54.75	—
Bangladesh	2014	76	48.79	2015	56	51.21	—
<b>Belgium</b>	2014	64	44.81	2015	65	55.19	100.00
Benin	—	—	—	2015	67	100.00	—
Bhutan	2014	73	35.47	2015	163	64.53	—
Bolivia	2014	110	53.33	2015	55	46.67	100.00
<b>Bosnia and Herzegovina</b>	—	—	—	2015	104	100.00	—
Botswana	2014	123	50.15	2015	81	49.85	25.93
<b>Brazil</b>	2014	114	38.33	2015	197	61.67	100.00
Bulgaria	2014	104	43.74	2015	115	56.26	—
Burundi	2013	110	46.96	2014	94	53.04	n/a
Cambodia	2014	79	45.16	2015	78	54.84	—
Cameroon	2014	82	42.53	2015	100	57.47	—
<b>Canada</b>	2014	79	42.32	2015	98	57.68	100.00
Cape Verde	2014	84	45.45	2015	81	54.55	19.75
Chad	2014	68	42.52	2015	83	57.48	—
Chile	2014	143	45.35	2015	139	54.65	72.66
Colombia	2014	162	45.00	2015	162	55.00	37.04
Costa Rica	2014	59	37.05	2015	114	62.95	97.37
Côte d'Ivoire	2014	76	43.90	2015	83	56.10	—
Croatia	2014	82	45.31	2015	80	54.69	—
Cyprus	2014	52	42.81	2015	62	57.19	—
<b>Czech Republic</b>	2014	77	42.38	2015	95	57.62	100.00
Denmark	2014	89	40.51	2015	128	59.49	0.78
Dominican Republic	2014	62	42.30	2015	77	57.70	—
Ecuador	—	—	—	2015	116	100.00	—
Egypt	2014	100	53.56	2015	49	46.44	2.04
<b>El Salvador</b>	2014	49	38.42	2015	84	61.58	100.00
<b>Estonia</b>	2014	89	45.14	2015	88	54.86	100.00
Ethiopia	2014	100	46.04	2015	92	53.96	—
<b>Finland</b>	2014	49	44.75	2015	50	55.25	100.00
Macedonia, FYR	2014	78	44.53	2015	81	55.47	—
France	2014	184	52.28	2015	101	47.72	54.46
Gabon	2014	40	45.97	2015	37	54.03	2.70
Gambia, The	2014	85	44.15	2015	91	55.85	—
<b>Georgia</b>	2014	51	45.50	2015	49	54.50	100.00
Germany	2014	99	39.96	2015	149	60.04	90.60
Ghana	2014	93	44.09	2015	100	55.91	7.00
Greece	2014	85	44.85	2015	86	55.15	94.19
Guatemala	2014	83	46.10	2015	76	53.90	—
Guinea	2013	56	40.90	2014	78	59.10	n/a
Guyana	2014	73	53.49	2015	36	46.51	—
Haiti	2014	39	46.35	2015	35	53.65	—
Honduras	2014	108	45.59	2015	103	54.41	—
Hong Kong SAR	2014	63	41.72	2015	82	58.28	64.63
Hungary	2014	99	53.90	2015	47	46.10	—
<b>Iceland</b>	2014	85	44.71	2015	87	55.29	100.00
India	2014	211	43.60	2015	236	56.40	0.42
Indonesia	2014	90	43.94	2015	98	56.06	—
<b>Iran, Islamic Rep.</b>	2014	152	38.23	2015	265	61.77	100.00
<b>Ireland</b>	2014	52	47.37	2015	43	52.63	100.00
<b>Israel</b>	2014	32	45.81	2015	30	54.19	100.00
Italy	2014	87	44.44	2015	91	55.56	4.40
Jamaica	2014	41	36.67	2015	82	63.33	—
Japan	2014	64	40.65	2015	91	59.35	8.79
Jordan	2014	117	45.32	2015	114	54.68	—
Kazakhstan	2014	124	48.57	2015	93	51.43	—
Kenya	2014	113	46.04	2015	104	53.96	—
Kuwait	2014	42	42.83	2015	50	57.17	30.00
Kyrgyz Republic	2014	97	44.49	2015	101	55.51	—
Lao PDR	2014	77	45.33	2015	75	54.67	—
<b>Latvia</b>	2014	81	45.63	2015	77	54.37	100.00
<b>Lebanon</b>	2014	40	35.15	2015	92	64.85	100.00

(Cont'd.)

Table 2: Executive Opinion Survey: Descriptive statistics and weightings (cont'd.)

Country/Economy	Period 1			Period 2			
	Survey edition	No. of respondents	Weight (%)*	Survey edition	No. of respondents	Weight (%)*	Online (%) 2015 only
Lesotho	2014	85	43.35	2015	97	56.65	—
Liberia	—	—	—	2015	80	100.00	—
Lithuania	2014	146	47.65	2015	118	52.35	59.32
<b>Luxembourg</b>	2014	69	49.24	2015	49	50.76	100.00
Madagascar	2014	99	46.90	2015	85	53.10	—
Malawi	2014	58	46.36	2015	52	53.64	21.15
Malaysia	2014	96	44.37	2015	101	55.63	45.54
Mali	2014	85	44.71	2015	87	55.29	—
Malta	2014	52	44.76	2015	53	55.24	71.70
Mauritania	2014	98	46.49	2015	87	53.51	—
Mauritius	2014	56	44.14	2015	60	55.86	86.67
Mexico	2014	340	46.11	2015	311	53.89	96.78
Moldova	2014	134	45.48	2015	129	54.52	—
Mongolia	2014	81	45.00	2015	81	55.00	—
<b>Morocco</b>	2014	47	36.79	2015	93	63.21	100.00
Mozambique	2014	107	47.16	2015	90	52.84	—
Myanmar	2014	86	47.56	2015	70	52.44	1.43
Namibia	2014	77	45.33	2015	75	54.67	—
Nepal	2014	84	43.46	2015	95	56.54	—
<b>Netherlands</b>	2014	88	45.73	2015	83	54.27	100.00
New Zealand	2014	41	43.56	2015	46	56.44	97.83
Nicaragua	2014	36	36.67	2015	72	63.33	98.61
Nigeria	2014	106	45.48	2015	102	54.52	—
Norway	2014	86	54.13	2015	40	45.87	52.50
<b>Oman</b>	2014	95	47.30	2015	79	52.70	100.00
Pakistan	2014	56	36.47	2015	114	63.53	17.54
Panama	2014	131	44.53	2015	136	55.47	36.76
Paraguay	2014	59	42.35	2015	73	57.65	31.51
China	2014	362	44.93	2015	364	55.07	—
Peru	2014	85	44.15	2015	91	55.85	32.97
Philippines	2014	120	44.00	2015	130	56.00	—
Poland	2014	200	44.15	2015	214	55.85	98.60
Portugal	2014	140	41.21	2015	190	58.79	88.95
Qatar	2014	103	44.88	2015	104	55.12	3.85
Korea, Rep.	2014	100	45.00	2015	100	55.00	—
Montenegro	2014	95	46.54	2015	84	53.46	—
Serbia	2014	100	45.13	2015	99	54.87	—
Romania	2014	72	40.11	2015	107	59.89	—
Russian Federation	2013	294	45.79	2014	276	54.21	n/a
<b>Rwanda</b>	2013	81	41.54	2015	107	58.46	100.00
Saudi Arabia	2014	181	51.42	2015	107	48.58	54.21
Senegal	2014	100	46.32	2015	90	53.68	—
Seychelles	2013	31	36.49	2014	63	63.51	n/a
Sierra Leone	2014	92	44.21	2015	98	55.79	—
Singapore	2014	163	44.85	2015	165	55.15	57.58
Slovak Republic	2014	85	46.90	2015	73	53.10	98.63
Slovenia	2014	84	42.95	2015	99	57.05	49.49
<b>South Africa</b>	2014	58	46.85	2015	50	53.15	100.00
Spain	2014	76	43.75	2015	84	56.25	95.24
Sri Lanka	2014	97	44.62	2015	100	55.38	—
Swaziland	2014	32	45.00	2015	32	55.00	68.75
Sweden	2014	62	43.85	2015	68	56.15	98.53
<b>Switzerland</b>	2014	73	45.52	2015	70	54.48	100.00
Taiwan, China	2014	83	41.73	2015	108	58.27	51.85
Tajikistan	2014	97	44.49	2015	101	55.51	—
Tanzania	2014	96	45.00	2015	96	55.00	—
Thailand	2014	101	43.93	2015	110	56.07	99.09
<b>Trinidad and Tobago</b>	2014	165	46.61	2015	145	53.39	100.00
Tunisia	2014	85	44.57	2015	88	55.43	89.77
Turkey	2014	88	45.73	2015	83	54.27	30.12
Uganda	2014	90	44.19	2015	96	55.81	—
Ukraine	2014	105	45.00	2015	105	55.00	0.95
United Arab Emirates	2012	169	45.92	2014	157	54.08	n/a
<b>United Kingdom</b>	2014	79	44.23	2015	84	55.77	100.00
<b>United States</b>	2014	369	42.31	2015	458	57.69	100.00
Uruguay	2014	99	46.47	2015	88	53.53	60.23
<b>Venezuela</b>	2014	40	40.83	2015	56	59.17	100.00
Vietnam	2014	95	42.09	2015	120	57.91	8.33
Zambia	2014	67	42.79	2015	80	57.21	—
Zimbabwe	2014	46	43.47	2015	52	56.53	46.15

Note: Bold typeface identifies economies where the Survey was conducted entirely online. All statistics are computed following the editing of the data; see text for details. "n/a" indicates that this information is not provided for economies for which 2015 data are not available; "—" indicates that there was no online administration of the Survey.

\* Weight applied to the country score in that edition of the Survey; see Box 3 for details.

of the country they are assessing based on international comparison.

In the context of the GCI revision (see Chapter 1.2), the Survey was entirely reviewed in the Fall of 2014, resulting in a streamlined and shortened questionnaire that also aims to better capture the concepts included in the GCI.

With such ongoing efforts in the realm of survey administration best practice, the Forum's competitiveness team continues to improve processes to achieve greater data accuracy and heightened comparability across economies. Further details about the Survey's statistics and weightings can be seen in Table 2.

### DATA TREATMENT AND SCORE COMPUTATION

This section details the process whereby individual 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 research projects.<sup>4</sup>

#### Data editing

Prior to aggregation, the respondent-level data are subjected to a careful editing process. A first series of tests is run to identify and exclude those surveys whose patterns of answers demonstrate a lack of sufficient focus on the part of the respondents. Surveys with at least 80 percent of the same answers are excluded. Surveys with a completion rate inferior to 50 percent are excluded.<sup>5</sup> The very few cases of duplicate surveys—which can occur, for example, when a completed survey is both completed online and mailed in—are also excluded in this phase.

In a second step, a multivariate test is applied to the data using the Mahalanobis distance method. This test estimates the probability that an individual survey in a specific country “belongs” to the sample of that country by comparing the pattern of answers of that survey against the average pattern of answers in the country sample.

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 individual survey  $i$  does not belong to the sample  $c$ . If the probability is high 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 50 core 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.

#### Aggregation and computation of country averages

We use a simple average to compute scores of all countries.<sup>6</sup> Therefore, every individual response carries the same implicit weight.

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

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

where

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

$N_{i,c}$  is the number of respondents to question  $i$  in country  $c$ .

#### Moving average and computation of country scores

As a final step, the country averages for 2015 are combined with the 2014 averages to produce the country scores that are used for the computation of the GCI 2015–2016 and for other projects.

This moving average technique, introduced in 2007, 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 2014 and first quarter of 2015 better aligns the Survey data with many of the data indicators from sources other than the Survey, which are often year-average data.

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 they contain more updated information. That is, we also “discount the past.” Table 2 reports the exact weights used in the computation of the scores of each country, while Box 3 details the methodology and provides a clarifying example.

### Box 3: 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 2015–2016* (see text for exceptions).

For any given Survey question  $i$ , country  $c$ 's final score,  $q_{i,c}^{2014-15}$ , is given by:

$$q_{i,c}^{2014-15} = w_c^{2014} \times q_{i,c}^{2014} + w_c^{2015} \times q_{i,c}^{2015} \quad (1)$$

where

$q_{i,c}^t$  is country  $c$ 's score on question  $i$  in year  $t$ , with  $t = 2014, 2015$ , as computed following the approach described in the text; 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:

$$w_c^{2014} = \frac{(1-\alpha) + \frac{N_c^{2014}}{N_c^{2014} + N_c^{2015}}}{2} \quad (2a)$$

and

$$w_c^{2015} = \frac{\alpha + \frac{N_c^{2015}}{N_c^{2014} + N_c^{2015}}}{2} \quad (2b)$$

where  $N_c^t$  is the sample size (i.e., the number of respondents) for country  $c$  in year  $t$ , with  $t = 2014, 2015$ .  $\alpha$  is a discount factor. Its value is set at 0.6. That is, the 2014 score of country  $c$  is given 2/3 of the weight given to the 2015 score.

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

$$q_{i,c}^{2014-15} = \frac{1}{2} \times \left[ \underbrace{(1-\alpha) \times q_{i,c}^{2014} + \alpha \times q_{i,c}^{2015}}_{\text{discounted-past weighted average}} \right] + \frac{1}{2} \times \left[ \underbrace{\frac{N_c^{2014}}{N_c^{2014} + N_c^{2015}} \times q_{i,c}^{2014} + \frac{N_c^{2015}}{N_c^{2014} + N_c^{2015}} \times q_{i,c}^{2015}}_{\text{sample-size weighted average}} \right]. \quad (3)$$

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. 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:

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

(Cont'd.)

### Trend analysis and exceptions

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. We therefore carry out an analysis to assess the reliability and consistency of the Survey data over time. As part of this analysis, we run an inter-quartile range test, or IQR test, to identify large swings—positive and negative—in the country scores. More specifically, for each country we compute the year-on-year difference,  $d$ , in the average score of a core set of 66 Survey questions. We then compute the inter-quartile range (i.e., the difference between the 25th percentile and the 75th percentile), denoted  $IQR$ , of the sample of 140 economies. Any value  $d$  lying outside the range bounded by the 25th percentile minus 1.5 times  $IQR$  and the 75th percentile plus 1.5 times  $IQR$  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 allows for the identification of countries, which display overly large upward or downward swings or repeated and significant changes over several editions. The IQR test is complemented by a series of additional empirical tests, including an analysis of five-year trends and a comparison of changes in the Survey results with changes in other indicators capturing similar concepts. We also conduct interviews of local experts

### Box 3: Score calculation (cont'd.)

#### 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 2015, where, by definition, no past data exist, the weight applied to the 2014 score is  $w_c^{2014} = 0$  and the weight applied to the 2015 score is  $w_c^{2015} = 1$ . Equation (1) simply is  $q_{i,c}^{2014-15} = q_{i,c}^{2015}$ . The same is true for the countries that were reinstated in 2015, namely Benin, Bosnia and Herzegovina, Ecuador, and Liberia. In this case, we have  $q_{i,c}^{2014-15} = q_{i,c}^{2015}$ .

In the case of countries for which the 2015 data was discarded, we rely on the results from last year's edition as a proxy.<sup>1</sup> They were calculated using Equation (1), but instead of using the 2014 and 2015 editions of the Survey, they were derived from the 2013 and 2014 editions, respectively. Therefore, we have  $q_{i,c}^{2013, 2014} = w_c^{2013} \times q_{i,c}^{2013} + w_c^{2014} \times q_{i,c}^{2014}$ .

Finally, in the case of countries whose data failed the inter-year robustness check last year and for which the 2014 data were discarded, we use the Survey data from 2013 instead, and combine them with those of 2015 to compute the scores. Equation (1) then becomes:  $q_{i,c}^{2013, 2015} = w_c^{2013} \times q_{i,c}^{2013} + w_c^{2015} \times q_{i,c}^{2015}$ .

#### Example of score computation

For this example, we compute the score of the United States for indicator 12.08 Quality of research institutions, which is derived from the following Survey question: "In your country, how do you assess the quality of scientific research institutions? [1 = extremely poor—among the worst in the world; 7 = extremely good—among the best in the world]." This question is *not* a new Survey question and the United States did not fail the inter-year robustness test either this year or last year. Therefore, we apply the normal treatment, using Equation (1). The United States' score was 6.14 in 2014 and 6.07 in 2015. The weighting scheme described above indicates how the two scores are combined. In the United States, the size of the sample was 369 in 2014 and 458 in 2015. Using  $\alpha = 0.6$  and applying Equations (2a) and (2b) yields weights of 42.3 percent for 2014 and 57.7 percent for 2015 (see Table 2). The final country score for this question is therefore:

$$\frac{0.423 \times 6.14}{2014} + \frac{0.577 \times 6.07}{2015} = 6.10.$$

This is the final score used in the computation of the GCI. Although numbers are rounded to two decimal places in this example and to one decimal place in the United States' country profile on page 360 exact figures are used in all calculations.

#### Note

- 1 This represents a change from the past. Until now, in this situation, only the results from the previous edition of the *Report* would be used.

and consider the latest developments in a country in order to assess the plausibility of the Survey results.

Based on the result of this test and additional qualitative analysis, and in light of the developments in these respective countries, it was decided to not use the data collected in Azerbaijan, Burundi, Guinea, the Russian Federation, Seychelles, and the United Arab Emirates. In those cases, we use the results from last year, which were derived from the results of the 2013 and 2014 editions, or the previous year (see the exceptions section in Box 3). Although this remains a remedial measure, we will continue to investigate the situation over the coming months in an effort to better understand the Survey data in these countries. This measure does not imply that the Partner Institutes have not implemented the Survey according the sampling guidelines.

Last year, the same analysis resulted in the Survey data of Rwanda being dismissed. 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 2013 and 2015 for Rwanda.

## CONCLUSIONS

The first of the World Economic Forum's *Global Competitiveness Reports* was launched in 1979. That first report also relied on survey data for complementing information not otherwise available. Today, the Executive Opinion Survey—also known as the "Voice of the Business Community"—has become one of the largest executive polls of its kind, collecting the perceptions of over 14,000 business executives in more than 140 countries worldwide. As described in this chapter, the insight into critical drivers of a country's development provided by the survey is not available from other sources. Drawing on investment decision makers of each country allows for a relevant and unique portrait of the business operating environment of each economy covered in this *Report*. As with all perception data, it is crucial to employ stringent processes while administering the survey in each country in order to collect a representative sample of the country's economic structure as well as minimizing the risk of cultural bias. For this reason, the Forum works closely with its network of over 160 Partner Institutes to carry out the Survey at a national level. Therefore, along with the data-editing

measures described in the second part of this chapter, the strong collaboration with the Partner Institutes and their commitment to following the guidelines is essential. Together these allow us to deliver this unique and strong dataset feeding into *The Global Competitiveness Report 2015–2016*.

## NOTES

- 1 The World Economic Forum's Competitiveness and Risks Team would like to acknowledge Research Now for carrying out the Executive Opinion Survey 2015 in the United States, following the detailed sampling guidelines. Furthermore, Research Now supplemented a sample in Germany.
- 2 *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.
- 3 In order to reach the required number of surveys in each country (80 for most economies and 300 for the BRICS countries and the United States), a Partner Institute uses the response rate from previous years.
- 4 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.
- 5 The *completion rate* is the proportion of answered questions among a subset of questions in the survey instrument. These 117 core questions are all numerical questions of sections III through XI.
- 6 Until 2013, we used a sector-weighted average was used for computing country scores. Since 2014, we have used a simple average. Refer to Chapter 1.3 of *The Global Competitiveness Report 2014–2015* for a detailed discussion about this evolution of the methodology.

## REFERENCE

- Browne, C., A. Di Battista, T. Geiger, and T. Gutknecht. 2014. "The Executive Opinion Survey: The Voice of the Business Community." *The Global Competitiveness Report 2014–2015*. Geneva: World Economic Forum. 85–96.