

Appendix I

Country/Economy Profiles

Country/Economy Profiles

The following tables provide detailed profiles for each of the 128 economies in the Global Innovation Index 2016. They are constructed around three sections.

1 Five key indicators at the beginning of each profile are intended to put the economy into context. They present the population in millions,¹ GDP in US\$ billions, and GDP per capita in PPP current international dollars.² The fourth indicator categorizes the economy into income group and the fifth indicates its geographical region.³

2 The next section provides the economy's scores and rankings on the Global Innovation Index (GII), the Innovation Output Sub-Index, the Innovation Input Sub-Index, and the Innovation Efficiency Ratio.

The GII ranking for the 2015 edition comes next. Because 13 economies dropped out in 2016, and because of adjustments made to the GII framework every year and other technical factors not directly related to actual performance (missing data, updates of data, etc.), the GII rankings are not directly comparable from one year to the next. Please refer to Annex 2 of Chapter 1 for details.

Scores are normalized in the 0–100 range except for the Innovation Efficiency Ratio, for which scores revolve around the

number 1 (this index is calculated as the ratio between the Output and Input Sub-Indices).

The Innovation Input Sub-Index score is calculated as the simple average of the scores in the first five pillars, while the Innovation Output

The 2016 GII includes 82 indicators and three types of data. Composite indicators are identified with an asterisk (*), survey questions from the World Economic Forum's Executive Opinion Survey are identified with a dagger (!), and the remaining indicators are all hard data series.

For hard data, the original value is provided (except for indicators 7.3.1, 7.3.2, and 7.3.4, for which the raw data were provided under the condition that only the normalized scores be published). Normalized scores in the 0–100 range are provided for everything else (index and survey data, sub-pillars, pillars, and indices).

When data are either not available or out of date (the cutoff year is 2006), 'n/a' is used. The year of each data point is indicated in the Data Tables shown in Appendix II. To the right of the indicator title, a clock symbol indicates that the country's data for that indicator are older than the base year. More details, including the year of the data in question, are available in Appendix II.

For further details, see Appendix III, Sources and Definitions, and Appendix IV, Technical Notes.

4 To the far right of each column, a solid circle indicates that an indicator is one of the strengths of the country/economy in question,

| | | Albania | |
|----------|---|---------------------|-----------|
| 1 | Key indicators | | 4 |
| | Population (millions) | 2.8 | |
| | GDP (US\$ billion) | 11.5 | |
| | GDP per capita (PPP) | 11,081 | |
| | Income group | Upper middle income | |
| | Region | Europe | |
| 2 | Global Innovation Index (out of 128) | 62.3 | 64 |
| | Innovation Input Sub-Index | 62.3 | |
| | Innovation Output Sub-Index | 62.3 | |
| | Innovation Efficiency Ratio | 1.0 | |
| 3 | Institutions | 62.3 | 64 |
| | 1.1 Political stability & safety* | 62.3 | |
| | 1.2 Government effectiveness* | 62.3 | |
| | 1.3 Regulatory quality* | 62.3 | |
| | 1.4 Rule of law* | 62.3 | |
| | 1.5 Ease of doing business* | 62.3 | |
| | 1.6 Ease of starting a business* | 62.3 | |
| | 1.7 Ease of trading internationally* | 62.3 | |
| | 1.8 Ease of doing business* | 62.3 | |
| | 1.9 Ease of doing business* | 62.3 | |
| | 1.10 Ease of doing business* | 62.3 | |
| | 1.11 Ease of doing business* | 62.3 | |
| | 1.12 Ease of doing business* | 62.3 | |
| | 1.13 Ease of doing business* | 62.3 | |
| | 1.14 Ease of doing business* | 62.3 | |
| | 1.15 Ease of doing business* | 62.3 | |
| | 1.16 Ease of doing business* | 62.3 | |
| | 1.17 Ease of doing business* | 62.3 | |
| | 1.18 Ease of doing business* | 62.3 | |
| | 1.19 Ease of doing business* | 62.3 | |
| | 1.20 Ease of doing business* | 62.3 | |
| | 1.21 Ease of doing business* | 62.3 | |
| | 1.22 Ease of doing business* | 62.3 | |
| | 1.23 Ease of doing business* | 62.3 | |
| | 1.24 Ease of doing business* | 62.3 | |
| | 1.25 Ease of doing business* | 62.3 | |
| | 1.26 Ease of doing business* | 62.3 | |
| | 1.27 Ease of doing business* | 62.3 | |
| | 1.28 Ease of doing business* | 62.3 | |
| | 1.29 Ease of doing business* | 62.3 | |
| | 1.30 Ease of doing business* | 62.3 | |
| | 1.31 Ease of doing business* | 62.3 | |
| | 1.32 Ease of doing business* | 62.3 | |
| | 1.33 Ease of doing business* | 62.3 | |
| | 1.34 Ease of doing business* | 62.3 | |
| | 1.35 Ease of doing business* | 62.3 | |
| | 1.36 Ease of doing business* | 62.3 | |
| | 1.37 Ease of doing business* | 62.3 | |
| | 1.38 Ease of doing business* | 62.3 | |
| | 1.39 Ease of doing business* | 62.3 | |
| | 1.40 Ease of doing business* | 62.3 | |
| | 1.41 Ease of doing business* | 62.3 | |
| | 1.42 Ease of doing business* | 62.3 | |
| | 1.43 Ease of doing business* | 62.3 | |
| | 1.44 Ease of doing business* | 62.3 | |
| | 1.45 Ease of doing business* | 62.3 | |
| | 1.46 Ease of doing business* | 62.3 | |
| | 1.47 Ease of doing business* | 62.3 | |
| | 1.48 Ease of doing business* | 62.3 | |
| | 1.49 Ease of doing business* | 62.3 | |
| | 1.50 Ease of doing business* | 62.3 | |
| | 1.51 Ease of doing business* | 62.3 | |
| | 1.52 Ease of doing business* | 62.3 | |
| | 1.53 Ease of doing business* | 62.3 | |
| | 1.54 Ease of doing business* | 62.3 | |
| | 1.55 Ease of doing business* | 62.3 | |
| | 1.56 Ease of doing business* | 62.3 | |
| | 1.57 Ease of doing business* | 62.3 | |
| | 1.58 Ease of doing business* | 62.3 | |
| | 1.59 Ease of doing business* | 62.3 | |
| | 1.60 Ease of doing business* | 62.3 | |
| | 1.61 Ease of doing business* | 62.3 | |
| | 1.62 Ease of doing business* | 62.3 | |
| | 1.63 Ease of doing business* | 62.3 | |
| | 1.64 Ease of doing business* | 62.3 | |
| | 1.65 Ease of doing business* | 62.3 | |
| | 1.66 Ease of doing business* | 62.3 | |
| | 1.67 Ease of doing business* | 62.3 | |
| | 1.68 Ease of doing business* | 62.3 | |
| | 1.69 Ease of doing business* | 62.3 | |
| | 1.70 Ease of doing business* | 62.3 | |
| | 1.71 Ease of doing business* | 62.3 | |
| | 1.72 Ease of doing business* | 62.3 | |
| | 1.73 Ease of doing business* | 62.3 | |
| | 1.74 Ease of doing business* | 62.3 | |
| | 1.75 Ease of doing business* | 62.3 | |
| | 1.76 Ease of doing business* | 62.3 | |
| | 1.77 Ease of doing business* | 62.3 | |
| | 1.78 Ease of doing business* | 62.3 | |
| | 1.79 Ease of doing business* | 62.3 | |
| | 1.80 Ease of doing business* | 62.3 | |
| | 1.81 Ease of doing business* | 62.3 | |
| | 1.82 Ease of doing business* | 62.3 | |
| | 1.83 Ease of doing business* | 62.3 | |
| | 1.84 Ease of doing business* | 62.3 | |
| | 1.85 Ease of doing business* | 62.3 | |
| | 1.86 Ease of doing business* | 62.3 | |
| | 1.87 Ease of doing business* | 62.3 | |
| | 1.88 Ease of doing business* | 62.3 | |
| | 1.89 Ease of doing business* | 62.3 | |
| | 1.90 Ease of doing business* | 62.3 | |
| | 1.91 Ease of doing business* | 62.3 | |
| | 1.92 Ease of doing business* | 62.3 | |
| | 1.93 Ease of doing business* | 62.3 | |
| | 1.94 Ease of doing business* | 62.3 | |
| | 1.95 Ease of doing business* | 62.3 | |
| | 1.96 Ease of doing business* | 62.3 | |
| | 1.97 Ease of doing business* | 62.3 | |
| | 1.98 Ease of doing business* | 62.3 | |
| | 1.99 Ease of doing business* | 62.3 | |
| | 2.00 Ease of doing business* | 62.3 | |
| | 2.01 Ease of doing business* | 62.3 | |
| | 2.02 Ease of doing business* | 62.3 | |
| | 2.03 Ease of doing business* | 62.3 | |
| | 2.04 Ease of doing business* | 62.3 | |
| | 2.05 Ease of doing business* | 62.3 | |
| | 2.06 Ease of doing business* | 62.3 | |
| | 2.07 Ease of doing business* | 62.3 | |
| | 2.08 Ease of doing business* | 62.3 | |
| | 2.09 Ease of doing business* | 62.3 | |
| | 2.10 Ease of doing business* | 62.3 | |
| | 2.11 Ease of doing business* | 62.3 | |
| | 2.12 Ease of doing business* | 62.3 | |
| | 2.13 Ease of doing business* | 62.3 | |
| | 2.14 Ease of doing business* | 62.3 | |
| | 2.15 Ease of doing business* | 62.3 | |
| | 2.16 Ease of doing business* | 62.3 | |
| | 2.17 Ease of doing business* | 62.3 | |
| | 2.18 Ease of doing business* | 62.3 | |
| | 2.19 Ease of doing business* | 62.3 | |
| | 2.20 Ease of doing business* | 62.3 | |
| | 2.21 Ease of doing business* | 62.3 | |
| | 2.22 Ease of doing business* | 62.3 | |
| | 2.23 Ease of doing business* | 62.3 | |
| | 2.24 Ease of doing business* | 62.3 | |
| | 2.25 Ease of doing business* | 62.3 | |
| | 2.26 Ease of doing business* | 62.3 | |
| | 2.27 Ease of doing business* | 62.3 | |
| | 2.28 Ease of doing business* | 62.3 | |
| | 2.29 Ease of doing business* | 62.3 | |
| | 2.30 Ease of doing business* | 62.3 | |
| | 2.31 Ease of doing business* | 62.3 | |
| | 2.32 Ease of doing business* | 62.3 | |
| | 2.33 Ease of doing business* | 62.3 | |
| | 2.34 Ease of doing business* | 62.3 | |
| | 2.35 Ease of doing business* | 62.3 | |
| | 2.36 Ease of doing business* | 62.3 | |
| | 2.37 Ease of doing business* | 62.3 | |
| | 2.38 Ease of doing business* | 62.3 | |
| | 2.39 Ease of doing business* | 62.3 | |
| | 2.40 Ease of doing business* | 62.3 | |
| | 2.41 Ease of doing business* | 62.3 | |
| | 2.42 Ease of doing business* | 62.3 | |
| | 2.43 Ease of doing business* | 62.3 | |
| | 2.44 Ease of doing business* | 62.3 | |
| | 2.45 Ease of doing business* | 62.3 | |
| | 2.46 Ease of doing business* | 62.3 | |
| | 2.47 Ease of doing business* | 62.3 | |
| | 2.48 Ease of doing business* | 62.3 | |
| | 2.49 Ease of doing business* | 62.3 | |
| | 2.50 Ease of doing business* | 62.3 | |
| | 2.51 Ease of doing business* | 62.3 | |
| | 2.52 Ease of doing business* | 62.3 | |
| | 2.53 Ease of doing business* | 62.3 | |
| | 2.54 Ease of doing business* | 62.3 | |
| | 2.55 Ease of doing business* | 62.3 | |
| | 2.56 Ease of doing business* | 62.3 | |
| | 2.57 Ease of doing business* | 62.3 | |
| | 2.58 Ease of doing business* | 62.3 | |
| | 2.59 Ease of doing business* | 62.3 | |
| | 2.60 Ease of doing business* | 62.3 | |
| | 2.61 Ease of doing business* | 62.3 | |
| | 2.62 Ease of doing business* | 62.3 | |
| | 2.63 Ease of doing business* | 62.3 | |
| | 2.64 Ease of doing business* | 62.3 | |
| | 2.65 Ease of doing business* | 62.3 | |
| | 2.66 Ease of doing business* | 62.3 | |
| | 2.67 Ease of doing business* | 62.3 | |
| | 2.68 Ease of doing business* | 62.3 | |
| | 2.69 Ease of doing business* | 62.3 | |
| | 2.70 Ease of doing business* | 62.3 | |
| | 2.71 Ease of doing business* | 62.3 | |
| | 2.72 Ease of doing business* | 62.3 | |
| | 2.73 Ease of doing business* | 62.3 | |
| | 2.74 Ease of doing business* | 62.3 | |
| | 2.75 Ease of doing business* | 62.3 | |
| | 2.76 Ease of doing business* | 62.3 | |
| | 2.77 Ease of doing business* | 62.3 | |
| | 2.78 Ease of doing business* | 62.3 | |
| | 2.79 Ease of doing business* | 62.3 | |
| | 2.80 Ease of doing business* | 62.3 | |
| | 2.81 Ease of doing business* | 62.3 | |
| | 2.82 Ease of doing business* | 62.3 | |
| | 2.83 Ease of doing business* | 62.3 | |
| | 2.84 Ease of doing business* | 62.3 | |
| | 2.85 Ease of doing business* | 62.3 | |
| | 2.86 Ease of doing business* | 62.3 | |
| | 2.87 Ease of doing business* | 62.3 | |
| | 2.88 Ease of doing business* | 62.3 | |
| | 2.89 Ease of doing business* | 62.3 | |
| | 2.90 Ease of doing business* | 62.3 | |
| | 2.91 Ease of doing business* | 62.3 | |
| | 2.92 Ease of doing business* | 62.3 | |
| | 2.93 Ease of doing business* | 62.3 | |
| | 2.94 Ease of doing business* | 62.3 | |
| | 2.95 Ease of doing business* | 62.3 | |
| | 2.96 Ease of doing business* | 62.3 | |
| | 2.97 Ease of doing business* | 62.3 | |
| | 2.98 Ease of doing business* | 62.3 | |
| | 2.99 Ease of doing business* | 62.3 | |
| | 3.00 Ease of doing business* | 62.3 | |
| | 3.01 Ease of doing business* | 62.3 | |
| | 3.02 Ease of doing business* | 62.3 | |
| | 3.03 Ease of doing business* | 62.3 | |
| | 3.04 Ease of doing business* | 62.3 | |
| | 3.05 Ease of doing business* | 62.3 | |
| | 3.06 Ease of doing business* | 62.3 | |
| | 3.07 Ease of doing business* | 62.3 | |
| | 3.08 Ease of doing business* | 62.3 | |
| | 3.09 Ease of doing business* | 62.3 | |
| | 3.10 Ease of doing business* | 62.3 | |
| | 3.11 Ease of doing business* | 62.3 | |
| | 3.12 Ease of doing business* | 62.3 | |
| | 3.13 Ease of doing business* | 62.3 | |
| | 3.14 Ease of doing business* | 62.3 | |
| | 3.15 Ease of doing business* | 62.3 | |
| | 3.16 Ease of doing business* | 62.3 | |
| | 3.17 Ease of doing business* | 62.3 | |
| | 3.18 Ease of doing business* | 62.3 | |
| | 3.19 Ease of doing business* | 62.3 | |
| | 3.20 Ease of doing business* | 62.3 | |
| | 3.21 Ease of doing business* | 62.3 | |
| | 3.22 Ease of doing business* | 62.3 | |
| | 3.23 Ease of doing business* | 62.3 | |
| | 3.24 Ease of doing business* | 62.3 | |
| | 3.25 Ease of doing business* | 62.3 | |
| | 3.26 Ease of doing business* | 62.3 | |
| | 3.27 Ease of doing business* | 62.3 | |
| | 3.28 Ease of doing business* | 62.3 | |
| | 3.29 Ease of doing business* | 62.3 | |
| | 3.30 Ease of doing business* | 62.3 | |
| | 3.31 Ease of doing business* | 62.3 | |
| | 3.32 Ease of doing business* | 62.3 | |
| | 3.33 Ease of doing business* | 62.3 | |
| | 3.34 Ease of doing business* | 62.3 | |
| | 3.35 Ease of doing business* | 62.3 | |
| | 3.36 Ease of doing business* | 62.3 | |
| | 3.37 Ease of doing business* | 62.3 | |
| | 3.38 Ease of doing business* | 62.3 | |
| | 3.39 Ease of doing business* | 62.3 | |
| | 3.40 Ease of doing business* | 62.3 | |
| | 3.41 Ease of doing business* | 62.3 | |
| | 3.42 Ease of doing business* | 62.3 | |
| | 3.43 Ease of doing business* | 62.3 | |
| | 3.44 Ease of doing business* | 62.3 | |
| | 3.45 Ease of doing business* | 62.3 | |
| | 3.46 Ease of doing business* | 62.3 | |
| | 3.47 Ease of doing business* | 62.3 | |
| | 3.48 Ease of doing business* | 62.3 | |
| | 3.49 Ease of doing business* | 62.3 | |
| | 3.50 Ease of doing business* | 62.3 | |
| | 3.51 Ease of doing business* | 62.3 | |
| | 3.52 Ease of doing business* | 62.3 | |
| | 3.53 Ease of doing business* | 62.3 | |
| | 3.54 Ease of doing business* | 62.3 | |
| | 3.55 Ease of doing business* | 62.3 | |
| | 3.56 Ease of doing business* | 62.3 | |
| | 3.57 Ease of doing business* | 62.3 | |
| | 3.58 Ease of doing business* | 62.3 | |
| | 3.59 Ease of doing business* | 62.3 | |
| | 3.60 Ease of doing business* | 62.3 | |
| | 3.61 Ease of doing business* | 62.3 | |
| | 3.62 Ease of doing business* | 62.3 | |
| | 3.63 Ease of doing business* | 62.3 | |
| | 3.64 Ease of doing business* | 62.3 | |
| | 3.65 Ease of doing business* | 62.3 | |
| | 3.66 Ease of doing business* | 62.3 | |
| | 3.67 Ease of doing business* | 62.3 | |
| | 3.68 Ease of doing business* | 62.3 | |
| | 3.69 Ease of doing business* | 62.3 | |
| | 3.70 Ease of doing business* | 62.3 | |
| | 3.71 Ease of doing business* | 62.3 | |
| | 3.72 Ease of doing business* | 62.3 | |
| | 3.73 Ease of doing business* | 62.3 | |
| | 3.74 Ease of doing business* | 62.3 | |
| | 3.75 Ease of doing business* | 62.3 | |
| | 3.76 Ease of doing business* | 62.3 | |
| | 3.77 Ease of doing business* | 62.3 | |
| | 3.78 Ease of doing business* | 62.3 | |
| | 3.79 Ease of doing business* | 62.3 | |
| | 3.80 Ease of doing business* | 62.3 | |
| | 3.81 Ease of doing business* | 62.3 | |
| | 3.82 Ease of doing business* | 62.3 | |
| | 3.83 Ease of doing business* | 62.3 | |
| | 3.84 Ease of doing business* | 62.3 | |
| | 3.85 Ease of doing business* | 62.3 | |
| | 3.86 Ease of doing business* | 62.3 | |
| | 3.87 Ease of doing business* | 62.3 | |
| | 3.88 Ease of doing business* | 62.3 | |
| | 3.89 Ease of doing business* | 62.3 | |
| | 3.90 Ease of doing business* | 62.3 | |
| | 3.91 Ease of doing business* | 62.3 | |
| | 3.92 Ease of doing business* | 62.3 | |
| | 3.93 Ease of doing business* | 62.3 | |
| | 3.94 Ease of doing business* | 62.3 | |
| | 3.95 Ease of doing business* | 62.3 | |
| | 3.96 Ease of doing business* | 62.3 | |
| | 3.97 Ease of doing business* | 62.3 | |
| | 3.98 Ease of doing business* | 62.3 | |
| | 3.99 Ease of doing business* | 62.3 | |

and a hollow circle indicates that it is a weakness.

All ranks of 1, 2, and 3 are highlighted as strengths, except in particular instances at the sub-pillar level where strengths and weaknesses are not signaled when the desired minimum indicator coverage (DMC) is not met for that sub-pillar.⁴ For the remaining indicators, strengths and weaknesses of a particular economy are based on the percentage of economies with scores that fall below its score (i.e., percent ranks).

- For a given economy, strengths (●) are those scores with percent ranks greater than the 10th largest percent rank among the 82 indicators in that economy.
- Similarly, for that economy, weaknesses (○) are those scores with percent ranks lower than the 10th smallest percent rank among the 82 indicators in that economy.

Percent ranks embed more information than ranks and allow for comparisons of ranks of series with missing data and ties in ranks. Examples from Ireland illustrate this point:

1. Strengths for Ireland are all indicators with percent ranks equal to or above 0.95 (10th largest percent rank for Ireland); weaknesses are all indicators with percent ranks equal to or below 0.56 (Ireland's 10th smallest percent rank).
2. Ireland ranks 7th out of 119 economies in 3.3.1, GDP/unit of energy use, 2005 PPP\$/kg oil eq. with a percent rank of 0.95; this indicator is a strength for Ireland.
3. Ireland also ranks 7th in 5.3.5, research talent, % in business enterprise, but with a percent rank of 0.93 (because only 81 countries are covered by that indicator), this indicator is not a strength for Ireland.
4. The rank of 58 (percent rank of 0.55) in 1.2.3, *cost of redundancy dismissal, salary weeks*, is a weakness for Ireland. By contrast, the rank of 31 for Namibia for that same indicator is a strength for Namibia (with a percent rank of 0.76, this is above the cutoff for strengths for Namibia, which is 0.57).

Percent ranks are not reported in the Country/Economy Profiles but they are presented in the Data Tables (Appendix II).

Notes

- 1 Data are from the United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2015 Revision*.
- 2 Data for GDP and GDP per capita are from the International Monetary Fund *World Economic Outlook 2015* database.
- 3 Income group is according to the World Bank Income Group Classification (July 2015): LI = low income; LM = lower-middle income; UM = upper-middle income; and HI = high income. Geographical regions are based on the United Nations Classification: EUR = Europe; NAC = Northern America; LCN = Latin America and the Caribbean; CSA = Central and Southern Asia; SEAO = South East Asia, East Asia, and Oceania; NAWA = Northern Africa and Western Asia; and SSF = Sub-Saharan Africa.
- 4 This year a new data stringency requirement is used in the attribution of strengths and weaknesses at the sub-pillar level. When countries do not meet a data minimum coverage (DMC) requirement at the sub-pillar level (for sub-pillars with two indicators, the DMC is 1; for three it is 2; for four it is 2; and for five it is 3), they are not attributed a strength or weakness at the sub-pillar level. Furthermore, if the country in question does not meet the DMC requirements at the sub-pillar level but still obtains a ranking higher than or equal to 10 or a ranking equal to or lower than 100, this rank is put into square brackets. This new procedure is to ensure that incomplete data coverage does not lead to erroneous conclusions about strengths or weaknesses or to particularly strong or weak sub-pillar rankings.

Index of Country/Economy Profiles

| Country/Economy | Page | Country/Economy | Page | Country/Economy | Page | Country/Economy | Page |
|--------------------------------|------|-------------------------|------|-------------------|------|--------------------------------|------|
| Albania..... | 175 | Dominican Republic..... | 207 | Latvia..... | 239 | Qatar..... | 271 |
| Algeria..... | 176 | Ecuador..... | 208 | Lebanon..... | 240 | Romania..... | 272 |
| Argentina..... | 177 | Egypt..... | 209 | Lithuania..... | 241 | Russian Federation..... | 273 |
| Armenia..... | 178 | El Salvador..... | 210 | Luxembourg..... | 242 | Rwanda..... | 274 |
| Australia..... | 179 | Estonia..... | 211 | Madagascar..... | 243 | Saudi Arabia..... | 275 |
| Austria..... | 180 | Ethiopia..... | 212 | Malawi..... | 244 | Senegal..... | 276 |
| Azerbaijan..... | 181 | Finland..... | 213 | Malaysia..... | 245 | Serbia..... | 277 |
| Bahrain..... | 182 | France..... | 214 | Mali..... | 246 | Singapore..... | 278 |
| Bangladesh..... | 183 | Georgia..... | 215 | Malta..... | 247 | Slovakia..... | 279 |
| Belarus..... | 184 | Germany..... | 216 | Mauritius..... | 248 | Slovenia..... | 280 |
| Belgium..... | 185 | Ghana..... | 217 | Mexico..... | 249 | South Africa..... | 281 |
| Benin..... | 186 | Greece..... | 218 | Moldova, Rep..... | 250 | Spain..... | 282 |
| Bhutan..... | 187 | Guatemala..... | 219 | Mongolia..... | 251 | Sri Lanka..... | 283 |
| Bolivia, Plurinational St..... | 188 | Guinea..... | 220 | Montenegro..... | 252 | Sweden..... | 284 |
| Bosnia and Herzegovina..... | 189 | Honduras..... | 221 | Morocco..... | 253 | Switzerland..... | 285 |
| Botswana..... | 190 | Hong Kong (China)..... | 222 | Mozambique..... | 254 | Tajikistan..... | 286 |
| Brazil..... | 191 | Hungary..... | 223 | Namibia..... | 255 | Tanzania, United Rep..... | 287 |
| Bulgaria..... | 192 | Iceland..... | 224 | Nepal..... | 256 | Thailand..... | 288 |
| Burkina Faso..... | 193 | India..... | 225 | Netherlands..... | 257 | TFYR of Macedonia..... | 289 |
| Burundi..... | 194 | Indonesia..... | 226 | New Zealand..... | 258 | Togo..... | 290 |
| Cambodia..... | 195 | Iran, Islamic Rep..... | 227 | Nicaragua..... | 259 | Tunisia..... | 291 |
| Cameroon..... | 196 | Ireland..... | 228 | Niger..... | 260 | Turkey..... | 292 |
| Canada..... | 197 | Israel..... | 229 | Nigeria..... | 261 | Uganda..... | 293 |
| Chile..... | 198 | Italy..... | 230 | Norway..... | 262 | Ukraine..... | 294 |
| China..... | 199 | Jamaica..... | 231 | Oman..... | 263 | United Arab Emirates..... | 295 |
| Colombia..... | 200 | Japan..... | 232 | Pakistan..... | 264 | United Kingdom..... | 296 |
| Costa Rica..... | 201 | Jordan..... | 233 | Panama..... | 265 | United States of America..... | 297 |
| Côte d'Ivoire..... | 202 | Kazakhstan..... | 234 | Paraguay..... | 266 | Uruguay..... | 298 |
| Croatia..... | 203 | Kenya..... | 235 | Peru..... | 267 | Venezuela, Bolivarian Rep..... | 299 |
| Cyprus..... | 204 | Korea, Rep..... | 236 | Philippines..... | 268 | Viet Nam..... | 300 |
| Czech Republic..... | 205 | Kuwait..... | 237 | Poland..... | 269 | Yemen..... | 301 |
| Denmark..... | 206 | Kyrgyzstan..... | 238 | Portugal..... | 270 | Zambia..... | 302 |

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 2.9 |
| GDP (US\$ billions) | 11.5 |
| GDP per capita, PPP\$ | 11,300.8 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 28.4 | 92 |
| Innovation Output Sub-Index | 16.2 | 115 |
| Innovation Input Sub-Index | 40.5 | 71 |
| Innovation Efficiency Ratio | 0.4 | 121 |
| Global Innovation Index 2015 (out of 141) | 30.7 | 87 |

| | | | |
|----------|---|-------------|-------------|
| 1 | Institutions | 62.3 | 64 |
| 1.1 | Political environment | 55.9 | 53 |
| 1.1.1 | Political stability & safety* | 74.6 | 44 |
| 1.1.2 | Government effectiveness* | 37.1 | 73 |
| 1.2 | Regulatory environment | 59.4 | 83 |
| 1.2.1 | Regulatory quality* | 50.3 | 61 |
| 1.2.2 | Rule of law* | 37.9 | 84 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 20.8 | 89 |
| 1.3 | Business environment | 71.8 | 58 |
| 1.3.1 | Ease of starting a business* | 90.1 | 48 |
| 1.3.2 | Ease of resolving insolvency* | 63.4 | 39 ● |
| 1.3.3 | Ease of paying taxes* | 62.0 | 98 |
| 2 | Human capital & research | 23.6 | 90 |
| 2.1 | Education | 37.5 | 93 |
| 2.1.1 | Expenditure on education, % GDP | 3.5 | 92 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 5.8 | 107 ○ |
| 2.1.3 | School life expectancy, years | 15.8 | 33 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 395.2 | 57 |
| 2.1.5 | Pupil-teacher ratio, secondary | 14.3 | 58 |
| 2.2 | Tertiary education | 32.2 | 76 |
| 2.2.1 | Tertiary enrolment, % gross | 62.7 | 37 ● |
| 2.2.2 | Graduates in science & engineering, % | 16.8 | 73 |
| 2.2.3 | Tertiary inbound mobility, % | 2.1 | 64 |
| 2.3 | Research & development (R&D) | 1.1 | 104 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓔ] | 157.3 | 76 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓔ] | 0.2 | 95 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 43.6 | 64 |
| 3.1 | Information & communication technologies (ICTs) | 44.2 | 79 |
| 3.1.1 | ICT access* | 45.0 | 87 |
| 3.1.2 | ICT use* | 34.0 | 70 |
| 3.1.3 | Government's online service* | 44.9 | 72 |
| 3.1.4 | E-participation* | 52.9 | 59 |
| 3.2 | General infrastructure | 38.4 | 56 |
| 3.2.1 | Electricity output, kWh/cap | 2,399.7 | 72 |
| 3.2.2 | Logistics performance* | n/a | n/a |
| 3.2.3 | Gross capital formation, % GDP | 29.9 | 20 ● |
| 3.3 | Ecological sustainability | 48.2 | 45 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.2 | 19 ● |
| 3.3.2 | Environmental performance* | 74.4 | 58 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.2 | 59 |
| 4 | Market sophistication | 51.2 | 30 ● |
| 4.1 | Credit | 27.8 | 82 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 37.6 | 80 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.4 | 40 |

| | | | |
|-------|---|------|-------|
| 4.2 | Investment | 73.3 | [6] |
| 4.2.1 | Ease of protecting minority investors* | 73.3 | 8 ● |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 52.6 | 94 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.2 | 38 ● |
| 4.3.2 | Intensity of local competition [†] | 50.6 | 120 ○ |
| 4.3.3 | Domestic market scale, bn PPP\$ | 31.6 | 104 |

| | | | |
|----------|---|-------------|------------|
| 5 | Business sophistication | 21.9 | 114 |
| 5.1 | Knowledge workers | 22.4 | 104 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓔ] | 16.1 | 84 |
| 5.1.2 | Firms offering formal training, % firms | 23.8 | 74 |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % [Ⓔ] | 3.3 | 82 |
| 5.1.5 | Females employed w/advanced degrees, % total | 9.0 | 68 |
| 5.2 | Innovation linkages | 17.3 | 119 |
| 5.2.1 | University/industry research collaboration [†] | 22.3 | 121 ○ |
| 5.2.2 | State of cluster development [†] | 30.9 | 119 ○ |
| 5.2.3 | GERD financed by abroad, % [Ⓔ] | 7.4 | 53 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP [Ⓔ] | 0.0 | 86 |
| 5.3 | Knowledge absorption | 25.9 | 78 |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 61 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 1.2 | 121 ○ |
| 5.3.3 | ICT services imports, % total trade | 1.3 | 42 ● |
| 5.3.4 | FDI net inflows, % GDP | 8.7 | 14 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

| | | | |
|----------|--|-------------|------------|
| 6 | Knowledge & technology outputs | 17.2 | 106 |
| 6.1 | Knowledge creation | 2.0 | 122 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.4 | 79 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 70 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.0 | 60 ○ |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 4.8 | 97 |
| 6.1.5 | Citable documents H index | 43.0 | 120 |
| 6.2 | Knowledge impact | 26.3 | 107 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.0 | 66 |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓔ] | 1.1 | 65 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 5.4 | 60 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 0.9 | 98 ○ |
| 6.3 | Knowledge diffusion | 23.2 | 72 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 82 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.0 | 115 |
| 6.3.3 | ICT services exports, % total trade | 3.2 | 21 ● |
| 6.3.4 | FDI net outflows, % GDP | 0.8 | 53 |

| | | | |
|----------|--|-------------|------------|
| 7 | Creative outputs | 15.3 | 119 |
| 7.1 | Intangible assets | 24.9 | 121 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 18.4 | 84 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.4 | 82 |
| 7.1.3 | ICTs & business model creation [†] | 45.0 | 111 |
| 7.1.4 | ICTs & organizational model creation [†] | 31.5 | 121 ○ |
| 7.2 | Creative goods & services | 2.1 | 117 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 54 |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 101 |
| 7.3 | Online creativity | 9.3 | 64 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 7.1 | 48 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.6 | 72 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 2,576.7 | 47 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Algeria

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 39.7 |
| GDP (US\$ billions) | 172.3 |
| GDP per capita, PPP\$ | 14,503.9 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 24.5 | 113 |
| Innovation Output Sub-Index | 16.1 | 116 |
| Innovation Input Sub-Index | 32.8 | 104 |
| Innovation Efficiency Ratio | 0.5 | 111 |
| Global Innovation Index 2015 (out of 141) | 24.4 | 126 |

1 Institutions 45.7 113

| | | |
|--|------|-------|
| 1.1 Political environment | 29.3 | 113 |
| 1.1.1 Political stability & safety* | 33.7 | 118 |
| 1.1.2 Government effectiveness* | 24.8 | 101 |
| 1.2 Regulatory environment | 51.7 | 104 |
| 1.2.1 Regulatory quality* | 14.8 | 126 ○ |
| 1.2.2 Rule of law* | 28.8 | 106 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 17.3 | 73 |
| 1.3 Business environment | 56.3 | 110 |
| 1.3.1 Ease of starting a business* | 76.1 | 108 |
| 1.3.2 Ease of resolving insolvency* | 47.7 | 66 ● |
| 1.3.3 Ease of paying taxes* | 45.0 | 116 |

2 Human capital & research 28.2 79

| | | |
|---|------|-------|
| 2.1 Education | 48.9 | 60 |
| 2.1.1 Expenditure on education, % GDP ^② | 4.3 | 73 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years ^② | 14.4 | 56 ● |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 35.6 | 64 ● |
| 2.2.1 Tertiary enrolment, % gross | 34.6 | 73 |
| 2.2.2 Graduates in science & engineering, % | 27.6 | 15 ● |
| 2.2.3 Tertiary inbound mobility, % | 0.6 | 86 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 37.2 86

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 18.4 | 116 |
| 3.1.1 ICT access* | 42.7 | 92 |
| 3.1.2 ICT use* | 15.2 | 99 |
| 3.1.3 Government's online service* | 7.9 | 124 |
| 3.1.4 E-participation* | 7.8 | 125 ○ |
| 3.2 General infrastructure | 51.5 | 15 ● |
| 3.2.1 Electricity output, kWh/cap | 1,527.4 | 83 |
| 3.2.2 Logistics performance* | 2.6 | 91 |
| 3.2.3 Gross capital formation, % GDP | 49.1 | 2 ● |
| 3.3 Ecological sustainability | 41.8 | 68 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.4 | 40 ● |
| 3.3.2 Environmental performance* | 70.3 | 76 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 106 |

4 Market sophistication 31.7 117

| | | |
|--|------|-------|
| 4.1 Credit | 7.8 | 126 ○ |
| 4.1.1 Ease of getting credit* | 10.0 | 124 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 18.4 | 110 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-------|
| 4.2 Investment | 33.3 | 78 |
| 4.2.1 Ease of protecting minority investors* | 33.3 | 126 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|--|-------|-------|
| 4.3 Trade, competition, & market scale | 53.9 | 90 |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 9.4 | 112 |
| 4.3.2 Intensity of local competition [†] | 45.7 | 122 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 548.6 | 32 ● |

5 Business sophistication 21.2 118

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 20.9 | 112 |
| 5.1.1 Knowledge-intensive employment, % ^② | 17.6 | 79 |
| 5.1.2 Firms offering formal training, % firms ^② | 17.3 | 85 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 4.4 | 79 |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 23.3 | 92 |
| 5.2.1 University/industry research collaboration [†] | 21.1 | 122 ○ |
| 5.2.2 State of cluster development [†] | 36.1 | 99 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 110 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 19.3 | 104 |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.2 | 76 |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.4 | 43 ● |
| 5.3.3 ICT services imports, % total trade ^② | 0.4 | 108 |
| 5.3.4 FDI net inflows, % GDP | 0.7 | 108 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 17.7 100

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 3.6 | 104 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.2 | 94 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 91 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 4.5 | 101 |
| 6.1.5 Citable documents H index | 97.0 | 82 |

| | | |
|---|------|------|
| 6.2 Knowledge impact | 34.9 | 71 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.1 | 37 ● |
| 6.2.2 New businesses/th pop. 15–64 | 0.6 | 84 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.8 | 109 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 29.1 | 40 ● |

| | | |
|--|-------|-------|
| 6.3 Knowledge diffusion | 14.5 | 120 |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 96 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.0 | 119 ○ |
| 6.3.3 ICT services exports, % total trade ^② | 0.3 | 106 |
| 6.3.4 FDI net outflows, % GDP ^② | (0.1) | 106 |

7 Creative outputs 14.6 122

| | | |
|---|------|------|
| 7.1 Intangible assets | 23.8 | 122 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 9.0 | 100 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.5 | 57 ● |
| 7.1.3 ICTs & business model creation [†] | 42.6 | 117 |
| 7.1.4 ICTs & organizational model creation [†] | 32.3 | 120 |

| | | |
|--|-----|-------|
| 7.2 Creative goods & services | 8.8 | 98 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 74 |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 1.8 | 50 |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.2 | 51 |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 123 ○ |

| | | |
|--|-------|-----|
| 7.3 Online creativity | 2.0 | 97 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.5 | 109 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 112 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 399.7 | 91 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 4.5 | 66 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 43.4 |
| GDP (US\$ billions) | 585.6 |
| GDP per capita, PPP\$ | 22,553.6 |
| Income group | High income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.2 | 81 |
| Innovation Output Sub-Index | 21.6 | 89 |
| Innovation Input Sub-Index | 38.9 | 77 |
| Innovation Efficiency Ratio | 0.6 | 98 |
| Global Innovation Index 2015 (out of 141) | 34.3 | 72 |

1 Institutions 47.2 106

| | | |
|--|------|-------|
| 1.1 Political environment | 49.4 | 67 |
| 1.1.1 Political stability & safety* | 64.7 | 62 |
| 1.1.2 Government effectiveness* | 34.0 | 81 |
| 1.2 Regulatory environment | 38.5 | 119 |
| 1.2.1 Regulatory quality* | 18.0 | 124 ○ |
| 1.2.2 Rule of law* | 24.5 | 115 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 30.3 | 116 |
| 1.3 Business environment | 53.7 | 118 |
| 1.3.1 Ease of starting a business* | 73.4 | 115 |
| 1.3.2 Ease of resolving insolvency* | 42.9 | 85 |
| 1.3.3 Ease of paying taxes* | 45.0 | 117 |

2 Human capital & research 37.3 47

| | | |
|---|---------|------|
| 2.1 Education | 52.1 | 50 |
| 2.1.1 Expenditure on education, % GDP | 5.3 | 41 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 20.9 | 50 |
| 2.1.3 School life expectancy, years | 17.1 | 15 ● |
| 2.1.4 PISA scales in reading, maths, & science | 396.7 | 55 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 10.9 | 33 ● |
| 2.2 Tertiary education | 40.8 | 42 |
| 2.2.1 Tertiary enrolment, % gross | 80.0 | 14 ● |
| 2.2.2 Graduates in science & engineering, % | 14.1 | 89 |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 19.0 | 47 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 1,193.9 | 43 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.6 | 55 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 48.1 | 29 ● |

3 Infrastructure 43.3 65

| | | |
|---|---------|-----|
| 3.1 Information & communication technologies (ICTs) | 55.9 | 50 |
| 3.1.1 ICT access* | 66.0 | 56 |
| 3.1.2 ICT use* | 47.6 | 53 |
| 3.1.3 Government's online service* | 55.1 | 55 |
| 3.1.4 E-participation* | 54.9 | 54 |
| 3.2 General infrastructure | 28.7 | 88 |
| 3.2.1 Electricity output, kWh/cap | 3,357.6 | 57 |
| 3.2.2 Logistics performance* | 3.0 | 58 |
| 3.2.3 Gross capital formation, % GDP | 17.4 | 105 |
| 3.3 Ecological sustainability | 45.3 | 55 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.3 | 53 |
| 3.3.2 Environmental performance* | 79.8 | 43 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.4 | 53 |

4 Market sophistication 35.7 106

| | | |
|--|------|-------|
| 4.1 Credit | 18.0 | 111 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 14.3 | 119 ○ |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 78 ○ |

| | | |
|--|------|------|
| 4.2 Investment | 25.2 | 111 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 11.2 | 78 |
| 4.2.3 Total value of stocks traded, % GDP | 0.9 | 57 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 83 ○ |

4.3 Trade, competition, & market scale 63.8 54

| | | |
|---|-------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 6.3 | 95 |
| 4.3.2 Intensity of local competition [†] | 54.9 | 113 |
| 4.3.3 Domestic market scale, bn PPP\$ | 951.0 | 23 ● |

5 Business sophistication 30.8 69

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 45.9 | 39 |
| 5.1.1 Knowledge-intensive employment, % | 23.9 | 59 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 63.6 | 7 ● |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.1 | 57 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 26.5 | 57 |
| 5.1.5 Females employed w/advanced degrees, % total | 16.4 | 35 |

5.2 Innovation linkages 16.8 121 ○

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 43.9 | 64 |
| 5.2.2 State of cluster development [†] | 34.6 | 106 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 0.6 | 93 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 70 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 65 |

5.3 Knowledge absorption 29.8 58

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 2.4 | 6 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 10.8 | 28 ● |
| 5.3.3 ICT services imports, % total trade | 1.4 | 36 |
| 5.3.4 FDI net inflows, % GDP | 1.1 | 97 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 7.0 | 68 |

6 Knowledge & technology outputs 18.0 97

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 9.2 | 67 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.5 | 73 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.2 | 43 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 8.6 | 69 |
| 6.1.5 Citable documents H index | 273.0 | 35 ● |

6.2 Knowledge impact 23.1 111

| | | |
|--|-------|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (1.1) | 103 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 0.4 | 90 |
| 6.2.3 Computer software spending, % GDP | 0.2 | 69 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 7.1 | 49 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 21.6 83

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 40 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.8 | 54 |
| 6.3.3 ICT services exports, % total trade | 1.7 | 57 |
| 6.3.4 FDI net outflows, % GDP | 0.4 | 65 |

7 Creative outputs 25.3 83

| | | |
|---|------|-------|
| 7.1 Intangible assets | 33.8 | 101 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 46.4 | 51 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.8 | 71 |
| 7.1.3 ICTs & business model creation [†] | 43.5 | 116 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 47.2 | 83 |

7.2 Creative goods & services 15.7 80

| | | |
|--|------|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.4 | 28 |
| 7.2.2 National feature films/mn pop. 15–69 | 5.9 | 30 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 10.5 | 32 |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 74 |

7.3 Online creativity 17.7 44

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 3.3 | 63 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 6.8 | 46 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,777.6 | 35 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 33.0 | 35 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Armenia

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 3.0 |
| GDP (US\$ billions) | 10.6 |
| GDP per capita, PPP\$ | 8,467.9 |
| Income group | Lower-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.1 | 60 |
| Innovation Output Sub-Index | 31.9 | 43 |
| Innovation Input Sub-Index | 38.4 | 80 |
| Innovation Efficiency Ratio | 0.8 | 15 ● |
| Global Innovation Index 2015 (out of 141) | 37.3 | 61 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 63.8 | 61 |
| 1.1 Political environment | 46.0 | 75 |
| 1.1.1 Political stability & safety* | 57.7 | 80 |
| 1.1.2 Government effectiveness* | 34.3 | 80 |
| 1.2 Regulatory environment | 69.3 | 54 |
| 1.2.1 Regulatory quality* | 50.1 | 62 |
| 1.2.2 Rule of law* | 39.1 | 78 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 11.0 | 39 |
| 1.3 Business environment | 76.1 | 44 |
| 1.3.1 Ease of starting a business* | 97.8 | 5 ● |
| 1.3.2 Ease of resolving insolvency* | 48.0 | 64 |
| 1.3.3 Ease of paying taxes* | 82.5 | 36 |

| | | |
|---|-------------|------------|
| 2 Human capital & research | 18.5 | 104 |
| 2.1 Education | 26.0 | 119 ○ |
| 2.1.1 Expenditure on education, % GDP | 2.4 | 111 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 15.9 | 75 |
| 2.1.3 School life expectancy, years [Ⓐ] | 12.3 | 84 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 28.1 | 86 |
| 2.2.1 Tertiary enrolment, % gross | 46.6 | 58 |
| 2.2.2 Graduates in science & engineering, % | 14.1 | 90 ○ |
| 2.2.3 Tertiary inbound mobility, % | 3.9 | 40 |
| 2.3 Research & development (R&D) | 1.5 | 95 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.2 | 82 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 39.7 | 74 |
| 3.1 Information & communication technologies (ICTs) | 51.8 | 60 |
| 3.1.1 ICT access* | 60.8 | 65 |
| 3.1.2 ICT use* | 31.9 | 76 |
| 3.1.3 Government's online service* | 61.4 | 43 |
| 3.1.4 E-participation* | 52.9 | 59 |
| 3.2 General infrastructure | 25.7 | 102 |
| 3.2.1 Electricity output, kWh/cap | 2,587.2 | 67 |
| 3.2.2 Logistics performance* | 2.7 | 87 |
| 3.2.3 Gross capital formation, % GDP | 19.6 | 90 |
| 3.3 Ecological sustainability | 41.6 | 72 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.9 | 74 |
| 3.3.2 Environmental performance* | 81.6 | 37 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 114 ○ |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 41.3 | 78 |
| 4.1 Credit | 41.4 | 42 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 |
| 4.1.2 Domestic credit to private sector, % GDP | 48.9 | 69 |
| 4.1.3 Microfinance gross loans, % GDP | 3.4 | 12 ● |

| | | |
|--|------|------|
| 4.2 Investment | 30.0 | 93 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 1.2 | 93 ○ |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.0 | 83 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|-------------|-----------|
| 4.3 Trade, competition, & market scale | 52.6 | 95 |
| 4.3.1 Applied tariff rate, weighted mean, % | 2.2 | 53 |
| 4.3.2 Intensity of local competition [†] | 63.5 | 83 |
| 4.3.3 Domestic market scale, bn PPP\$ | 24.4 | 111 |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 28.6 | 82 |
| 5.1 Knowledge workers | 40.0 | 58 |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 26.9 | 49 |
| 5.1.2 Firms offering formal training, % firms | 16.2 | 86 ○ |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 27.4 | 5 ● |

| | | |
|---|-------------|------------|
| 5.2 Innovation linkages | 21.5 | 106 |
| 5.2.1 University/industry research collaboration [†] | 34.2 | 102 |
| 5.2.2 State of cluster development [†] | 36.2 | 96 |
| 5.2.3 GERD financed by abroad, % | 5.1 | 66 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 41 |

| | | |
|--|-------------|-----------|
| 5.3 Knowledge absorption | 24.4 | 89 |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.6 | 86 |
| 5.3.3 ICT services imports, % total trade | 1.0 | 59 |
| 5.3.4 FDI net inflows, % GDP | 3.5 | 49 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 28.2 | 48 |
| 6.1 Knowledge creation | 27.7 | 34 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 5.0 | 23 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.2 | 49 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 2.2 | 12 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 29.9 | 24 ● |
| 6.1.5 Citable documents H index | 126.0 | 62 |

| | | |
|--|-------------|-----------|
| 6.2 Knowledge impact | 30.4 | 91 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.8 | 29 |
| 6.2.2 New businesses/th pop. 15–64 | 1.5 | 55 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.7 | 113 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | 4.3 | 93 ○ |

| | | |
|--|-------------|-----------|
| 6.3 Knowledge diffusion | 26.5 | 55 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 95 |
| 6.3.3 ICT services exports, % total trade | 3.0 | 24 ● |
| 6.3.4 FDI net outflows, % GDP | 0.1 | 79 |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 35.6 | 44 |
| 7.1 Intangible assets | 49.3 | 38 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 99.3 | 13 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.3 | 60 |
| 7.1.3 ICTs & business model creation [†] | 59.0 | 61 |
| 7.1.4 ICTs & organizational model creation [†] | 55.0 | 60 |

| | | |
|--|-------------|-----------|
| 7.2 Creative goods & services | 29.8 | 44 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.3 | 36 |
| 7.2.2 National feature films/mn pop. 15–69 | 12.8 | 7 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.5 | 33 |
| 7.2.5 Creative goods exports, % total trade | 0.5 | 60 |

| | | |
|--|-------------|-----------|
| 7.3 Online creativity | 13.9 | 50 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 3.0 | 66 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 4.5 | 56 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,651.3 | 30 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 24.0 |
| GDP (US\$ billions) | 1,223.9 |
| GDP per capita, PPP\$ | 47,389.1 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 53.1 | 19 |
| Innovation Output Sub-Index | 41.3 | 27 |
| Innovation Input Sub-Index | 64.9 | 11 |
| Innovation Efficiency Ratio | 0.6 | 73 ○ |
| Global Innovation Index 2015 (out of 141) | 55.2 | 17 |

1 Institutions **88.8** **10**

| | | |
|--|------|-----|
| 1.1 Political environment | 86.5 | 16 |
| 1.1.1 Political stability & safety* | 89.8 | 12 |
| 1.1.2 Government effectiveness* | 83.2 | 16 |
| 1.2 Regulatory environment | 92.9 | 12 |
| 1.2.1 Regulatory quality* | 91.1 | 5 ● |
| 1.2.2 Rule of law* | 95.2 | 9 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 11.7 | 43 |
| 1.3 Business environment | 86.8 | 14 |
| 1.3.1 Ease of starting a business* | 96.5 | 11 |
| 1.3.2 Ease of resolving insolvency* | 81.7 | 13 |
| 1.3.3 Ease of paying taxes* | 82.4 | 37 |

2 Human capital & research **59.7** **9**

| | | |
|--|---------|------|
| 2.1 Education | 56.3 | 37 |
| 2.1.1 Expenditure on education, % GDP | 4.9 | 54 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 16.5 | 73 ○ |
| 2.1.3 School life expectancy, years | 20.4 | 1 ● |
| 2.1.4 PISA scales in reading, maths, & science | 512.5 | 14 |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 57.5 | 8 ● |
| 2.2.1 Tertiary enrolment, % gross | 86.6 | 7 ● |
| 2.2.2 Graduates in science & engineering, % ^(d) | 15.9 | 79 ○ |
| 2.2.3 Tertiary inbound mobility, % | 18.0 | 5 ● |
| 2.3 Research & development (R&D) | 65.2 | 13 |
| 2.3.1 Researchers, FTE/mn pop. ^(d) | 4,530.7 | 12 |
| 2.3.2 Gross expenditure on R&D, % GDP ^(d) | 2.2 | 14 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 511.5 | 18 |
| 2.3.4 QS university ranking, average score top 3* | 85.3 | 6 ● |

3 Infrastructure **65.1** **6 ●**

| | | |
|---|----------|------|
| 3.1 Information & communication technologies (ICTs) | 86.7 | 7 ● |
| 3.1.1 ICT access* | 83.7 | 16 |
| 3.1.2 ICT use* | 75.8 | 16 |
| 3.1.3 Government's online service* | 92.9 | 8 |
| 3.1.4 E-participation* | 94.1 | 7 ● |
| 3.2 General infrastructure | 56.9 | 10 |
| 3.2.1 Electricity output, kWh/cap | 10,534.1 | 12 |
| 3.2.2 Logistics performance* | 3.8 | 16 |
| 3.2.3 Gross capital formation, % GDP | 26.3 | 36 |
| 3.3 Ecological sustainability | 51.7 | 33 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.1 | 68 ○ |
| 3.3.2 Environmental performance* | 87.2 | 13 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 5.2 | 20 |

4 Market sophistication **65.8** **10**

| | | |
|--|-------|-----|
| 4.1 Credit | 70.4 | 6 ● |
| 4.1.1 Ease of getting credit* | 90.0 | 5 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 129.6 | 15 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 48.5 | 26 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 ○ |
| 4.2.2 Market capitalization, % GDP | 88.6 | 18 |
| 4.2.3 Total value of stocks traded, % GDP | 50.6 | 15 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 16 |

4.3 Trade, competition, & market scale **78.4** **11**

| | | |
|---|---------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.8 | 49 |
| 4.3.2 Intensity of local competition [†] | 82.2 | 8 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,099.8 | 19 |

5 Business sophistication **45.0** **23**

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 65.2 | 9 |
| 5.1.1 Knowledge-intensive employment, % | 44.9 | 13 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP ^(d) | 1.2 | 15 |
| 5.1.4 GERD financed by business, % ^(d) | 61.9 | 7 |
| 5.1.5 Females employed w/advanced degrees, % total ^(d) | 22.6 | 15 |

5.2 Innovation linkages **38.5** **37**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 64.1 | 20 |
| 5.2.2 State of cluster development [†] | 51.0 | 39 |
| 5.2.3 GERD financed by abroad, % ^(d) | 1.6 | 83 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 4 ● |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.0 | 25 |

5.3 Knowledge absorption **31.4** **49**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 1.3 | 19 |
| 5.3.2 High-tech imports less re-imports, % total trade | 10.0 | 31 |
| 5.3.3 ICT services imports, % total trade | 0.9 | 66 ○ |
| 5.3.4 FDI net inflows, % GDP | 3.2 | 56 |
| 5.3.5 Research talent, % in business enterprise ^(d) | 27.9 | 47 ○ |

6 Knowledge & technology outputs **34.3** **32**

| | | |
|--|-------|----|
| 6.1 Knowledge creation | 33.6 | 28 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.8 | 51 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.5 | 24 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.9 | 26 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 48.3 | 9 |
| 6.1.5 Citable documents H index | 644.0 | 10 |

6.2 Knowledge impact **50.0** **18**

| | | |
|--|------|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.5 | 47 |
| 6.2.2 New businesses/th pop. 15–64 | 14.9 | 5 ● |
| 6.2.3 Computer software spending, % GDP | 0.3 | 39 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 17.9 | 21 |
| 6.2.5 High- & medium-high-tech manufactures, % | 24.8 | 49 |

6.3 Knowledge diffusion **19.3** **100 ○**

| | | |
|--|-------|-------|
| 6.3.1 Intellectual property receipts, % total trade | 0.3 | 28 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.8 | 53 |
| 6.3.3 ICT services exports, % total trade | 0.6 | 90 ○ |
| 6.3.4 FDI net outflows, % GDP | (0.1) | 107 ○ |

7 Creative outputs **48.2** **18**

| | | |
|---|------|----|
| 7.1 Intangible assets | 49.6 | 37 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 65.4 | 27 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.4 | 48 |
| 7.1.3 ICTs & business model creation [†] | 64.8 | 40 |
| 7.1.4 ICTs & organizational model creation [†] | 66.3 | 24 |

7.2 Creative goods & services **32.7** **37**

| | | |
|--|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.3 | 31 |
| 7.2.2 National feature films/mn pop. 15–69 | 1.6 | 61 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 61.7 | 8 |
| 7.2.4 Printing & publishing manufactures, % | 2.2 | 18 |
| 7.2.5 Creative goods exports, % total trade | 0.7 | 53 |

7.3 Online creativity **61.1** **9**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 68.7 | 9 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 62.9 | 14 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,868.5 | 9 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 54.6 | 16 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

○ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Austria

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 8.5 |
| GDP (US\$ billions) | 374.1 |
| GDP per capita, PPP\$ | 47,249.9 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 52.6 | 20 |
| Innovation Output Sub-Index | 44.4 | 22 |
| Innovation Input Sub-Index | 60.9 | 19 |
| Innovation Efficiency Ratio | 0.7 | 43 |
| Global Innovation Index 2015 (out of 141) | 54.1 | 18 |

1 Institutions **87.6** **14**

| | | |
|--|------|------|
| 1.1 Political environment | 88.8 | 12 ● |
| 1.1.1 Political stability & safety* | 95.1 | 3 ● |
| 1.1.2 Government effectiveness* | 82.6 | 17 |
| 1.2 Regulatory environment | 94.4 | 10 ● |
| 1.2.1 Regulatory quality* | 81.7 | 18 |
| 1.2.2 Rule of law* | 95.9 | 8 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 79.6 | 32 |
| 1.3.1 Ease of starting a business* | 83.5 | 80 ○ |
| 1.3.2 Ease of resolving insolvency* | 78.9 | 17 |
| 1.3.3 Ease of paying taxes* | 76.5 | 61 ○ |

2 Human capital & research **60.8** **8 ●**

| | | |
|---|---------|------|
| 2.1 Education | 58.3 | 29 |
| 2.1.1 Expenditure on education, % GDP | 5.5 | 38 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 27.0 | 25 |
| 2.1.3 School life expectancy, years | 15.9 | 32 |
| 2.1.4 PISA scales in reading, maths, & science | 500.3 | 18 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 9.7 | 22 |
| 2.2 Tertiary education | 65.7 | 2 ● |
| 2.2.1 Tertiary enrolment, % gross | 80.0 | 13 |
| 2.2.2 Graduates in science & engineering, % | 27.9 | 13 |
| 2.2.3 Tertiary inbound mobility, % | 15.5 | 9 ● |
| 2.3 Research & development (R&D) | 58.3 | 17 |
| 2.3.1 Researchers, FTE/mn pop. | 4,814.5 | 10 ● |
| 2.3.2 Gross expenditure on R&D, % GDP | 3.0 | 7 ● |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 107.9 | 28 |
| 2.3.4 QS university ranking, average score top 3* | 52.4 | 25 |

3 Infrastructure **57.1** **24**

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 71.1 | 27 |
| 3.1.1 ICT access* | 82.1 | 19 |
| 3.1.2 ICT use* | 64.7 | 27 |
| 3.1.3 Government's online service* | 74.8 | 23 |
| 3.1.4 E-participation* | 62.7 | 40 |
| 3.2 General infrastructure | 46.8 | 28 |
| 3.2.1 Electricity output, kWh/cap. | 7,207.8 | 26 |
| 3.2.2 Logistics performance* | 3.6 | 21 |
| 3.2.3 Gross capital formation, % GDP | 22.3 | 61 ○ |
| 3.3 Ecological sustainability | 53.3 | 26 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.9 | 33 |
| 3.3.2 Environmental performance* | 86.6 | 18 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.0 | 35 |

4 Market sophistication **51.3** **29**

| | | |
|--|------|------|
| 4.1 Credit | 47.0 | 31 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 88.6 | 32 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 33.2 | 81 ○ |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP | 22.2 | 60 ○ |
| 4.2.3 Total value of stocks traded, % GDP | 6.6 | 41 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 30 |

4.3 Trade, competition, & market scale **73.5** **21**

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 78.9 | 14 |
| 4.3.3 Domestic market scale, bn PPP\$ | 396.8 | 43 |

5 Business sophistication **47.6** **18**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 59.5 | 22 |
| 5.1.1 Knowledge-intensive employment, % | 40.4 | 22 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 2.1 | 6 ● |
| 5.1.4 GERD financed by business, % | 47.2 | 24 |
| 5.1.5 Females employed w/advanced degrees, % total | 15.8 | 37 |

5.2 Innovation linkages **42.5** **24**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 61.3 | 23 |
| 5.2.2 State of cluster development [†] | 65.4 | 15 |
| 5.2.3 GERD financed by abroad, % | 15.1 | 29 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 50 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 4.3 | 9 ● |

5.3 Knowledge absorption **40.8** **23**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.8 | 36 |
| 5.3.2 High-tech imports less re-imports, % total trade | 8.8 | 50 |
| 5.3.3 ICT services imports, % total trade | 1.9 | 21 |
| 5.3.4 FDI net inflows, % GDP | 1.9 | 82 ○ |
| 5.3.5 Research talent, % in business enterprise | 63.7 | 8 ● |

6 Knowledge & technology outputs **39.4** **24**

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 42.2 | 20 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 10.2 | 12 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 3.5 | 12 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.4 | 20 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 35.0 | 19 |
| 6.1.5 Citable documents H index | 449.0 | 17 |

6.2 Knowledge impact **39.1** **49**

| | | |
|--|-------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.5) | 99 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 0.7 | 81 ○ |
| 6.2.3 Computer software spending, % GDP | 0.6 | 14 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 10.6 | 36 |
| 6.2.5 High- & medium-high-tech manufactures, % | 43.2 | 16 |

6.3 Knowledge diffusion **36.8** **32**

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 0.5 | 23 |
| 6.3.2 High-tech exports less re-exports, % total trade | 9.4 | 20 |
| 6.3.3 ICT services exports, % total trade | 2.8 | 28 |
| 6.3.4 FDI net outflows, % GDP | 2.1 | 30 |

7 Creative outputs **49.5** **16**

| | | |
|---|------|----|
| 7.1 Intangible assets | 55.2 | 23 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 64.7 | 29 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 9.0 | 15 |
| 7.1.3 ICTs & business model creation [†] | 71.0 | 24 |
| 7.1.4 ICTs & organizational model creation [†] | 62.2 | 31 |

7.2 Creative goods & services **41.1** **16**

| | | |
|---|------|----|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 1.0 | 10 |
| 7.2.2 National feature films/mn pop. 15–69 | 7.5 | 22 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 63.0 | 7 |
| 7.2.4 Printing & publishing manufactures, % | 1.4 | 36 |
| 7.2.5 Creative goods exports, % total trade | 1.5 | 34 |

7.3 Online creativity **46.6** **19**

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 39.3 | 19 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 73.6 | 11 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,879.5 | 26 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 37.3 | 29 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 9.8 |
| GDP (US\$ billions) | 54.0 |
| GDP per capita, PPP\$ | 17,993.4 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.6 | 85 |
| Innovation Output Sub-Index | 20.9 | 94 |
| Innovation Input Sub-Index | 38.4 | 81 |
| Innovation Efficiency Ratio | 0.5 | 101 |
| Global Innovation Index 2015 (out of 141) | 30.1 | 93 |

| | | | |
|----------|---|-------------|-------------|
| 1 | Institutions | 56.4 | 76 |
| 1.1 | Political environment | 40.0 | 92 |
| 1.1.1 | Political stability & safety* | 50.4 | 89 |
| 1.1.2 | Government effectiveness* | 29.6 | 86 |
| 1.2 | Regulatory environment | 53.8 | 97 |
| 1.2.1 | Regulatory quality* | 37.5 | 87 |
| 1.2.2 | Rule of law* | 32.0 | 97 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 21.7 | 91 |
| 1.3 | Business environment | 75.4 | 48 |
| 1.3.1 | Ease of starting a business* | 97.8 | 7 ● |
| 1.3.2 | Ease of resolving insolvency* | 44.7 | 75 |
| 1.3.3 | Ease of paying taxes* | 83.8 | 30 ● |
| 2 | Human capital & research | 22.9 | 93 |
| 2.1 | Education | 32.2 | 105 |
| 2.1.1 | Expenditure on education, % GDP | 2.5 | 109 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 | School life expectancy, years | 12.6 | 82 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 | Tertiary education | 29.1 | 83 |
| 2.2.1 | Tertiary enrolment, % gross | 23.2 | 88 |
| 2.2.2 | Graduates in science & engineering, % | 22.0 | 45 |
| 2.2.3 | Tertiary inbound mobility, % | 2.3 | 62 |
| 2.3 | Research & development (R&D) | 7.5 | 69 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.2 | 86 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 18.6 | 55 |
| 3 | Infrastructure | 40.8 | 73 |
| 3.1 | Information & communication technologies (ICTs) | 48.6 | 70 |
| 3.1.1 | ICT access* | 61.1 | 64 |
| 3.1.2 | ICT use* | 47.0 | 56 |
| 3.1.3 | Government's online service* | 43.3 | 75 |
| 3.1.4 | E-participation* | 43.1 | 74 |
| 3.2 | General infrastructure | 25.2 | 104 |
| 3.2.1 | Electricity output, kWh/cap | 2,479.2 | 69 |
| 3.2.2 | Logistics performance* | 2.4 | 113 ○ |
| 3.2.3 | Gross capital formation, % GDP | 22.3 | 62 |
| 3.3 | Ecological sustainability | 48.5 | 44 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.0 | 29 ● |
| 3.3.2 | Environmental performance* | 83.8 | 31 ● |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 87 |
| 4 | Market sophistication | 52.1 | 27 ● |
| 4.1 | Credit | 35.4 | 53 |
| 4.1.1 | Ease of getting credit* | 40.0 | 92 |
| 4.1.2 | Domestic credit to private sector, % GDP | 30.7 | 94 |
| 4.1.3 | Microfinance gross loans, % GDP | 4.5 | 11 ● |

| | | | |
|-------|--|-------|-------|
| 4.2 | Investment | 63.3 | 13 |
| 4.2.1 | Ease of protecting minority investors* | 63.3 | 35 ● |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 57.7 | 77 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 4.6 | 82 |
| 4.3.2 | Intensity of local competition† | 55.8 | 111 ○ |
| 4.3.3 | Domestic market scale, bn PPP\$ | 165.9 | 62 |

| | | | |
|----------|--|-------------|--------------|
| 5 | Business sophistication | 19.7 | 123 ○ |
| 5.1 | Knowledge workers | 23.3 | 103 |
| 5.1.1 | Knowledge-intensive employment, % | 23.4 | 61 |
| 5.1.2 | Firms offering formal training, % firms | 20.2 | 80 |
| 5.1.3 | GERD performed by business, % of GDP | 0.0 | 76 |
| 5.1.4 | GERD financed by business, % | 5.3 | 77 |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓢ] | 12.9 | 48 |
| 5.2 | Innovation linkages | 17.7 | 117 ○ |
| 5.2.1 | University/industry research collaboration† | 36.0 | 95 |
| 5.2.2 | State of cluster development† | 40.1 | 88 |
| 5.2.3 | GERD financed by abroad, % | 0.2 | 97 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 55 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 78 |
| 5.3 | Knowledge absorption | 18.0 | 113 ○ |
| 5.3.1 | Intellectual property payments, % total trade [Ⓢ] | 0.1 | 96 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 2.2 | 119 ○ |
| 5.3.3 | ICT services imports, % total trade | 0.6 | 89 |
| 5.3.4 | FDI net inflows, % GDP | 5.9 | 23 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

| | | | |
|----------|--|-------------|------------|
| 6 | Knowledge & technology outputs | 17.6 | 101 |
| 6.1 | Knowledge creation | 3.0 | 110 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.2 | 60 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.0 | 94 ○ |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.1 | 46 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 2.6 | 112 ○ |
| 6.1.5 | Citable documents H index | 58.0 | 109 |
| 6.2 | Knowledge impact | 28.2 | 100 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.3 | 54 |
| 6.2.2 | New businesses/th pop. 15–64 | 1.0 | 71 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 1.5 | 97 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 10.4 | 76 |
| 6.3 | Knowledge diffusion | 21.6 | 82 |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓢ] | 0.0 | 101 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.1 | 105 |
| 6.3.3 | ICT services exports, % total trade | 0.5 | 97 |
| 6.3.4 | FDI net outflows, % GDP | 2.6 | 23 ● |

| | | | |
|----------|--|-------------|-----------|
| 7 | Creative outputs | 24.1 | 87 |
| 7.1 | Intangible assets | 39.5 | 78 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 22.2 | 76 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP [Ⓢ] | 0.3 | 87 |
| 7.1.3 | ICTs & business model creation† | 63.2 | 44 |
| 7.1.4 | ICTs & organizational model creation† | 62.5 | 29 ● |
| 7.2 | Creative goods & services | 12.5 | 86 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.0 | 62 |
| 7.2.2 | National feature films/mn pop. 15–69 | 9.9 | 13 ● |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 0.6 | 82 |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 113 ○ |
| 7.3 | Online creativity | 5.0 | 76 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 1.1 | 94 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.2 | 79 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,709.4 | 57 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓢ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Bahrain

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 1.4 |
| GDP (US\$ billions) | 30.4 |
| GDP per capita, PPP\$ | 50,094.9 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.5 | 57 |
| Innovation Output Sub-Index | 26.2 | 67 |
| Innovation Input Sub-Index | 44.8 | 51 |
| Innovation Efficiency Ratio | 0.6 | 92 |
| Global Innovation Index 2015 (out of 141) | 37.7 | 59 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 66.4 | 55 |
| 1.1 | Political environment | 47.5 | 71 |
| 1.1.1 | Political stability & safety* | 39.4 | 111 ○ |
| 1.1.2 | Government effectiveness* | 55.5 | 41 |
| 1.2 | Regulatory environment | 80.1 | 29 |
| 1.2.1 | Regulatory quality* | 62.0 | 40 |
| 1.2.2 | Rule of law* | 58.3 | 46 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 | Business environment | 71.8 | 59 |
| 1.3.1 | Ease of starting a business* | 77.1 | 106 |
| 1.3.2 | Ease of resolving insolvency* | 44.3 | 76 |
| 1.3.3 | Ease of paying taxes* | 93.9 | 8 ● |
| 2 | Human capital & research | 31.4 | 68 |
| 2.1 | Education | 42.8 | 80 |
| 2.1.1 | Expenditure on education, % GDP | 2.6 | 106 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 | School life expectancy, years | n/a | n/a |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 9.9 | 26 |
| 2.2 | Tertiary education | 43.7 | 34 |
| 2.2.1 | Tertiary enrolment, % gross | 36.8 | 70 |
| 2.2.2 | Graduates in science & engineering, % | 19.5 | 59 |
| 2.2.3 | Tertiary inbound mobility, % | 13.2 | 11 ● |
| 2.3 | Research & development (R&D) | 7.7 | 67 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 15.4 | 59 |
| 3 | Infrastructure | 55.3 | 29 |
| 3.1 | Information & communication technologies (ICTs) | 82.4 | 10 ● |
| 3.1.1 | ICT access* | 77.9 | 30 |
| 3.1.2 | ICT use* | 75.6 | 17 ● |
| 3.1.3 | Government's online service* | 93.7 | 7 ● |
| 3.1.4 | E-participation* | 82.4 | 14 ● |
| 3.2 | General infrastructure | 50.9 | 19 ● |
| 3.2.1 | Electricity output, kWh/cap. | 19,485.7 | 1 ● |
| 3.2.2 | Logistics performance* | 3.1 | 50 |
| 3.2.3 | Gross capital formation, % GDP | 17.6 | 102 |
| 3.3 | Ecological sustainability | 32.6 | 107 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 3.7 | 113 ○ |
| 3.3.2 | Environmental performance* | 70.1 | 77 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.2 | 58 |
| 4 | Market sophistication | 38.7 | 91 |
| 4.1 | Credit | 31.9 | 72 |
| 4.1.1 | Ease of getting credit* | 40.0 | 92 |
| 4.1.2 | Domestic credit to private sector, % GDP | 63.0 | 48 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|-------|--|------|-----|
| 4.2 | Investment | 26.6 | 108 |
| 4.2.1 | Ease of protecting minority investors* | 48.3 | 90 |
| 4.2.2 | Market capitalization, % GDP | 65.6 | 27 |
| 4.2.3 | Total value of stocks traded, % GDP ^② | 1.0 | 55 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 57 |

| | | | |
|-------|---|------|----|
| 4.3 | Trade, competition, & market scale | 57.7 | 76 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 3.7 | 67 |
| 4.3.2 | Intensity of local competition [†] | 71.5 | 46 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 62.2 | 88 |

5 Business sophistication

| | | | |
|-------|--|-----|-----|
| 5.1 | Knowledge workers | n/a | n/a |
| 5.1.1 | Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |

| | | | |
|-------|---|------|------|
| 5.2 | Innovation linkages | 46.1 | 15 ● |
| 5.2.1 | University/industry research collaboration [†] | 37.9 | 84 |
| 5.2.2 | State of cluster development [†] | 57.5 | 26 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 3 ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP ^② | 0.0 | 82 |

| | | | |
|-------|--|------|-------|
| 5.3 | Knowledge absorption | 18.1 | 112 ○ |
| 5.3.1 | Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 | High-tech imports less re-imports, % total trade | 5.0 | 97 |
| 5.3.3 | ICT services imports, % total trade ^② | 0.3 | 111 ○ |
| 5.3.4 | FDI net inflows, % GDP | 2.8 | 61 |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs

| | | | |
|-------|--|------|-------|
| 6.1 | Knowledge creation | 1.7 | 124 ○ |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.1 | 102 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 64 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 2.2 | 116 ○ |
| 6.1.5 | Citable documents H index | 48.0 | 115 ○ |

| | | | |
|-------|---|------|-----|
| 6.2 | Knowledge impact | 37.7 | 57 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 3.1 | 23 |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 27 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 5.0 | 62 |
| 6.2.5 | High- & medium-high-tech manufactures, % ^② | 9.9 | 78 |

| | | | |
|-------|--|------|------|
| 6.3 | Knowledge diffusion | 36.5 | 33 |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.2 | 93 |
| 6.3.3 | ICT services exports, % total trade ^② | 3.3 | 20 |
| 6.3.4 | FDI net outflows, % GDP ^② | 3.2 | 17 ● |

7 Creative outputs

| | | | |
|-------|---|------|-------|
| 7.1 | Intangible assets | 36.9 | 91 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 6.7 | 103 ○ |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.2 | 99 ○ |
| 7.1.3 | ICTs & business model creation [†] | 65.1 | 37 |
| 7.1.4 | ICTs & organizational model creation [†] | 60.7 | 36 |

| | | | |
|-------|--|------|-------|
| 7.2 | Creative goods & services | 22.7 | 65 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 0.0 | 101 ○ |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 9.2 | 34 |
| 7.2.4 | Printing & publishing manufactures, % ^② | 1.0 | 63 |
| 7.2.5 | Creative goods exports, % total trade | 2.3 | 20 ● |

| | | | |
|-------|--|---------|----|
| 7.3 | Online creativity | 11.8 | 57 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 6.0 | 52 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.5 | 74 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,547.7 | 62 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 28.1 | 43 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 161.0 |
| GDP (US\$ billions) | 205.7 |
| GDP per capita, PPP\$ | 3,606.6 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 22.9 | 117 |
| Innovation Output Sub-Index | 15.7 | 117 |
| Innovation Input Sub-Index | 30.0 | 115 |
| Innovation Efficiency Ratio | 0.5 | 107 |
| Global Innovation Index 2015 (out of 141) | 23.7 | 129 |

1 Institutions **43.3** **118**

| | | |
|--|------|-----|
| 1.1 Political environment | 29.3 | 112 |
| 1.1.1 Political stability & safety* | 41.1 | 104 |
| 1.1.2 Government effectiveness* | 17.6 | 113 |
| 1.2 Regulatory environment | 39.9 | 118 |
| 1.2.1 Regulatory quality* | 21.4 | 118 |
| 1.2.2 Rule of law* | 29.2 | 105 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 31.0 | 118 |
| 1.3 Business environment | 60.8 | 94 |
| 1.3.1 Ease of starting a business* | 81.7 | 87 |
| 1.3.2 Ease of resolving insolvency* | 26.4 | 122 |
| 1.3.3 Ease of paying taxes* | 74.4 | 67 |

2 Human capital & research **12.4** **124** ○

| | | | |
|--|------|-----|---|
| 2.1 Education | 17.0 | 127 | ○ |
| 2.1.1 Expenditure on education, % GDP | 2.0 | 116 | ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 12.1 | 94 | |
| 2.1.3 School life expectancy, years [Ⓓ] | 9.9 | 106 | |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a | |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 35.2 | 108 | ○ |
| 2.2 Tertiary education | 17.1 | 104 | |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 13.4 | 100 | |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 15.6 | 82 | |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 0.1 | 102 | |
| 2.3 Research & development (R&D) | 3.0 | 85 | |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a | |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a | |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 | ○ |
| 2.3.4 QS university ranking, average score top 3* | 6.0 | 66 | ● |

3 Infrastructure **30.7** **105**

| | | | |
|-------|--|-------|-----|
| 3.1 | Information & communication technologies (ICTs)..... | 27.0 | 105 |
| 3.1.1 | ICT access* | 28.2 | 113 |
| 3.1.2 | ICT use*..... | 6.0 | 115 |
| 3.1.3 | Government's online service*..... | 34.6 | 90 |
| 3.1.4 | E-participation*..... | 39.2 | 80 |
| 3.2 | General infrastructure | 30.6 | 79 |
| 3.2.1 | Electricity output, kWh/cap..... | 337.9 | 108 |
| 3.2.2 | Logistics performance*..... | 2.6 | 101 |
| 3.2.3 | Gross capital formation, % GDP..... | 29.5 | 25 |
| 3.3 | Ecological sustainability..... | 34.6 | 98 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq..... | 11.8 | 16 |
| 3.3.2 | Environmental performance*..... | 41.8 | 122 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP..... | 0.1 | 116 |

4 Market sophistication **40.5** **83**

| | | | |
|-------|--|------|-----|
| 4.1 | Credit | 22.6 | 102 |
| 4.1.1 | Ease of getting credit* | 30.0 | 106 |
| 4.1.2 | Domestic credit to private sector, % GDP | 42.4 | 78 |
| 4.1.3 | Microfinance gross loans, % GDP | 1.8 | 19 |

| | | | |
|--|------|-----|---|
| 4.2 Investment | 38.5 | 57 | ● |
| 4.2.1 Ease of protecting minority investors* | 53.3 | 77 | |
| 4.2.2 Market capitalization, % GDP | 20.1 | 65 | |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a | |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a | |

4.3 Trade, competition, & market scale **60.4** **67**

| | | | |
|-------|--|-------|-----|
| 4.3.1 | Applied tariff rate, weighted mean, % ^(d) | 8.4 | 107 |
| 4.3.2 | Intensity of local competition [†] | 66.3 | 73 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 536.5 | 34 |

5 Business sophistication **23.1** **110**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 27.9 | 92 |
| 5.1.1 Knowledge-intensive employment, % [Ⓓ] | 20.0 | 70 |
| 5.1.2 Firms offering formal training, % firms | 21.9 | 78 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages **23.8** **87**

| | | | |
|---|------|-----|---|
| 5.2.1 University/industry research collaboration [†] | 26.0 | 119 | ○ |
| 5.2.2 State of cluster development [†] | 46.0 | 58 | ● |
| 5.2.3 GERD financed by abroad, % | n/a | n/a | |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 69 | |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 109 | ○ |

5.3 Knowledge absorption **17.7** **116**

| | | | | |
|-------|---|-----|-----|---|
| 5.3.1 | Intellectual property payments, % total trade [Ⓓ] | 0.1 | 103 | |
| 5.3.2 | High-tech imports less re-imports, % total trade [Ⓓ] | 9.0 | 46 | ● |
| 5.3.3 | ICT services imports, % total trade [Ⓓ] | 0.1 | 119 | ○ |
| 5.3.4 | FDI net inflows, % GDP..... | 1.4 | 93 | |
| 5.3.5 | Research talent, % in business enterprise..... | n/a | n/a | |

6 Knowledge & technology outputs **16.3** **111**

| | | | |
|-------|---|-------|-----|
| 6.1 | Knowledge creation..... | 4.7 | 95 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP..... | 0.1 | 107 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP..... | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP..... | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP..... | 2.8 | 111 |
| 6.1.5 | Citable documents H index..... | 124.0 | 63 |

6.2 Knowledge impact **27.8** **104**

| | | | |
|---|-----|-----|---|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.4 | 19 | ● |
| 6.2.2 New businesses/th pop. 15–64 [Ⓓ] | 0.1 | 102 | |
| 6.2.3 Computer software spending, % GDP | 0.2 | 72 | ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.7 | 112 | |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓓ] | 9.7 | 79 | |

6.3 Knowledge diffusion **16.6** **112**

| | | |
|---|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade [Ⓓ] | 0.0 | 94 |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓓ] | 0.1 | 104 |
| 6.3.3 ICT services exports, % total trade [Ⓓ] | 1.1 | 75 |
| 6.3.4 FDI net outflows, % GDP | 0.0 | 92 |

7 Creative outputs **15.1** **121**

| | | | |
|-------|---|------|-----|
| 7.1 | Intangible assets..... | 29.3 | 109 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 14.8 | 88 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 2.3 | 49 |
| 7.1.3 | ICTs & business model creation [†] | 46.5 | 109 |
| 7.1.4 | ICTs & organizational model creation [†] | 42.4 | 99 |

7.2 Creative goods & services **1.3** **121**

| | | | |
|-------|---|-----|------|
| 7.2.1 | Cultural & creative services exports, % of total trade..... | 0.0 | 78 |
| 7.2.2 | National feature films/mn pop. 15–69 ^{d)} | 0.7 | 84 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % ^{d)} | 0.2 | 94 ○ |
| 7.2.5 | Creative goods exports, % total trade ^{d)} | 0.1 | 93 |

7.3 Online creativity **0.4** **110**

| | | | |
|-------|--|-------|-----|
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.4 | 112 |
| 7.3.2 | Country-code TLDs/th pop. 15–69..... | 0.0 | 124 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69..... | 121.6 | 105 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69..... | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Belarus

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 9.5 |
| GDP (US\$ billions) | 54.6 |
| GDP per capita, PPP\$ | 17,654.2 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.4 | 79 |
| Innovation Output Sub-Index | 18.8 | 103 ○ |
| Innovation Input Sub-Index | 42.0 | 64 |
| Innovation Efficiency Ratio | 0.4 | 116 ○ |
| Global Innovation Index 2015 (out of 141) | 38.2 | 53 |

1 Institutions 56.0 77

| | | |
|--|------|-------|
| 1.1 Political environment | 45.6 | 77 |
| 1.1.1 Political stability & safety* | 65.9 | 56 |
| 1.1.2 Government effectiveness* | 25.3 | 98 ○ |
| 1.2 Regulatory environment | 47.9 | 109 ○ |
| 1.2.1 Regulatory quality* | 18.9 | 123 ○ |
| 1.2.2 Rule of law* | 26.8 | 111 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 21.7 | 91 |
| 1.3 Business environment | 74.5 | 52 |
| 1.3.1 Ease of starting a business* | 96.3 | 12 ● |
| 1.3.2 Ease of resolving insolvency* | 48.4 | 62 |
| 1.3.3 Ease of paying taxes* | 78.7 | 53 |

2 Human capital & research 42.6 35

| | | |
|---|------|------|
| 2.1 Education | 65.0 | 12 ● |
| 2.1.1 Expenditure on education, % GDP | 5.0 | 50 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | 15.6 | 36 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 8.1 | 7 ● |
| 2.2 Tertiary education | 52.1 | 15 ● |
| 2.2.1 Tertiary enrolment, % gross | 88.9 | 4 ● |
| 2.2.2 Graduates in science & engineering, % | 28.6 | 10 ● |
| 2.2.3 Tertiary inbound mobility, % | 2.9 | 54 |
| 2.3 Research & development (R&D) | 10.7 | 56 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.7 | 52 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 17.3 | 56 |

3 Infrastructure 43.6 63

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 49.6 | 67 |
| 3.1.1 ICT access* | 76.8 | 34 |
| 3.1.2 ICT use* | 54.0 | 43 |
| 3.1.3 Government's online service* | 32.3 | 91 |
| 3.1.4 E-participation* | 35.3 | 85 |
| 3.2 General infrastructure | 39.6 | 49 |
| 3.2.1 Electricity output, kWh/cap. | 3,327.0 | 58 |
| 3.2.2 Logistics performance* | 2.6 | 94 |
| 3.2.3 Gross capital formation, % GDP | 33.9 | 8 ● |
| 3.3 Ecological sustainability | 41.7 | 70 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.3 | 93 ○ |
| 3.3.2 Environmental performance* | 82.3 | 35 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.1 | 44 |

4 Market sophistication 39.1 89

| | | |
|--|------|-------|
| 4.1 Credit | 16.0 | 116 ○ |
| 4.1.1 Ease of getting credit* | 40.0 | 92 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 24.5 | 104 ○ |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 83 ○ |

| | | |
|--|------|------|
| 4.2 Investment | 39.4 | 53 |
| 4.2.1 Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 79 ○ |

| | | |
|---|-------|-----|
| 4.3 Trade, competition, & market scale | 61.9 | 60 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.0 | 61 |
| 4.3.2 Intensity of local competition [†] | n/a | n/a |
| 4.3.3 Domestic market scale, bn PPP\$ | 172.8 | 61 |

5 Business sophistication 28.7 81

| | | |
|---|------|------|
| 5.1 Knowledge workers | 58.5 | 23 ● |
| 5.1.1 Knowledge-intensive employment, % [Ⓓ] | 35.9 | 33 |
| 5.1.2 Firms offering formal training, % firms | 51.1 | 23 ● |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.4 | 37 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 43.8 | 29 |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓓ] | 33.8 | 1 ● |

| | | |
|---|-----|-------|
| 5.2 Innovation linkages | 9.2 | 126 ○ |
| 5.2.1 University/industry research collaboration [†] | n/a | n/a |
| 5.2.2 State of cluster development [†] | n/a | n/a |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 7.9 | 50 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 53 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 40 |

| | | |
|--|------|-------|
| 5.3 Knowledge absorption | 18.4 | 109 ○ |
| 5.3.1 Intellectual property payments, % total trade | 0.5 | 58 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.3 | 91 |
| 5.3.3 ICT services imports, % total trade | 0.5 | 94 |
| 5.3.4 FDI net inflows, % GDP | 2.4 | 70 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 28.1 49

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 22.3 | 41 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.5 | 27 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 66 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 2.4 | 10 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.3 | 84 |
| 6.1.5 Citable documents H index | 122.0 | 65 |

| | | |
|---|------|------|
| 6.2 Knowledge impact | 41.3 | 42 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.5 | 49 |
| 6.2.2 New businesses/th pop. 15–64 | 1.1 | 68 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 17.2 | 22 ● |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓓ] | 31.4 | 37 |

| | | |
|--|------|----|
| 6.3 Knowledge diffusion | 20.8 | 90 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 53 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.6 | 56 |
| 6.3.3 ICT services exports, % total trade | 2.1 | 46 |
| 6.3.4 FDI net outflows, % GDP | 0.0 | 86 |

7 Creative outputs 9.5 124 ○

| | | |
|---|------|-------|
| 7.1 Intangible assets | 12.6 | 124 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 30.2 | 67 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.0 | 66 |
| 7.1.3 ICTs & business model creation [†] | n/a | n/a |
| 7.1.4 ICTs & organizational model creation [†] | n/a | n/a |

| | | |
|--|-----|-------|
| 7.2 Creative goods & services | 5.4 | 108 ○ |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 57 |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓓ] | 0.1 | 98 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 67 |

| | | |
|--|---------|-----|
| 7.3 Online creativity | 7.3 | 68 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.8 | 84 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 6.3 | 47 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,864.6 | 55 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 11.3 |
| GDP (US\$ billions) | 454.7 |
| GDP per capita, PPP\$ | 43,585.0 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 52.0 | 23 |
| Innovation Output Sub-Index | 45.7 | 18 |
| Innovation Input Sub-Index | 58.2 | 20 |
| Innovation Efficiency Ratio | 0.8 | 27 |
| Global Innovation Index 2015 (out of 141) | 50.9 | 25 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 80.5 | 25 |
| 1.1 | Political environment | 79.3 | 19 |
| 1.1.1 | Political stability & safety* | 80.6 | 33 |
| 1.1.2 | Government effectiveness* | 77.9 | 22 |
| 1.2 | Regulatory environment | 78.1 | 32 |
| 1.2.1 | Regulatory quality* | 73.8 | 23 |
| 1.2.2 | Rule of law* | 84.8 | 20 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 19.7 | 84 ○ |
| 1.3 | Business environment | 84.1 | 19 |
| 1.3.1 | Ease of starting a business* | 94.5 | 20 |
| 1.3.2 | Ease of resolving insolvency* | 84.0 | 9 ● |
| 1.3.3 | Ease of paying taxes* | 73.8 | 70 ○ |
| 2 | Human capital & research | 58.9 | 12 |
| 2.1 | Education | 72.1 | 6 ● |
| 2.1.1 | Expenditure on education, % GDP [Ⓐ] | 6.4 | 20 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 38.6 | 8 ● |
| 2.1.3 | School life expectancy, years | 19.6 | 2 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 509.8 | 15 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓐ] | 9.4 | 19 |
| 2.2 | Tertiary education | 44.3 | 32 |
| 2.2.1 | Tertiary enrolment, % gross | 72.3 | 23 |
| 2.2.2 | Graduates in science & engineering, % [Ⓐ] | 16.4 | 76 ○ |
| 2.2.3 | Tertiary inbound mobility, % | 10.0 | 16 |
| 2.3 | Research & development (R&D) | 60.3 | 16 |
| 2.3.1 | Researchers, FTE/mn pop. | 4,175.9 | 19 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 2.5 | 11 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 402.1 | 21 |
| 2.3.4 | QS university ranking, average score top 3* | 66.2 | 15 |
| 3 | Infrastructure | 55.3 | 28 |
| 3.1 | Information & communication technologies (ICTs) | 70.6 | 29 |
| 3.1.1 | ICT access* | 84.5 | 15 |
| 3.1.2 | ICT use* | 67.6 | 25 |
| 3.1.3 | Government's online service* | 67.7 | 31 |
| 3.1.4 | E-participation* | 62.7 | 40 |
| 3.2 | General infrastructure | 50.6 | 22 |
| 3.2.1 | Electricity output, kWh/cap | 6,387.2 | 28 |
| 3.2.2 | Logistics performance* | 4.0 | 3 ● |
| 3.2.3 | Gross capital formation, % GDP | 22.0 | 64 ○ |
| 3.3 | Ecological sustainability | 44.8 | 56 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.0 | 70 ○ |
| 3.3.2 | Environmental performance* | 80.2 | 41 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 2.5 | 39 |
| 4 | Market sophistication | 49.7 | 37 |
| 4.1 | Credit | 33.4 | 63 |
| 4.1.1 | Ease of getting credit* | 45.0 | 81 ○ |
| 4.1.2 | Domestic credit to private sector, % GDP | 58.2 | 53 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 40.2 | 48 |
| 4.2.1 | Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 | Market capitalization, % GDP | 71.2 | 25 |
| 4.2.3 | Total value of stocks traded, % GDP | 20.2 | 27 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 22 |
| 4.3 | Trade, competition, & market scale | 75.6 | 16 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 82.9 | 5 ● |
| 4.3.3 | Domestic market scale, bn PPP\$ | 483.3 | 36 |
| 5 | Business sophistication | 46.7 | 19 |
| 5.1 | Knowledge workers | 68.1 | 5 ● |
| 5.1.1 | Knowledge-intensive employment, % | 46.2 | 10 ● |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | 1.8 | 12 |
| 5.1.4 | GERD financed by business, % [Ⓐ] | 57.0 | 13 |
| 5.1.5 | Females employed w/advanced degrees, % total | 23.2 | 13 |
| 5.2 | Innovation linkages | 40.4 | 31 |
| 5.2.1 | University/industry research collaboration [†] | 76.3 | 6 ● |
| 5.2.2 | State of cluster development [†] | 59.6 | 21 |
| 5.2.3 | GERD financed by abroad, % [Ⓐ] | 13.1 | 34 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 40 ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 2.1 | 17 |
| 5.3 | Knowledge absorption | 31.6 | 47 |
| 5.3.1 | Intellectual property payments, % total trade | 0.8 | 40 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 9.5 | 39 |
| 5.3.3 | ICT services imports, % total trade | 1.9 | 22 |
| 5.3.4 | FDI net inflows, % GDP | (3.8) | 128 ○ |
| 5.3.5 | Research talent, % in business enterprise | 50.8 | 21 |
| 6 | Knowledge & technology outputs | 44.0 | 17 |
| 6.1 | Knowledge creation | 45.3 | 18 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 5.8 | 21 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 2.4 | 16 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 40.4 | 15 |
| 6.1.5 | Citable documents H index | 547.0 | 13 |
| 6.2 | Knowledge impact | 40.7 | 46 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.7 | 74 ○ |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓐ] | 2.1 | 47 |
| 6.2.3 | Computer software spending, % GDP | 0.7 | 5 ● |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 7.6 | 45 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 34.4 | 32 |
| 6.3 | Knowledge diffusion | 45.9 | 15 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.7 | 17 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 10.0 | 19 |
| 6.3.3 | ICT services exports, % total trade | 2.6 | 36 |
| 6.3.4 | FDI net outflows, % GDP | 4.9 | 10 ● |
| 7 | Creative outputs | 47.5 | 20 |
| 7.1 | Intangible assets | 49.2 | 39 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 42.7 | 54 ○ |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 2.8 | 43 |
| 7.1.3 | ICTs & business model creation [†] | 73.4 | 20 |
| 7.1.4 | ICTs & organizational model creation [†] | 68.0 | 21 |
| 7.2 | Creative goods & services | 44.8 | 11 ● |
| 7.2.1 | Cultural & creative services exports, % of total trade [Ⓐ] | 1.4 | 5 ● |
| 7.2.2 | National feature films/mn pop. 15–69 | 8.9 | 15 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 51.1 | 15 |
| 7.2.4 | Printing & publishing manufactures, % | 1.5 | 34 |
| 7.2.5 | Creative goods exports, % total trade | 1.6 | 32 |
| 7.3 | Online creativity | 46.6 | 18 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 23.7 | 26 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 69.1 | 12 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 6,650.7 | 17 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 44.6 | 25 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 10.9 |
| GDP (US\$ billions) | 8.5 |
| GDP per capita, PPP\$ | 2,113.2 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 22.2 | 121 |
| Innovation Output Sub-Index | 13.3 | 121 |
| Innovation Input Sub-Index | 31.2 | 111 |
| Innovation Efficiency Ratio | 0.4 | 118 |
| Global Innovation Index 2015 (out of 141) | n/a | n/a |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 53.6 | 86 |
| 1.1 | Political environment | 44.6 | 80 |
| 1.1.1 | Political stability & safety* | 64.1 | 64 |
| 1.1.2 | Government effectiveness* | 25.2 | 100 |
| 1.2 | Regulatory environment | 62.8 | 76 |
| 1.2.1 | Regulatory quality* | 32.2 | 100 |
| 1.2.2 | Rule of law* | 33.4 | 94 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 11.6 | 42 ● |
| 1.3 | Business environment | 53.4 | 120 |
| 1.3.1 | Ease of starting a business* | 82.2 | 86 |
| 1.3.2 | Ease of resolving insolvency* | 38.1 | 96 |
| 1.3.3 | Ease of paying taxes* | 39.9 | 122 ○ |

| | | | |
|----------|--|-------------|-----------|
| 2 | Human capital & research | 22.4 | 96 |
| 2.1 | Education | 42.7 | 81 |
| 2.1.1 | Expenditure on education, % GDP | 4.8 | 57 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 14.9 | 86 |
| 2.1.3 | School life expectancy, years | 12.1 | 88 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 9.9 | 27 ● |
| 2.2 | Tertiary education | 24.5 | 94 |
| 2.2.1 | Tertiary enrolment, % gross | 15.4 | 99 |
| 2.2.2 | Graduates in science & engineering, % ^② | 12.7 | 92 |
| 2.2.3 | Tertiary inbound mobility, % ^② | 7.9 | 20 ● |
| 2.3 | Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | | |
|----------|---|-------------|--------------|
| 3 | Infrastructure | 20.0 | 124 ○ |
| 3.1 | Information & communication technologies (ICTs) | 15.6 | 124 ○ |
| 3.1.1 | ICT access* | 30.8 | 109 |
| 3.1.2 | ICT use* | 2.9 | 122 ○ |
| 3.1.3 | Government's online service* | 11.0 | 121 ○ |
| 3.1.4 | E-participation* | 17.6 | 115 |
| 3.2 | General infrastructure | 23.7 | 112 |
| 3.2.1 | Electricity output, kWh/cap. | 16.8 | 118 ○ |
| 3.2.2 | Logistics performance* | 2.6 | 102 |
| 3.2.3 | Gross capital formation, % GDP | 22.5 | 58 ● |
| 3.3 | Ecological sustainability | 20.8 | 123 ○ |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 3.9 | 112 |
| 3.3.2 | Environmental performance* | 43.7 | 119 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 124 ○ |

| | | | |
|----------|--|-------------|--------------|
| 4 | Market sophistication | 28.8 | 124 ○ |
| 4.1 | Credit | 15.6 | 117 |
| 4.1.1 | Ease of getting credit* | 30.0 | 106 |
| 4.1.2 | Domestic credit to private sector, % GDP | 22.9 | 105 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.8 | 33 ● |

| | | | |
|-------|--|------|-----|
| 4.2 | Investment | 40.0 | 49 |
| 4.2.1 | Ease of protecting minority investors* | 40.0 | 112 |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | | |
|-------|---|------|-------|
| 4.3 | Trade, competition, & market scale | 30.7 | 125 ○ |
| 4.3.1 | Applied tariff rate, weighted mean, % | 15.6 | 126 ○ |
| 4.3.2 | Intensity of local competition [†] | 65.7 | 79 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 19.9 | 116 |

5 Business sophistication **31.0** **68**

| | | | |
|-------|--|------|-----|
| 5.1 | Knowledge workers | 31.1 | 88 |
| 5.1.1 | Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 | Firms offering formal training, % firms ^② | 27.0 | 64 |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |

| | | | |
|-------|---|------|-----|
| 5.2 | Innovation linkages | 36.2 | 45 |
| 5.2.1 | University/industry research collaboration [†] | 27.9 | 115 |
| 5.2.2 | State of cluster development [†] | 40.4 | 87 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

| | | | |
|-------|--|------|------|
| 5.3 | Knowledge absorption | 25.6 | 81 |
| 5.3.1 | Intellectual property payments, % total trade ^② | 0.2 | 85 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 4.4 | 106 |
| 5.3.3 | ICT services imports, % total trade ^② | 1.9 | 19 ● |
| 5.3.4 | FDI net inflows, % GDP | 3.9 | 41 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **10.8** **121**

| | | | |
|-------|---|------|------|
| 6.1 | Knowledge creation | 6.5 | 81 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.3 | 85 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP ^② | 0.1 | 79 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 13.6 | 52 ● |
| 6.1.5 | Citable documents H index | 59.0 | 108 |

| | | | |
|-------|--|-----|-----|
| 6.2 | Knowledge impact | 4.8 | 120 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 2.3 | 82 |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |

| | | | |
|-------|--|------|-------|
| 6.3 | Knowledge diffusion | 21.2 | 86 |
| 6.3.1 | Intellectual property receipts, % total trade ^② | 0.0 | 102 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.1 | 103 |
| 6.3.3 | ICT services exports, % total trade ^② | 2.6 | 34 ● |
| 6.3.4 | FDI net outflows, % GDP ^② | 0.5 | 59 |

7 Creative outputs **15.8** **115**

| | | | |
|-------|---|------|-----|
| 7.1 | Intangible assets | 31.4 | 104 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 10.2 | 97 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 | ICTs & business model creation [†] | 46.9 | 107 |
| 7.1.4 | ICTs & organizational model creation [†] | 42.1 | 103 |

| | | | |
|-------|---|-----|-------|
| 7.2 | Creative goods & services | 0.3 | [128] |
| 7.2.1 | Cultural & creative services exports, % of total trade ^② | 0.0 | 73 |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 118 |

| | | | |
|-------|--|------|-------|
| 7.3 | Online creativity | 0.3 | 114 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 105 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.0 | 122 ○ |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 19.6 | 120 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 0.8 |
| GDP (US\$ billions) | 2.2 |
| GDP per capita, PPP\$ | 8,200.7 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 27.9 | 96 |
| Innovation Output Sub-Index | 12.3 | 122 |
| Innovation Input Sub-Index | 43.5 | 54 |
| Innovation Efficiency Ratio | 0.3 | 128 ○ |
| Global Innovation Index 2015 (out of 141) | 26.1 | 121 |

1 Institutions **64.2** **60**

| | | |
|--|------|-------|
| 1.1 Political environment | 67.1 | 42 |
| 1.1.1 Political stability & safety* | 87.6 | 21 ● |
| 1.1.2 Government effectiveness* | 46.6 | 56 |
| 1.2 Regulatory environment | 68.6 | 56 |
| 1.2.1 Regulatory quality* | 19.7 | 121 |
| 1.2.2 Rule of law* | 55.8 | 47 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.3 | 18 ● |
| 1.3 Business environment | 57.0 | 107 |
| 1.3.1 Ease of starting a business* | 85.6 | 70 |
| 1.3.2 Ease of resolving insolvency* | 0.0 | 127 ○ |
| 1.3.3 Ease of paying taxes* | 85.5 | 25 ● |

2 Human capital & research **30.9** **69**

| | | |
|---|------|-------|
| 2.1 Education | 54.7 | 41 |
| 2.1.1 Expenditure on education, % GDP | 6.0 | 26 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 36.4 | 11 ● |
| 2.1.3 School life expectancy, years | 12.5 | 83 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 14.3 | 59 |
| 2.2 Tertiary education | 38.1 | 51 |
| 2.2.1 Tertiary enrolment, % gross | 10.9 | 102 |
| 2.2.2 Graduates in science & engineering, % | 26.8 | 19 ● |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure **47.8** **49**

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 29.5 | 100 |
| 3.1.1 ICT access* | 35.7 | 102 |
| 3.1.2 ICT use* | 22.7 | 90 |
| 3.1.3 Government's online service* | 24.4 | 106 |
| 3.1.4 E-participation* | 35.3 | 85 |
| 3.2 General infrastructure | 68.5 | 3 ● |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | 2.3 | 120 ○ |
| 3.2.3 Gross capital formation, % GDP | 55.9 | 1 ● |
| 3.3 Ecological sustainability | 45.4 | 51 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 65.0 | 93 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 68 |

4 Market sophistication **42.2** **74**

| | | |
|--|------|------|
| 4.1 Credit | 55.3 | 16 ● |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 43.8 | 75 |
| 4.1.3 Microfinance gross loans, % GDP | 8.2 | 1 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 46.7 | 27 |
| 4.2.1 Ease of protecting minority investors* | 46.7 | 92 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale **24.5** **128 ○**

| | | |
|--|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓔ] | 10.0 | 119 |
| 4.3.2 Intensity of local competition [†] | 60.4 | 97 |
| 4.3.3 Domestic market scale, bn PPP\$ | 5.9 | 128 ○ |

5 Business sophistication **32.1** **58**

| | | |
|---|------|------|
| 5.1 Knowledge workers | 21.7 | 106 |
| 5.1.1 Knowledge-intensive employment, % | 14.8 | 88 |
| 5.1.2 Firms offering formal training, % firms | 26.0 | 67 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓔ] | 1.1 | 84 ○ |

5.2 Innovation linkages **37.3** **41**

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 28.1 | 114 |
| 5.2.2 State of cluster development [†] | 42.0 | 79 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption **37.4** **29**

| | | |
|---|-----|-----|
| 5.3.1 Intellectual property payments, % total trade | 0.1 | 100 |
| 5.3.2 High-tech imports less re-imports, % total trade [Ⓔ] | 3.3 | 115 |
| 5.3.3 ICT services imports, % total trade | 5.5 | 1 ● |
| 5.3.4 FDI net inflows, % GDP | 0.4 | 116 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **2.0** **128 ○**

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 3.5 | 106 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓔ] | 0.6 | 72 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 5.5 | 92 |
| 6.1.5 Citable documents H index | 23.0 | 128 ○ |

6.2 Knowledge impact **1.4** **[126]**

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 0.1 | 104 ○ |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.2 | 103 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion **0.9** **128 ○**

| | | |
|---|-----|-------|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 98 |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓔ] | 0.0 | 118 ○ |
| 6.3.3 ICT services exports, % total trade | 0.3 | 109 |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs **22.6** **93**

| | | |
|---|------|-------|
| 7.1 Intangible assets | 27.8 | 116 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓔ] | 2.9 | 107 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 44.7 | 112 |
| 7.1.4 ICTs & organizational model creation [†] | 37.7 | 113 |

7.2 Creative goods & services **33.6** **34**

| | | |
|--|------|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓔ] | 58.6 | 1 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade [Ⓔ] | 0.0 | 116 |

7.3 Online creativity **1.5** **100**

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.4 | 73 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.7 | 83 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 178.9 | 103 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Bolivia, Plurinational State of

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 10.7 |
| GDP (US\$ billions) | 33.2 |
| GDP per capita, PPP\$ | 6,465.3 |
| Income group | Lower-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 25.2 | 109 |
| Innovation Output Sub-Index | 18.8 | 102 |
| Innovation Input Sub-Index | 31.7 | 108 |
| Innovation Efficiency Ratio | 0.6 | 89 |
| Global Innovation Index 2015 (out of 141) | 28.6 | 104 |

1 Institutions 29.2 127 ○

| | | |
|---|------|-------|
| 1.1 Political environment | 38.2 | 95 |
| 1.1.1 Political stability & safety* | 53.9 | 85 |
| 1.1.2 Government effectiveness* | 22.6 | 103 |
| 1.2 Regulatory environment | 10.9 | 127 ○ |
| 1.2.1 Regulatory quality* | 23.4 | 116 |
| 1.2.2 Rule of law* | 20.3 | 124 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks ^② | 82.3 | 126 ○ |
| 1.3 Business environment | 38.4 | 127 ○ |
| 1.3.1 Ease of starting a business* | 59.7 | 126 ○ |
| 1.3.2 Ease of resolving insolvency* | 43.3 | 82 |
| 1.3.3 Ease of paying taxes* | 12.2 | 128 ○ |

2 Human capital & research 29.3 77

| | | |
|---|-------|------|
| 2.1 Education | 52.5 | 47 ● |
| 2.1.1 Expenditure on education, % GDP | 7.0 | 10 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 20.3 | 53 ● |
| 2.1.3 School life expectancy, years ^② | 14.0 | 61 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 18.2 | 78 |
| 2.2 Tertiary education | 34.4 | 66 |
| 2.2.1 Tertiary enrolment, % gross ^② | 38.4 | 69 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 1.1 | 100 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 166.0 | 74 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.2 | 94 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 32.2 101

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 36.7 | 89 |
| 3.1.1 ICT access* | 43.1 | 91 |
| 3.1.2 ICT use* | 23.3 | 89 |
| 3.1.3 Government's online service* | 39.4 | 81 |
| 3.1.4 E-participation* | 41.2 | 77 |
| 3.2 General infrastructure | 21.5 | 120 ○ |
| 3.2.1 Electricity output, kWh/cap | 755.7 | 97 |
| 3.2.2 Logistics performance* | 2.5 | 110 |
| 3.2.3 Gross capital formation, % GDP | 20.3 | 81 |
| 3.3 Ecological sustainability | 38.3 | 85 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.9 | 75 |
| 3.3.2 Environmental performance* | 71.1 | 69 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.7 | 71 |

4 Market sophistication 42.4 70

| | | |
|--|------|------|
| 4.1 Credit | 51.2 | 21 ● |
| 4.1.1 Ease of getting credit* | 35.0 | 101 |
| 4.1.2 Domestic credit to private sector, % GDP | 50.3 | 64 |
| 4.1.3 Microfinance gross loans, % GDP | 16.4 | 1 ● |

| | | |
|--|------|-------|
| 4.2 Investment | 22.6 | 126 ○ |
| 4.2.1 Ease of protecting minority investors* | 41.7 | 109 |
| 4.2.2 Market capitalization, % GDP ^② | 16.4 | 70 |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.1 | 79 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 53.3 93

| | | |
|---|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % | 4.2 | 76 |
| 4.3.2 Intensity of local competition [†] | 54.4 | 116 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 70.3 | 85 |

5 Business sophistication 25.2 98

| | | |
|--|------|------|
| 5.1 Knowledge workers | 39.1 | 59 ● |
| 5.1.1 Knowledge-intensive employment, % ^② | 15.3 | 85 |
| 5.1.2 Firms offering formal training, % firms ^② | 57.1 | 13 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % ^② | 5.2 | 78 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 19.9 111

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 42.3 | 70 |
| 5.2.2 State of cluster development [†] | 35.4 | 102 |
| 5.2.3 GERD financed by abroad, % ^② | 1.9 | 79 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 75 |

5.3 Knowledge absorption 16.7 119

| | | |
|--|-----|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.5 | 54 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.4 | 42 ● |
| 5.3.3 ICT services imports, % total trade | 0.6 | 83 |
| 5.3.4 FDI net inflows, % GDP | 0.2 | 120 ○ |
| 5.3.5 Research talent, % in business enterprise ^② | 0.4 | 80 ○ |

6 Knowledge & technology outputs 17.6 102

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 3.0 | 112 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 101 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.2 | 45 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 3.1 | 107 |
| 6.1.5 Citable documents H index | 78.0 | 92 |

6.2 Knowledge impact 32.5 81

| | | |
|--|-----|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.1 | 25 ● |
| 6.2.2 New businesses/th pop. 15–64 | 0.6 | 85 |
| 6.2.3 Computer software spending, % GDP | 0.2 | 66 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.9 | 77 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 17.2 111

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 42 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.3 | 92 |
| 6.3.3 ICT services exports, % total trade | 0.7 | 87 |
| 6.3.4 FDI net outflows, % GDP ^② | 0.0 | 94 |

7 Creative outputs 20.1 102

| | | |
|---|------|-----|
| 7.1 Intangible assets | 31.1 | 105 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 35.1 | 63 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.4 | 86 |
| 7.1.3 ICTs & business model creation [†] | 46.5 | 108 |
| 7.1.4 ICTs & organizational model creation [†] | 42.3 | 100 |

7.2 Creative goods & services 15.8 79

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 59 |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 4.2 | 38 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.7 | 49 ● |

7.3 Online creativity 2.3 96

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.0 | 81 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.6 | 89 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 590.5 | 87 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 3.8 |
| GDP (US\$ billions) | 15.8 |
| GDP per capita, PPP\$ | 10,491.8 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.6 | 87 |
| Innovation Output Sub-Index | 18.7 | 104 |
| Innovation Input Sub-Index | 40.5 | 70 |
| Innovation Efficiency Ratio | 0.5 | 115 ○ |
| Global Innovation Index 2015 (out of 141) | 32.3 | 79 |

| | | |
|---|-------------|-------------|
| 1 Institutions | 58.7 | 69 |
| 1.1 Political environment | 43.7 | 87 |
| 1.1.1 Political stability & safety* | 61.3 | 71 |
| 1.1.2 Government effectiveness* | 26.1 | 95 |
| 1.2 Regulatory environment | 69.9 | 49 |
| 1.2.1 Regulatory quality* | 42.5 | 77 |
| 1.2.2 Rule of law* | 42.0 | 72 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 9.2 | 27 ● |
| 1.3 Business environment | 62.5 | 86 |
| 1.3.1 Ease of starting a business* | 63.5 | 124 ○ |
| 1.3.2 Ease of resolving insolvency* | 66.4 | 35 ● |
| 1.3.3 Ease of paying taxes* | 57.6 | 106 |
| 2 Human capital & research | 41.0 | 39 ● |
| 2.1 Education | 90.0 | [1] |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 10.6 | 32 ● |
| 2.2 Tertiary education | 31.1 | 80 |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % | 15.4 | 84 |
| 2.2.3 Tertiary inbound mobility, % | 7.3 | 22 ● |
| 2.3 Research & development (R&D) | 2.0 | 92 |
| 2.3.1 Researchers, FTE/mn pop. | 266.6 | 67 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.3 | 80 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 33.0 | 97 |
| 3.1 Information & communication technologies (ICTs) | 36.6 | 90 |
| 3.1.1 ICT access* | 57.1 | 69 |
| 3.1.2 ICT use* | 37.4 | 67 |
| 3.1.3 Government's online service* | 28.3 | 103 |
| 3.1.4 E-participation* | 23.5 | 108 |
| 3.2 General infrastructure | 27.3 | 96 |
| 3.2.1 Electricity output, kWh/cap | 4,556.4 | 45 |
| 3.2.2 Logistics performance* | 2.7 | 78 |
| 3.2.3 Gross capital formation, % GDP | 17.6 | 103 |
| 3.3 Ecological sustainability | 35.2 | 95 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.4 | 104 ○ |
| 3.3.2 Environmental performance* | 63.3 | 99 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.9 | 24 ● |
| 4 Market sophistication | 42.8 | 67 |
| 4.1 Credit | 34.3 | 59 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 |
| 4.1.2 Domestic credit to private sector, % GDP | 54.8 | 57 |
| 4.1.3 Microfinance gross loans, % GDP | 1.4 | 27 ● |

| | | |
|---|-------------|------------|
| 4.2 Investment | 39.5 | 52 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 Market capitalization, % GDP [Ⓢ] | 12.4 | 75 |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 54.6 | 88 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.5 | 45 |
| 4.3.2 Intensity of local competition [†] | 56.6 | 110 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 38.3 | 97 |
| 5 Business sophistication | 27.1 | 88 |
| 5.1 Knowledge workers | 38.4 | 64 |
| 5.1.1 Knowledge-intensive employment, % | 24.9 | 54 |
| 5.1.2 Firms offering formal training, % firms | 52.4 | 20 ● |
| 5.1.3 GERD performed by business, % of GDP | 0.1 | 66 |
| 5.1.4 GERD financed by business, % | 24.2 | 59 |
| 5.1.5 Females employed w/advanced degrees, % total | 9.5 | 65 |
| 5.2 Innovation linkages | 25.4 | 83 |
| 5.2.1 University/industry research collaboration [†] | 55.3 | 34 ● |
| 5.2.2 State of cluster development [†] | 32.7 | 111 ○ |
| 5.2.3 GERD financed by abroad, % | 12.1 | 43 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 88 |
| 5.3 Knowledge absorption | 17.5 | 117 ○ |
| 5.3.1 Intellectual property payments, % total trade | 0.1 | 98 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.8 | 70 |
| 5.3.3 ICT services imports, % total trade | 0.8 | 71 |
| 5.3.4 FDI net inflows, % GDP | 2.7 | 66 |
| 5.3.5 Research talent, % in business enterprise | 5.7 | 70 |
| 6 Knowledge & technology outputs | 17.8 | 99 |
| 6.1 Knowledge creation | 6.3 | 82 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.1 | 64 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 61 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 9.9 | 65 |
| 6.1.5 Citable documents H index | 55.0 | 111 |
| 6.2 Knowledge impact | 28.4 | 97 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (2.0) | 106 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 0.8 | 78 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 22.1 | 17 ● |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓢ] | 11.1 | 74 |
| 6.3 Knowledge diffusion | 18.6 | 105 |
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 39 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.1 | 63 |
| 6.3.3 ICT services exports, % total trade | 1.0 | 77 |
| 6.3.4 FDI net outflows, % GDP | (0.0) | 100 |
| 7 Creative outputs | 19.6 | 103 |
| 7.1 Intangible assets | 25.9 | 120 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 14.9 | 87 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.7 | 54 |
| 7.1.3 ICTs & business model creation [†] | 43.6 | 114 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 35.0 | 118 ○ |
| 7.2 Creative goods & services | 13.4 | 84 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 77 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 3.8 | 42 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓢ] | 1.1 | 60 |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 68 |
| 7.3 Online creativity | 13.3 | 52 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.5 | 72 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.1 | 67 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,913.2 | 34 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 19.6 | 52 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓢ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Botswana

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 2.3 |
| GDP (US\$ billions) | 12.9 |
| GDP per capita, PPP\$ | 16,368.2 |
| Income group | Upper-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.0 | 90 |
| Innovation Output Sub-Index | 17.0 | 111 |
| Innovation Input Sub-Index | 40.9 | 69 |
| Innovation Efficiency Ratio | 0.4 | 119 ○ |
| Global Innovation Index 2015 (out of 141) | 30.5 | 90 |

1 Institutions 68.3 49

| | | |
|--|------|------|
| 1.1 Political environment | 68.1 | 40 ● |
| 1.1.1 Political stability & safety* | 88.3 | 16 ● |
| 1.1.2 Government effectiveness* | 48.0 | 52 |
| 1.2 Regulatory environment | 67.3 | 63 |
| 1.2.1 Regulatory quality* | 60.6 | 44 |
| 1.2.2 Rule of law* | 62.9 | 40 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 21.7 | 94 |
| 1.3 Business environment | 69.4 | 67 |
| 1.3.1 Ease of starting a business* | 76.2 | 107 |
| 1.3.2 Ease of resolving insolvency* | 54.7 | 53 |
| 1.3.3 Ease of paying taxes* | 77.5 | 58 |

2 Human capital & research 32.6 58

| | | |
|--|-------|------|
| 2.1 Education | 71.9 | 7 ● |
| 2.1.1 Expenditure on education, % GDP ^② | 9.6 | 1 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 42.1 | 4 ● |
| 2.1.3 School life expectancy, years | 13.1 | 74 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 11.2 | 35 ● |
| 2.2 Tertiary education | 24.3 | 96 |
| 2.2.1 Tertiary enrolment, % gross | 27.5 | 82 |
| 2.2.2 Graduates in science & engineering, % | 17.5 | 70 |
| 2.2.3 Tertiary inbound mobility, % | 1.6 | 73 |
| 2.3 Research & development (R&D) | 1.7 | 94 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 164.9 | 75 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.3 | 81 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 37.0 89

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 32.0 | 96 |
| 3.1.1 ICT access* | 42.2 | 93 |
| 3.1.2 ICT use* | 23.7 | 87 |
| 3.1.3 Government's online service* | 30.7 | 97 |
| 3.1.4 E-participation* | 31.4 | 97 |
| 3.2 General infrastructure | 32.9 | 68 |
| 3.2.1 Electricity output, kWh/cap. | 431.2 | 105 ○ |
| 3.2.2 Logistics performance* | 2.5 | 109 ○ |
| 3.2.3 Gross capital formation, % GDP | 32.8 | 11 ● |
| 3.3 Ecological sustainability | 45.9 | 50 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.5 | 17 ● |
| 3.3.2 Environmental performance* | 70.7 | 72 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 95 |

4 Market sophistication 42.8 66

| | | |
|--|------|-----|
| 4.1 Credit | 33.1 | 65 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 |
| 4.1.2 Domestic credit to private sector, % GDP | 31.9 | 90 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-----|
| 4.2 Investment | 36.9 | 63 |
| 4.2.1 Ease of protecting minority investors* | 55.0 | 72 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.8 | 60 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 58.5 73

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 0.5 | 4 ● |
| 4.3.2 Intensity of local competition [†] | 67.2 | 70 |
| 4.3.3 Domestic market scale, bn PPP\$ | 35.9 | 99 |

5 Business sophistication 23.9 105

| | | |
|---|------|------|
| 5.1 Knowledge workers | 31.3 | 87 |
| 5.1.1 Knowledge-intensive employment, % ^② | 17.9 | 77 |
| 5.1.2 Firms offering formal training, % firms ^② | 51.9 | 21 ● |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 74 |
| 5.1.4 GERD financed by business, % ^② | 5.8 | 76 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 9.2 | 66 |
| 5.2 Innovation linkages | 26.1 | 79 |
| 5.2.1 University/industry research collaboration [†] | 35.7 | 96 |
| 5.2.2 State of cluster development [†] | 38.6 | 93 |
| 5.2.3 GERD financed by abroad, % ^② | 6.8 | 57 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption 14.4 124 ○

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade ^② | 0.1 | 90 |
| 5.3.2 High-tech imports less re-imports, % total trade | 3.5 | 111 ○ |
| 5.3.3 ICT services imports, % total trade ^② | 0.6 | 91 |
| 5.3.4 FDI net inflows, % GDP | 2.5 | 68 |
| 5.3.5 Research talent, % in business enterprise ^② | 10.5 | 66 |

6 Knowledge & technology outputs 18.6 93

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 2.6 | 118 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 103 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.0 | 61 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 5.5 | 93 |
| 6.1.5 Citable documents H index | 71.0 | 97 |

6.2 Knowledge impact 38.5 54

| | | |
|--|------|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 13.1 | 8 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.5 | 120 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 14.8 119 ○

| | | |
|--|-------|-------|
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 95 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 94 |
| 6.3.3 ICT services exports, % total trade ^② | 0.2 | 110 ○ |
| 6.3.4 FDI net outflows, % GDP ^② | (0.0) | 97 |

7 Creative outputs 15.3 118 ○

| | | |
|---|------|-------|
| 7.1 Intangible assets | 26.9 | 118 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 10.0 | 98 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 89 |
| 7.1.3 ICTs & business model creation [†] | 48.2 | 101 |
| 7.1.4 ICTs & organizational model creation [†] | 40.1 | 108 |

7.2 Creative goods & services 6.1 105

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 80 |

7.3 Online creativity 1.5 99

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.2 | 93 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.7 | 70 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 240.5 | 99 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 207.8 |
| GDP (US\$ billions) | 1,772.6 |
| GDP per capita, PPP\$ | 15,614.5 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.2 | 69 |
| Innovation Output Sub-Index | 23.7 | 79 |
| Innovation Input Sub-Index | 42.7 | 58 |
| Innovation Efficiency Ratio | 0.6 | 100 ○ |
| Global Innovation Index 2015 (out of 141) | 34.9 | 70 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 55.3 | 78 |
| 1.1 Political environment | 48.6 | 70 |
| 1.1.1 Political stability & safety* | 62.5 | 68 |
| 1.1.2 Government effectiveness* | 34.8 | 79 |
| 1.2 Regulatory environment | 64.6 | 73 |
| 1.2.1 Regulatory quality* | 42.9 | 75 |
| 1.2.2 Rule of law* | 45.1 | 64 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.4 | 65 |
| 1.3 Business environment | 52.6 | 123 ○ |
| 1.3.1 Ease of starting a business* | 64.3 | 123 ○ |
| 1.3.2 Ease of resolving insolvency* | 52.7 | 58 |
| 1.3.3 Ease of paying taxes* | 40.9 | 121 ○ |
| 2 Human capital & research | 32.5 | 60 |
| 2.1 Education | 43.8 | 75 |
| 2.1.1 Expenditure on education, % GDP | 5.9 | 28 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 22.7 | 46 |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | 402.1 | 53 ○ |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 17.3 | 74 |
| 2.2 Tertiary education | 13.8 | 111 ○ |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 12.0 | 96 ○ |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 0.2 | 98 ○ |
| 2.3 Research & development (R&D) | 39.9 | 30 ● |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 698.1 | 52 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 1.2 | 29 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 557.8 | 17 ● |
| 2.3.4 QS university ranking, average score top 3* | 52.3 | 26 ● |
| 3 Infrastructure | 44.9 | 59 |
| 3.1 Information & communication technologies (ICTs) | 61.2 | 42 |
| 3.1.1 ICT access* | 62.8 | 61 |
| 3.1.2 ICT use* | 51.6 | 46 |
| 3.1.3 Government's online service* | 59.8 | 49 |
| 3.1.4 E-participation* | 70.6 | 24 ● |
| 3.2 General infrastructure | 28.1 | 91 |
| 3.2.1 Electricity output, kWh/cap | 2,851.6 | 65 |
| 3.2.2 Logistics performance* | 2.9 | 63 |
| 3.2.3 Gross capital formation, % GDP | 18.0 | 98 ○ |
| 3.3 Ecological sustainability | 45.3 | 52 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.8 | 45 |
| 3.3.2 Environmental performance* | 78.9 | 45 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.0 | 63 |
| 4 Market sophistication | 43.9 | 57 |
| 4.1 Credit | 24.0 | 95 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 |
| 4.1.2 Domestic credit to private sector, % GDP | 67.1 | 45 |
| 4.1.3 Microfinance gross loans, % GDP | 0.1 | 59 |

| | | |
|---|-------------|-----------|
| 4.2 Investment | 35.5 | 68 |
| 4.2.1 Ease of protecting minority investors* | 65.0 | 28 ● |
| 4.2.2 Market capitalization, % GDP | 36.0 | 46 |
| 4.2.3 Total value of stocks traded, % GDP | 27.6 | 23 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 47 |
| 4.3 Trade, competition, & market scale | 72.3 | 28 ● |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓓ] | 7.8 | 103 ○ |
| 4.3.2 Intensity of local competition [†] | 72.9 | 40 |
| 4.3.3 Domestic market scale, bn PPP\$ | 3,275.8 | 7 ● |
| 5 Business sophistication | 37.0 | 39 |
| 5.1 Knowledge workers | 41.6 | 52 |
| 5.1.1 Knowledge-intensive employment, % | 21.6 | 63 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 42.2 | 34 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % [Ⓓ] | 40.3 | 35 |
| 5.1.5 Females employed w/advanced degrees, % total | 9.1 | 67 |
| 5.2 Innovation linkages | 31.5 | 61 |
| 5.2.1 University/industry research collaboration [†] | 46.7 | 53 |
| 5.2.2 State of cluster development [†] | 52.5 | 35 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 66 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 58 |
| 5.3 Knowledge absorption | 38.0 | 28 ● |
| 5.3.1 Intellectual property payments, % total trade | 2.0 | 8 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 12.3 | 22 ● |
| 5.3.3 ICT services imports, % total trade | 1.3 | 43 |
| 5.3.4 FDI net inflows, % GDP | 4.1 | 39 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 25.9 | 50 |
| 6 Knowledge & technology outputs | 23.7 | 67 |
| 6.1 Knowledge creation | 15.5 | 53 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.4 | 56 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.2 | 52 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.8 | 29 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.2 | 59 |
| 6.1.5 Citable documents H index | 379.0 | 23 ● |
| 6.2 Knowledge impact | 34.2 | 75 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.3 | 85 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 2.9 | 39 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 55 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 5.6 | 58 |
| 6.2.5 High- & medium-high-tech manufactures, % | 38.7 | 23 ● |
| 6.3 Knowledge diffusion | 21.3 | 83 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 44 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.0 | 42 |
| 6.3.3 ICT services exports, % total trade | 0.5 | 95 |
| 6.3.4 FDI net outflows, % GDP | 1.1 | 46 |
| 7 Creative outputs | 23.6 | 90 |
| 7.1 Intangible assets | 37.0 | 90 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 39.1 | 59 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.1 | 63 |
| 7.1.3 ICTs & business model creation [†] | 55.5 | 74 |
| 7.1.4 ICTs & organizational model creation [†] | 49.9 | 77 |
| 7.2 Creative goods & services | 8.8 | 97 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 46 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.9 | 78 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 8.1 | 39 |
| 7.2.4 Printing & publishing manufactures, % | 0.8 | 74 ○ |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 78 |
| 7.3 Online creativity | 11.7 | 58 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.7 | 89 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 8.9 | 43 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 971.2 | 73 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 28.8 | 42 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Bulgaria

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 7.1 |
| GDP (US\$ billions) | 49.0 |
| GDP per capita, PPP\$ | 19,097.3 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 41.4 | 38 |
| Innovation Output Sub-Index | 37.5 | 35 |
| Innovation Input Sub-Index | 45.3 | 49 |
| Innovation Efficiency Ratio | 0.8 | 16 ● |
| Global Innovation Index 2015 (out of 141) | 42.2 | 39 |

1 Institutions 67.8 50

| | | |
|--|------|------|
| 1.1 Political environment | 53.2 | 59 |
| 1.1.1 Political stability & safety* | 64.9 | 60 |
| 1.1.2 Government effectiveness* | 41.6 | 65 |
| 1.2 Regulatory environment | 75.4 | 37 |
| 1.2.1 Regulatory quality* | 59.0 | 46 |
| 1.2.2 Rule of law* | 45.2 | 63 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.6 | 19 ● |
| 1.3 Business environment | 74.7 | 51 |
| 1.3.1 Ease of starting a business* | 91.1 | 43 |
| 1.3.2 Ease of resolving insolvency* | 58.9 | 45 |
| 1.3.3 Ease of paying taxes* | 74.2 | 69 |

2 Human capital & research 32.1 65

| | | |
|---|---------|------|
| 2.1 Education | 44.7 | 70 |
| 2.1.1 Expenditure on education, % GDP | 3.6 | 88 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 20.4 | 52 |
| 2.1.3 School life expectancy, years | 15.0 | 46 |
| 2.1.4 PISA scales in reading, maths, & science | 440.4 | 42 |
| 2.1.5 Pupil-teacher ratio, secondary | 13.2 | 50 |
| 2.2 Tertiary education | 40.2 | 45 |
| 2.2.1 Tertiary enrolment, % gross | 70.8 | 26 |
| 2.2.2 Graduates in science & engineering, % | 20.1 | 55 |
| 2.2.3 Tertiary inbound mobility, % | 4.0 | 38 |
| 2.3 Research & development (R&D) | 11.5 | 54 |
| 2.3.1 Researchers, FTE/mn pop. | 1,817.9 | 38 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.8 | 43 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 6.7 | 65 |

3 Infrastructure 46.7 55

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 42.5 | 81 |
| 3.1.1 ICT access* | 68.5 | 50 |
| 3.1.2 ICT use* | 52.2 | 44 |
| 3.1.3 Government's online service* | 23.6 | 109 ○ |
| 3.1.4 E-participation* | 25.5 | 104 ○ |
| 3.2 General infrastructure | 38.2 | 58 |
| 3.2.1 Electricity output, kWh/cap | 5,924.2 | 31 |
| 3.2.2 Logistics performance* | 3.2 | 45 |
| 3.2.3 Gross capital formation, % GDP | 21.7 | 68 |
| 3.3 Ecological sustainability | 59.4 | 14 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.4 | 91 ○ |
| 3.3.2 Environmental performance* | 83.4 | 33 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 13.6 | 1 ● |

4 Market sophistication 43.7 59

| | | |
|--|------|------|
| 4.1 Credit | 30.8 | 74 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 59.6 | 51 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 74 ○ |

| | | |
|--|------|------|
| 4.2 Investment | 37.3 | 62 |
| 4.2.1 Ease of protecting minority investors* | 71.7 | 14 ● |
| 4.2.2 Market capitalization, % GDP | 9.7 | 84 ○ |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 73 ○ |

| | | |
|---|-------|------|
| 4.3 Trade, competition, & market scale | 63.0 | 56 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition† | 60.2 | 99 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 129.1 | 69 |

5 Business sophistication 36.2 45

| | | |
|--|------|----|
| 5.1 Knowledge workers | 43.2 | 46 |
| 5.1.1 Knowledge-intensive employment, % | 31.9 | 43 |
| 5.1.2 Firms offering formal training, % firms | 42.7 | 33 |
| 5.1.3 GERD performed by business, % of GDP | 0.5 | 34 |
| 5.1.4 GERD financed by business, % ⁽²⁾ | 19.5 | 63 |
| 5.1.5 Females employed w/advanced degrees, % total | 19.4 | 25 |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 39.6 | 34 |
| 5.2.1 University/industry research collaboration† | 33.3 | 103 ○ |
| 5.2.2 State of cluster development† | 36.0 | 100 ○ |
| 5.2.3 GERD financed by abroad, % ⁽²⁾ | 48.3 | 6 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 44 |

| | | |
|--|------|----|
| 5.3 Knowledge absorption | 25.8 | 80 |
| 5.3.1 Intellectual property payments, % total trade | 0.6 | 47 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.8 | 69 |
| 5.3.3 ICT services imports, % total trade | 0.9 | 65 |
| 5.3.4 FDI net inflows, % GDP | 3.5 | 48 |
| 5.3.5 Research talent, % in business enterprise | 26.4 | 49 |

6 Knowledge & technology outputs 32.1 38

| | | |
|--|-------|----|
| 6.1 Knowledge creation | 19.2 | 46 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.9 | 48 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 40 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.7 | 16 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 14.7 | 49 |
| 6.1.5 Citable documents H index | 167.0 | 46 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 51.4 | 16 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.3 | 55 |
| 6.2.2 New businesses/th pop. 15–64 | 8.9 | 13 ● |
| 6.2.3 Computer software spending, % GDP | 0.3 | 43 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 44.4 | 3 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 19.1 | 61 |

| | | |
|--|------|----|
| 6.3 Knowledge diffusion | 25.7 | 60 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 54 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.0 | 43 |
| 6.3.3 ICT services exports, % total trade | 2.3 | 41 |
| 6.3.4 FDI net outflows, % GDP | 1.4 | 38 |

7 Creative outputs 43.0 29

| | | |
|---|-------|------|
| 7.1 Intangible assets | 61.9 | 11 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 119.9 | 7 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 14.7 | 7 ● |
| 7.1.3 ICTs & business model creation† | 56.4 | 72 |
| 7.1.4 ICTs & organizational model creation† | 54.0 | 62 |

| | | |
|---|------|------|
| 7.2 Creative goods & services | 25.3 | 54 |
| 7.2.1 Cultural & creative services exports, % of total trade ⁽²⁾ | 0.8 | 16 ● |
| 7.2.2 National feature films/mn pop. 15–69 | 2.8 | 49 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.2 | 55 |
| 7.2.5 Creative goods exports, % total trade | 0.8 | 48 |

| | | |
|--|---------|------|
| 7.3 Online creativity | 22.7 | 37 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 23.6 | 27 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.4 | 66 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,772.6 | 28 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 29.5 | 40 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

○ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 18.1 |
| GDP (US\$ billions) | 11.0 |
| GDP per capita, PPP\$ | 1,723.6 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|--------------|
| Global Innovation Index (out of 128) | 21.0 | 122 ○ |
| Innovation Output Sub-Index | 9.3 | 127 ○ |
| Innovation Input Sub-Index | 32.8 | 105 |
| Innovation Efficiency Ratio | 0.3 | 127 ○ |
| Global Innovation Index 2015 (out of 141) | 28.7 | 102 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 53.2 | 89 |
| 1.1 Political environment | 33.4 | 105 |
| 1.1.1 Political stability & safety* | 43.3 | 101 |
| 1.1.2 Government effectiveness* | 23.5 | 102 |
| 1.2 Regulatory environment | 65.1 | 71 |
| 1.2.1 Regulatory quality* | 36.4 | 88 |
| 1.2.2 Rule of law* | 33.8 | 92 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.5 | 36 ● |
| 1.3 Business environment | 61.0 | 93 |
| 1.3.1 Ease of starting a business* | 86.7 | 59 ● |
| 1.3.2 Ease of resolving insolvency* | 38.1 | 96 |
| 1.3.3 Ease of paying taxes* | 58.1 | 105 |

| | | |
|---|-------------|------------|
| 2 Human capital & research | 16.1 | 110 |
| 2.1 Education | 26.3 | 117 |
| 2.1.1 Expenditure on education, % GDP | 4.5 | 67 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 15.2 | 82 |
| 2.1.3 School life expectancy, years | 7.7 | 116 ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 27.1 | 99 |
| 2.2 Tertiary education | 20.9 | 102 |
| 2.2.1 Tertiary enrolment, % gross | 4.8 | 114 |
| 2.2.2 Graduates in science & engineering, % | 17.6 | 69 |
| 2.2.3 Tertiary inbound mobility, % | 2.9 | 52 ● |
| 2.3 Research & development (R&D) | 1.0 | 105 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓔ] | 47.5 | 86 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓔ] | 0.2 | 87 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|------------|
| 3 Infrastructure | 23.5 | 120 |
| 3.1 Information & communication technologies (ICTs) | 19.1 | 115 |
| 3.1.1 ICT access* | 26.3 | 115 |
| 3.1.2 ICT use* | 6.3 | 112 |
| 3.1.3 Government's online service* | 29.9 | 101 |
| 3.1.4 E-participation* | 13.7 | 120 ○ |
| 3.2 General infrastructure | 22.1 | 117 |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | 2.6 | 93 |
| 3.2.3 Gross capital formation, % GDP | 13.8 | 116 |
| 3.3 Ecological sustainability | 29.3 | 115 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 43.7 | 118 ○ |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 119 |

| | | |
|--|-------------|--------------|
| 4 Market sophistication | 29.3 | 122 ○ |
| 4.1 Credit | 18.9 | 109 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 28.0 | 97 |
| 4.1.3 Microfinance gross loans, % GDP | 1.4 | 28 ● |

| | | |
|---|------|-------|
| 4.2 Investment | 31.6 | 87 |
| 4.2.1 Ease of protecting minority investors* | 41.7 | 109 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 40 ● |
| 4.3 Trade, competition, & market scale | 37.5 | 122 ○ |
| 4.3.1 Applied tariff rate, weighted mean, % | 8.4 | 107 |
| 4.3.2 Intensity of local competition [†] | n/a | n/a |
| 4.3.3 Domestic market scale, bn PPP\$ | 29.4 | 107 |

| | | |
|--|-------------|-------------|
| 5 Business sophistication | 41.9 | 28 ● |
| 5.1 Knowledge workers | 23.9 | 101 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms [Ⓔ] | 24.8 | 73 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % [Ⓔ] | 11.9 | 69 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 76.3 | [1] |
| 5.2.1 University/industry research collaboration [†] | n/a | n/a |
| 5.2.2 State of cluster development [†] | n/a | n/a |
| 5.2.3 GERD financed by abroad, % [Ⓔ] | 59.6 | 2 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |
| 5.3 Knowledge absorption | 25.5 | 83 |
| 5.3.1 Intellectual property payments, % total trade [Ⓔ] | 0.0 | 112 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.2 | 108 |
| 5.3.3 ICT services imports, % total trade [Ⓔ] | 2.4 | 11 ● |
| 5.3.4 FDI net inflows, % GDP | 2.7 | 65 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

| | | |
|--|-------------|------------|
| 6 Knowledge & technology outputs | 17.4 | 105 |
| 6.1 Knowledge creation | 5.5 | 92 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.2 | 95 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP [Ⓔ] | 0.1 | 47 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 11.3 | 61 ● |
| 6.1.5 Citable documents H index | 77.0 | 93 |
| 6.2 Knowledge impact | 28.1 | 101 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.5 | 77 |
| 6.2.2 New businesses/th pop. 15–64 [Ⓔ] | 0.2 | 97 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.5 | 96 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 18.7 | 104 |
| 6.3.1 Intellectual property receipts, % total trade [Ⓔ] | 0.0 | 78 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.3 | 85 |
| 6.3.3 ICT services exports, % total trade [Ⓔ] | 1.9 | 52 ● |
| 6.3.4 FDI net outflows, % GDP [Ⓔ] | 0.0 | 89 |

| | | |
|--|------------|--------------|
| 7 Creative outputs | 1.2 | 127 ○ |
| 7.1 Intangible assets | 0.6 | 127 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 2.8 | 108 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.0 | 110 ○ |
| 7.1.3 ICTs & business model creation [†] | n/a | n/a |
| 7.1.4 ICTs & organizational model creation [†] | n/a | n/a |
| 7.2 Creative goods & services | 3.5 | 112 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 1.8 | 57 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 106 |
| 7.3 Online creativity | 0.0 | 127 ○ |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 123 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 120 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 8.7 | 125 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Burundi

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 11.2 |
| GDP (US\$ billions) | 2.9 |
| GDP per capita, PPP\$ | 818.5 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 20.9 | 123 |
| Innovation Output Sub-Index | 11.8 | 123 |
| Innovation Input Sub-Index | 30.0 | 114 |
| Innovation Efficiency Ratio | 0.4 | 122 |
| Global Innovation Index 2015 (out of 141) | 21.0 | 136 |

1 Institutions 48.0 **103**

| | | |
|--|------|------|
| 1.1 Political environment | 24.6 | 119 |
| 1.1.1 Political stability & safety* | 40.6 | 105 |
| 1.1.2 Government effectiveness* | 8.6 | 121 |
| 1.2 Regulatory environment | 54.5 | 95 |
| 1.2.1 Regulatory quality* | 25.6 | 111 |
| 1.2.2 Rule of law* | 23.8 | 117 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.9 | 69 |
| 1.3 Business environment | 64.8 | 80 |
| 1.3.1 Ease of starting a business* | 94.5 | 19 ● |
| 1.3.2 Ease of resolving insolvency* | 30.5 | 116 |
| 1.3.3 Ease of paying taxes* | 69.5 | 82 |

2 Human capital & research 14.6 **115**

| | | |
|---|------|------|
| 2.1 Education | 37.0 | 94 |
| 2.1.1 Expenditure on education, % GDP | 5.4 | 39 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 30.1 | 20 ● |
| 2.1.3 School life expectancy, years | 10.6 | 101 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 37.2 | 109 |
| 2.2 Tertiary education | 6.1 | 119 |
| 2.2.1 Tertiary enrolment, % gross | 4.4 | 116 |
| 2.2.2 Graduates in science & engineering, % | 6.4 | 100 |
| 2.2.3 Tertiary inbound mobility, % | 1.0 | 80 |
| 2.3 Research & development (R&D) | 0.6 | 109 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 99 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 23.0 **121**

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 3.7 | 127 ○ |
| 3.1.1 ICT access* | n/a | n/a |
| 3.1.2 ICT use* | n/a | n/a |
| 3.1.3 Government's online service* | 1.6 | 126 ○ |
| 3.1.4 E-participation* | 5.9 | 126 ○ |
| 3.2 General infrastructure | 21.9 | 118 |
| 3.2.1 Electricity output, kWh/cap. | n/a | n/a |
| 3.2.2 Logistics performance* | 2.6 | 100 |
| 3.2.3 Gross capital formation, % GDP | 14.7 | 115 |
| 3.3 Ecological sustainability | 43.4 | 59 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 43.4 | 120 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | n/a | n/a |

4 Market sophistication 32.8 **113**

| | | |
|--|------|------|
| 4.1 Credit | 16.7 | 115 |
| 4.1.1 Ease of getting credit* | 10.0 | 124 |
| 4.1.2 Domestic credit to private sector, % GDP | 15.4 | 116 |
| 4.1.3 Microfinance gross loans, % GDP | 2.9 | 15 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 46.7 | 27 |
| 4.2.1 Ease of protecting minority investors* | 46.7 | 92 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 35.1 **123**

| | | |
|---|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % | 5.4 | 88 |
| 4.3.2 Intensity of local competition [†] | 48.6 | 121 |
| 4.3.3 Domestic market scale, bn PPP\$ | 8.4 | 127 ○ |

5 Business sophistication 31.8 **62**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 37.7 | 67 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 32.0 | 52 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 32.5 **57 ●**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 29.7 | 110 |
| 5.2.2 State of cluster development [†] | 28.9 | 121 |
| 5.2.3 GERD financed by abroad, % ^② | 39.9 | 11 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.2 | 53 ● |

5.3 Knowledge absorption 25.2 **84**

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade ^② | 0.0 | 113 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 11.2 | 24 ● |
| 5.3.3 ICT services imports, % total trade ^② | 1.3 | 41 ● |
| 5.3.4 FDI net inflows, % GDP ^② | 0.3 | 119 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 8.0 **127 ○**

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 2.8 | 117 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 3.9 | 105 |
| 6.1.5 Citable documents H index | 28.0 | 125 ○ |

6.2 Knowledge impact 0.7 **[128]**

| | | |
|---|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.0 | 128 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 1.8 | 97 |

6.3 Knowledge diffusion 20.5 **92**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 85 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.1 | 112 |
| 6.3.3 ICT services exports, % total trade ^② | 2.8 | 29 ● |
| 6.3.4 FDI net outflows, % GDP ^② | 0.0 | 90 |

7 Creative outputs 15.6 **116**

| | | |
|---|------|-------|
| 7.1 Intangible assets | 26.4 | 119 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 29.0 | 123 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 23.9 | 123 ○ |

7.2 Creative goods & services 9.7 **93**

| | | |
|---|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.3 | 33 ● |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.8 | 75 |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 111 |

7.3 Online creativity 0.1 **125**

| | | |
|--|-----|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.0 | 126 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 109 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7.6 | 126 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 15.6 |
| GDP (US\$ billions) | 18.2 |
| GDP per capita, PPP\$ | 3,487.5 |
| Income group | Low income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 27.9 | 95 |
| Innovation Output Sub-Index | 20.8 | 95 |
| Innovation Input Sub-Index | 35.1 | 94 |
| Innovation Efficiency Ratio | 0.6 | 90 |
| Global Innovation Index 2015 (out of 141) | 30.4 | 91 |

| | | | |
|----------|--|-------------|--------------|
| 1 | Institutions | 51.1 | 95 |
| 1.1 | Political environment | 41.0 | 90 |
| 1.1.1 | Political stability & safety* | 61.9 | 69 |
| 1.1.2 | Government effectiveness* | 20.2 | 105 |
| 1.2 | Regulatory environment | 53.4 | 99 |
| 1.2.1 | Regulatory quality* | 34.8 | 96 |
| 1.2.2 | Rule of law* | 24.0 | 116 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 19.4 | 82 |
| 1.3 | Business environment | 58.8 | 102 |
| 1.3.1 | Ease of starting a business* | 58.1 | 127 ○ |
| 1.3.2 | Ease of resolving insolvency* | 45.1 | 73 |
| 1.3.3 | Ease of paying taxes* | 73.1 | 74 |
| 2 | Human capital & research | 14.1 | 119 ○ |
| 2.1 | Education | 28.0 | 113 |
| 2.1.1 | Expenditure on education, % GDP ^② | 2.6 | 107 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 | School life expectancy, years ^② | 10.5 | 102 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary ^② | 28.9 | 102 |
| 2.2 | Tertiary education | 14.2 | 108 |
| 2.2.1 | Tertiary enrolment, % gross ^② | 15.9 | 95 |
| 2.2.2 | Graduates in science & engineering, % ^② | 12.5 | 93 ○ |
| 2.2.3 | Tertiary inbound mobility, % ^② | 0.1 | 105 ○ |
| 2.3 | Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 25.2 | 116 |
| 3.1 | Information & communication technologies (ICTs) | 20.6 | 113 |
| 3.1.1 | ICT access* | 37.7 | 101 |
| 3.1.2 | ICT use* | 7.8 | 108 |
| 3.1.3 | Government's online service* | 17.3 | 112 |
| 3.1.4 | E-participation* | 19.6 | 112 |
| 3.2 | General infrastructure | 26.1 | 99 |
| 3.2.1 | Electricity output, kWh/cap | 117.4 | ○ |
| 3.2.2 | Logistics performance* | 2.7 | 79 |
| 3.2.3 | Gross capital formation, % GDP | 22.5 | 59 ● |
| 3.3 | Ecological sustainability | 29.0 | 116 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.6 | 81 |
| 3.3.2 | Environmental performance* | 51.2 | 112 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 112 |
| 4 | Market sophistication | 48.4 | 44 ● |
| 4.1 | Credit | 66.7 | 9 ● |
| 4.1.1 | Ease of getting credit* | 80.0 | 14 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 54.1 | 59 ● |
| 4.1.3 | Microfinance gross loans, % GDP | 23.7 | 1 ● |

| | | | |
|----------|---|-------------|-------------|
| 4.2 | Investment | 34.3 | 73 |
| 4.2.1 | Ease of protecting minority investors* | 48.3 | 90 |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 51 |
| 4.3 | Trade, competition, & market scale | 44.3 | 114 |
| 4.3.1 | Applied tariff rate, weighted mean, % ^② | 9.9 | 116 ○ |
| 4.3.2 | Intensity of local competition [†] | 61.5 | 92 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 50.2 | 94 |
| 5 | Business sophistication | 36.5 | 42 ● |
| 5.1 | Knowledge workers | 45.3 | 43 |
| 5.1.1 | Knowledge-intensive employment, % ^② | 4.1 | 100 ○ |
| 5.1.2 | Firms offering formal training, % firms | 67.9 | 4 ● |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 37.0 | 42 ● |
| 5.2.1 | University/industry research collaboration [†] | 33.0 | 105 |
| 5.2.2 | State of cluster development [†] | 45.7 | 61 ● |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 24 ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |
| 5.3 | Knowledge absorption | 27.2 | 69 |
| 5.3.1 | Intellectual property payments, % total trade | 0.2 | 84 |
| 5.3.2 | High-tech imports less re-imports, % total trade ^② | 4.3 | 107 |
| 5.3.3 | ICT services imports, % total trade | 0.6 | 87 |
| 5.3.4 | FDI net inflows, % GDP | 10.3 | 9 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 20.9 | 85 |
| 6.1 | Knowledge creation | 3.6 | 105 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.0 | 113 ○ |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 4.7 | 98 |
| 6.1.5 | Citable documents H index | 65.0 | 104 |
| 6.2 | Knowledge impact | 42.5 | 36 ● |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 5.2 | 4 ● |
| 6.2.2 | New businesses/th pop. 15–64 ^② | 0.2 | 96 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 0.6 | 117 ○ |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 | Knowledge diffusion | 16.5 | 113 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 75 |
| 6.3.2 | High-tech exports less re-exports, % total trade ^② | 0.7 | 66 |
| 6.3.3 | ICT services exports, % total trade | 0.4 | 101 |
| 6.3.4 | FDI net outflows, % GDP ^② | 0.3 | 73 |
| 7 | Creative outputs | 20.8 | 100 |
| 7.1 | Intangible assets | 35.7 | 95 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 23.6 | 74 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.7 | 74 |
| 7.1.3 | ICTs & business model creation [†] | 56.8 | 69 |
| 7.1.4 | ICTs & organizational model creation [†] | 53.8 | 63 |
| 7.2 | Creative goods & services | 10.9 | 90 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 ^② | 1.4 | 64 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade ^② | 0.4 | 62 ● |
| 7.3 | Online creativity | 0.8 | 106 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.9 | 99 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.1 | 113 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 202.6 | 102 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Cameroon

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 23.3 |
| GDP (US\$ billions) | 28.5 |
| GDP per capita, PPP\$ | 3,143.7 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 22.8 | 118 |
| Innovation Output Sub-Index | 16.8 | 113 |
| Innovation Input Sub-Index | 28.9 | 118 |
| Innovation Efficiency Ratio | 0.6 | 93 |
| Global Innovation Index 2015 (out of 141) | 27.8 | 110 |

1 Institutions 43.0 120 ○

| | | |
|--|------|-------|
| 1.1 Political environment | 28.9 | 115 |
| 1.1.1 Political stability & safety* | 39.4 | 112 |
| 1.1.2 Government effectiveness* | 18.5 | 110 |
| 1.2 Regulatory environment | 50.0 | 108 |
| 1.2.1 Regulatory quality* | 21.5 | 117 |
| 1.2.2 Rule of law* | 25.4 | 113 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 19.9 | 85 |
| 1.3 Business environment | 50.1 | 124 ○ |
| 1.3.1 Ease of starting a business* | 77.4 | 104 |
| 1.3.2 Ease of resolving insolvency* | 36.5 | 99 |
| 1.3.3 Ease of paying taxes* | 36.3 | 123 ○ |

2 Human capital & research 18.5 105

| | | |
|--|------|-------|
| 2.1 Education | 31.2 | 108 |
| 2.1.1 Expenditure on education, % GDP | 3.0 | 99 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 19.7 | 56 ● |
| 2.1.3 School life expectancy, years ^② | 10.4 | 103 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 20.4 | 85 |
| 2.2 Tertiary education | 24.3 | 97 |
| 2.2.1 Tertiary enrolment, % gross ^② | 11.9 | 101 |
| 2.2.2 Graduates in science & engineering, % ^② | 21.0 | 48 ● |
| 2.2.3 Tertiary inbound mobility, % ^② | 1.4 | 76 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 23.5 119

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 16.8 | 119 |
| 3.1.1 ICT access* | 28.3 | 111 |
| 3.1.2 ICT use* | 3.7 | 117 ○ |
| 3.1.3 Government's online service* | 19.7 | 111 |
| 3.1.4 E-participation* | 15.7 | 118 ○ |
| 3.2 General infrastructure | 20.8 | 122 ○ |
| 3.2.1 Electricity output, kWh/cap. | 307.8 | 109 |
| 3.2.2 Logistics performance* | 2.3 | 119 ○ |
| 3.2.3 Gross capital formation, % GDP | 22.7 | 57 ● |
| 3.3 Ecological sustainability | 32.9 | 105 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.4 | 64 ● |
| 3.3.2 Environmental performance* | 57.1 | 108 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 100 |

4 Market sophistication 34.5 108

| | | |
|--|------|------|
| 4.1 Credit | 17.4 | 113 |
| 4.1.1 Ease of getting credit* | 35.0 | 101 |
| 4.1.2 Domestic credit to private sector, % GDP | 15.6 | 115 |
| 4.1.3 Microfinance gross loans, % GDP | 1.0 | 32 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 43.3 | 35 |
| 4.2.1 Ease of protecting minority investors* | 43.3 | 104 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|--|------|-------|
| 4.3 Trade, competition, & market scale | 42.7 | 117 |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 11.7 | 122 ○ |
| 4.3.2 Intensity of local competition [†] | 59.8 | 101 |
| 4.3.3 Domestic market scale, bn PPP\$ | 67.8 | 86 |

5 Business sophistication 24.9 101

| | | |
|--|------|-------|
| 5.1 Knowledge workers | 29.2 | 90 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms ^② | 25.5 | 70 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 29.5 | 73 ● |
| 5.2.1 University/industry research collaboration [†] | 39.6 | 78 |
| 5.2.2 State of cluster development [†] | 38.9 | 90 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.0 | 94 |
| 5.3 Knowledge absorption | 16.1 | 121 ○ |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.1 | 97 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.9 | 82 |
| 5.3.3 ICT services imports, % total trade ^② | 0.5 | 101 |
| 5.3.4 FDI net inflows, % GDP | 1.6 | 90 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 16.0 113

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 6.0 | 88 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.4 | 82 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 92 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 10.6 | 64 ● |
| 6.1.5 Citable documents H index | 85.0 | 88 |
| 6.2 Knowledge impact | 28.0 | 102 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.8 | 41 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.2 | 71 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.8 | 108 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 5.1 | 91 |
| 6.3 Knowledge diffusion | 14.0 | 121 ○ |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 93 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.3 | 88 |
| 6.3.3 ICT services exports, % total trade ^② | 1.3 | 72 ● |
| 6.3.4 FDI net outflows, % GDP ^② | (1.3) | 113 ○ |

7 Creative outputs 17.5 109

| | | |
|---|------|------|
| 7.1 Intangible assets | 29.2 | 112 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 7.3 | 102 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.6 | 75 |
| 7.1.3 ICTs & business model creation [†] | 51.1 | 91 |
| 7.1.4 ICTs & organizational model creation [†] | 46.2 | 85 |
| 7.2 Creative goods & services | 11.4 | 88 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.1 | 55 |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 1.8 | 56 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.3 | 46 ● |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 114 |
| 7.3 Online creativity | 0.2 | 117 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 117 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.3 | 99 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 27.5 | 117 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|------------------|
| Population (millions) | 35.9 |
| GDP (US\$ billions) | 1,552.4 |
| GDP per capita, PPP\$ | 45,552.6 |
| Income group | High income |
| Region | Northern America |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 54.7 | 15 |
| Innovation Output Sub-Index | 44.0 | 23 |
| Innovation Input Sub-Index | 65.4 | 10 |
| Innovation Efficiency Ratio | 0.7 | 57 ○ |
| Global Innovation Index 2015 (out of 141) | 55.7 | 16 |

| | | |
|--|-------------|------------|
| 1 Institutions | 91.7 | 6 ● |
| 1.1 Political environment | 90.0 | 8 ● |
| 1.1.1 Political stability & safety* | 92.1 | 8 ● |
| 1.1.2 Government effectiveness* | 87.9 | 11 |
| 1.2 Regulatory environment | 94.1 | 11 |
| 1.2.1 Regulatory quality* | 90.1 | 6 ● |
| 1.2.2 Rule of law* | 94.3 | 12 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.0 | 32 |
| 1.3 Business environment | 90.9 | 2 ● |
| 1.3.1 Ease of starting a business* | 98.2 | 3 ● |
| 1.3.2 Ease of resolving insolvency* | 81.4 | 15 |
| 1.3.3 Ease of paying taxes* | 93.0 | 9 |
| 2 Human capital & research | 52.9 | 22 |
| 2.1 Education | 42.4 | 82 ○ |
| 2.1.1 Expenditure on education, % GDP [Ⓢ] | 5.3 | 42 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓢ] | 18.3 | 64 ○ |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | 522.2 | 8 |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | n/a | n/a |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 63.5 | 14 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓢ] | 4,518.5 | 13 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.6 | 22 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 929.8 | 13 |
| 2.3.4 QS university ranking, average score top 3* | 85.6 | 4 ● |
| 3 Infrastructure | 62.3 | 11 |
| 3.1 Information & communication technologies (ICTs) | 80.8 | 11 |
| 3.1.1 ICT access* | 81.3 | 21 |
| 3.1.2 ICT use* | 68.4 | 24 |
| 3.1.3 Government's online service* | 91.3 | 10 |
| 3.1.4 E-participation* | 82.4 | 14 |
| 3.2 General infrastructure | 64.5 | 4 ● |
| 3.2.1 Electricity output, kWh/cap. | 17,991.5 | 5 ● |
| 3.2.2 Logistics performance* | 3.9 | 12 |
| 3.2.3 Gross capital formation, % GDP | 23.6 | 54 ○ |
| 3.3 Ecological sustainability | 41.7 | 69 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 5.3 | 94 ○ |
| 3.3.2 Environmental performance* | 85.1 | 25 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.3 | 54 ○ |
| 4 Market sophistication | 73.6 | 3 ● |
| 4.1 Credit | 66.9 | 8 ● |
| 4.1.1 Ease of getting credit* | 85.0 | 7 |
| 4.1.2 Domestic credit to private sector, % GDP [Ⓢ] | 124.9 | 18 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|---------|-----|
| 4.2 Investment | 74.7 | 4 ● |
| 4.2.1 Ease of protecting minority investors* | 76.7 | 6 ● |
| 4.2.2 Market capitalization, % GDP | 117.3 | 7 |
| 4.2.3 Total value of stocks traded, % GDP | 75.6 | 10 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.7 | 1 ● |
| 4.3 Trade, competition, & market scale | 79.2 | 9 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.5 | 43 |
| 4.3.2 Intensity of local competition [†] | 75.9 | 23 |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,596.0 | 15 |

5 Business sophistication **46.5** **20**

| | | |
|---|------|------|
| 5.1 Knowledge workers | 53.9 | 26 |
| 5.1.1 Knowledge-intensive employment, % | 43.7 | 16 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.8 | 24 |
| 5.1.4 GERD financed by business, % | 45.4 | 27 |
| 5.1.5 Females employed w/advanced degrees, % total | 16.3 | 36 |
| 5.2 Innovation linkages | 44.5 | 21 |
| 5.2.1 University/industry research collaboration [†] | 65.0 | 18 |
| 5.2.2 State of cluster development [†] | 63.3 | 19 |
| 5.2.3 GERD financed by abroad, % | 6.0 | 62 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 7 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 2.1 | 18 |
| 5.3 Knowledge absorption | 41.0 | 21 |
| 5.3.1 Intellectual property payments, % total trade | 1.8 | 10 |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.9 | 32 |
| 5.3.3 ICT services imports, % total trade | 1.1 | 56 ○ |
| 5.3.4 FDI net inflows, % GDP | 3.2 | 54 |
| 5.3.5 Research talent, % in business enterprise [Ⓢ] | 56.0 | 16 |

6 Knowledge & technology outputs **40.9** **23**

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 43.4 | 19 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.6 | 40 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.7 | 23 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 37.0 | 17 |
| 6.1.5 Citable documents H index | 794.0 | 5 ● |
| 6.2 Knowledge impact | 43.2 | 35 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.8 | 42 |
| 6.2.2 New businesses/th pop. 15–64 | 1.3 | 61 ○ |
| 6.2.3 Computer software spending, % GDP | 0.8 | 2 ● |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 6.0 | 54 |
| 6.2.5 High- & medium-high-tech manufactures, % | 29.4 | 39 |
| 6.3 Knowledge diffusion | 36.2 | 35 |
| 6.3.1 Intellectual property receipts, % total trade | 0.7 | 18 |
| 6.3.2 High-tech exports less re-exports, % total trade | 6.0 | 29 |
| 6.3.3 ICT services exports, % total trade | 1.6 | 64 ○ |
| 6.3.4 FDI net outflows, % GDP | 3.2 | 19 |

7 Creative outputs **47.1** **23**

| | | |
|---|---------|------|
| 7.1 Intangible assets | 50.6 | 33 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 50.0 | 44 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.5 | 78 ○ |
| 7.1.3 ICTs & business model creation [†] | 74.4 | 18 |
| 7.1.4 ICTs & organizational model creation [†] | 74.0 | 12 |
| 7.2 Creative goods & services | 25.9 | 51 |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓢ] | 0.9 | 14 |
| 7.2.2 National feature films/mn pop. 15–69 | 3.6 | 43 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 50.9 | 16 |
| 7.2.4 Printing & publishing manufactures, % | 0.4 | 89 ○ |
| 7.2.5 Creative goods exports, % total trade | 0.9 | 40 |
| 7.3 Online creativity | 61.2 | 8 ● |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 81.6 | 6 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 35.6 | 18 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,167.2 | 16 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 74.8 | 8 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓢ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Chile

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 17.9 |
| GDP (US\$ billions) | 240.2 |
| GDP per capita, PPP\$ | 23,459.6 |
| Income group | High income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 38.4 | 44 |
| Innovation Output Sub-Index | 28.6 | 53 |
| Innovation Input Sub-Index | 48.3 | 40 |
| Innovation Efficiency Ratio | 0.6 | 91 |
| Global Innovation Index 2015 (out of 141) | 41.2 | 42 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 73.6 | 36 |
| 1.1 | Political environment | 73.0 | 34 |
| 1.1.1 | Political stability & safety* | 75.1 | 43 |
| 1.1.2 | Government effectiveness* | 70.8 | 26 |
| 1.2 | Regulatory environment | 72.0 | 44 |
| 1.2.1 | Regulatory quality* | 82.0 | 17 ● |
| 1.2.2 | Rule of law* | 82.7 | 22 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 27.4 | 106 ○ |
| 1.3 | Business environment | 76.0 | 45 |
| 1.3.1 | Ease of starting a business* | 89.8 | 52 |
| 1.3.2 | Ease of resolving insolvency* | 54.2 | 55 |
| 1.3.3 | Ease of paying taxes* | 84.0 | 29 |
| 2 | Human capital & research | 32.2 | 62 |
| 2.1 | Education | 44.4 | 73 |
| 2.1.1 | Expenditure on education, % GDP | 4.6 | 66 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 15.2 | 84 ○ |
| 2.1.3 | School life expectancy, years | 16.2 | 27 |
| 2.1.4 | PISA scales in reading, maths, & science | 436.3 | 45 ○ |
| 2.1.5 | Pupil-teacher ratio, secondary ^② | 21.0 | 86 ○ |
| 2.2 | Tertiary education | 37.2 | 56 |
| 2.2.1 | Tertiary enrolment, % gross | 83.8 | 9 ● |
| 2.2.2 | Graduates in science & engineering, % ^② | 19.2 | 61 |
| 2.2.3 | Tertiary inbound mobility, % | 0.3 | 95 ○ |
| 2.3 | Research & development (R&D) | 15.0 | 49 |
| 2.3.1 | Researchers, FTE/mn pop. | 428.0 | 61 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.4 | 68 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 47.2 | 31 |
| 3 | Infrastructure | 51.7 | 38 |
| 3.1 | Information & communication technologies (ICTs) | 72.6 | 24 |
| 3.1.1 | ICT access* | 65.5 | 58 |
| 3.1.2 | ICT use* | 48.8 | 52 |
| 3.1.3 | Government's online service* | 81.9 | 16 ● |
| 3.1.4 | E-participation* | 94.1 | 7 ● |
| 3.2 | General infrastructure | 38.0 | 61 |
| 3.2.1 | Electricity output, kWh/cap. | 4,296.8 | 48 |
| 3.2.2 | Logistics performance* | 3.3 | 40 |
| 3.2.3 | Gross capital formation, % GDP | 22.3 | 60 |
| 3.3 | Ecological sustainability | 44.5 | 57 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.6 | 62 |
| 3.3.2 | Environmental performance* | 77.7 | 51 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 2.4 | 40 |
| 4 | Market sophistication | 47.1 | 47 |
| 4.1 | Credit | 33.9 | 61 |
| 4.1.1 | Ease of getting credit* | 50.0 | 69 |
| 4.1.2 | Domestic credit to private sector, % GDP | 109.4 | 23 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.7 | 34 |

| | | | |
|----------|--|-------------|-----------|
| 4.2 | Investment | 35.6 | 67 |
| 4.2.1 | Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 | Market capitalization, % GDP | 90.4 | 16 ● |
| 4.2.3 | Total value of stocks traded, % GDP | 10.5 | 34 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 84 ○ |
| 4.3 | Trade, competition, & market scale | 71.9 | 30 |
| 4.3.1 | Applied tariff rate, weighted mean, % ^② | 1.8 | 47 |
| 4.3.2 | Intensity of local competition [†] | 76.2 | 21 ● |
| 4.3.3 | Domestic market scale, bn PPP\$ | 410.9 | 41 |
| 5 | Business sophistication | 36.6 | 41 |
| 5.1 | Knowledge workers | 44.5 | 45 |
| 5.1.1 | Knowledge-intensive employment, % | 24.8 | 55 |
| 5.1.2 | Firms offering formal training, % firms ^② | 57.5 | 12 ● |
| 5.1.3 | GERD performed by business, % of GDP | 0.1 | 58 |
| 5.1.4 | GERD financed by business, % | 32.0 | 47 |
| 5.1.5 | Females employed w/advanced degrees, % total | 15.5 | 38 |
| 5.2 | Innovation linkages | 30.3 | 66 |
| 5.2.1 | University/industry research collaboration [†] | 53.3 | 38 |
| 5.2.2 | State of cluster development [†] | 44.4 | 67 |
| 5.2.3 | GERD financed by abroad, % | 13.8 | 31 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 16 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 49 |
| 5.3 | Knowledge absorption | 35.0 | 36 |
| 5.3.1 | Intellectual property payments, % total trade ^② | 1.0 | 26 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 8.3 | 53 |
| 5.3.3 | ICT services imports, % total trade ^② | 0.9 | 67 |
| 5.3.4 | FDI net inflows, % GDP | 8.5 | 16 ● |
| 5.3.5 | Research talent, % in business enterprise | 29.8 | 43 |
| 6 | Knowledge & technology outputs | 26.0 | 59 |
| 6.1 | Knowledge creation | 11.0 | 59 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.1 | 63 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.4 | 43 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP ^② | 0.2 | 41 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 17.0 | 43 |
| 6.1.5 | Citable documents H index | 233.0 | 37 |
| 6.2 | Knowledge impact | 38.8 | 52 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.3 | 86 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 8.0 | 14 ● |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 44 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 11.0 | 35 |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 | Knowledge diffusion | 28.1 | 45 |
| 6.3.1 | Intellectual property receipts, % total trade ^② | 0.1 | 55 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.9 | 65 |
| 6.3.3 | ICT services exports, % total trade ^② | 0.6 | 91 ○ |
| 6.3.4 | FDI net outflows, % GDP | 4.7 | 11 ● |
| 7 | Creative outputs | 31.2 | 55 |
| 7.1 | Intangible assets | 46.9 | 49 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 70.4 | 22 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.3 | 93 ○ |
| 7.1.3 | ICTs & business model creation [†] | 67.9 | 30 |
| 7.1.4 | ICTs & organizational model creation [†] | 56.7 | 48 |
| 7.2 | Creative goods & services | 8.6 | 99 ○ |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 2.4 | 52 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 9.0 | 35 |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.2 | 76 |
| 7.3 | Online creativity | 22.3 | 38 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 2.3 | 76 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 13.6 | 37 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 5,520.3 | 21 ● |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 32.5 | 37 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 1,376.0 |
| GDP (US\$ billions) | 10,982.8 |
| GDP per capita, PPP\$ | 14,107.4 |
| Income group | Upper-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 50.6 | 25 |
| Innovation Output Sub-Index | 48.0 | 15 |
| Innovation Input Sub-Index | 53.1 | 29 |
| Innovation Efficiency Ratio | 0.9 | 7 |
| Global Innovation Index 2015 (out of 141) | 47.5 | 29 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 55.2 | 79 |
| 1.1 Political environment | 49.9 | 66 |
| 1.1.1 Political stability & safety* | 51.3 | 88 |
| 1.1.2 Government effectiveness* | 48.5 | 49 |
| 1.2 Regulatory environment | 50.0 | 107 ○ |
| 1.2.1 Regulatory quality* | 38.1 | 84 |
| 1.2.2 Rule of law* | 38.8 | 80 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.4 | 107 ○ |
| 1.3 Business environment | 65.8 | 77 |
| 1.3.1 Ease of starting a business* | 77.5 | 103 |
| 1.3.2 Ease of resolving insolvency* | 55.4 | 52 |
| 1.3.3 Ease of paying taxes* | 64.5 | 92 |

| | | |
|---|-------------|-----------|
| 2 Human capital & research | 48.1 | 29 |
| 2.1 Education | 72.4 | 4 ● |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | 13.8 | 63 |
| 2.1.4 PISA scales in reading, maths, & science | 587.5 | 1 ● |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 15.1 | 64 |
| 2.2 Tertiary education | 14.1 | 109 ○ |
| 2.2.1 Tertiary enrolment, % gross | 30.2 | 78 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | 0.3 | 93 ○ |
| 2.3 Research & development (R&D) | 57.7 | 18 |
| 2.3.1 Researchers, FTE/mn pop. | 1,113.1 | 46 |
| 2.3.2 Gross expenditure on R&D, % GDP | 2.0 | 15 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 2,094.5 | 9 |
| 2.3.4 QS university ranking, average score top 3* | 84.4 | 7 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 52.0 | 36 |
| 3.1 Information & communication technologies (ICTs) | 54.1 | 53 |
| 3.1.1 ICT access* | 52.5 | 75 |
| 3.1.2 ICT use* | 38.4 | 63 |
| 3.1.3 Government's online service* | 60.6 | 47 |
| 3.1.4 E-participation* | 64.7 | 33 |
| 3.2 General infrastructure | 61.7 | 6 |
| 3.2.1 Electricity output, kWh/cap | 3,997.5 | 53 |
| 3.2.2 Logistics performance* | 3.5 | 27 |
| 3.2.3 Gross capital formation, % GDP | 44.3 | 4 ● |
| 3.3 Ecological sustainability | 40.1 | 76 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.6 | 102 ○ |
| 3.3.2 Environmental performance* | 65.1 | 92 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 6.5 | 16 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 56.6 | 21 |
| 4.1 Credit | 35.3 | 54 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 141.9 | 10 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 75 ○ |

| | | |
|--|----------|-------|
| 4.2 Investment | 46.6 | 29 |
| 4.2.1 Ease of protecting minority investors* | 43.3 | 104 ○ |
| 4.2.2 Market capitalization, % GDP | 58.0 | 30 |
| 4.2.3 Total value of stocks traded, % GDP | 115.5 | 1 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 33 |
| 4.3 Trade, competition, & market scale | 87.8 | 3 ● |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓓ] | 3.6 | 64 |
| 4.3.2 Intensity of local competition [†] | 73.5 | 35 |
| 4.3.3 Domestic market scale, bn PPP\$ | 18,088.1 | 1 ● |

| | | |
|---|-------------|----------|
| 5 Business sophistication | 53.8 | 7 |
| 5.1 Knowledge workers | 85.8 | 1 ● |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 79.2 | 1 ● |
| 5.1.3 GERD performed by business, % of GDP | 1.6 | 13 |
| 5.1.4 GERD financed by business, % | 75.4 | 2 ● |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 29.9 | 67 |
| 5.2.1 University/industry research collaboration [†] | 56.7 | 31 |
| 5.2.2 State of cluster development [†] | 58.8 | 23 |
| 5.2.3 GERD financed by abroad, % | 0.8 | 90 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 49 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.9 | 26 |
| 5.3 Knowledge absorption | 45.6 | 14 |
| 5.3.1 Intellectual property payments, % total trade | 1.0 | 30 |
| 5.3.2 High-tech imports less re-imports, % total trade | 18.5 | 7 |
| 5.3.3 ICT services imports, % total trade | 0.5 | 98 |
| 5.3.4 FDI net inflows, % GDP | 2.8 | 64 |
| 5.3.5 Research talent, % in business enterprise | 62.1 | 9 |

| | | |
|---|-------------|----------|
| 6 Knowledge & technology outputs | 53.3 | 6 |
| 6.1 Knowledge creation | 64.9 | 7 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 44.3 | 1 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.5 | 25 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 47.6 | 1 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 13.9 | 50 |
| 6.1.5 Citable documents H index | 495.0 | 16 |
| 6.2 Knowledge impact | 54.6 | 11 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.4 | 20 |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.4 | 23 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 19.0 | 20 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓓ] | 43.1 | 18 |
| 6.3 Knowledge diffusion | 40.4 | 25 |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 72 |
| 6.3.2 High-tech exports less re-exports, % total trade | 28.0 | 1 ● |
| 6.3.3 ICT services exports, % total trade | 0.9 | 85 |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 1.7 | 36 |

| | | |
|--|-------------|-----------|
| 7 Creative outputs | 42.7 | 30 |
| 7.1 Intangible assets | 68.0 | 3 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 114.8 | 8 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 30.3 | 1 ● |
| 7.1.3 ICTs & business model creation [†] | 62.0 | 48 |
| 7.1.4 ICTs & organizational model creation [†] | 62.3 | 30 |
| 7.2 Creative goods & services | 31.9 | 38 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 71 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 0.6 | 85 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 3.4 | 48 |
| 7.2.4 Printing & publishing manufactures, % [Ⓓ] | 0.5 | 87 ○ |
| 7.2.5 Creative goods exports, % total trade | 14.7 | 1 ● |
| 7.3 Online creativity | 3.0 | 92 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.3 | 74 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 5.5 | 50 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 149.8 | 104 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Colombia

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 48.2 |
| GDP (US\$ billions) | 293.2 |
| GDP per capita, PPP\$ | 13,846.5 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 34.2 | 63 |
| Innovation Output Sub-Index | 24.6 | 74 |
| Innovation Input Sub-Index | 43.8 | 53 |
| Innovation Efficiency Ratio | 0.6 | 96 |
| Global Innovation Index 2015 (out of 141) | 36.4 | 67 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 58.2 | 71 |
| 1.1 | Political environment | 35.5 | 100 |
| 1.1.1 | Political stability & safety* | 35.0 | 117 ○ |
| 1.1.2 | Government effectiveness* | 36.0 | 75 |
| 1.2 | Regulatory environment | 65.4 | 70 |
| 1.2.1 | Regulatory quality* | 57.2 | 51 |
| 1.2.2 | Rule of law* | 38.6 | 81 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 16.7 | 70 |
| 1.3 | Business environment | 73.8 | 55 |
| 1.3.1 | Ease of starting a business* | 86.1 | 65 |
| 1.3.2 | Ease of resolving insolvency* | 72.1 | 28 |
| 1.3.3 | Ease of paying taxes* | 63.3 | 94 |
| 2 | Human capital & research | 27.9 | 80 |
| 2.1 | Education | 38.9 | 91 |
| 2.1.1 | Expenditure on education, % GDP | 4.7 | 61 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 17.7 | 68 |
| 2.1.3 | School life expectancy, years ^② | 14.3 | 57 |
| 2.1.4 | PISA scales in reading, maths, & science | 392.9 | 58 ○ |
| 2.1.5 | Pupil-teacher ratio, secondary | 24.9 | 93 ○ |
| 2.2 | Tertiary education | 33.4 | 71 |
| 2.2.1 | Tertiary enrolment, % gross | 51.3 | 53 |
| 2.2.2 | Graduates in science & engineering, % | 22.7 | 37 |
| 2.2.3 | Tertiary inbound mobility, % | 0.0 | 106 ○ |
| 2.3 | Research & development (R&D) | 11.5 | 55 |
| 2.3.1 | Researchers, FTE/mn pop. ^② | 151.9 | 78 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.2 | 88 ○ |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 40.6 | 34 |
| 3 | Infrastructure | 52.5 | 35 |
| 3.1 | Information & communication technologies (ICTs) | 65.2 | 38 |
| 3.1.1 | ICT access* | 55.4 | 72 |
| 3.1.2 | ICT use* | 38.3 | 64 |
| 3.1.3 | Government's online service* | 78.7 | 17 ● |
| 3.1.4 | E-participation* | 88.2 | 11 ● |
| 3.2 | General infrastructure | 27.8 | 92 |
| 3.2.1 | Electricity output, kWh/cap | 1,338.7 | 88 |
| 3.2.2 | Logistics performance* | 2.6 | 92 |
| 3.2.3 | Gross capital formation, % GDP | 24.0 | 48 |
| 3.3 | Ecological sustainability | 64.5 | 5 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 16.4 | 3 ● |
| 3.3.2 | Environmental performance* | 75.9 | 56 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 5.4 | 19 ● |
| 4 | Market sophistication | 49.4 | 40 |
| 4.1 | Credit | 45.2 | 33 |
| 4.1.1 | Ease of getting credit* | 95.0 | 2 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 52.7 | 60 |
| 4.1.3 | Microfinance gross loans, % GDP | 1.7 | 21 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 33.6 | 77 |
| 4.2.1 | Ease of protecting minority investors* | 71.7 | 14 ● |
| 4.2.2 | Market capitalization, % GDP | 38.8 | 42 |
| 4.2.3 | Total value of stocks traded, % GDP | 5.5 | 43 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 74 ○ |
| 4.3 | Trade, competition, & market scale | 69.3 | 37 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 4.5 | 81 |
| 4.3.2 | Intensity of local competition [†] | 73.9 | 34 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 642.5 | 30 |
| 5 | Business sophistication | 30.8 | 70 |
| 5.1 | Knowledge workers | 42.1 | 49 |
| 5.1.1 | Knowledge-intensive employment, % ^② | 16.8 | 83 |
| 5.1.2 | Firms offering formal training, % firms ^② | 65.2 | 6 ● |
| 5.1.3 | GERD performed by business, % of GDP | 0.1 | 67 |
| 5.1.4 | GERD financed by business, % | 30.5 | 50 |
| 5.1.5 | Females employed w/advanced degrees, % total ^② | 13.2 | 46 |
| 5.2 | Innovation linkages | 21.3 | 107 ○ |
| 5.2.1 | University/industry research collaboration [†] | 48.8 | 48 |
| 5.2.2 | State of cluster development [†] | 44.9 | 62 |
| 5.2.3 | GERD financed by abroad, % | 3.2 | 73 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 73 ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 69 |
| 5.3 | Knowledge absorption | 29.1 | 61 |
| 5.3.1 | Intellectual property payments, % total trade | 0.7 | 42 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 16.2 | 10 ● |
| 5.3.3 | ICT services imports, % total trade | 0.8 | 74 |
| 5.3.4 | FDI net inflows, % GDP | 4.3 | 36 |
| 5.3.5 | Research talent, % in business enterprise ^② | 0.8 | 78 ○ |
| 6 | Knowledge & technology outputs | 21.2 | 82 |
| 6.1 | Knowledge creation | 6.0 | 87 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.4 | 81 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 56 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.3 | 40 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 5.5 | 91 |
| 6.1.5 | Citable documents H index | 169.0 | 45 |
| 6.2 | Knowledge impact | 38.8 | 51 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 2.3 | 34 |
| 6.2.2 | New businesses/th pop. 15–64 ^② | 2.0 | 48 |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 58 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 22.6 | 16 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % | 20.0 | 58 |
| 6.3 | Knowledge diffusion | 18.8 | 103 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 56 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 1.1 | 64 |
| 6.3.3 | ICT services exports, % total trade | 0.3 | 107 ○ |
| 6.3.4 | FDI net outflows, % GDP | 1.0 | 48 |
| 7 | Creative outputs | 27.9 | 68 |
| 7.1 | Intangible assets | 39.1 | 79 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 31.0 | 65 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.4 | 83 |
| 7.1.3 | ICTs & business model creation [†] | 60.7 | 55 |
| 7.1.4 | ICTs & organizational model creation [†] | 58.2 | 42 |
| 7.2 | Creative goods & services | 18.4 | 73 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 53 |
| 7.2.2 | National feature films/mn pop. 15–69 | 0.8 | 81 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 4.3 | 47 |
| 7.2.4 | Printing & publishing manufactures, % | 2.2 | 19 ● |
| 7.2.5 | Creative goods exports, % total trade | 0.2 | 75 |
| 7.3 | Online creativity | 15.2 | 48 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 3.1 | 64 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 21.0 | 29 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 2,259.6 | 49 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 20.0 | 51 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 4.8 |
| GDP (US\$ billions) | 52.9 |
| GDP per capita, PPP\$ | 15,482.3 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 38.4 | 45 |
| Innovation Output Sub-Index | 31.9 | 44 |
| Innovation Input Sub-Index | 44.9 | 50 |
| Innovation Efficiency Ratio | 0.7 | 50 |
| Global Innovation Index 2015 (out of 141) | 38.6 | 51 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 66.7 | 53 |
| 1.1 | Political environment | 64.3 | 44 |
| 1.1.1 | Political stability & safety* | 78.5 | 37 |
| 1.1.2 | Government effectiveness* | 50.1 | 45 |
| 1.2 | Regulatory environment | 68.8 | 55 |
| 1.2.1 | Regulatory quality* | 57.9 | 48 |
| 1.2.2 | Rule of law* | 59.9 | 42 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 18.7 | 78 |
| 1.3 | Business environment | 66.9 | 73 |
| 1.3.1 | Ease of starting a business* | 81.0 | 90 |
| 1.3.2 | Ease of resolving insolvency* | 44.1 | 78 |
| 1.3.3 | Ease of paying taxes* | 75.7 | 65 |
| 2 | Human capital & research | 32.1 | 64 |
| 2.1 | Education | 61.2 | 18 ● |
| 2.1.1 | Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 | School life expectancy, years | 15.1 | 43 |
| 2.1.4 | PISA scales in reading, maths, & science | 425.6 | 46 |
| 2.1.5 | Pupil-teacher ratio, secondary | 14.4 | 60 |
| 2.2 | Tertiary education | 31.1 | 79 |
| 2.2.1 | Tertiary enrolment, % gross | 53.0 | 50 |
| 2.2.2 | Graduates in science & engineering, % | 13.1 | 91 ○ |
| 2.2.3 | Tertiary inbound mobility, % | n/a | n/a |
| 2.3 | Research & development (R&D) | 4.1 | 76 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓔ] | 357.8 | 64 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓔ] | 0.6 | 57 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 47.4 | 52 |
| 3.1 | Information & communication technologies (ICTs) | 64.5 | 40 |
| 3.1.1 | ICT access* | 63.0 | 60 |
| 3.1.2 | ICT use* | 51.2 | 48 |
| 3.1.3 | Government's online service* | 61.4 | 43 |
| 3.1.4 | E-participation* | 82.4 | 14 ● |
| 3.2 | General infrastructure | 25.5 | 103 |
| 3.2.1 | Electricity output, kWh/cap | 2,101.6 | 76 |
| 3.2.2 | Logistics performance* | 2.7 | 82 |
| 3.2.3 | Gross capital formation, % GDP | 19.7 | 89 |
| 3.3 | Ecological sustainability | 52.1 | 30 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 12.0 | 15 ● |
| 3.3.2 | Environmental performance* | 80.0 | 42 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.3 | 57 |
| 4 | Market sophistication | 38.1 | 96 |
| 4.1 | Credit | 35.8 | 52 |
| 4.1.1 | Ease of getting credit* | 85.0 | 7 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 55.1 | 55 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.1 | 56 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 18.9 | 128 ○ |
| 4.2.1 | Ease of protecting minority investors* | 35.0 | 121 ○ |
| 4.2.2 | Market capitalization, % GDP [Ⓔ] | 3.6 | 91 ○ |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 60 |
| 4.3 | Trade, competition, & market scale | 59.7 | 70 |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓔ] | 2.8 | 59 |
| 4.3.2 | Intensity of local competition [†] | 70.8 | 53 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 71.2 | 84 |
| 5 | Business sophistication | 40.4 | 33 |
| 5.1 | Knowledge workers | 37.8 | 66 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓔ] | 25.0 | 53 |
| 5.1.2 | Firms offering formal training, % firms [Ⓔ] | 54.7 | 19 |
| 5.1.3 | GERD performed by business, % of GDP [Ⓔ] | 0.2 | 53 |
| 5.1.4 | GERD financed by business, % [Ⓔ] | 5.0 | 79 ○ |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓔ] | 13.2 | 47 |
| 5.2 | Innovation linkages | 29.7 | 72 |
| 5.2.1 | University/industry research collaboration [†] | 56.0 | 32 |
| 5.2.2 | State of cluster development [†] | 50.4 | 41 |
| 5.2.3 | GERD financed by abroad, % [Ⓔ] | 7.3 | 55 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 64 |
| 5.3 | Knowledge absorption | 53.6 | 5 ● |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 62 |
| 5.3.2 | High-tech imports less re-imports, % total trade [Ⓔ] | 23.7 | 1 ● |
| 5.3.3 | ICT services imports, % total trade | 0.5 | 96 |
| 5.3.4 | FDI net inflows, % GDP | 5.2 | 28 |
| 5.3.5 | Research talent, % in business enterprise [Ⓔ] | 69.2 | 4 ● |
| 6 | Knowledge & technology outputs | 26.8 | 57 |
| 6.1 | Knowledge creation | 4.0 | 99 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.2 | 92 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 63 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.1 | 58 ○ |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 6.8 | 79 |
| 6.1.5 | Citable documents H index | 127.0 | 61 |
| 6.2 | Knowledge impact | 25.2 | 108 ○ |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.1 | 88 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 1.1 | 66 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 46 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 3.5 | 70 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 11.7 | 73 |
| 6.3 | Knowledge diffusion | 51.1 | 9 ● |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 76 |
| 6.3.2 | High-tech exports less re-exports, % total trade [Ⓔ] | 19.1 | 6 ● |
| 6.3.3 | ICT services exports, % total trade | 10.3 | 1 ● |
| 6.3.4 | FDI net outflows, % GDP | 1.0 | 49 |
| 7 | Creative outputs | 37.0 | 39 |
| 7.1 | Intangible assets | 46.5 | 52 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 71.9 | 21 ● |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.1 | 105 ○ |
| 7.1.3 | ICTs & business model creation [†] | 63.2 | 43 |
| 7.1.4 | ICTs & organizational model creation [†] | 59.7 | 39 |
| 7.2 | Creative goods & services | 44.5 | 12 ● |
| 7.2.1 | Cultural & creative services exports, % of total trade | 7.0 | 1 ● |
| 7.2.2 | National feature films/mn pop. 15–69 | 0.6 | 86 ○ |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 2.7 | 9 ● |
| 7.2.5 | Creative goods exports, % total trade [Ⓔ] | 0.7 | 54 |
| 7.3 | Online creativity | 10.2 | 59 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 12.3 | 37 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.9 | 68 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 2,245.2 | 50 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Côte d'Ivoire

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 22.7 |
| GDP (US\$ billions) | 31.2 |
| GDP per capita, PPP\$ | 3,315.8 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 25.8 | 108 |
| Innovation Output Sub-Index | 23.3 | 81 |
| Innovation Input Sub-Index | 28.3 | 121 ○ |
| Innovation Efficiency Ratio | 0.8 | 19 ● |
| Global Innovation Index 2015 (out of 141) | 27.2 | 116 |

1 Institutions 49.4 **98**

| | | |
|--|------|-------|
| 1.1 Political environment | 27.5 | 116 |
| 1.1.1 Political stability & safety* | 37.6 | 115 |
| 1.1.2 Government effectiveness* | 17.3 | 114 |
| 1.2 Regulatory environment | 60.3 | 79 |
| 1.2.1 Regulatory quality* | 29.3 | 104 |
| 1.2.2 Rule of law* | 31.9 | 98 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.1 | 52 ● |
| 1.3 Business environment | 60.4 | 95 |
| 1.3.1 Ease of starting a business* | 91.4 | 40 ● |
| 1.3.2 Ease of resolving insolvency* | 47.0 | 68 ● |
| 1.3.3 Ease of paying taxes* | 42.7 | 120 ○ |

2 Human capital & research 14.5 **116**

| | | |
|---|------|-------|
| 2.1 Education | 35.6 | 99 |
| 2.1.1 Expenditure on education, % GDP | 4.7 | 60 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 25.7 | 31 ● |
| 2.1.3 School life expectancy, years | 8.8 | 109 ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 22.3 | 89 |
| 2.2 Tertiary education | 7.9 | 115 ○ |
| 2.2.1 Tertiary enrolment, % gross | 8.7 | 108 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | 1.7 | 71 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 24.0 **118** ○

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 20.6 | 112 |
| 3.1.1 ICT access* | 34.4 | 104 |
| 3.1.2 ICT use* | 13.2 | 102 |
| 3.1.3 Government's online service* | 17.3 | 112 |
| 3.1.4 E-participation* | 17.6 | 115 ○ |
| 3.2 General infrastructure | 23.0 | 114 |
| 3.2.1 Electricity output, kWh/cap | 372.4 | 106 |
| 3.2.2 Logistics performance* | 2.8 | 76 |
| 3.2.3 Gross capital formation, % GDP | 18.5 | 96 |
| 3.3 Ecological sustainability | 28.2 | 117 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.3 | 106 |
| 3.3.2 Environmental performance* | 59.9 | 102 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 99 |

4 Market sophistication 29.5 **121** ○

| | | |
|--|------|-------|
| 4.1 Credit | 13.3 | 119 ○ |
| 4.1.1 Ease of getting credit* | 30.0 | 106 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 20.3 | 108 |
| 4.1.3 Microfinance gross loans, % GDP | 0.3 | 47 |

| | | |
|--|------|-------|
| 4.2 Investment | 24.0 | 119 ○ |
| 4.2.1 Ease of protecting minority investors* | 38.3 | 115 ○ |
| 4.2.2 Market capitalization, % GDP | 34.1 | 47 ● |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 61 |

4.3 Trade, competition, & market scale 51.1 **99**

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 6.6 | 97 |
| 4.3.2 Intensity of local competition† | 60.1 | 100 |
| 4.3.3 Domestic market scale, bn PPP\$ | 71.7 | 83 |

5 Business sophistication 24.1 **104**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 20.7 | 114 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms ^② | 19.1 | 81 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 33.8 **52**

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration† | 39.0 | 81 |
| 5.2.2 State of cluster development† | 31.2 | 117 ○ |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption 17.7 **115**

| | | |
|--|-----|-----|
| 5.3.1 Intellectual property payments, % total trade ^② | 0.2 | 87 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.9 | 81 |
| 5.3.3 ICT services imports, % total trade ^② | 0.8 | 75 |
| 5.3.4 FDI net inflows, % GDP | 1.3 | 94 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 27.1 **53** ●

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 2.9 | 115 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 84 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 86 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 3.0 | 109 |
| 6.1.5 Citable documents H index | 82.0 | 91 |

6.2 Knowledge impact 56.4 **[4]**

| | | |
|--|-----|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 5.1 | 5 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.8 | 92 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 22.0 **80**

| | | |
|--|-------|------|
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.1 | 49 ● |
| 6.3.3 ICT services exports, % total trade ^② | 0.9 | 82 |
| 6.3.4 FDI net outflows, % GDP ^② | (0.0) | 99 |

7 Creative outputs 19.5 **105**

| | | |
|---|------|------|
| 7.1 Intangible assets | 35.9 | 94 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 9.7 | 99 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.9 | 41 ● |
| 7.1.3 ICTs & business model creation† | 57.2 | 68 |
| 7.1.4 ICTs & organizational model creation† | 55.7 | 56 ● |

7.2 Creative goods & services 6.1 **104**

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 79 |

7.3 Online creativity 0.3 **113**

| | | |
|--|------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.6 | 108 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.2 | 103 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 23.7 | 119 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 4.2 |
| GDP (US\$ billions) | 48.9 |
| GDP per capita, PPP\$ | 21,581.4 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 38.3 | 47 |
| Innovation Output Sub-Index | 30.2 | 48 |
| Innovation Input Sub-Index | 46.4 | 45 |
| Innovation Efficiency Ratio | 0.7 | 68 |
| Global Innovation Index 2015 (out of 141) | 41.7 | 40 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 70.9 | 42 |
| 1.1 Political environment | 68.1 | 41 |
| 1.1.1 Political stability & safety* | 77.8 | 40 |
| 1.1.2 Government effectiveness* | 58.3 | 40 |
| 1.2 Regulatory environment | 70.4 | 48 |
| 1.2.1 Regulatory quality* | 54.7 | 55 |
| 1.2.2 Rule of law* | 54.9 | 50 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.1 | 63 |
| 1.3 Business environment | 74.4 | 53 |
| 1.3.1 Ease of starting a business* | 86.2 | 64 |
| 1.3.2 Ease of resolving insolvency* | 53.9 | 56 |
| 1.3.3 Ease of paying taxes* | 83.0 | 34 |
| 2 Human capital & research | 35.7 | 50 |
| 2.1 Education | 59.1 | 26 ● |
| 2.1.1 Expenditure on education, % GDP [Ⓓ] | 4.2 | 78 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years [Ⓓ] | 14.9 | 50 |
| 2.1.4 PISA scales in reading, maths, & science | 482.4 | 33 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 7.8 | 2 ● |
| 2.2 Tertiary education | 37.6 | 54 |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 61.7 | 40 |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 23.8 | 32 |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 0.5 | 89 ○ |
| 2.3 Research & development (R&D) | 10.4 | 58 |
| 2.3.1 Researchers, FTE/mn pop. | 1,437.3 | 41 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.8 | 41 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 6.8 | 64 |
| 3 Infrastructure | 48.4 | 47 |
| 3.1 Information & communication technologies (ICTs) | 52.9 | 57 |
| 3.1.1 ICT access* | 73.3 | 38 |
| 3.1.2 ICT use* | 58.5 | 35 |
| 3.1.3 Government's online service* | 46.5 | 70 |
| 3.1.4 E-participation* | 33.3 | 89 ○ |
| 3.2 General infrastructure | 29.5 | 82 |
| 3.2.1 Electricity output, kWh/cap | 3,128.2 | 60 |
| 3.2.2 Logistics performance* | 3.1 | 53 |
| 3.2.3 Gross capital formation, % GDP | 17.7 | 101 ○ |
| 3.3 Ecological sustainability | 62.9 | 8 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.8 | 45 |
| 3.3.2 Environmental performance* | 87.0 | 15 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 10.7 | 7 ● |
| 4 Market sophistication | 42.2 | 73 |
| 4.1 Credit | 27.2 | 85 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 |
| 4.1.2 Domestic credit to private sector, % GDP | 69.5 | 42 |
| 4.1.3 Microfinance gross loans, % GDP [Ⓓ] | 0.0 | 73 ○ |

| | | |
|---|-------------|-----------|
| 4.2 Investment | 37.8 | 61 |
| 4.2.1 Ease of protecting minority investors* | 65.0 | 28 |
| 4.2.2 Market capitalization, % GDP [Ⓓ] | 38.6 | 43 |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 65 ○ |
| 4.3 Trade, competition, & market scale | 61.8 | 61 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.3 | 40 |
| 4.3.2 Intensity of local competition [†] | 64.9 | 81 |
| 4.3.3 Domestic market scale, bn PPP\$ | 88.7 | 76 |
| 5 Business sophistication | 34.6 | 50 |
| 5.1 Knowledge workers | 49.3 | 33 |
| 5.1.1 Knowledge-intensive employment, % | 35.7 | 35 |
| 5.1.2 Firms offering formal training, % firms | 49.3 | 26 |
| 5.1.3 GERD performed by business, % of GDP | 0.4 | 39 |
| 5.1.4 GERD financed by business, % | 42.9 | 31 |
| 5.1.5 Females employed w/advanced degrees, % total | 15.0 | 39 |
| 5.2 Innovation linkages | 24.5 | 86 |
| 5.2.1 University/industry research collaboration [†] | 39.9 | 77 |
| 5.2.2 State of cluster development [†] | 34.1 | 107 ○ |
| 5.2.3 GERD financed by abroad, % | 12.8 | 36 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 50 |
| 5.3 Knowledge absorption | 29.9 | 55 |
| 5.3.1 Intellectual property payments, % total trade | 1.1 | 25 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.9 | 68 |
| 5.3.3 ICT services imports, % total trade | 1.4 | 39 |
| 5.3.4 FDI net inflows, % GDP | 6.9 | 18 ● |
| 5.3.5 Research talent, % in business enterprise | 15.1 | 59 ○ |
| 6 Knowledge & technology outputs | 26.5 | 58 |
| 6.1 Knowledge creation | 19.3 | 45 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.1 | 46 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.3 | 46 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.9 | 27 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 33.8 | 20 ● |
| 6.1.5 Citable documents H index | 177.0 | 43 |
| 6.2 Knowledge impact | 39.1 | 50 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (3.0) | 107 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 4.6 | 25 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 31.6 | 7 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 21.0 | 88 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 58 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.5 | 38 |
| 6.3.3 ICT services exports, % total trade | 1.9 | 50 |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | (0.3) | 109 ○ |
| 7 Creative outputs | 33.9 | 48 |
| 7.1 Intangible assets | 45.6 | 57 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 55.1 | 37 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 7.1 | 18 ● |
| 7.1.3 ICTs & business model creation [†] | 55.2 | 76 |
| 7.1.4 ICTs & organizational model creation [†] | 55.1 | 59 |
| 7.2 Creative goods & services | 24.5 | 57 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.2 | 39 |
| 7.2.2 National feature films/mn pop. 15–69 | 8.5 | 18 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.8 | 45 |
| 7.3 Online creativity | 20.0 | 43 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 14.9 | 32 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 10.7 | 39 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,562.7 | 37 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 27.9 | 45 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 1.2 |
| GDP (US\$ billions) | 19.3 |
| GDP per capita, PPP\$ | 32,785.5 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 46.3 | 31 |
| Innovation Output Sub-Index | 40.8 | 29 |
| Innovation Input Sub-Index | 51.9 | 33 |
| Innovation Efficiency Ratio | 0.8 | 26 |
| Global Innovation Index 2015 (out of 141) | 43.5 | 34 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 81.6 | 20 |
| 1.1 | Political environment | 75.3 | 27 |
| 1.1.1 | Political stability & safety* | 79.9 | 35 |
| 1.1.2 | Government effectiveness* | 70.6 | 28 |
| 1.2 | Regulatory environment | 86.3 | 19 |
| 1.2.1 | Regulatory quality* | 71.9 | 28 |
| 1.2.2 | Rule of law* | 73.5 | 28 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 | Business environment | 83.3 | 22 |
| 1.3.1 | Ease of starting a business* | 89.2 | 53 |
| 1.3.2 | Ease of resolving insolvency* | 79.0 | 16 |
| 1.3.3 | Ease of paying taxes* | 81.7 | 38 |
| 2 | Human capital & research | 38.7 | 44 |
| 2.1 | Education | 63.1 | 14 |
| 2.1.1 | Expenditure on education, % GDP ^② | 6.6 | 19 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap ^② | 38.3 | 9 ● |
| 2.1.3 | School life expectancy, years | 14.2 | 58 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 9.7 | 23 |
| 2.2 | Tertiary education | 48.4 | 21 |
| 2.2.1 | Tertiary enrolment, % gross | 53.1 | 49 |
| 2.2.2 | Graduates in science & engineering, % | 19.0 | 64 |
| 2.2.3 | Tertiary inbound mobility, % | 14.3 | 10 ● |
| 2.3 | Research & development (R&D) | 4.8 | 75 |
| 2.3.1 | Researchers, FTE/mn pop. | 749.8 | 50 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.5 | 62 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 41.6 | 71 |
| 3.1 | Information & communication technologies (ICTs) | 49.5 | 68 |
| 3.1.1 | ICT access* | 70.4 | 48 |
| 3.1.2 | ICT use* | 48.9 | 51 |
| 3.1.3 | Government's online service* | 47.2 | 68 |
| 3.1.4 | E-participation* | 31.4 | 97 ○ |
| 3.2 | General infrastructure | 25.8 | 101 ○ |
| 3.2.1 | Electricity output, kWh/cap. | 4,931.0 | 41 |
| 3.2.2 | Logistics performance* | 3.0 | 56 |
| 3.2.3 | Gross capital formation, % GDP | 11.9 | 122 ○ |
| 3.3 | Ecological sustainability | 49.5 | 43 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.0 | 31 |
| 3.3.2 | Environmental performance* | 80.2 | 40 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 2.0 | 47 |
| 4 | Market sophistication | 56.8 | 20 |
| 4.1 | Credit | 82.5 | 4 ● |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 251.5 | 1 ● |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 30.8 | 90 |
| 4.2.1 | Ease of protecting minority investors* | 66.7 | 25 |
| 4.2.2 | Market capitalization, % GDP | 17.4 | 69 ○ |
| 4.2.3 | Total value of stocks traded, % GDP | 0.2 | 70 ○ |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 38 |
| 4.3 | Trade, competition, & market scale | 57.2 | 79 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 71.5 | 45 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 27.5 | 109 ○ |
| 5 | Business sophistication | 40.6 | 32 |
| 5.1 | Knowledge workers | 40.6 | 54 |
| 5.1.1 | Knowledge-intensive employment, % | 35.8 | 34 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | 0.1 | 60 |
| 5.1.4 | GERD financed by business, % ^② | 12.1 | 68 |
| 5.1.5 | Females employed w/advanced degrees, % total | 24.1 | 10 |
| 5.2 | Innovation linkages | 41.6 | 28 |
| 5.2.1 | University/industry research collaboration [†] | 53.2 | 39 |
| 5.2.2 | State of cluster development [†] | 48.2 | 51 |
| 5.2.3 | GERD financed by abroad, % ^② | 19.6 | 22 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 5 ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.7 | 28 |
| 5.3 | Knowledge absorption | 39.7 | 24 |
| 5.3.1 | Intellectual property payments, % total trade | 0.5 | 51 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 3.3 | 114 ○ |
| 5.3.3 | ICT services imports, % total trade | 7.4 | 1 ● |
| 5.3.4 | FDI net inflows, % GDP | 3.7 | 45 |
| 5.3.5 | Research talent, % in business enterprise | 20.8 | 54 |
| 6 | Knowledge & technology outputs | 42.4 | 20 |
| 6.1 | Knowledge creation | 25.2 | 36 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.9 | 49 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 1.8 | 22 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 37.2 | 16 |
| 6.1.5 | Citable documents H index | 113.0 | 70 |
| 6.2 | Knowledge impact | 43.2 | 34 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | (0.4) | 95 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 13.7 | 7 ● |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 10.0 | 37 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 13.8 | 69 |
| 6.3 | Knowledge diffusion | 58.7 | 6 ● |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 69 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.5 | 77 |
| 6.3.3 | ICT services exports, % total trade | 9.1 | 1 ● |
| 6.3.4 | FDI net outflows, % GDP | 9.9 | 7 ● |
| 7 | Creative outputs | 39.2 | 35 |
| 7.1 | Intangible assets | 43.4 | 61 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 68.1 | 25 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 3.1 | 38 |
| 7.1.3 | ICTs & business model creation [†] | 55.7 | 73 |
| 7.1.4 | ICTs & organizational model creation [†] | 50.2 | 75 |
| 7.2 | Creative goods & services | 30.6 | 41 |
| 7.2.1 | Cultural & creative services exports, % of total trade ^② | 0.6 | 22 |
| 7.2.2 | National feature films/mn pop. 15–69 | 2.3 | 53 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 2.9 | 7 ● |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 109 ○ |
| 7.3 | Online creativity | 39.5 | 23 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 73.1 | 8 ● |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 5.5 | 51 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 5,408.8 | 22 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 10.5 |
| GDP (US\$ billions) | 181.9 |
| GDP per capita, PPP\$ | 31,549.5 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 49.4 | 27 |
| Innovation Output Sub-Index | 44.5 | 21 |
| Innovation Input Sub-Index | 54.3 | 26 |
| Innovation Efficiency Ratio | 0.8 | 21 |
| Global Innovation Index 2015 (out of 141) | 51.3 | 24 |

| | | |
|---|-------------|-----------|
| 1 Institutions | 76.1 | 30 |
| 1.1 Political environment | 77.2 | 23 |
| 1.1.1 Political stability & safety* | 86.9 | 22 |
| 1.1.2 Government effectiveness* | 67.5 | 32 |
| 1.2 Regulatory environment | 74.3 | 40 |
| 1.2.1 Regulatory quality* | 70.1 | 31 |
| 1.2.2 Rule of law* | 75.5 | 25 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 20.2 | 86 ○ |
| 1.3 Business environment | 76.7 | 43 |
| 1.3.1 Ease of starting a business* | 85.2 | 71 |
| 1.3.2 Ease of resolving insolvency* | 77.7 | 20 |
| 1.3.3 Ease of paying taxes* | 67.1 | 87 ○ |
| 2 Human capital & research | 48.3 | 28 |
| 2.1 Education | 54.8 | 40 |
| 2.1.1 Expenditure on education, % GDP | 4.3 | 75 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 25.4 | 33 |
| 2.1.3 School life expectancy, years | 16.7 | 18 |
| 2.1.4 PISA scales in reading, maths, & science | 500.0 | 19 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓢ] | 11.5 | 40 |
| 2.2 Tertiary education | 49.3 | 19 |
| 2.2.1 Tertiary enrolment, % gross | 65.4 | 32 |
| 2.2.2 Graduates in science & engineering, % | 23.2 | 35 |
| 2.2.3 Tertiary inbound mobility, % | 9.4 | 18 |
| 2.3 Research & development (R&D) | 40.6 | 27 |
| 2.3.1 Researchers, FTE/mn pop. | 3,418.5 | 25 |
| 2.3.2 Gross expenditure on R&D, % GDP | 2.0 | 17 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 38.5 | 39 |
| 2.3.4 QS university ranking, average score top 3* | 34.0 | 38 |
| 3 Infrastructure | 53.7 | 31 |
| 3.1 Information & communication technologies (ICTs) | 49.9 | 66 |
| 3.1.1 ICT access* | 74.1 | 37 |
| 3.1.2 ICT use* | 62.9 | 29 |
| 3.1.3 Government's online service* | 37.0 | 85 ○ |
| 3.1.4 E-participation* | 25.5 | 104 ○ |
| 3.2 General infrastructure | 49.6 | 25 |
| 3.2.1 Electricity output, kWh/cap | 8,066.4 | 21 |
| 3.2.2 Logistics performance* | 3.5 | 31 |
| 3.2.3 Gross capital formation, % GDP | 26.3 | 35 |
| 3.3 Ecological sustainability | 61.6 | 11 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.3 | 85 ○ |
| 3.3.2 Environmental performance* | 84.7 | 27 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 18.5 | 1 ● |
| 4 Market sophistication | 50.5 | 31 |
| 4.1 Credit | 44.3 | 36 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 50.4 | 63 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|-------------|-------------|
| 4.2 Investment | 34.8 | 71 |
| 4.2.1 Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 Market capitalization, % GDP [Ⓢ] | 36.5 | 45 |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 53 |
| 4.3 Trade, competition, & market scale | 72.4 | 27 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 79.1 | 13 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 315.9 | 48 |
| 5 Business sophistication | 42.9 | 26 |
| 5.1 Knowledge workers | 52.9 | 28 |
| 5.1.1 Knowledge-intensive employment, % | 37.9 | 28 |
| 5.1.2 Firms offering formal training, % firms | 55.1 | 17 |
| 5.1.3 GERD performed by business, % of GDP | 1.1 | 17 |
| 5.1.4 GERD financed by business, % [Ⓢ] | 37.6 | 40 |
| 5.1.5 Females employed w/advanced degrees, % total | 11.1 | 59 ○ |
| 5.2 Innovation linkages | 33.7 | 53 |
| 5.2.1 University/industry research collaboration [†] | 50.0 | 41 |
| 5.2.2 State of cluster development [†] | 48.0 | 52 |
| 5.2.3 GERD financed by abroad, % [Ⓢ] | 27.2 | 15 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 65 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.7 | 30 |
| 5.3 Knowledge absorption | 41.9 | 19 ● |
| 5.3.1 Intellectual property payments, % total trade | 0.7 | 41 |
| 5.3.2 High-tech imports less re-imports, % total trade | 15.9 | 11 ● |
| 5.3.3 ICT services imports, % total trade | 1.2 | 47 |
| 5.3.4 FDI net inflows, % GDP | 2.4 | 71 |
| 5.3.5 Research talent, % in business enterprise | 50.7 | 22 |
| 6 Knowledge & technology outputs | 42.8 | 19 ● |
| 6.1 Knowledge creation | 46.0 | 17 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 3.4 | 34 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.6 | 31 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 4.6 | 6 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 35.2 | 18 ● |
| 6.1.5 Citable documents H index | 294.0 | 32 |
| 6.2 Knowledge impact | 51.5 | 15 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.4 | 52 |
| 6.2.2 New businesses/th pop. 15–64 | 3.4 | 35 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 38 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 41.9 | 4 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 43.2 | 17 |
| 6.3 Knowledge diffusion | 31.0 | 37 |
| 6.3.1 Intellectual property receipts, % total trade | 0.3 | 27 |
| 6.3.2 High-tech exports less re-exports, % total trade | 16.3 | 8 ● |
| 6.3.3 ICT services exports, % total trade | 1.8 | 53 |
| 6.3.4 FDI net outflows, % GDP | (0.8) | 112 ○ |
| 7 Creative outputs | 46.2 | 24 |
| 7.1 Intangible assets | 52.4 | 26 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 64.6 | 30 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 6.0 | 24 |
| 7.1.3 ICTs & business model creation [†] | 67.4 | 34 |
| 7.1.4 ICTs & organizational model creation [†] | 64.5 | 28 |
| 7.2 Creative goods & services | 42.5 | 13 ● |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓢ] | 0.5 | 24 |
| 7.2.2 National feature films/mn pop. 15–69 | 5.7 | 31 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 19.1 | 26 |
| 7.2.4 Printing & publishing manufactures, % | 1.1 | 61 ○ |
| 7.2.5 Creative goods exports, % total trade | 10.0 | 4 ● |
| 7.3 Online creativity | 37.6 | 24 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 17.9 | 30 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 57.0 | 15 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,275.3 | 41 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 51.4 | 20 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓢ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Denmark

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 5.7 |
| GDP (US\$ billions) | 295.0 |
| GDP per capita, PPP\$ | 45,709.4 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|----------|
| Global Innovation Index (out of 128) | 58.5 | 8 |
| Innovation Output Sub-Index | 49.8 | 13 |
| Innovation Input Sub-Index | 67.1 | 8 |
| Innovation Efficiency Ratio | 0.7 | 34 |
| Global Innovation Index 2015 (out of 141) | 57.7 | 10 |

| | | | |
|----------|--|-------------|------------|
| 1 | Institutions | 91.6 | 7 |
| 1.1 | Political environment | 87.8 | 13 |
| 1.1.1 | Political stability & safety* | 86.3 | 23 |
| 1.1.2 | Government effectiveness* | 89.2 | 9 |
| 1.2 | Regulatory environment | 96.6 | 4 ● |
| 1.2.1 | Regulatory quality* | 87.3 | 12 |
| 1.2.2 | Rule of law* | 99.3 | 2 ● |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 | Business environment | 90.3 | 5 ● |
| 1.3.1 | Ease of starting a business* | 94.0 | 28 |
| 1.3.2 | Ease of resolving insolvency* | 84.8 | 8 |
| 1.3.3 | Ease of paying taxes* | 91.9 | 12 |
| 2 | Human capital & research | 65.8 | 4 ● |
| 2.1 | Education | 70.9 | 8 |
| 2.1.1 | Expenditure on education, % GDP ^② | 8.5 | 3 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap ^② | 29.4 | 21 |
| 2.1.3 | School life expectancy, years | 19.2 | 4 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 498.2 | 22 |
| 2.1.5 | Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 | Tertiary education | 50.8 | 17 |
| 2.2.1 | Tertiary enrolment, % gross | 81.2 | 12 |
| 2.2.2 | Graduates in science & engineering, % | 20.4 | 52 ○ |
| 2.2.3 | Tertiary inbound mobility, % | 10.1 | 15 |
| 2.3 | Research & development (R&D) | 75.6 | 7 |
| 2.3.1 | Researchers, FTE/mn pop. | 7,198.2 | 2 ● |
| 2.3.2 | Gross expenditure on R&D, % GDP | 3.1 | 6 ● |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 696.5 | 15 |
| 2.3.4 | QS university ranking, average score top 3* | 70.0 | 14 |
| 3 | Infrastructure | 58.8 | 21 |
| 3.1 | Information & communication technologies (ICTs) | 74.1 | 22 |
| 3.1.1 | ICT access* | 87.2 | 13 |
| 3.1.2 | ICT use* | 88.3 | 1 ● |
| 3.1.3 | Government's online service* | 66.1 | 35 |
| 3.1.4 | E-participation* | 54.9 | 54 ○ |
| 3.2 | General infrastructure | 44.3 | 35 |
| 3.2.1 | Electricity output, kWh/cap. | 5,656.9 | 33 |
| 3.2.2 | Logistics performance* | 3.8 | 17 |
| 3.2.3 | Gross capital formation, % GDP | 19.9 | 86 ○ |
| 3.3 | Ecological sustainability | 57.9 | 20 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.4 | 18 |
| 3.3.2 | Environmental performance* | 89.2 | 4 ● |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 3.6 | 25 |
| 4 | Market sophistication | 71.3 | 6 ● |
| 4.1 | Credit | 70.3 | 7 |
| 4.1.1 | Ease of getting credit* | 70.0 | 27 |
| 4.1.2 | Domestic credit to private sector, % GDP | 178.7 | 5 ● |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 74.4 | 5 ● |
| 4.2.1 | Ease of protecting minority investors* | 68.3 | 20 |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.2 | 8 |
| 4.3 | Trade, competition, & market scale | 69.4 | 36 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 71.7 | 44 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 250.7 | 55 |
| 5 | Business sophistication | 47.9 | 17 |
| 5.1 | Knowledge workers | 67.7 | 7 |
| 5.1.1 | Knowledge-intensive employment, % | 45.3 | 11 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | 2.0 | 8 |
| 5.1.4 | GERD financed by business, % | 57.9 | 12 |
| 5.1.5 | Females employed w/advanced degrees, % total | 21.1 | 21 |
| 5.2 | Innovation linkages | 39.7 | 33 |
| 5.2.1 | University/industry research collaboration [†] | 65.0 | 19 |
| 5.2.2 | State of cluster development [†] | 57.7 | 24 |
| 5.2.3 | GERD financed by abroad, % | 7.4 | 52 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 25 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 4.3 | 10 |
| 5.3 | Knowledge absorption | 36.2 | 32 |
| 5.3.1 | Intellectual property payments, % total trade | 0.9 | 35 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 6.3 | 76 ○ |
| 5.3.3 | ICT services imports, % total trade | 2.2 | 14 |
| 5.3.4 | FDI net inflows, % GDP | (0.2) | 125 ○ |
| 5.3.5 | Research talent, % in business enterprise | 59.5 | 13 |
| 6 | Knowledge & technology outputs | 46.4 | 14 |
| 6.1 | Knowledge creation | 53.1 | 12 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 13.4 | 8 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 5.2 | 9 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.6 | 32 ○ |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 64.5 | 2 ● |
| 6.1.5 | Citable documents H index | 518.0 | 14 |
| 6.2 | Knowledge impact | 43.9 | 32 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.4 | 79 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 4.4 | 28 |
| 6.2.3 | Computer software spending, % GDP | 0.6 | 11 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 6.7 | 52 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 44.1 | 11 |
| 6.3 | Knowledge diffusion | 42.1 | 21 |
| 6.3.1 | Intellectual property receipts, % total trade | 1.4 | 12 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 6.1 | 28 |
| 6.3.3 | ICT services exports, % total trade | 1.9 | 51 |
| 6.3.4 | FDI net outflows, % GDP | 2.5 | 27 |
| 7 | Creative outputs | 53.3 | 11 |
| 7.1 | Intangible assets | 51.6 | 29 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 47.6 | 49 ○ |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 6.7 | 19 |
| 7.1.3 | ICTs & business model creation [†] | 69.1 | 28 |
| 7.1.4 | ICTs & organizational model creation [†] | 67.3 | 23 |
| 7.2 | Creative goods & services | 45.7 | 9 |
| 7.2.1 | Cultural & creative services exports, % of total trade ^② | 0.7 | 18 |
| 7.2.2 | National feature films/mn pop. 15–69 | 17.3 | 6 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 70.6 | 4 |
| 7.2.4 | Printing & publishing manufactures, % | 1.2 | 54 ○ |
| 7.2.5 | Creative goods exports, % total trade | 1.6 | 28 |
| 7.3 | Online creativity | 64.4 | 6 ● |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 51.2 | 15 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 5,288.9 | 23 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 67.4 | 11 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 10.5 |
| GDP (US\$ billions) | 67.5 |
| GDP per capita, PPP\$ | 14,983.7 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.6 | 76 |
| Innovation Output Sub-Index | 23.3 | 82 |
| Innovation Input Sub-Index | 37.8 | 84 |
| Innovation Efficiency Ratio | 0.6 | 82 |
| Global Innovation Index 2015 (out of 141) | 30.6 | 89 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 53.6 | 87 |
| 1.1 Political environment | 47.3 | 72 |
| 1.1.1 Political stability & safety* | 67.5 | 52 ● |
| 1.1.2 Government effectiveness* | 27.1 | 94 |
| 1.2 Regulatory environment | 52.4 | 103 |
| 1.2.1 Regulatory quality* | 43.9 | 73 |
| 1.2.2 Rule of law* | 37.6 | 85 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 26.2 | 102 |
| 1.3 Business environment | 61.0 | 92 |
| 1.3.1 Ease of starting a business* | 83.1 | 83 |
| 1.3.2 Ease of resolving insolvency* | 23.7 | 123 ○ |
| 1.3.3 Ease of paying taxes* | 76.3 | 63 |

| | | |
|---|-------------|------------|
| 2 Human capital & research | 19.0 | 103 |
| 2.1 Education | 30.5 | 110 |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 2.1 | 114 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 14.6 | 88 |
| 2.1.3 School life expectancy, years | 13.2 | 70 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 21.4 | 88 |
| 2.2 Tertiary education | 26.5 | 90 |
| 2.2.1 Tertiary enrolment, % gross | 47.5 | 56 |
| 2.2.2 Graduates in science & engineering, % | 14.4 | 87 |
| 2.2.3 Tertiary inbound mobility, % | 2.3 | 61 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 38.9 | 77 |
| 3.1 Information & communication technologies (ICTs) | 35.7 | 92 |
| 3.1.1 ICT access* | 41.2 | 98 |
| 3.1.2 ICT use* | 29.7 | 79 |
| 3.1.3 Government's online service* | 38.6 | 83 |
| 3.1.4 E-participation* | 33.3 | 89 |
| 3.2 General infrastructure | 27.6 | 94 |
| 3.2.1 Electricity output, kWh/cap | 1,700.0 | 80 |
| 3.2.2 Logistics performance* | 2.9 | 66 |
| 3.2.3 Gross capital formation, % GDP | 20.3 | 83 |
| 3.3 Ecological sustainability | 53.2 | 27 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 14.5 | 5 ● |
| 3.3.2 Environmental performance* | 75.3 | 57 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 101 |

| | | |
|--|-------------|-------------|
| 4 Market sophistication | 45.5 | 52 ● |
| 4.1 Credit | 23.1 | 98 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 |
| 4.1.2 Domestic credit to private sector, % GDP | 26.5 | 101 |
| 4.1.3 Microfinance gross loans, % GDP | 1.3 | 29 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 55.0 | 16 |
| 4.2.1 Ease of protecting minority investors* | 55.0 | 72 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|--|-------------|-----------|
| 4.3 Trade, competition, & market scale | 58.5 | 74 |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓐ] | 6.1 | 91 |
| 4.3.2 Intensity of local competition [†] | 72.3 | 43 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 138.5 | 67 |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 32.1 | 60 |
| 5.1 Knowledge workers | 46.3 | 38 ● |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 17.2 | 80 |
| 5.1.2 Firms offering formal training, % firms [Ⓐ] | 57.0 | 14 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 12.5 | 51 |

| | | |
|---|-------------|-----------|
| 5.2 Innovation linkages | 30.7 | 63 |
| 5.2.1 University/industry research collaboration [†] | 37.6 | 88 |
| 5.2.2 State of cluster development [†] | 42.3 | 77 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 97 |

| | | |
|--|-------------|------------|
| 5.3 Knowledge absorption | 19.2 | 106 |
| 5.3.1 Intellectual property payments, % total trade [Ⓐ] | 0.4 | 65 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.5 | 87 |
| 5.3.3 ICT services imports, % total trade [Ⓐ] | 0.3 | 110 ○ |
| 5.3.4 FDI net inflows, % GDP | 3.7 | 44 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 19.1 | 91 |
| 6.1 Knowledge creation | 0.9 | 128 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 104 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 83 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 56 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 0.7 | 126 ○ |
| 6.1.5 Citable documents H index | 47.0 | 118 ○ |

| | | |
|--|-------------|-----------|
| 6.2 Knowledge impact | 36.2 | 62 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.7 | 30 ● |
| 6.2.2 New businesses/th pop. 15–64 | 1.2 | 62 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.3 | 101 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 20.2 | 94 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.2 | 61 |
| 6.3.3 ICT services exports, % total trade [Ⓐ] | 1.2 | 73 |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | (0.6) | 111 ○ |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 27.5 | 71 |
| 7.1 Intangible assets | 41.3 | 72 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 44.4 | 53 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.2 | 98 ○ |
| 7.1.3 ICTs & business model creation [†] | 63.3 | 42 ● |
| 7.1.4 ICTs & organizational model creation [†] | 56.4 | 50 ● |

| | | |
|--|-------------|-----------|
| 7.2 Creative goods & services | 23.2 | 60 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓐ] | 1.0 | 76 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 1.5 | 33 ● |

| | | |
|--|------------|-----------|
| 7.3 Online creativity | 4.2 | 80 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.8 | 68 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.3 | 78 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,155.1 | 69 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 16.1 |
| GDP (US\$ billions) | 98.8 |
| GDP per capita, PPP\$ | 11,263.6 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 27.1 | 100 |
| Innovation Output Sub-Index | 20.3 | 97 |
| Innovation Input Sub-Index | 33.9 | 100 |
| Innovation Efficiency Ratio | 0.6 | 87 |
| Global Innovation Index 2015 (out of 141) | 26.9 | 119 |

| | | | |
|----------|---|-------------|------------|
| 1 | Institutions | 44.6 | 115 |
| 1.1 | Political environment | 43.9 | 86 |
| 1.1.1 | Political stability & safety* | 62.6 | 67 |
| 1.1.2 | Government effectiveness* | 25.2 | 99 |
| 1.2 | Regulatory environment | 36.6 | 120 ○ |
| 1.2.1 | Regulatory quality* | 19.5 | 122 ○ |
| 1.2.2 | Rule of law* | 20.9 | 123 ○ |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 31.8 | 119 ○ |
| 1.3 | Business environment | 53.3 | 121 ○ |
| 1.3.1 | Ease of starting a business* | 68.5 | 119 ○ |
| 1.3.2 | Ease of resolving insolvency* | 28.4 | 119 ○ |
| 1.3.3 | Ease of paying taxes* | 62.8 | 97 |
| 2 | Human capital & research | 21.4 | 98 |
| 2.1 | Education | 39.0 | 90 |
| 2.1.1 | Expenditure on education, % GDP | 4.2 | 77 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 6.3 | 106 ○ |
| 2.1.3 | School life expectancy, years | 15.2 | 41 ● |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 18.6 | 80 |
| 2.2 | Tertiary education | 23.1 | 100 |
| 2.2.1 | Tertiary enrolment, % gross | 40.5 | 63 |
| 2.2.2 | Graduates in science & engineering, % | 14.9 | 86 |
| 2.2.3 | Tertiary inbound mobility, % ^② | 0.6 | 87 |
| 2.3 | Research & development (R&D) | 2.2 | 89 |
| 2.3.1 | Researchers, FTE/mn pop. ^② | 180.3 | 71 |
| 2.3.2 | Gross expenditure on R&D, % GDP ^② | 0.3 | 73 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 38.7 | 78 |
| 3.1 | Information & communication technologies (ICTs) | 44.5 | 78 |
| 3.1.1 | ICT access* | 52.1 | 76 |
| 3.1.2 | ICT use* | 29.0 | 82 |
| 3.1.3 | Government's online service* | 48.0 | 66 |
| 3.1.4 | E-participation* | 49.0 | 64 |
| 3.2 | General infrastructure | 29.5 | 83 |
| 3.2.1 | Electricity output, kWh/cap | 1,477.7 | 84 |
| 3.2.2 | Logistics performance* | 2.7 | 81 |
| 3.2.3 | Gross capital formation, % GDP | 24.7 | 43 ● |
| 3.3 | Ecological sustainability | 41.9 | 67 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.6 | 38 ● |
| 3.3.2 | Environmental performance* | 66.6 | 87 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.0 | 62 |
| 4 | Market sophistication | 40.7 | 82 |
| 4.1 | Credit | 37.3 | 50 |
| 4.1.1 | Ease of getting credit* | 45.0 | 81 |
| 4.1.2 | Domestic credit to private sector, % GDP | 27.4 | 98 |
| 4.1.3 | Microfinance gross loans, % GDP | 4.7 | 10 ● |

| | | | |
|-------|--|-------|-------|
| 4.2 | Investment | 23.7 | 121 ○ |
| 4.2.1 | Ease of protecting minority investors* | 46.7 | 92 |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP ^② | 0.2 | 76 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 80 ○ |
| 4.3 | Trade, competition, & market scale | 61.1 | 63 |
| 4.3.1 | Applied tariff rate, weighted mean, % ^② | 4.3 | 78 |
| 4.3.2 | Intensity of local competition [†] | 66.2 | 74 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 181.2 | 60 |

5 Business sophistication **24.2** **103**

| | | | |
|-------|---|------|-------|
| 5.1 | Knowledge workers | 34.0 | 79 |
| 5.1.1 | Knowledge-intensive employment, % | 12.3 | 91 |
| 5.1.2 | Firms offering formal training, % firms ^② | 65.9 | 5 ● |
| 5.1.3 | GERD performed by business, % of GDP ^② | 0.2 | 50 |
| 5.1.4 | GERD financed by business, % ^② | 0.4 | 89 ○ |
| 5.1.5 | Females employed w/advanced degrees, % total | 10.0 | 63 |
| 5.2 | Innovation linkages | 20.9 | 109 |
| 5.2.1 | University/industry research collaboration [†] | 49.1 | 46 ● |
| 5.2.2 | State of cluster development [†] | 40.1 | 89 |
| 5.2.3 | GERD financed by abroad, % ^② | 4.5 | 69 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 59 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 76 |
| 5.3 | Knowledge absorption | 17.8 | 114 |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 67 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 9.0 | 47 |
| 5.3.3 | ICT services imports, % total trade | 0.0 | 122 ○ |
| 5.3.4 | FDI net inflows, % GDP | 0.8 | 103 |
| 5.3.5 | Research talent, % in business enterprise ^② | 15.0 | 61 |

6 Knowledge & technology outputs **13.2** **118**

| | | | |
|-------|---|-------|-------|
| 6.1 | Knowledge creation | 3.0 | 111 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP ^② | 0.0 | 117 ○ |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.0 | 84 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP ^② | 0.1 | 49 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 4.4 | 102 |
| 6.1.5 | Citable documents H index | 100.0 | 79 |
| 6.2 | Knowledge impact | 34.3 | 74 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.7 | 45 |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 65 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 7.4 | 46 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % ^② | 14.0 | 68 |
| 6.3 | Knowledge diffusion | 2.3 | 125 ○ |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.3 | 90 |
| 6.3.3 | ICT services exports, % total trade | 0.4 | 103 |
| 6.3.4 | FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs **27.4** **72**

| | | | |
|-------|--|---------|------|
| 7.1 | Intangible assets | 42.8 | 65 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP ^② | 63.9 | 32 ● |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP ^② | 0.4 | 85 |
| 7.1.3 | ICTs & business model creation [†] | 58.6 | 63 |
| 7.1.4 | ICTs & organizational model creation [†] | 55.1 | 58 |
| 7.2 | Creative goods & services | 18.2 | 74 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.3 | 30 ● |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % ^② | 1.6 | 32 ● |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 97 |
| 7.3 | Online creativity | 5.7 | 73 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 2.3 | 75 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.4 | 77 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,804.1 | 56 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 91.5 |
| GDP (US\$ billions) | 330.8 |
| GDP per capita, PPP\$ | 11,849.6 |
| Income group | Lower-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.0 | 107 |
| Innovation Output Sub-Index | 20.2 | 98 |
| Innovation Input Sub-Index | 31.8 | 107 |
| Innovation Efficiency Ratio | 0.6 | 74 |
| Global Innovation Index 2015 (out of 141) | 28.9 | 100 |

| | | | | |
|----------|---|-------------|------------|---|
| 1 | Institutions | 39.0 | 123 | ○ |
| 1.1 | Political environment | 19.9 | 124 | ○ |
| 1.1.1 | Political stability & safety* | 23.5 | 122 | ○ |
| 1.1.2 | Government effectiveness* | 16.3 | 116 | |
| 1.2 | Regulatory environment | 36.0 | 122 | ○ |
| 1.2.1 | Regulatory quality* | 26.1 | 110 | |
| 1.2.2 | Rule of law* | 32.1 | 96 | |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 36.8 | 121 | ○ |
| 1.3 | Business environment | 61.2 | 91 | |
| 1.3.1 | Ease of starting a business* | 88.2 | 58 | |
| 1.3.2 | Ease of resolving insolvency* | 36.4 | 100 | |
| 1.3.3 | Ease of paying taxes* | 58.9 | 104 | |
| 2 | Human capital & research | 27.3 | 82 | |
| 2.1 | Education | 50.2 | 56 | |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 3.8 | 85 | |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a | |
| 2.1.3 | School life expectancy, years | 13.1 | 72 | |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a | |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 12.1 | 43 | ● |
| 2.2 | Tertiary education | 19.0 | 103 | |
| 2.2.1 | Tertiary enrolment, % gross | 30.3 | 77 | |
| 2.2.2 | Graduates in science & engineering, % | 11.8 | 97 | ○ |
| 2.2.3 | Tertiary inbound mobility, % | 1.8 | 69 | |
| 2.3 | Research & development (R&D) | 12.9 | 52 | |
| 2.3.1 | Researchers, FTE/mn pop. | 681.6 | 54 | |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.7 | 51 | |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 | ○ |
| 2.3.4 | QS university ranking, average score top 3* | 28.5 | 46 | ● |
| 3 | Infrastructure | 38.3 | 82 | |
| 3.1 | Information & communication technologies (ICTs) | 48.1 | 72 | |
| 3.1.1 | ICT access* | 51.2 | 78 | |
| 3.1.2 | ICT use* | 27.1 | 84 | |
| 3.1.3 | Government's online service* | 59.1 | 51 | |
| 3.1.4 | E-participation* | 54.9 | 54 | |
| 3.2 | General infrastructure | 24.3 | 111 | |
| 3.2.1 | Electricity output, kWh/cap | 2,045.1 | 78 | |
| 3.2.2 | Logistics performance* | 3.0 | 60 | |
| 3.2.3 | Gross capital formation, % GDP | 14.8 | 113 | |
| 3.3 | Ecological sustainability | 42.5 | 61 | |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.1 | 26 | ● |
| 3.3.2 | Environmental performance* | 66.5 | 88 | |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 67 | |
| 4 | Market sophistication | 34.2 | 110 | |
| 4.1 | Credit | 19.8 | 107 | |
| 4.1.1 | Ease of getting credit* | 50.0 | 69 | |
| 4.1.2 | Domestic credit to private sector, % GDP | 25.9 | 102 | |
| 4.1.3 | Microfinance gross loans, % GDP | 0.1 | 64 | |

| | | | | |
|-------|--|-------|-----|---|
| 4.2 | Investment | 22.2 | 127 | ○ |
| 4.2.1 | Ease of protecting minority investors* | 45.0 | 97 | |
| 4.2.2 | Market capitalization, % GDP | 24.5 | 57 | |
| 4.2.3 | Total value of stocks traded, % GDP | 9.3 | 36 | |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 71 | |
| 4.3 | Trade, competition, & market scale | 60.5 | 65 | |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓓ] | 8.2 | 105 | |
| 4.3.2 | Intensity of local competition [†] | 53.9 | 117 | ○ |
| 4.3.3 | Domestic market scale, bn PPP\$ | 946.6 | 24 | ● |

5 Business sophistication **20.0** **122** ○

| | | | | |
|-------|---|------|-----|---|
| 5.1 | Knowledge workers | 21.2 | 109 | |
| 5.1.1 | Knowledge-intensive employment, % [Ⓓ] | 36.3 | 31 | ● |
| 5.1.2 | Firms offering formal training, % firms | 5.2 | 92 | ○ |
| 5.1.3 | GERD performed by business, % of GDP | 0.1 | 64 | |
| 5.1.4 | GERD financed by business, % | 8.1 | 73 | |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓓ] | 5.5 | 77 | |

| | | | | |
|-------|---|------|-----|---|
| 5.2 | Innovation linkages | 21.8 | 105 | |
| 5.2.1 | University/industry research collaboration [†] | 23.8 | 120 | ○ |
| 5.2.2 | State of cluster development [†] | 54.5 | 31 | ● |
| 5.2.3 | GERD financed by abroad, % | 0.1 | 98 | ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 27 | ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 100 | |

| | | | | |
|-------|--|------|-----|--|
| 5.3 | Knowledge absorption | 16.9 | 118 | |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 63 | |
| 5.3.2 | High-tech imports less re-imports, % total trade | 7.0 | 67 | |
| 5.3.3 | ICT services imports, % total trade | 0.7 | 82 | |
| 5.3.4 | FDI net inflows, % GDP | 1.7 | 85 | |
| 5.3.5 | Research talent, % in business enterprise | 5.5 | 71 | |

6 Knowledge & technology outputs **18.5** **94**

| | | | | |
|-------|--|-------|-----|---|
| 6.1 | Knowledge creation | 8.3 | 70 | |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.8 | 68 | |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 74 | |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a | |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 9.4 | 66 | |
| 6.1.5 | Citable documents H index | 165.0 | 48 | ● |

| | | | | |
|-------|---|------|-----|---|
| 6.2 | Knowledge impact | 26.5 | 106 | |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.6 | 76 | |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓓ] | 0.1 | 100 | ○ |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 59 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 2.3 | 84 | |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓓ] | 21.5 | 54 | |

| | | | | |
|-------|--|------|----|---|
| 6.3 | Knowledge diffusion | 20.7 | 91 | |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓓ] | 0.3 | 29 | ● |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.3 | 89 | |
| 6.3.3 | ICT services exports, % total trade | 1.7 | 55 | |
| 6.3.4 | FDI net outflows, % GDP | 0.1 | 80 | |

7 Creative outputs **21.8** **97**

| | | | | |
|-------|---|------|-----|--|
| 7.1 | Intangible assets | 34.3 | 100 | |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 13.3 | 91 | |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a | |
| 7.1.3 | ICTs & business model creation [†] | 50.3 | 95 | |
| 7.1.4 | ICTs & organizational model creation [†] | 45.7 | 86 | |

| | | | | |
|-------|--|------|-----|---|
| 7.2 | Creative goods & services | 15.6 | 81 | |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a | |
| 7.2.2 | National feature films/mn pop. 15–69 | 0.6 | 87 | |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 0.7 | 55 | |
| 7.2.4 | Printing & publishing manufactures, % [Ⓓ] | 0.6 | 80 | |
| 7.2.5 | Creative goods exports, % total trade | 1.6 | 31 | ● |

| | | | | |
|-------|--|-------|-----|---|
| 7.3 | Online creativity | 3.1 | 90 | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 1.3 | 91 | |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.0 | 119 | ○ |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 439.1 | 90 | |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 7.7 | 64 | |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 6.1 |
| GDP (US\$ billions) | 25.8 |
| GDP per capita, PPP\$ | 8,302.5 |
| Income group | Lower-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.6 | 104 |
| Innovation Output Sub-Index | 17.2 | 110 |
| Innovation Input Sub-Index | 35.9 | 89 |
| Innovation Efficiency Ratio | 0.5 | 113 |
| Global Innovation Index 2015 (out of 141) | 29.3 | 99 |

1 Institutions **55.2** **80**

| | | |
|--|------|-----|
| 1.1 Political environment | 48.8 | 69 |
| 1.1.1 Political stability & safety* | 59.1 | 77 |
| 1.1.2 Government effectiveness* | 38.4 | 71 |
| 1.2 Regulatory environment | 57.2 | 90 |
| 1.2.1 Regulatory quality* | 53.3 | 58 |
| 1.2.2 Rule of law* | 34.2 | 91 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 22.9 | 97 |
| 1.3 Business environment | 59.6 | 98 |
| 1.3.1 Ease of starting a business* | 80.2 | 94 |
| 1.3.2 Ease of resolving insolvency* | 45.9 | 71 |
| 1.3.3 Ease of paying taxes* | 52.7 | 111 |

2 Human capital & research **18.3** **106**

| | | |
|--|------|-------|
| 2.1 Education | 26.6 | 116 |
| 2.1.1 Expenditure on education, % GDP ^② | 3.4 | 94 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 11.3 | 96 |
| 2.1.3 School life expectancy, years | 13.2 | 69 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 38.0 | 110 ○ |
| 2.2 Tertiary education | 28.3 | 85 |
| 2.2.1 Tertiary enrolment, % gross | 29.2 | 80 |
| 2.2.2 Graduates in science & engineering, % | 22.2 | 40 |
| 2.2.3 Tertiary inbound mobility, % | 0.4 | 91 |
| 2.3 Research & development (R&D) | 0.1 | 113 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 107 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure **37.0** **88**

| | | |
|---|-------|------|
| 3.1 Information & communication technologies (ICTs) | 47.2 | 73 |
| 3.1.1 ICT access* | 50.4 | 79 |
| 3.1.2 ICT use* | 24.1 | 86 |
| 3.1.3 Government's online service* | 53.5 | 59 |
| 3.1.4 E-participation* | 60.8 | 45 ● |
| 3.2 General infrastructure | 21.7 | 119 |
| 3.2.1 Electricity output, kWh/cap. | 920.3 | 92 |
| 3.2.2 Logistics performance* | 3.0 | 62 |
| 3.2.3 Gross capital formation, % GDP | 13.6 | 117 |
| 3.3 Ecological sustainability | 42.2 | 65 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.0 | 31 ● |
| 3.3.2 Environmental performance* | 68.1 | 85 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 94 |

4 Market sophistication **40.5** **85**

| | | |
|--|------|------|
| 4.1 Credit | 38.6 | 47 ● |
| 4.1.1 Ease of getting credit* | 80.0 | 14 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 43.9 | 74 |
| 4.1.3 Microfinance gross loans, % GDP | 1.6 | 24 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 24.4 | 115 |
| 4.2.1 Ease of protecting minority investors* | 38.3 | 115 |
| 4.2.2 Market capitalization, % GDP ^② | 45.1 | 36 |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.2 | 72 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale **58.4** **75**

| | | |
|---|------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 2.1 | 52 |
| 4.3.2 Intensity of local competition [†] | 68.8 | 60 |
| 4.3.3 Domestic market scale, bn PPP\$ | 51.2 | 93 |

5 Business sophistication **28.6** **83**

| | | |
|---|------|------|
| 5.1 Knowledge workers | 31.6 | 84 |
| 5.1.1 Knowledge-intensive employment, % ^② | 12.1 | 92 |
| 5.1.2 Firms offering formal training, % firms ^② | 61.0 | 9 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % ^② | 0.7 | 88 ○ |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 0.0 | 88 ○ |

5.2 Innovation linkages **29.7** **71**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 46.8 | 52 |
| 5.2.2 State of cluster development [†] | 44.5 | 66 |
| 5.2.3 GERD financed by abroad, % ^② | 16.4 | 28 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.0 | 93 |

5.3 Knowledge absorption **24.5** **88**

| | | |
|--|-----|------|
| 5.3.1 Intellectual property payments, % total trade | 0.8 | 39 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.7 | 36 ● |
| 5.3.3 ICT services imports, % total trade | 0.5 | 95 |
| 5.3.4 FDI net inflows, % GDP | 1.9 | 81 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **10.7** **123 ○**

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 1.5 | 126 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 87 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 48 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.3 | 125 ○ |
| 6.1.5 Citable documents H index | 40.0 | 122 ○ |

6.2 Knowledge impact **6.3** **118**

| | | |
|--|-----|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 0.5 | 87 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 4.6 | 66 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion **24.4** **66**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 30 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.6 | 46 ● |
| 6.3.3 ICT services exports, % total trade | 2.0 | 49 |
| 6.3.4 FDI net outflows, % GDP | 0.8 | 52 |

7 Creative outputs **23.7** **89**

| | | |
|---|------|-----|
| 7.1 Intangible assets | 40.8 | 75 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.9 | 68 |
| 7.1.3 ICTs & business model creation [†] | 51.0 | 92 |
| 7.1.4 ICTs & organizational model creation [†] | 48.7 | 79 |

7.2 Creative goods & services **9.8** **92**

| | | |
|---|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.0 | 84 ○ |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 0.3 | 97 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.7 | 51 |

7.3 Online creativity **3.4** **87**

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.7 | 71 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.7 | 87 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 921.3 | 76 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 1.3 |
| GDP (US\$ billions) | 22.7 |
| GDP per capita, PPP\$ | 28,591.8 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 51.7 | 24 |
| Innovation Output Sub-Index | 49.3 | 14 |
| Innovation Input Sub-Index | 54.2 | 27 |
| Innovation Efficiency Ratio | 0.9 | 6 ● |
| Global Innovation Index 2015 (out of 141) | 52.8 | 23 |

1 Institutions 81.2 21

| | | |
|--|------|----|
| 1.1 Political environment | 74.9 | 28 |
| 1.1.1 Political stability & safety* | 81.8 | 31 |
| 1.1.2 Government effectiveness* | 68.1 | 30 |
| 1.2 Regulatory environment | 87.0 | 18 |
| 1.2.1 Regulatory quality* | 86.2 | 14 |
| 1.2.2 Rule of law* | 81.1 | 23 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 12.9 | 46 |
| 1.3 Business environment | 81.6 | 24 |
| 1.3.1 Ease of starting a business* | 95.1 | 15 |
| 1.3.2 Ease of resolving insolvency* | 65.3 | 37 |
| 1.3.3 Ease of paying taxes* | 84.3 | 27 |

2 Human capital & research 41.2 37

| | | |
|--|---------|------|
| 2.1 Education | 59.2 | 25 |
| 2.1.1 Expenditure on education, % GDP | 4.8 | 58 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 27.1 | 24 |
| 2.1.3 School life expectancy, years | 16.5 | 21 |
| 2.1.4 PISA scales in reading, maths, & science | 526.1 | 7 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 8.4 | 12 |
| 2.2 Tertiary education | 41.4 | 39 |
| 2.2.1 Tertiary enrolment, % gross | 72.9 | 22 |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 22.1 | 43 |
| 2.2.3 Tertiary inbound mobility, % | 2.9 | 53 |
| 2.3 Research & development (R&D) | 23.0 | 44 |
| 2.3.1 Researchers, FTE/mn pop. | 3,270.8 | 26 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.4 | 24 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 19.7 | 53 |

3 Infrastructure 61.6 14

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 77.2 | 17 |
| 3.1.1 ICT access* | 78.6 | 25 |
| 3.1.2 ICT use* | 76.6 | 13 |
| 3.1.3 Government's online service* | 77.2 | 18 |
| 3.1.4 E-participation* | 76.5 | 22 |
| 3.2 General infrastructure | 48.7 | 26 |
| 3.2.1 Electricity output, kWh/cap | 9,427.3 | 15 |
| 3.2.2 Logistics performance* | 3.3 | 38 |
| 3.2.3 Gross capital formation, % GDP | 25.6 | 38 |
| 3.3 Ecological sustainability | 59.0 | 16 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.3 | 106 ○ |
| 3.3.2 Environmental performance* | 88.6 | 8 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 13.4 | 4 ● |

4 Market sophistication 46.0 49

| | | |
|--|------|-------|
| 4.1 Credit | 35.0 | 55 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 4.3 | 126 ○ |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 42.9 | 37 |
| 4.2.1 Ease of protecting minority investors* | 55.0 | 72 ○ |
| 4.2.2 Market capitalization, % GDP [Ⓓ] | 10.1 | 83 ○ |
| 4.2.3 Total value of stocks traded, % GDP [Ⓓ] | 0.8 | 59 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.3 | 6 ● |

4.3 Trade, competition, & market scale 60.2 68

| | | |
|---|------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 76.8 | 19 |
| 4.3.3 Domestic market scale, bn PPP\$ | 36.8 | 98 ○ |

5 Business sophistication 40.7 31

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 51.5 | 30 |
| 5.1.1 Knowledge-intensive employment, % | 42.7 | 19 |
| 5.1.2 Firms offering formal training, % firms | 35.2 | 44 |
| 5.1.3 GERD performed by business, % of GDP | 0.6 | 30 |
| 5.1.4 GERD financed by business, % | 37.0 | 41 |
| 5.1.5 Females employed w/advanced degrees, % total | 25.1 | 8 ● |

5.2 Innovation linkages 32.1 58

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 55.9 | 33 |
| 5.2.2 State of cluster development [†] | 45.9 | 59 |
| 5.2.3 GERD financed by abroad, % | 12.4 | 40 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.5 | 33 |

5.3 Knowledge absorption 38.6 27

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.3 | 74 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 12.8 | 18 |
| 5.3.3 ICT services imports, % total trade | 2.0 | 16 |
| 5.3.4 FDI net inflows, % GDP | 5.9 | 22 |
| 5.3.5 Research talent, % in business enterprise | 29.0 | 44 ○ |

6 Knowledge & technology outputs 43.9 18

| | | |
|--|-------|----|
| 6.1 Knowledge creation | 29.4 | 32 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.2 | 45 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.0 | 28 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.9 | 14 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 44.1 | 12 |
| 6.1.5 Citable documents H index | 162.0 | 52 |

6.2 Knowledge impact 64.9 1 ●

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.3 | 57 |
| 6.2.2 New businesses/th pop. 15–64 | 16.1 | 4 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 27.9 | 11 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 38.6 | 24 |

6.3 Knowledge diffusion 37.5 28

| | | |
|--|------|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 62 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 12.5 | 17 |
| 6.3.3 ICT services exports, % total trade | 2.8 | 31 |
| 6.3.4 FDI net outflows, % GDP | 3.2 | 18 |

7 Creative outputs 54.7 8 ●

| | | |
|---|------|-----|
| 7.1 Intangible assets | 59.5 | 16 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 77.4 | 16 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 4.2 | 30 |
| 7.1.3 ICTs & business model creation [†] | 76.9 | 11 |
| 7.1.4 ICTs & organizational model creation [†] | 77.3 | 5 ● |

7.2 Creative goods & services 53.5 4 ●

| | | |
|---|------|-----|
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓓ] | 1.1 | 8 |
| 7.2.2 National feature films/mn pop. 15–69 | 19.2 | 1 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 2.2 | 20 |
| 7.2.5 Creative goods exports, % total trade | 1.2 | 37 |

7.3 Online creativity 46.2 20

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 9.9 | 40 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 39.1 | 16 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,671.3 | 11 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 79.2 | 6 ● |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 99.4 |
| GDP (US\$ billions) | 61.6 |
| GDP per capita, PPP\$ | 1,800.7 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 24.8 | 110 |
| Innovation Output Sub-Index | 22.5 | 85 |
| Innovation Input Sub-Index | 27.2 | 124 |
| Innovation Efficiency Ratio | 0.8 | 18 ● |
| Global Innovation Index 2015 (out of 141) | 24.2 | 127 |

1 Institutions 46.2 110

| | | |
|--|------|-------|
| 1.1 Political environment | 29.0 | 114 |
| 1.1.1 Political stability & safety* | 32.0 | 119 |
| 1.1.2 Government effectiveness* | 26.0 | 97 |
| 1.2 Regulatory environment | 53.3 | 100 |
| 1.2.1 Regulatory quality* | 20.5 | 119 |
| 1.2.2 Rule of law* | 36.7 | 88 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 19.1 | 81 |
| 1.3 Business environment | 56.4 | 109 |
| 1.3.1 Ease of starting a business* | 62.5 | 125 ○ |
| 1.3.2 Ease of resolving insolvency* | 37.8 | 98 |
| 1.3.3 Ease of paying taxes* | 69.0 | 84 |

2 Human capital & research 14.4 118

| | | |
|--|------|-------|
| 2.1 Education | 25.7 | 120 |
| 2.1.1 Expenditure on education, % GDP | 4.5 | 68 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 22.7 | 45 ● |
| 2.1.3 School life expectancy, years ^② | 8.4 | 112 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 38.8 | 111 ○ |
| 2.2 Tertiary education | 14.1 | 110 |
| 2.2.1 Tertiary enrolment, % gross | 6.3 | 112 |
| 2.2.2 Graduates in science & engineering, % ^② | 11.2 | 98 |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 3.4 | 82 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 45.1 | 87 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.6 | 56 ● |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 27.4 108

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 23.5 | 109 |
| 3.1.1 ICT access* | 19.0 | 122 ○ |
| 3.1.2 ICT use* | 3.8 | 116 |
| 3.1.3 Government's online service* | 45.7 | 71 ● |
| 3.1.4 E-participation* | 25.5 | 104 |
| 3.2 General infrastructure | 40.1 | 47 ● |
| 3.2.1 Electricity output, kWh/cap. | 92.7 | 116 |
| 3.2.2 Logistics performance* | 2.6 | 98 |
| 3.2.3 Gross capital formation, % GDP | 39.5 | 6 ● |
| 3.3 Ecological sustainability | 18.7 | 126 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 2.3 | 117 ○ |
| 3.3.2 Environmental performance* | 45.8 | 117 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.0 | 126 ○ |

4 Market sophistication 26.3 126 ○

| | | |
|---|------|-------|
| 4.1 Credit | 6.9 | 127 ○ |
| 4.1.1 Ease of getting credit* | 15.0 | 121 |
| 4.1.2 Domestic credit to private sector, % GDP ^② | 17.7 | 111 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 70 |

| | | |
|--|------|-------|
| 4.2 Investment | 23.9 | 120 |
| 4.2.1 Ease of protecting minority investors* | 35.0 | 121 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 78 |

4.3 Trade, competition, & market scale 48.2 109

| | | |
|--|-------|------|
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 10.0 | 117 |
| 4.3.2 Intensity of local competition [†] | 54.6 | 115 |
| 4.3.3 Domestic market scale, bn PPP\$ | 145.1 | 66 ● |

5 Business sophistication 21.6 115

| | | |
|--|------|------|
| 5.1 Knowledge workers | 14.1 | 120 |
| 5.1.1 Knowledge-intensive employment, % ^② | 3.8 | 102 |
| 5.1.2 Firms offering formal training, % firms ^② | 30.0 | 59 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 81 |
| 5.1.4 GERD financed by business, % ^② | 0.7 | 87 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 6.0 | 75 |
| 5.2 Innovation linkages | 24.6 | 85 |
| 5.2.1 University/industry research collaboration [†] | 41.0 | 75 |
| 5.2.2 State of cluster development [†] | 38.2 | 94 |
| 5.2.3 GERD financed by abroad, % ^② | 2.1 | 78 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |
| 5.3 Knowledge absorption | 26.1 | 77 |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.0 | 108 |
| 5.3.2 High-tech imports less re-imports, % total trade | 14.3 | 14 ● |
| 5.3.3 ICT services imports, % total trade ^② | 1.6 | 29 ● |
| 5.3.4 FDI net inflows, % GDP | 2.2 | 75 |
| 5.3.5 Research talent, % in business enterprise ^② | 0.5 | 79 |

6 Knowledge & technology outputs 17.1 107

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 8.0 | 74 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.7 | 80 |
| 6.1.5 Citable documents H index | 88.0 | 86 |
| 6.2 Knowledge impact | 37.2 | 58 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 5.4 | 3 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.0 | 106 ○ |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.6 | 116 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 10.9 | 75 |
| 6.3 Knowledge diffusion | 6.2 | 124 |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 89 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 96 |
| 6.3.3 ICT services exports, % total trade ^② | 1.7 | 60 ● |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs 27.8 69 ●

| | | |
|--|------|-------|
| 7.1 Intangible assets | 42.7 | 67 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 43.7 | 113 |
| 7.1.4 ICTs & organizational model creation [†] | 41.8 | 104 |
| 7.2 Creative goods & services | 25.7 | 52 ● |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 79 |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 2.7 | 10 ● |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 104 |
| 7.3 Online creativity | 0.0 | 126 ○ |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.0 | 128 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 125 ○ |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 23.9 | 118 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 5.5 |
| GDP (US\$ billions) | 229.7 |
| GDP per capita, PPP\$ | 41,120.0 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|----------|
| Global Innovation Index (out of 128) | 59.9 | 5 |
| Innovation Output Sub-Index | 51.3 | 10 |
| Innovation Input Sub-Index | 68.5 | 4 |
| Innovation Efficiency Ratio | 0.7 | 32 |
| Global Innovation Index 2015 (out of 141) | 60.0 | 6 |

1 Institutions **94.3** **2 ●**

| | | |
|--|-------|-----|
| 1.1 Political environment | 94.9 | 4 |
| 1.1.1 Political stability & safety* | 94.8 | 4 |
| 1.1.2 Government effectiveness* | 95.1 | 3 ● |
| 1.2 Regulatory environment | 95.9 | 5 |
| 1.2.1 Regulatory quality* | 91.9 | 4 |
| 1.2.2 Rule of law* | 100.0 | 1 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.1 | 34 |
| 1.3 Business environment | 92.1 | 1 ● |
| 1.3.1 Ease of starting a business* | 93.1 | 31 |
| 1.3.2 Ease of resolving insolvency* | 93.8 | 1 ● |
| 1.3.3 Ease of paying taxes* | 89.4 | 16 |

2 Human capital & research **68.1** **1 ●**

| | | |
|--|---------|------|
| 2.1 Education | 72.3 | 5 |
| 2.1.1 Expenditure on education, % GDP | 7.2 | 9 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓔ] | 34.7 | 12 |
| 2.1.3 School life expectancy, years | 19.3 | 3 ● |
| 2.1.4 PISA scales in reading, maths, & science | 529.4 | 6 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓔ] | 12.7 | 46 ○ |
| 2.2 Tertiary education | 57.2 | 9 |
| 2.2.1 Tertiary enrolment, % gross | 91.1 | 3 ● |
| 2.2.2 Graduates in science & engineering, % | 27.9 | 14 |
| 2.2.3 Tertiary inbound mobility, % | 7.1 | 24 |
| 2.3 Research & development (R&D) | 74.9 | 8 |
| 2.3.1 Researchers, FTE/mn pop. | 6,985.9 | 3 ● |
| 2.3.2 Gross expenditure on R&D, % GDP | 3.2 | 4 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 1,278.5 | 12 |
| 2.3.4 QS university ranking, average score top 3* | 60.8 | 18 |

3 Infrastructure **60.0** **17**

| | | |
|---|----------|------|
| 3.1 Information & communication technologies (ICTs) | 77.0 | 19 |
| 3.1.1 ICT access* | 78.1 | 28 |
| 3.1.2 ICT use* | 82.1 | 7 |
| 3.1.3 Government's online service* | 77.2 | 18 |
| 3.1.4 E-participation* | 70.6 | 24 |
| 3.2 General infrastructure | 51.3 | 16 |
| 3.2.1 Electricity output, kWh/cap. | 12,460.1 | 9 |
| 3.2.2 Logistics performance* | 3.6 | 23 |
| 3.2.3 Gross capital formation, % GDP | 20.3 | 82 ○ |
| 3.3 Ecological sustainability | 51.7 | 31 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 5.1 | 96 ○ |
| 3.3.2 Environmental performance* | 90.7 | 1 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 6.8 | 15 |

4 Market sophistication **62.7** **12**

| | | |
|--|------|------|
| 4.1 Credit | 50.6 | 24 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 93.7 | 29 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 71.1 | 8 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.5 | 1 ● |

| | | |
|---|-------|------|
| 4.3 Trade, competition, & market scale | 66.5 | 48 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 62.6 | 85 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 221.7 | 58 ○ |

5 Business sophistication **57.3** **4**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 70.5 | 4 |
| 5.1.1 Knowledge-intensive employment, % | 45.2 | 12 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 2.1 | 4 |
| 5.1.4 GERD financed by business, % | 53.5 | 16 |
| 5.1.5 Females employed w/advanced degrees, % total | 26.0 | 7 |

| | | |
|---|------|-----|
| 5.2 Innovation linkages | 51.7 | 7 |
| 5.2.1 University/industry research collaboration [†] | 82.8 | 1 ● |
| 5.2.2 State of cluster development [†] | 65.1 | 16 |
| 5.2.3 GERD financed by abroad, % | 17.3 | 26 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 23 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 8.4 | 3 ● |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 49.8 | 10 |
| 5.3.1 Intellectual property payments, % total trade [Ⓔ] | 1.9 | 9 |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.6 | 63 ○ |
| 5.3.3 ICT services imports, % total trade [Ⓔ] | 3.2 | 7 |
| 5.3.4 FDI net inflows, % GDP | 5.4 | 26 |
| 5.3.5 Research talent, % in business enterprise | 55.8 | 17 |

6 Knowledge & technology outputs **52.1** **7**

| | | |
|--|-------|----|
| 6.1 Knowledge creation | 64.3 | 8 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 16.3 | 7 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 7.1 | 6 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.9 | 15 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 54.2 | 5 |
| 6.1.5 Citable documents H index | 443.0 | 18 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 41.7 | 41 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.4 | 80 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 3.4 | 34 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 18 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 12.0 | 32 |
| 6.2.5 High- & medium-high-tech manufactures, % | 34.9 | 29 |

| | | |
|--|-------|-------|
| 6.3 Knowledge diffusion | 50.2 | 10 |
| 6.3.1 Intellectual property receipts, % total trade [Ⓔ] | 3.2 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 5.0 | 33 |
| 6.3.3 ICT services exports, % total trade [Ⓔ] | 5.7 | 8 |
| 6.3.4 FDI net outflows, % GDP [Ⓔ] | (0.1) | 102 ○ |

7 Creative outputs **50.6** **14**

| | | |
|---|------|-----|
| 7.1 Intangible assets | 58.7 | 17 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 52.3 | 40 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 5.7 | 25 |
| 7.1.3 ICTs & business model creation [†] | 82.5 | 1 ● |
| 7.1.4 ICTs & organizational model creation [†] | 79.2 | 3 ● |

| | | |
|---|------|------|
| 7.2 Creative goods & services | 34.2 | 30 |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓔ] | 0.3 | 32 |
| 7.2.2 National feature films/mn pop. 15–69 | 12.6 | 8 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 57.9 | 9 |
| 7.2.4 Printing & publishing manufactures, % | 1.4 | 42 ○ |
| 7.2.5 Creative goods exports, % total trade | 0.7 | 50 |

| | | |
|--|---------|----|
| 7.3 Online creativity | 50.6 | 17 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 31.1 | 21 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 34.9 | 19 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 8,836.0 | 7 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 71.1 | 9 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

France

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 64.4 |
| GDP (US\$ billions) | 2,421.6 |
| GDP per capita, PPP\$ | 41,180.7 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 54.0 | 18 |
| Innovation Output Sub-Index | 45.5 | 19 |
| Innovation Input Sub-Index | 62.6 | 15 |
| Innovation Efficiency Ratio | 0.7 | 44 |
| Global Innovation Index 2015 (out of 141) | 53.6 | 21 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 80.4 | 26 |
| 1.1 Political environment | 74.9 | 29 |
| 1.1.1 Political stability & safety* | 71.7 | 46 |
| 1.1.2 Government effectiveness* | 78.0 | 21 |
| 1.2 Regulatory environment | 85.0 | 21 |
| 1.2.1 Regulatory quality* | 71.6 | 29 |
| 1.2.2 Rule of law* | 83.7 | 21 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 11.8 | 44 |
| 1.3 Business environment | 81.2 | 25 |
| 1.3.1 Ease of starting a business* | 93.1 | 30 |
| 1.3.2 Ease of resolving insolvency* | 76.1 | 22 |
| 1.3.3 Ease of paying taxes* | 74.3 | 68 ○ |

| | | |
|---|-------------|-------------|
| 2 Human capital & research | 58.9 | 11 ● |
| 2.1 Education | 57.7 | 31 |
| 2.1.1 Expenditure on education, % GDP | 5.5 | 35 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 26.9 | 26 |
| 2.1.3 School life expectancy, years | 16.2 | 28 |
| 2.1.4 PISA scales in reading, maths, & science | 499.8 | 20 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 12.9 | 48 |
| 2.2 Tertiary education | 51.1 | 16 |
| 2.2.1 Tertiary enrolment, % gross | 62.1 | 39 |
| 2.2.2 Graduates in science & engineering, % | 24.5 | 31 |
| 2.2.3 Tertiary inbound mobility, % | 10.2 | 13 |
| 2.3 Research & development (R&D) | 67.9 | 11 ● |
| 2.3.1 Researchers, FTE/mn pop. | 4,201.1 | 18 |
| 2.3.2 Gross expenditure on R&D, % GDP | 2.3 | 13 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 3,032.3 | 6 ● |
| 2.3.4 QS university ranking, average score top 3* | 78.7 | 10 ● |

| | | |
|---|-------------|------------|
| 3 Infrastructure | 63.7 | 8 ● |
| 3.1 Information & communication technologies (ICTs) | 89.0 | 5 ● |
| 3.1.1 ICT access* | 87.7 | 12 |
| 3.1.2 ICT use* | 72.3 | 19 |
| 3.1.3 Government's online service* | 100.0 | 1 ● |
| 3.1.4 E-participation* | 96.1 | 4 ● |
| 3.2 General infrastructure | 50.3 | 23 |
| 3.2.1 Electricity output, kWh/cap | 8,418.4 | 19 |
| 3.2.2 Logistics performance* | 3.8 | 13 |
| 3.2.3 Gross capital formation, % GDP | 21.7 | 69 ○ |
| 3.3 Ecological sustainability | 51.6 | 34 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.5 | 48 |
| 3.3.2 Environmental performance* | 88.2 | 10 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.2 | 28 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 61.9 | 15 |
| 4.1 Credit | 43.3 | 38 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 94.9 | 28 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-----|
| 4.2 Investment | 60.0 | 14 |
| 4.2.1 Ease of protecting minority investors* | 65.0 | 28 |
| 4.2.2 Market capitalization, % GDP | 73.7 | 22 |
| 4.2.3 Total value of stocks traded, % GDP | 41.5 | 19 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.3 | 1 ● |

| | | |
|---|-------------|------------|
| 4.3 Trade, competition, & market scale | 82.3 | 6 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 75.3 | 28 |
| 4.3.3 Domestic market scale, bn PPP\$ | 2,591.2 | 9 ● |

| | | |
|--|-------------|-----------|
| 5 Business sophistication | 48.0 | 16 |
| 5.1 Knowledge workers | 62.8 | 14 |
| 5.1.1 Knowledge-intensive employment, % | 44.0 | 15 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.5 | 14 |
| 5.1.4 GERD financed by business, % ^② | 55.0 | 14 |
| 5.1.5 Females employed w/advanced degrees, % total | 20.4 | 23 |

| | | |
|---|-------------|-----------|
| 5.2 Innovation linkages | 37.6 | 39 |
| 5.2.1 University/industry research collaboration [†] | 59.7 | 28 |
| 5.2.2 State of cluster development [†] | 57.6 | 25 |
| 5.2.3 GERD financed by abroad, % ^② | 8.0 | 49 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 39 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 3.5 | 11 |

| | | |
|--|-------------|-----------|
| 5.3 Knowledge absorption | 43.6 | 17 |
| 5.3.1 Intellectual property payments, % total trade | 1.2 | 21 |
| 5.3.2 High-tech imports less re-imports, % total trade | 11.1 | 25 |
| 5.3.3 ICT services imports, % total trade | 2.3 | 12 |
| 5.3.4 FDI net inflows, % GDP | 0.3 | 118 ○ |
| 5.3.5 Research talent, % in business enterprise | 60.4 | 11 |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 41.3 | 21 |
| 6.1 Knowledge creation | 36.7 | 24 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 9.7 | 15 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 3.2 | 13 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 55 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 25.3 | 32 |
| 6.1.5 Citable documents H index | 811.0 | 4 ● |

| | | |
|--|-------------|-----------|
| 6.2 Knowledge impact | 42.2 | 39 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.1) | 90 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 2.3 | 46 ○ |
| 6.2.3 Computer software spending, % GDP | 0.6 | 12 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 11.2 | 33 |
| 6.2.5 High- & medium-high-tech manufactures, % | 43.9 | 13 |
| 6.3 Knowledge diffusion | 45.0 | 17 |
| 6.3.1 Intellectual property receipts, % total trade | 1.4 | 13 |
| 6.3.2 High-tech exports less re-exports, % total trade | 13.9 | 12 |
| 6.3.3 ICT services exports, % total trade | 2.1 | 44 |
| 6.3.4 FDI net outflows, % GDP | 1.1 | 47 |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 49.8 | 15 |
| 7.1 Intangible assets | 61.7 | 12 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 106.5 | 10 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 8.3 | 16 |
| 7.1.3 ICTs & business model creation [†] | 69.2 | 27 |
| 7.1.4 ICTs & organizational model creation [†] | 65.4 | 25 |

| | | |
|---|-------------|-----------|
| 7.2 Creative goods & services | 38.0 | 22 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 1.1 | 7 ● |
| 7.2.2 National feature films/mn pop. 15–69 | 6.2 | 29 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 53.0 | 13 |
| 7.2.4 Printing & publishing manufactures, % | 1.1 | 58 ○ |
| 7.2.5 Creative goods exports, % total trade | 1.6 | 29 |

| | | |
|--|-------------|-----------|
| 7.3 Online creativity | 37.6 | 25 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 43.9 | 18 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 23.9 | 27 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,814.5 | 27 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 46.9 | 22 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 4.0 |
| GDP (US\$ billions) | 14.0 |
| GDP per capita, PPP\$ | 9,630.0 |
| Income group | Lower-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.9 | 64 |
| Innovation Output Sub-Index | 26.7 | 60 |
| Innovation Input Sub-Index | 41.0 | 67 |
| Innovation Efficiency Ratio | 0.7 | 67 |
| Global Innovation Index 2015 (out of 141) | 33.8 | 73 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 69.2 | 44 |
| 1.1 | Political environment | 54.8 | 54 |
| 1.1.1 | Political stability & safety* | 57.1 | 81 |
| 1.1.2 | Government effectiveness* | 52.5 | 43 |
| 1.2 | Regulatory environment | 79.3 | 30 |
| 1.2.1 | Regulatory quality* | 67.7 | 34 |
| 1.2.2 | Rule of law* | 52.2 | 52 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.6 | 19 ● |
| 1.3 | Business environment | 73.6 | 56 |
| 1.3.1 | Ease of starting a business* | 97.8 | 6 ● |
| 1.3.2 | Ease of resolving insolvency* | 40.2 | 89 |
| 1.3.3 | Ease of paying taxes* | 82.8 | 35 |
| 2 | Human capital & research | 23.2 | 91 |
| 2.1 | Education | 39.9 | 88 |
| 2.1.1 | Expenditure on education, % GDP | 2.0 | 115 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 15.5 | 78 |
| 2.1.3 | School life expectancy, years | 14.9 | 48 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 7.2 | 1 ● |
| 2.2 | Tertiary education | 27.7 | 88 |
| 2.2.1 | Tertiary enrolment, % gross | 39.2 | 65 |
| 2.2.2 | Graduates in science & engineering, % | 16.7 | 75 |
| 2.2.3 | Tertiary inbound mobility, % | 2.8 | 56 |
| 2.3 | Research & development (R&D) | 2.1 | 91 |
| 2.3.1 | Researchers, FTE/mn pop. | 585.4 | 58 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.1 | 103 ○ |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 41.7 | 69 |
| 3.1 | Information & communication technologies (ICTs) | 52.8 | 58 |
| 3.1.1 | ICT access* | 62.0 | 63 |
| 3.1.2 | ICT use* | 30.3 | 77 |
| 3.1.3 | Government's online service* | 59.8 | 49 |
| 3.1.4 | E-participation* | 58.8 | 49 |
| 3.2 | General infrastructure | 35.0 | 64 |
| 3.2.1 | Electricity output, kWh/cap. | 2,240.3 | 75 |
| 3.2.2 | Logistics performance* | 2.5 | 106 |
| 3.2.3 | Gross capital formation, % GDP | 32.3 | 12 ● |
| 3.3 | Ecological sustainability | 37.5 | 87 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 7.1 | 69 |
| 3.3.2 | Environmental performance* | 65.0 | 94 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.7 | 49 |
| 4 | Market sophistication | 44.3 | 55 |
| 4.1 | Credit | 41.5 | 41 |
| 4.1.1 | Ease of getting credit* | 85.0 | 7 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 45.2 | 72 |
| 4.1.3 | Microfinance gross loans, % GDP | 1.9 | 17 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 34.7 | 72 |
| 4.2.1 | Ease of protecting minority investors* | 68.3 | 20 ● |
| 4.2.2 | Market capitalization, % GDP [Ⓐ] | 6.0 | 86 ○ |
| 4.2.3 | Total value of stocks traded, % GDP [Ⓐ] | 0.0 | 82 ○ |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 56.8 | 80 |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 0.7 | 5 ● |
| 4.3.2 | Intensity of local competition [†] | 62.3 | 87 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 34.3 | 101 |
| 5 | Business sophistication | 26.5 | 90 |
| 5.1 | Knowledge workers | 26.5 | 95 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓐ] | 22.2 | 62 |
| 5.1.2 | Firms offering formal training, % firms | 10.5 | 91 ○ |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | 14.8 | 42 |
| 5.2 | Innovation linkages | 22.2 | 102 |
| 5.2.1 | University/industry research collaboration [†] | 27.3 | 117 ○ |
| 5.2.2 | State of cluster development [†] | 33.7 | 109 ○ |
| 5.2.3 | GERD financed by abroad, % | 14.3 | 30 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 70 |
| 5.3 | Knowledge absorption | 31.0 | 52 |
| 5.3.1 | Intellectual property payments, % total trade | 0.2 | 79 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 7.6 | 62 |
| 5.3.3 | ICT services imports, % total trade | 0.5 | 92 |
| 5.3.4 | FDI net inflows, % GDP | 10.0 | 10 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 26.8 | 56 |
| 6.1 | Knowledge creation | 18.1 | 48 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 3.2 | 35 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 53 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 1.5 | 19 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 16.8 | 45 |
| 6.1.5 | Citable documents H index | 101.0 | 78 |
| 6.2 | Knowledge impact | 43.6 | 33 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 4.8 | 8 ● |
| 6.2.2 | New businesses/th pop. 15–64 | 5.7 | 22 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 3.4 | 72 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 12.1 | 72 |
| 6.3 | Knowledge diffusion | 18.9 | 102 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 79 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.3 | 87 |
| 6.3.3 | ICT services exports, % total trade | 0.7 | 89 |
| 6.3.4 | FDI net outflows, % GDP | 1.2 | 42 |
| 7 | Creative outputs | 26.6 | 76 |
| 7.1 | Intangible assets | 34.7 | 99 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 45.4 | 52 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 2.5 | 46 |
| 7.1.3 | ICTs & business model creation [†] | 49.5 | 98 |
| 7.1.4 | ICTs & organizational model creation [†] | 40.3 | 107 ○ |
| 7.2 | Creative goods & services | 31.5 | 39 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 50 |
| 7.2.2 | National feature films/mn pop. 15–69 | 3.1 | 47 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 3.5 | 4 ● |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 103 |
| 7.3 | Online creativity | 5.4 | 74 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 1.9 | 83 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 2.5 | 64 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,586.9 | 60 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Germany

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 80.7 |
| GDP (US\$ billions) | 3,357.6 |
| GDP per capita, PPP\$ | 46,893.2 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 57.9 | 10 |
| Innovation Output Sub-Index | 54.0 | 8 |
| Innovation Input Sub-Index | 61.9 | 18 |
| Innovation Efficiency Ratio | 0.9 | 9 |
| Global Innovation Index 2015 (out of 141) | 57.1 | 12 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 84.1 | 18 |
| 1.1 Political environment | 86.6 | 15 |
| 1.1.1 Political stability & safety* | 86.1 | 24 |
| 1.1.2 Government effectiveness* | 87.2 | 12 |
| 1.2 Regulatory environment | 81.6 | 24 |
| 1.2.1 Regulatory quality* | 86.7 | 13 |
| 1.2.2 Rule of law* | 93.3 | 15 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 21.6 | 90 ○ |
| 1.3 Business environment | 84.1 | 19 |
| 1.3.1 Ease of starting a business* | 83.4 | 81 ○ |
| 1.3.2 Ease of resolving insolvency* | 91.9 | 3 ● |
| 1.3.3 Ease of paying taxes* | 77.0 | 59 |

| | | |
|---|-------------|-----------|
| 2 Human capital & research | 58.9 | 10 |
| 2.1 Education | 56.9 | 35 |
| 2.1.1 Expenditure on education, % GDP | 4.9 | 52 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 23.2 | 40 |
| 2.1.3 School life expectancy, years | 17.0 | 16 |
| 2.1.4 PISA scales in reading, maths, & science | 515.1 | 13 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 12.6 | 44 |
| 2.2 Tertiary education | 46.0 | 29 |
| 2.2.1 Tertiary enrolment, % gross | 61.1 | 42 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | 7.1 | 25 |
| 2.3 Research & development (R&D) | 74.0 | 9 |
| 2.3.1 Researchers, FTE/mn pop. | 4,459.5 | 16 |
| 2.3.2 Gross expenditure on R&D, % GDP | 2.8 | 9 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 7,304.7 | 1 ● |
| 2.3.4 QS university ranking, average score top 3* | 76.0 | 11 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 58.5 | 22 |
| 3.1 Information & communication technologies (ICTs) | 74.9 | 21 |
| 3.1.1 ICT access* | 92.2 | 5 ● |
| 3.1.2 ICT use* | 69.8 | 21 |
| 3.1.3 Government's online service* | 66.9 | 34 |
| 3.1.4 E-participation* | 70.6 | 24 |
| 3.2 General infrastructure | 49.8 | 24 |
| 3.2.1 Electricity output, kWh/cap | 7,389.6 | 24 |
| 3.2.2 Logistics performance* | 4.1 | 1 ● |
| 3.2.3 Gross capital formation, % GDP | 18.8 | 93 ○ |
| 3.3 Ecological sustainability | 50.8 | 39 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.8 | 36 |
| 3.3.2 Environmental performance* | 84.3 | 30 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.1 | 45 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 59.7 | 16 |
| 4.1 Credit | 50.2 | 25 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 79.6 | 36 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|----|
| 4.2 Investment | 42.8 | 38 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 44.9 | 37 |
| 4.2.3 Total value of stocks traded, % GDP | 34.8 | 22 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 17 |

| | | |
|---|-------------|------------|
| 4.3 Trade, competition, & market scale | 86.0 | 4 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 82.8 | 6 |
| 4.3.3 Domestic market scale, bn PPP\$ | 3,748.1 | 5 ● |

| | | |
|--|-------------|-----------|
| 5 Business sophistication | 48.3 | 15 |
| 5.1 Knowledge workers | 63.2 | 11 |
| 5.1.1 Knowledge-intensive employment, % | 43.5 | 17 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.9 | 9 |
| 5.1.4 GERD financed by business, % ^② | 65.4 | 6 |
| 5.1.5 Females employed w/advanced degrees, % total | 12.4 | 53 ○ |

| | | |
|---|-------------|-----------|
| 5.2 Innovation linkages | 44.8 | 20 |
| 5.2.1 University/industry research collaboration [†] | 72.3 | 10 |
| 5.2.2 State of cluster development [†] | 74.4 | 3 ● |
| 5.2.3 GERD financed by abroad, % ^② | 5.2 | 65 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 47 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 5.9 | 7 |

| | | |
|--|-------------|-----------|
| 5.3 Knowledge absorption | 36.9 | 31 |
| 5.3.1 Intellectual property payments, % total trade | 0.5 | 56 |
| 5.3.2 High-tech imports less re-imports, % total trade | 10.9 | 26 |
| 5.3.3 ICT services imports, % total trade | 1.6 | 30 |
| 5.3.4 FDI net inflows, % GDP | 0.2 | 121 ○ |
| 5.3.5 Research talent, % in business enterprise | 56.8 | 15 |

| | | |
|--|-------------|----------|
| 6 Knowledge & technology outputs | 51.6 | 8 |
| 6.1 Knowledge creation | 66.4 | 6 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 19.7 | 1 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 4.7 | 10 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 2.9 | 9 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 25.7 | 31 |
| 6.1.5 Citable documents H index | 887.0 | 3 ● |

| | | |
|--|-------------|-----------|
| 6.2 Knowledge impact | 45.7 | 26 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.8 | 71 ○ |
| 6.2.2 New businesses/th pop. 15–64 ^② | 1.3 | 60 ○ |
| 6.2.3 Computer software spending, % GDP | 0.5 | 19 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 14.8 | 27 |
| 6.2.5 High- & medium-high-tech manufactures, % | 54.7 | 7 |
| 6.3 Knowledge diffusion | 42.7 | 19 |
| 6.3.1 Intellectual property receipts, % total trade | 0.8 | 14 |
| 6.3.2 High-tech exports less re-exports, % total trade | 13.0 | 15 |
| 6.3.3 ICT services exports, % total trade | 1.8 | 54 |
| 6.3.4 FDI net outflows, % GDP | 3.1 | 20 |

| | | |
|---|-------------|----------|
| 7 Creative outputs | 56.3 | 7 |
| 7.1 Intangible assets | 65.1 | 8 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 65.3 | 28 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 18.1 | 5 ● |
| 7.1.3 ICTs & business model creation [†] | 73.0 | 21 |
| 7.1.4 ICTs & organizational model creation [†] | 70.1 | 18 |

| | | |
|---|-------------|-----------|
| 7.2 Creative goods & services | 34.4 | 29 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.6 | 21 |
| 7.2.2 National feature films/mn pop. 15–69 | 3.9 | 41 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 57.0 | 10 |
| 7.2.4 Printing & publishing manufactures, % | 1.2 | 52 ○ |
| 7.2.5 Creative goods exports, % total trade | 2.0 | 24 |

| | | |
|--|-------------|-----------|
| 7.3 Online creativity | 60.5 | 10 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 59.1 | 13 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 5,952.1 | 19 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 38.8 | 28 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 27.4 |
| GDP (US\$ billions) | 36.0 |
| GDP per capita, PPP\$ | 4,266.2 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.7 | 102 |
| Innovation Output Sub-Index | 19.9 | 100 |
| Innovation Input Sub-Index | 33.4 | 103 |
| Innovation Efficiency Ratio | 0.6 | 88 |
| Global Innovation Index 2015 (out of 141) | 28.0 | 108 |

1 Institutions 45.3 114

| | | |
|--|------|-------|
| 1.1 Political environment | 45.5 | 78 |
| 1.1.1 Political stability & safety* | 59.6 | 76 |
| 1.1.2 Government effectiveness* | 31.5 | 83 |
| 1.2 Regulatory environment | 31.5 | 123 ○ |
| 1.2.1 Regulatory quality* | 43.8 | 74 |
| 1.2.2 Rule of law* | 47.6 | 60 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 49.8 | 123 ○ |
| 1.3 Business environment | 59.0 | 101 |
| 1.3.1 Ease of starting a business* | 83.7 | 77 |
| 1.3.2 Ease of resolving insolvency* | 21.9 | 124 ○ |
| 1.3.3 Ease of paying taxes* | 71.2 | 80 |

2 Human capital & research 25.7 85

| | | |
|---|------|------|
| 2.1 Education | 49.8 | 58 |
| 2.1.1 Expenditure on education, % GDP | 5.9 | 27 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 31.6 | 15 ● |
| 2.1.3 School life expectancy, years | 11.4 | 93 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 15.8 | 70 |
| 2.2 Tertiary education | 24.7 | 93 |
| 2.2.1 Tertiary enrolment, % gross | 15.6 | 98 |
| 2.2.2 Graduates in science & engineering, % | 17.6 | 68 |
| 2.2.3 Tertiary inbound mobility, % | 3.9 | 43 ● |
| 2.3 Research & development (R&D) | 2.6 | 86 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 38.7 | 89 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.4 | 69 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 2.3 | 72 |

3 Infrastructure 33.3 96

| | | |
|---|-------|------|
| 3.1 Information & communication technologies (ICTs) | 35.6 | 93 |
| 3.1.1 ICT access* | 45.1 | 86 |
| 3.1.2 ICT use* | 26.4 | 85 |
| 3.1.3 Government's online service* | 31.5 | 94 |
| 3.1.4 E-participation* | 39.2 | 80 |
| 3.2 General infrastructure | 26.3 | 98 |
| 3.2.1 Electricity output, kWh/cap | 496.8 | 104 |
| 3.2.2 Logistics performance* | 2.6 | 95 |
| 3.2.3 Gross capital formation, % GDP | 23.8 | 52 ● |
| 3.3 Ecological sustainability | 38.1 | 86 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.9 | 33 ● |
| 3.3.2 Environmental performance* | 58.9 | 103 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 108 |

4 Market sophistication 36.3 101

| | | |
|--|------|------|
| 4.1 Credit | 30.1 | 76 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 19.9 | 109 |
| 4.1.3 Microfinance gross loans, % GDP | 1.5 | 25 ● |

| | | |
|---|------|-----|
| 4.2 Investment | 30.0 | 92 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 Market capitalization, % GDP [Ⓓ] | 10.3 | 82 |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 70 |

4.3 Trade, competition, & market scale 48.8 108

| | | |
|---|-------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 10.0 | 117 |
| 4.3.2 Intensity of local competition [†] | 63.1 | 84 |
| 4.3.3 Domestic market scale, bn PPP\$ | 108.5 | 73 |

5 Business sophistication 26.2 92

| | | |
|---|------|------|
| 5.1 Knowledge workers | 20.9 | 111 |
| 5.1.1 Knowledge-intensive employment, % [Ⓓ] | 9.6 | 95 |
| 5.1.2 Firms offering formal training, % firms | 40.1 | 39 ● |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.0 | 85 ○ |
| 5.1.4 GERD financed by business, % [Ⓓ] | 0.1 | 92 ○ |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 31.3 62

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 41.0 | 74 |
| 5.2.2 State of cluster development [†] | 43.7 | 71 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 31.2 | 14 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 48 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓓ] | 0.0 | 104 |

5.3 Knowledge absorption 26.3 76

| | | |
|---|-----|------|
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade [Ⓓ] | 5.1 | 96 |
| 5.3.3 ICT services imports, % total trade | n/a | n/a |
| 5.3.4 FDI net inflows, % GDP | 8.7 | 13 ● |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 1.0 | 75 |

6 Knowledge & technology outputs 20.3 87

| | | |
|--|------|------|
| 6.1 Knowledge creation | 6.2 | 84 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 93 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 8.1 | 70 |
| 6.1.5 Citable documents H index | 92.0 | 84 |

6.2 Knowledge impact 30.4 89

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.1 | 62 |
| 6.2.2 New businesses/th pop. 15–64 [Ⓓ] | 0.9 | 76 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.5 | 119 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 24.1 69

| | | |
|---|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓓ] | 0.3 | 86 |
| 6.3.3 ICT services exports, % total trade | n/a | n/a |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 0.0 | 93 |

7 Creative outputs 19.6 104

| | | |
|--|------|-------|
| 7.1 Intangible assets | 37.8 | 86 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓓ] | 0.0 | 108 ○ |
| 7.1.3 ICTs & business model creation [†] | 51.9 | 85 |
| 7.1.4 ICTs & organizational model creation [†] | 42.6 | 96 |

7.2 Creative goods & services 2.4 114

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade [Ⓓ] | 0.1 | 88 |

7.3 Online creativity 0.5 108

| | | |
|--|-------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 101 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 128 ○ |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 101.7 | 108 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 0.6 | 72 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Greece

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 11.0 |
| GDP (US\$ billions) | 195.3 |
| GDP per capita, PPP\$ | 26,448.7 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 39.8 | 40 |
| Innovation Output Sub-Index | 30.1 | 49 |
| Innovation Input Sub-Index | 49.4 | 37 |
| Innovation Efficiency Ratio | 0.6 | 84 |
| Global Innovation Index 2015 (out of 141) | 40.3 | 45 |

1 Institutions 67.1 51

| | | |
|--|------|----|
| 1.1 Political environment | 56.7 | 49 |
| 1.1.1 Political stability & safety* | 63.5 | 65 |
| 1.1.2 Government effectiveness* | 50.0 | 46 |
| 1.2 Regulatory environment | 69.4 | 52 |
| 1.2.1 Regulatory quality* | 53.3 | 57 |
| 1.2.2 Rule of law* | 55.7 | 48 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.9 | 68 |
| 1.3 Business environment | 75.1 | 49 |
| 1.3.1 Ease of starting a business* | 90.7 | 44 |
| 1.3.2 Ease of resolving insolvency* | 56.3 | 51 |
| 1.3.3 Ease of paying taxes* | 78.5 | 56 |

2 Human capital & research 55.3 18 ●

| | | |
|--|---------|------|
| 2.1 Education | 76.8 | 3 ● |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | 17.2 | 14 ● |
| 2.1.4 PISA scales in reading, maths, & science | 465.6 | 39 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 7.9 | 5 ● |
| 2.2 Tertiary education | 58.7 | 7 ● |
| 2.2.1 Tertiary enrolment, % gross | 110.2 | 1 ● |
| 2.2.2 Graduates in science & engineering, % ^② | 28.7 | 9 ● |
| 2.2.3 Tertiary inbound mobility, % | 4.2 | 36 |
| 2.3 Research & development (R&D) | 30.3 | 36 |
| 2.3.1 Researchers, FTE/mn pop. | 2,699.3 | 31 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.8 | 39 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 30.3 | 43 |
| 2.3.4 QS university ranking, average score top 3* | 31.5 | 43 |

3 Infrastructure 48.6 46

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 67.2 | 33 |
| 3.1.1 ICT access* | 77.1 | 33 |
| 3.1.2 ICT use* | 50.5 | 49 |
| 3.1.3 Government's online service* | 60.6 | 47 |
| 3.1.4 E-participation* | 80.4 | 17 ● |
| 3.2 General infrastructure | 24.9 | 105 ○ |
| 3.2.1 Electricity output, kWh/cap. | 4,329.5 | 47 |
| 3.2.2 Logistics performance* | 3.2 | 42 |
| 3.2.3 Gross capital formation, % GDP | 9.0 | 124 ○ |
| 3.3 Ecological sustainability | 53.7 | 25 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.1 | 26 |
| 3.3.2 Environmental performance* | 85.8 | 21 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.2 | 29 |

4 Market sophistication 49.0 41

| | | |
|--|-------|------|
| 4.1 Credit | 47.8 | 28 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 116.9 | 20 ● |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|----|
| 4.2 Investment | 30.1 | 91 |
| 4.2.1 Ease of protecting minority investors* | 61.7 | 45 |
| 4.2.2 Market capitalization, % GDP | 23.4 | 59 |
| 4.2.3 Total value of stocks traded, % GDP | 14.3 | 30 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 59 |

4.3 Trade, competition, & market scale 69.1 39

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 67.8 | 66 |
| 4.3.3 Domestic market scale, bn PPP\$ | 285.3 | 50 |

5 Business sophistication 27.2 87

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 38.5 | 63 |
| 5.1.1 Knowledge-intensive employment, % | 30.6 | 45 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.3 | 46 |
| 5.1.4 GERD financed by business, % | 30.0 | 51 |
| 5.1.5 Females employed w/advanced degrees, % total | 16.5 | 34 |

5.2 Innovation linkages 22.4 98 ○

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 34.4 | 101 ○ |
| 5.2.2 State of cluster development [†] | 32.5 | 114 ○ |
| 5.2.3 GERD financed by abroad, % | 13.3 | 33 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 41 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.4 | 38 |

5.3 Knowledge absorption 20.6 97 ○

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.6 | 45 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.7 | 85 |
| 5.3.3 ICT services imports, % total trade | 1.2 | 50 |
| 5.3.4 FDI net inflows, % GDP | 0.7 | 107 ○ |
| 5.3.5 Research talent, % in business enterprise | 16.6 | 58 |

6 Knowledge & technology outputs 24.9 62

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 17.6 | 49 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.6 | 41 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 39 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 53 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 33.6 | 21 ● |
| 6.1.5 Citable documents H index | 326.0 | 29 |

6.2 Knowledge impact 35.8 65

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.0 | 89 ○ |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.8 | 79 ○ |
| 6.2.3 Computer software spending, % GDP | 0.6 | 13 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 19.1 | 19 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 12.1 | 71 ○ |

6.3 Knowledge diffusion 21.4 84

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 41 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.9 | 52 |
| 6.3.3 ICT services exports, % total trade | 1.6 | 63 |
| 6.3.4 FDI net outflows, % GDP | 0.4 | 67 |

7 Creative outputs 35.3 45

| | | |
|---|------|------|
| 7.1 Intangible assets | 42.2 | 68 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 4.3 | 29 |
| 7.1.3 ICTs & business model creation [†] | 50.5 | 93 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 43.5 | 94 ○ |

7.2 Creative goods & services 29.1 46

| | | |
|---|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.6 | 19 |
| 7.2.2 National feature films/mn pop. 15–69 | 8.9 | 16 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 16.6 | 28 |
| 7.2.4 Printing & publishing manufactures, % | 1.3 | 50 |
| 7.2.5 Creative goods exports, % total trade | 1.0 | 38 |

7.3 Online creativity 27.6 33

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 13.1 | 36 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 19.5 | 32 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,568.8 | 31 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 44.1 | 26 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 16.3 |
| GDP (US\$ billions) | 63.9 |
| GDP per capita, PPP\$ | 7,737.6 |
| Income group | Lower-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 27.3 | 97 |
| Innovation Output Sub-Index | 20.9 | 93 |
| Innovation Input Sub-Index | 33.7 | 101 |
| Innovation Efficiency Ratio | 0.6 | 79 |
| Global Innovation Index 2015 (out of 141) | 28.8 | 101 |

| | | |
|--|-------------|------------|
| 1 Institutions | 48.0 | 102 |
| 1.1 Political environment | 33.0 | 106 |
| 1.1.1 Political stability & safety* | 46.9 | 95 |
| 1.1.2 Government effectiveness* | 19.2 | 107 |
| 1.2 Regulatory environment | 46.9 | 110 |
| 1.2.1 Regulatory quality* | 40.1 | 80 |
| 1.2.2 Rule of law* | 22.5 | 121 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.0 | 103 |
| 1.3 Business environment | 64.1 | 82 |
| 1.3.1 Ease of starting a business* | 83.9 | 76 |
| 1.3.2 Ease of resolving insolvency* | 27.3 | 121 ○ |
| 1.3.3 Ease of paying taxes* | 81.2 | 44 ● |

| | | |
|--|-------------|------------|
| 2 Human capital & research | 18.0 | 108 |
| 2.1 Education | 28.2 | 112 |
| 2.1.1 Expenditure on education, % GDP | 2.8 | 104 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 5.4 | 108 ○ |
| 2.1.3 School life expectancy, years | 10.7 | 100 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 12.7 | 45 |
| 2.2 Tertiary education | 25.8 | 91 |
| 2.2.1 Tertiary enrolment, % gross | 18.3 | 94 |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 16.8 | 74 |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 0.0 | 114 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 26.7 | 95 ○ |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.0 | 108 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|------------|
| 3 Infrastructure | 26.5 | 113 |
| 3.1 Information & communication technologies (ICTs) | 22.1 | 110 |
| 3.1.1 ICT access* | 41.6 | 95 |
| 3.1.2 ICT use* | 12.3 | 104 |
| 3.1.3 Government's online service* | 15.0 | 116 |
| 3.1.4 E-participation* | 19.6 | 112 |
| 3.2 General infrastructure | 18.4 | 124 ○ |
| 3.2.1 Electricity output, kWh/cap | 641.2 | 99 |
| 3.2.2 Logistics performance* | 2.8 | 74 |
| 3.2.3 Gross capital formation, % GDP | 12.7 | 120 ○ |
| 3.3 Ecological sustainability | 39.0 | 83 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.1 | 54 |
| 3.3.2 Environmental performance* | 69.6 | 79 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 109 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 43.5 | 60 |
| 4.1 Credit | 31.9 | 71 |
| 4.1.1 Ease of getting credit* | 80.0 | 14 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 32.9 | 89 |
| 4.1.3 Microfinance gross loans, % GDP | 0.3 | 44 |

| | | |
|---|-------|-------|
| 4.2 Investment | 33.3 | 78 |
| 4.2.1 Ease of protecting minority investors* | 33.3 | 126 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 65.3 | 50 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.8 | 46 |
| 4.3.2 Intensity of local competition [†] | 75.5 | 27 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 119.8 | 72 |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 32.4 | 55 |
| 5.1 Knowledge workers | 28.5 | 91 |
| 5.1.1 Knowledge-intensive employment, % | 10.9 | 93 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 51.9 | 21 ● |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.0 | 87 ○ |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓓ] | 3.5 | 81 |
| 5.2 Innovation linkages | 44.0 | 23 ● |
| 5.2.1 University/industry research collaboration [†] | 43.6 | 66 |
| 5.2.2 State of cluster development [†] | 47.2 | 55 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 49.0 | 4 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 106 |
| 5.3 Knowledge absorption | 24.6 | 86 |
| 5.3.1 Intellectual property payments, % total trade | 1.0 | 29 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.5 | 40 ● |
| 5.3.3 ICT services imports, % total trade | 0.4 | 104 |
| 5.3.4 FDI net inflows, % GDP | 2.0 | 79 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 17.9 | 98 |
| 6.1 Knowledge creation | 1.5 | 125 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 106 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 89 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 52 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.3 | 124 ○ |
| 6.1.5 Citable documents H index | 63.0 | 107 |
| 6.2 Knowledge impact | 31.8 | 84 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.5 | 48 |
| 6.2.2 New businesses/th pop. 15–64 [Ⓓ] | 0.5 | 87 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.8 | 91 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 20.3 | 93 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 52 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.4 | 58 |
| 6.3.3 ICT services exports, % total trade | 2.2 | 42 ● |
| 6.3.4 FDI net outflows, % GDP | (0.3) | 108 |

| | | |
|--|-------------|-----------|
| 7 Creative outputs | 24.0 | 88 |
| 7.1 Intangible assets | 42.8 | 66 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 39.3 | 58 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.5 | 77 |
| 7.1.3 ICTs & business model creation [†] | 66.1 | 35 ● |
| 7.1.4 ICTs & organizational model creation [†] | 60.9 | 33 ● |
| 7.2 Creative goods & services | 6.6 | 103 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 69 |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓓ] | 1.2 | 67 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 64 |
| 7.3 Online creativity | 3.6 | 84 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 4.6 | 58 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.6 | 90 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 774.9 | 84 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Guinea

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 12.6 |
| GDP (US\$ billions) | 6.7 |
| GDP per capita, PPP\$ | 1,213.6 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|--------------|
| Global Innovation Index (out of 128) | 17.2 | 127 ○ |
| Innovation Output Sub-Index | 11.3 | 124 |
| Innovation Input Sub-Index | 23.2 | 127 ○ |
| Innovation Efficiency Ratio | 0.5 | 112 |
| Global Innovation Index 2015 (out of 141) | 18.5 | 139 |

1 Institutions 42.4 121

| | | |
|--|------|-------|
| 1.1 Political environment | 22.5 | 122 |
| 1.1.1 Political stability & safety* | 39.7 | 109 |
| 1.1.2 Government effectiveness* | 5.3 | 124 |
| 1.2 Regulatory environment | 55.5 | 93 |
| 1.2.1 Regulatory quality* | 17.5 | 125 |
| 1.2.2 Rule of law* | 12.8 | 127 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.1 | 33 ● |
| 1.3 Business environment | 49.0 | 125 |
| 1.3.1 Ease of starting a business* | 80.0 | 95 |
| 1.3.2 Ease of resolving insolvency* | 38.8 | 95 |
| 1.3.3 Ease of paying taxes* | 28.3 | 126 |

2 Human capital & research 9.0 127 ○

| | | |
|---|------|-------|
| 2.1 Education | 20.0 | 126 |
| 2.1.1 Expenditure on education, % GDP | 3.5 | 90 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 9.9 | 99 |
| 2.1.3 School life expectancy, years | 8.7 | 110 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 33.1 | 107 |
| 2.2 Tertiary education | 6.9 | 118 |
| 2.2.1 Tertiary enrolment, % gross | 10.8 | 103 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % ^② | 0.9 | 82 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 18.6 126

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 1.0 | 128 ○ |
| 3.1.1 ICT access* | n/a | n/a |
| 3.1.2 ICT use* | n/a | n/a |
| 3.1.3 Government's online service* | 0.0 | 127 ○ |
| 3.1.4 E-participation* | 2.0 | 127 ○ |
| 3.2 General infrastructure | 17.4 | 125 |
| 3.2.1 Electricity output, kWh/cap. | n/a | n/a |
| 3.2.2 Logistics performance* | 2.5 | 111 |
| 3.2.3 Gross capital formation, % GDP | 12.5 | 121 |
| 3.3 Ecological sustainability | 37.4 | 88 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 55.4 | 109 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 104 |

4 Market sophistication 24.8 128 ○

| | | |
|---|------|------|
| 4.1 Credit | 11.7 | 123 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP ^② | 9.1 | 124 |
| 4.1.3 Microfinance gross loans, % GDP ^② | 0.2 | 49 ● |

| | | |
|--|------|------|
| 4.2 Investment | 31.4 | 88 |
| 4.2.1 Ease of protecting minority investors* | 35.0 | 121 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 29 ● |

| | | |
|--|------|-----|
| 4.3 Trade, competition, & market scale | 31.5 | 124 |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 11.9 | 123 |
| 4.3.2 Intensity of local competition [†] | 53.3 | 118 |
| 4.3.3 Domestic market scale, bn PPP\$ | 15.1 | 122 |

5 Business sophistication 21.1 119

| | | |
|--|------|-------|
| 5.1 Knowledge workers | 11.7 | 122 |
| 5.1.1 Knowledge-intensive employment, % ^② | 0.7 | 106 ○ |
| 5.1.2 Firms offering formal training, % firms ^② | 21.1 | 79 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 22.5 | 96 |
| 5.2.1 University/industry research collaboration [†] | 19.7 | 123 ○ |
| 5.2.2 State of cluster development [†] | 33.7 | 108 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.1 | 62 ● |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 29.2 | 60 ● |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.1 | 102 |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.6 | 104 |
| 5.3.3 ICT services imports, % total trade ^② | 1.5 | 34 ● |
| 5.3.4 FDI net inflows, % GDP | 8.5 | 15 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 8.6 126

| | | |
|--|------|------|
| 6.1 Knowledge creation | 4.6 | 96 |
| 6.1.1 Patents by origin/bn PPP\$ GDP ^② | 0.1 | 100 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 7.9 | 72 ● |
| 6.1.5 Citable documents H index | 41.0 | 121 |

| | | |
|--|-------|-------|
| 6.2 Knowledge impact | 1.0 | [127] |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 0.1 | 99 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.6 | 115 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 20.2 | 95 |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 87 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.1 | 102 |
| 6.3.3 ICT services exports, % total trade ^② | 2.7 | 33 ● |
| 6.3.4 FDI net outflows, % GDP ^② | (0.0) | 96 |

7 Creative outputs 14.0 123

| | | |
|---|------|-------|
| 7.1 Intangible assets | 23.5 | 123 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 12.1 | 94 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 4.3 | 28 ● |
| 7.1.3 ICTs & business model creation [†] | 35.9 | 122 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 28.6 | 122 ○ |

| | | |
|---|-----|------|
| 7.2 Creative goods & services | 9.1 | 96 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.5 | 25 ● |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 0.8 | 80 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 112 |

| | | |
|--|-----|-------|
| 7.3 Online creativity | 0.0 | 128 ○ |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 124 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 115 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 5.6 | 127 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 8.1 |
| GDP (US\$ billions) | 20.3 |
| GDP per capita, PPP\$ | 4,868.6 |
| Income group | Lower-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.9 | 101 |
| Innovation Output Sub-Index | 18.6 | 106 |
| Innovation Input Sub-Index | 35.3 | 93 |
| Innovation Efficiency Ratio | 0.5 | 105 |
| Global Innovation Index 2015 (out of 141) | 27.5 | 113 |

| | | | | |
|----------|---|-------------|------------|---|
| 1 | Institutions | 43.5 | 117 | ○ |
| 1.1 | Political environment | 33.5 | 104 | |
| 1.1.1 | Political stability & safety* | 50.1 | 90 | |
| 1.1.2 | Government effectiveness* | 17.0 | 115 | ○ |
| 1.2 | Regulatory environment | 42.5 | 116 | ○ |
| 1.2.1 | Regulatory quality* | 35.4 | 93 | |
| 1.2.2 | Rule of law* | 22.9 | 120 | ○ |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 30.3 | 116 | ○ |
| 1.3 | Business environment | 54.6 | 114 | |
| 1.3.1 | Ease of starting a business* | 74.9 | 111 | |
| 1.3.2 | Ease of resolving insolvency* | 31.7 | 111 | |
| 1.3.3 | Ease of paying taxes* | 57.3 | 107 | |
| 2 | Human capital & research | 21.0 | 101 | |
| 2.1 | Education | 46.8 | 67 | |
| 2.1.1 | Expenditure on education, % GDP | 5.9 | 29 | ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 18.7 | 62 | |
| 2.1.3 | School life expectancy, years | 11.2 | 97 | |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a | |
| 2.1.5 | Pupil-teacher ratio, secondary | 8.6 | 13 | ● |
| 2.2 | Tertiary education | 16.1 | 105 | |
| 2.2.1 | Tertiary enrolment, % gross | 21.2 | 90 | |
| 2.2.2 | Graduates in science & engineering, % | 12.4 | 94 | ○ |
| 2.2.3 | Tertiary inbound mobility, % | 0.7 | 84 | |
| 2.3 | Research & development (R&D) | 0.0 | 115 | ○ |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a | |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a | |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 | ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 | ○ |
| 3 | Infrastructure | 31.0 | 104 | |
| 3.1 | Information & communication technologies (ICTs) | 31.6 | 97 | |
| 3.1.1 | ICT access* | 40.5 | 99 | |
| 3.1.2 | ICT use* | 12.6 | 103 | |
| 3.1.3 | Government's online service* | 40.2 | 79 | |
| 3.1.4 | E-participation* | 33.3 | 89 | |
| 3.2 | General infrastructure | 24.9 | 106 | |
| 3.2.1 | Electricity output, kWh/cap | 996.8 | 90 | |
| 3.2.2 | Logistics performance* | 2.6 | 97 | |
| 3.2.3 | Gross capital formation, % GDP | 21.8 | 67 | |
| 3.3 | Ecological sustainability | 36.6 | 91 | |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.2 | 88 | |
| 3.3.2 | Environmental performance* | 69.6 | 79 | |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 65 | |
| 4 | Market sophistication | 44.9 | 54 | |
| 4.1 | Credit | 42.4 | 39 | ● |
| 4.1.1 | Ease of getting credit* | 85.0 | 7 | ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 55.3 | 54 | |
| 4.1.3 | Microfinance gross loans, % GDP | 1.8 | 20 | ● |

| | | | | |
|-------|--|------|-----|--|
| 4.2 | Investment | 43.3 | 35 | |
| 4.2.1 | Ease of protecting minority investors* | 43.3 | 104 | |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a | |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a | |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a | |
| 4.3 | Trade, competition, & market scale | 49.1 | 105 | |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 6.7 | 98 | |
| 4.3.2 | Intensity of local competition [†] | 66.5 | 72 | |
| 4.3.3 | Domestic market scale, bn PPP\$ | 39.2 | 96 | |

| | | | | |
|----------|---|-------------|-----------|---|
| 5 | Business sophistication | 36.2 | 44 | ● |
| 5.1 | Knowledge workers | 42.7 | 47 | |
| 5.1.1 | Knowledge-intensive employment, % | n/a | n/a | |
| 5.1.2 | Firms offering formal training, % firms [Ⓐ] | 35.8 | 43 | |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a | |
| 5.1.4 | GERD financed by business, % | n/a | n/a | |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a | |
| 5.2 | Innovation linkages | 37.5 | 40 | ● |
| 5.2.1 | University/industry research collaboration [†] | 49.0 | 47 | ● |
| 5.2.2 | State of cluster development [†] | 49.5 | 47 | ● |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a | |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a | |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP [Ⓐ] | 0.1 | 73 | |
| 5.3 | Knowledge absorption | 28.3 | 65 | |
| 5.3.1 | Intellectual property payments, % total trade | 0.5 | 57 | |
| 5.3.2 | High-tech imports less re-imports, % total trade | 7.4 | 65 | |
| 5.3.3 | ICT services imports, % total trade | 0.8 | 76 | |
| 5.3.4 | FDI net inflows, % GDP | 6.7 | 19 | ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a | |

| | | | | |
|----------|--|-------------|------------|---|
| 6 | Knowledge & technology outputs | 14.4 | 117 | ○ |
| 6.1 | Knowledge creation | 2.3 | 121 | ○ |
| 6.1.1 | Patents by origin/bn PPP\$ GDP [Ⓐ] | 0.2 | 98 | |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a | |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP [Ⓐ] | 0.2 | 42 | |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 1.8 | 119 | ○ |
| 6.1.5 | Citable documents H index | 48.0 | 115 | ○ |
| 6.2 | Knowledge impact | 13.9 | [116] | |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a | |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a | |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 50 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 4.6 | 64 | |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a | |
| 6.3 | Knowledge diffusion | 27.0 | 51 | |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a | |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.5 | 74 | |
| 6.3.3 | ICT services exports, % total trade | 3.0 | 22 | ● |
| 6.3.4 | FDI net outflows, % GDP [Ⓐ] | 0.2 | 76 | |

| | | | | |
|----------|--|-------------|-----------|---|
| 7 | Creative outputs | 22.7 | 92 | |
| 7.1 | Intangible assets | 43.2 | 62 | |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 49.9 | 45 | |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP [Ⓐ] | 0.2 | 96 | |
| 7.1.3 | ICTs & business model creation [†] | 62.6 | 47 | ● |
| 7.1.4 | ICTs & organizational model creation [†] | 60.8 | 34 | ● |
| 7.2 | Creative goods & services | 2.1 | 116 | ○ |
| 7.2.1 | Cultural & creative services exports, % of total trade | (0.0) | 85 | ○ |
| 7.2.2 | National feature films/mn pop. 15–69 [Ⓐ] | 0.4 | 92 | ○ |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a | |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a | |
| 7.2.5 | Creative goods exports, % total trade | 0.1 | 86 | |
| 7.3 | Online creativity | 2.3 | 95 | |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 104 | |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.5 | 91 | |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 777.8 | 83 | |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a | |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Hong Kong (China)

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 7.3 |
| GDP (US\$ billions) | 309.9 |
| GDP per capita, PPP\$ | 56,700.8 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 55.7 | 14 |
| Innovation Output Sub-Index | 42.2 | 25 |
| Innovation Input Sub-Index | 69.1 | 2 ● |
| Innovation Efficiency Ratio | 0.6 | 83 ○ |
| Global Innovation Index 2015 (out of 141) | 57.2 | 11 |

| | | | |
|----------|--|-------------|------------|
| 1 | Institutions | 92.8 | 4 |
| 1.1 | Political environment | 90.5 | 6 |
| 1.1.1 | Political stability & safety* | 90.9 | 10 |
| 1.1.2 | Government effectiveness* | 90.2 | 5 |
| 1.2 | Regulatory environment | 97.2 | 3 ● |
| 1.2.1 | Regulatory quality* | 95.6 | 2 ● |
| 1.2.2 | Rule of law* | 93.4 | 14 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 | Business environment | 90.6 | 3 ● |
| 1.3.1 | Ease of starting a business* | 98.1 | 4 |
| 1.3.2 | Ease of resolving insolvency* | 75.1 | 24 |
| 1.3.3 | Ease of paying taxes* | 98.7 | 4 |
| 2 | Human capital & research | 55.2 | 19 |
| 2.1 | Education | 51.9 | 52 |
| 2.1.1 | Expenditure on education, % GDP | 3.6 | 89 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 19.3 | 60 ○ |
| 2.1.3 | School life expectancy, years | 16.4 | 23 |
| 2.1.4 | PISA scales in reading, maths, & science | 553.6 | 3 ● |
| 2.1.5 | Pupil-teacher ratio, secondary | 13.6 | 53 |
| 2.2 | Tertiary education | 63.1 | 3 ● |
| 2.2.1 | Tertiary enrolment, % gross | 68.8 | 27 |
| 2.2.2 | Graduates in science & engineering, % ⁽²⁾ | 34.7 | 5 |
| 2.2.3 | Tertiary inbound mobility, % | 9.8 | 17 |
| 2.3 | Research & development (R&D) | 50.6 | 21 |
| 2.3.1 | Researchers, FTE/mn pop. ⁽²⁾ | 3,136.0 | 27 |
| 2.3.2 | Gross expenditure on R&D, % GDP ⁽²⁾ | 0.7 | 46 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 267.1 | 23 |
| 2.3.4 | QS university ranking, average score top 3* | 85.6 | 4 |
| 3 | Infrastructure | 67.5 | 2 ● |
| 3.1 | Information & communication technologies (ICTs) | 84.4 | 9 |
| 3.1.1 | ICT access* | 93.2 | 3 ● |
| 3.1.2 | ICT use* | 75.5 | 18 |
| 3.1.3 | Government's online service* | n/a | n/a |
| 3.1.4 | E-participation* | n/a | n/a |
| 3.2 | General infrastructure | 47.6 | 27 |
| 3.2.1 | Electricity output, kWh/cap | 5,445.8 | 37 |
| 3.2.2 | Logistics performance* | 3.8 | 15 |
| 3.2.3 | Gross capital formation, % GDP | 23.2 | 56 |
| 3.3 | Ecological sustainability | 70.5 | 1 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 23.8 | 1 ● |
| 3.3.2 | Environmental performance* | n/a | n/a |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.6 | 51 |
| 4 | Market sophistication | 80.0 | 2 ● |
| 4.1 | Credit | 83.9 | 2 ● |
| 4.1.1 | Ease of getting credit* | 75.0 | 18 |
| 4.1.2 | Domestic credit to private sector, % GDP | 233.7 | 2 ● |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 79.2 | 2 ● |
| 4.2.1 | Ease of protecting minority investors* | 83.3 | 1 ● |
| 4.2.2 | Market capitalization, % GDP | 1,111.4 | 1 ● |
| 4.2.3 | Total value of stocks traded, % GDP | 522.9 | 1 ● |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 27 |
| 4.3 | Trade, competition, & market scale | 77.0 | 14 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 0.0 | 1 ● |
| 4.3.2 | Intensity of local competition [†] | 86.0 | 2 ● |
| 4.3.3 | Domestic market scale, bn PPP\$ | 400.4 | 42 |
| 5 | Business sophistication | 50.2 | 12 |
| 5.1 | Knowledge workers | 45.8 | 40 |
| 5.1.1 | Knowledge-intensive employment, % | 37.9 | 27 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP ⁽²⁾ | 0.3 | 41 |
| 5.1.4 | GERD financed by business, % ⁽²⁾ | 47.6 | 23 |
| 5.1.5 | Females employed w/advanced degrees, % total | 12.7 | 49 ○ |
| 5.2 | Innovation linkages | 47.5 | 11 |
| 5.2.1 | University/industry research collaboration [†] | 59.8 | 27 |
| 5.2.2 | State of cluster development [†] | 67.3 | 14 |
| 5.2.3 | GERD financed by abroad, % ⁽²⁾ | 6.8 | 58 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 1 ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.8 | 27 |
| 5.3 | Knowledge absorption | 57.1 | 2 ● |
| 5.3.1 | Intellectual property payments, % total trade ⁽²⁾ | 0.3 | 69 ○ |
| 5.3.2 | High-tech imports less re-imports, % total trade | 43.8 | 1 ● |
| 5.3.3 | ICT services imports, % total trade ⁽²⁾ | 0.3 | 114 ○ |
| 5.3.4 | FDI net inflows, % GDP | 39.9 | 1 ● |
| 5.3.5 | Research talent, % in business enterprise ⁽²⁾ | 39.9 | 30 |
| 6 | Knowledge & technology outputs | 35.9 | 30 |
| 6.1 | Knowledge creation | 17.2 | 50 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.5 | 78 ○ |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.9 | 28 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | n/a | n/a |
| 6.1.5 | Citable documents H index | 359.0 | 25 |
| 6.2 | Knowledge impact | 48.5 | 21 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.5 | 50 |
| 6.2.2 | New businesses/th pop. 15–64 | 31.3 | 1 ● |
| 6.2.3 | Computer software spending, % GDP | 0.4 | 22 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 5.7 | 56 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 22.0 | 23 |
| 6.3 | Knowledge diffusion | 41.8 | 23 |
| 6.3.1 | Intellectual property receipts, % total trade ⁽²⁾ | 0.1 | 51 |
| 6.3.2 | High-tech exports less re-exports, % total trade ⁽²⁾ | 0.1 | 107 ○ |
| 6.3.3 | ICT services exports, % total trade ⁽²⁾ | 0.4 | 99 ○ |
| 6.3.4 | FDI net outflows, % GDP | 53.4 | 1 ● |
| 7 | Creative outputs | 48.6 | 17 |
| 7.1 | Intangible assets | 55.0 | 24 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 73.6 | 19 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 3.7 | 33 |
| 7.1.3 | ICTs & business model creation [†] | 70.7 | 25 |
| 7.1.4 | ICTs & organizational model creation [†] | 71.2 | 16 |
| 7.2 | Creative goods & services | 22.1 | 67 |
| 7.2.1 | Cultural & creative services exports, % of total trade ⁽²⁾ | 0.2 | 41 |
| 7.2.2 | National feature films/mn pop. 15–69 | 7.5 | 21 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 46.6 | 17 |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade ⁽²⁾ | 0.2 | 72 ○ |
| 7.3 | Online creativity | 62.3 | 7 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 74.1 | 7 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 8.9 | 42 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 11,073.5 | 2 ● |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 84.5 | 3 ● |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

⁽²⁾ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 9.9 |
| GDP (US\$ billions) | 120.6 |
| GDP per capita, PPP\$ | 26,222.0 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 44.7 | 33 |
| Innovation Output Sub-Index | 40.5 | 30 |
| Innovation Input Sub-Index | 48.9 | 38 |
| Innovation Efficiency Ratio | 0.8 | 17 ● |
| Global Innovation Index 2015 (out of 141) | 43.0 | 35 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 71.3 | 40 |
| 1.1 Political environment | 67.1 | 43 |
| 1.1.1 Political stability & safety* | 80.3 | 34 |
| 1.1.2 Government effectiveness* | 53.8 | 42 |
| 1.2 Regulatory environment | 75.4 | 36 |
| 1.2.1 Regulatory quality* | 63.7 | 39 |
| 1.2.2 Rule of law* | 59.5 | 43 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.4 | 54 |
| 1.3 Business environment | 71.4 | 60 |
| 1.3.1 Ease of starting a business* | 90.6 | 45 |
| 1.3.2 Ease of resolving insolvency* | 50.6 | 60 |
| 1.3.3 Ease of paying taxes* | 73.1 | 74 |

| | | |
|--|-------------|-----------|
| 2 Human capital & research | 41.2 | 36 |
| 2.1 Education | 52.1 | 51 |
| 2.1.1 Expenditure on education, % GDP [Ⓓ] | 4.6 | 62 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 19.7 | 57 |
| 2.1.3 School life expectancy, years | 15.8 | 34 |
| 2.1.4 PISA scales in reading, maths, & science | 486.6 | 30 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 10.5 | 30 |
| 2.2 Tertiary education | 35.8 | 61 |
| 2.2.1 Tertiary enrolment, % gross | 57.0 | 44 |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 16.8 | 72 ○ |
| 2.2.3 Tertiary inbound mobility, % | 5.8 | 30 |
| 2.3 Research & development (R&D) | 35.9 | 32 |
| 2.3.1 Researchers, FTE/mn pop. | 2,650.6 | 32 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.4 | 25 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 141.1 | 26 |
| 2.3.4 QS university ranking, average score top 3* | 24.8 | 48 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 51.1 | 41 |
| 3.1 Information & communication technologies (ICTs) | 57.1 | 49 |
| 3.1.1 ICT access* | 75.4 | 35 |
| 3.1.2 ICT use* | 51.9 | 45 |
| 3.1.3 Government's online service* | 55.9 | 53 |
| 3.1.4 E-participation* | 45.1 | 73 |
| 3.2 General infrastructure | 38.2 | 59 |
| 3.2.1 Electricity output, kWh/cap | 2,970.4 | 62 |
| 3.2.2 Logistics performance* | 3.5 | 32 |
| 3.2.3 Gross capital formation, % GDP | 21.5 | 71 |
| 3.3 Ecological sustainability | 58.0 | 19 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.1 | 54 |
| 3.3.2 Environmental performance* | 84.6 | 28 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 9.0 | 9 ● |

| | | |
|--|-------------|-------------|
| 4 Market sophistication | 41.0 | 80 ○ |
| 4.1 Credit | 30.3 | 75 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 |
| 4.1.2 Domestic credit to private sector, % GDP | 43.5 | 77 ○ |
| 4.1.3 Microfinance gross loans, % GDP [Ⓓ] | 0.0 | 80 ○ |

| | | |
|---|-------|-------|
| 4.2 Investment | 24.2 | 118 ○ |
| 4.2.1 Ease of protecting minority investors* | 55.0 | 72 |
| 4.2.2 Market capitalization, % GDP | 10.5 | 81 ○ |
| 4.2.3 Total value of stocks traded, % GDP | 5.1 | 44 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 72 ○ |
| 4.3 Trade, competition, & market scale | 68.6 | 40 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 68.7 | 61 |
| 4.3.3 Domestic market scale, bn PPP\$ | 247.1 | 56 |

| | | |
|--|-------------|-----------|
| 5 Business sophistication | 40.1 | 34 |
| 5.1 Knowledge workers | 40.0 | 57 |
| 5.1.1 Knowledge-intensive employment, % | 35.3 | 37 |
| 5.1.2 Firms offering formal training, % firms | 15.8 | 87 ○ |
| 5.1.3 GERD performed by business, % of GDP | 1.0 | 22 |
| 5.1.4 GERD financed by business, % | 48.3 | 22 |
| 5.1.5 Females employed w/advanced degrees, % total | 14.9 | 41 |

| | | |
|---|------|------|
| 5.2 Innovation linkages | 29.7 | 69 |
| 5.2.1 University/industry research collaboration [†] | 54.6 | 35 |
| 5.2.2 State of cluster development [†] | 43.8 | 70 |
| 5.2.3 GERD financed by abroad, % | 17.5 | 25 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 54 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.5 | 31 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 50.5 | 7 ● |
| 5.3.1 Intellectual property payments, % total trade | 1.4 | 18 |
| 5.3.2 High-tech imports less re-imports, % total trade | 12.8 | 19 ● |
| 5.3.3 ICT services imports, % total trade | 1.2 | 46 |
| 5.3.4 FDI net inflows, % GDP | 9.0 | 12 ● |
| 5.3.5 Research talent, % in business enterprise | 59.4 | 14 |

| | | |
|--|-------------|-------------|
| 6 Knowledge & technology outputs | 44.4 | 15 ● |
| 6.1 Knowledge creation | 20.9 | 43 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.7 | 39 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.6 | 32 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.0 | 25 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 25.1 | 33 |
| 6.1.5 Citable documents H index | 301.0 | 30 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 47.9 | 23 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.5 | 78 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 3.7 | 33 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 45 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 28.0 | 10 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 56.2 | 6 ● |
| 6.3 Knowledge diffusion | 64.4 | 3 ● |
| 6.3.1 Intellectual property receipts, % total trade | 1.8 | 10 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 13.2 | 13 ● |
| 6.3.3 ICT services exports, % total trade | 1.6 | 62 |
| 6.3.4 FDI net outflows, % GDP | 8.4 | 8 ● |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 36.5 | 40 |
| 7.1 Intangible assets | 41.1 | 74 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 40.0 | 57 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 4.0 | 31 |
| 7.1.3 ICTs & business model creation [†] | 60.2 | 58 |
| 7.1.4 ICTs & organizational model creation [†] | 50.8 | 72 |

| | | |
|---|------|------|
| 7.2 Creative goods & services | 35.1 | 26 |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓓ] | 0.6 | 20 |
| 7.2.2 National feature films/mn pop. 15–69 | 5.2 | 36 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 12.1 | 30 |
| 7.2.4 Printing & publishing manufactures, % | 0.8 | 70 ○ |
| 7.2.5 Creative goods exports, % total trade | 5.9 | 7 ● |

| | | |
|--|---------|------|
| 7.3 Online creativity | 28.9 | 32 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 11.0 | 39 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 33.6 | 20 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 2,890.9 | 45 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 49.6 | 21 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Iceland

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 0.3 |
| GDP (US\$ billions) | 16.7 |
| GDP per capita, PPP\$ | 46,097.0 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 56.0 | 13 |
| Innovation Output Sub-Index | 55.3 | 6 ● |
| Innovation Input Sub-Index | 56.6 | 24 |
| Innovation Efficiency Ratio | 1.0 | 3 ● |
| Global Innovation Index 2015 (out of 141) | 57.0 | 13 |

1 Institutions **86.4** **16**

| | | |
|--|------|-----|
| 1.1 Political environment | 87.2 | 14 |
| 1.1.1 Political stability & safety* | 93.7 | 6 ● |
| 1.1.2 Government effectiveness* | 80.6 | 18 |
| 1.2 Regulatory environment | 86.2 | 20 |
| 1.2.1 Regulatory quality* | 74.7 | 20 |
| 1.2.2 Rule of law* | 90.0 | 17 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.0 | 48 |
| 1.3 Business environment | 85.9 | 17 |
| 1.3.1 Ease of starting a business* | 92.4 | 35 |
| 1.3.2 Ease of resolving insolvency* | 81.7 | 14 |
| 1.3.3 Ease of paying taxes* | 83.7 | 32 |

2 Human capital & research **47.3** **30**

| | | |
|--|---------|------|
| 2.1 Education | 60.7 | 22 |
| 2.1.1 Expenditure on education, % GDP ^② | 7.0 | 11 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 20.2 | 54 |
| 2.1.3 School life expectancy, years ^② | 19.0 | 6 |
| 2.1.4 PISA scales in reading, maths, & science | 484.5 | 31 |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 40.8 | 41 |
| 2.2.1 Tertiary enrolment, % gross ^② | 82.2 | 11 |
| 2.2.2 Graduates in science & engineering, % ^② | 15.6 | 81 ○ |
| 2.2.3 Tertiary inbound mobility, % ^② | 6.2 | 27 |
| 2.3 Research & development (R&D) | 40.3 | 29 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 5,993.1 | 7 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.9 | 19 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 53.7 | 35 |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure **55.9** **26**

| | | |
|---|----------|-------|
| 3.1 Information & communication technologies (ICTs) | 71.3 | 26 |
| 3.1.1 ICT access* | 93.7 | 2 ● |
| 3.1.2 ICT use* | 81.1 | 8 |
| 3.1.3 Government's online service* | 61.4 | 43 |
| 3.1.4 E-participation* | 49.0 | 64 |
| 3.2 General infrastructure | 55.9 | 12 |
| 3.2.1 Electricity output, kWh/cap. | 54,915.2 | 1 ● |
| 3.2.2 Logistics performance* | 3.4 | 36 |
| 3.2.3 Gross capital formation, % GDP | 18.8 | 94 ○ |
| 3.3 Ecological sustainability | 40.6 | 75 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 2.2 | 119 ○ |
| 3.3.2 Environmental performance* | 90.5 | 2 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.0 | 32 |

4 Market sophistication **48.2** **45**

| | | |
|--|------|-----|
| 4.1 Credit | 49.1 | 26 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 |
| 4.1.2 Domestic credit to private sector, % GDP | 98.8 | 27 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 44.8 | 33 |
| 4.2.1 Ease of protecting minority investors* | 68.3 | 20 |
| 4.2.2 Market capitalization, % GDP ^② | 19.9 | 66 ○ |
| 4.2.3 Total value of stocks traded, % GDP ^② | 4.8 | 45 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 10 |

4.3 Trade, competition, & market scale **50.7** **102 ○**

| | | |
|---|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.1 | 36 |
| 4.3.2 Intensity of local competition [†] | 63.8 | 82 |
| 4.3.3 Domestic market scale, bn PPP\$ | 14.3 | 123 ○ |

5 Business sophistication **45.3** **22**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 59.8 | 21 |
| 5.1.1 Knowledge-intensive employment, % | 48.2 | 6 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.1 | 21 |
| 5.1.4 GERD financed by business, % ^② | 39.2 | 37 |
| 5.1.5 Females employed w/advanced degrees, % total | 21.5 | 19 |

5.2 Innovation linkages **41.4** **29**

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 60.3 | 24 |
| 5.2.2 State of cluster development [†] | 49.6 | 46 |
| 5.2.3 GERD financed by abroad, % ^② | 20.1 | 20 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.9 | 19 |

5.3 Knowledge absorption **34.8** **37**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 1.3 | 20 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.3 | 90 ○ |
| 5.3.3 ICT services imports, % total trade | 1.9 | 20 |
| 5.3.4 FDI net inflows, % GDP | 4.4 | 34 |
| 5.3.5 Research talent, % in business enterprise ^② | 37.7 | 34 |

6 Knowledge & technology outputs **41.2** **22**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 49.1 | 15 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 6.4 | 20 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 3.0 | 15 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 64.8 | 1 ● |
| 6.1.5 Citable documents H index | 198.0 | 39 |

6.2 Knowledge impact **35.8** **64**

| | | |
|---|-----|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.3 | 84 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 9.5 | 12 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 4.7 | 63 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 7.1 | 85 ○ |

6.3 Knowledge diffusion **38.7** **27**

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 1.9 | 9 |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.4 | 57 |
| 6.3.3 ICT services exports, % total trade | 2.4 | 40 |
| 6.3.4 FDI net outflows, % GDP | 0.2 | 77 |

7 Creative outputs **69.5** **1 ●**

| | | |
|---|-------|----|
| 7.1 Intangible assets | 60.8 | 15 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 105.8 | 11 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.7 | 45 |
| 7.1.3 ICTs & business model creation [†] | 73.0 | 22 |
| 7.1.4 ICTs & organizational model creation [†] | 73.7 | 13 |

7.2 Creative goods & services **61.1** **1 ●**

| | | |
|--|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 30.5 | 1 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 6.4 | 1 ● |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 87 ○ |

7.3 Online creativity **95.3** **1 ●**

| | | |
|--|----------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 86.0 | 6 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 13,529.2 | 1 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 1,311.1 |
| GDP (US\$ billions) | 2,090.7 |
| GDP per capita, PPP\$ | 6,161.6 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.6 | 66 |
| Innovation Output Sub-Index | 26.7 | 59 |
| Innovation Input Sub-Index | 40.5 | 72 |
| Innovation Efficiency Ratio | 0.7 | 63 |
| Global Innovation Index 2015 (out of 141) | 31.7 | 81 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 50.7 | 96 |
| 1.1 | Political environment | 36.2 | 98 |
| 1.1.1 | Political stability & safety* | 38.9 | 113 ○ |
| 1.1.2 | Government effectiveness* | 33.4 | 82 |
| 1.2 | Regulatory environment | 61.9 | 77 |
| 1.2.1 | Regulatory quality* | 33.6 | 99 |
| 1.2.2 | Rule of law* | 44.9 | 66 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 15.8 | 67 |
| 1.3 | Business environment | 54.1 | 117 ○ |
| 1.3.1 | Ease of starting a business* | 73.6 | 114 ○ |
| 1.3.2 | Ease of resolving insolvency* | 32.6 | 110 |
| 1.3.3 | Ease of paying taxes* | 56.1 | 109 |
| 2 | Human capital & research | 32.2 | 63 |
| 2.1 | Education | 26.0 | 118 ○ |
| 2.1.1 | Expenditure on education, % GDP | 3.8 | 83 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 15.2 | 83 |
| 2.1.3 | School life expectancy, years | 11.6 | 92 |
| 2.1.4 | PISA scales in reading, maths, & science [Ⓐ] | 336.0 | 62 ○ |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓐ] | 30.8 | 103 ○ |
| 2.2 | Tertiary education | 34.1 | 67 |
| 2.2.1 | Tertiary enrolment, % gross | 23.9 | 87 |
| 2.2.2 | Graduates in science & engineering, % | 29.1 | 8 ● |
| 2.2.3 | Tertiary inbound mobility, % | 0.1 | 99 ○ |
| 2.3 | Research & development (R&D) | 36.4 | 31 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓐ] | 156.6 | 77 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓐ] | 0.8 | 40 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 433.9 | 20 ● |
| 2.3.4 | QS university ranking, average score top 3* | 57.1 | 20 ● |
| 3 | Infrastructure | 37.0 | 87 |
| 3.1 | Information & communication technologies (ICTs) | 39.2 | 86 |
| 3.1.1 | ICT access* | 31.3 | 108 |
| 3.1.2 | ICT use* | 8.5 | 107 |
| 3.1.3 | Government's online service* | 54.3 | 57 |
| 3.1.4 | E-participation* | 62.7 | 40 |
| 3.2 | General infrastructure | 39.3 | 52 |
| 3.2.1 | Electricity output, kWh/cap | 954.8 | 91 |
| 3.2.2 | Logistics performance* | 3.1 | 52 |
| 3.2.3 | Gross capital formation, % GDP | 30.7 | 18 ● |
| 3.3 | Ecological sustainability | 32.6 | 109 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.5 | 63 |
| 3.3.2 | Environmental performance* | 53.6 | 110 ○ |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 66 |
| 4 | Market sophistication | 50.3 | 33 |
| 4.1 | Credit | 29.4 | 78 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 51.6 | 62 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.3 | 43 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 46.6 | 30 |
| 4.2.1 | Ease of protecting minority investors* | 73.3 | 8 ● |
| 4.2.2 | Market capitalization, % GDP | 76.1 | 21 |
| 4.2.3 | Total value of stocks traded, % GDP | 35.7 | 21 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 32 |
| 4.3 | Trade, competition, & market scale | 74.9 | 20 ● |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 6.8 | 99 |
| 4.3.2 | Intensity of local competition [†] | 60.6 | 96 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 7,411.1 | 3 ● |
| 5 | Business sophistication | 32.2 | 57 |
| 5.1 | Knowledge workers | 31.4 | 86 |
| 5.1.1 | Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 | Firms offering formal training, % firms | 35.9 | 42 |
| 5.1.3 | GERD performed by business, % of GDP [Ⓐ] | 0.3 | 45 |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 37.0 | 43 |
| 5.2.1 | University/industry research collaboration [†] | 47.8 | 49 |
| 5.2.2 | State of cluster development [†] | 56.0 | 28 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 37 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.4 | 37 |
| 5.3 | Knowledge absorption | 28.2 | 66 |
| 5.3.1 | Intellectual property payments, % total trade | 0.9 | 32 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 7.1 | 66 |
| 5.3.3 | ICT services imports, % total trade | 0.8 | 70 |
| 5.3.4 | FDI net inflows, % GDP | 1.7 | 86 |
| 5.3.5 | Research talent, % in business enterprise [Ⓐ] | 38.7 | 31 |
| 6 | Knowledge & technology outputs | 31.0 | 43 |
| 6.1 | Knowledge creation | 14.4 | 57 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.6 | 54 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 51 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 7.0 | 77 |
| 6.1.5 | Citable documents H index | 383.0 | 22 ● |
| 6.2 | Knowledge impact | 39.3 | 48 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 5.0 | 6 ● |
| 6.2.2 | New businesses/th pop. 15–64 | 0.1 | 101 ○ |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 62 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 5.5 | 59 |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓐ] | 31.7 | 36 |
| 6.3 | Knowledge diffusion | 39.2 | 26 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 45 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 3.5 | 37 |
| 6.3.3 | ICT services exports, % total trade | 10.7 | 1 ● |
| 6.3.4 | FDI net outflows, % GDP | 0.5 | 60 |
| 7 | Creative outputs | 22.5 | 94 |
| 7.1 | Intangible assets | 34.8 | 98 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 27.0 | 72 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.8 | 72 |
| 7.1.3 | ICTs & business model creation [†] | 51.5 | 87 |
| 7.1.4 | ICTs & organizational model creation [†] | 53.7 | 64 |
| 7.2 | Creative goods & services | 19.1 | 72 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 45 |
| 7.2.2 | National feature films/mn pop. 15–69 | 2.0 | 54 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 0.1 | 59 ○ |
| 7.2.4 | Printing & publishing manufactures, % [Ⓐ] | 0.6 | 84 ○ |
| 7.2.5 | Creative goods exports, % total trade | 2.9 | 16 ● |
| 7.3 | Online creativity | 1.3 | 101 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 1.0 | 98 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.7 | 84 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 264.6 | 96 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 1.5 | 68 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Indonesia

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 257.6 |
| GDP (US\$ billions) | 859.0 |
| GDP per capita, PPP\$ | 11,125.9 |
| Income group | Lower-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.1 | 88 |
| Innovation Output Sub-Index | 24.1 | 76 |
| Innovation Input Sub-Index | 34.0 | 99 |
| Innovation Efficiency Ratio | 0.7 | 52 |
| Global Innovation Index 2015 (out of 141) | 29.8 | 97 |

1 Institutions 41.6 122 ○

| | | |
|--|------|-------|
| 1.1 Political environment | 46.2 | 74 |
| 1.1.1 Political stability & safety* | 53.7 | 86 |
| 1.1.2 Government effectiveness* | 38.7 | 69 |
| 1.2 Regulatory environment | 20.9 | 126 ○ |
| 1.2.1 Regulatory quality* | 42.2 | 78 |
| 1.2.2 Rule of law* | 38.5 | 82 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 57.8 | 125 ○ |
| 1.3 Business environment | 57.7 | 105 |
| 1.3.1 Ease of starting a business* | 66.0 | 122 ○ |
| 1.3.2 Ease of resolving insolvency* | 46.5 | 69 |
| 1.3.3 Ease of paying taxes* | 60.5 | 101 |

2 Human capital & research 23.1 92

| | | |
|--|-------|-------|
| 2.1 Education | 32.9 | 103 |
| 2.1.1 Expenditure on education, % GDP | 3.4 | 95 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 9.8 | 100 |
| 2.1.3 School life expectancy, years | 12.9 | 76 |
| 2.1.4 PISA scales in reading, maths, & science | 384.4 | 59 ○ |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 15.4 | 66 |
| 2.2 Tertiary education | 27.8 | 87 |
| 2.2.1 Tertiary enrolment, % gross | 31.3 | 75 |
| 2.2.2 Graduates in science & engineering, % ^② | 21.7 | 46 |
| 2.2.3 Tertiary inbound mobility, % ^② | 0.1 | 100 ○ |
| 2.3 Research & development (R&D) | 8.6 | 62 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 89.5 | 83 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 105 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 32.3 | 41 ● |

3 Infrastructure 38.5 80

| | | |
|---|-------|------|
| 3.1 Information & communication technologies (ICTs) | 32.4 | 95 |
| 3.1.1 ICT access* | 46.0 | 84 |
| 3.1.2 ICT use* | 17.9 | 95 |
| 3.1.3 Government's online service* | 36.2 | 88 |
| 3.1.4 E-participation* | 29.4 | 99 |
| 3.2 General infrastructure | 42.2 | 38 ● |
| 3.2.1 Electricity output, kWh/cap | 862.4 | 94 |
| 3.2.2 Logistics performance* | 3.1 | 51 |
| 3.2.3 Gross capital formation, % GDP | 34.0 | 7 ● |
| 3.3 Ecological sustainability | 41.0 | 74 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.6 | 38 ● |
| 3.3.2 Environmental performance* | 65.9 | 90 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.6 | 76 |

4 Market sophistication 43.3 62

| | | |
|--|------|-----|
| 4.1 Credit | 22.7 | 101 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 |
| 4.1.2 Domestic credit to private sector, % GDP | 36.5 | 82 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 76 |

| | | |
|--|------|-----|
| 4.2 Investment | 28.2 | 100 |
| 4.2.1 Ease of protecting minority investors* | 53.3 | 77 |
| 4.2.2 Market capitalization, % GDP | 47.5 | 34 |
| 4.2.3 Total value of stocks traded, % GDP | 10.2 | 35 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 63 |

4.3 Trade, competition, & market scale 78.8 10 ●

| | | |
|---|---------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 2.3 | 54 |
| 4.3.2 Intensity of local competition [†] | 68.5 | 63 |
| 4.3.3 Domestic market scale, bn PPP\$ | 2,685.9 | 8 ● |

5 Business sophistication 23.7 106

| | | |
|---|-----|-------|
| 5.1 Knowledge workers | 7.0 | 125 ○ |
| 5.1.1 Knowledge-intensive employment, % ^② | 8.9 | 96 |
| 5.1.2 Firms offering formal training, % firms ^② | 4.7 | 93 ○ |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 75 |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 3.9 | 80 |

5.2 Innovation linkages 34.9 47

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 59.1 | 29 ● |
| 5.2.2 State of cluster development [†] | 56.1 | 27 ● |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 64 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 112 ○ |

5.3 Knowledge absorption 29.4 59

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.9 | 33 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.8 | 60 |
| 5.3.3 ICT services imports, % total trade | 0.8 | 73 |
| 5.3.4 FDI net inflows, % GDP | 3.0 | 59 |
| 5.3.5 Research talent, % in business enterprise ^② | 35.5 | 37 |

6 Knowledge & technology outputs 23.0 71

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 2.6 | 119 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 90 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 96 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 54 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 0.6 | 127 ○ |
| 6.1.5 Citable documents H index | 140.0 | 56 |

6.2 Knowledge impact 45.7 28 ●

| | | |
|---|------|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 7.8 | 1 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.3 | 92 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 32 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.8 | 80 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 30.9 | 38 |

6.3 Knowledge diffusion 20.9 89

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 71 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.3 | 41 |
| 6.3.3 ICT services exports, % total trade | 0.6 | 92 |
| 6.3.4 FDI net outflows, % GDP | 1.2 | 44 |

7 Creative outputs 25.2 85

| | | |
|---|------|------|
| 7.1 Intangible assets | 37.6 | 87 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 12.9 | 93 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.9 | 67 |
| 7.1.3 ICTs & business model creation [†] | 62.7 | 46 |
| 7.1.4 ICTs & organizational model creation [†] | 59.8 | 38 ● |

7.2 Creative goods & services 22.7 64

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 0.5 | 90 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 1.1 | 54 |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.9 | 68 |
| 7.2.5 Creative goods exports, % total trade | 2.8 | 17 ● |

7.3 Online creativity 2.8 94

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.7 | 88 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.3 | 100 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 260.6 | 97 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 7.4 | 65 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 79.1 |
| GDP (US\$ billions) | 387.6 |
| GDP per capita, PPP\$ | 17,251.3 |
| Income group | Upper-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.5 | 78 |
| Innovation Output Sub-Index | 25.3 | 72 |
| Innovation Input Sub-Index | 35.7 | 90 |
| Innovation Efficiency Ratio | 0.7 | 51 ● |
| Global Innovation Index 2015 (out of 141) | 28.4 | 106 |

1 Institutions 45.9 112

| | | |
|--|------|-------|
| 1.1 Political environment | 34.0 | 102 |
| 1.1.1 Political stability & safety* | 40.3 | 106 |
| 1.1.2 Government effectiveness* | 27.6 | 92 |
| 1.2 Regulatory environment | 42.5 | 115 |
| 1.2.1 Regulatory quality* | 8.5 | 127 ○ |
| 1.2.2 Rule of law* | 21.4 | 122 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 23.1 | 98 |
| 1.3 Business environment | 61.4 | 90 |
| 1.3.1 Ease of starting a business* | 85.7 | 68 |
| 1.3.2 Ease of resolving insolvency* | 31.6 | 112 |
| 1.3.3 Ease of paying taxes* | 66.8 | 88 |

2 Human capital & research 36.9 48 ●

| | | |
|---|-------|------|
| 2.1 Education | 39.3 | 89 |
| 2.1.1 Expenditure on education, % GDP | 3.1 | 98 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 16.2 | 74 |
| 2.1.3 School life expectancy, years | 14.8 | 52 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 17.5 | 76 |
| 2.2 Tertiary education | 62.9 | 4 ● |
| 2.2.1 Tertiary enrolment, % gross | 66.0 | 31 ● |
| 2.2.2 Graduates in science & engineering, % | 46.6 | 2 ● |
| 2.2.3 Tertiary inbound mobility, % | 0.2 | 97 ○ |
| 2.3 Research & development (R&D) | 8.5 | 63 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓔ] | 691.4 | 53 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓔ] | 0.3 | 74 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 19.1 | 54 |

3 Infrastructure 36.7 91

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 37.0 | 88 |
| 3.1.1 ICT access* | 59.7 | 67 |
| 3.1.2 ICT use* | 21.9 | 91 |
| 3.1.3 Government's online service* | 37.0 | 85 |
| 3.1.4 E-participation* | 29.4 | 99 |
| 3.2 General infrastructure | 41.4 | 41 ● |
| 3.2.1 Electricity output, kWh/cap | 3,490.9 | 54 |
| 3.2.2 Logistics performance* | n/a | n/a |
| 3.2.3 Gross capital formation, % GDP | 30.8 | 17 ● |
| 3.3 Ecological sustainability | 31.8 | 110 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.6 | 103 |
| 3.3.2 Environmental performance* | 66.3 | 89 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.6 | 78 |

4 Market sophistication 36.2 102

| | | |
|--|------|-----|
| 4.1 Credit | 32.6 | 67 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 |
| 4.1.2 Domestic credit to private sector, % GDP | 54.4 | 58 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-------|
| 4.2 Investment | 24.3 | 117 ○ |
| 4.2.1 Ease of protecting minority investors* | 40.0 | 112 |
| 4.2.2 Market capitalization, % GDP | 27.4 | 54 |
| 4.2.3 Total value of stocks traded, % GDP | 5.5 | 42 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 51.8 96

| | | |
|--|---------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓔ] | 15.2 | 125 ○ |
| 4.3.2 Intensity of local competition [†] | 55.7 | 112 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,357.0 | 18 ● |

5 Business sophistication 22.8 111

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 23.8 | 102 |
| 5.1.1 Knowledge-intensive employment, % | 17.1 | 81 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP [Ⓔ] | 0.1 | 61 |
| 5.1.4 GERD financed by business, % [Ⓔ] | 30.9 | 49 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 30.4 65

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 36.3 | 94 |
| 5.2.2 State of cluster development [†] | 42.7 | 76 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 113 ○ |

5.3 Knowledge absorption 14.3 125 ○

| | | |
|---|------|-------|
| 5.3.1 Intellectual property payments, % total trade [Ⓔ] | 0.2 | 86 |
| 5.3.2 High-tech imports less re-imports, % total trade [Ⓔ] | 4.0 | 109 ○ |
| 5.3.3 ICT services imports, % total trade [Ⓔ] | 0.6 | 85 |
| 5.3.4 FDI net inflows, % GDP | 0.5 | 115 |
| 5.3.5 Research talent, % in business enterprise [Ⓔ] | 15.0 | 60 |

6 Knowledge & technology outputs 24.0 65

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 34.5 | 26 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 10.1 | 14 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 20.1 | 37 ● |
| 6.1.5 Citable documents H index | 180.0 | 41 ● |

6.2 Knowledge impact 36.1 63

| | | |
|---|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.0 | 64 |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.2 | 64 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.0 | 87 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓔ] | 33.8 | 33 ● |

6.3 Knowledge diffusion 1.4 127 ○

| | | |
|---|-----|-------|
| 6.3.1 Intellectual property receipts, % total trade [Ⓔ] | 0.0 | 83 |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓔ] | 0.5 | 72 |
| 6.3.3 ICT services exports, % total trade [Ⓔ] | 0.2 | 115 ○ |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs 26.7 75

| | | |
|---|------|------|
| 7.1 Intangible assets | 45.8 | 55 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 6.5 | 20 ● |
| 7.1.3 ICTs & business model creation [†] | 54.7 | 77 |
| 7.1.4 ICTs & organizational model creation [†] | 42.3 | 101 |

7.2 Creative goods & services 7.8 101

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 1.5 | 62 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓔ] | 0.2 | 93 ○ |
| 7.2.5 Creative goods exports, % total trade [Ⓔ] | 0.5 | 58 |

7.3 Online creativity 7.3 67

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.9 | 82 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 4.5 | 55 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 2,091.4 | 51 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Ireland

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 4.7 |
| GDP (US\$ billions) | 238.0 |
| GDP per capita, PPP\$ | 55,532.9 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 59.0 | 7 ● |
| Innovation Output Sub-Index | 55.6 | 5 ● |
| Innovation Input Sub-Index | 62.4 | 16 |
| Innovation Efficiency Ratio | 0.9 | 8 |
| Global Innovation Index 2015 (out of 141) | 59.1 | 8 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 88.1 | 12 |
| 1.1 Political environment | 86.4 | 17 |
| 1.1.1 Political stability & safety* | 89.4 | 14 |
| 1.1.2 Government effectiveness* | 83.5 | 15 |
| 1.2 Regulatory environment | 88.8 | 16 |
| 1.2.1 Regulatory quality* | 88.2 | 11 |
| 1.2.2 Rule of law* | 92.0 | 16 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 14.3 | 58 ○ |
| 1.3 Business environment | 89.2 | 9 |
| 1.3.1 Ease of starting a business* | 94.2 | 24 |
| 1.3.2 Ease of resolving insolvency* | 78.4 | 19 |
| 1.3.3 Ease of paying taxes* | 95.0 | 6 ● |

| | | |
|--|-------------|-----------|
| 2 Human capital & research | 54.0 | 20 |
| 2.1 Education | 60.7 | 21 |
| 2.1.1 Expenditure on education, % GDP | 5.8 | 30 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 26.3 | 27 |
| 2.1.3 School life expectancy, years | 18.8 | 7 |
| 2.1.4 PISA scales in reading, maths, & science | 515.6 | 12 |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 47.9 | 22 |
| 2.2.1 Tertiary enrolment, % gross | 73.2 | 21 |
| 2.2.2 Graduates in science & engineering, % ⁽²⁾ | 23.8 | 33 |
| 2.2.3 Tertiary inbound mobility, % | 6.4 | 26 |
| 2.3 Research & development (R&D) | 53.4 | 20 |
| 2.3.1 Researchers, FTE/mn pop. | 3,732.1 | 23 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.5 | 23 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 624.8 | 16 |
| 2.3.4 QS university ranking, average score top 3* | 61.3 | 17 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 59.4 | 19 |
| 3.1 Information & communication technologies (ICTs) | 70.8 | 28 |
| 3.1.1 ICT access* | 82.4 | 18 |
| 3.1.2 ICT use* | 68.5 | 23 |
| 3.1.3 Government's online service* | 67.7 | 31 |
| 3.1.4 E-participation* | 64.7 | 33 |
| 3.2 General infrastructure | 46.2 | 31 |
| 3.2.1 Electricity output, kWh/cap | 5,621.4 | 34 |
| 3.2.2 Logistics performance* | 3.9 | 11 |
| 3.2.3 Gross capital formation, % GDP | 20.8 | 75 ○ |
| 3.3 Ecological sustainability | 61.2 | 12 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 14.3 | 7 ● |
| 3.3.2 Environmental performance* | 86.6 | 19 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.8 | 37 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 56.9 | 19 |
| 4.1 Credit | 51.0 | 22 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 83.2 | 35 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 51.7 | 20 |
| 4.2.1 Ease of protecting minority investors* | 73.3 | 8 |
| 4.2.2 Market capitalization, % GDP | 57.2 | 31 |
| 4.2.3 Total value of stocks traded, % GDP | 6.6 | 40 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 9 |

| | | |
|---|-------------|-----------|
| 4.3 Trade, competition, & market scale | 68.2 | 42 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 68.1 | 65 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 236.4 | 57 ○ |

| | | |
|--|-------------|----------|
| 5 Business sophistication | 53.8 | 8 |
| 5.1 Knowledge workers | 60.3 | 19 |
| 5.1.1 Knowledge-intensive employment, % | 40.3 | 23 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.1 | 18 |
| 5.1.4 GERD financed by business, % | 53.6 | 15 |
| 5.1.5 Females employed w/advanced degrees, % total | 24.2 | 9 |

| | | |
|---|-------------|-----------|
| 5.2 Innovation linkages | 44.3 | 22 |
| 5.2.1 University/industry research collaboration [†] | 70.7 | 13 |
| 5.2.2 State of cluster development [†] | 64.8 | 17 |
| 5.2.3 GERD financed by abroad, % | 19.3 | 23 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 20 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.7 | 22 |

| | | |
|--|-------------|------------|
| 5.3 Knowledge absorption | 56.7 | 3 ● |
| 5.3.1 Intellectual property payments, % total trade | 24.7 | 1 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.7 | 100 ○ |
| 5.3.3 ICT services imports, % total trade | 0.7 | 80 ○ |
| 5.3.4 FDI net inflows, % GDP | 34.6 | 1 ● |
| 5.3.5 Research talent, % in business enterprise | 64.5 | 7 |

| | | |
|--|-------------|------------|
| 6 Knowledge & technology outputs | 57.9 | 3 ● |
| 6.1 Knowledge creation | 30.1 | 31 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 3.7 | 32 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.8 | 21 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 27.9 | 27 |
| 6.1.5 Citable documents H index | 332.0 | 28 |

| | | |
|---|-------------|------------|
| 6.2 Knowledge impact | 56.8 | 3 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.0 | 27 |
| 6.2.2 New businesses/th pop. 15–64 | 5.8 | 21 |
| 6.2.3 Computer software spending, % GDP | 0.7 | 4 ● |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 8.7 | 42 |
| 6.2.5 High- & medium-high-tech manufactures, % ⁽²⁾ | 57.6 | 4 ● |

| | | |
|--|-------------|------------|
| 6.3 Knowledge diffusion | 86.8 | 1 ● |
| 6.3.1 Intellectual property receipts, % total trade | 2.1 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 9.1 | 22 |
| 6.3.3 ICT services exports, % total trade | 23.2 | 1 ● |
| 6.3.4 FDI net outflows, % GDP ⁽²⁾ | 15.8 | 1 ● |

| | | |
|--|-------------|-----------|
| 7 Creative outputs | 53.4 | 10 |
| 7.1 Intangible assets | 62.0 | 10 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP ⁽²⁾ | 1.9 | 52 ○ |
| 7.1.3 ICTs & business model creation [†] | 76.6 | 12 |
| 7.1.4 ICTs & organizational model creation [†] | 73.3 | 14 |

| | | |
|---|-------------|-----------|
| 7.2 Creative goods & services | 33.0 | 36 |
| 7.2.1 Cultural & creative services exports, % of total trade ⁽²⁾ | 0.2 | 38 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 10.3 | 12 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 46.0 | 18 |
| 7.2.4 Printing & publishing manufactures, % ⁽²⁾ | 0.9 | 66 ○ |
| 7.2.5 Creative goods exports, % total trade | 2.1 | 22 |

| | | |
|--|-------------|-----------|
| 7.3 Online creativity | 56.6 | 15 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 65.8 | 10 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 23.2 | 28 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 9,744.5 | 3 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 65.3 | 13 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

○ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 8.1 |
| GDP (US\$ billions) | 296.1 |
| GDP per capita, PPP\$ | 33,656.1 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 52.3 | 21 |
| Innovation Output Sub-Index | 46.8 | 16 |
| Innovation Input Sub-Index | 57.8 | 21 |
| Innovation Efficiency Ratio | 0.8 | 23 |
| Global Innovation Index 2015 (out of 141) | 53.5 | 22 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 67.0 | 52 |
| 1.1 | Political environment | 54.7 | 55 |
| 1.1.1 | Political stability & safety* | 38.1 | 114 ○ |
| 1.1.2 | Government effectiveness* | 71.2 | 24 |
| 1.2 | Regulatory environment | 68.1 | 58 |
| 1.2.1 | Regulatory quality* | 74.7 | 21 |
| 1.2.2 | Rule of law* | 74.7 | 27 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 27.4 | 110 ○ |
| 1.3 | Business environment | 78.2 | 37 |
| 1.3.1 | Ease of starting a business* | 90.6 | 46 |
| 1.3.2 | Ease of resolving insolvency* | 72.5 | 27 |
| 1.3.3 | Ease of paying taxes* | 71.7 | 78 ○ |
| 2 | Human capital & research | 55.4 | 16 |
| 2.1 | Education | 53.3 | 45 |
| 2.1.1 | Expenditure on education, % GDP [Ⓐ] | 5.6 | 33 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 15.5 | 79 ○ |
| 2.1.3 | School life expectancy, years | 16.0 | 31 |
| 2.1.4 | PISA scales in reading, maths, & science | 474.1 | 36 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓐ] | 9.8 | 24 |
| 2.2 | Tertiary education | 33.0 | 73 |
| 2.2.1 | Tertiary enrolment, % gross | 66.3 | 29 |
| 2.2.2 | Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 | Tertiary inbound mobility, % [Ⓐ] | 1.2 | 77 ○ |
| 2.3 | Research & development (R&D) | 80.1 | 3 ● |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓐ] | 8,255.4 | 1 ● |
| 2.3.2 | Gross expenditure on R&D, % GDP | 4.1 | 2 ● |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 440.5 | 19 |
| 2.3.4 | QS university ranking, average score top 3* | 56.1 | 22 |
| 3 | Infrastructure | 56.1 | 25 |
| 3.1 | Information & communication technologies (ICTs) | 77.3 | 16 |
| 3.1.1 | ICT access* | 79.8 | 23 |
| 3.1.2 | ICT use* | 55.7 | 38 |
| 3.1.3 | Government's online service* | 87.4 | 13 |
| 3.1.4 | E-participation* | 86.3 | 12 |
| 3.2 | General infrastructure | 40.0 | 48 |
| 3.2.1 | Electricity output, kWh/cap. | 7,003.3 | 27 |
| 3.2.2 | Logistics performance* | 3.3 | 39 |
| 3.2.3 | Gross capital formation, % GDP | 20.7 | 77 ○ |
| 3.3 | Ecological sustainability | 50.9 | 37 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 10.4 | 25 |
| 3.3.2 | Environmental performance* | 78.1 | 48 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 3.0 | 31 |
| 4 | Market sophistication | 56.5 | 22 |
| 4.1 | Credit | 45.2 | 34 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 66.9 | 46 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|------------|
| 4.2 | Investment | 58.1 | 15 |
| 4.2.1 | Ease of protecting minority investors* | 73.3 | 8 |
| 4.2.2 | Market capitalization, % GDP | 65.6 | 28 |
| 4.2.3 | Total value of stocks traded, % GDP | 15.5 | 28 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.5 | 1 ● |
| 4.3 | Trade, competition, & market scale | 66.3 | 49 |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 0.9 | 8 |
| 4.3.2 | Intensity of local competition [†] | 57.2 | 109 ○ |
| 4.3.3 | Domestic market scale, bn PPP\$ | 272.1 | 53 |
| 5 | Business sophistication | 53.9 | 6 ● |
| 5.1 | Knowledge workers | 60.5 | 18 |
| 5.1.1 | Knowledge-intensive employment, % | 47.7 | 7 |
| 5.1.2 | Firms offering formal training, % firms | 18.6 | 82 ○ |
| 5.1.3 | GERD performed by business, % of GDP | 3.5 | 1 ● |
| 5.1.4 | GERD financed by business, % [Ⓐ] | 36.5 | 43 |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓐ] | 28.4 | 3 ● |
| 5.2 | Innovation linkages | 57.4 | 3 ● |
| 5.2.1 | University/industry research collaboration [†] | 75.1 | 7 ● |
| 5.2.2 | State of cluster development [†] | 55.7 | 29 |
| 5.2.3 | GERD financed by abroad, % [Ⓐ] | 48.8 | 5 ● |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 22 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 5.3 | 8 |
| 5.3 | Knowledge absorption | 43.7 | 16 |
| 5.3.1 | Intellectual property payments, % total trade [Ⓐ] | 0.5 | 53 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 9.8 | 33 |
| 5.3.3 | ICT services imports, % total trade [Ⓐ] | 1.2 | 52 |
| 5.3.4 | FDI net inflows, % GDP | 2.2 | 72 |
| 5.3.5 | Research talent, % in business enterprise [Ⓐ] | 83.7 | 1 ● |
| 6 | Knowledge & technology outputs | 47.8 | 12 |
| 6.1 | Knowledge creation | 56.4 | 10 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 4.1 | 29 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 6.0 | 7 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 45.8 | 10 |
| 6.1.5 | Citable documents H index | 496.0 | 15 |
| 6.2 | Knowledge impact | 40.8 | 45 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | (0.3) | 93 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 3.1 | 36 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 42 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 32.6 | 6 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓐ] | 29.0 | 41 |
| 6.3 | Knowledge diffusion | 46.2 | 14 |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓐ] | 0.6 | 22 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 12.9 | 16 |
| 6.3.3 | ICT services exports, % total trade [Ⓐ] | 6.5 | 7 ● |
| 6.3.4 | FDI net outflows, % GDP | 1.2 | 41 |
| 7 | Creative outputs | 45.8 | 26 |
| 7.1 | Intangible assets | 50.3 | 34 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 13.5 | 90 ○ |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 | ICTs & business model creation [†] | 75.3 | 15 |
| 7.1.4 | ICTs & organizational model creation [†] | 68.7 | 20 |
| 7.2 | Creative goods & services | 38.5 | 19 |
| 7.2.1 | Cultural & creative services exports, % of total trade [Ⓐ] | 0.9 | 12 |
| 7.2.2 | National feature films/mn pop. 15–69 | 10.8 | 10 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 32.3 | 22 |
| 7.2.4 | Printing & publishing manufactures, % [Ⓐ] | 1.3 | 48 |
| 7.2.5 | Creative goods exports, % total trade | 1.7 | 25 |
| 7.3 | Online creativity | 43.9 | 21 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 24.7 | 24 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 16.0 | 34 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 7,906.3 | 8 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 76.7 | 7 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 59.8 |
| GDP (US\$ billions) | 1,815.8 |
| GDP per capita, PPP\$ | 35,708.3 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 47.2 | 29 |
| Innovation Output Sub-Index | 40.3 | 31 |
| Innovation Input Sub-Index | 54.1 | 28 |
| Innovation Efficiency Ratio | 0.7 | 33 |
| Global Innovation Index 2015 (out of 141) | 46.4 | 31 |

1 Institutions 72.8 38

| | | |
|--|------|------|
| 1.1 Political environment | 62.4 | 46 |
| 1.1.1 Political stability & safety* | 75.2 | 42 |
| 1.1.2 Government effectiveness* | 49.5 | 48 |
| 1.2 Regulatory environment | 79.2 | 31 |
| 1.2.1 Regulatory quality* | 61.1 | 43 |
| 1.2.2 Rule of law* | 55.5 | 49 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 76.8 | 42 |
| 1.3.1 Ease of starting a business* | 91.1 | 42 |
| 1.3.2 Ease of resolving insolvency* | 76.1 | 21 |
| 1.3.3 Ease of paying taxes* | 63.0 | 95 ○ |

2 Human capital & research 46.5 31

| | | |
|--|---------|------|
| 2.1 Education | 52.3 | 48 |
| 2.1.1 Expenditure on education, % GDP ^② | 4.1 | 80 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 22.8 | 42 |
| 2.1.3 School life expectancy, years | 16.3 | 26 |
| 2.1.4 PISA scales in reading, maths, & science | 489.5 | 28 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 11.4 | 39 |
| 2.2 Tertiary education | 39.1 | 48 |
| 2.2.1 Tertiary enrolment, % gross | 63.5 | 34 |
| 2.2.2 Graduates in science & engineering, % ^② | 20.2 | 54 |
| 2.2.3 Tertiary inbound mobility, % | 4.4 | 34 |
| 2.3 Research & development (R&D) | 48.0 | 23 |
| 2.3.1 Researchers, FTE/mn pop. | 2,006.7 | 36 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.3 | 26 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 2,029.0 | 10 ● |
| 2.3.4 QS university ranking, average score top 3* | 52.9 | 24 |

3 Infrastructure 59.7 18 ●

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 71.9 | 25 |
| 3.1.1 ICT access* | 77.1 | 32 |
| 3.1.2 ICT use* | 57.4 | 36 |
| 3.1.3 Government's online service* | 74.8 | 23 |
| 3.1.4 E-participation* | 78.4 | 19 |
| 3.2 General infrastructure | 38.3 | 57 |
| 3.2.1 Electricity output, kWh/cap | 4,542.9 | 46 |
| 3.2.2 Logistics performance* | 3.7 | 19 |
| 3.2.3 Gross capital formation, % GDP | 16.3 | 109 ○ |
| 3.3 Ecological sustainability | 69.0 | 2 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.1 | 20 |
| 3.3.2 Environmental performance* | 84.5 | 29 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 12.7 | 5 ● |

4 Market sophistication 53.6 25

| | | |
|--|------|------|
| 4.1 Credit | 39.7 | 45 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 89.4 | 31 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 40.8 | 45 |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP ^② | 21.8 | 62 ○ |
| 4.2.3 Total value of stocks traded, % GDP ^② | 59.9 | 13 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 36 |

4.3 Trade, competition, & market scale 80.2 7 ●

| | | |
|---|---------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 71.0 | 51 |
| 4.3.3 Domestic market scale, bn PPP\$ | 2,135.4 | 12 ● |

5 Business sophistication 37.8 36

| | | |
|--|------|------|
| 5.1 Knowledge workers | 45.0 | 44 |
| 5.1.1 Knowledge-intensive employment, % | 35.6 | 36 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.7 | 25 |
| 5.1.4 GERD financed by business, % ^② | 45.2 | 28 |
| 5.1.5 Females employed w/advanced degrees, % total | 11.1 | 60 ○ |

5.2 Innovation linkages 37.8 38

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 45.5 | 57 |
| 5.2.2 State of cluster development [†] | 74.3 | 4 ● |
| 5.2.3 GERD financed by abroad, % ^② | 9.7 | 45 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 45 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.7 | 23 |

5.3 Knowledge absorption 30.6 53

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.9 | 34 |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.4 | 64 |
| 5.3.3 ICT services imports, % total trade | 1.7 | 28 |
| 5.3.4 FDI net inflows, % GDP | 0.6 | 111 ○ |
| 5.3.5 Research talent, % in business enterprise | 38.3 | 32 |

6 Knowledge & technology outputs 38.7 25

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 33.9 | 27 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 5.7 | 22 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.4 | 26 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.1 | 23 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 27.3 | 28 |
| 6.1.5 Citable documents H index | 713.0 | 7 ● |

6.2 Knowledge impact 52.3 14 ●

| | | |
|--|-------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.5) | 97 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 2.3 | 44 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 16 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 79.1 | 1 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 37.6 | 25 |

6.3 Knowledge diffusion 30.0 40

| | | |
|--|-----|----|
| 6.3.1 Intellectual property receipts, % total trade | 0.6 | 19 |
| 6.3.2 High-tech exports less re-exports, % total trade | 5.5 | 31 |
| 6.3.3 ICT services exports, % total trade | 1.4 | 69 |
| 6.3.4 FDI net outflows, % GDP | 1.2 | 40 |

7 Creative outputs 41.8 32

| | | |
|---|------|------|
| 7.1 Intangible assets | 51.8 | 28 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 49.8 | 46 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 18.5 | 1 ● |
| 7.1.3 ICTs & business model creation [†] | 56.7 | 70 |
| 7.1.4 ICTs & organizational model creation [†] | 47.4 | 82 ○ |

7.2 Creative goods & services 29.4 45

| | | |
|---|------|----|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.3 | 35 |
| 7.2.2 National feature films/mn pop. 15–69 | 4.0 | 40 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 27.8 | 24 |
| 7.2.4 Printing & publishing manufactures, % | 1.3 | 44 |
| 7.2.5 Creative goods exports, % total trade | 2.3 | 21 |

7.3 Online creativity 34.2 28

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 24.4 | 25 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 24.5 | 26 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,569.6 | 13 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 32.1 | 38 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 2.8 |
| GDP (US\$ billions) | 13.9 |
| GDP per capita, PPP\$ | 8,758.5 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.0 | 89 |
| Innovation Output Sub-Index | 20.0 | 99 |
| Innovation Input Sub-Index | 38.0 | 83 |
| Innovation Efficiency Ratio | 0.5 | 104 |
| Global Innovation Index 2015 (out of 141) | 29.9 | 96 |

| | | | |
|----------|---|-------------|------------|
| 1 | Institutions | 65.3 | 57 |
| 1.1 | Political environment | 54.0 | 58 |
| 1.1.1 | Political stability & safety* | 65.0 | 59 |
| 1.1.2 | Government effectiveness* | 42.9 | 61 |
| 1.2 | Regulatory environment | 66.1 | 68 |
| 1.2.1 | Regulatory quality* | 48.8 | 64 |
| 1.2.2 | Rule of law* | 39.4 | 77 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 14.0 | 56 |
| 1.3 | Business environment | 75.8 | 46 ● |
| 1.3.1 | Ease of starting a business* | 97.3 | 9 ● |
| 1.3.2 | Ease of resolving insolvency* | 69.1 | 32 ● |
| 1.3.3 | Ease of paying taxes* | 61.0 | 100 |
| 2 | Human capital & research | 24.2 | 88 |
| 2.1 | Education | 48.2 | 62 |
| 2.1.1 | Expenditure on education, % GDP | 6.0 | 25 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 22.8 | 43 |
| 2.1.3 | School life expectancy, years | n/a | n/a |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 16.5 | 73 |
| 2.2 | Tertiary education | 24.4 | 95 |
| 2.2.1 | Tertiary enrolment, % gross | 27.4 | 83 |
| 2.2.2 | Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 | Tertiary inbound mobility, % | n/a | n/a |
| 2.3 | Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 31.2 | 102 |
| 3.1 | Information & communication technologies (ICTs) | 31.1 | 99 |
| 3.1.1 | ICT access* | 45.7 | 85 |
| 3.1.2 | ICT use* | 27.6 | 83 |
| 3.1.3 | Government's online service* | 31.5 | 94 |
| 3.1.4 | E-participation* | 19.6 | 112 ○ |
| 3.2 | General infrastructure | 23.2 | 113 ○ |
| 3.2.1 | Electricity output, kWh/cap | 1,527.6 | 82 |
| 3.2.2 | Logistics performance* | 2.8 | 67 |
| 3.2.3 | Gross capital formation, % GDP | 16.0 | 111 ○ |
| 3.3 | Ecological sustainability | 39.3 | 82 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.4 | 84 |
| 3.3.2 | Environmental performance* | 77.0 | 53 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.5 | 82 |
| 4 | Market sophistication | 40.3 | 86 |
| 4.1 | Credit | 32.0 | 69 |
| 4.1.1 | Ease of getting credit* | 85.0 | 7 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 29.3 | 96 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.1 | 62 |

| | | | |
|----------|---|-------------|--------------|
| 4.2 | Investment | 42.0 | 42 ● |
| 4.2.1 | Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 | Market capitalization, % GDP | 21.1 | 63 |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 46.9 | 111 ○ |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 7.3 | 101 |
| 4.3.2 | Intensity of local competition [†] | 73.3 | 38 ● |
| 4.3.3 | Domestic market scale, bn PPP\$ | 24.1 | 112 ○ |
| 5 | Business sophistication | 28.8 | 80 |
| 5.1 | Knowledge workers | 30.6 | 89 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓐ] | 20.1 | 69 |
| 5.1.2 | Firms offering formal training, % firms [Ⓐ] | 25.9 | 68 |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 32.8 | 56 |
| 5.2.1 | University/industry research collaboration [†] | 46.6 | 55 |
| 5.2.2 | State of cluster development [†] | 40.9 | 84 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 61 |
| 5.3 | Knowledge absorption | 23.1 | 92 |
| 5.3.1 | Intellectual property payments, % total trade | 1.1 | 24 ● |
| 5.3.2 | High-tech imports less re-imports, % total trade | 4.8 | 99 ○ |
| 5.3.3 | ICT services imports, % total trade | 0.6 | 86 |
| 5.3.4 | FDI net inflows, % GDP | 4.3 | 35 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 16.3 | 110 ○ |
| 6.1 | Knowledge creation | 6.8 | 79 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.4 | 59 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 5.7 | 89 |
| 6.1.5 | Citable documents H index | 71.0 | 97 |
| 6.2 | Knowledge impact | 23.7 | 110 ○ |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | (1.3) | 104 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 1.0 | 70 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 26 ● |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 0.9 | 106 ○ |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 | Knowledge diffusion | 18.5 | 106 ○ |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 47 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.1 | 113 ○ |
| 6.3.3 | ICT services exports, % total trade | 1.5 | 65 |
| 6.3.4 | FDI net outflows, % GDP | (0.0) | 98 ○ |
| 7 | Creative outputs | 23.6 | 91 |
| 7.1 | Intangible assets | 44.9 | 58 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 75.1 | 18 ● |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 3.0 | 40 ● |
| 7.1.3 | ICTs & business model creation [†] | 57.5 | 67 |
| 7.1.4 | ICTs & organizational model creation [†] | 50.1 | 76 |
| 7.2 | Creative goods & services | 1.6 | [1 19] |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 96 |
| 7.3 | Online creativity | 3.0 | 91 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 2.1 | 79 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.2 | 80 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 779.8 | 82 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Japan

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 126.6 |
| GDP (US\$ billions) | 4,123.3 |
| GDP per capita, PPP\$ | 38,054.2 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 54.5 | 16 |
| Innovation Output Sub-Index | 43.0 | 24 |
| Innovation Input Sub-Index | 66.0 | 9 |
| Innovation Efficiency Ratio | 0.7 | 65 |
| Global Innovation Index 2015 (out of 141) | 54.0 | 19 |

1 Institutions **87.1** **15**

| | | |
|--|------|------|
| 1.1 Political environment | 88.9 | 11 |
| 1.1.1 Political stability & safety* | 88.2 | 18 |
| 1.1.2 Government effectiveness* | 89.6 | 7 |
| 1.2 Regulatory environment | 90.0 | 15 |
| 1.2.1 Regulatory quality* | 72.9 | 25 |
| 1.2.2 Rule of law* | 87.0 | 19 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 82.4 | 23 |
| 1.3.1 Ease of starting a business* | 86.3 | 62 |
| 1.3.2 Ease of resolving insolvency* | 93.8 | 2 ● |
| 1.3.3 Ease of paying taxes* | 67.2 | 86 ○ |

2 Human capital & research **57.5** **13**

| | | |
|---|---------|------|
| 2.1 Education | 53.4 | 44 |
| 2.1.1 Expenditure on education, % GDP | 3.8 | 84 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 25.7 | 32 |
| 2.1.3 School life expectancy, years | 15.3 | 38 |
| 2.1.4 PISA scales in reading, maths, & science | 540.4 | 5 |
| 2.1.5 Pupil-teacher ratio, secondary ² | 11.7 | 41 |
| 2.2 Tertiary education | 37.4 | 55 |
| 2.2.1 Tertiary enrolment, % gross | 62.4 | 38 |
| 2.2.2 Graduates in science & engineering, % | 19.9 | 58 ○ |
| 2.2.3 Tertiary inbound mobility, % | 3.5 | 49 |
| 2.3 Research & development (R&D) | 81.6 | 2 ● |
| 2.3.1 Researchers, FTE/mn pop. | 5,386.2 | 9 |
| 2.3.2 Gross expenditure on R&D, % GDP | 3.6 | 3 ● |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 4,694.6 | 4 ● |
| 2.3.4 QS university ranking, average score top 3* | 83.0 | 8 |

3 Infrastructure **64.4** **7**

| | | |
|---|---------|-----|
| 3.1 Information & communication technologies (ICTs) | 89.7 | 4 ● |
| 3.1.1 ICT access* | 88.5 | 11 |
| 3.1.2 ICT use* | 79.8 | 10 |
| 3.1.3 Government's online service* | 94.5 | 4 |
| 3.1.4 E-participation* | 96.1 | 4 |
| 3.2 General infrastructure | 50.8 | 20 |
| 3.2.1 Electricity output, kWh/cap | 8,020.1 | 22 |
| 3.2.2 Logistics performance* | 3.9 | 10 |
| 3.2.3 Gross capital formation, % GDP | 21.8 | 66 |
| 3.3 Ecological sustainability | 52.6 | 29 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.3 | 42 |
| 3.3.2 Environmental performance* | 80.6 | 39 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 5.0 | 21 |

4 Market sophistication **68.3** **8**

| | | |
|--|-------|------|
| 4.1 Credit | 62.1 | 13 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 187.6 | 4 ● |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|-------|----|
| 4.2 Investment | 54.3 | 18 |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP | 95.1 | 13 |
| 4.2.3 Total value of stocks traded, % GDP | 105.3 | 4 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 44 |

4.3 Trade, competition, & market scale **88.5** **2 ●**

| | | |
|--|---------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % ² | 1.2 | 39 |
| 4.3.2 Intensity of local competition [†] | 88.9 | 1 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 4,767.2 | 4 ● |

5 Business sophistication **52.8** **10**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 63.0 | 13 |
| 5.1.1 Knowledge-intensive employment, % | 24.4 | 57 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 2.8 | 3 ● |
| 5.1.4 GERD financed by business, % | 77.3 | 1 ● |
| 5.1.5 Females employed w/advanced degrees, % total | 19.7 | 24 |

5.2 Innovation linkages **46.7** **13**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 66.7 | 15 |
| 5.2.2 State of cluster development [†] | 71.3 | 9 |
| 5.2.3 GERD financed by abroad, % | 0.4 | 95 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 32 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 15.4 | 1 ● |

5.3 Knowledge absorption **48.5** **11**

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 2.3 | 7 |
| 5.3.2 High-tech imports less re-imports, % total trade | 13.7 | 16 |
| 5.3.3 ICT services imports, % total trade | 1.2 | 49 |
| 5.3.4 FDI net inflows, % GDP | 0.2 | 122 ○ |
| 5.3.5 Research talent, % in business enterprise | 74.1 | 3 ● |

6 Knowledge & technology outputs **46.9** **13**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 56.1 | 11 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 55.8 | 1 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 9.1 | 1 ● |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.1 | 22 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 15.0 | 47 |
| 6.1.5 Citable documents H index | 745.0 | 6 |

6.2 Knowledge impact **34.8** **72**

| | | |
|--|-------|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.7) | 100 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 0.2 | 97 ○ |
| 6.2.3 Computer software spending, % GDP | 0.3 | 37 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 9.6 | 39 |
| 6.2.5 High- & medium-high-tech manufactures, % | 51.8 | 8 |

6.3 Knowledge diffusion **49.8** **11**

| | | |
|--|------|-------|
| 6.3.1 Intellectual property receipts, % total trade | 4.0 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 11.6 | 18 |
| 6.3.3 ICT services exports, % total trade | 0.3 | 104 ○ |
| 6.3.4 FDI net outflows, % GDP | 2.6 | 24 |

7 Creative outputs **39.2** **36**

| | | |
|---|------|----|
| 7.1 Intangible assets | 48.5 | 43 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 40.3 | 56 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 5.2 | 26 |
| 7.1.3 ICTs & business model creation [†] | 71.8 | 23 |
| 7.1.4 ICTs & organizational model creation [†] | 61.9 | 32 |

7.2 Creative goods & services **38.3** **20**

| | | |
|--|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 60 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 6.7 | 26 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 54.7 | 11 |
| 7.2.4 Printing & publishing manufactures, % | 2.1 | 22 |
| 7.2.5 Creative goods exports, % total trade | 2.1 | 23 |

7.3 Online creativity **21.6** **40**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 16.4 | 31 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 5.8 | 49 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,292.1 | 40 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 39.8 | 27 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

○ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 7.6 |
| GDP (US\$ billions) | 37.6 |
| GDP per capita, PPP\$ | 12,122.9 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.0 | 82 |
| Innovation Output Sub-Index | 24.1 | 77 |
| Innovation Input Sub-Index | 36.0 | 88 |
| Innovation Efficiency Ratio | 0.7 | 58 |
| Global Innovation Index 2015 (out of 141) | 33.8 | 75 |

1 Institutions **62.6** **63**

| | | |
|--|------|-------|
| 1.1 Political environment | 45.9 | 76 |
| 1.1.1 Political stability & safety* | 48.9 | 94 |
| 1.1.2 Government effectiveness* | 42.8 | 62 |
| 1.2 Regulatory environment | 76.5 | 34 ● |
| 1.2.1 Regulatory quality* | 46.7 | 67 |
| 1.2.2 Rule of law* | 59.1 | 44 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 65.6 | 78 |
| 1.3.1 Ease of starting a business* | 85.7 | 69 |
| 1.3.2 Ease of resolving insolvency* | 30.2 | 117 ○ |
| 1.3.3 Ease of paying taxes* | 81.0 | 46 ● |

2 Human capital & research **25.4** **86**

| | | |
|--|-------|-------|
| 2.1 Education | 30.7 | 109 ○ |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 15.1 | 85 ○ |
| 2.1.3 School life expectancy, years [Ⓓ] | 12.8 | 80 |
| 2.1.4 PISA scales in reading, maths, & science | 398.0 | 54 ○ |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 37.2 | 57 |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 47.6 | 55 |
| 2.2.2 Graduates in science & engineering, % [Ⓓ] | 16.1 | 78 |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 9.1 | 19 ● |
| 2.3 Research & development (R&D) | 8.3 | 64 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.4 | 65 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 15.9 | 58 |

3 Infrastructure **38.5** **79**

| | | |
|---|---------|----|
| 3.1 Information & communication technologies (ICTs) | 44.9 | 77 |
| 3.1.1 ICT access* | 56.9 | 70 |
| 3.1.2 ICT use* | 23.6 | 88 |
| 3.1.3 Government's online service* | 52.0 | 62 |
| 3.1.4 E-participation* | 47.1 | 70 |
| 3.2 General infrastructure | 29.1 | 84 |
| 3.2.1 Electricity output, kWh/cap. | 2,672.3 | 66 |
| 3.2.2 Logistics performance* | 2.9 | 65 |
| 3.2.3 Gross capital formation, % GDP | 20.3 | 79 |
| 3.3 Ecological sustainability | 41.6 | 71 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 8.5 | 48 |
| 3.3.2 Environmental performance* | 72.2 | 68 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.7 | 72 |

4 Market sophistication **32.0** **115** ○

| | | |
|--|------|-------|
| 4.1 Credit | 10.5 | 125 ○ |
| 4.1.1 Ease of getting credit* | 0.0 | 127 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 70.2 | 41 ● |
| 4.1.3 Microfinance gross loans, % GDP | 0.4 | 41 |

| | | |
|--|------|-------|
| 4.2 Investment | 29.0 | 97 |
| 4.2.1 Ease of protecting minority investors* | 36.7 | 120 ○ |
| 4.2.2 Market capitalization, % GDP | 71.3 | 24 ● |
| 4.2.3 Total value of stocks traded, % GDP | 8.6 | 37 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 24 ● |
| 4.3 Trade, competition, & market scale | 56.5 | 82 |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓓ] | 5.1 | 86 |
| 4.3.2 Intensity of local competition [†] | 70.2 | 55 |
| 4.3.3 Domestic market scale, bn PPP\$ | 79.9 | 79 |

5 Business sophistication **21.5** **116** ○

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 0.0 | [127] |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 3.4 | 94 ○ |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 34.6 | 48 |
| 5.2.1 University/industry research collaboration [†] | 47.1 | 51 |
| 5.2.2 State of cluster development [†] | 54.6 | 30 ● |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 36 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 67 |
| 5.3 Knowledge absorption | 29.8 | 57 |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.1 | 94 |
| 5.3.3 ICT services imports, % total trade | n/a | n/a |
| 5.3.4 FDI net inflows, % GDP | 4.9 | 30 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **21.7** **79**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 10.9 | 60 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.5 | 75 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 14.8 | 48 |
| 6.1.5 Citable documents H index | 102.0 | 77 |
| 6.2 Knowledge impact | 29.8 | 92 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.3 | 53 |
| 6.2.2 New businesses/th pop. 15–64 | 1.0 | 71 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 49 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 3.7 | 68 |
| 6.2.5 High- & medium-high-tech manufactures, % | 20.4 | 57 |
| 6.3 Knowledge diffusion | 24.4 | 64 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.5 | 78 |
| 6.3.3 ICT services exports, % total trade | n/a | n/a |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 0.0 | 85 |

7 Creative outputs **26.4** **78**

| | | |
|--|---------|------|
| 7.1 Intangible assets | 38.6 | 82 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 31.9 | 64 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.2 | 97 ○ |
| 7.1.3 ICTs & business model creation [†] | 61.5 | 49 |
| 7.1.4 ICTs & organizational model creation [†] | 56.0 | 55 |
| 7.2 Creative goods & services | 21.5 | 68 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 1.7 | 52 ○ |
| 7.2.4 Printing & publishing manufactures, % | 1.4 | 40 |
| 7.2.5 Creative goods exports, % total trade | 0.9 | 39 ● |
| 7.3 Online creativity | 6.9 | 69 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 7.1 | 47 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.4 | 97 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,037.9 | 70 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 12.4 | 59 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Kazakhstan

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 17.6 |
| GDP (US\$ billions) | 173.2 |
| GDP per capita, PPP\$ | 24,267.9 |
| Income group | Upper-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 31.5 | 75 |
| Innovation Output Sub-Index | 21.3 | 90 |
| Innovation Input Sub-Index | 41.7 | 65 |
| Innovation Efficiency Ratio | 0.5 | 108 |
| Global Innovation Index 2015 (out of 141) | 31.2 | 82 |

1 Institutions 66.5 54

| | | |
|--|------|------|
| 1.1 Political environment | 51.4 | 61 |
| 1.1.1 Political stability & safety* | 64.2 | 63 |
| 1.1.2 Government effectiveness* | 38.6 | 70 |
| 1.2 Regulatory environment | 67.2 | 64 |
| 1.2.1 Regulatory quality* | 38.1 | 85 |
| 1.2.2 Rule of law* | 33.5 | 93 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.7 | 21 ● |
| 1.3 Business environment | 80.9 | 27 ● |
| 1.3.1 Ease of starting a business* | 94.4 | 21 ● |
| 1.3.2 Ease of resolving insolvency* | 59.0 | 44 |
| 1.3.3 Ease of paying taxes* | 89.2 | 17 ● |

2 Human capital & research 31.4 66

| | | |
|---|-------|-------|
| 2.1 Education | 43.0 | 79 |
| 2.1.1 Expenditure on education, % GDP | 2.9 | 102 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 20.4 | 51 |
| 2.1.3 School life expectancy, years | 15.0 | 47 |
| 2.1.4 PISA scales in reading, maths, & science | 416.4 | 48 |
| 2.1.5 Pupil-teacher ratio, secondary | 8.7 | 15 ● |
| 2.2 Tertiary education | 39.4 | 47 |
| 2.2.1 Tertiary enrolment, % gross | 48.5 | 54 |
| 2.2.2 Graduates in science & engineering, % | 25.7 | 25 |
| 2.2.3 Tertiary inbound mobility, % | 2.7 | 58 |
| 2.3 Research & development (R&D) | 12.0 | 53 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 734.1 | 51 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.2 | 92 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 36.1 | 37 |

3 Infrastructure 46.8 54

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 66.5 | 37 |
| 3.1.1 ICT access* | 69.2 | 49 |
| 3.1.2 ICT use* | 45.4 | 58 |
| 3.1.3 Government's online service* | 74.8 | 23 ● |
| 3.1.4 E-participation* | 76.5 | 22 ● |
| 3.2 General infrastructure | 40.4 | 42 |
| 3.2.1 Electricity output, kWh/cap | 5,596.7 | 35 |
| 3.2.2 Logistics performance* | 2.7 | 83 |
| 3.2.3 Gross capital formation, % GDP | 30.8 | 16 ● |
| 3.3 Ecological sustainability | 33.6 | 103 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.2 | 109 ○ |
| 3.3.2 Environmental performance* | 73.3 | 64 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 89 |

4 Market sophistication 38.6 92

| | | |
|--|------|-----|
| 4.1 Credit | 22.8 | 100 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 |
| 4.1.2 Domestic credit to private sector, % GDP | 34.1 | 86 |
| 4.1.3 Microfinance gross loans, % GDP | 0.1 | 60 |

| | | |
|--|------|------|
| 4.2 Investment | 27.6 | 104 |
| 4.2.1 Ease of protecting minority investors* | 66.7 | 25 ● |
| 4.2.2 Market capitalization, % GDP | 10.5 | 79 |
| 4.2.3 Total value of stocks traded, % GDP | 0.4 | 65 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 85 ○ |

| | | |
|---|-------|----|
| 4.3 Trade, competition, & market scale | 65.3 | 51 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.8 | 68 |
| 4.3.2 Intensity of local competition [†] | 62.1 | 89 |
| 4.3.3 Domestic market scale, bn PPP\$ | 420.0 | 40 |

5 Business sophistication 25.4 96

| | | |
|---|------|----|
| 5.1 Knowledge workers | 37.0 | 68 |
| 5.1.1 Knowledge-intensive employment, % ^② | 32.3 | 41 |
| 5.1.2 Firms offering formal training, % firms | 28.4 | 61 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.1 | 65 |
| 5.1.4 GERD financed by business, % ^② | 28.9 | 53 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 17.6 | 29 |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 18.7 | 114 ○ |
| 5.2.1 University/industry research collaboration [†] | 38.2 | 82 |
| 5.2.2 State of cluster development [†] | 35.2 | 105 |
| 5.2.3 GERD financed by abroad, % ^② | 0.8 | 91 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 31 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 56 |

| | | |
|--|------|-----|
| 5.3 Knowledge absorption | 20.5 | 98 |
| 5.3.1 Intellectual property payments, % total trade | 0.2 | 77 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.8 | 71 |
| 5.3.3 ICT services imports, % total trade | 0.5 | 97 |
| 5.3.4 FDI net inflows, % GDP | 3.5 | 47 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 21.2 83

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 7.1 | 75 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.3 | 28 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 77 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.3 | 37 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.7 | 121 ○ |
| 6.1.5 Citable documents H index | 64.0 | 106 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 36.3 | 61 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.6 | 16 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 1.7 | 50 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.2 | 102 |
| 6.2.5 High- & medium-high-tech manufactures, % | 16.5 | 63 |

| | | |
|--|------|-------|
| 6.3 Knowledge diffusion | 20.2 | 96 |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 92 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 4.8 | 34 |
| 6.3.3 ICT services exports, % total trade | 0.2 | 112 ○ |
| 6.3.4 FDI net outflows, % GDP ^② | 0.8 | 51 |

7 Creative outputs 21.4 99

| | | |
|---|------|------|
| 7.1 Intangible assets | 33.8 | 102 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP ^② | 17.8 | 85 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 94 ○ |
| 7.1.3 ICTs & business model creation [†] | 56.6 | 71 |
| 7.1.4 ICTs & organizational model creation [†] | 51.8 | 69 |

| | | |
|--|------|-----|
| 7.2 Creative goods & services | 14.2 | 83 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 70 |
| 7.2.2 National feature films/mn pop. 15–69 | 2.9 | 48 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 0.9 | 67 |
| 7.2.5 Creative goods exports, % total trade | 0.6 | 57 |

| | | |
|--|-------|-------|
| 7.3 Online creativity | 3.6 | 86 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.4 | 113 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 3.6 | 58 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 919.7 | 77 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 46.1 |
| GDP (US\$ billions) | 61.4 |
| GDP per capita, PPP\$ | 3,207.7 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.4 | 80 |
| Innovation Output Sub-Index | 26.3 | 65 |
| Innovation Input Sub-Index | 34.4 | 97 |
| Innovation Efficiency Ratio | 0.8 | 30 ● |
| Global Innovation Index 2015 (out of 141) | 30.2 | 92 |

1 Institutions 52.7 **90**

| | | |
|--|------|-------|
| 1.1 Political environment | 31.0 | 109 |
| 1.1.1 Political stability & safety* | 31.3 | 121 ○ |
| 1.1.2 Government effectiveness* | 30.6 | 85 |
| 1.2 Regulatory environment | 68.1 | 59 |
| 1.2.1 Regulatory quality* | 36.4 | 89 |
| 1.2.2 Rule of law* | 35.9 | 90 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 59.0 | 100 |
| 1.3.1 Ease of starting a business* | 74.5 | 112 |
| 1.3.2 Ease of resolving insolvency* | 30.6 | 115 |
| 1.3.3 Ease of paying taxes* | 72.0 | 76 |

2 Human capital & research 13.9 **120** ○

| | | |
|--|-------|-------|
| 2.1 Education | 32.6 | 104 |
| 2.1.1 Expenditure on education, % GDP [Ⓓ] | 5.5 | 37 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 21.2 | 49 |
| 2.1.3 School life expectancy, years [Ⓓ] | 11.1 | 98 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 41.1 | 112 ○ |
| 2.2 Tertiary education | 3.0 | [122] |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 4.0 | 118 ○ |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 6.2 | 73 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 230.7 | 68 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.8 | 42 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 4.6 | 69 |

3 Infrastructure 32.8 **98**

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 39.5 | 85 |
| 3.1.1 ICT access* | 33.0 | 106 |
| 3.1.2 ICT use* | 17.6 | 97 |
| 3.1.3 Government's online service* | 42.5 | 76 |
| 3.1.4 E-participation* | 64.7 | 33 |
| 3.2 General infrastructure | 28.4 | 90 |
| 3.2.1 Electricity output, kWh/cap. | 200.1 | 111 ○ |
| 3.2.2 Logistics performance* | 2.8 | 71 |
| 3.2.3 Gross capital formation, % GDP | 23.8 | 50 |
| 3.3 Ecological sustainability | 30.7 | 113 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 5.0 | 99 |
| 3.3.2 Environmental performance* | 62.5 | 100 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 93 |

4 Market sophistication 41.2 **79**

| | | |
|--|------|----|
| 4.1 Credit | 33.5 | 62 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 34.4 | 83 |
| 4.1.3 Microfinance gross loans, % GDP | 1.5 | 26 |

| | | |
|---|-------|-------|
| 4.2 Investment | 36.4 | 66 |
| 4.2.1 Ease of protecting minority investors* | 46.7 | 92 |
| 4.2.2 Market capitalization, % GDP [Ⓓ] | 40.5 | 40 |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 23 ● |
| 4.3 Trade, competition, & market scale | 53.6 | 92 |
| 4.3.1 Applied tariff rate, weighted mean, % | 9.7 | 115 ○ |
| 4.3.2 Intensity of local competition [†] | 76.0 | 22 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 133.0 | 68 |

5 Business sophistication 31.6 **64**

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 26.4 | 96 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 40.6 | 38 |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.1 | 63 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 4.3 | 80 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 46.4 | 14 ● |
| 5.2.1 University/industry research collaboration [†] | 53.6 | 36 |
| 5.2.2 State of cluster development [†] | 51.3 | 36 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 47.1 | 7 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 80 |
| 5.3 Knowledge absorption | 21.9 | 95 |
| 5.3.1 Intellectual property payments, % total trade | 1.0 | 31 ● |
| 5.3.2 High-tech imports less re-imports, % total trade [Ⓓ] | 10.8 | 27 ● |
| 5.3.3 ICT services imports, % total trade | 0.1 | 117 ○ |
| 5.3.4 FDI net inflows, % GDP | 1.5 | 91 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 11.4 | 63 |

6 Knowledge & technology outputs 22.1 **77**

| | | |
|---|-------|------|
| 6.1 Knowledge creation | 9.9 | 65 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.0 | 65 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 65 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.6 | 31 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 10.9 | 63 |
| 6.1.5 Citable documents H index | 165.0 | 48 |
| 6.2 Knowledge impact | 29.0 | 94 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.5 | 31 ● |
| 6.2.2 New businesses/th pop. 15–64 | 1.8 | 49 |
| 6.2.3 Computer software spending, % GDP | 0.2 | 68 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 4.2 | 67 |
| 6.2.5 High- & medium-high-tech manufactures, % | 8.8 | 82 |
| 6.3 Knowledge diffusion | 27.3 | 48 |
| 6.3.1 Intellectual property receipts, % total trade | 0.4 | 26 ● |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓓ] | 0.6 | 71 |
| 6.3.3 ICT services exports, % total trade | 4.3 | 13 ● |
| 6.3.4 FDI net outflows, % GDP | (0.1) | 105 |

7 Creative outputs 30.5 **60**

| | | |
|--|-------|------|
| 7.1 Intangible assets | 49.1 | 41 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.6 | 76 |
| 7.1.3 ICTs & business model creation [†] | 64.8 | 39 |
| 7.1.4 ICTs & organizational model creation [†] | 56.3 | 51 |
| 7.2 Creative goods & services | 23.0 | 62 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 83 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 1.4 | 53 |
| 7.2.4 Printing & publishing manufactures, % | 2.6 | 13 ● |
| 7.2.5 Creative goods exports, % total trade [Ⓓ] | 0.3 | 70 |
| 7.3 Online creativity | 0.9 | 104 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.1 | 95 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.7 | 85 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 107.0 | 107 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 0.9 | 70 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Korea, Republic of

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 50.3 |
| GDP (US\$ billions) | 1,376.9 |
| GDP per capita, PPP\$ | 36,511.0 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 57.1 | 11 |
| Innovation Output Sub-Index | 50.8 | 11 |
| Innovation Input Sub-Index | 63.5 | 13 |
| Innovation Efficiency Ratio | 0.8 | 24 |
| Global Innovation Index 2015 (out of 141) | 56.3 | 14 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 75.4 | 31 |
| 1.1 | Political environment | 69.6 | 39 |
| 1.1.1 | Political stability & safety* | 67.5 | 53 |
| 1.1.2 | Government effectiveness* | 71.7 | 23 |
| 1.2 | Regulatory environment | 66.7 | 66 |
| 1.2.1 | Regulatory quality* | 72.2 | 26 |
| 1.2.2 | Rule of law* | 71.6 | 30 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 27.4 | 107 ○ |
| 1.3 | Business environment | 89.7 | 6 |
| 1.3.1 | Ease of starting a business* | 94.4 | 22 |
| 1.3.2 | Ease of resolving insolvency* | 90.3 | 4 ● |
| 1.3.3 | Ease of paying taxes* | 84.5 | 26 |

| | | | |
|----------|--|-------------|------------|
| 2 | Human capital & research | 66.9 | 3 ● |
| 2.1 | Education | 55.6 | 38 |
| 2.1.1 | Expenditure on education, % GDP | 4.6 | 63 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 23.4 | 39 |
| 2.1.3 | School life expectancy, years | 16.6 | 19 |
| 2.1.4 | PISA scales in reading, maths, & science | 542.4 | 4 |
| 2.1.5 | Pupil-teacher ratio, secondary | 15.6 | 69 |
| 2.2 | Tertiary education | 55.5 | 12 |
| 2.2.1 | Tertiary enrolment, % gross | 95.3 | 2 ● |
| 2.2.2 | Graduates in science & engineering, % ⁽²⁾ | 31.9 | 7 |
| 2.2.3 | Tertiary inbound mobility, % | 1.7 | 72 ○ |
| 2.3 | Research & development (R&D) | 89.5 | 1 ● |
| 2.3.1 | Researchers, FTE/mn pop. | 6,899.0 | 4 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 4.3 | 1 ● |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 4,465.7 | 5 |
| 2.3.4 | QS university ranking, average score top 3* | 80.0 | 9 |

| | | | |
|----------|---|-------------|----------|
| 3 | Infrastructure | 63.3 | 9 |
| 3.1 | Information & communication technologies (ICTs) | 92.9 | 1 ● |
| 3.1.1 | ICT access* | 90.0 | 9 |
| 3.1.2 | ICT use* | 84.2 | 4 ● |
| 3.1.3 | Government's online service* | 97.6 | 3 ● |
| 3.1.4 | E-participation* | 100.0 | 1 ● |
| 3.2 | General infrastructure | 57.4 | 9 |
| 3.2.1 | Electricity output, kWh/cap. | 10,724.9 | 11 |
| 3.2.2 | Logistics performance* | 3.7 | 20 |
| 3.2.3 | Gross capital formation, % GDP | 28.6 | 27 |
| 3.3 | Ecological sustainability | 39.6 | 80 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.1 | 90 ○ |
| 3.3.2 | Environmental performance* | 70.6 | 73 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 2.8 | 36 |

| | | | |
|----------|--|-------------|-----------|
| 4 | Market sophistication | 62.0 | 14 |
| 4.1 | Credit | 59.6 | 15 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 138.5 | 12 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|-------|--|------|------|
| 4.2 | Investment | 54.4 | 17 |
| 4.2.1 | Ease of protecting minority investors* | 73.3 | 8 |
| 4.2.2 | Market capitalization, % GDP | 86.0 | 20 |
| 4.2.3 | Total value of stocks traded, % GDP | 91.8 | 7 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 54 ○ |

| | | | |
|-------|--|---------|-------|
| 4.3 | Trade, competition, & market scale | 72.0 | 29 |
| 4.3.1 | Applied tariff rate, weighted mean, % ⁽²⁾ | 7.2 | 100 ○ |
| 4.3.2 | Intensity of local competition [†] | 80.4 | 12 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 1,784.0 | 13 |

| | | | |
|----------|--|-------------|-----------|
| 5 | Business sophistication | 50.1 | 13 |
| 5.1 | Knowledge workers | 65.5 | 8 |
| 5.1.1 | Knowledge-intensive employment, % | 21.6 | 64 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | 3.4 | 2 ● |
| 5.1.4 | GERD financed by business, % | 75.3 | 3 ● |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |

| | | | |
|-------|---|------|------|
| 5.2 | Innovation linkages | 41.8 | 27 |
| 5.2.1 | University/industry research collaboration [†] | 60.3 | 25 |
| 5.2.2 | State of cluster development [†] | 58.8 | 22 |
| 5.2.3 | GERD financed by abroad, % | 0.7 | 92 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 30 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 13.7 | 2 ● |

| | | | |
|-------|--|------|-------|
| 5.3 | Knowledge absorption | 43.1 | 18 |
| 5.3.1 | Intellectual property payments, % total trade | 1.5 | 16 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 12.6 | 20 |
| 5.3.3 | ICT services imports, % total trade | 0.3 | 112 ○ |
| 5.3.4 | FDI net inflows, % GDP | 0.7 | 109 ○ |
| 5.3.5 | Research talent, % in business enterprise | 79.5 | 2 ● |

| | | | |
|----------|--|-------------|----------|
| 6 | Knowledge & technology outputs | 54.1 | 5 |
| 6.1 | Knowledge creation | 77.6 | 3 ● |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 92.0 | 1 ● |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 7.9 | 1 ● |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 4.9 | 5 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 29.7 | 25 |
| 6.1.5 | Citable documents H index | 424.0 | 19 |

| | | | |
|-------|--|------|-------|
| 6.2 | Knowledge impact | 41.2 | 43 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.2 | 61 |
| 6.2.2 | New businesses/th pop. 15–64 | 2.3 | 45 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 35 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 6.6 | 53 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 57.2 | 5 |
| 6.3 | Knowledge diffusion | 43.5 | 18 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.8 | 16 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 21.8 | 5 |
| 6.3.3 | ICT services exports, % total trade | 0.4 | 100 ○ |
| 6.3.4 | FDI net outflows, % GDP | 2.2 | 29 |

| | | | |
|----------|---|-------------|-----------|
| 7 | Creative outputs | 47.4 | 21 |
| 7.1 | Intangible assets | 68.7 | 2 ● |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 92.1 | 15 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 35.4 | 1 ● |
| 7.1.3 | ICTs & business model creation [†] | 74.8 | 17 |
| 7.1.4 | ICTs & organizational model creation [†] | 64.6 | 27 |

| | | | |
|-------|--|------|------|
| 7.2 | Creative goods & services | 26.1 | 50 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.3 | 34 |
| 7.2.2 | National feature films/mn pop. 15–69 | 5.4 | 33 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 40.3 | 19 |
| 7.2.4 | Printing & publishing manufactures, % | 0.3 | 92 ○ |
| 7.2.5 | Creative goods exports, % total trade | 2.7 | 18 |

| | | | |
|-------|--|---------|----|
| 7.3 | Online creativity | 26.1 | 35 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 8.7 | 44 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 9.3 | 41 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 4,407.7 | 33 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 54.0 | 17 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

○ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 3.9 |
| GDP (US\$ billions) | 120.7 |
| GDP per capita, PPP\$ | 70,166.0 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.6 | 67 |
| Innovation Output Sub-Index | 28.4 | 56 |
| Innovation Input Sub-Index | 38.8 | 78 |
| Innovation Efficiency Ratio | 0.7 | 42 |
| Global Innovation Index 2015 (out of 141) | 33.2 | 77 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 57.0 | 75 |
| 1.1 Political environment | 50.6 | 63 |
| 1.1.1 Political stability & safety* | 66.2 | 55 |
| 1.1.2 Government effectiveness* | 34.9 | 78 |
| 1.2 Regulatory environment | 52.5 | 102 |
| 1.2.1 Regulatory quality* | 41.5 | 79 |
| 1.2.2 Rule of law* | 48.4 | 58 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 28.1 | 112 ○ |
| 1.3 Business environment | 67.9 | 72 |
| 1.3.1 Ease of starting a business* | 75.4 | 109 |
| 1.3.2 Ease of resolving insolvency* | 36.0 | 102 |
| 1.3.3 Ease of paying taxes* | 92.5 | 11 ● |
| 2 Human capital & research | 30.2 | 72 |
| 2.1 Education | 44.5 | 72 |
| 2.1.1 Expenditure on education, % GDP [Ⓓ] | 3.8 | 86 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 21.8 | 48 |
| 2.1.3 School life expectancy, years | 13.0 | 75 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 8.2 | 9 ● |
| 2.2 Tertiary education | 42.9 | 37 ● |
| 2.2.1 Tertiary enrolment, % gross | 27.0 | 84 |
| 2.2.2 Graduates in science & engineering, % | 26.7 | 20 ● |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 3.2 | 84 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 128.4 | 79 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.3 | 77 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 5.2 | 68 |
| 3 Infrastructure | 48.1 | 48 |
| 3.1 Information & communication technologies (ICTs) | 58.5 | 47 |
| 3.1.1 ICT access* | 73.1 | 39 ● |
| 3.1.2 ICT use* | 60.3 | 32 ● |
| 3.1.3 Government's online service* | 57.5 | 52 |
| 3.1.4 E-participation* | 43.1 | 74 |
| 3.2 General infrastructure | 51.1 | 17 ● |
| 3.2.1 Electricity output, kWh/cap. | 18,095.5 | 4 ● |
| 3.2.2 Logistics performance* | 3.0 | 54 |
| 3.2.3 Gross capital formation, % GDP | 20.8 | 74 |
| 3.3 Ecological sustainability | 34.8 | 97 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 6.8 | 77 |
| 3.3.2 Environmental performance* | 64.4 | 95 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 98 |
| 4 Market sophistication | 46.0 | 50 |
| 4.1 Credit | 32.7 | 66 |
| 4.1.1 Ease of getting credit* | 40.0 | 92 |
| 4.1.2 Domestic credit to private sector, % GDP | 67.2 | 44 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|-------|------|
| 4.2 Investment | 40.7 | 46 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 Market capitalization, % GDP [Ⓓ] | 105.4 | 10 ● |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 82 ○ |
| 4.3 Trade, competition, & market scale | 64.4 | 53 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.9 | 70 |
| 4.3.2 Intensity of local competition [†] | 67.5 | 67 |
| 4.3.3 Domestic market scale, bn PPP\$ | 282.6 | 51 |

5 Business sophistication **12.9** **127** ○

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 1.7 | [126] |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % [Ⓓ] | 1.4 | 85 ○ |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 22.8 | 94 |
| 5.2.1 University/industry research collaboration [†] | 35.1 | 98 |
| 5.2.2 State of cluster development [†] | 46.3 | 57 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 1.2 | 86 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 15 ● |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 99 |
| 5.3 Knowledge absorption | 14.1 | 126 ○ |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.5 | 105 |
| 5.3.3 ICT services imports, % total trade | 0.5 | 100 |
| 5.3.4 FDI net inflows, % GDP | 0.3 | 117 ○ |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **27.6** **51**

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 3.4 | 107 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.0 | 118 ○ |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 2.3 | 115 ○ |
| 6.1.5 Citable documents H index | 100.0 | 79 |
| 6.2 Knowledge impact | 27.1 | 105 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.9) | 101 ○ |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.3 | 30 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.1 | 104 |
| 6.2.5 High- & medium-high-tech manufactures, % | 14.3 | 67 |
| 6.3 Knowledge diffusion | 52.2 | 8 ● |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.0 | 117 ○ |
| 6.3.3 ICT services exports, % total trade | 3.8 | 16 ● |
| 6.3.4 FDI net outflows, % GDP | 8.0 | 9 ● |

7 Creative outputs **29.1** **64**

| | | |
|--|---------|------|
| 7.1 Intangible assets | 46.8 | 50 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 49.9 | 97 |
| 7.1.4 ICTs & organizational model creation [†] | 43.7 | 92 |
| 7.2 Creative goods & services | 10.4 | 91 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 17.8 | 27 |
| 7.2.4 Printing & publishing manufactures, % | 0.6 | 83 ○ |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 73 |
| 7.3 Online creativity | 12.6 | 55 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 8.8 | 43 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.5 | 93 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,452.2 | 66 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 30.4 | 39 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Kyrgyzstan

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 5.9 |
| GDP (US\$ billions) | 6.7 |
| GDP per capita, PPP\$ | 3,362.6 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.6 | 103 |
| Innovation Output Sub-Index | 17.6 | 109 |
| Innovation Input Sub-Index | 35.6 | 92 |
| Innovation Efficiency Ratio | 0.5 | 110 |
| Global Innovation Index 2015 (out of 141) | 28.0 | 109 |

| | | | |
|----------|---|-------------|------------|
| 1 | Institutions | 49.4 | 97 |
| 1.1 | Political environment | 29.6 | 111 |
| 1.1.1 | Political stability & safety* | 43.3 | 100 |
| 1.1.2 | Government effectiveness* | 15.8 | 119 |
| 1.2 | Regulatory environment | 55.3 | 94 |
| 1.2.1 | Regulatory quality* | 34.2 | 98 |
| 1.2.2 | Rule of law* | 23.8 | 118 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 17.3 | 73 |
| 1.3 | Business environment | 63.5 | 84 |
| 1.3.1 | Ease of starting a business* | 92.9 | 32 ● |
| 1.3.2 | Ease of resolving insolvency* | 34.7 | 105 |
| 1.3.3 | Ease of paying taxes* | 62.9 | 96 |
| 2 | Human capital & research | 30.2 | 71 |
| 2.1 | Education | 57.1 | 33 ● |
| 2.1.1 | Expenditure on education, % GDP | 6.8 | 14 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 33.2 | 13 ● |
| 2.1.3 | School life expectancy, years | 12.8 | 79 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 13.0 | 49 |
| 2.2 | Tertiary education | 32.8 | 75 |
| 2.2.1 | Tertiary enrolment, % gross | 47.3 | 57 |
| 2.2.2 | Graduates in science & engineering, % | 18.3 | 66 |
| 2.2.3 | Tertiary inbound mobility, % | 4.0 | 39 |
| 2.3 | Research & development (R&D) | 0.6 | 108 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.1 | 98 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 32.2 | 100 |
| 3.1 | Information & communication technologies (ICTs) | 36.2 | 91 |
| 3.1.1 | ICT access* | 41.6 | 96 |
| 3.1.2 | ICT use* | 34.6 | 69 |
| 3.1.3 | Government's online service* | 27.6 | 104 |
| 3.1.4 | E-participation* | 41.2 | 77 |
| 3.2 | General infrastructure | 27.6 | 95 |
| 3.2.1 | Electricity output, kWh/cap | 2,449.5 | 71 |
| 3.2.2 | Logistics performance* | 2.2 | 122 ○ |
| 3.2.3 | Gross capital formation, % GDP | 28.2 | 29 ● |
| 3.3 | Ecological sustainability | 32.7 | 106 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.0 | 111 |
| 3.3.2 | Environmental performance* | 73.1 | 65 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 122 ○ |
| 4 | Market sophistication | 42.9 | 65 |
| 4.1 | Credit | 47.8 | 29 ● |
| 4.1.1 | Ease of getting credit* | 70.0 | 27 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 21.2 | 107 |
| 4.1.3 | Microfinance gross loans, % GDP | 5.4 | 7 ● |

| | | | |
|----------|---|-------------|------------|
| 4.2 | Investment | 31.8 | 84 |
| 4.2.1 | Ease of protecting minority investors* | 63.3 | 35 ● |
| 4.2.2 | Market capitalization, % GDP ^② | 2.5 | 92 ○ |
| 4.2.3 | Total value of stocks traded, % GDP ^② | 0.1 | 78 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 49.1 | 106 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 2.5 | 56 |
| 4.3.2 | Intensity of local competition [†] | 57.3 | 108 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 19.2 | 118 |
| 5 | Business sophistication | 23.3 | 109 |
| 5.1 | Knowledge workers | 36.3 | 72 |
| 5.1.1 | Knowledge-intensive employment, % | 17.9 | 78 |
| 5.1.2 | Firms offering formal training, % firms | 62.7 | 8 ● |
| 5.1.3 | GERD performed by business, % of GDP | 0.0 | 78 |
| 5.1.4 | GERD financed by business, % | 7.4 | 75 |
| 5.1.5 | Females employed w/advanced degrees, % total ^② | 10.8 | 61 |
| 5.2 | Innovation linkages | 15.5 | 124 ○ |
| 5.2.1 | University/industry research collaboration [†] | 26.2 | 118 ○ |
| 5.2.2 | State of cluster development [†] | 31.2 | 116 |
| 5.2.3 | GERD financed by abroad, % | 1.0 | 89 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 72 |
| 5.3 | Knowledge absorption | 18.2 | 110 |
| 5.3.1 | Intellectual property payments, % total trade | 0.1 | 94 |
| 5.3.2 | High-tech imports less re-imports, % total trade ^② | 5.5 | 88 |
| 5.3.3 | ICT services imports, % total trade | 0.6 | 84 |
| 5.3.4 | FDI net inflows, % GDP | 2.8 | 60 |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 18.2 | 96 |
| 6.1 | Knowledge creation | 10.6 | 62 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 7.1 | 17 ● |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 78 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.4 | 35 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 4.7 | 99 |
| 6.1.5 | Citable documents H index | 40.0 | 122 ○ |
| 6.2 | Knowledge impact | 28.3 | 99 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 2.4 | 33 ● |
| 6.2.2 | New businesses/th pop. 15–64 | 1.1 | 67 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 0.2 | 124 ○ |
| 6.2.5 | High- & medium-high-tech manufactures, % ^② | 3.3 | 94 ○ |
| 6.3 | Knowledge diffusion | 15.6 | 117 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 68 |
| 6.3.2 | High-tech exports less re-exports, % total trade ^② | 0.4 | 83 |
| 6.3.3 | ICT services exports, % total trade | 0.4 | 98 |
| 6.3.4 | FDI net outflows, % GDP | (0.0) | 95 |
| 7 | Creative outputs | 17.1 | 111 |
| 7.1 | Intangible assets | 28.9 | 113 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 19.3 | 83 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 2.5 | 47 |
| 7.1.3 | ICTs & business model creation [†] | 42.0 | 118 ○ |
| 7.1.4 | ICTs & organizational model creation [†] | 42.1 | 102 |
| 7.2 | Creative goods & services | 9.6 | 94 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 0.5 | 89 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % ^② | 1.0 | 65 |
| 7.2.5 | Creative goods exports, % total trade ^② | 0.1 | 95 |
| 7.3 | Online creativity | 1.0 | 102 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 115 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.5 | 92 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 332.1 | 94 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 2.0 |
| GDP (US\$ billions) | 27.0 |
| GDP per capita, PPP\$ | 24,712.2 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 44.3 | 34 |
| Innovation Output Sub-Index | 38.9 | 34 |
| Innovation Input Sub-Index | 49.7 | 36 |
| Innovation Efficiency Ratio | 0.8 | 28 |
| Global Innovation Index 2015 (out of 141) | 45.5 | 33 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 77.7 | 29 |
| 1.1 | Political environment | 71.4 | 35 |
| 1.1.1 | Political stability & safety* | 76.7 | 41 |
| 1.1.2 | Government effectiveness* | 66.1 | 37 |
| 1.2 | Regulatory environment | 80.7 | 27 |
| 1.2.1 | Regulatory quality* | 73.7 | 24 |
| 1.2.2 | Rule of law* | 68.7 | 35 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 13.0 | 49 |
| 1.3 | Business environment | 81.1 | 26 |
| 1.3.1 | Ease of starting a business* | 94.2 | 26 |
| 1.3.2 | Ease of resolving insolvency* | 63.4 | 40 |
| 1.3.3 | Ease of paying taxes* | 85.8 | 24 |
| 2 | Human capital & research | 31.4 | 67 |
| 2.1 | Education | 48.3 | 61 |
| 2.1.1 | Expenditure on education, % GDP | 3.2 | 97 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 17.2 | 70 |
| 2.1.3 | School life expectancy, years | 16.0 | 30 |
| 2.1.4 | PISA scales in reading, maths, & science | 493.8 | 24 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 8.3 | 11 ● |
| 2.2 | Tertiary education | 36.5 | 59 |
| 2.2.1 | Tertiary enrolment, % gross | 67.0 | 28 |
| 2.2.2 | Graduates in science & engineering, % | 17.9 | 67 |
| 2.2.3 | Tertiary inbound mobility, % | 3.7 | 45 |
| 2.3 | Research & development (R&D) | 9.5 | 60 |
| 2.3.1 | Researchers, FTE/mn pop. | 1,884.0 | 37 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.7 | 49 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 54.3 | 30 |
| 3.1 | Information & communication technologies (ICTs) | 69.0 | 31 |
| 3.1.1 | ICT access* | 72.3 | 43 |
| 3.1.2 | ICT use* | 62.9 | 28 |
| 3.1.3 | Government's online service* | 70.1 | 28 |
| 3.1.4 | E-participation* | 70.6 | 24 |
| 3.2 | General infrastructure | 39.4 | 51 |
| 3.2.1 | Electricity output, kWh/cap | 3,089.1 | 61 |
| 3.2.2 | Logistics performance* | 3.4 | 35 |
| 3.2.3 | Gross capital formation, % GDP | 23.5 | 55 |
| 3.3 | Ecological sustainability | 54.6 | 24 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.7 | 59 |
| 3.3.2 | Environmental performance* | 85.7 | 22 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 6.9 | 13 ● |
| 4 | Market sophistication | 48.6 | 43 |
| 4.1 | Credit | 51.4 | 20 |
| 4.1.1 | Ease of getting credit* | 75.0 | 18 |
| 4.1.2 | Domestic credit to private sector, % GDP | 73.2 | 40 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 33.3 | 80 |
| 4.2.1 | Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 | Market capitalization, % GDP [Ⓓ] | 4.0 | 89 ○ |
| 4.2.3 | Total value of stocks traded, % GDP [Ⓓ] | 0.1 | 77 ○ |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 15 |
| 4.3 | Trade, competition, & market scale | 61.0 | 64 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 73.4 | 37 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 48.4 | 95 ○ |
| 5 | Business sophistication | 36.6 | 40 |
| 5.1 | Knowledge workers | 41.9 | 51 |
| 5.1.1 | Knowledge-intensive employment, % | 39.6 | 24 |
| 5.1.2 | Firms offering formal training, % firms | 25.2 | 72 ○ |
| 5.1.3 | GERD performed by business, % of GDP | 0.2 | 47 |
| 5.1.4 | GERD financed by business, % | 27.8 | 55 |
| 5.1.5 | Females employed w/advanced degrees, % total | 22.5 | 16 |
| 5.2 | Innovation linkages | 42.1 | 26 |
| 5.2.1 | University/industry research collaboration [†] | 44.5 | 61 |
| 5.2.2 | State of cluster development [†] | 43.3 | 73 |
| 5.2.3 | GERD financed by abroad, % | 44.2 | 8 ● |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 45 |
| 5.3 | Knowledge absorption | 25.9 | 79 |
| 5.3.1 | Intellectual property payments, % total trade | 0.2 | 75 ○ |
| 5.3.2 | High-tech imports less re-imports, % total trade | 9.2 | 45 |
| 5.3.3 | ICT services imports, % total trade | 1.2 | 53 |
| 5.3.4 | FDI net inflows, % GDP | 2.8 | 63 |
| 5.3.5 | Research talent, % in business enterprise | 20.7 | 55 ○ |
| 6 | Knowledge & technology outputs | 31.6 | 41 |
| 6.1 | Knowledge creation | 12.3 | 58 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 2.3 | 43 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.6 | 33 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 13.7 | 51 |
| 6.1.5 | Citable documents H index | 104.0 | 76 |
| 6.2 | Knowledge impact | 55.0 | 10 ● |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 3.8 | 14 ● |
| 6.2.2 | New businesses/th pop. 15–64 | 10.6 | 10 ● |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 20.7 | 18 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % | 15.6 | 64 |
| 6.3 | Knowledge diffusion | 27.6 | 46 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 73 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | 7.0 | 25 |
| 6.3.3 | ICT services exports, % total trade | 2.0 | 48 |
| 6.3.4 | FDI net outflows, % GDP | 1.5 | 37 |
| 7 | Creative outputs | 46.2 | 25 |
| 7.1 | Intangible assets | 46.4 | 53 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 55.0 | 38 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 3.1 | 37 |
| 7.1.3 | ICTs & business model creation [†] | 62.9 | 45 |
| 7.1.4 | ICTs & organizational model creation [†] | 60.7 | 35 |
| 7.2 | Creative goods & services | 56.4 | 3 ● |
| 7.2.1 | Cultural & creative services exports, % of total trade [Ⓓ] | 1.4 | 6 ● |
| 7.2.2 | National feature films/mn pop. 15–69 | 6.9 | 24 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 2.5 | 14 ● |
| 7.2.5 | Creative goods exports, % total trade | 3.4 | 13 ● |
| 7.3 | Online creativity | 35.7 | 27 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 9.9 | 41 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 30.7 | 22 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 3,087.0 | 44 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 79.3 | 5 ● |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Lebanon

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 5.9 |
| GDP (US\$ billions) | 51.2 |
| GDP per capita, PPP\$ | 18,239.8 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 32.7 | 70 |
| Innovation Output Sub-Index | 27.6 | 57 |
| Innovation Input Sub-Index | 37.8 | 85 |
| Innovation Efficiency Ratio | 0.7 | 41 |
| Global Innovation Index 2015 (out of 141) | 33.8 | 74 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 52.1 | 91 |
| 1.1 | Political environment | 24.3 | 120 ○ |
| 1.1.1 | Political stability & safety* | 20.0 | 123 ○ |
| 1.1.2 | Government effectiveness* | 28.6 | 87 |
| 1.2 | Regulatory environment | 66.2 | 67 |
| 1.2.1 | Regulatory quality* | 39.3 | 81 |
| 1.2.2 | Rule of law* | 28.2 | 108 ○ |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.7 | 21 ● |
| 1.3 | Business environment | 65.8 | 76 |
| 1.3.1 | Ease of starting a business* | 82.7 | 85 |
| 1.3.2 | Ease of resolving insolvency* | 33.1 | 109 ○ |
| 1.3.3 | Ease of paying taxes* | 81.7 | 39 |
| 2 | Human capital & research | 29.8 | 76 |
| 2.1 | Education | 31.9 | 107 |
| 2.1.1 | Expenditure on education, % GDP | 2.6 | 108 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 5.1 | 109 ○ |
| 2.1.3 | School life expectancy, years | 12.2 | 86 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary ^② | 8.2 | 10 ● |
| 2.2 | Tertiary education | 42.0 | 38 |
| 2.2.1 | Tertiary enrolment, % gross | 42.8 | 60 |
| 2.2.2 | Graduates in science & engineering, % ^② | 23.3 | 34 |
| 2.2.3 | Tertiary inbound mobility, % | 7.6 | 21 ● |
| 2.3 | Research & development (R&D) | 15.4 | 48 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 30.8 | 44 |
| 3 | Infrastructure | 37.5 | 84 |
| 3.1 | Information & communication technologies (ICTs) | 46.5 | 75 |
| 3.1.1 | ICT access* | 65.7 | 57 |
| 3.1.2 | ICT use* | 55.4 | 39 |
| 3.1.3 | Government's online service* | 35.4 | 89 |
| 3.1.4 | E-participation* | 29.4 | 99 |
| 3.2 | General infrastructure | 24.4 | 109 ○ |
| 3.2.1 | Electricity output, kWh/cap. | 4,061.1 | 51 |
| 3.2.2 | Logistics performance* | 2.7 | 80 |
| 3.2.3 | Gross capital formation, % GDP | n/a | n/a |
| 3.3 | Ecological sustainability | 41.5 | 73 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.3 | 41 |
| 3.3.2 | Environmental performance* | 69.1 | 83 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 84 |
| 4 | Market sophistication | 37.9 | 99 |
| 4.1 | Credit | 27.1 | 86 |
| 4.1.1 | Ease of getting credit* | 40.0 | 92 |
| 4.1.2 | Domestic credit to private sector, % GDP | 103.3 | 24 ● |
| 4.1.3 | Microfinance gross loans, % GDP | 0.1 | 61 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 27.7 | 103 |
| 4.2.1 | Ease of protecting minority investors* | 43.3 | 104 ○ |
| 4.2.2 | Market capitalization, % GDP | 24.4 | 58 |
| 4.2.3 | Total value of stocks traded, % GDP ^② | 0.9 | 56 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 20 ● |
| 4.3 | Trade, competition, & market scale | 58.9 | 72 |
| 4.3.1 | Applied tariff rate, weighted mean, % ^② | 4.3 | 77 |
| 4.3.2 | Intensity of local competition [†] | 74.1 | 33 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 81.4 | 77 |
| 5 | Business sophistication | 31.7 | 63 |
| 5.1 | Knowledge workers | 40.6 | 55 |
| 5.1.1 | Knowledge-intensive employment, % ^② | 31.9 | 44 |
| 5.1.2 | Firms offering formal training, % firms | 26.6 | 65 |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 27.4 | 76 |
| 5.2.1 | University/industry research collaboration [†] | 31.4 | 108 ○ |
| 5.2.2 | State of cluster development [†] | 44.7 | 65 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 38 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 74 |
| 5.3 | Knowledge absorption | 27.1 | 71 |
| 5.3.1 | Intellectual property payments, % total trade | 0.1 | 88 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 3.9 | 110 ○ |
| 5.3.3 | ICT services imports, % total trade | 1.7 | 27 ● |
| 5.3.4 | FDI net inflows, % GDP | 6.5 | 21 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 22.4 | 74 |
| 6.1 | Knowledge creation | 14.9 | 55 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 13.3 | 53 |
| 6.1.5 | Citable documents H index | 122.0 | 65 |
| 6.2 | Knowledge impact | 25.0 | [109] |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 9.2 | 41 |
| 6.2.5 | High- & medium-high-tech manufactures, % ^② | 22.0 | 53 |
| 6.3 | Knowledge diffusion | 27.4 | 47 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 59 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.2 | 98 |
| 6.3.3 | ICT services exports, % total trade | 2.7 | 32 ● |
| 6.3.4 | FDI net outflows, % GDP ^② | 2.7 | 22 ● |
| 7 | Creative outputs | 32.8 | 51 |
| 7.1 | Intangible assets | 41.6 | 71 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 | ICTs & business model creation [†] | 45.5 | 110 ○ |
| 7.1.4 | ICTs & organizational model creation [†] | 37.7 | 112 ○ |
| 7.2 | Creative goods & services | 41.5 | 15 ● |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.4 | 27 |
| 7.2.2 | National feature films/mn pop. 15–69 | 4.0 | 39 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 3.2 | 49 |
| 7.2.4 | Printing & publishing manufactures, % ^② | 4.2 | 1 ● |
| 7.2.5 | Creative goods exports, % total trade | 0.8 | 41 |
| 7.3 | Online creativity | 6.7 | 70 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 7.4 | 46 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.3 | 98 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 876.3 | 78 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 12.7 | 58 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 2.9 |
| GDP (US\$ billions) | 41.3 |
| GDP per capita, PPP\$ | 28,359.1 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 41.8 | 36 |
| Innovation Output Sub-Index | 32.3 | 41 |
| Innovation Input Sub-Index | 51.2 | 34 |
| Innovation Efficiency Ratio | 0.6 | 75 |
| Global Innovation Index 2015 (out of 141) | 42.3 | 38 |

1 Institutions **73.3** **37**

| | | |
|--|------|-------|
| 1.1 Political environment | 74.5 | 32 |
| 1.1.1 Political stability & safety* | 82.4 | 30 |
| 1.1.2 Government effectiveness* | 66.7 | 35 |
| 1.2 Regulatory environment | 69.7 | 51 |
| 1.2.1 Regulatory quality* | 74.5 | 22 ● |
| 1.2.2 Rule of law* | 69.7 | 34 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 24.6 | 100 ○ |
| 1.3 Business environment | 75.7 | 47 |
| 1.3.1 Ease of starting a business* | 97.7 | 8 ● |
| 1.3.2 Ease of resolving insolvency* | 48.1 | 63 |
| 1.3.3 Ease of paying taxes* | 81.4 | 43 |

2 Human capital & research **49.1** **26**

| | | |
|--|---------|------|
| 2.1 Education | 86.3 | 2 ● |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 17.7 | 1 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 66.6 | 3 ● |
| 2.1.3 School life expectancy, years | 16.5 | 22 |
| 2.1.4 PISA scales in reading, maths, & science | 483.9 | 32 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 8.1 | 8 ● |
| 2.2 Tertiary education | 40.7 | 44 |
| 2.2.1 Tertiary enrolment, % gross | 72.0 | 24 |
| 2.2.2 Graduates in science & engineering, % | 22.2 | 42 |
| 2.2.3 Tertiary inbound mobility, % | 2.5 | 60 |
| 2.3 Research & development (R&D) | 20.2 | 46 |
| 2.3.1 Researchers, FTE/mn pop. | 2,961.5 | 29 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.0 | 34 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 22.1 | 51 |

3 Infrastructure **52.9** **33**

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 67.9 | 32 |
| 3.1.1 ICT access* | 70.4 | 47 |
| 3.1.2 ICT use* | 61.0 | 30 |
| 3.1.3 Government's online service* | 75.6 | 21 |
| 3.1.4 E-participation* | 64.7 | 33 |
| 3.2 General infrastructure | 32.2 | 72 |
| 3.2.1 Electricity output, kWh/cap. | 1,423.6 | 86 ○ |
| 3.2.2 Logistics performance* | 3.2 | 44 |
| 3.2.3 Gross capital formation, % GDP | 21.1 | 73 |
| 3.3 Ecological sustainability | 58.6 | 17 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 8.3 | 51 |
| 3.3.2 Environmental performance* | 85.5 | 23 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 8.8 | 11 ● |

4 Market sophistication **45.0** **53**

| | | |
|--|------|-------|
| 4.1 Credit | 36.5 | 51 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 11.9 | 123 ○ |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 33.7 | 76 |
| 4.2.1 Ease of protecting minority investors* | 61.7 | 45 |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 9.2 | 85 ○ |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.4 | 64 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 19 |

4.3 Trade, competition, & market scale **64.7** **52**

| | | |
|---|------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 77.4 | 17 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 79.9 | 78 |

5 Business sophistication **35.7** **48**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 52.1 | 29 |
| 5.1.1 Knowledge-intensive employment, % | 42.7 | 20 |
| 5.1.2 Firms offering formal training, % firms | 42.0 | 35 |
| 5.1.3 GERD performed by business, % of GDP | 0.3 | 44 |
| 5.1.4 GERD financed by business, % | 31.7 | 48 |
| 5.1.5 Females employed w/advanced degrees, % total | 26.1 | 6 ● |

5.2 Innovation linkages **36.8** **44**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 60.1 | 26 |
| 5.2.2 State of cluster development [†] | 41.9 | 80 |
| 5.2.3 GERD financed by abroad, % | 34.3 | 12 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 34 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.4 | 36 |

5.3 Knowledge absorption **18.1** **111 ○**

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.1 | 92 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.3 | 92 ○ |
| 5.3.3 ICT services imports, % total trade | 0.7 | 81 |
| 5.3.4 FDI net inflows, % GDP | 0.7 | 106 ○ |
| 5.3.5 Research talent, % in business enterprise | 23.1 | 51 |

6 Knowledge & technology outputs **25.7** **60**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 16.8 | 51 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.8 | 50 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.5 | 35 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 25.9 | 30 |
| 6.1.5 Citable documents H index | 133.0 | 58 |

6.2 Knowledge impact **39.4** **47**

| | | |
|--|------|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.9 | 68 |
| 6.2.2 New businesses/th pop. 15–64 | 4.2 | 30 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 15.2 | 25 |
| 6.2.5 High- & medium-high-tech manufactures, % | 19.8 | 59 |

6.3 Knowledge diffusion **21.0** **87**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 60 |
| 6.3.2 High-tech exports less re-exports, % total trade | 5.3 | 32 |
| 6.3.3 ICT services exports, % total trade | 0.7 | 88 ○ |
| 6.3.4 FDI net outflows, % GDP | 0.3 | 72 |

7 Creative outputs **39.0** **37**

| | | |
|---|------|------|
| 7.1 Intangible assets | 49.1 | 40 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 51.0 | 43 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.0 | 51 |
| 7.1.3 ICTs & business model creation [†] | 69.4 | 26 |
| 7.1.4 ICTs & organizational model creation [†] | 69.3 | 19 ● |

7.2 Creative goods & services **28.5** **47**

| | | |
|---|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓐ] | 0.4 | 26 |
| 7.2.2 National feature films/mn pop. 15–69 | 7.0 | 23 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.0 | 64 |
| 7.2.5 Creative goods exports, % total trade | 1.6 | 30 |

7.3 Online creativity **29.1** **31**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 14.1 | 33 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 30.4 | 23 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,619.1 | 36 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 45.2 | 23 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Luxembourg

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 0.6 |
| GDP (US\$ billions) | 57.4 |
| GDP per capita, PPP\$ | 98,987.2 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 57.1 | 12 |
| Innovation Output Sub-Index | 57.6 | 3 ● |
| Innovation Input Sub-Index | 56.6 | 23 |
| Innovation Efficiency Ratio | 1.0 | 1 ● |
| Global Innovation Index 2015 (out of 141) | 59.0 | 9 |

1 Institutions 82.1 19

| | | |
|--|------|------|
| 1.1 Political environment | 91.2 | 5 |
| 1.1.1 Political stability & safety* | 97.4 | 2 ● |
| 1.1.2 Government effectiveness* | 85.0 | 13 |
| 1.2 Regulatory environment | 81.5 | 25 |
| 1.2.1 Regulatory quality* | 85.6 | 15 |
| 1.2.2 Rule of law* | 94.4 | 10 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 21.7 | 93 ○ |
| 1.3 Business environment | 73.5 | 57 |
| 1.3.1 Ease of starting a business* | 86.5 | 61 |
| 1.3.2 Ease of resolving insolvency* | 45.5 | 72 |
| 1.3.3 Ease of paying taxes* | 88.6 | 20 |

2 Human capital & research 43.3 33

| | | |
|--|---------|------|
| 2.1 Education | 51.9 | 53 |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 18.0 | 67 |
| 2.1.3 School life expectancy, years ^② | 13.9 | 62 |
| 2.1.4 PISA scales in reading, maths, & science | 489.6 | 26 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 7.9 | 4 ● |
| 2.2 Tertiary education | 44.0 | 33 |
| 2.2.1 Tertiary enrolment, % gross ^② | 19.4 | 93 ○ |
| 2.2.2 Graduates in science & engineering, % | 16.3 | 77 ○ |
| 2.2.3 Tertiary inbound mobility, % ^② | 40.6 | 1 ● |
| 2.3 Research & development (R&D) | 33.9 | 34 |
| 2.3.1 Researchers, FTE/mn pop. | 4,577.3 | 11 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.3 | 28 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 98.3 | 30 |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 55.5 27

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 73.8 | 23 |
| 3.1.1 ICT access* | 94.9 | 1 ● |
| 3.1.2 ICT use* | 83.4 | 5 |
| 3.1.3 Government's online service* | 62.2 | 42 |
| 3.1.4 E-participation* | 54.9 | 54 |
| 3.2 General infrastructure | 41.9 | 39 |
| 3.2.1 Electricity output, kWh/cap. | 3,403.6 | 56 |
| 3.2.2 Logistics performance* | 3.9 | 8 |
| 3.2.3 Gross capital formation, % GDP | 18.2 | 97 ○ |
| 3.3 Ecological sustainability | 50.8 | 38 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.9 | 33 |
| 3.3.2 Environmental performance* | 86.6 | 20 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.3 | 56 |

4 Market sophistication 42.5 69

| | | |
|--|------|-------|
| 4.1 Credit | 25.2 | 93 ○ |
| 4.1.1 Ease of getting credit* | 15.0 | 121 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 91.6 | 30 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 41.7 | 43 |
| 4.2.1 Ease of protecting minority investors* | 45.0 | 97 ○ |
| 4.2.2 Market capitalization, % GDP | 97.4 | 12 |
| 4.2.3 Total value of stocks traded, % GDP | 0.2 | 74 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 12 |

4.3 Trade, competition, & market scale 60.5 66

| | | |
|---|------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 69.1 | 59 |
| 4.3.3 Domestic market scale, bn PPP\$ | 53.7 | 92 |

5 Business sophistication 59.9 2 ●

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 61.3 | 17 |
| 5.1.1 Knowledge-intensive employment, % | 62.3 | 1 ● |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.7 | 28 |
| 5.1.4 GERD financed by business, % ^② | 16.5 | 66 |
| 5.1.5 Females employed w/advanced degrees, % total | 22.3 | 17 |

5.2 Innovation linkages 64.8 2 ●

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 65.0 | 17 |
| 5.2.2 State of cluster development [†] | 67.8 | 13 |
| 5.2.3 GERD financed by abroad, % ^② | 32.3 | 13 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 1 ● |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 6.2 | 6 |

5.3 Knowledge absorption 53.6 6

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 3.4 | 1 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 2.8 | 117 ○ |
| 5.3.3 ICT services imports, % total trade | 3.5 | 4 ● |
| 5.3.4 FDI net inflows, % GDP | 10.9 | 7 |
| 5.3.5 Research talent, % in business enterprise | 40.3 | 29 |

6 Knowledge & technology outputs 48.7 11

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 49.3 | 14 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 10.9 | 11 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 7.2 | 1 ● |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 17.9 | 41 |
| 6.1.5 Citable documents H index | 105.0 | 75 |

6.2 Knowledge impact 38.1 55

| | | |
|--|-----|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.1 | 22 |
| 6.2.2 New businesses/th pop. 15–64 ^② | 6.1 | 20 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.8 | 81 |
| 6.2.5 High- & medium-high-tech manufactures, % | 6.5 | 87 ○ |

6.3 Knowledge diffusion 58.8 5

| | | |
|--|-------|-----|
| 6.3.1 Intellectual property receipts, % total trade | 0.8 | 15 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.6 | 69 |
| 6.3.3 ICT services exports, % total trade | 5.0 | 10 |
| 6.3.4 FDI net outflows, % GDP | 198.7 | 1 ● |

7 Creative outputs 66.4 2 ●

| | | |
|---|-------|-----|
| 7.1 Intangible assets | 72.0 | 1 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 126.2 | 5 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 11.3 | 13 |
| 7.1.3 ICTs & business model creation [†] | 79.7 | 5 |
| 7.1.4 ICTs & organizational model creation [†] | 71.8 | 15 |

7.2 Creative goods & services 45.3 10

| | | |
|---|------|-----|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 4.9 | 1 ● |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 42.4 | 1 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.4 | 37 |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 81 |

7.3 Online creativity 76.2 3 ●

| | | |
|--|---------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 74.5 | 8 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,322.3 | 14 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 24.2 |
| GDP (US\$ billions) | 9.7 |
| GDP per capita, PPP\$ | 1,462.2 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 24.8 | 111 |
| Innovation Output Sub-Index | 21.1 | 91 |
| Innovation Input Sub-Index | 28.5 | 120 |
| Innovation Efficiency Ratio | 0.7 | 35 ● |
| Global Innovation Index 2015 (out of 141) | 24.4 | 125 |

| | | |
|---|-------------|------------|
| 1 Institutions | 49.0 | 99 |
| 1.1 Political environment | 26.4 | 117 |
| 1.1.1 Political stability & safety* | 49.3 | 93 |
| 1.1.2 Government effectiveness* | 3.5 | 127 ○ |
| 1.2 Regulatory environment | 57.2 | 89 |
| 1.2.1 Regulatory quality* | 26.8 | 109 |
| 1.2.2 Rule of law* | 28.6 | 107 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 14.7 | 60 ● |
| 1.3 Business environment | 63.4 | 85 |
| 1.3.1 Ease of starting a business* | 79.6 | 96 |
| 1.3.2 Ease of resolving insolvency* | 34.2 | 106 |
| 1.3.3 Ease of paying taxes* | 76.3 | 62 |
| 2 Human capital & research | 14.8 | 114 |
| 2.1 Education | 21.8 | 125 ○ |
| 2.1.1 Expenditure on education, % GDP | 2.1 | 113 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 8.4 | 103 |
| 2.1.3 School life expectancy, years [Ⓔ] | 10.3 | 104 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 23.1 | 91 |
| 2.2 Tertiary education | 22.2 | 101 |
| 2.2.1 Tertiary enrolment, % gross | 4.2 | 117 ○ |
| 2.2.2 Graduates in science & engineering, % | 20.3 | 53 |
| 2.2.3 Tertiary inbound mobility, % | 1.7 | 70 |
| 2.3 Research & development (R&D) | 0.5 | 111 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓔ] | 51.0 | 84 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓔ] | 0.1 | 101 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 21.9 | 122 |
| 3.1 Information & communication technologies (ICTs) | 19.9 | 114 |
| 3.1.1 ICT access* | 16.7 | 123 ○ |
| 3.1.2 ICT use* | 3.3 | 120 ○ |
| 3.1.3 Government's online service* | 24.4 | 106 |
| 3.1.4 E-participation* | 35.3 | 85 |
| 3.2 General infrastructure | 20.7 | 123 |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | 2.4 | 115 |
| 3.2.3 Gross capital formation, % GDP | 16.3 | 110 |
| 3.3 Ecological sustainability | 25.0 | 121 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 37.1 | 125 ○ |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 115 |
| 4 Market sophistication | 36.1 | 103 |
| 4.1 Credit | 11.1 | 124 ○ |
| 4.1.1 Ease of getting credit* | 15.0 | 121 |
| 4.1.2 Domestic credit to private sector, % GDP | 13.0 | 122 ○ |
| 4.1.3 Microfinance gross loans, % GDP | 1.2 | 31 ● |

| | | |
|---|------|-----|
| 4.2 Investment | 50.0 | 23 |
| 4.2.1 Ease of protecting minority investors* | 50.0 | 86 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 47.0 | 110 |
| 4.3.1 Applied tariff rate, weighted mean, % | 6.4 | 96 |
| 4.3.2 Intensity of local competition [†] | 59.4 | 104 |
| 4.3.3 Domestic market scale, bn PPP\$ | 34.1 | 103 |

5 Business sophistication **20.5** **120**

| | | |
|--|------|-------|
| 5.1 Knowledge workers | 8.1 | 124 ○ |
| 5.1.1 Knowledge-intensive employment, % [Ⓔ] | 3.5 | 104 ○ |
| 5.1.2 Firms offering formal training, % firms | 12.7 | 89 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓔ] | 2.3 | 83 |
| 5.2 Innovation linkages | 21.8 | 104 |
| 5.2.1 University/industry research collaboration [†] | 37.6 | 87 |
| 5.2.2 State of cluster development [†] | 32.6 | 112 |
| 5.2.3 GERD financed by abroad, % [Ⓔ] | 10.6 | 44 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓔ] | 0.0 | 87 |
| 5.3 Knowledge absorption | 31.5 | 48 ● |
| 5.3.1 Intellectual property payments, % total trade [Ⓔ] | 0.5 | 52 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.7 | 102 |
| 5.3.3 ICT services imports, % total trade [Ⓔ] | 2.9 | 9 ● |
| 5.3.4 FDI net inflows, % GDP | 3.3 | 51 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **16.1** **112**

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 3.7 | 103 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 99 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP [Ⓔ] | 0.1 | 72 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.3 | 83 |
| 6.1.5 Citable documents H index | 68.0 | 100 |
| 6.2 Knowledge impact | 22.2 | 112 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.1) | 91 |
| 6.2.2 New businesses/th pop. 15–64 | 0.7 | 82 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.1 | 85 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓔ] | 2.4 | 95 ○ |
| 6.3 Knowledge diffusion | 22.4 | 78 |
| 6.3.1 Intellectual property receipts, % total trade [Ⓔ] | 0.5 | 24 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.1 | 106 |
| 6.3.3 ICT services exports, % total trade [Ⓔ] | 1.7 | 59 |
| 6.3.4 FDI net outflows, % GDP [Ⓔ] | 0.1 | 78 |

7 Creative outputs **26.1** **80**

| | | |
|---|------|-------|
| 7.1 Intangible assets | 41.7 | 69 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 66.0 | 26 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 6.0 | 23 ● |
| 7.1.3 ICTs & business model creation [†] | 47.9 | 103 |
| 7.1.4 ICTs & organizational model creation [†] | 45.5 | 88 |
| 7.2 Creative goods & services | 21.1 | 70 |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓔ] | 0.0 | 61 |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓔ] | 2.1 | 23 ● |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 84 |
| 7.3 Online creativity | 0.1 | 124 ○ |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 121 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 117 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 16.1 | 121 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Malawi

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 17.2 |
| GDP (US\$ billions) | 6.4 |
| GDP per capita, PPP\$ | 1,124.2 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 27.3 | 98 |
| Innovation Output Sub-Index | 23.1 | 83 |
| Innovation Input Sub-Index | 31.4 | 110 |
| Innovation Efficiency Ratio | 0.7 | 38 ● |
| Global Innovation Index 2015 (out of 141) | 29.7 | 98 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 51.6 | 94 |
| 1.1 Political environment | 42.9 | 89 |
| 1.1.1 Political stability & safety* | 65.8 | 57 ● |
| 1.1.2 Government effectiveness* | 19.9 | 106 |
| 1.2 Regulatory environment | 58.2 | 87 |
| 1.2.1 Regulatory quality* | 27.6 | 108 |
| 1.2.2 Rule of law* | 39.7 | 75 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 16.7 | 71 |
| 1.3 Business environment | 53.6 | 119 |
| 1.3.1 Ease of starting a business* | 69.7 | 116 |
| 1.3.2 Ease of resolving insolvency* | 19.2 | 125 ○ |
| 1.3.3 Ease of paying taxes* | 71.8 | 77 |

| | | |
|---|-------------|------------|
| 2 Human capital & research | 14.5 | 117 |
| 2.1 Education | 40.4 | 86 |
| 2.1.1 Expenditure on education, % GDP | 6.9 | 12 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 30.2 | 19 ● |
| 2.1.3 School life expectancy, years ^Q | 10.7 | 99 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 70.4 | 112 ○ |
| 2.2 Tertiary education | 2.9 | 123 ○ |
| 2.2.1 Tertiary enrolment, % gross ^Q | 0.8 | 121 ○ |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % ^Q | 1.1 | 78 |
| 2.3 Research & development (R&D) | 0.2 | 112 |
| 2.3.1 Researchers, FTE/mn pop. ^Q | 49.6 | 85 |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|------------|
| 3 Infrastructure | 24.6 | 117 |
| 3.1 Information & communication technologies (ICTs) | 16.0 | 122 |
| 3.1.1 ICT access* | 19.6 | 121 ○ |
| 3.1.2 ICT use* | 3.3 | 119 ○ |
| 3.1.3 Government's online service* | 17.3 | 112 |
| 3.1.4 E-participation* | 23.5 | 108 |
| 3.2 General infrastructure | 24.6 | 108 |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | 2.8 | 70 |
| 3.2.3 Gross capital formation, % GDP | 13.4 | 118 |
| 3.3 Ecological sustainability | 33.2 | 104 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 49.7 | 115 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 123 ○ |

| | | |
|--|-------------|------------|
| 4 Market sophistication | 30.7 | 119 |
| 4.1 Credit | 16.9 | 114 |
| 4.1.1 Ease of getting credit* | 25.0 | 118 |
| 4.1.2 Domestic credit to private sector, % GDP | 16.2 | 113 |
| 4.1.3 Microfinance gross loans, % GDP | 1.7 | 22 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 25.4 | 110 |
| 4.2.1 Ease of protecting minority investors* | 46.7 | 92 |
| 4.2.2 Market capitalization, % GDP ^Q | 17.8 | 68 |
| 4.2.3 Total value of stocks traded, % GDP ^Q | 0.4 | 66 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|-------------|------------|
| 4.3 Trade, competition, & market scale | 49.8 | 104 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.8 | 68 |
| 4.3.2 Intensity of local competition [†] | 68.2 | 64 |
| 4.3.3 Domestic market scale, bn PPP\$ | 19.6 | 117 |

5 Business sophistication **35.7** **47 ●**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 38.9 | 61 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 32.9 | 48 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

| | | |
|---|------|-----|
| 5.2 Innovation linkages | 34.3 | 49 |
| 5.2.1 University/industry research collaboration [†] | 30.7 | 109 |
| 5.2.2 State of cluster development [†] | 36.1 | 98 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 34.0 | 39 ● |
| 5.3.1 Intellectual property payments, % total trade | 0.1 | 99 |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.5 | 38 ● |
| 5.3.3 ICT services imports, % total trade | 0.7 | 79 |
| 5.3.4 FDI net inflows, % GDP | 16.8 | 1 ● |
| 5.3.5 Research talent, % in business enterprise ^Q | 1.7 | 74 |

6 Knowledge & technology outputs **23.8** **66**

| | | |
|--|------|------|
| 6.1 Knowledge creation | 18.2 | 47 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 19.2 | 39 ● |
| 6.1.5 Citable documents H index | 97.0 | 82 |

| | | |
|---|------|------|
| 6.2 Knowledge impact | 29.2 | 93 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.5 | 32 ● |
| 6.2.2 New businesses/th pop. 15–64 ^Q | 0.1 | 103 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.8 | 110 |
| 6.2.5 High- & medium-high-tech manufactures, % ^Q | 8.6 | 83 |

| | | |
|--|------|------|
| 6.3 Knowledge diffusion | 24.1 | 68 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.4 | 81 |
| 6.3.3 ICT services exports, % total trade | 0.9 | 81 |
| 6.3.4 FDI net outflows, % GDP ^Q | 1.2 | 43 ● |

7 Creative outputs **22.4** **95**

| | | |
|---|------|-------|
| 7.1 Intangible assets | 36.3 | 92 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 40.1 | 119 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 32.6 | 119 ○ |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 16.7 | 78 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 63 |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^Q | 1.7 | 29 ● |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 90 |

| | | |
|--|------|-----|
| 7.3 Online creativity | 0.1 | 122 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 116 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 110 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 14.2 | 122 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

^Q indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 30.3 |
| GDP (US\$ billions) | 296.2 |
| GDP per capita, PPP\$ | 26,314.8 |
| Income group | Upper-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 43.4 | 35 |
| Innovation Output Sub-Index | 34.7 | 39 |
| Innovation Input Sub-Index | 52.1 | 32 |
| Innovation Efficiency Ratio | 0.7 | 59 |
| Global Innovation Index 2015 (out of 141) | 46.0 | 32 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 70.9 | 43 |
| 1.1 Political environment | 71.0 | 36 |
| 1.1.1 Political stability & safety* | 71.3 | 47 |
| 1.1.2 Government effectiveness* | 70.7 | 27 |
| 1.2 Regulatory environment | 60.9 | 78 |
| 1.2.1 Regulatory quality* | 65.5 | 36 |
| 1.2.2 Rule of law* | 63.1 | 39 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 29.4 | 114 ○ |
| 1.3 Business environment | 80.7 | 28 |
| 1.3.1 Ease of starting a business* | 95.3 | 14 |
| 1.3.2 Ease of resolving insolvency* | 62.5 | 42 |
| 1.3.3 Ease of paying taxes* | 84.3 | 28 |

| | | |
|---|-------------|-----------|
| 2 Human capital & research | 43.3 | 34 |
| 2.1 Education | 49.5 | 59 |
| 2.1.1 Expenditure on education, % GDP | 6.3 | 22 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 23.2 | 41 |
| 2.1.3 School life expectancy, years | 13.4 | 66 |
| 2.1.4 PISA scales in reading, maths, & science | 412.7 | 51 ○ |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 13.3 | 51 |
| 2.2 Tertiary education | 46.6 | 27 |
| 2.2.1 Tertiary enrolment, % gross | 38.5 | 68 |
| 2.2.2 Graduates in science & engineering, % | 33.3 | 6 ● |
| 2.2.3 Tertiary inbound mobility, % | 3.6 | 47 |
| 2.3 Research & development (R&D) | 33.7 | 35 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 1,793.5 | 39 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 1.1 | 33 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 32.2 | 42 |
| 2.3.4 QS university ranking, average score top 3* | 49.1 | 28 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 49.2 | 43 |
| 3.1 Information & communication technologies (ICTs) | 58.6 | 46 |
| 3.1.1 ICT access* | 66.1 | 55 |
| 3.1.2 ICT use* | 47.6 | 54 |
| 3.1.3 Government's online service* | 67.7 | 31 |
| 3.1.4 E-participation* | 52.9 | 59 |
| 3.2 General infrastructure | 46.7 | 29 |
| 3.2.1 Electricity output, kWh/cap | 4,655.0 | 44 |
| 3.2.2 Logistics performance* | 3.6 | 24 |
| 3.2.3 Gross capital formation, % GDP | 26.5 | 34 |
| 3.3 Ecological sustainability | 42.4 | 62 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.7 | 79 |
| 3.3.2 Environmental performance* | 74.2 | 59 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.0 | 34 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 55.0 | 24 |
| 4.1 Credit | 39.5 | 46 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 120.6 | 19 |
| 4.1.3 Microfinance gross loans, % GDP [Ⓓ] | 0.1 | 57 ○ |

| | | |
|--|-------|-----|
| 4.2 Investment | 52.8 | 19 |
| 4.2.1 Ease of protecting minority investors* | 78.3 | 4 ● |
| 4.2.2 Market capitalization, % GDP | 135.8 | 6 ● |
| 4.2.3 Total value of stocks traded, % GDP | 42.4 | 17 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 48 |
| 4.3 Trade, competition, & market scale | 72.8 | 25 |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓓ] | 2.8 | 60 |
| 4.3.2 Intensity of local competition [†] | 73.4 | 36 |
| 4.3.3 Domestic market scale, bn PPP\$ | 769.4 | 27 |

| | | |
|--|-------------|-----------|
| 5 Business sophistication | 41.8 | 29 |
| 5.1 Knowledge workers | 47.8 | 35 |
| 5.1.1 Knowledge-intensive employment, % | 25.2 | 51 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 50.1 | 25 |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.7 | 27 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 60.2 | 11 |
| 5.1.5 Females employed w/advanced degrees, % total | 11.4 | 58 |

| | | |
|---|------|------|
| 5.2 Innovation linkages | 39.0 | 36 |
| 5.2.1 University/industry research collaboration [†] | 72.1 | 12 ● |
| 5.2.2 State of cluster development [†] | 72.0 | 5 ● |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 4.6 | 68 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 12 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 48 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 38.7 | 26 |
| 5.3.1 Intellectual property payments, % total trade | 0.6 | 48 |
| 5.3.2 High-tech imports less re-imports, % total trade | 23.1 | 3 ● |
| 5.3.3 ICT services imports, % total trade | 1.2 | 48 |
| 5.3.4 FDI net inflows, % GDP | 3.1 | 58 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 10.8 | 65 ○ |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 33.4 | 35 |
| 6.1 Knowledge creation | 8.5 | 69 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.8 | 52 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.3 | 45 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 51 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.6 | 55 |
| 6.1.5 Citable documents H index | 165.0 | 48 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 45.4 | 30 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.3 | 21 |
| 6.2.2 New businesses/th pop. 15–64 | 2.4 | 43 |
| 6.2.3 Computer software spending, % GDP | 0.4 | 21 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 14.9 | 26 |
| 6.2.5 High- & medium-high-tech manufactures, % | 37.4 | 26 |
| 6.3 Knowledge diffusion | 46.4 | 13 |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 74 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 28.2 | 1 ● |
| 6.3.3 ICT services exports, % total trade | 1.1 | 76 |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 4.0 | 12 |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 35.9 | 43 |
| 7.1 Intangible assets | 47.6 | 47 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 20.0 | 79 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.1 | 65 |
| 7.1.3 ICTs & business model creation [†] | 77.1 | 10 ● |
| 7.1.4 ICTs & organizational model creation [†] | 76.3 | 8 ● |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 38.2 | 21 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 3.4 | 44 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 10.4 | 33 |
| 7.2.4 Printing & publishing manufactures, % | 0.9 | 69 ○ |
| 7.2.5 Creative goods exports, % total trade | 9.2 | 6 ● |

| | | |
|--|---------|------|
| 7.3 Online creativity | 10.2 | 61 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 6.8 | 51 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 5.3 | 52 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,677.1 | 58 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 16.2 | 57 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 17.6 |
| GDP (US\$ billions) | 13.1 |
| GDP per capita, PPP\$ | 2,199.0 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 24.8 | 112 |
| Innovation Output Sub-Index | 21.0 | 92 |
| Innovation Input Sub-Index | 28.5 | 119 |
| Innovation Efficiency Ratio | 0.7 | 37 ● |
| Global Innovation Index 2015 (out of 141) | 28.4 | 105 |

1 Institutions 43.1 119

| | | |
|--|------|-------|
| 1.1 Political environment | 13.8 | 125 ○ |
| 1.1.1 Political stability & safety* | 19.6 | 124 ○ |
| 1.1.2 Government effectiveness* | 8.0 | 122 |
| 1.2 Regulatory environment | 59.9 | 81 |
| 1.2.1 Regulatory quality* | 30.9 | 102 |
| 1.2.2 Rule of law* | 30.9 | 99 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.7 | 55 ● |
| 1.3 Business environment | 55.5 | 112 |
| 1.3.1 Ease of starting a business* | 66.1 | 121 |
| 1.3.2 Ease of resolving insolvency* | 40.4 | 88 |
| 1.3.3 Ease of paying taxes* | 60.2 | 102 |

2 Human capital & research 13.6 121

| | | |
|---|------|-------|
| 2.1 Education | 33.1 | 102 |
| 2.1.1 Expenditure on education, % GDP | 4.3 | 74 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 24.3 | 36 ● |
| 2.1.3 School life expectancy, years [Ⓓ] | 7.7 | 115 ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 18.9 | 81 |
| 2.2 Tertiary education | 4.1 | 121 ○ |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 6.9 | 111 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 0.5 | 90 |
| 2.3 Research & development (R&D) | 3.7 | 80 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 29.2 | 94 ○ |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.7 | 53 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 28.5 107

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 17.4 | 118 |
| 3.1.1 ICT access* | 34.3 | 105 |
| 3.1.2 ICT use* | 6.1 | 114 |
| 3.1.3 Government's online service* | 13.4 | 119 |
| 3.1.4 E-participation* | 15.7 | 118 |
| 3.2 General infrastructure | 40.4 | 44 ● |
| 3.2.1 Electricity output, kWh/cap. | n/a | n/a |
| 3.2.2 Logistics performance* | 2.5 | 108 |
| 3.2.3 Gross capital formation, % GDP | 30.5 | 19 ● |
| 3.3 Ecological sustainability | 27.9 | 118 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 41.5 | 123 ○ |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 118 |

4 Market sophistication 28.2 125 ○

| | | |
|--|------|-----|
| 4.1 Credit | 13.6 | 118 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 24.5 | 103 |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 52 |

| | | |
|--|------|-------|
| 4.2 Investment | 27.4 | 105 |
| 4.2.1 Ease of protecting minority investors* | 35.0 | 121 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 39 ● |

4.3 Trade, competition, & market scale 43.7 116

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 7.4 | 102 |
| 4.3.2 Intensity of local competition [†] | 57.7 | 107 |
| 4.3.3 Domestic market scale, bn PPP\$ | 27.5 | 110 |

5 Business sophistication 29.2 79

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 22.2 | 105 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 32.1 | 50 |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.0 | 80 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 10.1 | 71 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 29.7 70

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 36.7 | 92 |
| 5.2.2 State of cluster development [†] | 44.8 | 63 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 8.8 | 48 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption 35.5 34 ●

| | | |
|---|------|------|
| 5.3.1 Intellectual property payments, % total trade [Ⓓ] | 0.1 | 101 |
| 5.3.2 High-tech imports less re-imports, % total trade [Ⓓ] | 5.1 | 93 |
| 5.3.3 ICT services imports, % total trade [Ⓓ] | 3.1 | 8 ● |
| 5.3.4 FDI net inflows, % GDP | 1.7 | 87 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 49.0 | 25 ● |

6 Knowledge & technology outputs 26.9 55 ●

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 4.9 | 94 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 83 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.1 | 88 |
| 6.1.5 Citable documents H index | 68.0 | 100 |

6.2 Knowledge impact 51.3 17

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.1 | 13 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.2 | 125 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 24.4 65

| | | |
|---|-----|------|
| 6.3.1 Intellectual property receipts, % total trade [Ⓓ] | 0.0 | 90 |
| 6.3.2 High-tech exports less re-exports, % total trade [Ⓓ] | 0.1 | 108 |
| 6.3.3 ICT services exports, % total trade [Ⓓ] | 4.6 | 11 ● |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 0.0 | 88 |

7 Creative outputs 15.2 120

| | | |
|---|------|-------|
| 7.1 Intangible assets | 27.7 | 117 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 3.3 | 106 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 95 |
| 7.1.3 ICTs & business model creation [†] | 51.2 | 90 |
| 7.1.4 ICTs & organizational model creation [†] | 43.9 | 91 |

7.2 Creative goods & services 0.6 126 ○

| | | |
|---|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓓ] | 0.0 | 65 |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓓ] | 0.1 | 99 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade [Ⓓ] | 0.0 | 120 |

7.3 Online creativity 4.6 78

| | | |
|--|------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 120 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 13.7 | 36 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 12.7 | 124 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 0.4 |
| GDP (US\$ billions) | 9.8 |
| GDP per capita, PPP\$ | 35,825.6 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 50.4 | 26 |
| Innovation Output Sub-Index | 49.9 | 12 |
| Innovation Input Sub-Index | 51.0 | 35 |
| Innovation Efficiency Ratio | 1.0 | 2 ● |
| Global Innovation Index 2015 (out of 141) | 50.5 | 26 |

| | | |
|---|-------------|-------------|
| 1 Institutions | 78.7 | 28 |
| 1.1 Political environment | 79.1 | 20 |
| 1.1.1 Political stability & safety* | 90.6 | 11 |
| 1.1.2 Government effectiveness* | 67.6 | 31 |
| 1.2 Regulatory environment | 87.3 | 17 |
| 1.2.1 Regulatory quality* | 72.1 | 27 |
| 1.2.2 Rule of law* | 77.2 | 24 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 69.7 | 66 |
| 1.3.1 Ease of starting a business* | 78.4 | 99 ○ |
| 1.3.2 Ease of resolving insolvency* | 44.8 | 74 |
| 1.3.3 Ease of paying taxes* | 85.9 | 22 |
| 2 Human capital & research | 41.1 | 38 |
| 2.1 Education | 66.3 | 11 |
| 2.1.1 Expenditure on education, % GDP | 6.8 | 16 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 41.6 | 5 ● |
| 2.1.3 School life expectancy, years | 14.6 | 54 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 7.8 | 3 ● |
| 2.2 Tertiary education | 35.6 | 63 |
| 2.2.1 Tertiary enrolment, % gross | 45.1 | 59 |
| 2.2.2 Graduates in science & engineering, % ^(d) | 19.1 | 62 |
| 2.2.3 Tertiary inbound mobility, % | 5.9 | 28 |
| 2.3 Research & development (R&D) | 21.2 | 45 |
| 2.3.1 Researchers, FTE/mn pop. | 2,133.0 | 34 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.8 | 38 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 34.5 | 40 |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 51.3 | 40 |
| 3.1 Information & communication technologies (ICTs) | 59.5 | 44 |
| 3.1.1 ICT access* | 90.4 | 7 ● |
| 3.1.2 ICT use* | 60.5 | 31 |
| 3.1.3 Government's online service* | 40.2 | 79 |
| 3.1.4 E-participation* | 47.1 | 70 |
| 3.2 General infrastructure | 34.4 | 66 |
| 3.2.1 Electricity output, kWh/cap | 5,366.7 | 38 |
| 3.2.2 Logistics performance* | 3.1 | 49 |
| 3.2.3 Gross capital formation, % GDP | 19.1 | 92 ○ |
| 3.3 Ecological sustainability | 59.8 | 13 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 13.7 | 11 |
| 3.3.2 Environmental performance* | 88.5 | 9 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.1 | 43 |
| 4 Market sophistication | 39.5 | 88 ○ |
| 4.1 Credit | 26.7 | 88 ○ |
| 4.1.1 Ease of getting credit* | 10.0 | 124 ○ |
| 4.1.2 Domestic credit to private sector, % GDP ^(d) | 111.8 | 22 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-------|
| 4.2 Investment | 36.9 | 64 |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP ^(d) | 44.1 | 38 |
| 4.2.3 Total value of stocks traded, % GDP ^(d) | 0.7 | 62 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 54.9 | 85 ○ |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 80.7 | 11 |
| 4.3.3 Domestic market scale, bn PPP\$ | 14.1 | 124 ○ |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 44.6 | 25 |
| 5.1 Knowledge workers | 48.0 | 34 |
| 5.1.1 Knowledge-intensive employment, % | 39.3 | 25 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.5 | 35 |
| 5.1.4 GERD financed by business, % | 50.0 | 21 |
| 5.1.5 Females employed w/advanced degrees, % total | 12.0 | 56 |
| 5.2 Innovation linkages | 40.9 | 30 |
| 5.2.1 University/industry research collaboration [†] | 47.6 | 50 |
| 5.2.2 State of cluster development [†] | 49.3 | 48 |
| 5.2.3 GERD financed by abroad, % | 21.5 | 18 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 2.5 | 14 |
| 5.3 Knowledge absorption | 44.8 | 15 |
| 5.3.1 Intellectual property payments, % total trade | 3.0 | 5 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 8.1 | 57 |
| 5.3.3 ICT services imports, % total trade | 1.0 | 62 |
| 5.3.4 FDI net inflows, % GDP ^(d) | 4.1 | 40 |
| 5.3.5 Research talent, % in business enterprise | 59.8 | 12 |

| | | |
|---|-------------|-----------|
| 6 Knowledge & technology outputs | 38.3 | 28 |
| 6.1 Knowledge creation | 30.4 | 30 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.5 | 26 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 4.5 | 11 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 18.0 | 40 |
| 6.1.5 Citable documents H index | 75.0 | 94 ○ |
| 6.2 Knowledge impact | 58.6 | 2 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.9) | 102 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 17.3 | 1 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 33.0 | 5 ● |
| 6.2.5 High- & medium-high-tech manufactures, % ^(d) | 24.5 | 50 |
| 6.3 Knowledge diffusion | 26.0 | 58 |
| 6.3.1 Intellectual property receipts, % total trade | 2.1 | 7 |
| 6.3.2 High-tech exports less re-exports, % total trade | 5.7 | 30 |
| 6.3.3 ICT services exports, % total trade | 0.9 | 80 ○ |
| 6.3.4 FDI net outflows, % GDP ^(d) | (92.9) | 118 ○ |

| | | |
|--|-------------|------------|
| 7 Creative outputs | 61.4 | 4 ● |
| 7.1 Intangible assets | 67.0 | 6 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP ^(d) | 132.8 | 3 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 13.2 | 11 |
| 7.1.3 ICTs & business model creation [†] | 65.4 | 36 |
| 7.1.4 ICTs & organizational model creation [†] | 59.3 | 41 |
| 7.2 Creative goods & services | 52.5 | 5 ● |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 6.5 | 28 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^(d) | 36.2 | 1 ● |
| 7.2.5 Creative goods exports, % total trade | 0.5 | 59 |
| 7.3 Online creativity | 59.2 | 13 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 99.1 | 4 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 8.8 | 44 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 9,424.4 | 5 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

^(d) indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Mauritius

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 1.3 |
| GDP (US\$ billions) | 11.6 |
| GDP per capita, PPP\$ | 19,509.2 |
| Income group | Upper-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.9 | 53 |
| Innovation Output Sub-Index | 26.0 | 68 |
| Innovation Input Sub-Index | 45.7 | 48 |
| Innovation Efficiency Ratio | 0.6 | 95 |
| Global Innovation Index 2015 (out of 141) | 39.2 | 49 |

1 Institutions **80.5** **24** ●

| | | | |
|--|------|----|---|
| 1.1 Political environment | 75.8 | 25 | ● |
| 1.1.1 Political stability & safety* | 81.2 | 32 | |
| 1.1.2 Government effectiveness* | 70.5 | 29 | ● |
| 1.2 Regulatory environment | 82.3 | 23 | ● |
| 1.2.1 Regulatory quality* | 69.5 | 32 | |
| 1.2.2 Rule of law* | 70.0 | 33 | |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.6 | 37 | |
| 1.3 Business environment | 83.5 | 21 | ● |
| 1.3.1 Ease of starting a business* | 92.5 | 34 | |
| 1.3.2 Ease of resolving insolvency* | 65.9 | 36 | |
| 1.3.3 Ease of paying taxes* | 91.9 | 13 | ● |

2 Human capital & research **30.0** **75**

| | | | |
|---|-------|-----|---|
| 2.1 Education | 53.0 | 46 | |
| 2.1.1 Expenditure on education, % GDP | 5.0 | 49 | |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 29.2 | 22 | ● |
| 2.1.3 School life expectancy, years | 15.2 | 42 | |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a | |
| 2.1.5 Pupil-teacher ratio, secondary | 15.2 | 65 | |
| 2.2 Tertiary education | 35.6 | 62 | |
| 2.2.1 Tertiary enrolment, % gross | 38.7 | 67 | |
| 2.2.2 Graduates in science & engineering, % | 22.9 | 36 | |
| 2.2.3 Tertiary inbound mobility, % | 3.8 | 44 | |
| 2.3 Research & development (R&D) | 1.3 | 98 | |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 181.1 | 70 | |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.2 | 90 | ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 | ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 | ○ |

3 Infrastructure **43.1** **66**

| | | | |
|---|---------|-----|---|
| 3.1 Information & communication technologies (ICTs) | 49.4 | 69 | |
| 3.1.1 ICT access* | 64.8 | 59 | |
| 3.1.2 ICT use* | 32.5 | 74 | |
| 3.1.3 Government's online service* | 47.2 | 68 | |
| 3.1.4 E-participation* | 52.9 | 59 | |
| 3.2 General infrastructure | 28.7 | 86 | |
| 3.2.1 Electricity output, kWh/cap | 2,292.1 | 74 | |
| 3.2.2 Logistics performance* | 2.5 | 105 | ○ |
| 3.2.3 Gross capital formation, % GDP | 25.4 | 39 | |
| 3.3 Ecological sustainability | 51.2 | 36 | |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 13.9 | 9 | ● |
| 3.3.2 Environmental performance* | 70.9 | 70 | |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 69 | |

4 Market sophistication **49.5** **39**

| | | | |
|--|-------|-----|---|
| 4.1 Credit | 51.9 | 19 | ● |
| 4.1.1 Ease of getting credit* | 65.0 | 39 | |
| 4.1.2 Domestic credit to private sector, % GDP | 100.1 | 26 | ● |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a | |

| | | | |
|--|------|----|--|
| 4.2 Investment | 39.1 | 54 | |
| 4.2.1 Ease of protecting minority investors* | 65.0 | 28 | |
| 4.2.2 Market capitalization, % GDP | 69.3 | 26 | |
| 4.2.3 Total value of stocks traded, % GDP | 3.7 | 46 | |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 26 | |

4.3 Trade, competition, & market scale **57.4** **78**

| | | | |
|---|------|-----|---|
| 4.3.1 Applied tariff rate, weighted mean, % | 0.7 | 6 | ● |
| 4.3.2 Intensity of local competition [†] | 74.3 | 31 | |
| 4.3.3 Domestic market scale, bn PPP\$ | 23.5 | 113 | ○ |

5 Business sophistication **25.6** **94**

| | | | |
|---|------|-----|---|
| 5.1 Knowledge workers | 24.0 | 99 | |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 20.4 | 68 | |
| 5.1.2 Firms offering formal training, % firms [Ⓐ] | 25.6 | 69 | |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a | |
| 5.1.4 GERD financed by business, % [Ⓐ] | 0.3 | 90 | ○ |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 7.4 | 73 | |

5.2 Innovation linkages **26.5** **77**

| | | | |
|---|------|----|---|
| 5.2.1 University/industry research collaboration [†] | 36.5 | 93 | |
| 5.2.2 State of cluster development [†] | 50.1 | 43 | |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 6.4 | 60 | |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 19 | ● |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 51 | |

5.3 Knowledge absorption **26.4** **75**

| | | | |
|--|-----|-----|--|
| 5.3.1 Intellectual property payments, % total trade | 0.2 | 80 | |
| 5.3.2 High-tech imports less re-imports, % total trade | 8.4 | 52 | |
| 5.3.3 ICT services imports, % total trade | 1.3 | 45 | |
| 5.3.4 FDI net inflows, % GDP | 3.3 | 50 | |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a | |

6 Knowledge & technology outputs **22.9** **73**

| | | | |
|--|------|-----|---|
| 6.1 Knowledge creation | 2.9 | 114 | ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓐ] | 0.1 | 105 | ○ |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a | |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a | |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 4.3 | 103 | |
| 6.1.5 Citable documents H index | 50.0 | 114 | ○ |

6.2 Knowledge impact **20.0** **113** ○

| | | | |
|--|-----|-----|---|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a | |
| 6.2.2 New businesses/th pop. 15–64 | 5.1 | 24 | ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a | |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 9.4 | 40 | |
| 6.2.5 High- & medium-high-tech manufactures, % | 8.2 | 84 | ○ |

6.3 Knowledge diffusion **45.8** **16** ●

| | | | |
|--|-------|-----|---|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 64 | |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.0 | 120 | ○ |
| 6.3.3 ICT services exports, % total trade | 2.5 | 38 | |
| 6.3.4 FDI net outflows, % GDP | 182.1 | 1 | ● |

7 Creative outputs **29.0** **65**

| | | | |
|--|------|----|--|
| 7.1 Intangible assets | 37.5 | 88 | |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓐ] | 35.2 | 62 | |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓐ] | 0.4 | 81 | |
| 7.1.3 ICTs & business model creation [†] | 58.1 | 64 | |
| 7.1.4 ICTs & organizational model creation [†] | 53.0 | 67 | |

7.2 Creative goods & services **33.1** **35**

| | | | |
|--|-----|-----|---|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 58 | |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓐ] | 1.1 | 69 | |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a | |
| 7.2.4 Printing & publishing manufactures, % | 3.2 | 5 | ● |
| 7.2.5 Creative goods exports, % total trade | 0.7 | 52 | |

7.3 Online creativity **7.9** **66**

| | | | |
|--|-------|-----|--|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 13.5 | 34 | |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.8 | 62 | |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 998.8 | 71 | |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a | |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 127.0 |
| GDP (US\$ billions) | 1,144.3 |
| GDP per capita, PPP\$ | 17,534.4 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 34.6 | 61 |
| Innovation Output Sub-Index | 26.6 | 62 |
| Innovation Input Sub-Index | 42.5 | 60 |
| Innovation Efficiency Ratio | 0.6 | 76 |
| Global Innovation Index 2015 (out of 141) | 38.0 | 57 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 60.5 | 65 |
| 1.1 | Political environment | 44.1 | 83 |
| 1.1.1 | Political stability & safety* | 44.0 | 99 |
| 1.1.2 | Government effectiveness* | 44.3 | 59 |
| 1.2 | Regulatory environment | 59.0 | 85 |
| 1.2.1 | Regulatory quality* | 55.4 | 53 |
| 1.2.2 | Rule of law* | 35.9 | 89 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 22.0 | 95 |
| 1.3 | Business environment | 78.5 | 35 |
| 1.3.1 | Ease of starting a business* | 88.9 | 54 |
| 1.3.2 | Ease of resolving insolvency* | 73.0 | 26 ● |
| 1.3.3 | Ease of paying taxes* | 73.7 | 72 |
| 2 | Human capital & research | 33.7 | 53 |
| 2.1 | Education | 41.5 | 83 |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 5.1 | 44 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 15.9 | 77 |
| 2.1.3 | School life expectancy, years | 13.1 | 71 |
| 2.1.4 | PISA scales in reading, maths, & science | 417.3 | 47 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 17.7 | 77 |
| 2.2 | Tertiary education | 33.1 | 72 |
| 2.2.1 | Tertiary enrolment, % gross | 29.2 | 79 |
| 2.2.2 | Graduates in science & engineering, % [Ⓓ] | 26.9 | 17 ● |
| 2.2.3 | Tertiary inbound mobility, % | 0.2 | 96 ○ |
| 2.3 | Research & development (R&D) | 26.4 | 41 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓓ] | 322.5 | 65 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.5 | 59 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 58.6 | 34 |
| 2.3.4 | QS university ranking, average score top 3* | 44.4 | 33 ● |
| 3 | Infrastructure | 42.8 | 67 |
| 3.1 | Information & communication technologies (ICTs) | 52.3 | 59 |
| 3.1.1 | ICT access* | 48.4 | 82 |
| 3.1.2 | ICT use* | 33.7 | 71 |
| 3.1.3 | Government's online service* | 66.1 | 35 |
| 3.1.4 | E-participation* | 60.8 | 45 |
| 3.2 | General infrastructure | 33.8 | 67 |
| 3.2.1 | Electricity output, kWh/cap. | 2,507.7 | 68 |
| 3.2.2 | Logistics performance* | 3.1 | 48 |
| 3.2.3 | Gross capital formation, % GDP | 22.1 | 63 |
| 3.3 | Ecological sustainability | 42.4 | 63 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 8.6 | 47 |
| 3.3.2 | Environmental performance* | 73.6 | 63 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.7 | 74 |
| 4 | Market sophistication | 45.7 | 51 |
| 4.1 | Credit | 35.0 | 56 |
| 4.1.1 | Ease of getting credit* | 90.0 | 5 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 31.0 | 93 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.3 | 45 |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 29.2 | 95 |
| 4.2.1 | Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 | Market capitalization, % GDP | 37.1 | 44 |
| 4.2.3 | Total value of stocks traded, % GDP | 11.0 | 32 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 69 ○ |
| 4.3 | Trade, competition, & market scale | 73.0 | 24 ● |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓓ] | 5.4 | 87 |
| 4.3.2 | Intensity of local competition [†] | 69.4 | 57 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 2,148.9 | 11 ● |
| 5 | Business sophistication | 29.8 | 77 |
| 5.1 | Knowledge workers | 35.0 | 75 |
| 5.1.1 | Knowledge-intensive employment, % | 19.5 | 73 |
| 5.1.2 | Firms offering formal training, % firms [Ⓓ] | 50.8 | 24 ● |
| 5.1.3 | GERD performed by business, % of GDP [Ⓓ] | 0.2 | 54 |
| 5.1.4 | GERD financed by business, % | 23.8 | 61 |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓓ] | 8.2 | 69 ○ |
| 5.2 | Innovation linkages | 23.4 | 91 |
| 5.2.1 | University/industry research collaboration [†] | 49.5 | 42 |
| 5.2.2 | State of cluster development [†] | 53.2 | 33 |
| 5.2.3 | GERD financed by abroad, % | 0.5 | 94 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 60 ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 66 |
| 5.3 | Knowledge absorption | 31.0 | 51 |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 59 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 16.9 | 8 ● |
| 5.3.3 | ICT services imports, % total trade | 0.0 | 121 ○ |
| 5.3.4 | FDI net inflows, % GDP | 1.9 | 83 |
| 5.3.5 | Research talent, % in business enterprise [Ⓓ] | 30.0 | 42 |
| 6 | Knowledge & technology outputs | 23.3 | 70 |
| 6.1 | Knowledge creation | 8.2 | 73 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.6 | 71 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 55 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.3 | 39 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 5.5 | 90 |
| 6.1.5 | Citable documents H index | 289.0 | 34 |
| 6.2 | Knowledge impact | 35.4 | 66 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.7 | 43 |
| 6.2.2 | New businesses/th pop. 15–64 | 0.9 | 73 |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 67 ○ |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 3.7 | 69 |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓓ] | 43.7 | 14 ● |
| 6.3 | Knowledge diffusion | 26.4 | 56 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 77 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 14.8 | 9 ● |
| 6.3.3 | ICT services exports, % total trade | 0.0 | 123 ○ |
| 6.3.4 | FDI net outflows, % GDP | 0.4 | 64 |
| 7 | Creative outputs | 29.9 | 62 |
| 7.1 | Intangible assets | 39.9 | 77 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 37.7 | 61 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.8 | 73 |
| 7.1.3 | ICTs & business model creation [†] | 61.0 | 53 |
| 7.1.4 | ICTs & organizational model creation [†] | 56.1 | 54 |
| 7.2 | Creative goods & services | 30.2 | 42 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.0 | 66 ○ |
| 7.2.2 | National feature films/mn pop. 15–69 | 1.5 | 63 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 8.2 | 37 |
| 7.2.4 | Printing & publishing manufactures, % [Ⓓ] | 0.6 | 85 ○ |
| 7.2.5 | Creative goods exports, % total trade | 10.3 | 3 ● |
| 7.3 | Online creativity | 9.4 | 63 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 2.7 | 69 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 3.2 | 59 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,479.0 | 63 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 20.8 | 50 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Moldova, Republic of

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 4.1 |
| GDP (US\$ billions) | 6.4 |
| GDP per capita, PPP\$ | 5,006.2 |
| Income group | Lower-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 38.4 | 46 |
| Innovation Output Sub-Index | 37.2 | 36 |
| Innovation Input Sub-Index | 39.6 | 74 |
| Innovation Efficiency Ratio | 0.9 | 4 ● |
| Global Innovation Index 2015 (out of 141) | 40.5 | 44 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 58.7 | 68 |
| 1.1 Political environment | 44.4 | 81 |
| 1.1.1 Political stability & safety* | 60.3 | 74 |
| 1.1.2 Government effectiveness* | 28.4 | 89 |
| 1.2 Regulatory environment | 57.0 | 91 |
| 1.2.1 Regulatory quality* | 45.4 | 69 |
| 1.2.2 Rule of law* | 40.3 | 74 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 22.6 | 96 |
| 1.3 Business environment | 74.8 | 50 |
| 1.3.1 Ease of starting a business* | 94.2 | 25 ● |
| 1.3.2 Ease of resolving insolvency* | 53.9 | 57 |
| 1.3.3 Ease of paying taxes* | 76.3 | 64 |

| | | |
|---|-------------|-----------|
| 2 Human capital & research | 34.1 | 51 |
| 2.1 Education | 61.7 | 17 ● |
| 2.1.1 Expenditure on education, % GDP | 7.5 | 6 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 38.8 | 7 ● |
| 2.1.3 School life expectancy, years | 11.8 | 91 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 9.4 | 18 ● |
| 2.2 Tertiary education | 36.7 | 58 |
| 2.2.1 Tertiary enrolment, % gross | 41.3 | 61 |
| 2.2.2 Graduates in science & engineering, % | 25.7 | 23 |
| 2.2.3 Tertiary inbound mobility, % | 1.9 | 66 |
| 2.3 Research & development (R&D) | 3.9 | 79 |
| 2.3.1 Researchers, FTE/mn pop. | 652.0 | 55 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.4 | 71 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 39.5 | 75 |
| 3.1 Information & communication technologies (ICTs) | 55.7 | 51 |
| 3.1.1 ICT access* | 67.0 | 53 |
| 3.1.2 ICT use* | 40.2 | 61 |
| 3.1.3 Government's online service* | 52.8 | 60 |
| 3.1.4 E-participation* | 62.7 | 40 |
| 3.2 General infrastructure | 26.0 | 100 |
| 3.2.1 Electricity output, kWh/cap | 1,261.5 | 89 |
| 3.2.2 Logistics performance* | 2.7 | 89 |
| 3.2.3 Gross capital formation, % GDP | 21.9 | 65 |
| 3.3 Ecological sustainability | 36.9 | 90 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.7 | 101 ○ |
| 3.3.2 Environmental performance* | 76.7 | 54 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.1 | 61 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 38.6 | 93 |
| 4.1 Credit | 29.2 | 79 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 |
| 4.1.2 Domestic credit to private sector, % GDP | 37.1 | 81 |
| 4.1.3 Microfinance gross loans, % GDP | 0.4 | 42 |

| | | |
|--|------|------|
| 4.2 Investment | 42.3 | 40 |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.2 | 71 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|-------------|--------------|
| 4.3 Trade, competition, & market scale | 44.2 | 115 ○ |
| 4.3.1 Applied tariff rate, weighted mean, % | 5.7 | 89 |
| 4.3.2 Intensity of local competition [†] | 60.4 | 98 |
| 4.3.3 Domestic market scale, bn PPP\$ | 17.8 | 121 ○ |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 27.0 | 89 |
| 5.1 Knowledge workers | 35.1 | 74 |
| 5.1.1 Knowledge-intensive employment, % | 28.7 | 47 |
| 5.1.2 Firms offering formal training, % firms | 32.4 | 49 |
| 5.1.3 GERD performed by business, % of GDP | 0.1 | 62 |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 13.9 | 43 |

| | | |
|---|-------------|--------------|
| 5.2 Innovation linkages | 19.0 | 113 ○ |
| 5.2.1 University/industry research collaboration [†] | 29.0 | 112 ○ |
| 5.2.2 State of cluster development [†] | 22.0 | 123 ○ |
| 5.2.3 GERD financed by abroad, % | 12.8 | 37 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 46 |

| | | |
|--|-------------|-----------|
| 5.3 Knowledge absorption | 26.8 | 74 |
| 5.3.1 Intellectual property payments, % total trade | 0.5 | 55 |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.8 | 59 |
| 5.3.3 ICT services imports, % total trade | 2.0 | 17 ● |
| 5.3.4 FDI net inflows, % GDP | 4.4 | 33 |
| 5.3.5 Research talent, % in business enterprise | 6.6 | 69 ○ |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 34.9 | 31 |
| 6.1 Knowledge creation | 41.7 | 21 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 3.8 | 31 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 42 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 8.8 | 1 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.4 | 58 |
| 6.1.5 Citable documents H index | 74.0 | 95 |

| | | |
|--|-------------|-----------|
| 6.2 Knowledge impact | 36.4 | 60 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.5 | 17 ● |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 1.6 | 52 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 6.9 | 50 |
| 6.2.5 High- & medium-high-tech manufactures, % | 9.0 | 81 ○ |

| | | |
|--|-------------|-----------|
| 6.3 Knowledge diffusion | 26.5 | 54 |
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 37 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.6 | 70 |
| 6.3.3 ICT services exports, % total trade | 4.3 | 14 ● |
| 6.3.4 FDI net outflows, % GDP | 0.4 | 61 |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 39.6 | 34 |
| 7.1 Intangible assets | 67.7 | 4 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 179.2 | 1 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 17.4 | 6 ● |
| 7.1.3 ICTs & business model creation [†] | 47.3 | 105 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 42.6 | 97 |

| | | |
|--|-------------|-----------|
| 7.2 Creative goods & services | 19.3 | 71 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.3 | 29 |
| 7.2.2 National feature films/mn pop. 15–69 | 1.0 | 77 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.9 | 25 |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 98 |

| | | |
|--|------------|-----------|
| 7.3 Online creativity | 3.7 | 81 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.2 | 77 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.8 | 61 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 812.6 | 80 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 3.0 |
| GDP (US\$ billions) | 11.7 |
| GDP per capita, PPP\$ | 12,146.6 |
| Income group | Upper-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.7 | 55 |
| Innovation Output Sub-Index | 29.9 | 51 |
| Innovation Input Sub-Index | 41.6 | 66 |
| Innovation Efficiency Ratio | 0.7 | 47 |
| Global Innovation Index 2015 (out of 141) | 36.4 | 66 |

1 Institutions **64.8** **58**

| | | |
|--|------|----|
| 1.1 Political environment | 56.0 | 52 |
| 1.1.1 Political stability & safety* | 84.4 | 25 |
| 1.1.2 Government effectiveness* | 27.5 | 93 |
| 1.2 Regulatory environment | 68.6 | 57 |
| 1.2.1 Regulatory quality* | 38.5 | 83 |
| 1.2.2 Rule of law* | 38.4 | 83 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.7 | 21 |
| 1.3 Business environment | 70.0 | 64 |
| 1.3.1 Ease of starting a business* | 92.6 | 33 |
| 1.3.2 Ease of resolving insolvency* | 43.8 | 80 |
| 1.3.3 Ease of paying taxes* | 73.8 | 71 |

2 Human capital & research **26.9** **83**

| | | |
|--|------|------|
| 2.1 Education | 45.8 | 68 |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 4.6 | 64 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 15.4 | 81 |
| 2.1.3 School life expectancy, years | 14.8 | 51 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 13.7 | 55 |
| 2.2 Tertiary education | 33.6 | 70 |
| 2.2.1 Tertiary enrolment, % gross | 64.3 | 33 |
| 2.2.2 Graduates in science & engineering, % | 19.5 | 60 |
| 2.2.3 Tertiary inbound mobility, % | 0.6 | 85 |
| 2.3 Research & development (R&D) | 1.4 | 97 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.2 | 83 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure **38.3** **81**

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 52.9 | 56 |
| 3.1.1 ICT access* | 49.7 | 81 |
| 3.1.2 ICT use* | 32.0 | 75 |
| 3.1.3 Government's online service* | 61.4 | 43 |
| 3.1.4 E-participation* | 68.6 | 30 |
| 3.2 General infrastructure | 31.8 | 74 |
| 3.2.1 Electricity output, kWh/cap. | 1,767.6 | 79 |
| 3.2.2 Logistics performance* | 2.4 | 116 ○ |
| 3.2.3 Gross capital formation, % GDP | 31.6 | 13 ● |
| 3.3 Ecological sustainability | 30.2 | 114 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 4.4 | 104 |
| 3.3.2 Environmental performance* | 64.4 | 96 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 103 |

4 Market sophistication **49.9** **36**

| | | |
|--|------|------|
| 4.1 Credit | 60.9 | 14 ● |
| 4.1.1 Ease of getting credit* | 60.0 | 53 |
| 4.1.2 Domestic credit to private sector, % GDP | 60.7 | 50 |
| 4.1.3 Microfinance gross loans, % GDP | 19.7 | 1 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 37.8 | 60 |
| 4.2.1 Ease of protecting minority investors* | 73.3 | 8 ● |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 10.5 | 80 |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.3 | 67 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 51.0 | 101 |
| 4.3.1 Applied tariff rate, weighted mean, % | 5.0 | 85 |
| 4.3.2 Intensity of local competition [†] | 66.0 | 76 |
| 4.3.3 Domestic market scale, bn PPP\$ | 34.9 | 100 |

5 Business sophistication **27.8** **85**

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 41.4 | 53 |
| 5.1.1 Knowledge-intensive employment, % | 25.0 | 52 |
| 5.1.2 Firms offering formal training, % firms | 60.9 | 10 ● |
| 5.1.3 GERD performed by business, % of GDP | 0.0 | 79 ○ |
| 5.1.4 GERD financed by business, % | 7.5 | 74 |
| 5.1.5 Females employed w/advanced degrees, % total | 16.7 | 31 |
| 5.2 Innovation linkages | 17.3 | 120 ○ |
| 5.2.1 University/industry research collaboration [†] | 33.1 | 104 |
| 5.2.2 State of cluster development [†] | 31.0 | 118 ○ |
| 5.2.3 GERD financed by abroad, % | 2.8 | 74 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓐ] | 0.0 | 81 |
| 5.3 Knowledge absorption | 24.6 | 87 |
| 5.3.1 Intellectual property payments, % total trade | 0.2 | 81 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.1 | 95 |
| 5.3.3 ICT services imports, % total trade | 1.8 | 23 |
| 5.3.4 FDI net inflows, % GDP | 3.2 | 55 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **23.4** **68**

| | | |
|---|------|-------|
| 6.1 Knowledge creation | 39.3 | 22 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.0 | 30 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 85 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 5.4 | 1 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.1 | 87 |
| 6.1.5 Citable documents H index | 65.0 | 104 |
| 6.2 Knowledge impact | 14.8 | 115 ○ |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 6.3 | 19 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.5 | 118 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 5.5 | 90 ○ |
| 6.3 Knowledge diffusion | 16.1 | 115 ○ |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 63 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.5 | 75 |
| 6.3.3 ICT services exports, % total trade | 0.2 | 111 ○ |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | 0.3 | 70 |

7 Creative outputs **36.5** **41**

| | | |
|--|-------|-------|
| 7.1 Intangible assets | 52.0 | 27 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 120.4 | 6 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 7.4 | 17 ● |
| 7.1.3 ICTs & business model creation [†] | 52.9 | 83 |
| 7.1.4 ICTs & organizational model creation [†] | 42.4 | 98 |
| 7.2 Creative goods & services | 38.5 | 18 ● |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 10.5 | 11 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 2.9 | 6 ● |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 119 ○ |
| 7.3 Online creativity | 3.2 | 89 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 103 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.7 | 69 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 984.7 | 72 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Montenegro

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 0.6 |
| GDP (US\$ billions) | 4.0 |
| GDP per capita, PPP\$ | 16,123.1 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 37.4 | 51 |
| Innovation Output Sub-Index | 28.6 | 52 |
| Innovation Input Sub-Index | 46.1 | 46 |
| Innovation Efficiency Ratio | 0.6 | 80 |
| Global Innovation Index 2015 (out of 141) | 41.2 | 41 |

1 Institutions 69.2 45

| | | |
|--|------|----|
| 1.1 Political environment | 57.7 | 48 |
| 1.1.1 Political stability & safety* | 68.7 | 50 |
| 1.1.2 Government effectiveness* | 46.7 | 54 |
| 1.2 Regulatory environment | 70.9 | 45 |
| 1.2.1 Regulatory quality* | 47.7 | 66 |
| 1.2.2 Rule of law* | 48.8 | 57 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 11.2 | 40 |
| 1.3 Business environment | 79.0 | 33 |
| 1.3.1 Ease of starting a business* | 90.1 | 49 |
| 1.3.2 Ease of resolving insolvency* | 68.2 | 33 |
| 1.3.3 Ease of paying taxes* | 78.6 | 54 |

2 Human capital & research 35.8 49

| | | |
|---|-------|------|
| 2.1 Education | 53.6 | 43 |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years ^Q | 15.1 | 44 |
| 2.1.4 PISA scales in reading, maths, & science | 413.9 | 49 ○ |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 49.9 | 18 |
| 2.2.1 Tertiary enrolment, % gross ^Q | 55.3 | 47 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 3.9 | 78 |
| 2.3.1 Researchers, FTE/mn pop. ^Q | 646.8 | 56 |
| 2.3.2 Gross expenditure on R&D, % GDP ^Q | 0.4 | 70 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 45.8 56

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 54.5 | 52 |
| 3.1.1 ICT access* | 67.4 | 52 |
| 3.1.2 ICT use* | 39.1 | 62 |
| 3.1.3 Government's online service* | 52.8 | 60 |
| 3.1.4 E-participation* | 58.8 | 49 |
| 3.2 General infrastructure | 39.4 | 50 |
| 3.2.1 Electricity output, kWh/cap. | 6,362.9 | 29 ● |
| 3.2.2 Logistics performance* | 2.9 | 64 |
| 3.2.3 Gross capital formation, % GDP | 26.3 | 37 |
| 3.3 Ecological sustainability | 43.6 | 58 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.5 | 82 |
| 3.3.2 Environmental performance* | 78.9 | 46 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.8 | 38 |

4 Market sophistication 43.8 58

| | | |
|--|------|-----|
| 4.1 Credit | 46.8 | 32 |
| 4.1.1 Ease of getting credit* | 85.0 | 7 ● |
| 4.1.2 Domestic credit to private sector, % GDP | n/a | n/a |
| 4.1.3 Microfinance gross loans, % GDP | 0.7 | 35 |

| | | |
|--|------|------|
| 4.2 Investment | 42.7 | 39 |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP ^Q | 92.6 | 14 ● |
| 4.2.3 Total value of stocks traded, % GDP ^Q | 1.0 | 54 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 41.9 118 ○

| | | |
|--|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % ^Q | 2.6 | 57 |
| 4.3.2 Intensity of local competition [†] | 53.0 | 119 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 9.4 | 126 ○ |

5 Business sophistication 36.0 46

| | | |
|---|------|------|
| 5.1 Knowledge workers | 38.7 | 62 |
| 5.1.1 Knowledge-intensive employment, % ^Q | 37.2 | 29 |
| 5.1.2 Firms offering formal training, % firms | 23.7 | 75 ○ |
| 5.1.3 GERD performed by business, % of GDP ^Q | 0.2 | 51 |
| 5.1.4 GERD financed by business, % ^Q | 42.3 | 32 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 29.8 68

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 49.1 | 45 |
| 5.2.2 State of cluster development [†] | 32.4 | 115 ○ |
| 5.2.3 GERD financed by abroad, % ^Q | 22.5 | 17 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 47 |

5.3 Knowledge absorption 39.7 25 ●

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.2 | 78 |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 2.2 | 15 ● |
| 5.3.4 FDI net inflows, % GDP | 10.8 | 8 ● |
| 5.3.5 Research talent, % in business enterprise ^Q | 21.3 | 53 |

6 Knowledge & technology outputs 23.4 69

| | | |
|---|------|-------|
| 6.1 Knowledge creation | 10.3 | 63 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.4 | 57 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP ^Q | 0.1 | 60 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 20.9 | 35 |
| 6.1.5 Citable documents H index | 28.0 | 125 ○ |

6.2 Knowledge impact 34.1 76

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 6.9 | 17 ● |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 13.8 | 28 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 25.8 59

| | | |
|--|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 61 |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 2.1 | 45 |
| 6.3.4 FDI net outflows, % GDP | 0.6 | 58 |

7 Creative outputs 33.8 50

| | | |
|---|------|------|
| 7.1 Intangible assets | 41.2 | 73 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.6 | 55 |
| 7.1.3 ICTs & business model creation [†] | 54.2 | 78 |
| 7.1.4 ICTs & organizational model creation [†] | 44.7 | 90 ○ |

7.2 Creative goods & services 12.7 85

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 49 |
| 7.2.2 National feature films/mn pop. 15–69 | 6.7 | 27 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 82 |

7.3 Online creativity 39.9 22 ●

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.8 | 86 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 5,218.3 | 24 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 19.3 | 53 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

^Q indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 34.4 |
| GDP (US\$ billions) | 103.1 |
| GDP per capita, PPP\$ | 8,164.4 |
| Income group | Lower-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 32.3 | 72 |
| Innovation Output Sub-Index | 25.6 | 70 |
| Innovation Input Sub-Index | 38.9 | 75 |
| Innovation Efficiency Ratio | 0.7 | 64 |
| Global Innovation Index 2015 (out of 141) | 33.2 | 78 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 57.5 | 74 |
| 1.1 | Political environment | 44.1 | 84 |
| 1.1.1 | Political stability & safety* | 53.0 | 87 |
| 1.1.2 | Government effectiveness* | 35.2 | 77 |
| 1.2 | Regulatory environment | 60.0 | 80 |
| 1.2.1 | Regulatory quality* | 44.5 | 71 |
| 1.2.2 | Rule of law* | 45.7 | 62 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 20.7 | 87 |
| 1.3 | Business environment | 68.3 | 71 |
| 1.3.1 | Ease of starting a business* | 92.1 | 37 ● |
| 1.3.2 | Ease of resolving insolvency* | 33.9 | 107 ○ |
| 1.3.3 | Ease of paying taxes* | 78.9 | 52 |
| 2 | Human capital & research | 32.3 | 61 |
| 2.1 | Education | 47.4 | 64 |
| 2.1.1 | Expenditure on education, % GDP [Ⓐ] | 5.4 | 40 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 36.5 | 10 ● |
| 2.1.3 | School life expectancy, years [Ⓐ] | 12.1 | 89 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 | Tertiary education | 42.9 | 36 |
| 2.2.1 | Tertiary enrolment, % gross | 24.6 | 85 |
| 2.2.2 | Graduates in science & engineering, % [Ⓐ] | 34.9 | 4 ● |
| 2.2.3 | Tertiary inbound mobility, % [Ⓐ] | 1.9 | 65 |
| 2.3 | Research & development (R&D) | 6.5 | 72 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓐ] | 856.9 | 48 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓐ] | 0.7 | 47 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 48.6 | 45 |
| 3.1 | Information & communication technologies (ICTs) | 58.9 | 45 |
| 3.1.1 | ICT access* | 56.5 | 71 |
| 3.1.2 | ICT use* | 29.5 | 80 |
| 3.1.3 | Government's online service* | 69.3 | 30 ● |
| 3.1.4 | E-participation* | 80.4 | 17 ● |
| 3.2 | General infrastructure | 40.1 | 45 |
| 3.2.1 | Electricity output, kWh/cap | 846.1 | 95 |
| 3.2.2 | Logistics performance* | n/a | n/a |
| 3.2.3 | Gross capital formation, % GDP | 33.4 | 9 ● |
| 3.3 | Ecological sustainability | 46.7 | 48 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.0 | 21 ● |
| 3.3.2 | Environmental performance* | 74.2 | 60 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.5 | 80 |
| 4 | Market sophistication | 38.0 | 98 |
| 4.1 | Credit | 24.1 | 94 |
| 4.1.1 | Ease of getting credit* | 40.0 | 92 |
| 4.1.2 | Domestic credit to private sector, % GDP | 68.7 | 43 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.5 | 36 |

| | | | |
|-------|--|-------|-------|
| 4.2 | Investment | 26.4 | 109 ○ |
| 4.2.1 | Ease of protecting minority investors* | 50.0 | 86 |
| 4.2.2 | Market capitalization, % GDP | 47.9 | 33 |
| 4.2.3 | Total value of stocks traded, % GDP | 2.8 | 50 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 46 |
| 4.3 | Trade, competition, & market scale | 63.6 | 55 |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 4.1 | 74 |
| 4.3.2 | Intensity of local competition [†] | 67.1 | 71 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 259.2 | 54 |

| | | | |
|----------|--|-------------|------------|
| 5 | Business sophistication | 18.3 | 125 |
| 5.1 | Knowledge workers | 20.8 | 113 ○ |
| 5.1.1 | Knowledge-intensive employment, % [Ⓐ] | 6.8 | 98 ○ |
| 5.1.2 | Firms offering formal training, % firms | 26.3 | 66 |
| 5.1.3 | GERD performed by business, % of GDP [Ⓐ] | 0.2 | 49 |
| 5.1.4 | GERD financed by business, % [Ⓐ] | 29.9 | 52 |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 17.6 | 118 ○ |
| 5.2.1 | University/industry research collaboration [†] | 37.2 | 90 |
| 5.2.2 | State of cluster development [†] | 40.5 | 86 |
| 5.2.3 | GERD financed by abroad, % [Ⓐ] | 1.7 | 81 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 71 ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 102 ○ |
| 5.3 | Knowledge absorption | 16.4 | 120 ○ |
| 5.3.1 | Intellectual property payments, % total trade [Ⓐ] | 0.2 | 82 |
| 5.3.2 | High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 | ICT services imports, % total trade [Ⓐ] | 0.5 | 93 |
| 5.3.4 | FDI net inflows, % GDP | 3.3 | 52 |
| 5.3.5 | Research talent, % in business enterprise [Ⓐ] | 9.3 | 67 ○ |

| | | | |
|----------|--|-------------|-----------|
| 6 | Knowledge & technology outputs | 22.9 | 72 |
| 6.1 | Knowledge creation | 6.9 | 78 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.4 | 58 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 57 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 6.2 | 85 |
| 6.1.5 | Citable documents H index | 117.0 | 68 |
| 6.2 | Knowledge impact | 35.0 | 70 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 3.0 | 26 ● |
| 6.2.2 | New businesses/th pop. 15–64 | 1.5 | 54 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 56 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 3.1 | 76 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 27.2 | 44 |
| 6.3 | Knowledge diffusion | 26.9 | 52 |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓐ] | 0.0 | 91 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 | ICT services exports, % total trade [Ⓐ] | 2.9 | 27 ● |
| 6.3.4 | FDI net outflows, % GDP [Ⓐ] | 0.4 | 63 |

| | | | |
|----------|--|-------------|-----------|
| 7 | Creative outputs | 28.2 | 67 |
| 7.1 | Intangible assets | 49.9 | 36 ● |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 55.5 | 36 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 14.2 | 8 ● |
| 7.1.3 | ICTs & business model creation [†] | 58.7 | 62 |
| 7.1.4 | ICTs & organizational model creation [†] | 47.1 | 84 |
| 7.2 | Creative goods & services | 8.6 | 100 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 48 |
| 7.2.2 | National feature films/mn pop. 15–69 | 1.0 | 75 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 0.7 | 56 ○ |
| 7.2.4 | Printing & publishing manufactures, % | 0.8 | 73 |
| 7.2.5 | Creative goods exports, % total trade | n/a | n/a |
| 7.3 | Online creativity | 4.5 | 79 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 1.7 | 87 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.9 | 82 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 390.4 | 92 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 12.3 | 60 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Mozambique

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 28.0 |
| GDP (US\$ billions) | 15.0 |
| GDP per capita, PPP\$ | 1,186.2 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.8 | 84 |
| Innovation Output Sub-Index | 25.1 | 73 ● |
| Innovation Input Sub-Index | 34.6 | 96 |
| Innovation Efficiency Ratio | 0.7 | 45 ● |
| Global Innovation Index 2015 (out of 141) | 30.1 | 95 |

1 Institutions 46.1 111

| | | |
|--|------|------|
| 1.1 Political environment | 36.4 | 97 |
| 1.1.1 Political stability & safety* | 54.1 | 84 |
| 1.1.2 Government effectiveness* | 18.8 | 108 |
| 1.2 Regulatory environment | 36.1 | 121 |
| 1.2.1 Regulatory quality* | 35.0 | 95 |
| 1.2.2 Rule of law* | 26.2 | 112 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 37.5 | 122 |
| 1.3 Business environment | 65.9 | 75 ● |
| 1.3.1 Ease of starting a business* | 80.2 | 93 |
| 1.3.2 Ease of resolving insolvency* | 49.6 | 61 ● |
| 1.3.3 Ease of paying taxes* | 67.8 | 85 |

2 Human capital & research 22.7 94

| | | |
|---|------|------|
| 2.1 Education | 58.2 | 30 ● |
| 2.1.1 Expenditure on education, % GDP | 6.7 | 17 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 70.0 | 2 ● |
| 2.1.3 School life expectancy, years | 9.1 | 107 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 31.2 | 105 |
| 2.2 Tertiary education | 7.6 | 117 |
| 2.2.1 Tertiary enrolment, % gross | 6.0 | 113 |
| 2.2.2 Graduates in science & engineering, % | 8.1 | 99 ○ |
| 2.2.3 Tertiary inbound mobility, % | 0.4 | 92 |
| 2.3 Research & development (R&D) | 2.3 | 88 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 37.5 | 92 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.4 | 66 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 28.6 106

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 23.8 | 108 |
| 3.1.1 ICT access* | 27.4 | 114 |
| 3.1.2 ICT use* | 3.0 | 121 ○ |
| 3.1.3 Government's online service* | 31.5 | 94 |
| 3.1.4 E-participation* | 33.3 | 89 |
| 3.2 General infrastructure | 44.5 | 33 ● |
| 3.2.1 Electricity output, kWh/cap | 576.7 | 102 |
| 3.2.2 Logistics performance* | 2.2 | 121 ○ |
| 3.2.3 Gross capital formation, % GDP | 48.6 | 3 ● |
| 3.3 Ecological sustainability | 17.5 | 127 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 2.3 | 118 ○ |
| 3.3.2 Environmental performance* | 41.8 | 121 ○ |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 92 |

4 Market sophistication 38.2 95

| | | |
|--|------|-----|
| 4.1 Credit | 13.0 | 121 |
| 4.1.1 Ease of getting credit* | 25.0 | 118 |
| 4.1.2 Domestic credit to private sector, % GDP | 31.8 | 91 |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 51 |

| | | |
|--|------|-----|
| 4.2 Investment | 51.7 | 21 |
| 4.2.1 Ease of protecting minority investors* | 51.7 | 83 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 50.0 103

| | | |
|--|------|------|
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 4.2 | 75 ● |
| 4.3.2 Intensity of local competition [†] | 59.4 | 103 |
| 4.3.3 Domestic market scale, bn PPP\$ | 31.2 | 105 |

5 Business sophistication 37.1 38 ●

| | | |
|---|------|------|
| 5.1 Knowledge workers | 16.9 | 116 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms ^② | 22.1 | 77 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 0.5 | 87 ○ |

5.2 Innovation linkages 53.5 4 ●

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 38.0 | 83 |
| 5.2.2 State of cluster development [†] | 41.0 | 83 |
| 5.2.3 GERD financed by abroad, % ^② | 78.1 | 1 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 83 |

5.3 Knowledge absorption 40.9 22 ●

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.3 | 71 |
| 5.3.2 High-tech imports less re-imports, % total trade | 5.8 | 83 |
| 5.3.3 ICT services imports, % total trade | 1.0 | 88 ● |
| 5.3.4 FDI net inflows, % GDP | 31.4 | 1 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 28.5 47 ●

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 7.0 | 76 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.8 | 78 |
| 6.1.5 Citable documents H index | 66.0 | 103 |

6.2 Knowledge impact 55.1 [9]

| | | |
|--|-----|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.8 | 7 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.4 | 99 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 23.5 71 ●

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 88 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.5 | 73 |
| 6.3.3 ICT services exports, % total trade | 0.5 | 96 |
| 6.3.4 FDI net outflows, % GDP ^② | 3.3 | 15 ● |

7 Creative outputs 21.7 98

| | | |
|---|------|------|
| 7.1 Intangible assets | 43.1 | 63 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 48.7 | 100 |
| 7.1.4 ICTs & organizational model creation [†] | 37.4 | 115 |

7.2 Creative goods & services 0.8 125 ○

| | | |
|--|-----|-------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 64 |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 0.1 | 100 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 117 |

7.3 Online creativity 0.1 123

| | | |
|--|------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.0 | 127 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 111 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 27.5 | 116 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 2.5 |
| GDP (US\$ billions) | 12.8 |
| GDP per capita, PPP\$ | 11,408.2 |
| Income group | Upper-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 28.2 | 93 |
| Innovation Output Sub-Index | 19.8 | 101 |
| Innovation Input Sub-Index | 36.7 | 87 |
| Innovation Efficiency Ratio | 0.5 | 102 |
| Global Innovation Index 2015 (out of 141) | 28.1 | 107 |

| | | | |
|----------|--|-------------|------------|
| 1 | Institutions | 64.7 | 59 |
| 1.1 | Political environment | 60.1 | 47 ● |
| 1.1.1 | Political stability & safety* | 78.2 | 39 ● |
| 1.1.2 | Government effectiveness* | 41.9 | 63 |
| 1.2 | Regulatory environment | 72.4 | 43 ● |
| 1.2.1 | Regulatory quality* | 45.5 | 68 |
| 1.2.2 | Rule of law* | 50.6 | 55 ● |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 9.7 | 31 ● |
| 1.3 | Business environment | 61.6 | 89 |
| 1.3.1 | Ease of starting a business* | 68.9 | 117 ○ |
| 1.3.2 | Ease of resolving insolvency* | 42.2 | 86 |
| 1.3.3 | Ease of paying taxes* | 73.6 | 73 |
| 2 | Human capital & research | 21.0 | 100 |
| 2.1 | Education | 47.2 | 66 |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 8.4 | 4 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 15.9 | 76 |
| 2.1.3 | School life expectancy, years [Ⓓ] | 11.3 | 95 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 24.6 | 92 |
| 2.2 | Tertiary education | 15.2 | 107 |
| 2.2.1 | Tertiary enrolment, % gross [Ⓓ] | 9.3 | 107 |
| 2.2.2 | Graduates in science & engineering, % [Ⓓ] | 2.6 | 102 ○ |
| 2.2.3 | Tertiary inbound mobility, % [Ⓓ] | 10.2 | 14 ● |
| 2.3 | Research & development (R&D) | 0.8 | 106 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓓ] | 0.1 | 96 ○ |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 36.2 | 92 |
| 3.1 | Information & communication technologies (ICTs) | 31.2 | 98 |
| 3.1.1 | ICT access* | 41.4 | 97 |
| 3.1.2 | ICT use* | 17.7 | 96 |
| 3.1.3 | Government's online service* | 32.3 | 91 |
| 3.1.4 | E-participation* | 33.3 | 89 |
| 3.2 | General infrastructure | 32.3 | 71 |
| 3.2.1 | Electricity output, kWh/cap. | 578.7 | 101 |
| 3.2.2 | Logistics performance* | 2.7 | 88 |
| 3.2.3 | Gross capital formation, % GDP | 29.6 | 23 ● |
| 3.3 | Ecological sustainability | 45.3 | 53 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 10.9 | 23 ● |
| 3.3.2 | Environmental performance* | 70.8 | 71 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.6 | 77 |
| 4 | Market sophistication | 40.0 | 87 |
| 4.1 | Credit | 26.2 | 90 |
| 4.1.1 | Ease of getting credit* | 60.0 | 53 |
| 4.1.2 | Domestic credit to private sector, % GDP | 49.1 | 68 |
| 4.1.3 | Microfinance gross loans, % GDP [Ⓓ] | 0.0 | 68 |

| | | | |
|----------|--|-------------|--------------|
| 4.2 | Investment | 39.9 | 51 ● |
| 4.2.1 | Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 | Market capitalization, % GDP | 14.8 | 73 |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 53.9 | 89 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 0.8 | 7 ● |
| 4.3.2 | Intensity of local competition [†] | 60.6 | 95 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 23.5 | 114 ○ |
| 5 | Business sophistication | 21.3 | 117 ○ |
| 5.1 | Knowledge workers | 21.5 | 108 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓓ] | 14.5 | 89 |
| 5.1.2 | Firms offering formal training, % firms | 25.4 | 71 |
| 5.1.3 | GERD performed by business, % of GDP [Ⓓ] | 0.0 | 77 |
| 5.1.4 | GERD financed by business, % [Ⓓ] | 19.8 | 62 |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 23.7 | 90 |
| 5.2.1 | University/industry research collaboration [†] | 41.0 | 76 |
| 5.2.2 | State of cluster development [†] | 47.9 | 54 |
| 5.2.3 | GERD financed by abroad, % [Ⓓ] | 1.5 | 84 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 77 |
| 5.3 | Knowledge absorption | 18.9 | 107 |
| 5.3.1 | Intellectual property payments, % total trade | 0.1 | 91 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 6.0 | 79 |
| 5.3.3 | ICT services imports, % total trade | 0.3 | 109 |
| 5.3.4 | FDI net inflows, % GDP | 3.8 | 43 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 8.8 | 125 ○ |
| 6.1 | Knowledge creation | 5.6 | 90 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 54 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 7.2 | 75 |
| 6.1.5 | Citable documents H index | 67.0 | 102 |
| 6.2 | Knowledge impact | 4.7 | 121 ○ |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓓ] | 0.9 | 77 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 1.7 | 94 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 4.9 | 92 ○ |
| 6.3 | Knowledge diffusion | 15.9 | 116 ○ |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓓ] | 0.0 | 100 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | 1.6 | 55 |
| 6.3.3 | ICT services exports, % total trade | 0.1 | 122 ○ |
| 6.3.4 | FDI net outflows, % GDP [Ⓓ] | 0.2 | 75 |
| 7 | Creative outputs | 30.9 | 59 |
| 7.1 | Intangible assets | 50.9 | 30 ● |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 | ICTs & business model creation [†] | 53.3 | 82 |
| 7.1.4 | ICTs & organizational model creation [†] | 48.6 | 80 |
| 7.2 | Creative goods & services | 18.1 | 75 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.7 | 55 |
| 7.3 | Online creativity | 3.7 | 82 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 9.3 | 42 ● |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.1 | 118 ○ |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 224.1 | 100 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 28.5 |
| GDP (US\$ billions) | 21.4 |
| GDP per capita, PPP\$ | 2,465.2 |
| Income group | Low income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 23.1 | 115 |
| Innovation Output Sub-Index | 16.9 | 112 |
| Innovation Input Sub-Index | 29.3 | 116 |
| Innovation Efficiency Ratio | 0.6 | 94 |
| Global Innovation Index 2015 (out of 141) | 21.1 | 135 |

1 Institutions 46.6 108

| | | |
|--|------|-----|
| 1.1 Political environment | 30.7 | 110 |
| 1.1.1 Political stability & safety* | 45.4 | 98 |
| 1.1.2 Government effectiveness* | 16.0 | 117 |
| 1.2 Regulatory environment | 44.5 | 114 |
| 1.2.1 Regulatory quality* | 23.7 | 115 |
| 1.2.2 Rule of law* | 30.2 | 101 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.2 | 104 |
| 1.3 Business environment | 64.7 | 81 |
| 1.3.1 Ease of starting a business* | 83.5 | 79 |
| 1.3.2 Ease of resolving insolvency* | 44.2 | 77 |
| 1.3.3 Ease of paying taxes* | 66.5 | 89 |

2 Human capital & research 16.7 109

| | | |
|---|------|-------|
| 2.1 Education | 34.5 | 100 |
| 2.1.1 Expenditure on education, % GDP | 4.7 | 59 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 14.6 | 87 |
| 2.1.3 School life expectancy, years | 12.2 | 87 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 28.8 | 101 |
| 2.2 Tertiary education | 13.7 | 112 |
| 2.2.1 Tertiary enrolment, % gross | 15.8 | 96 |
| 2.2.2 Graduates in science & engineering, % | 12.1 | 95 |
| 2.2.3 Tertiary inbound mobility, % [Ⓐ] | 0.0 | 107 ○ |
| 2.3 Research & development (R&D) | 2.0 | 93 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.3 | 76 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 25.9 115

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 21.4 | 111 |
| 3.1.1 ICT access* | 29.2 | 110 |
| 3.1.2 ICT use* | 11.4 | 105 |
| 3.1.3 Government's online service* | 15.7 | 115 |
| 3.1.4 E-participation* | 29.4 | 99 |
| 3.2 General infrastructure | 30.2 | 81 |
| 3.2.1 Electricity output, kWh/cap | 131.2 | 113 ○ |
| 3.2.2 Logistics performance* | 2.6 | 99 |
| 3.2.3 Gross capital formation, % GDP | 28.9 | 26 ● |
| 3.3 Ecological sustainability | 26.1 | 120 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.2 | 95 |
| 3.3.2 Environmental performance* | 50.2 | 114 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 102 |

4 Market sophistication 31.3 118

| | | |
|--|------|------|
| 4.1 Credit | 22.9 | 99 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 62.6 | 49 ● |
| 4.1.3 Microfinance gross loans, % GDP | 1.2 | 30 ● |

| | | |
|--|------|------|
| 4.2 Investment | 31.7 | 85 |
| 4.2.1 Ease of protecting minority investors* | 58.3 | 55 ● |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 22.1 | 61 |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.3 | 69 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|------|-------|
| 4.3 Trade, competition, & market scale | 39.4 | 121 ○ |
| 4.3.1 Applied tariff rate, weighted mean, % | 14.7 | 124 ○ |
| 4.3.2 Intensity of local competition [†] | 65.5 | 80 |
| 4.3.3 Domestic market scale, bn PPP\$ | 67.1 | 87 |

5 Business sophistication 26.0 93

| | | |
|--|------|------|
| 5.1 Knowledge workers | 21.7 | 107 |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 4.3 | 99 ○ |
| 5.1.2 Firms offering formal training, % firms | 31.9 | 54 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 33.2 | 54 |
| 5.2.1 University/industry research collaboration [†] | 27.3 | 116 ○ |
| 5.2.2 State of cluster development [†] | 36.2 | 97 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

| | | |
|--|------|-------|
| 5.3 Knowledge absorption | 23.1 | 93 |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.6 | 37 ● |
| 5.3.3 ICT services imports, % total trade [Ⓐ] | 0.8 | 78 |
| 5.3.4 FDI net inflows, % GDP | 0.0 | 124 ○ |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 17.6 103

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 6.2 | 86 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓐ] | 0.3 | 87 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 7.4 | 74 |
| 6.1.5 Citable documents H index | 87.0 | 87 |

| | | |
|---|-----|-----|
| 6.2 Knowledge impact | 5.2 | 119 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 0.7 | 83 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.4 | 98 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 6.7 | 86 |

| | | |
|--|------|------|
| 6.3 Knowledge diffusion | 41.4 | 24 ● |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.1 | 110 |
| 6.3.3 ICT services exports, % total trade [Ⓐ] | 7.5 | 5 ● |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs 16.3 112

| | | |
|--|------|-------|
| 7.1 Intangible assets | 28.4 | 115 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 37.8 | 60 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓐ] | 0.3 | 88 |
| 7.1.3 ICTs & business model creation [†] | 39.7 | 120 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 38.2 | 111 |

| | | |
|--|-----|------|
| 7.2 Creative goods & services | 7.5 | 102 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 0.4 | 88 ○ |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 66 ● |

| | | |
|--|-------|-----|
| 7.3 Online creativity | 1.0 | 103 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.5 | 110 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.9 | 81 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 218.2 | 101 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 16.9 |
| GDP (US\$ billions) | 738.4 |
| GDP per capita, PPP\$ | 49,165.8 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|----------|
| Global Innovation Index (out of 128) | 58.3 | 9 |
| Innovation Output Sub-Index | 52.5 | 9 |
| Innovation Input Sub-Index | 64.0 | 12 |
| Innovation Efficiency Ratio | 0.8 | 20 |
| Global Innovation Index 2015 (out of 141) | 61.6 | 4 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 91.0 | 8 |
| 1.1 Political environment | 89.4 | 9 |
| 1.1.1 Political stability & safety* | 88.9 | 15 |
| 1.1.2 Government effectiveness* | 89.9 | 6 ● |
| 1.2 Regulatory environment | 95.7 | 6 ● |
| 1.2.1 Regulatory quality* | 88.8 | 10 |
| 1.2.2 Rule of law* | 96.5 | 7 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.7 | 21 |
| 1.3 Business environment | 87.9 | 10 |
| 1.3.1 Ease of starting a business* | 94.1 | 27 |
| 1.3.2 Ease of resolving insolvency* | 83.8 | 10 |
| 1.3.3 Ease of paying taxes* | 85.8 | 23 |
| 2 Human capital & research | 55.3 | 17 |
| 2.1 Education | 60.4 | 23 |
| 2.1.1 Expenditure on education, % GDP | 5.5 | 36 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 24.2 | 37 |
| 2.1.3 School life expectancy, years [Ⓢ] | 18.1 | 8 |
| 2.1.4 PISA scales in reading, maths, & science | 518.8 | 10 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓢ] | 14.1 | 56 ○ |
| 2.2 Tertiary education | 40.0 | 46 ○ |
| 2.2.1 Tertiary enrolment, % gross [Ⓢ] | 78.5 | 17 |
| 2.2.2 Graduates in science & engineering, % [Ⓢ] | 14.4 | 88 ○ |
| 2.2.3 Tertiary inbound mobility, % [Ⓢ] | 7.2 | 23 |
| 2.3 Research & development (R&D) | 65.5 | 12 |
| 2.3.1 Researchers, FTE/mn pop. | 4,478.1 | 15 |
| 2.3.2 Gross expenditure on R&D, % GDP | 2.0 | 18 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 2,257.5 | 8 |
| 2.3.4 QS university ranking, average score top 3* | 75.8 | 12 |
| 3 Infrastructure | 62.1 | 12 |
| 3.1 Information & communication technologies (ICTs) | 90.1 | 3 ● |
| 3.1.1 ICT access* | 90.4 | 8 |
| 3.1.2 ICT use* | 76.9 | 12 |
| 3.1.3 Government's online service* | 92.9 | 8 |
| 3.1.4 E-participation* | 100.0 | 1 ● |
| 3.2 General infrastructure | 46.3 | 30 |
| 3.2.1 Electricity output, kWh/cap. | 6,079.9 | 30 |
| 3.2.2 Logistics performance* | 4.0 | 2 ● |
| 3.2.3 Gross capital formation, % GDP | 17.9 | 99 ○ |
| 3.3 Ecological sustainability | 49.8 | 41 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.0 | 44 ○ |
| 3.3.2 Environmental performance* | 82.0 | 36 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.0 | 33 |
| 4 Market sophistication | 58.1 | 18 |
| 4.1 Credit | 47.7 | 30 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 116.5 | 21 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|-------------|------------|
| 4.2 Investment | 48.7 | 25 |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 ○ |
| 4.2.2 Market capitalization, % GDP | 89.5 | 17 |
| 4.2.3 Total value of stocks traded, % GDP | 54.3 | 14 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 18 |
| 4.3 Trade, competition, & market scale | 77.7 | 13 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 81.0 | 10 |
| 4.3.3 Domestic market scale, bn PPP\$ | 808.8 | 26 |
| 5 Business sophistication | 53.7 | 9 |
| 5.1 Knowledge workers | 60.2 | 20 |
| 5.1.1 Knowledge-intensive employment, % | 46.4 | 9 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.1 | 19 |
| 5.1.4 GERD financed by business, % | 51.5 | 19 |
| 5.1.5 Females employed w/advanced degrees, % total | 18.3 | 28 |
| 5.2 Innovation linkages | 45.1 | 18 |
| 5.2.1 University/industry research collaboration [†] | 73.0 | 9 |
| 5.2.2 State of cluster development [†] | 70.3 | 10 |
| 5.2.3 GERD financed by abroad, % | 12.5 | 38 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 28 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 3.4 | 12 |
| 5.3 Knowledge absorption | 55.9 | 4 ● |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 12.5 | 21 |
| 5.3.3 ICT services imports, % total trade | n/a | n/a |
| 5.3.4 FDI net inflows, % GDP | 5.5 | 25 |
| 5.3.5 Research talent, % in business enterprise | 60.8 | 10 |
| 6 Knowledge & technology outputs | 44.1 | 16 |
| 6.1 Knowledge creation | 67.7 | 4 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 11.3 | 10 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 5.2 | 8 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 42.8 | 13 |
| 6.1.5 Citable documents H index | 694.0 | 8 |
| 6.2 Knowledge impact | 48.3 | 22 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.2 | 59 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 5.3 | 23 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 7 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 12.9 | 30 |
| 6.2.5 High- & medium-high-tech manufactures, % | 41.0 | 22 |
| 6.3 Knowledge diffusion | 16.3 | 114 ○ |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 13.1 | 14 |
| 6.3.3 ICT services exports, % total trade | n/a | n/a |
| 6.3.4 FDI net outflows, % GDP | (5.9) | 118 ○ |
| 7 Creative outputs | 61.0 | 6 ● |
| 7.1 Intangible assets | 56.7 | 18 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 56.7 | 35 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 3.5 | 35 |
| 7.1.3 ICTs & business model creation [†] | 80.1 | 4 ● |
| 7.1.4 ICTs & organizational model creation [†] | 77.7 | 4 ● |
| 7.2 Creative goods & services | 46.2 | 8 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 5.6 | 32 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 52.1 | 14 |
| 7.2.4 Printing & publishing manufactures, % | 1.5 | 35 ○ |
| 7.2.5 Creative goods exports, % total trade | 5.3 | 8 |
| 7.3 Online creativity | 84.5 | 2 ● |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 82.5 | 5 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 9,406.7 | 6 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 85.9 | 2 ● |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓢ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

New Zealand

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 4.5 |
| GDP (US\$ billions) | 172.2 |
| GDP per capita, PPP\$ | 36,171.6 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 54.2 | 17 |
| Innovation Output Sub-Index | 45.8 | 17 |
| Innovation Input Sub-Index | 62.6 | 14 |
| Innovation Efficiency Ratio | 0.7 | 40 |
| Global Innovation Index 2015 (out of 141) | 55.9 | 15 |

| | | | |
|----------|---|-------------|------------|
| 1 | Institutions | 93.5 | 3 ● |
| 1.1 | Political environment | 96.3 | 2 ● |
| 1.1.1 | Political stability & safety* | 100.0 | 1 ● |
| 1.1.2 | Government effectiveness* | 92.6 | 4 ● |
| 1.2 | Regulatory environment | 97.6 | 2 ● |
| 1.2.1 | Regulatory quality* | 92.9 | 3 ● |
| 1.2.2 | Rule of law* | 97.4 | 4 ● |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 | Business environment | 86.5 | 16 |
| 1.3.1 | Ease of starting a business* | 100.0 | 1 ● |
| 1.3.2 | Ease of resolving insolvency* | 71.4 | 29 |
| 1.3.3 | Ease of paying taxes* | 88.1 | 21 |
| 2 | Human capital & research | 56.6 | 15 |
| 2.1 | Education | 66.9 | 10 |
| 2.1.1 | Expenditure on education, % GDP | 7.3 | 8 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 24.7 | 34 |
| 2.1.3 | School life expectancy, years | 19.2 | 5 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 509.2 | 16 |
| 2.1.5 | Pupil-teacher ratio, secondary ^② | 14.4 | 61 |
| 2.2 | Tertiary education | 56.6 | 10 |
| 2.2.1 | Tertiary enrolment, % gross | 79.7 | 15 |
| 2.2.2 | Graduates in science & engineering, % ^② | 18.8 | 65 ○ |
| 2.2.3 | Tertiary inbound mobility, % | 16.1 | 8 |
| 2.3 | Research & development (R&D) | 46.3 | 24 |
| 2.3.1 | Researchers, FTE/mn pop. ^② | 4,008.7 | 22 |
| 2.3.2 | Gross expenditure on R&D, % GDP ^② | 1.2 | 32 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 84.9 | 32 |
| 2.3.4 | QS university ranking, average score top 3* | 60.2 | 19 |
| 3 | Infrastructure | 58.8 | 20 |
| 3.1 | Information & communication technologies (ICTs) | 79.9 | 13 |
| 3.1.1 | ICT access* | 80.8 | 22 |
| 3.1.2 | ICT use* | 76.3 | 14 |
| 3.1.3 | Government's online service* | 84.3 | 15 |
| 3.1.4 | E-participation* | 78.4 | 19 |
| 3.2 | General infrastructure | 51.1 | 18 |
| 3.2.1 | Electricity output, kWh/cap | 9,654.3 | 14 |
| 3.2.2 | Logistics performance* | 3.6 | 22 |
| 3.2.3 | Gross capital formation, % GDP | 23.7 | 53 |
| 3.3 | Ecological sustainability | 45.3 | 54 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.2 | 88 ○ |
| 3.3.2 | Environmental performance* | 88.0 | 11 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.8 | 48 |
| 4 | Market sophistication | 63.5 | 11 |
| 4.1 | Credit | 78.2 | 5 ● |
| 4.1.1 | Ease of getting credit* | 100.0 | 1 ● |
| 4.1.2 | Domestic credit to private sector, % GDP ^② | 143.6 | 9 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 44.1 | 34 |
| 4.2.1 | Ease of protecting minority investors* | 83.3 | 1 ● |
| 4.2.2 | Market capitalization, % GDP ^② | 29.5 | 52 ○ |
| 4.2.3 | Total value of stocks traded, % GDP ^② | 3.0 | 48 ○ |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 21 |
| 4.3 | Trade, competition, & market scale | 68.1 | 43 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.4 | 41 |
| 4.3.2 | Intensity of local competition [†] | 77.9 | 15 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 160.8 | 64 |
| 5 | Business sophistication | 40.9 | 30 |
| 5.1 | Knowledge workers | 53.1 | 27 |
| 5.1.1 | Knowledge-intensive employment, % ^② | 42.9 | 18 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP ^② | 0.5 | 32 |
| 5.1.4 | GERD financed by business, % ^② | 39.8 | 36 |
| 5.1.5 | Females employed w/advanced degrees, % total ^② | 20.8 | 22 |
| 5.2 | Innovation linkages | 36.2 | 46 |
| 5.2.1 | University/industry research collaboration [†] | 65.1 | 16 |
| 5.2.2 | State of cluster development [†] | 49.6 | 45 |
| 5.2.3 | GERD financed by abroad, % ^② | 7.2 | 56 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 18 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 2.4 | 15 |
| 5.3 | Knowledge absorption | 33.4 | 42 |
| 5.3.1 | Intellectual property payments, % total trade | 1.6 | 11 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 10.7 | 29 |
| 5.3.3 | ICT services imports, % total trade | 1.2 | 51 |
| 5.3.4 | FDI net inflows, % GDP ^② | 0.8 | 101 ○ |
| 5.3.5 | Research talent, % in business enterprise ^② | 34.1 | 39 |
| 6 | Knowledge & technology outputs | 38.3 | 27 |
| 6.1 | Knowledge creation | 49.9 | 13 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 10.2 | 13 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 2.2 | 17 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 51.1 | 7 ● |
| 6.1.5 | Citable documents H index | 351.0 | 26 |
| 6.2 | Knowledge impact | 42.4 | 38 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | (0.2) | 92 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 16.6 | 3 ● |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 34 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 8.0 | 44 |
| 6.2.5 | High- & medium-high-tech manufactures, % ^② | 14.8 | 66 ○ |
| 6.3 | Knowledge diffusion | 22.7 | 75 ○ |
| 6.3.1 | Intellectual property receipts, % total trade | 0.6 | 21 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 1.3 | 60 |
| 6.3.3 | ICT services exports, % total trade | 1.1 | 74 ○ |
| 6.3.4 | FDI net outflows, % GDP ^② | (0.1) | 101 ○ |
| 7 | Creative outputs | 53.3 | 12 |
| 7.1 | Intangible assets | 60.8 | 14 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 97.3 | 14 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 6.4 | 21 |
| 7.1.3 | ICTs & business model creation [†] | 73.8 | 19 |
| 7.1.4 | ICTs & organizational model creation [†] | 67.9 | 22 |
| 7.2 | Creative goods & services | 33.6 | 33 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 8.0 | 20 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 53.4 | 12 |
| 7.2.4 | Printing & publishing manufactures, % ^② | 2.0 | 24 |
| 7.2.5 | Creative goods exports, % total trade | 0.3 | 69 |
| 7.3 | Online creativity | 58.0 | 14 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 37.1 | 20 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 73.7 | 10 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 7,816.3 | 10 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 63.2 | 15 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 6.1 |
| GDP (US\$ billions) | 12.2 |
| GDP per capita, PPP\$ | 4,997.2 |
| Income group | Lower-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 23.1 | 116 |
| Innovation Output Sub-Index | 13.3 | 120 ○ |
| Innovation Input Sub-Index | 32.8 | 106 |
| Innovation Efficiency Ratio | 0.4 | 120 ○ |
| Global Innovation Index 2015 (out of 141) | 23.5 | 130 |

| | | | |
|----------|--|-------------|--------------|
| 1 | Institutions | 51.8 | 92 |
| 1.1 | Political environment | 38.8 | 94 |
| 1.1.1 | Political stability & safety* | 61.7 | 70 |
| 1.1.2 | Government effectiveness* | 15.9 | 118 |
| 1.2 | Regulatory environment | 59.6 | 82 |
| 1.2.1 | Regulatory quality* | 35.4 | 94 |
| 1.2.2 | Rule of law* | 30.4 | 100 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 14.9 | 62 ● |
| 1.3 | Business environment | 57.1 | 106 |
| 1.3.1 | Ease of starting a business* | 80.5 | 92 |
| 1.3.2 | Ease of resolving insolvency* | 40.1 | 91 |
| 1.3.3 | Ease of paying taxes* | 50.6 | 113 |
| 2 | Human capital & research | 11.7 | 125 ○ |
| 2.1 | Education | 23.4 | 122 ○ |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 4.5 | 69 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 7.4 | 104 ○ |
| 2.1.3 | School life expectancy, years | n/a | n/a |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 30.8 | 104 |
| 2.2 | Tertiary education | n/a | n/a |
| 2.2.1 | Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 | Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 | Tertiary inbound mobility, % | n/a | n/a |
| 2.3 | Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 27.3 | 109 |
| 3.1 | Information & communication technologies (ICTs) | 16.8 | 120 ○ |
| 3.1.1 | ICT access* | 40.1 | 100 |
| 3.1.2 | ICT use* | 7.7 | 109 |
| 3.1.3 | Government's online service* | 9.4 | 123 ○ |
| 3.1.4 | E-participation* | 9.8 | 123 ○ |
| 3.2 | General infrastructure | 30.4 | 80 |
| 3.2.1 | Electricity output, kWh/cap. | 684.7 | 98 |
| 3.2.2 | Logistics performance* | 2.7 | 90 |
| 3.2.3 | Gross capital formation, % GDP | 27.5 | 31 ● |
| 3.3 | Ecological sustainability | 34.8 | 96 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 6.9 | 75 |
| 3.3.2 | Environmental performance* | 64.2 | 97 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 97 |
| 4 | Market sophistication | 41.9 | 76 |
| 4.1 | Credit | 31.8 | 73 |
| 4.1.1 | Ease of getting credit* | 45.0 | 81 |
| 4.1.2 | Domestic credit to private sector, % GDP | 34.1 | 85 |
| 4.1.3 | Microfinance gross loans, % GDP | 3.1 | 14 ● |

| | | | |
|-------|--|------|-----|
| 4.2 | Investment | 40.0 | 49 |
| 4.2.1 | Ease of protecting minority investors* | 40.0 | 112 |
| 4.2.2 | Market capitalization, % GDP | n/a | n/a |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | | |
|-------|---|------|------|
| 4.3 | Trade, competition, & market scale | 53.8 | 91 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.9 | 50 ● |
| 4.3.2 | Intensity of local competition [†] | 61.6 | 91 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 29.7 | 106 |

5 Business sophistication **31.2** **67**

| | | | |
|-------|--|------|------|
| 5.1 | Knowledge workers | 40.3 | 56 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓓ] | 14.8 | 87 |
| 5.1.2 | Firms offering formal training, % firms [Ⓓ] | 47.2 | 28 ● |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |

| | | | |
|-------|---|------|-----|
| 5.2 | Innovation linkages | 26.1 | 78 |
| 5.2.1 | University/industry research collaboration [†] | 32.6 | 106 |
| 5.2.2 | State of cluster development [†] | 35.2 | 104 |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 84 |

| | | | |
|-------|--|------|-------|
| 5.3 | Knowledge absorption | 27.1 | 70 |
| 5.3.1 | Intellectual property payments, % total trade | 0.0 | 111 ○ |
| 5.3.2 | High-tech imports less re-imports, % total trade | 8.6 | 51 ● |
| 5.3.3 | ICT services imports, % total trade | 0.4 | 103 |
| 5.3.4 | FDI net inflows, % GDP | 7.5 | 17 ● |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **10.8** **122** ○

| | | | |
|-------|--|------|-------|
| 6.1 | Knowledge creation | 1.9 | 123 ○ |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.0 | 115 ○ |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 2.1 | 117 |
| 6.1.5 | Citable documents H index | 56.0 | 110 |

6.2 Knowledge impact **3.4** **[123]**

| | | | |
|-------|--|-----|-----|
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 1.7 | 95 |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion **27.1** **50** ●

| | | | |
|-------|--|-----|------|
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.2 | 101 |
| 6.3.3 | ICT services exports, % total trade | 2.6 | 35 ● |
| 6.3.4 | FDI net outflows, % GDP | 0.7 | 57 ● |

7 Creative outputs **15.9** **113**

| | | | |
|-------|--|------|-------|
| 7.1 | Intangible assets | 29.4 | 108 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 41.1 | 55 ● |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP [Ⓓ] | 0.0 | 109 ○ |
| 7.1.3 | ICTs & business model creation [†] | 43.6 | 115 ○ |
| 7.1.4 | ICTs & organizational model creation [†] | 36.9 | 117 ○ |

7.2 Creative goods & services **1.8** **118**

| | | | |
|-------|--|-----|-----|
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 [Ⓓ] | 0.3 | 95 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.1 | 94 |

7.3 Online creativity **2.9** **93**

| | | | |
|-------|--|-------|-----|
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 3.0 | 65 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.6 | 88 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 691.2 | 85 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Niger

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 19.9 |
| GDP (US\$ billions) | 7.2 |
| GDP per capita, PPP\$ | 1,079.7 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 20.4 | 124 |
| Innovation Output Sub-Index | 10.8 | 125 |
| Innovation Input Sub-Index | 30.1 | 113 |
| Innovation Efficiency Ratio | 0.4 | 125 |
| Global Innovation Index 2015 (out of 141) | 21.2 | 134 |

1 Institutions 46.8 107

| | | |
|--|------|------|
| 1.1 Political environment | 24.9 | 118 |
| 1.1.1 Political stability & safety* | 31.3 | 120 |
| 1.1.2 Government effectiveness* | 18.6 | 109 |
| 1.2 Regulatory environment | 58.6 | 86 |
| 1.2.1 Regulatory quality* | 28.4 | 106 |
| 1.2.2 Rule of law* | 29.9 | 103 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 14.0 | 57 ● |
| 1.3 Business environment | 56.8 | 108 |
| 1.3.1 Ease of starting a business* | 77.6 | 101 |
| 1.3.2 Ease of resolving insolvency* | 36.0 | 101 |
| 1.3.3 Ease of paying taxes* | 56.9 | 108 |

2 Human capital & research 21.1 99

| | | |
|--|------|-------|
| 2.1 Education | 54.3 | 42 ● |
| 2.1.1 Expenditure on education, % GDP | 6.8 | 15 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 71.0 | 1 ● |
| 2.1.3 School life expectancy, years [Ⓐ] | 5.3 | 117 ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 25.1 | 95 |
| 2.2 Tertiary education | 9.0 | 113 |
| 2.2.1 Tertiary enrolment, % gross [Ⓐ] | 1.7 | 120 ○ |
| 2.2.2 Graduates in science & engineering, % [Ⓐ] | 4.3 | 101 ○ |
| 2.2.3 Tertiary inbound mobility, % [Ⓐ] | 5.4 | 31 ● |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 26.6 112

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 18.1 | 117 |
| 3.1.1 ICT access* | n/a | n/a |
| 3.1.2 ICT use* | n/a | n/a |
| 3.1.3 Government's online service* | 12.6 | 120 |
| 3.1.4 E-participation* | 23.5 | 108 |
| 3.2 General infrastructure | 41.4 | 40 ● |
| 3.2.1 Electricity output, kWh/cap. | 24.8 | 117 |
| 3.2.2 Logistics performance* | 2.4 | 114 |
| 3.2.3 Gross capital formation, % GDP | 43.8 | 5 ● |
| 3.3 Ecological sustainability | 20.4 | 124 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.0 | 98 |
| 3.3.2 Environmental performance* | 37.5 | 124 ○ |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 117 |

4 Market sophistication 25.8 127 ○

| | | |
|--|------|-----|
| 4.1 Credit | 13.0 | 120 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 14.2 | 120 |
| 4.1.3 Microfinance gross loans, % GDP | 0.4 | 39 |

| | | |
|--|------|-----|
| 4.2 Investment | 35.0 | 69 |
| 4.2.1 Ease of protecting minority investors* | 35.0 | 121 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 29.5 126 ○

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 10.2 | 121 |
| 4.3.2 Intensity of local competition [†] | n/a | n/a |
| 4.3.3 Domestic market scale, bn PPP\$ | 18.0 | 120 |

5 Business sophistication 30.0 76

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 37.9 | 65 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms [Ⓐ] | 32.1 | 50 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 2.1 [127]

| | | |
|---|-----|-----|
| 5.2.1 University/industry research collaboration [†] | n/a | n/a |
| 5.2.2 State of cluster development [†] | n/a | n/a |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 71 |

5.3 Knowledge absorption 50.1 8 ●

| | | |
|--|-----|------|
| 5.3.1 Intellectual property payments, % total trade [Ⓐ] | 0.1 | 93 |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.7 | 61 |
| 5.3.3 ICT services imports, % total trade [Ⓐ] | 4.4 | 3 ● |
| 5.3.4 FDI net inflows, % GDP | 9.4 | 11 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 21.1 84

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 4.0 | 100 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.5 | 76 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 76 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.7 | 81 |
| 6.1.5 Citable documents H index | 54.0 | 112 |

6.2 Knowledge impact 36.7 59

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.5 | 18 ● |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 0.0 | 107 ○ |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.4 | 121 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 22.5 77

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade [Ⓐ] | 0.0 | 99 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.0 | 44 ● |
| 6.3.3 ICT services exports, % total trade [Ⓐ] | 2.8 | 30 ● |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | 0.0 | 91 |

7 Creative outputs 0.5 128 ○

| | | |
|---|-----|-------|
| 7.1 Intangible assets | 0.0 | 128 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 1.2 | 109 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.1 | 106 |
| 7.1.3 ICTs & business model creation [†] | n/a | n/a |
| 7.1.4 ICTs & organizational model creation [†] | n/a | n/a |

7.2 Creative goods & services 1.6 120

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓐ] | 0.7 | 82 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 108 |

7.3 Online creativity 0.4 112

| | | |
|--|-----|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.1 | 97 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 126 ○ |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 5.3 | 128 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 182.2 |
| GDP (US\$ billions) | 490.2 |
| GDP per capita, PPP\$ | 6,108.4 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 23.1 | 114 |
| Innovation Output Sub-Index | 18.5 | 107 |
| Innovation Input Sub-Index | 27.8 | 122 |
| Innovation Efficiency Ratio | 0.7 | 60 ● |
| Global Innovation Index 2015 (out of 141) | 23.7 | 128 |

1 Institutions 36.2 125

| | | |
|--|------|-------|
| 1.1 Political environment | 8.2 | 127 ○ |
| 1.1.1 Political stability & safety* | 10.5 | 126 ○ |
| 1.1.2 Government effectiveness* | 5.9 | 123 |
| 1.2 Regulatory environment | 53.8 | 98 |
| 1.2.1 Regulatory quality* | 24.5 | 112 |
| 1.2.2 Rule of law* | 20.1 | 125 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.4 | 64 ● |
| 1.3 Business environment | 46.7 | 126 ○ |
| 1.3.1 Ease of starting a business* | 77.1 | 105 |
| 1.3.2 Ease of resolving insolvency* | 30.7 | 114 |
| 1.3.3 Ease of paying taxes* | 32.2 | 124 |

2 Human capital & research 12.4 123

| | | |
|---|------|------|
| 2.1 Education | 23.8 | 121 |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 33.1 | 106 |
| 2.2 Tertiary education | n/a | n/a |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 1.1 | 103 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 38.6 | 90 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.2 | 85 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 27.0 110

| | | |
|---|-------|-----|
| 3.1 Information & communication technologies (ICTs) | 27.6 | 103 |
| 3.1.1 ICT access* | 28.2 | 112 |
| 3.1.2 ICT use* | 18.1 | 94 |
| 3.1.3 Government's online service* | 30.7 | 97 |
| 3.1.4 E-participation* | 33.3 | 89 |
| 3.2 General infrastructure | 22.3 | 116 |
| 3.2.1 Electricity output, kWh/cap | 166.4 | 112 |
| 3.2.2 Logistics performance* | 2.8 | 72 |
| 3.2.3 Gross capital formation, % GDP | 17.4 | 106 |
| 3.3 Ecological sustainability | 31.0 | 111 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.3 | 86 |
| 3.3.2 Environmental performance* | 58.3 | 106 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 120 |

4 Market sophistication 43.3 61 ●

| | | |
|--|------|------|
| 4.1 Credit | 21.7 | 104 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 14.5 | 117 |
| 4.1.3 Microfinance gross loans, % GDP | 0.1 | 63 |

| | | |
|--|-------|------|
| 4.2 Investment | 46.2 | 31 ● |
| 4.2.1 Ease of protecting minority investors* | 68.3 | 20 ● |
| 4.2.2 Market capitalization, % GDP | 100.0 | 11 ● |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 76 |

4.3 Trade, competition, & market scale 62.0 59 ●

| | | |
|---|---------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 10.1 | 120 |
| 4.3.2 Intensity of local competition [†] | 69.2 | 58 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,052.9 | 21 ● |

5 Business sophistication 20.1 121

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 24.1 | 98 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 30.8 | 57 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % [Ⓓ] | 0.2 | 91 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 16.6 122

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 29.2 | 111 |
| 5.2.2 State of cluster development [†] | 42.1 | 78 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 1.0 | 88 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 75 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓓ] | 0.0 | 114 ○ |

5.3 Knowledge absorption 19.6 101

| | | |
|--|-----|------|
| 5.3.1 Intellectual property payments, % total trade | 0.3 | 70 |
| 5.3.2 High-tech imports less re-imports, % total trade | 3.4 | 113 |
| 5.3.3 ICT services imports, % total trade | 1.8 | 25 ● |
| 5.3.4 FDI net inflows, % GDP | 0.8 | 102 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 17.5 104

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 2.9 | 116 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓓ] | 0.1 | 111 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 95 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 2.0 | 118 |
| 6.1.5 Citable documents H index | 115.0 | 69 ● |

6.2 Knowledge impact 30.7 88

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.8 | 15 ● |
| 6.2.2 New businesses/th pop. 15–64 | 0.8 | 80 |
| 6.2.3 Computer software spending, % GDP | 0.1 | 73 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.2 | 127 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 19.0 101

| | | |
|--|-----|-------|
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 100 |
| 6.3.3 ICT services exports, % total trade | 0.1 | 121 ○ |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 0.3 | 69 |

7 Creative outputs 19.5 106

| | | |
|--|------|-----|
| 7.1 Intangible assets | 31.4 | 103 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 19.8 | 81 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓓ] | 0.9 | 70 |
| 7.1.3 ICTs & business model creation [†] | 54.0 | 80 |
| 7.1.4 ICTs & organizational model creation [†] | 43.1 | 95 |

7.2 Creative goods & services 14.9 82

| | | |
|--|------|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓓ] | 11.2 | 9 ● |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 0.5 | 57 |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 115 |

7.3 Online creativity 0.2 116

| | | |
|--|------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.6 | 107 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 108 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 36.2 | 115 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 0.0 | 74 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Norway

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 5.2 |
| GDP (US\$ billions) | 389.5 |
| GDP per capita, PPP\$ | 68,430.2 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 52.0 | 22 |
| Innovation Output Sub-Index | 42.0 | 26 |
| Innovation Input Sub-Index | 62.0 | 17 |
| Innovation Efficiency Ratio | 0.7 | 55 |
| Global Innovation Index 2015 (out of 141) | 53.8 | 20 |

1 Institutions **91.9** **5 ●**

| | | |
|--|------|-----|
| 1.1 Political environment | 90.2 | 7 ● |
| 1.1.1 Political stability & safety* | 91.0 | 9 |
| 1.1.2 Government effectiveness* | 89.3 | 8 ● |
| 1.2 Regulatory environment | 95.2 | 7 ● |
| 1.2.1 Regulatory quality* | 85.3 | 16 |
| 1.2.2 Rule of law* | 98.1 | 3 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.7 | 21 |
| 1.3 Business environment | 90.5 | 4 ● |
| 1.3.1 Ease of starting a business* | 94.3 | 23 |
| 1.3.2 Ease of resolving insolvency* | 85.7 | 6 ● |
| 1.3.3 Ease of paying taxes* | 91.4 | 14 |

2 Human capital & research **53.0** **21**

| | | |
|--|---------|------|
| 2.1 Education | 62.4 | 16 |
| 2.1.1 Expenditure on education, % GDP | 7.4 | 7 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 25.8 | 29 |
| 2.1.3 School life expectancy, years | 17.7 | 11 |
| 2.1.4 PISA scales in reading, maths, & science | 495.9 | 23 |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 40.7 | 43 |
| 2.2.1 Tertiary enrolment, % gross | 76.1 | 20 |
| 2.2.2 Graduates in science & engineering, % | 20.0 | 56 ○ |
| 2.2.3 Tertiary inbound mobility, % | 3.6 | 48 |
| 2.3 Research & development (R&D) | 55.9 | 19 |
| 2.3.1 Researchers, FTE/mn pop. | 5,703.6 | 8 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.7 | 20 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 212.6 | 24 |
| 2.3.4 QS university ranking, average score top 3* | 55.3 | 23 |

3 Infrastructure **67.0** **3 ●**

| | | |
|---|----------|-----|
| 3.1 Information & communication technologies (ICTs) | 77.7 | 15 |
| 3.1.1 ICT access* | 82.4 | 17 |
| 3.1.2 ICT use* | 84.3 | 2 ● |
| 3.1.3 Government's online service* | 75.6 | 21 |
| 3.1.4 E-participation* | 68.6 | 30 |
| 3.2 General infrastructure | 72.0 | 2 ● |
| 3.2.1 Electricity output, kWh/cap. | 27,550.0 | 1 ● |
| 3.2.2 Logistics performance* | 4.0 | 7 ● |
| 3.2.3 Gross capital formation, % GDP | 28.2 | 30 |
| 3.3 Ecological sustainability | 51.4 | 35 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.3 | 51 |
| 3.3.2 Environmental performance* | 86.9 | 17 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.5 | 26 |

4 Market sophistication **52.3** **26**

| | | |
|---|------|------|
| 4.1 Credit | 43.8 | 37 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 ○ |
| 4.1.2 Domestic credit to private sector, % GDP ^② | 84.8 | 34 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|----|
| 4.2 Investment | 42.1 | 41 |
| 4.2.1 Ease of protecting minority investors* | 71.7 | 14 |
| 4.2.2 Market capitalization, % GDP | 43.9 | 39 |
| 4.2.3 Total value of stocks traded, % GDP | 25.2 | 25 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 28 |

4.3 Trade, competition, & market scale **70.9** **32**

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.1 | 37 |
| 4.3.2 Intensity of local competition [†] | 71.4 | 48 |
| 4.3.3 Domestic market scale, bn PPP\$ | 346.3 | 47 |

5 Business sophistication **45.7** **21**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 63.1 | 12 |
| 5.1.1 Knowledge-intensive employment, % | 50.7 | 4 ● |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.9 | 23 |
| 5.1.4 GERD financed by business, % ^② | 43.1 | 30 |
| 5.1.5 Females employed w/advanced degrees, % total | 24.1 | 11 |

5.2 Innovation linkages **42.1** **25**

| | | |
|---|------|----|
| 5.2.1 University/industry research collaboration [†] | 67.0 | 14 |
| 5.2.2 State of cluster development [†] | 70.1 | 11 |
| 5.2.3 GERD financed by abroad, % ^② | 9.5 | 46 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 14 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.6 | 24 |

5.3 Knowledge absorption **31.8** **46**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.4 | 66 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.0 | 80 ○ |
| 5.3.3 ICT services imports, % total trade | 1.6 | 31 |
| 5.3.4 FDI net inflows, % GDP | 2.1 | 76 ○ |
| 5.3.5 Research talent, % in business enterprise | 49.3 | 24 |

6 Knowledge & technology outputs **36.2** **29**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 35.7 | 25 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.7 | 24 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.9 | 20 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 33.3 | 22 |
| 6.1.5 Citable documents H index | 402.0 | 20 |

6.2 Knowledge impact **47.8** **24**

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.1 | 63 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 7.7 | 15 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 15 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 6.9 | 51 |
| 6.2.5 High- & medium-high-tech manufactures, % | 42.9 | 19 |

6.3 Knowledge diffusion **25.0** **63 ○**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 31 |
| 6.3.2 High-tech exports less re-exports, % total trade | 3.3 | 40 |
| 6.3.3 ICT services exports, % total trade | 1.4 | 68 ○ |
| 6.3.4 FDI net outflows, % GDP ^② | 1.4 | 39 |

7 Creative outputs **47.9** **19**

| | | |
|---|------|------|
| 7.1 Intangible assets | 50.2 | 35 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 30.5 | 66 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.0 | 50 |
| 7.1.3 ICTs & business model creation [†] | 76.5 | 13 |
| 7.1.4 ICTs & organizational model creation [†] | 77.2 | 6 ● |

7.2 Creative goods & services **34.7** **28**

| | | |
|--|-------|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 56 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 8.0 | 19 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 100.0 | 1 ● |
| 7.2.4 Printing & publishing manufactures, % | 1.6 | 31 |
| 7.2.5 Creative goods exports, % total trade | 0.5 | 61 ○ |

7.3 Online creativity **56.5** **16**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 55.4 | 14 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 65.3 | 13 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,232.9 | 15 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 52.0 | 19 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 4.5 |
| GDP (US\$ billions) | 58.5 |
| GDP per capita, PPP\$ | 44,628.3 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 32.2 | 73 |
| Innovation Output Sub-Index | 22.3 | 86 |
| Innovation Input Sub-Index | 42.1 | 63 |
| Innovation Efficiency Ratio | 0.5 | 103 |
| Global Innovation Index 2015 (out of 141) | 35.0 | 69 |

1 Institutions 71.0 41

| | | |
|--|------|------|
| 1.1 Political environment | 63.1 | 45 |
| 1.1.1 Political stability & safety* | 79.2 | 36 ● |
| 1.1.2 Government effectiveness* | 47.0 | 53 |
| 1.2 Regulatory environment | 80.8 | 26 ● |
| 1.2.1 Regulatory quality* | 61.8 | 41 |
| 1.2.2 Rule of law* | 61.6 | 41 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 69.1 | 70 |
| 1.3.1 Ease of starting a business* | 75.0 | 110 |
| 1.3.2 Ease of resolving insolvency* | 39.3 | 93 |
| 1.3.3 Ease of paying taxes* | 92.9 | 10 ● |

2 Human capital & research 33.9 52

| | | |
|---|-------|------|
| 2.1 Education | 38.2 | 92 |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 4.2 | 76 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 20.0 | 55 |
| 2.1.3 School life expectancy, years [Ⓐ] | 13.7 | 64 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 60.3 | 5 ● |
| 2.2.1 Tertiary enrolment, % gross [Ⓐ] | 28.6 | 81 |
| 2.2.2 Graduates in science & engineering, % | 48.7 | 1 ● |
| 2.2.3 Tertiary inbound mobility, % | 3.0 | 51 |
| 2.3 Research & development (R&D) | 3.4 | 83 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 127.3 | 80 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.2 | 93 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 9.1 | 62 |

3 Infrastructure 47.5 51

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 66.7 | 36 ● |
| 3.1.1 ICT access* | 72.4 | 41 |
| 3.1.2 ICT use* | 50.5 | 50 |
| 3.1.3 Government's online service* | 73.2 | 26 ● |
| 3.1.4 E-participation* | 70.6 | 24 ● |
| 3.2 General infrastructure | 45.1 | 32 ● |
| 3.2.1 Electricity output, kWh/cap | 7,228.7 | 25 ● |
| 3.2.2 Logistics performance* | 3.0 | 57 |
| 3.2.3 Gross capital formation, % GDP | 29.5 | 24 ● |
| 3.3 Ecological sustainability | 30.8 | 112 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.4 | 91 |
| 3.3.2 Environmental performance* | 60.1 | 101 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.5 | 83 |

4 Market sophistication 39.0 90

| | | |
|--|------|-----|
| 4.1 Credit | 26.0 | 92 |
| 4.1.1 Ease of getting credit* | 35.0 | 101 |
| 4.1.2 Domestic credit to private sector, % GDP | 46.5 | 70 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-----|
| 4.2 Investment | 28.5 | 99 |
| 4.2.1 Ease of protecting minority investors* | 43.3 | 104 |
| 4.2.2 Market capitalization, % GDP | 46.2 | 35 |
| 4.2.3 Total value of stocks traded, % GDP | 7.1 | 39 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 62.4 57

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 2.5 | 55 |
| 4.3.2 Intensity of local competition [†] | 61.8 | 90 |
| 4.3.3 Domestic market scale, bn PPP\$ | 163.0 | 63 |

5 Business sophistication 19.1 124 ○

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 16.4 | [117] |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP [Ⓐ] | 0.0 | 71 |
| 5.1.4 GERD financed by business, % [Ⓐ] | 24.5 | 58 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 25.9 | 80 |
| 5.2.1 University/industry research collaboration [†] | 43.6 | 67 |
| 5.2.2 State of cluster development [†] | 43.1 | 74 |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 0.0 | 99 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 10 ● |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 108 ○ |
| 5.3 Knowledge absorption | 14.9 | 123 ○ |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 3.1 | 116 ○ |
| 5.3.3 ICT services imports, % total trade | 0.2 | 116 ○ |
| 5.3.4 FDI net inflows, % GDP | 0.9 | 100 |
| 5.3.5 Research talent, % in business enterprise [Ⓐ] | 20.2 | 56 |

6 Knowledge & technology outputs 18.5 95

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 3.0 | 113 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓐ] | 0.0 | 119 ○ |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 88 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 4.3 | 104 |
| 6.1.5 Citable documents H index | 83.0 | 89 |
| 6.2 Knowledge impact | 28.4 | 96 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (2.0) | 105 ○ |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 1.0 | 69 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 3.3 | 74 |
| 6.2.5 High- & medium-high-tech manufactures, % | 36.7 | 27 ● |
| 6.3 Knowledge diffusion | 23.9 | 70 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.5 | 76 |
| 6.3.3 ICT services exports, % total trade | 0.2 | 114 ○ |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | 1.8 | 35 |

7 Creative outputs 26.2 79

| | | |
|--|-------|-------|
| 7.1 Intangible assets | 47.7 | 46 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 51.7 | 86 |
| 7.1.4 ICTs & organizational model creation [†] | 43.7 | 93 |
| 7.2 Creative goods & services | 5.8 | 106 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 [Ⓐ] | 0.0 | 101 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 6.6 | 40 |
| 7.2.4 Printing & publishing manufactures, % | 0.7 | 77 |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 107 |
| 7.3 Online creativity | 3.6 | 85 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.0 | 80 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.2 | 104 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 637.4 | 86 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 7.7 | 63 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Pakistan

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 188.9 |
| GDP (US\$ billions) | 270.0 |
| GDP per capita, PPP\$ | 5,000.0 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 22.6 | 119 |
| Innovation Output Sub-Index | 17.7 | 108 |
| Innovation Input Sub-Index | 27.5 | 123 ○ |
| Innovation Efficiency Ratio | 0.6 | 71 |
| Global Innovation Index 2015 (out of 141) | 23.1 | 131 |

| | | | |
|--|-------------|------------|---|
| 1 Institutions | 37.1 | 124 | ○ |
| 1.1 Political environment | 10.3 | 126 | ○ |
| 1.1.1 Political stability & safety* | 2.3 | 127 | ○ |
| 1.1.2 Government effectiveness* | 18.2 | 112 | |
| 1.2 Regulatory environment | 44.9 | 113 | |
| 1.2.1 Regulatory quality* | 27.8 | 107 | |
| 1.2.2 Rule of law* | 27.7 | 109 | |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.2 | 104 | |
| 1.3 Business environment | 56.1 | 111 | |
| 1.3.1 Ease of starting a business* | 80.9 | 91 | |
| 1.3.2 Ease of resolving insolvency* | 43.0 | 84 | |
| 1.3.3 Ease of paying taxes* | 44.5 | 118 | |

| | | | |
|---|-------------|------------|---|
| 2 Human capital & research | 13.0 | 122 | ○ |
| 2.1 Education | 22.6 | 124 | ○ |
| 2.1.1 Expenditure on education, % GDP | 2.5 | 110 | |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 13.2 | 89 | |
| 2.1.3 School life expectancy, years | 8.1 | 113 | ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a | |
| 2.1.5 Pupil-teacher ratio, secondary | 19.2 | 82 | |
| 2.2 Tertiary education | 8.7 | 114 | |
| 2.2.1 Tertiary enrolment, % gross | 10.4 | 104 | |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a | |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a | |
| 2.3 Research & development (R&D) | 7.6 | 68 | |
| 2.3.1 Researchers, FTE/mn pop. ^② | 166.9 | 73 | |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.3 | 78 | |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 | ○ |
| 2.3.4 QS university ranking, average score top 3* | 22.7 | 49 | ● |

| | | | |
|---|-------------|------------|---|
| 3 Infrastructure | 26.5 | 114 | |
| 3.1 Information & communication technologies (ICTs) | 26.0 | 106 | |
| 3.1.1 ICT access* | 31.5 | 107 | |
| 3.1.2 ICT use* | 6.9 | 111 | |
| 3.1.3 Government's online service* | 32.3 | 91 | |
| 3.1.4 E-participation* | 33.3 | 89 | |
| 3.2 General infrastructure | 20.9 | 121 | ○ |
| 3.2.1 Electricity output, kWh/cap | 537.3 | 103 | |
| 3.2.2 Logistics performance* | 2.8 | 69 | |
| 3.2.3 Gross capital formation, % GDP | 15.1 | 112 | |
| 3.3 Ecological sustainability | 32.6 | 108 | |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 8.4 | 50 | ● |
| 3.3.2 Environmental performance* | 51.4 | 111 | |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 90 | |

| | | | |
|--|-------------|------------|---|
| 4 Market sophistication | 35.7 | 105 | |
| 4.1 Credit | 12.3 | 122 | ○ |
| 4.1.1 Ease of getting credit* | 30.0 | 106 | |
| 4.1.2 Domestic credit to private sector, % GDP | 15.6 | 114 | |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 54 | |

| | | | |
|---|------|-----|---|
| 4.2 Investment | 35.0 | 70 | |
| 4.2.1 Ease of protecting minority investors* | 66.7 | 25 | ● |
| 4.2.2 Market capitalization, % GDP ^② | 15.2 | 71 | |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a | |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 86 | ○ |

| | | | |
|--|-------------|-----------|---|
| 4.3 Trade, competition, & market scale | 60.0 | 69 | |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 9.6 | 114 | |
| 4.3.2 Intensity of local competition [†] | 61.5 | 93 | |
| 4.3.3 Domestic market scale, bn PPP\$ | 884.2 | 25 | ● |

| | | | |
|--|-------------|-----------|--|
| 5 Business sophistication | 25.3 | 97 | |
| 5.1 Knowledge workers | 34.1 | 78 | |
| 5.1.1 Knowledge-intensive employment, % ^② | 19.5 | 72 | |
| 5.1.2 Firms offering formal training, % firms | 32.0 | 52 | |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a | |
| 5.1.4 GERD financed by business, % | n/a | n/a | |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a | |

| | | | |
|---|-------------|------------|---|
| 5.2 Innovation linkages | 18.6 | 115 | |
| 5.2.1 University/industry research collaboration [†] | 36.9 | 91 | |
| 5.2.2 State of cluster development [†] | 44.7 | 64 | |
| 5.2.3 GERD financed by abroad, % ^② | 1.3 | 85 | |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 72 | ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 111 | ○ |

| | | | |
|--|-------------|-----------|---|
| 5.3 Knowledge absorption | 23.2 | 91 | |
| 5.3.1 Intellectual property payments, % total trade | 0.4 | 64 | |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.4 | 41 | ● |
| 5.3.3 ICT services imports, % total trade | 0.9 | 63 | ● |
| 5.3.4 FDI net inflows, % GDP | 0.7 | 105 | |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a | |

| | | | |
|--|-------------|-----------|---|
| 6 Knowledge & technology outputs | 19.6 | 90 | |
| 6.1 Knowledge creation | 8.3 | 71 | |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.2 | 97 | |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a | |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a | |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 7.9 | 71 | |
| 6.1.5 Citable documents H index | 148.0 | 54 | ● |

| | | | |
|---|-------------|-----------|---|
| 6.2 Knowledge impact | 31.1 | 87 | |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.1 | 36 | ● |
| 6.2.2 New businesses/th pop. 15–64 | 0.0 | 105 | ○ |
| 6.2.3 Computer software spending, % GDP | 0.3 | 48 | |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.8 | 79 | |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 23.7 | 51 | ● |
| 6.3 Knowledge diffusion | 19.5 | 99 | |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 67 | |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.7 | 68 | |
| 6.3.3 ICT services exports, % total trade | 2.0 | 47 | ● |
| 6.3.4 FDI net outflows, % GDP | 0.0 | 84 | |

| | | | |
|---|-------------|------------|--|
| 7 Creative outputs | 15.9 | 114 | |
| 7.1 Intangible assets | 29.3 | 110 | |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 23.3 | 75 | |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.5 | 79 | |
| 7.1.3 ICTs & business model creation [†] | 51.3 | 88 | |
| 7.1.4 ICTs & organizational model creation [†] | 37.5 | 114 | |

| | | | |
|---|------------|------------|---|
| 7.2 Creative goods & services | 4.0 | 110 | |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.0 | 67 | |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 0.3 | 96 | ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 0.0 | 60 | ○ |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.3 | 91 | ○ |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 65 | |

| | | | |
|--|------------|------------|--|
| 7.3 Online creativity | 0.9 | 105 | |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 106 | |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 106 | |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 244.8 | 98 | |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a | |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 3.9 |
| GDP (US\$ billions) | 52.1 |
| GDP per capita, PPP\$ | 21,764.6 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.5 | 68 |
| Innovation Output Sub-Index | 26.7 | 61 |
| Innovation Input Sub-Index | 40.3 | 73 |
| Innovation Efficiency Ratio | 0.7 | 61 |
| Global Innovation Index 2015 (out of 141) | 36.8 | 62 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 59.6 | 67 |
| 1.1 | Political environment | 56.0 | 51 |
| 1.1.1 | Political stability & safety* | 65.3 | 58 |
| 1.1.2 | Government effectiveness* | 46.7 | 55 |
| 1.2 | Regulatory environment | 64.7 | 72 |
| 1.2.1 | Regulatory quality* | 54.0 | 56 |
| 1.2.2 | Rule of law* | 44.9 | 65 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 18.1 | 77 |
| 1.3 | Business environment | 58.0 | 103 |
| 1.3.1 | Ease of starting a business* | 92.0 | 38 |
| 1.3.2 | Ease of resolving insolvency* | 33.6 | 108 |
| 1.3.3 | Ease of paying taxes* | 48.6 | 114 |
| 2 | Human capital & research | 22.0 | 97 |
| 2.1 | Education | 34.3 | 101 |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 3.3 | 96 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 9.7 | 101 ○ |
| 2.1.3 | School life expectancy, years | 12.8 | 78 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 15.5 | 68 |
| 2.2 | Tertiary education | 30.7 | 81 |
| 2.2.1 | Tertiary enrolment, % gross | 38.7 | 66 |
| 2.2.2 | Graduates in science & engineering, % | 15.9 | 80 |
| 2.2.3 | Tertiary inbound mobility, % | n/a | n/a |
| 2.3 | Research & development (R&D) | 1.1 | 101 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓓ] | 119.0 | 81 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓓ] | 0.2 | 91 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 47.0 | 53 |
| 3.1 | Information & communication technologies (ICTs) | 43.1 | 80 |
| 3.1.1 | ICT access* | 57.2 | 68 |
| 3.1.2 | ICT use* | 29.2 | 81 |
| 3.1.3 | Government's online service* | 37.0 | 85 |
| 3.1.4 | E-participation* | 49.0 | 64 |
| 3.2 | General infrastructure | 40.4 | 43 |
| 3.2.1 | Electricity output, kWh/cap. | 2,320.7 | 73 |
| 3.2.2 | Logistics performance* | 3.2 | 43 |
| 3.2.3 | Gross capital formation, % GDP | 28.5 | 28 ● |
| 3.3 | Ecological sustainability | 57.4 | 21 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 16.1 | 4 ● |
| 3.3.2 | Environmental performance* | 78.0 | 50 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.3 | 96 |
| 4 | Market sophistication | 42.3 | 72 |
| 4.1 | Credit | 38.0 | 49 |
| 4.1.1 | Ease of getting credit* | 75.0 | 18 ● |
| 4.1.2 | Domestic credit to private sector, % GDP | 88.3 | 33 ● |
| 4.1.3 | Microfinance gross loans, % GDP | 0.4 | 38 |

| | | | |
|-------|---|------|-----|
| 4.2 | Investment | 33.8 | 75 |
| 4.2.1 | Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 | Market capitalization, % GDP | 29.8 | 51 |
| 4.2.3 | Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 45 |
| 4.3 | Trade, competition, & market scale | 55.1 | 84 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 6.1 | 91 |
| 4.3.2 | Intensity of local competition [†] | 71.3 | 50 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 76.8 | 80 |

| | | | |
|----------|---|-------------|-----------|
| 5 | Business sophistication | 30.7 | 71 |
| 5.1 | Knowledge workers | 24.1 | 97 |
| 5.1.1 | Knowledge-intensive employment, % | 24.0 | 58 |
| 5.1.2 | Firms offering formal training, % firms [Ⓓ] | 11.0 | 90 ○ |
| 5.1.3 | GERD performed by business, % of GDP [Ⓓ] | 0.0 | 83 ○ |
| 5.1.4 | GERD financed by business, % [Ⓓ] | 18.9 | 64 |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓓ] | 16.6 | 33 |
| 5.2 | Innovation linkages | 30.6 | 64 |
| 5.2.1 | University/industry research collaboration [†] | 50.6 | 40 |
| 5.2.2 | State of cluster development [†] | 50.6 | 40 |
| 5.2.3 | GERD financed by abroad, % [Ⓓ] | 20.7 | 19 ● |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 52 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 60 |
| 5.3 | Knowledge absorption | 37.3 | 30 ● |
| 5.3.1 | Intellectual property payments, % total trade | 0.4 | 68 |
| 5.3.2 | High-tech imports less re-imports, % total trade [Ⓓ] | 20.1 | 5 ● |
| 5.3.3 | ICT services imports, % total trade | 0.3 | 113 ○ |
| 5.3.4 | FDI net inflows, % GDP | 11.3 | 6 ● |
| 5.3.5 | Research talent, % in business enterprise [Ⓓ] | 0.9 | 77 ○ |

| | | | |
|----------|---|-------------|-----------|
| 6 | Knowledge & technology outputs | 24.2 | 64 |
| 6.1 | Knowledge creation | 3.8 | 101 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.2 | 96 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 50 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 0.1 | 57 ○ |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 4.8 | 96 |
| 6.1.5 | Citable documents H index | 128.0 | 60 |
| 6.2 | Knowledge impact | 33.2 | 78 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓓ] | 14.1 | 6 ● |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 63 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 1.9 | 89 |
| 6.2.5 | High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 | Knowledge diffusion | 35.5 | 36 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 66 |
| 6.3.2 | High-tech exports less re-exports, % total trade [Ⓓ] | 18.3 | 7 ● |
| 6.3.3 | ICT services exports, % total trade | 1.4 | 70 |
| 6.3.4 | FDI net outflows, % GDP | 1.9 | 34 |

| | | | |
|----------|--|-------------|-----------|
| 7 | Creative outputs | 29.2 | 63 |
| 7.1 | Intangible assets | 46.7 | 51 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 64.5 | 31 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.2 | 101 ○ |
| 7.1.3 | ICTs & business model creation [†] | 67.4 | 33 |
| 7.1.4 | ICTs & organizational model creation [†] | 60.2 | 37 |
| 7.2 | Creative goods & services | 3.0 | 113 |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.1 | 44 |
| 7.2.2 | National feature films/mn pop. 15–69 [Ⓓ] | 0.4 | 91 ○ |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 110 |
| 7.3 | Online creativity | 20.3 | 42 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 49.0 | 16 ● |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 1.5 | 76 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,416.5 | 67 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Paraguay

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 6.6 |
| GDP (US\$ billions) | 28.1 |
| GDP per capita, PPP\$ | 8,707.8 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 28.2 | 94 |
| Innovation Output Sub-Index | 21.6 | 88 |
| Innovation Input Sub-Index | 34.7 | 95 |
| Innovation Efficiency Ratio | 0.6 | 77 |
| Global Innovation Index 2015 (out of 141) | 30.7 | 88 |

| | | |
|---|-------------|------------|
| 1 Institutions | 47.9 | 104 |
| 1.1 Political environment | 35.6 | 99 |
| 1.1.1 Political stability & safety* | 57.9 | 79 |
| 1.1.2 Government effectiveness* | 13.4 | 120 ○ |
| 1.2 Regulatory environment | 45.8 | 112 |
| 1.2.1 Regulatory quality* | 37.9 | 86 |
| 1.2.2 Rule of law* | 30.1 | 102 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 29.4 | 113 |
| 1.3 Business environment | 62.4 | 87 |
| 1.3.1 Ease of starting a business* | 77.5 | 102 |
| 1.3.2 Ease of resolving insolvency* | 40.2 | 90 |
| 1.3.3 Ease of paying taxes* | 69.5 | 82 |
| 2 Human capital & research | 24.4 | 87 |
| 2.1 Education | 41.1 | 84 |
| 2.1.1 Expenditure on education, % GDP | 5.0 | 51 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 17.4 | 69 |
| 2.1.3 School life expectancy, years ^② | 12.3 | 85 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 18.4 | 79 |
| 2.2 Tertiary education | 31.3 | 78 |
| 2.2.1 Tertiary enrolment, % gross ^② | 35.1 | 72 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 0.7 | 107 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 169.5 | 72 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 104 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 34.1 | 95 |
| 3.1 Information & communication technologies (ICTs) | 27.5 | 104 |
| 3.1.1 ICT access* | 44.4 | 88 |
| 3.1.2 ICT use* | 17.1 | 98 |
| 3.1.3 Government's online service* | 22.8 | 110 |
| 3.1.4 E-participation* | 25.5 | 104 |
| 3.2 General infrastructure | 32.6 | 70 |
| 3.2.1 Electricity output, kWh/cap. | 8,879.6 | 17 ● |
| 3.2.2 Logistics performance* | 2.8 | 75 |
| 3.2.3 Gross capital formation, % GDP | 16.8 | 108 |
| 3.3 Ecological sustainability | 42.2 | 64 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 9.6 | 37 ● |
| 3.3.2 Environmental performance* | 70.4 | 75 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 107 |
| 4 Market sophistication | 42.3 | 71 |
| 4.1 Credit | 44.4 | 35 ● |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 49.9 | 66 |
| 4.1.3 Microfinance gross loans, % GDP | 5.3 | 8 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 27.8 | 102 |
| 4.2.1 Ease of protecting minority investors* | 41.7 | 109 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.2 | 73 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|-------------|-----------|
| 4.3 Trade, competition, & market scale | 54.8 | 86 |
| 4.3.1 Applied tariff rate, weighted mean, % | 4.4 | 80 |
| 4.3.2 Intensity of local competition [†] | 65.9 | 77 |
| 4.3.3 Domestic market scale, bn PPP\$ | 58.5 | 91 |

5 Business sophistication

| | | |
|---|-------------|-----------|
| 5.1 Knowledge workers | 32.8 | 82 |
| 5.1.1 Knowledge-intensive employment, % | 18.1 | 76 |
| 5.1.2 Firms offering formal training, % firms ^② | 54.9 | 18 ● |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 86 ○ |
| 5.1.4 GERD financed by business, % ^② | 0.8 | 86 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 12.4 | 52 |

| | | |
|---|-------------|------------|
| 5.2 Innovation linkages | 18.0 | 116 |
| 5.2.1 University/industry research collaboration [†] | 28.3 | 113 |
| 5.2.2 State of cluster development [†] | 29.6 | 120 ○ |
| 5.2.3 GERD financed by abroad, % ^② | 7.7 | 51 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.0 | 95 |

| | | |
|--|-------------|-----------|
| 5.3 Knowledge absorption | 24.2 | 90 |
| 5.3.1 Intellectual property payments, % total trade | 0.1 | 89 |
| 5.3.2 High-tech imports less re-imports, % total trade | 13.9 | 15 ● |
| 5.3.3 ICT services imports, % total trade | 0.0 | 123 ○ |
| 5.3.4 FDI net inflows, % GDP | 1.7 | 84 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs

| | | |
|--|------------|--------------|
| 6.1 Knowledge creation | 2.4 | 120 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP ^② | 0.4 | 80 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.7 | 120 ○ |
| 6.1.5 Citable documents H index | 54.0 | 112 |

| | | |
|---|-------------|------------|
| 6.2 Knowledge impact | 15.1 | 114 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 4.6 | 65 ● |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 15.0 | 65 |

| | | |
|--|-------------|------------|
| 6.3 Knowledge diffusion | 18.0 | 109 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.5 | 79 |
| 6.3.3 ICT services exports, % total trade | 0.1 | 118 ○ |
| 6.3.4 FDI net outflows, % GDP ^② | (0.1) | 103 |

7 Creative outputs

| | | |
|--|-------------|-------------|
| 7.1 Intangible assets | 55.6 | 22 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP ^② | 296.3 | 1 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP ^② | 2.7 | 44 ● |
| 7.1.3 ICTs & business model creation [†] | 50.0 | 96 |
| 7.1.4 ICTs & organizational model creation [†] | 37.4 | 116 ○ |

| | | |
|--|-------------|-----------|
| 7.2 Creative goods & services | 11.4 | 89 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 75 |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 1.3 | 66 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.3 | 43 ● |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 89 |

| | | |
|--|------------|-----------|
| 7.3 Online creativity | 3.3 | 88 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.8 | 85 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.5 | 73 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 872.4 | 79 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 31.4 |
| GDP (US\$ billions) | 192.1 |
| GDP per capita, PPP\$ | 12,194.7 |
| Income group | Upper-middle income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 32.5 | 71 |
| Innovation Output Sub-Index | 21.8 | 87 |
| Innovation Input Sub-Index | 43.2 | 56 |
| Innovation Efficiency Ratio | 0.5 | 109 ○ |
| Global Innovation Index 2015 (out of 141) | 34.9 | 71 |

| | | |
|---|-------------|-------------|
| 1 Institutions | 60.4 | 66 |
| 1.1 Political environment | 40.6 | 91 |
| 1.1.1 Political stability & safety* | 49.9 | 91 |
| 1.1.2 Government effectiveness* | 31.4 | 84 |
| 1.2 Regulatory environment | 69.3 | 53 |
| 1.2.1 Regulatory quality* | 57.7 | 50 |
| 1.2.2 Rule of law* | 33.3 | 95 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 11.4 | 41 ● |
| 1.3 Business environment | 71.3 | 61 |
| 1.3.1 Ease of starting a business* | 85.0 | 74 |
| 1.3.2 Ease of resolving insolvency* | 47.6 | 67 |
| 1.3.3 Ease of paying taxes* | 81.2 | 44 |
| 2 Human capital & research | 27.5 | 81 |
| 2.1 Education | 35.7 | 97 |
| 2.1.1 Expenditure on education, % GDP | 3.7 | 87 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 12.9 | 91 ○ |
| 2.1.3 School life expectancy, years [Ⓐ] | 13.4 | 67 |
| 2.1.4 PISA scales in reading, maths, & science | 375.1 | 61 ○ |
| 2.1.5 Pupil-teacher ratio, secondary | 14.2 | 57 |
| 2.2 Tertiary education | 36.3 | 60 |
| 2.2.1 Tertiary enrolment, % gross [Ⓐ] | 40.5 | 62 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 10.5 | 57 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 21.1 | 52 |
| 3 Infrastructure | 45.0 | 57 |
| 3.1 Information & communication technologies (ICTs) | 50.4 | 64 |
| 3.1.1 ICT access* | 46.8 | 83 |
| 3.1.2 ICT use* | 21.1 | 93 |
| 3.1.3 Government's online service* | 63.0 | 41 ● |
| 3.1.4 E-participation* | 70.6 | 24 ● |
| 3.2 General infrastructure | 31.8 | 75 |
| 3.2.1 Electricity output, kWh/cap | 1,427.6 | 85 |
| 3.2.2 Logistics performance* | 2.8 | 68 |
| 3.2.3 Gross capital formation, % GDP | 25.4 | 40 ● |
| 3.3 Ecological sustainability | 53.0 | 28 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 14.3 | 6 ● |
| 3.3.2 Environmental performance* | 73.0 | 67 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.9 | 64 |
| 4 Market sophistication | 50.0 | 35 ● |
| 4.1 Credit | 51.0 | 23 ● |
| 4.1.1 Ease of getting credit* | 80.0 | 14 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 34.0 | 87 |
| 4.1.3 Microfinance gross loans, % GDP | 5.0 | 9 ● |

| | | |
|--|-------------|--------------|
| 4.2 Investment | 29.1 | 96 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 38.9 | 41 |
| 4.2.3 Total value of stocks traded, % GDP | 1.8 | 51 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 52 |
| 4.3 Trade, competition, & market scale | 70.1 | 34 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.5 | 44 |
| 4.3.2 Intensity of local competition [†] | 69.5 | 56 |
| 4.3.3 Domestic market scale, bn PPP\$ | 372.7 | 45 |
| 5 Business sophistication | 32.9 | 54 |
| 5.1 Knowledge workers | 47.4 | 36 ● |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 15.0 | 86 |
| 5.1.2 Firms offering formal training, % firms [Ⓐ] | 60.1 | 11 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 13.9 | 44 |
| 5.2 Innovation linkages | 22.4 | 97 |
| 5.2.1 University/industry research collaboration [†] | 35.0 | 99 |
| 5.2.2 State of cluster development [†] | 36.5 | 95 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 61 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 98 ○ |
| 5.3 Knowledge absorption | 29.0 | 62 |
| 5.3.1 Intellectual property payments, % total trade [Ⓐ] | 0.4 | 60 |
| 5.3.2 High-tech imports less re-imports, % total trade | 10.2 | 30 ● |
| 5.3.3 ICT services imports, % total trade [Ⓐ] | 1.0 | 61 |
| 5.3.4 FDI net inflows, % GDP | 3.9 | 42 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |
| 6 Knowledge & technology outputs | 16.4 | 109 ○ |
| 6.1 Knowledge creation | 5.9 | 89 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.2 | 93 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 68 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.5 | 33 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 2.6 | 113 ○ |
| 6.1.5 Citable documents H index | 140.0 | 56 |
| 6.2 Knowledge impact | 27.9 | 103 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.3 | 56 |
| 6.2.2 New businesses/th pop. 15–64 | 2.4 | 42 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 54 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.9 | 78 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 9.2 | 80 ○ |
| 6.3 Knowledge diffusion | 15.5 | 118 ○ |
| 6.3.1 Intellectual property receipts, % total trade [Ⓐ] | 0.0 | 81 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.4 | 80 |
| 6.3.3 ICT services exports, % total trade [Ⓐ] | 0.3 | 105 ○ |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | 0.1 | 83 |
| 7 Creative outputs | 27.2 | 73 |
| 7.1 Intangible assets | 38.2 | 84 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 49.5 | 48 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 91 ○ |
| 7.1.3 ICTs & business model creation [†] | 57.9 | 65 |
| 7.1.4 ICTs & organizational model creation [†] | 47.9 | 81 |
| 7.2 Creative goods & services | 22.5 | 66 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 51 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.6 | 88 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 4.8 | 45 |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 2.7 | 11 ● |
| 7.2.5 Creative goods exports, % total trade | 0.4 | 63 |
| 7.3 Online creativity | 10.2 | 60 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 5.6 | 54 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.5 | 75 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,929.6 | 53 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 19.3 | 54 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Philippines

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 100.7 |
| GDP (US\$ billions) | 292.0 |
| GDP per capita, PPP\$ | 7,254.2 |
| Income group | Lower-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 31.8 | 74 |
| Innovation Output Sub-Index | 26.4 | 64 |
| Innovation Input Sub-Index | 37.2 | 86 |
| Innovation Efficiency Ratio | 0.7 | 49 |
| Global Innovation Index 2015 (out of 141) | 31.1 | 83 |

1 Institutions 53.4 88

| | | |
|--|------|-------|
| 1.1 Political environment | 44.9 | 79 |
| 1.1.1 Political stability & safety* | 45.4 | 97 |
| 1.1.2 Government effectiveness* | 44.4 | 58 |
| 1.2 Regulatory environment | 51.6 | 105 |
| 1.2.1 Regulatory quality* | 44.4 | 72 |
| 1.2.2 Rule of law* | 38.9 | 79 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.4 | 110 |
| 1.3 Business environment | 63.9 | 83 |
| 1.3.1 Ease of starting a business* | 68.6 | 118 ○ |
| 1.3.2 Ease of resolving insolvency* | 56.8 | 50 |
| 1.3.3 Ease of paying taxes* | 66.2 | 90 |

2 Human capital & research 22.7 95

| | | |
|--|-------|-------|
| 2.1 Education | 27.0 | 115 ○ |
| 2.1.1 Expenditure on education, % GDP ^② | 2.7 | 105 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 9.1 | 102 ○ |
| 2.1.3 School life expectancy, years | 12.7 | 81 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 27.0 | 98 |
| 2.2 Tertiary education | 32.9 | 74 |
| 2.2.1 Tertiary enrolment, % gross | 35.8 | 71 |
| 2.2.2 Graduates in science & engineering, % | 25.5 | 26 ● |
| 2.2.3 Tertiary inbound mobility, % ^② | 0.1 | 101 ○ |
| 2.3 Research & development (R&D) | 8.1 | 65 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 221.3 | 69 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 97 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 27.6 | 47 |

3 Infrastructure 41.4 72

| | | |
|---|-------|------|
| 3.1 Information & communication technologies (ICTs) | 46.1 | 76 |
| 3.1.1 ICT access* | 43.9 | 90 |
| 3.1.2 ICT use* | 35.5 | 68 |
| 3.1.3 Government's online service* | 48.0 | 66 |
| 3.1.4 E-participation* | 56.9 | 51 |
| 3.2 General infrastructure | 28.7 | 87 |
| 3.2.1 Electricity output, kWh/cap. | 765.0 | 96 |
| 3.2.2 Logistics performance* | 3.0 | 55 |
| 3.2.3 Gross capital formation, % GDP | 20.7 | 76 |
| 3.3 Ecological sustainability | 49.5 | 42 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 12.5 | 14 ● |
| 3.3.2 Environmental performance* | 73.7 | 62 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.6 | 75 |

4 Market sophistication 38.3 94

| | | |
|--|------|-----|
| 4.1 Credit | 19.0 | 108 |
| 4.1.1 Ease of getting credit* | 40.0 | 92 |
| 4.1.2 Domestic credit to private sector, % GDP | 39.2 | 79 |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 50 |

| | | |
|--|------|-------|
| 4.2 Investment | 26.8 | 106 |
| 4.2.1 Ease of protecting minority investors* | 38.3 | 115 ○ |
| 4.2.2 Market capitalization, % GDP | 91.9 | 15 ● |
| 4.2.3 Total value of stocks traded, % GDP | 14.8 | 29 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 75 ○ |

| | | |
|--|-------|------|
| 4.3 Trade, competition, & market scale | 69.1 | 38 ● |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 4.4 | 79 |
| 4.3.2 Intensity of local competition [†] | 70.4 | 54 |
| 4.3.3 Domestic market scale, bn PPP\$ | 693.4 | 29 ● |

5 Business sophistication 30.3 74

| | | |
|--|------|----|
| 5.1 Knowledge workers | 33.4 | 81 |
| 5.1.1 Knowledge-intensive employment, % | 23.5 | 60 |
| 5.1.2 Firms offering formal training, % firms ^② | 31.1 | 55 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 69 |
| 5.1.4 GERD financed by business, % ^② | 36.9 | 42 |
| 5.1.5 Females employed w/advanced degrees, % total | 12.7 | 50 |

| | | |
|---|------|----|
| 5.2 Innovation linkages | 23.7 | 89 |
| 5.2.1 University/industry research collaboration [†] | 46.6 | 54 |
| 5.2.2 State of cluster development [†] | 49.6 | 44 |
| 5.2.3 GERD financed by abroad, % ^② | 1.8 | 80 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 35 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 91 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 33.8 | 41 ● |
| 5.3.1 Intellectual property payments, % total trade | 0.7 | 43 |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 0.8 | 72 |
| 5.3.4 FDI net inflows, % GDP | 2.2 | 74 |
| 5.3.5 Research talent, % in business enterprise ^② | 54.1 | 18 ● |

6 Knowledge & technology outputs 30.8 44

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 10.6 | 61 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.5 | 77 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 82 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.3 | 21 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.5 | 123 ○ |
| 6.1.5 Citable documents H index | 147.0 | 55 |

| | | |
|---|------|------|
| 6.2 Knowledge impact | 44.3 | 31 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 6.2 | 2 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.3 | 93 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 53 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 2.3 | 83 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 44.0 | 12 ● |

| | | |
|--|------|------|
| 6.3 Knowledge diffusion | 37.4 | 31 ● |
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 84 |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 4.5 | 12 ● |
| 6.3.4 FDI net outflows, % GDP | 2.5 | 26 ● |

7 Creative outputs 22.1 96

| | | |
|---|------|----|
| 7.1 Intangible assets | 38.9 | 81 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 28.8 | 69 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.2 | 61 |
| 7.1.3 ICTs & business model creation [†] | 60.3 | 57 |
| 7.1.4 ICTs & organizational model creation [†] | 57.1 | 46 |

| | | |
|--|-----|------|
| 7.2 Creative goods & services | 5.5 | 107 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 52 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.8 | 79 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 1.8 | 51 |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.5 | 86 ○ |
| 7.2.5 Creative goods exports, % total trade | n/a | n/a |

| | | |
|--|---------|----|
| 7.3 Online creativity | 5.0 | 75 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.2 | 92 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.4 | 96 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,298.3 | 68 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 8.8 | 61 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 38.6 |
| GDP (US\$ billions) | 474.9 |
| GDP per capita, PPP\$ | 26,455.3 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 40.2 | 39 |
| Innovation Output Sub-Index | 31.7 | 46 |
| Innovation Input Sub-Index | 48.7 | 39 |
| Innovation Efficiency Ratio | 0.7 | 66 |
| Global Innovation Index 2015 (out of 141) | 40.2 | 46 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 75.3 | 32 |
| 1.1 Political environment | 73.2 | 33 |
| 1.1.1 Political stability & safety* | 84.4 | 26 ● |
| 1.1.2 Government effectiveness* | 62.0 | 39 |
| 1.2 Regulatory environment | 74.0 | 41 |
| 1.2.1 Regulatory quality* | 71.0 | 30 |
| 1.2.2 Rule of law* | 67.5 | 36 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 18.8 | 79 |
| 1.3 Business environment | 78.7 | 34 |
| 1.3.1 Ease of starting a business* | 85.9 | 66 |
| 1.3.2 Ease of resolving insolvency* | 70.4 | 30 |
| 1.3.3 Ease of paying taxes* | 79.6 | 49 |
| 2 Human capital & research | 39.6 | 42 |
| 2.1 Education | 57.1 | 34 |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 4.9 | 55 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 23.5 | 38 |
| 2.1.3 School life expectancy, years | 16.4 | 25 |
| 2.1.4 PISA scales in reading, maths, & science | 520.5 | 9 ● |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 9.5 | 21 ● |
| 2.2 Tertiary education | 34.0 | 68 |
| 2.2.1 Tertiary enrolment, % gross | 71.2 | 25 |
| 2.2.2 Graduates in science & engineering, % | 17.4 | 71 ○ |
| 2.2.3 Tertiary inbound mobility, % | 1.5 | 74 ○ |
| 2.3 Research & development (R&D) | 27.7 | 39 |
| 2.3.1 Researchers, FTE/mn pop. | 2,037.2 | 35 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.9 | 36 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 18.6 | 44 |
| 2.3.4 QS university ranking, average score top 3* | 31.7 | 42 |
| 3 Infrastructure | 47.6 | 50 |
| 3.1 Information & communication technologies (ICTs) | 57.8 | 48 |
| 3.1.1 ICT access* | 71.5 | 45 |
| 3.1.2 ICT use* | 56.2 | 37 |
| 3.1.3 Government's online service* | 54.3 | 57 |
| 3.1.4 E-participation* | 49.0 | 64 |
| 3.2 General infrastructure | 38.7 | 53 |
| 3.2.1 Electricity output, kWh/cap. | 4,117.9 | 50 |
| 3.2.2 Logistics performance* | 3.5 | 30 |
| 3.2.3 Gross capital formation, % GDP | 20.1 | 84 ○ |
| 3.3 Ecological sustainability | 46.3 | 49 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 7.8 | 57 |
| 3.3.2 Environmental performance* | 81.3 | 38 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.3 | 41 |
| 4 Market sophistication | 46.5 | 48 |
| 4.1 Credit | 32.0 | 70 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 52.2 | 61 |
| 4.1.3 Microfinance gross loans, % GDP | 0.1 | 58 ○ |

| | | |
|---|-------------|-----------|
| 4.2 Investment | 31.3 | 89 ○ |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 31.0 | 49 |
| 4.2.3 Total value of stocks traded, % GDP | 10.7 | 33 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 37 |
| 4.3 Trade, competition, & market scale | 76.2 | 15 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 71.5 | 47 |
| 4.3.3 Domestic market scale, bn PPP\$ | 959.8 | 22 ● |
| 5 Business sophistication | 34.6 | 51 |
| 5.1 Knowledge workers | 45.5 | 41 |
| 5.1.1 Knowledge-intensive employment, % | 36.8 | 30 |
| 5.1.2 Firms offering formal training, % firms | 34.6 | 46 |
| 5.1.3 GERD performed by business, % of GDP | 0.4 | 38 |
| 5.1.4 GERD financed by business, % | 39.0 | 38 |
| 5.1.5 Females employed w/advanced degrees, % total | 19.0 | 26 |
| 5.2 Innovation linkages | 25.5 | 82 |
| 5.2.1 University/industry research collaboration [†] | 41.7 | 71 |
| 5.2.2 State of cluster development [†] | 43.0 | 75 |
| 5.2.3 GERD financed by abroad, % | 13.4 | 32 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 62 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.5 | 32 |
| 5.3 Knowledge absorption | 32.7 | 43 |
| 5.3.1 Intellectual property payments, % total trade | 1.2 | 22 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.7 | 35 |
| 5.3.3 ICT services imports, % total trade | 1.2 | 55 |
| 5.3.4 FDI net inflows, % GDP | 3.2 | 57 |
| 5.3.5 Research talent, % in business enterprise | 31.8 | 40 |
| 6 Knowledge & technology outputs | 27.2 | 52 |
| 6.1 Knowledge creation | 24.0 | 38 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 4.6 | 25 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 37 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP [Ⓐ] | 1.1 | 24 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 24.9 | 34 |
| 6.1.5 Citable documents H index | 371.0 | 24 ● |
| 6.2 Knowledge impact | 35.4 | 68 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.7 | 44 |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 0.5 | 86 ○ |
| 6.2.3 Computer software spending, % GDP | 0.3 | 51 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 10.0 | 38 |
| 6.2.5 High- & medium-high-tech manufactures, % | 33.1 | 34 |
| 6.3 Knowledge diffusion | 22.2 | 79 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 46 |
| 6.3.2 High-tech exports less re-exports, % total trade | 6.6 | 27 |
| 6.3.3 ICT services exports, % total trade | 1.6 | 61 |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | (0.6) | 110 ○ |
| 7 Creative outputs | 36.3 | 42 |
| 7.1 Intangible assets | 43.5 | 59 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 47.5 | 50 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 53.9 | 81 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 50.7 | 73 |
| 7.2 Creative goods & services | 34.1 | 32 |
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓐ] | 1.0 | 9 ● |
| 7.2.2 National feature films/mn pop. 15–69 | 1.1 | 70 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 11.0 | 31 |
| 7.2.4 Printing & publishing manufactures, % | 1.1 | 61 ○ |
| 7.2.5 Creative goods exports, % total trade | 4.3 | 11 ● |
| 7.3 Online creativity | 23.8 | 36 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 7.5 | 45 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 33.1 | 21 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 2,614.2 | 46 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 35.3 | 32 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Portugal

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 10.3 |
| GDP (US\$ billions) | 199.1 |
| GDP per capita, PPP\$ | 27,834.8 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 46.4 | 30 |
| Innovation Output Sub-Index | 39.8 | 32 |
| Innovation Input Sub-Index | 53.1 | 30 |
| Innovation Efficiency Ratio | 0.8 | 31 |
| Global Innovation Index 2015 (out of 141) | 46.6 | 30 |

1 Institutions 79.1 27

| | | |
|--|------|------|
| 1.1 Political environment | 74.8 | 30 |
| 1.1.1 Political stability & safety* | 82.6 | 29 |
| 1.1.2 Government effectiveness* | 67.1 | 33 |
| 1.2 Regulatory environment | 75.9 | 35 |
| 1.2.1 Regulatory quality* | 63.8 | 38 |
| 1.2.2 Rule of law* | 75.3 | 26 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 17.0 | 72 |
| 1.3 Business environment | 86.5 | 15 ● |
| 1.3.1 Ease of starting a business* | 96.3 | 13 ● |
| 1.3.2 Ease of resolving insolvency* | 84.8 | 7 ● |
| 1.3.3 Ease of paying taxes* | 78.5 | 55 |

2 Human capital & research 48.7 27

| | | |
|--|---------|------|
| 2.1 Education | 60.3 | 24 |
| 2.1.1 Expenditure on education, % GDP ^② | 5.1 | 46 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 32.6 | 14 ● |
| 2.1.3 School life expectancy, years | 16.8 | 17 |
| 2.1.4 PISA scales in reading, maths, & science | 488.0 | 29 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 9.8 | 25 |
| 2.2 Tertiary education | 45.5 | 30 |
| 2.2.1 Tertiary enrolment, % gross | 66.2 | 30 |
| 2.2.2 Graduates in science & engineering, % | 26.1 | 22 |
| 2.2.3 Tertiary inbound mobility, % | 3.9 | 42 |
| 2.3 Research & development (R&D) | 40.3 | 28 |
| 2.3.1 Researchers, FTE/mn pop. | 3,699.9 | 24 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.3 | 27 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 73.1 | 33 |
| 2.3.4 QS university ranking, average score top 3* | 39.0 | 35 |

3 Infrastructure 52.7 34

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 64.4 | 41 |
| 3.1.1 ICT access* | 77.7 | 31 |
| 3.1.2 ICT use* | 51.4 | 47 |
| 3.1.3 Government's online service* | 63.8 | 39 |
| 3.1.4 E-participation* | 64.7 | 33 |
| 3.2 General infrastructure | 35.7 | 63 |
| 3.2.1 Electricity output, kWh/cap. | 5,009.0 | 40 |
| 3.2.2 Logistics performance* | 3.6 | 25 |
| 3.2.3 Gross capital formation, % GDP | 14.7 | 114 ○ |
| 3.3 Ecological sustainability | 58.0 | 18 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.6 | 24 |
| 3.3.2 Environmental performance* | 88.6 | 7 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 4.7 | 23 |

4 Market sophistication 50.2 34

| | | |
|--|-------|------|
| 4.1 Credit | 47.8 | 27 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 129.5 | 16 ● |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|------|
| 4.2 Investment | 33.0 | 82 ○ |
| 4.2.1 Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 Market capitalization, % GDP | 25.1 | 55 ○ |
| 4.2.3 Total value of stocks traded, % GDP | 20.5 | 26 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 31 |

4.3 Trade, competition, & market scale 69.8 35

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 71.0 | 52 |
| 4.3.3 Domestic market scale, bn PPP\$ | 281.4 | 52 |

5 Business sophistication 34.5 53

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 45.3 | 42 |
| 5.1.1 Knowledge-intensive employment, % | 34.8 | 38 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.6 | 31 |
| 5.1.4 GERD financed by business, % ^② | 42.3 | 33 |
| 5.1.5 Females employed w/advanced degrees, % total | 14.9 | 40 |

5.2 Innovation linkages 28.4 74 ○

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 61.4 | 22 |
| 5.2.2 State of cluster development [†] | 52.6 | 34 |
| 5.2.3 GERD financed by abroad, % ^② | 6.1 | 61 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 57 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.4 | 34 |

5.3 Knowledge absorption 29.9 56

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 0.6 | 46 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.6 | 35 ○ |
| 5.3.3 ICT services imports, % total trade | 1.4 | 37 |
| 5.3.4 FDI net inflows, % GDP | 5.4 | 27 |
| 5.3.5 Research talent, % in business enterprise | 27.4 | 48 ○ |

6 Knowledge & technology outputs 32.4 36

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 22.0 | 42 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 3.0 | 36 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.6 | 34 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.3 | 38 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 44.9 | 11 ● |
| 6.1.5 Citable documents H index | 297.0 | 31 |

6.2 Knowledge impact 45.5 29

| | | |
|--|-------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.5) | 98 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 4.6 | 26 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 10 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 28.5 | 9 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 26.2 | 47 |

6.3 Knowledge diffusion 29.7 42

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 48 |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.5 | 47 |
| 6.3.3 ICT services exports, % total trade | 1.5 | 67 |
| 6.3.4 FDI net outflows, % GDP | 3.9 | 13 ● |

7 Creative outputs 47.3 22

| | | |
|---|-------|------|
| 7.1 Intangible assets | 65.6 | 7 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 102.1 | 12 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 12.2 | 12 ● |
| 7.1.3 ICTs & business model creation [†] | 75.2 | 16 |
| 7.1.4 ICTs & organizational model creation [†] | 65.0 | 26 |

7.2 Creative goods & services 26.4 49

| | | |
|---|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.6 | 23 |
| 7.2.2 National feature films/mn pop. 15–69 | 1.7 | 59 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 29.1 | 23 |
| 7.2.4 Printing & publishing manufactures, % | 1.3 | 47 |
| 7.2.5 Creative goods exports, % total trade | 1.3 | 36 |

7.3 Online creativity 31.4 30

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 19.7 | 29 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 37.9 | 17 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,156.4 | 42 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 44.9 | 24 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 2.2 |
| GDP (US\$ billions) | 185.4 |
| GDP per capita, PPP\$ | 132,098.7 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 37.5 | 50 |
| Innovation Output Sub-Index | 26.9 | 58 |
| Innovation Input Sub-Index | 48.1 | 41 |
| Innovation Efficiency Ratio | 0.6 | 97 |
| Global Innovation Index 2015 (out of 141) | 39.0 | 50 |

| | | | |
|----------|--|-------------|-------------|
| 1 | Institutions | 75.0 | 34 |
| 1.1 | Political environment | 77.2 | 24 |
| 1.1.1 | Political stability & safety* | 87.7 | 20 |
| 1.1.2 | Government effectiveness* | 66.6 | 36 |
| 1.2 | Regulatory environment | 67.5 | 62 |
| 1.2.1 | Regulatory quality* | 58.8 | 47 |
| 1.2.2 | Rule of law* | 71.7 | 29 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 23.2 | 99 |
| 1.3 | Business environment | 80.4 | 30 |
| 1.3.1 | Ease of starting a business* | 83.2 | 82 |
| 1.3.2 | Ease of resolving insolvency* | 58.4 | 48 |
| 1.3.3 | Ease of paying taxes* | 99.4 | 1 ● |
| 2 | Human capital & research | 32.6 | 59 |
| 2.1 | Education | 35.6 | 98 |
| 2.1.1 | Expenditure on education, % GDP | 3.5 | 91 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 10.3 | 98 ○ |
| 2.1.3 | School life expectancy, years [Ⓐ] | 13.1 | 73 |
| 2.1.4 | PISA scales in reading, maths, & science | 382.5 | 60 ○ |
| 2.1.5 | Pupil-teacher ratio, secondary | 10.2 | 29 |
| 2.2 | Tertiary education | 55.5 | 13 ● |
| 2.2.1 | Tertiary enrolment, % gross | 15.8 | 97 |
| 2.2.2 | Graduates in science & engineering, % | 27.6 | 16 |
| 2.2.3 | Tertiary inbound mobility, % | 39.9 | 1 ● |
| 2.3 | Research & development (R&D) | 6.8 | 71 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓐ] | 597.1 | 57 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓐ] | 0.5 | 63 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 9.9 | 61 |
| 3 | Infrastructure | 60.5 | 16 ● |
| 3.1 | Information & communication technologies (ICTs) | 69.2 | 30 |
| 3.1.1 | ICT access* | 81.3 | 20 |
| 3.1.2 | ICT use* | 69.3 | 22 |
| 3.1.3 | Government's online service* | 65.4 | 37 |
| 3.1.4 | E-participation* | 60.8 | 45 |
| 3.2 | General infrastructure | 75.4 | 1 ● |
| 3.2.1 | Electricity output, kWh/cap. | 15,976.0 | 6 ● |
| 3.2.2 | Logistics performance* | 3.5 | 28 |
| 3.2.3 | Gross capital formation, % GDP | n/a | n/a |
| 3.3 | Ecological sustainability | 36.9 | 89 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 6.5 | 83 |
| 3.3.2 | Environmental performance* | 69.9 | 78 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.7 | 73 |
| 4 | Market sophistication | 42.8 | 68 |
| 4.1 | Credit | 23.3 | 96 |
| 4.1.1 | Ease of getting credit* | 30.0 | 106 ○ |
| 4.1.2 | Domestic credit to private sector, % GDP | 45.2 | 71 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|-------|---|-------|-----|
| 4.2 | Investment | 38.4 | 58 |
| 4.2.1 | Ease of protecting minority investors* | 45.0 | 97 |
| 4.2.2 | Market capitalization, % GDP | 88.5 | 19 |
| 4.2.3 | Total value of stocks traded, % GDP | 26.0 | 24 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 | Trade, competition, & market scale | 66.6 | 47 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 4.1 | 73 |
| 4.3.2 | Intensity of local competition [†] | 75.8 | 24 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 306.6 | 49 |

| | | | |
|----------|---|-------------|-----------|
| 5 | Business sophistication | 29.3 | 78 |
| 5.1 | Knowledge workers | 21.0 | 110 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓐ] | 18.2 | 75 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP [Ⓐ] | 0.1 | 59 |
| 5.1.4 | GERD financed by business, % [Ⓐ] | 24.2 | 60 |
| 5.1.5 | Females employed w/advanced degrees, % total [Ⓐ] | 4.5 | 78 |
| 5.2 | Innovation linkages | 40.1 | 32 |
| 5.2.1 | University/industry research collaboration [†] | 74.0 | 8 ● |
| 5.2.2 | State of cluster development [†] | 71.4 | 8 ● |
| 5.2.3 | GERD financed by abroad, % [Ⓐ] | 2.4 | 77 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 8 ● |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 54 |
| 5.3 | Knowledge absorption | 26.9 | 73 |
| 5.3.1 | Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 | High-tech imports less re-imports, % total trade | 2.7 | 118 ○ |
| 5.3.3 | ICT services imports, % total trade | 2.6 | 10 ● |
| 5.3.4 | FDI net inflows, % GDP | 0.5 | 114 ○ |
| 5.3.5 | Research talent, % in business enterprise [Ⓐ] | 28.0 | 46 |
| 6 | Knowledge & technology outputs | 20.0 | 88 |
| 6.1 | Knowledge creation | 3.1 | 108 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.0 | 116 ○ |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 73 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 5.1 | 94 |
| 6.1.5 | Citable documents H index | 70.0 | 99 |
| 6.2 | Knowledge impact | 28.5 | 95 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.9 | 67 |
| 6.2.2 | New businesses/th pop. 15–64 | 1.7 | 51 |
| 6.2.3 | Computer software spending, % GDP | 0.2 | 61 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 2.1 | 86 |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓐ] | 20.8 | 56 |
| 6.3 | Knowledge diffusion | 28.3 | 44 |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade | 0.0 | 121 ○ |
| 6.3.3 | ICT services exports, % total trade | 0.4 | 102 |
| 6.3.4 | FDI net outflows, % GDP | 3.2 | 16 ● |
| 7 | Creative outputs | 33.8 | 49 |
| 7.1 | Intangible assets | 52.9 | 25 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 4.6 | 105 ○ |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 | ICTs & business model creation [†] | 80.1 | 3 ● |
| 7.1.4 | ICTs & organizational model creation [†] | 76.6 | 7 ● |
| 7.2 | Creative goods & services | 16.8 | 77 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 34.8 | 21 |
| 7.2.4 | Printing & publishing manufactures, % [Ⓐ] | 1.2 | 56 |
| 7.2.5 | Creative goods exports, % total trade | 0.0 | 124 ○ |
| 7.3 | Online creativity | 12.6 | 54 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 4.7 | 56 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 4.0 | 57 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 2,058.2 | 52 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 26.6 | 46 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Romania

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 19.5 |
| GDP (US\$ billions) | 177.3 |
| GDP per capita, PPP\$ | 20,786.9 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 37.9 | 48 |
| Innovation Output Sub-Index | 31.8 | 45 |
| Innovation Input Sub-Index | 44.0 | 52 |
| Innovation Efficiency Ratio | 0.7 | 46 |
| Global Innovation Index 2015 (out of 141) | 38.2 | 54 |

1 Institutions 69.0 48

| | | |
|--|------|------|
| 1.1 Political environment | 51.9 | 60 |
| 1.1.1 Political stability & safety* | 64.8 | 61 |
| 1.1.2 Government effectiveness* | 39.0 | 68 |
| 1.2 Regulatory environment | 77.6 | 33 ● |
| 1.2.1 Regulatory quality* | 59.5 | 45 |
| 1.2.2 Rule of law* | 50.8 | 54 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 77.5 | 40 |
| 1.3.1 Ease of starting a business* | 91.9 | 39 |
| 1.3.2 Ease of resolving insolvency* | 59.8 | 43 |
| 1.3.3 Ease of paying taxes* | 80.7 | 48 |

2 Human capital & research 30.2 73

| | | |
|---|-------|-------|
| 2.1 Education | 40.5 | 85 |
| 2.1.1 Expenditure on education, % GDP | 3.0 | 100 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 12.6 | 92 ○ |
| 2.1.3 School life expectancy, years ^② | 15.3 | 39 |
| 2.1.4 PISA scales in reading, maths, & science | 440.3 | 43 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 12.8 | 47 |
| 2.2 Tertiary education | 41.1 | 40 |
| 2.2.1 Tertiary enrolment, % gross | 52.2 | 51 |
| 2.2.2 Graduates in science & engineering, % | 25.5 | 28 |
| 2.2.3 Tertiary inbound mobility, % | 3.5 | 50 |
| 2.3 Research & development (R&D) | 8.9 | 61 |
| 2.3.1 Researchers, FTE/mn pop. | 921.5 | 47 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.4 | 67 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 16.4 | 57 |

3 Infrastructure 48.9 44

| | | |
|---|---------|-----|
| 3.1 Information & communication technologies (ICTs) | 50.7 | 62 |
| 3.1.1 ICT access* | 66.9 | 54 |
| 3.1.2 ICT use* | 44.8 | 59 |
| 3.1.3 Government's online service* | 44.1 | 73 |
| 3.1.4 E-participation* | 47.1 | 70 |
| 3.2 General infrastructure | 32.2 | 73 |
| 3.2.1 Electricity output, kWh/cap | 2,929.7 | 63 |
| 3.2.2 Logistics performance* | n/a | n/a |
| 3.2.3 Gross capital formation, % GDP | 24.2 | 47 |
| 3.3 Ecological sustainability | 63.7 | 7 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.8 | 57 |
| 3.3.2 Environmental performance* | 83.2 | 34 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 23.6 | 1 ● |

4 Market sophistication 41.8 77

| | | |
|--|------|------|
| 4.1 Credit | 32.2 | 68 |
| 4.1.1 Ease of getting credit* | 85.0 | 7 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 31.2 | 92 |
| 4.1.3 Microfinance gross loans, % GDP | 0.1 | 65 ○ |

| | | |
|--|------|-------|
| 4.2 Investment | 24.7 | 112 ○ |
| 4.2.1 Ease of protecting minority investors* | 58.3 | 55 |
| 4.2.2 Market capitalization, % GDP | 11.2 | 77 ○ |
| 4.2.3 Total value of stocks traded, % GDP ^② | 1.2 | 53 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 81 ○ |

| | | |
|---|-------|-------|
| 4.3 Trade, competition, & market scale | 68.4 | 41 |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 58.6 | 106 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 393.8 | 44 |

5 Business sophistication 30.2 75

| | | |
|--|------|----|
| 5.1 Knowledge workers | 34.4 | 76 |
| 5.1.1 Knowledge-intensive employment, % | 21.5 | 65 |
| 5.1.2 Firms offering formal training, % firms | 40.7 | 37 |
| 5.1.3 GERD performed by business, % of GDP | 0.2 | 56 |
| 5.1.4 GERD financed by business, % | 32.9 | 45 |
| 5.1.5 Females employed w/advanced degrees, % total | 9.6 | 64 |

| | | |
|---|------|------|
| 5.2 Innovation linkages | 25.7 | 81 |
| 5.2.1 University/industry research collaboration [†] | 43.2 | 69 |
| 5.2.2 State of cluster development [†] | 44.1 | 69 |
| 5.2.3 GERD financed by abroad, % | 17.0 | 27 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 68 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 55 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 30.3 | 54 |
| 5.3.1 Intellectual property payments, % total trade | 1.1 | 23 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 1.6 | 32 ● |
| 5.3.4 FDI net inflows, % GDP | 1.9 | 80 |
| 5.3.5 Research talent, % in business enterprise | 29.0 | 45 |

6 Knowledge & technology outputs 31.0 42

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 9.9 | 64 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.5 | 42 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 62 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 50 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 17.6 | 42 |
| 6.1.5 Citable documents H index | 167.0 | 46 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 53.3 | 12 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.9 | 40 |
| 6.2.2 New businesses/th pop. 15–64 | 4.1 | 31 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 41 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 48.2 | 1 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 34.9 | 30 |

| | | |
|--|------|------|
| 6.3 Knowledge diffusion | 29.8 | 41 |
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 36 |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 3.7 | 18 ● |
| 6.3.4 FDI net outflows, % GDP | 0.0 | 87 ○ |

7 Creative outputs 32.6 53

| | | |
|---|------|----|
| 7.1 Intangible assets | 41.7 | 70 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 58.0 | 34 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 3.0 | 39 |
| 7.1.3 ICTs & business model creation [†] | 54.2 | 79 |
| 7.1.4 ICTs & organizational model creation [†] | 51.8 | 70 |

| | | |
|---|------|-----|
| 7.2 Creative goods & services | 30.0 | 43 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 1.4 | 4 ● |
| 7.2.2 National feature films/mn pop. 15–69 | 2.6 | 51 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 4.8 | 43 |
| 7.2.4 Printing & publishing manufactures, % | 1.1 | 58 |
| 7.2.5 Creative goods exports, % total trade | 1.4 | 35 |

| | | |
|--|-------|------|
| 7.3 Online creativity | 17.0 | 47 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 5.0 | 55 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 20.6 | 30 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 934.5 | 75 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 35.6 | 31 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 143.5 |
| GDP (US\$ billions) | 1,324.7 |
| GDP per capita, PPP\$ | 25,410.9 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 38.5 | 43 |
| Innovation Output Sub-Index | 30.3 | 47 |
| Innovation Input Sub-Index | 46.7 | 44 |
| Innovation Efficiency Ratio | 0.6 | 69 |
| Global Innovation Index 2015 (out of 141) | 39.3 | 48 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 57.9 | 73 |
| 1.1 | Political environment | 39.4 | 93 |
| 1.1.1 | Political stability & safety* | 42.0 | 103 ○ |
| 1.1.2 | Government effectiveness* | 36.9 | 74 |
| 1.2 | Regulatory environment | 56.8 | 92 |
| 1.2.1 | Regulatory quality* | 34.7 | 97 ○ |
| 1.2.2 | Rule of law* | 29.4 | 104 ○ |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 17.3 | 75 |
| 1.3 | Business environment | 77.4 | 41 |
| 1.3.1 | Ease of starting a business* | 92.4 | 36 |
| 1.3.2 | Ease of resolving insolvency* | 58.4 | 48 |
| 1.3.3 | Ease of paying taxes* | 81.6 | 41 |
| 2 | Human capital & research | 50.4 | 23 |
| 2.1 | Education | 58.5 | 27 |
| 2.1.1 | Expenditure on education, % GDP | 4.2 | 79 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 | School life expectancy, years | 14.9 | 49 |
| 2.1.4 | PISA scales in reading, maths, & science | 481.2 | 35 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 8.8 | 16 ● |
| 2.2 | Tertiary education | 47.7 | 23 |
| 2.2.1 | Tertiary enrolment, % gross | 78.0 | 18 ● |
| 2.2.2 | Graduates in science & engineering, % [Ⓓ] | 28.1 | 11 ● |
| 2.2.3 | Tertiary inbound mobility, % | 1.8 | 68 |
| 2.3 | Research & development (R&D) | 45.0 | 25 |
| 2.3.1 | Researchers, FTE/mn pop. | 3,101.6 | 28 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 1.2 | 31 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 300.2 | 22 |
| 2.3.4 | QS university ranking, average score top 3* | 51.5 | 27 |
| 3 | Infrastructure | 44.5 | 60 |
| 3.1 | Information & communication technologies (ICTs) | 66.8 | 35 |
| 3.1.1 | ICT access* | 72.4 | 42 |
| 3.1.2 | ICT use* | 55.2 | 40 |
| 3.1.3 | Government's online service* | 70.9 | 27 |
| 3.1.4 | E-participation* | 68.6 | 30 |
| 3.2 | General infrastructure | 31.4 | 77 |
| 3.2.1 | Electricity output, kWh/cap | 7,395.7 | 23 |
| 3.2.2 | Logistics performance* | 2.7 | 85 |
| 3.2.3 | Gross capital formation, % GDP | 18.7 | 95 ○ |
| 3.3 | Ecological sustainability | 35.5 | 94 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 3.0 | 114 ○ |
| 3.3.2 | Environmental performance* | 83.5 | 32 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 91 |
| 4 | Market sophistication | 43.1 | 63 |
| 4.1 | Credit | 29.1 | 80 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 59.3 | 52 |
| 4.1.3 | Microfinance gross loans, % GDP | 0.0 | 72 ○ |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 26.6 | 107 ○ |
| 4.2.1 | Ease of protecting minority investors* | 56.7 | 62 |
| 4.2.2 | Market capitalization, % GDP | 20.7 | 64 |
| 4.2.3 | Total value of stocks traded, % GDP | 8.6 | 38 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 67 ○ |
| 4.3 | Trade, competition, & market scale | 73.5 | 22 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 6.3 | 93 |
| 4.3.2 | Intensity of local competition [†] | 66.2 | 75 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 3,576.8 | 6 ● |
| 5 | Business sophistication | 37.5 | 37 |
| 5.1 | Knowledge workers | 58.1 | 24 |
| 5.1.1 | Knowledge-intensive employment, % | 44.2 | 14 ● |
| 5.1.2 | Firms offering formal training, % firms [Ⓓ] | 46.1 | 30 |
| 5.1.3 | GERD performed by business, % of GDP | 0.7 | 26 |
| 5.1.4 | GERD financed by business, % | 27.1 | 56 |
| 5.1.5 | Females employed w/advanced degrees, % total | 33.0 | 2 ● |
| 5.2 | Innovation linkages | 19.2 | 112 ○ |
| 5.2.1 | University/industry research collaboration [†] | 43.9 | 65 |
| 5.2.2 | State of cluster development [†] | 35.6 | 101 ○ |
| 5.2.3 | GERD financed by abroad, % | 2.5 | 76 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 51 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.2 | 52 |
| 5.3 | Knowledge absorption | 35.3 | 35 |
| 5.3.1 | Intellectual property payments, % total trade | 1.6 | 14 ● |
| 5.3.2 | High-tech imports less re-imports, % total trade | 8.3 | 54 |
| 5.3.3 | ICT services imports, % total trade | 1.4 | 40 |
| 5.3.4 | FDI net inflows, % GDP | 1.2 | 95 |
| 5.3.5 | Research talent, % in business enterprise | 46.7 | 27 |
| 6 | Knowledge & technology outputs | 31.9 | 40 |
| 6.1 | Knowledge creation | 37.6 | 23 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 6.8 | 18 ● |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 48 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 3.6 | 7 ● |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 9.3 | 67 |
| 6.1.5 | Citable documents H index | 390.0 | 21 |
| 6.2 | Knowledge impact | 32.0 | 82 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.4 | 81 |
| 6.2.2 | New businesses/th pop. 15–64 | 4.2 | 29 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 52 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 3.2 | 75 |
| 6.2.5 | High- & medium-high-tech manufactures, % | 26.3 | 46 |
| 6.3 | Knowledge diffusion | 26.1 | 57 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.1 | 43 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 2.1 | 51 |
| 6.3.3 | ICT services exports, % total trade | 0.9 | 83 |
| 6.3.4 | FDI net outflows, % GDP | 3.0 | 21 |
| 7 | Creative outputs | 28.7 | 66 |
| 7.1 | Intangible assets | 37.2 | 89 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 49.8 | 47 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.9 | 69 |
| 7.1.3 | ICTs & business model creation [†] | 50.4 | 94 ○ |
| 7.1.4 | ICTs & organizational model creation [†] | 50.3 | 74 |
| 7.2 | Creative goods & services | 23.3 | 59 |
| 7.2.1 | Cultural & creative services exports, % of total trade [Ⓓ] | 1.0 | 11 ● |
| 7.2.2 | National feature films/mn pop. 15–69 | 1.3 | 65 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 6.4 | 41 |
| 7.2.4 | Printing & publishing manufactures, % | 1.2 | 53 |
| 7.2.5 | Creative goods exports, % total trade | 0.8 | 47 |
| 7.3 | Online creativity | 17.1 | 46 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 3.5 | 59 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 17.0 | 33 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,569.0 | 61 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 36.5 | 30 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Rwanda

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 11.6 |
| GDP (US\$ billions) | 8.3 |
| GDP per capita, PPP\$ | 1,807.0 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.0 | 83 |
| Innovation Output Sub-Index | 16.5 | 114 |
| Innovation Input Sub-Index | 43.4 | 55 |
| Innovation Efficiency Ratio | 0.4 | 123 ○ |
| Global Innovation Index 2015 (out of 141) | 30.1 | 94 |

1 Institutions 63.5 62

| | | |
|--|------|------|
| 1.1 Political environment | 50.0 | 64 |
| 1.1.1 Political stability & safety* | 60.4 | 73 |
| 1.1.2 Government effectiveness* | 39.7 | 67 |
| 1.2 Regulatory environment | 69.7 | 50 |
| 1.2.1 Regulatory quality* | 49.2 | 63 |
| 1.2.2 Rule of law* | 49.1 | 56 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.0 | 47 |
| 1.3 Business environment | 70.8 | 63 |
| 1.3.1 Ease of starting a business* | 83.1 | 84 |
| 1.3.2 Ease of resolving insolvency* | 47.8 | 65 |
| 1.3.3 Ease of paying taxes* | 81.5 | 42 ● |

2 Human capital & research 24.0 89

| | | |
|--|------|-------|
| 2.1 Education | 47.8 | 63 |
| 2.1.1 Expenditure on education, % GDP | 5.0 | 48 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 41.3 | 6 ● |
| 2.1.3 School life expectancy, years | 11.2 | 96 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 22.8 | 90 |
| 2.2 Tertiary education | 24.3 | 98 |
| 2.2.1 Tertiary enrolment, % gross | 7.5 | 109 |
| 2.2.2 Graduates in science & engineering, % ^② | 22.5 | 38 |
| 2.2.3 Tertiary inbound mobility, % | 1.0 | 81 |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. ^② | 12.3 | 97 ○ |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 35.3 93

| | | |
|---|------|-------|
| 3.1 Information & communication technologies (ICTs) | 33.7 | 94 |
| 3.1.1 ICT access* | 25.4 | 118 ○ |
| 3.1.2 ICT use* | 7.3 | 110 |
| 3.1.3 Government's online service* | 51.2 | 63 |
| 3.1.4 E-participation* | 51.0 | 63 |
| 3.2 General infrastructure | 38.4 | 55 |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | 2.8 | 77 |
| 3.2.3 Gross capital formation, % GDP | 25.3 | 41 ● |
| 3.3 Ecological sustainability | 33.7 | 102 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 50.3 | 113 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 121 ○ |

4 Market sophistication 55.5 23 ●

| | | |
|--|------|-----|
| 4.1 Credit | 83.3 | 3 ● |
| 4.1.1 Ease of getting credit* | 95.0 | 2 ● |
| 4.1.2 Domestic credit to private sector, % GDP | n/a | n/a |
| 4.1.3 Microfinance gross loans, % GDP | 5.8 | 6 ● |

| | | |
|--|------|-----|
| 4.2 Investment | 41.5 | 44 |
| 4.2.1 Ease of protecting minority investors* | 53.3 | 77 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 35 |

4.3 Trade, competition, & market scale 41.7 119

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 8.7 | 111 |
| 4.3.2 Intensity of local competition [†] | 67.4 | 68 |
| 4.3.3 Domestic market scale, bn PPP\$ | 18.9 | 119 |

5 Business sophistication 38.7 35 ●

| | | |
|--|------|-------|
| 5.1 Knowledge workers | 36.7 | 69 |
| 5.1.1 Knowledge-intensive employment, % ^② | 3.8 | 103 ○ |
| 5.1.2 Firms offering formal training, % firms ^② | 55.4 | 16 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 48.1 [9]

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 44.2 | 62 |
| 5.2.2 State of cluster development [†] | 50.1 | 42 ● |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption 31.2 50

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade ^② | 0.1 | 105 |
| 5.3.2 High-tech imports less re-imports, % total trade | 13.4 | 17 ● |
| 5.3.3 ICT services imports, % total trade ^② | 1.0 | 60 |
| 5.3.4 FDI net inflows, % GDP | 3.7 | 46 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 15.1 116

| | | |
|--|------|------|
| 6.1 Knowledge creation | 3.1 | 109 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 89 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 80 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.1 | 59 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 8.9 | 68 |
| 6.1.5 Citable documents H index | 48.0 | 115 |

6.2 Knowledge impact 4.6 [122]

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 1.5 | 57 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.3 | 123 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 37.4 30 ●

| | | |
|--|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade ^② | 2.0 | 8 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.4 | 82 |
| 6.3.3 ICT services exports, % total trade ^② | 1.5 | 66 |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs 18.0 108

| | | |
|---|------|-------|
| 7.1 Intangible assets | 35.5 | 97 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP ^② | 6.7 | 104 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.1 | 104 |
| 7.1.3 ICTs & business model creation [†] | 67.5 | 31 ● |
| 7.1.4 ICTs & organizational model creation [†] | 53.4 | 66 |

7.2 Creative goods & services 0.9 [124]

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 82 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 100 |

7.3 Online creativity 0.2 120

| | | |
|--|------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 119 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 114 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 38.6 | 114 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 31.5 |
| GDP (US\$ billions) | 653.2 |
| GDP per capita, PPP\$ | 53,624.4 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 37.8 | 49 |
| Innovation Output Sub-Index | 28.5 | 54 |
| Innovation Input Sub-Index | 47.0 | 43 |
| Innovation Efficiency Ratio | 0.6 | 85 |
| Global Innovation Index 2015 (out of 141) | 40.7 | 43 |

| | | | |
|----------|--|-------------|-----------|
| 1 | Institutions | 57.9 | 72 |
| 1.1 | Political environment | 51.1 | 62 |
| 1.1.1 | Political stability & safety* | 56.9 | 82 |
| 1.1.2 | Government effectiveness* | 45.3 | 57 |
| 1.2 | Regulatory environment | 63.3 | 75 |
| 1.2.1 | Regulatory quality* | 44.6 | 70 |
| 1.2.2 | Rule of law* | 53.8 | 51 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 19.5 | 83 |
| 1.3 | Business environment | 59.3 | 99 ○ |
| 1.3.1 | Ease of starting a business* | 78.7 | 98 ○ |
| 1.3.2 | Ease of resolving insolvency* | 0.0 | 127 ○ |
| 1.3.3 | Ease of paying taxes* | 99.2 | 3 ● |
| 2 | Human capital & research | 44.7 | 32 |
| 2.1 | Education | 52.3 | 49 |
| 2.1.1 | Expenditure on education, % GDP [Ⓓ] | 5.1 | 45 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 18.1 | 66 |
| 2.1.3 | School life expectancy, years | 16.1 | 29 |
| 2.1.4 | PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 | Pupil-teacher ratio, secondary | 11.0 | 34 |
| 2.2 | Tertiary education | 46.3 | 28 |
| 2.2.1 | Tertiary enrolment, % gross | 61.1 | 41 |
| 2.2.2 | Graduates in science & engineering, % | 26.9 | 18 ● |
| 2.2.3 | Tertiary inbound mobility, % | 4.8 | 33 |
| 2.3 | Research & development (R&D) | 35.6 | 33 |
| 2.3.1 | Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓓ] | 0.1 | 106 ○ |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 173.4 | 25 ● |
| 2.3.4 | QS university ranking, average score top 3* | 48.0 | 30 |
| 3 | Infrastructure | 51.4 | 39 |
| 3.1 | Information & communication technologies (ICTs) | 67.1 | 34 |
| 3.1.1 | ICT access* | 74.2 | 36 |
| 3.1.2 | ICT use* | 60.0 | 33 |
| 3.1.3 | Government's online service* | 77.2 | 18 ● |
| 3.1.4 | E-participation* | 56.9 | 51 |
| 3.2 | General infrastructure | 50.6 | 21 ● |
| 3.2.1 | Electricity output, kWh/cap. | 9,851.4 | 13 ● |
| 3.2.2 | Logistics performance* | 3.1 | 47 |
| 3.2.3 | Gross capital formation, % GDP | 29.7 | 22 ● |
| 3.3 | Ecological sustainability | 36.5 | 92 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.9 | 71 |
| 3.3.2 | Environmental performance* | 68.6 | 84 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 111 ○ |
| 4 | Market sophistication | 49.6 | 38 |
| 4.1 | Credit | 33.1 | 64 |
| 4.1.1 | Ease of getting credit* | 50.0 | 69 |
| 4.1.2 | Domestic credit to private sector, % GDP | 44.4 | 73 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 40.4 | 47 |
| 4.2.1 | Ease of protecting minority investors* | 51.7 | 83 |
| 4.2.2 | Market capitalization, % GDP | 64.7 | 29 |
| 4.2.3 | Total value of stocks traded, % GDP | 76.0 | 9 ● |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 68 ○ |
| 4.3 | Trade, competition, & market scale | 75.3 | 17 ● |
| 4.3.1 | Applied tariff rate, weighted mean, % | 3.6 | 64 |
| 4.3.2 | Intensity of local competition [†] | 73.1 | 39 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 1,609.6 | 14 ● |
| 5 | Business sophistication | 31.3 | 66 |
| 5.1 | Knowledge workers | 35.3 | 73 |
| 5.1.1 | Knowledge-intensive employment, % | 28.1 | 48 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % total | 5.8 | 76 ○ |
| 5.2 | Innovation linkages | 39.2 | 35 |
| 5.2.1 | University/industry research collaboration [†] | 53.3 | 37 |
| 5.2.2 | State of cluster development [†] | 60.0 | 20 ● |
| 5.2.3 | GERD financed by abroad, % | n/a | n/a |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 26 |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 59 |
| 5.3 | Knowledge absorption | 19.6 | 102 ○ |
| 5.3.1 | Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 | High-tech imports less re-imports, % total trade [Ⓓ] | 6.0 | 78 |
| 5.3.3 | ICT services imports, % total trade | 0.8 | 77 |
| 5.3.4 | FDI net inflows, % GDP | 1.1 | 98 ○ |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |
| 6 | Knowledge & technology outputs | 22.4 | 75 |
| 6.1 | Knowledge creation | 9.4 | 66 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 0.6 | 70 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 7.5 | 73 |
| 6.1.5 | Citable documents H index | 164.0 | 51 |
| 6.2 | Knowledge impact | 37.7 | 56 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.6 | 75 |
| 6.2.2 | New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 29 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 1.9 | 90 |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓓ] | 35.9 | 28 |
| 6.3 | Knowledge diffusion | 20.1 | 98 ○ |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade [Ⓓ] | 0.1 | 109 ○ |
| 6.3.3 | ICT services exports, % total trade | 0.1 | 120 ○ |
| 6.3.4 | FDI net outflows, % GDP | 0.7 | 56 |
| 7 | Creative outputs | 34.6 | 47 |
| 7.1 | Intangible assets | 50.8 | 31 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 0.1 | 103 ○ |
| 7.1.3 | ICTs & business model creation [†] | 67.5 | 32 |
| 7.1.4 | ICTs & organizational model creation [†] | 59.3 | 40 |
| 7.2 | Creative goods & services | 24.5 | 56 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 8.9 | 36 |
| 7.2.4 | Printing & publishing manufactures, % [Ⓓ] | 2.3 | 17 ● |
| 7.2.5 | Creative goods exports, % total trade [Ⓓ] | 0.1 | 85 |
| 7.3 | Online creativity | 12.3 | 56 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 3.3 | 62 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.7 | 86 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 1,469.8 | 65 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 34.4 | 33 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 15.1 |
| GDP (US\$ billions) | 13.7 |
| GDP per capita, PPP\$ | 2,451.3 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|--|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.1 | 106 |
| Innovation Output Sub-Index | 20.8 | 96 |
| Innovation Input Sub-Index | 31.5 | 109 |
| Innovation Efficiency Ratio | 0.7 | 62 |
| Global Innovation Index 2015 (out of 141) | 31.0 | 84 |
| 1 Institutions | 53.8 | 84 |
| 1.1 Political environment | 43.9 | 85 |
| 1.1.1 Political stability & safety* | 59.7 | 75 |
| 1.1.2 Government effectiveness* | 28.2 | 90 |
| 1.2 Regulatory environment | 64.2 | 74 |
| 1.2.1 Regulatory quality* | 39.3 | 82 |
| 1.2.2 Rule of law* | 44.6 | 67 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 14.8 | 61 |
| 1.3 Business environment | 53.2 | 122 ○ |
| 1.3.1 Ease of starting a business* | 85.9 | 66 |
| 1.3.2 Ease of resolving insolvency* | 43.9 | 79 |
| 1.3.3 Ease of paying taxes* | 29.8 | 125 ○ |
| 2 Human capital & research | 15.4 | 112 |
| 2.1 Education | 36.1 | 95 |
| 2.1.1 Expenditure on education, % GDP ^② | 5.6 | 34 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 29.0 | 23 ● |
| 2.1.3 School life expectancy, years ^② | 7.9 | 114 ○ |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 27.4 | 100 |
| 2.2 Tertiary education | 6.0 | [120] |
| 2.2.1 Tertiary enrolment, % gross ^② | 7.4 | 110 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 4.0 | 77 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 361.1 | 63 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.5 | 58 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 31.1 | 103 |
| 3.1 Information & communication technologies (ICTs) | 28.8 | 102 |
| 3.1.1 ICT access* | 35.1 | 103 |
| 3.1.2 ICT use* | 14.2 | 101 |
| 3.1.3 Government's online service* | 30.7 | 97 |
| 3.1.4 E-participation* | 35.3 | 85 |
| 3.2 General infrastructure | 28.9 | 85 |
| 3.2.1 Electricity output, kWh/cap. | 262.6 | 110 |
| 3.2.2 Logistics performance* | 2.6 | 96 |
| 3.2.3 Gross capital formation, % GDP | 26.9 | 32 ● |
| 3.3 Ecological sustainability | 35.6 | 93 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.4 | 65 |
| 3.3.2 Environmental performance* | 63.7 | 98 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 86 |
| 4 Market sophistication | 32.1 | 114 |
| 4.1 Credit | 21.5 | 105 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 33.2 | 88 |
| 4.1.3 Microfinance gross loans, % GDP | 1.9 | 18 ● |

| | | |
|---|-------------|------------|
| 4.2 Investment | 28.8 | 98 |
| 4.2.1 Ease of protecting minority investors* | 38.3 | 115 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 43 |
| 4.3 Trade, competition, & market scale | 46.0 | 112 |
| 4.3.1 Applied tariff rate, weighted mean, % | 8.1 | 104 |
| 4.3.2 Intensity of local competition [†] | 65.8 | 78 |
| 4.3.3 Domestic market scale, bn PPP\$ | 34.2 | 102 |
| 5 Business sophistication | 25.0 | 100 |
| 5.1 Knowledge workers | 8.8 | 123 ○ |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 17.4 | 84 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 84 ○ |
| 5.1.4 GERD financed by business, % ^② | 4.1 | 81 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 0.7 | 85 ○ |
| 5.2 Innovation linkages | 46.9 | 12 ● |
| 5.2.1 University/industry research collaboration [†] | 44.0 | 63 |
| 5.2.2 State of cluster development [†] | 43.4 | 72 |
| 5.2.3 GERD financed by abroad, % ^② | 40.5 | 10 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |
| 5.3 Knowledge absorption | 19.2 | 105 |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.0 | 109 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.7 | 101 |
| 5.3.3 ICT services imports, % total trade ^② | 2.3 | 13 ● |
| 5.3.4 FDI net inflows, % GDP | 2.2 | 73 |
| 5.3.5 Research talent, % in business enterprise ^② | 0.1 | 81 ○ |
| 6 Knowledge & technology outputs | 21.3 | 81 |
| 6.1 Knowledge creation | 8.3 | 72 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.8 | 69 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 36 ● |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 11.0 | 62 |
| 6.1.5 Citable documents H index | 89.0 | 85 |
| 6.2 Knowledge impact | 28.3 | 98 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.7 | 46 ● |
| 6.2.2 New businesses/th pop. 15–64 | 0.3 | 91 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 47 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.7 | 93 |
| 6.2.5 High- & medium-high-tech manufactures, % | 16.6 | 62 |
| 6.3 Knowledge diffusion | 27.2 | 49 ● |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 65 |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.7 | 67 |
| 6.3.3 ICT services exports, % total trade ^② | 5.2 | 9 ● |
| 6.3.4 FDI net outflows, % GDP ^② | 0.3 | 71 |
| 7 Creative outputs | 20.4 | 101 |
| 7.1 Intangible assets | 35.6 | 96 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 12.9 | 92 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.4 | 84 |
| 7.1.3 ICTs & business model creation [†] | 60.8 | 54 |
| 7.1.4 ICTs & organizational model creation [†] | 56.2 | 52 ● |
| 7.2 Creative goods & services | 9.5 | 95 |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.2 | 37 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.4 | 93 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 0.8 | 71 |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 83 |
| 7.3 Online creativity | 0.8 | 107 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.1 | 96 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.2 | 105 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 51.4 | 110 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 1.4 | 69 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 8.9 |
| GDP (US\$ billions) | 36.5 |
| GDP per capita, PPP\$ | 13,671.4 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 33.8 | 65 |
| Innovation Output Sub-Index | 26.6 | 63 |
| Innovation Input Sub-Index | 40.9 | 68 |
| Innovation Efficiency Ratio | 0.6 | 70 |
| Global Innovation Index 2015 (out of 141) | 36.5 | 63 |

1 Institutions **65.7** **56**

| | | |
|--|------|-----|
| 1.1 Political environment | 54.4 | 57 |
| 1.1.1 Political stability & safety* | 67.3 | 54 |
| 1.1.2 Government effectiveness* | 41.6 | 64 |
| 1.2 Regulatory environment | 72.9 | 42 |
| 1.2.1 Regulatory quality* | 48.3 | 65 |
| 1.2.2 Rule of law* | 43.2 | 71 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 69.8 | 65 |
| 1.3.1 Ease of starting a business* | 88.9 | 54 |
| 1.3.2 Ease of resolving insolvency* | 58.5 | 47 |
| 1.3.3 Ease of paying taxes* | 61.9 | 99 |

2 Human capital & research **32.8** **56**

| | | |
|--|---------|------|
| 2.1 Education | 45.2 | 69 |
| 2.1.1 Expenditure on education, % GDP | 4.4 | 70 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓔ] | 13.1 | 90 ○ |
| 2.1.3 School life expectancy, years | 14.4 | 55 |
| 2.1.4 PISA scales in reading, maths, & science | 446.6 | 41 |
| 2.1.5 Pupil-teacher ratio, secondary | 8.7 | 14 ● |
| 2.2 Tertiary education | 43.4 | 35 |
| 2.2.1 Tertiary enrolment, % gross | 58.1 | 43 |
| 2.2.2 Graduates in science & engineering, % | 26.2 | 21 ● |
| 2.2.3 Tertiary inbound mobility, % | 3.7 | 46 |
| 2.3 Research & development (R&D) | 9.8 | 59 |
| 2.3.1 Researchers, FTE/mn pop. | 1,464.8 | 40 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.8 | 44 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 4.3 | 70 |

3 Infrastructure **43.7** **61**

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 50.1 | 65 |
| 3.1.1 ICT access* | 72.8 | 40 |
| 3.1.2 ICT use* | 46.9 | 57 |
| 3.1.3 Government's online service* | 39.4 | 81 |
| 3.1.4 E-participation* | 41.2 | 77 |
| 3.2 General infrastructure | 31.0 | 78 |
| 3.2.1 Electricity output, kWh/cap. | 5,478.6 | 36 |
| 3.2.2 Logistics performance* | 3.0 | 61 |
| 3.2.3 Gross capital formation, % GDP | 17.3 | 107 ○ |
| 3.3 Ecological sustainability | 50.1 | 40 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 4.8 | 100 ○ |
| 3.3.2 Environmental performance* | 78.7 | 47 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 9.4 | 8 ● |

4 Market sophistication **34.3** **109 ○**

| | | |
|--|------|----|
| 4.1 Credit | 26.2 | 89 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 |
| 4.1.2 Domestic credit to private sector, % GDP | 43.8 | 76 |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 53 |

| | | |
|--|------|-------|
| 4.2 Investment | 28.0 | 101 ○ |
| 4.2.1 Ease of protecting minority investors* | 55.0 | 72 |
| 4.2.2 Market capitalization, % GDP [Ⓔ] | 3.9 | 90 ○ |
| 4.2.3 Total value of stocks traded, % GDP [Ⓔ] | 0.7 | 61 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale **48.9** **107 ○**

| | | |
|---|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % | n/a | n/a |
| 4.3.2 Intensity of local competition [†] | 54.6 | 114 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 95.8 | 75 |

5 Business sophistication **28.1** **84**

| | | |
|---|------|----|
| 5.1 Knowledge workers | 33.7 | 80 |
| 5.1.1 Knowledge-intensive employment, % | 29.1 | 46 |
| 5.1.2 Firms offering formal training, % firms | 37.8 | 40 |
| 5.1.3 GERD performed by business, % of GDP | 0.2 | 48 |
| 5.1.4 GERD financed by business, % | 8.2 | 72 |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓔ] | 12.2 | 54 |

5.2 Innovation linkages **22.3** **99**

| | | |
|---|------|-------|
| 5.2.1 University/industry research collaboration [†] | 37.3 | 89 |
| 5.2.2 State of cluster development [†] | 35.4 | 103 ○ |
| 5.2.3 GERD financed by abroad, % | 12.5 | 39 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 43 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 57 |

5.3 Knowledge absorption **28.4** **64**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 1.0 | 28 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 1.7 | 26 ● |
| 5.3.4 FDI net inflows, % GDP | 4.6 | 32 |
| 5.3.5 Research talent, % in business enterprise | 10.9 | 64 ○ |

6 Knowledge & technology outputs **27.7** **50**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 20.9 | 44 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.2 | 44 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 44 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.7 | 30 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 49.0 | 8 ● |
| 6.1.5 Citable documents H index | 100.0 | 79 |

6.2 Knowledge impact **31.9** **83**

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 1.6 | 53 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 27.5 | 12 ● |
| 6.2.5 High- & medium-high-tech manufactures, % | 21.0 | 55 |

6.3 Knowledge diffusion **30.2** **39**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 34 |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 2.9 | 26 ● |
| 6.3.4 FDI net outflows, % GDP [Ⓔ] | 0.8 | 55 |

7 Creative outputs **25.5** **82**

| | | |
|---|------|-------|
| 7.1 Intangible assets | 30.8 | 106 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 27.8 | 70 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.6 | 56 |
| 7.1.3 ICTs & business model creation [†] | 48.1 | 102 ○ |
| 7.1.4 ICTs & organizational model creation [†] | 40.4 | 106 ○ |

7.2 Creative goods & services **23.1** **61**

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.2 | 42 |
| 7.2.2 National feature films/mn pop. 15–69 | 2.8 | 50 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 1.7 | 30 |
| 7.2.5 Creative goods exports, % total trade | 0.8 | 43 |

7.3 Online creativity **17.3** **45**

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 1.6 | 90 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 4.9 | 54 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,693.0 | 29 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 28.1 | 44 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓔ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Singapore

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 5.6 |
| GDP (US\$ billions) | 292.7 |
| GDP per capita, PPP\$ | 85,253.2 |
| Income group | High income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|----------|
| Global Innovation Index (out of 128) | 59.2 | 6 |
| Innovation Output Sub-Index | 45.4 | 20 |
| Innovation Input Sub-Index | 72.9 | 1 ● |
| Innovation Efficiency Ratio | 0.6 | 78 ○ |
| Global Innovation Index 2015 (out of 141) | 59.4 | 7 |

1 Institutions 94.9 1 ●

| | | |
|--|-------|-----|
| 1.1 Political environment | 96.7 | 1 ● |
| 1.1.1 Political stability & safety* | 93.4 | 7 |
| 1.1.2 Government effectiveness* | 100.0 | 1 ● |
| 1.2 Regulatory environment | 98.6 | 1 ● |
| 1.2.1 Regulatory quality* | 100.0 | 1 ● |
| 1.2.2 Rule of law* | 94.4 | 11 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 89.3 | 8 |
| 1.3.1 Ease of starting a business* | 96.5 | 10 |
| 1.3.2 Ease of resolving insolvency* | 74.8 | 25 |
| 1.3.3 Ease of paying taxes* | 96.6 | 5 |

2 Human capital & research 67.1 2 ●

| | | |
|--|---------|-------|
| 2.1 Education | 40.4 | 87 ○ |
| 2.1.1 Expenditure on education, % GDP | 2.9 | 101 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 16.7 | 71 ○ |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | 555.7 | 2 ● |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 14.9 | 63 ○ |
| 2.2 Tertiary education | 100.0 | [1] |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | 19.2 | 1 ● |
| 2.3 Research & development (R&D) | 60.9 | 15 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 6,665.2 | 6 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 2.0 | 16 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 121.0 | 27 |
| 2.3.4 QS university ranking, average score top 3* | 62.7 | 16 |

3 Infrastructure 69.1 1 ●

| | | |
|---|---------|-----|
| 3.1 Information & communication technologies (ICTs) | 88.0 | 6 |
| 3.1.1 ICT access* | 86.4 | 14 |
| 3.1.2 ICT use* | 76.1 | 15 |
| 3.1.3 Government's online service* | 99.2 | 2 ● |
| 3.1.4 E-participation* | 90.2 | 10 |
| 3.2 General infrastructure | 57.5 | 8 |
| 3.2.1 Electricity output, kWh/cap. | 8,882.2 | 16 |
| 3.2.2 Logistics performance* | 4.0 | 5 |
| 3.2.3 Gross capital formation, % GDP | 26.6 | 33 |
| 3.3 Ecological sustainability | 61.8 | 10 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 14.1 | 8 |
| 3.3.2 Environmental performance* | 87.0 | 14 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.4 | 27 |

4 Market sophistication 71.5 5

| | | |
|--|-------|-----|
| 4.1 Credit | 63.2 | 12 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 |
| 4.1.2 Domestic credit to private sector, % GDP | 131.5 | 14 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|-------|-----|
| 4.2 Investment | 76.1 | 3 ● |
| 4.2.1 Ease of protecting minority investors* | 83.3 | 1 ● |
| 4.2.2 Market capitalization, % GDP | 244.5 | 1 ● |
| 4.2.3 Total value of stocks traded, % GDP | 65.2 | 12 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 14 |

4.3 Trade, competition, & market scale 75.2 18

| | | |
|---|-------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 0.0 | 1 ● |
| 4.3.2 Intensity of local competition [†] | 76.3 | 20 |
| 4.3.3 Domestic market scale, bn PPP\$ | 454.3 | 38 |

5 Business sophistication 62.1 1 ●

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 67.9 | 6 |
| 5.1.1 Knowledge-intensive employment, % | 53.1 | 2 ● |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP ^② | 1.2 | 16 |
| 5.1.4 GERD financed by business, % ^② | 52.7 | 17 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 22.7 | 14 |

5.2 Innovation linkages 47.5 10

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 76.3 | 5 |
| 5.2.2 State of cluster development [†] | 68.8 | 12 |
| 5.2.3 GERD financed by abroad, % ^② | 5.8 | 63 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.1 | 6 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 1.8 | 20 |

5.3 Knowledge absorption 71.0 1 ●

| | | |
|--|------|-----|
| 5.3.1 Intellectual property payments, % total trade | 4.1 | 1 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 20.1 | 4 |
| 5.3.3 ICT services imports, % total trade | 1.4 | 38 |
| 5.3.4 FDI net inflows, % GDP | 21.9 | 1 ● |
| 5.3.5 Research talent, % in business enterprise ^② | 50.9 | 20 |

6 Knowledge & technology outputs 49.6 10

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 29.0 | 33 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 2.9 | 37 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 1.9 | 19 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 26.1 | 29 |
| 6.1.5 Citable documents H index | 349.0 | 27 |

6.2 Knowledge impact 52.4 13

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.3 | 82 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 9.5 | 11 |
| 6.2.3 Computer software spending, % GDP | 0.4 | 24 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 12.7 | 31 |
| 6.2.5 High- & medium-high-tech manufactures, % | 69.3 | 1 ● |

6.3 Knowledge diffusion 67.5 2 ●

| | | |
|--|------|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.6 | 20 |
| 6.3.2 High-tech exports less re-exports, % total trade | 26.8 | 1 ● |
| 6.3.3 ICT services exports, % total trade | 1.0 | 79 ○ |
| 6.3.4 FDI net outflows, % GDP | 13.2 | 1 ● |

7 Creative outputs 41.1 33

| | | |
|---|------|------|
| 7.1 Intangible assets | 48.4 | 44 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 20.0 | 80 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.8 | 53 ○ |
| 7.1.3 ICTs & business model creation [†] | 79.5 | 6 |
| 7.1.4 ICTs & organizational model creation [†] | 74.5 | 11 |

7.2 Creative goods & services 35.1 25

| | | |
|--|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 3.1 | 46 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 36.8 | 20 |
| 7.2.4 Printing & publishing manufactures, % | 0.8 | 72 ○ |
| 7.2.5 Creative goods exports, % total trade | 4.8 | 10 |

7.3 Online creativity 32.6 29

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 27.9 | 23 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 14.7 | 35 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 2,562.1 | 48 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 69.1 | 10 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 5.4 |
| GDP (US\$ billions) | 86.6 |
| GDP per capita, PPP\$ | 29,720.1 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 41.7 | 37 |
| Innovation Output Sub-Index | 35.4 | 38 |
| Innovation Input Sub-Index | 48.0 | 42 |
| Innovation Efficiency Ratio | 0.7 | 36 |
| Global Innovation Index 2015 (out of 141) | 43.0 | 36 |

| | | | |
|----------|---|-------------|-----------|
| 1 | Institutions | 75.0 | 35 |
| 1.1 | Political environment | 75.7 | 26 |
| 1.1.1 | Political stability & safety* | 88.3 | 17 ● |
| 1.1.2 | Government effectiveness* | 63.2 | 38 |
| 1.2 | Regulatory environment | 70.8 | 46 |
| 1.2.1 | Regulatory quality* | 67.0 | 35 |
| 1.2.2 | Rule of law* | 58.9 | 45 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 18.8 | 80 |
| 1.3 | Business environment | 78.5 | 36 |
| 1.3.1 | Ease of starting a business* | 88.5 | 56 |
| 1.3.2 | Ease of resolving insolvency* | 70.0 | 31 |
| 1.3.3 | Ease of paying taxes* | 76.8 | 60 |
| 2 | Human capital & research | 32.8 | 57 |
| 2.1 | Education | 47.3 | 65 |
| 2.1.1 | Expenditure on education, % GDP | 3.9 | 82 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap | 18.4 | 63 |
| 2.1.3 | School life expectancy, years | 15.1 | 45 |
| 2.1.4 | PISA scales in reading, maths, & science | 471.9 | 37 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓒ] | 11.2 | 36 |
| 2.2 | Tertiary education | 38.0 | 52 |
| 2.2.1 | Tertiary enrolment, % gross | 54.4 | 48 |
| 2.2.2 | Graduates in science & engineering, % | 20.5 | 50 |
| 2.2.3 | Tertiary inbound mobility, % | 4.9 | 32 |
| 2.3 | Research & development (R&D) | 13.2 | 51 |
| 2.3.1 | Researchers, FTE/mn pop. | 2,718.5 | 30 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 0.9 | 37 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 53.3 | 32 |
| 3.1 | Information & communication technologies (ICTs) | 60.2 | 43 |
| 3.1.1 | ICT access* | 70.4 | 46 |
| 3.1.2 | ICT use* | 58.6 | 34 |
| 3.1.3 | Government's online service* | 48.8 | 65 |
| 3.1.4 | E-participation* | 62.7 | 40 |
| 3.2 | General infrastructure | 37.8 | 62 |
| 3.2.1 | Electricity output, kWh/cap | 4,892.1 | 42 |
| 3.2.2 | Logistics performance* | 3.3 | 41 |
| 3.2.3 | Gross capital formation, % GDP | 21.3 | 72 |
| 3.3 | Ecological sustainability | 62.0 | 9 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.9 | 56 |
| 3.3.2 | Environmental performance* | 85.4 | 24 ● |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 11.8 | 6 ● |
| 4 | Market sophistication | 44.2 | 56 |
| 4.1 | Credit | 41.8 | 40 |
| 4.1.1 | Ease of getting credit* | 65.0 | 39 |
| 4.1.2 | Domestic credit to private sector, % GDP | 50.2 | 65 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 23.0 | 124 ○ |
| 4.2.1 | Ease of protecting minority investors* | 53.3 | 77 |
| 4.2.2 | Market capitalization, % GDP | 4.9 | 88 ○ |
| 4.2.3 | Total value of stocks traded, % GDP [Ⓒ] | 0.2 | 75 ○ |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 50 |
| 4.3 | Trade, competition, & market scale | 67.8 | 45 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 75.6 | 26 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 153.2 | 65 |
| 5 | Business sophistication | 34.5 | 52 |
| 5.1 | Knowledge workers | 41.9 | 50 |
| 5.1.1 | Knowledge-intensive employment, % | 31.9 | 42 |
| 5.1.2 | Firms offering formal training, % firms | 43.5 | 31 |
| 5.1.3 | GERD performed by business, % of GDP | 0.3 | 42 |
| 5.1.4 | GERD financed by business, % | 32.2 | 46 |
| 5.1.5 | Females employed w/advanced degrees, % total | 12.0 | 55 |
| 5.2 | Innovation linkages | 34.2 | 50 |
| 5.2.1 | University/industry research collaboration [†] | 39.3 | 80 |
| 5.2.2 | State of cluster development [†] | 48.0 | 53 |
| 5.2.3 | GERD financed by abroad, % | 23.7 | 16 ● |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 42 |
| 5.3 | Knowledge absorption | 27.5 | 68 |
| 5.3.1 | Intellectual property payments, % total trade | 0.6 | 49 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 14.8 | 13 ● |
| 5.3.3 | ICT services imports, % total trade | 0.8 | 69 |
| 5.3.4 | FDI net inflows, % GDP | 0.1 | 123 ○ |
| 5.3.5 | Research talent, % in business enterprise | 17.9 | 57 ○ |
| 6 | Knowledge & technology outputs | 32.3 | 37 |
| 6.1 | Knowledge creation | 22.9 | 40 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.6 | 55 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.2 | 47 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 2.2 | 13 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 20.2 | 36 |
| 6.1.5 | Citable documents H index | 180.0 | 41 |
| 6.2 | Knowledge impact | 49.7 | 19 ● |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 1.0 | 65 |
| 6.2.2 | New businesses/th pop. 15–64 | 3.1 | 37 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 40 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 30.1 | 8 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % | 57.9 | 3 ● |
| 6.3 | Knowledge diffusion | 24.3 | 67 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.0 | 70 ○ |
| 6.3.2 | High-tech exports less re-exports, % total trade | 9.2 | 21 ● |
| 6.3.3 | ICT services exports, % total trade | 1.0 | 78 |
| 6.3.4 | FDI net outflows, % GDP | 0.4 | 68 |
| 7 | Creative outputs | 38.6 | 38 |
| 7.1 | Intangible assets | 47.6 | 48 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 70.1 | 23 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 3.6 | 34 |
| 7.1.3 | ICTs & business model creation [†] | 60.4 | 56 |
| 7.1.4 | ICTs & organizational model creation [†] | 57.6 | 43 |
| 7.2 | Creative goods & services | 37.4 | 23 ● |
| 7.2.1 | Cultural & creative services exports, % of total trade | 0.0 | 80 ○ |
| 7.2.2 | National feature films/mn pop. 15–69 | 5.3 | 35 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 0.6 | 81 ○ |
| 7.2.5 | Creative goods exports, % total trade | 10.3 | 2 ● |
| 7.3 | Online creativity | 21.7 | 39 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 3.4 | 61 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 29.0 | 24 ● |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 3,369.6 | 38 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 29.5 | 41 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓒ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Slovenia

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 2.1 |
| GDP (US\$ billions) | 42.8 |
| GDP per capita, PPP\$ | 31,007.4 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 46.0 | 32 |
| Innovation Output Sub-Index | 38.9 | 33 |
| Innovation Input Sub-Index | 53.0 | 31 |
| Innovation Efficiency Ratio | 0.7 | 39 |
| Global Innovation Index 2015 (out of 141) | 48.5 | 28 |

| | | | |
|----------|--|-------------|-------------|
| 1 | Institutions | 80.8 | 23 |
| 1.1 | Political environment | 74.8 | 31 |
| 1.1.1 | Political stability & safety* | 82.6 | 28 |
| 1.1.2 | Government effectiveness* | 67.1 | 34 |
| 1.2 | Regulatory environment | 80.5 | 28 |
| 1.2.1 | Regulatory quality* | 61.2 | 42 |
| 1.2.2 | Rule of law* | 71.5 | 31 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 10.7 | 38 |
| 1.3 | Business environment | 87.2 | 13 ● |
| 1.3.1 | Ease of starting a business* | 94.5 | 18 |
| 1.3.2 | Ease of resolving insolvency* | 83.4 | 11 ● |
| 1.3.3 | Ease of paying taxes* | 83.7 | 31 |
| 2 | Human capital & research | 50.4 | 24 |
| 2.1 | Education | 63.0 | 15 |
| 2.1.1 | Expenditure on education, % GDP | 5.7 | 32 |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 30.8 | 17 |
| 2.1.3 | School life expectancy, years | 17.6 | 12 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 498.9 | 21 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 10.1 | 28 |
| 2.2 | Tertiary education | 46.7 | 26 |
| 2.2.1 | Tertiary enrolment, % gross | 85.2 | 8 ● |
| 2.2.2 | Graduates in science & engineering, % [Ⓓ] | 24.7 | 30 |
| 2.2.3 | Tertiary inbound mobility, % | 2.6 | 59 |
| 2.3 | Research & development (R&D) | 41.3 | 26 |
| 2.3.1 | Researchers, FTE/mn pop. | 4,149.9 | 20 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 2.4 | 12 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 97.2 | 31 |
| 2.3.4 | QS university ranking, average score top 3* | 8.5 | 63 |
| 3 | Infrastructure | 50.7 | 42 |
| 3.1 | Information & communication technologies (ICTs) | 53.8 | 54 |
| 3.1.1 | ICT access* | 79.4 | 24 |
| 3.1.2 | ICT use* | 54.2 | 41 |
| 3.1.3 | Government's online service* | 42.5 | 76 |
| 3.1.4 | E-participation* | 39.2 | 80 ○ |
| 3.2 | General infrastructure | 42.5 | 37 |
| 3.2.1 | Electricity output, kWh/cap. | 8,330.1 | 20 |
| 3.2.2 | Logistics performance* | 3.4 | 37 |
| 3.2.3 | Gross capital formation, % GDP | 19.8 | 87 ○ |
| 3.3 | Ecological sustainability | 55.9 | 22 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.7 | 59 |
| 3.3.2 | Environmental performance* | 89.0 | 5 ● |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 6.9 | 14 |
| 4 | Market sophistication | 40.5 | 84 ○ |
| 4.1 | Credit | 27.8 | 83 ○ |
| 4.1.1 | Ease of getting credit* | 35.0 | 101 ○ |
| 4.1.2 | Domestic credit to private sector, % GDP | 55.0 | 56 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 32.6 | 83 ○ |
| 4.2.1 | Ease of protecting minority investors* | 75.0 | 7 ● |
| 4.2.2 | Market capitalization, % GDP | 15.2 | 72 ○ |
| 4.2.3 | Total value of stocks traded, % GDP | 1.5 | 52 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 55 ○ |
| 4.3 | Trade, competition, & market scale | 61.1 | 62 |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 68.7 | 62 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 61.6 | 89 ○ |
| 5 | Business sophistication | 42.5 | 27 |
| 5.1 | Knowledge workers | 61.5 | 15 |
| 5.1.1 | Knowledge-intensive employment, % | 41.7 | 21 |
| 5.1.2 | Firms offering formal training, % firms | 41.5 | 36 |
| 5.1.3 | GERD performed by business, % of GDP | 1.8 | 11 |
| 5.1.4 | GERD financed by business, % | 68.4 | 5 ● |
| 5.1.5 | Females employed w/advanced degrees, % total | 18.8 | 27 |
| 5.2 | Innovation linkages | 31.6 | 60 |
| 5.2.1 | University/industry research collaboration [†] | 49.3 | 43 |
| 5.2.2 | State of cluster development [†] | 40.9 | 85 ○ |
| 5.2.3 | GERD financed by abroad, % | 9.3 | 47 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 1.7 | 21 |
| 5.3 | Knowledge absorption | 34.4 | 38 |
| 5.3.1 | Intellectual property payments, % total trade | 0.7 | 44 |
| 5.3.2 | High-tech imports less re-imports, % total trade | 5.7 | 84 ○ |
| 5.3.3 | ICT services imports, % total trade | 1.8 | 24 |
| 5.3.4 | FDI net inflows, % GDP | 2.1 | 77 |
| 5.3.5 | Research talent, % in business enterprise | 54.1 | 19 |
| 6 | Knowledge & technology outputs | 33.9 | 34 |
| 6.1 | Knowledge creation | 23.6 | 39 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 2.0 | 47 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 1.3 | 27 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP [Ⓓ] | 0.2 | 44 ○ |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 58.4 | 3 ● |
| 6.1.5 | Citable documents H index | 189.0 | 40 |
| 6.2 | Knowledge impact | 55.4 | 7 ● |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 2.0 | 39 |
| 6.2.2 | New businesses/th pop. 15–64 | 4.4 | 27 |
| 6.2.3 | Computer software spending, % GDP | n/a | n/a |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 27.2 | 13 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % | 48.0 | 9 ● |
| 6.3 | Knowledge diffusion | 22.6 | 76 |
| 6.3.1 | Intellectual property receipts, % total trade | 0.2 | 33 |
| 6.3.2 | High-tech exports less re-exports, % total trade | 4.5 | 35 |
| 6.3.3 | ICT services exports, % total trade | 1.7 | 58 |
| 6.3.4 | FDI net outflows, % GDP | (0.1) | 104 ○ |
| 7 | Creative outputs | 44.0 | 27 |
| 7.1 | Intangible assets | 55.9 | 20 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 111.6 | 9 ● |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP [Ⓓ] | 6.4 | 22 |
| 7.1.3 | ICTs & business model creation [†] | 59.0 | 60 |
| 7.1.4 | ICTs & organizational model creation [†] | 57.3 | 45 |
| 7.2 | Creative goods & services | 37.3 | 24 |
| 7.2.1 | Cultural & creative services exports, % of total trade [Ⓓ] | 0.9 | 13 |
| 7.2.2 | National feature films/mn pop. 15–69 | 8.6 | 17 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % | 1.8 | 28 |
| 7.2.5 | Creative goods exports, % total trade | 0.8 | 46 |
| 7.3 | Online creativity | 27.0 | 34 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 22.7 | 28 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 28.3 | 25 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 3,298.3 | 39 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 32.9 | 36 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 54.5 |
| GDP (US\$ billions) | 313.0 |
| GDP per capita, PPP\$ | 13,165.2 |
| Income group | Upper-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.8 | 54 |
| Innovation Output Sub-Index | 25.6 | 71 |
| Innovation Input Sub-Index | 46.1 | 47 |
| Innovation Efficiency Ratio | 0.6 | 99 ○ |
| Global Innovation Index 2015 (out of 141) | 37.4 | 60 |

1 Institutions **69.1** **46**

| | | |
|--|------|------|
| 1.1 Political environment | 54.6 | 56 |
| 1.1.1 Political stability & safety* | 61.0 | 72 |
| 1.1.2 Government effectiveness* | 48.2 | 51 |
| 1.2 Regulatory environment | 74.6 | 38 |
| 1.2.1 Regulatory quality* | 52.7 | 59 |
| 1.2.2 Rule of law* | 51.1 | 53 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 9.3 | 28 |
| 1.3 Business environment | 78.1 | 38 |
| 1.3.1 Ease of starting a business* | 81.2 | 89 |
| 1.3.2 Ease of resolving insolvency* | 64.3 | 38 |
| 1.3.3 Ease of paying taxes* | 88.8 | 19 ● |

2 Human capital & research **33.1** **55**

| | | |
|---|-------|------|
| 2.1 Education | 44.4 | 74 |
| 2.1.1 Expenditure on education, % GDP | 6.1 | 24 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 19.0 | 61 |
| 2.1.3 School life expectancy, years | 13.2 | 68 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 25.0 | 94 ○ |
| 2.2 Tertiary education | 27.4 | 89 |
| 2.2.1 Tertiary enrolment, % gross | 19.7 | 92 ○ |
| 2.2.2 Graduates in science & engineering, % | 19.0 | 63 |
| 2.2.3 Tertiary inbound mobility, % | 4.1 | 37 |
| 2.3 Research & development (R&D) | 27.7 | 40 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 404.7 | 62 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.7 | 45 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 46.0 | 37 |
| 2.3.4 QS university ranking, average score top 3* | 46.6 | 32 |

3 Infrastructure **37.4** **85**

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 39.7 | 84 |
| 3.1.1 ICT access* | 53.1 | 74 |
| 3.1.2 ICT use* | 33.7 | 73 |
| 3.1.3 Government's online service* | 38.6 | 83 |
| 3.1.4 E-participation* | 33.3 | 89 ○ |
| 3.2 General infrastructure | 38.6 | 54 |
| 3.2.1 Electricity output, kWh/cap | 4,762.8 | 43 |
| 3.2.2 Logistics performance* | 3.4 | 33 |
| 3.2.3 Gross capital formation, % GDP | 20.0 | 85 |
| 3.3 Ecological sustainability | 33.8 | 101 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 4.2 | 110 ○ |
| 3.3.2 Environmental performance* | 70.5 | 74 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.3 | 55 |

4 Market sophistication **58.7** **17 ●**

| | | |
|--|-------|------|
| 4.1 Credit | 39.9 | 44 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 |
| 4.1.2 Domestic credit to private sector, % GDP | 151.5 | 7 ● |
| 4.1.3 Microfinance gross loans, % GDP [Ⓓ] | 0.0 | 77 ○ |

| | | |
|--|-------|------|
| 4.2 Investment | 66.0 | 10 ● |
| 4.2.1 Ease of protecting minority investors* | 71.7 | 14 ● |
| 4.2.2 Market capitalization, % GDP | 266.8 | 1 ● |
| 4.2.3 Total value of stocks traded, % GDP | 92.7 | 6 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 49 |

4.3 Trade, competition, & market scale **70.3** **33**

| | | |
|---|-------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 4.0 | 71 |
| 4.3.2 Intensity of local competition [†] | 72.5 | 42 |
| 4.3.3 Domestic market scale, bn PPP\$ | 707.1 | 28 ● |

5 Business sophistication **32.2** **56**

| | | |
|--|------|----|
| 5.1 Knowledge workers | 36.4 | 70 |
| 5.1.1 Knowledge-intensive employment, % | 24.8 | 56 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 36.8 | 41 |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.3 | 43 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 38.3 | 39 |
| 5.1.5 Females employed w/advanced degrees, % total | 10.2 | 62 |

5.2 Innovation linkages **31.7** **59**

| | | |
|---|------|----|
| 5.2.1 University/industry research collaboration [†] | 58.1 | 30 |
| 5.2.2 State of cluster development [†] | 53.6 | 32 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 13.1 | 35 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 44 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.4 | 35 |

5.3 Knowledge absorption **28.6** **63**

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 1.5 | 15 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.7 | 34 |
| 5.3.3 ICT services imports, % total trade | 0.9 | 64 |
| 5.3.4 FDI net inflows, % GDP | 1.6 | 88 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 21.3 | 52 |

6 Knowledge & technology outputs **24.7** **63**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 15.7 | 52 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.1 | 62 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 38 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 15.6 | 46 |
| 6.1.5 Citable documents H index | 292.0 | 33 |

6.2 Knowledge impact **35.4** **67**

| | | |
|---|-------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.4) | 94 ○ |
| 6.2.2 New businesses/th pop. 15–64 [Ⓓ] | 6.5 | 18 ● |
| 6.2.3 Computer software spending, % GDP | 0.4 | 25 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 5.3 | 61 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓓ] | 28.2 | 42 |

6.3 Knowledge diffusion **22.9** **73**

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 50 |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.5 | 48 |
| 6.3.3 ICT services exports, % total trade | 0.5 | 94 ○ |
| 6.3.4 FDI net outflows, % GDP | 2.0 | 32 |

7 Creative outputs **26.5** **77**

| | | |
|---|------|----|
| 7.1 Intangible assets | 38.2 | 83 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 29.0 | 68 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.1 | 64 |
| 7.1.3 ICTs & business model creation [†] | 59.2 | 59 |
| 7.1.4 ICTs & organizational model creation [†] | 56.1 | 53 |

7.2 Creative goods & services **24.7** **55**

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.1 | 47 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.7 | 83 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 8.1 | 38 |
| 7.2.4 Printing & publishing manufactures, % [Ⓓ] | 2.4 | 15 ● |
| 7.2.5 Creative goods exports, % total trade | 0.8 | 42 |

7.3 Online creativity **4.8** **77**

| | | |
|--|-------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 3.5 | 60 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 10.2 | 40 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 363.8 | 93 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 3.0 | 67 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 46.1 |
| GDP (US\$ billions) | 1,199.7 |
| GDP per capita, PPP\$ | 34,819.5 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 49.2 | 28 |
| Innovation Output Sub-Index | 41.1 | 28 |
| Innovation Input Sub-Index | 57.3 | 22 |
| Innovation Efficiency Ratio | 0.7 | 48 |
| Global Innovation Index 2015 (out of 141) | 49.1 | 27 |

| | | | |
|----------|--|-------------|-------------|
| 1 | Institutions | 75.3 | 33 |
| 1.1 | Political environment | 70.9 | 37 |
| 1.1.1 | Political stability & safety* | 70.7 | 48 |
| 1.1.2 | Government effectiveness* | 71.1 | 25 |
| 1.2 | Regulatory environment | 74.3 | 39 |
| 1.2.1 | Regulatory quality* | 64.0 | 37 |
| 1.2.2 | Rule of law* | 70.5 | 32 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 17.4 | 76 ○ |
| 1.3 | Business environment | 80.5 | 29 |
| 1.3.1 | Ease of starting a business* | 86.3 | 63 ○ |
| 1.3.2 | Ease of resolving insolvency* | 75.8 | 23 |
| 1.3.3 | Ease of paying taxes* | 79.5 | 50 |
| 2 | Human capital & research | 49.7 | 25 |
| 2.1 | Education | 56.4 | 36 |
| 2.1.1 | Expenditure on education, % GDP | 4.4 | 71 ○ |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 25.8 | 30 |
| 2.1.3 | School life expectancy, years | 17.6 | 13 ● |
| 2.1.4 | PISA scales in reading, maths, & science | 489.6 | 27 |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓓ] | 11.4 | 38 |
| 2.2 | Tertiary education | 44.7 | 31 |
| 2.2.1 | Tertiary enrolment, % gross | 87.1 | 6 ● |
| 2.2.2 | Graduates in science & engineering, % [Ⓓ] | 22.2 | 41 |
| 2.2.3 | Tertiary inbound mobility, % | 2.9 | 55 ○ |
| 2.3 | Research & development (R&D) | 48.2 | 22 |
| 2.3.1 | Researchers, FTE/mn pop. | 2,640.9 | 33 |
| 2.3.2 | Gross expenditure on R&D, % GDP | 1.2 | 30 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 926.8 | 14 ● |
| 2.3.4 | QS university ranking, average score top 3* | 56.3 | 21 |
| 3 | Infrastructure | 62.6 | 10 ● |
| 3.1 | Information & communication technologies (ICTs) | 79.3 | 14 ● |
| 3.1.1 | ICT access* | 78.0 | 29 |
| 3.1.2 | ICT use* | 66.2 | 26 |
| 3.1.3 | Government's online service* | 94.5 | 4 ● |
| 3.1.4 | E-participation* | 78.4 | 19 |
| 3.2 | General infrastructure | 43.6 | 36 |
| 3.2.1 | Electricity output, kWh/cap. | 5,895.9 | 32 |
| 3.2.2 | Logistics performance* | 3.7 | 18 |
| 3.2.3 | Gross capital formation, % GDP | 19.8 | 88 ○ |
| 3.3 | Ecological sustainability | 64.8 | 4 ● |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq | 11.0 | 21 |
| 3.3.2 | Environmental performance* | 88.9 | 6 ● |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 8.8 | 12 ● |
| 4 | Market sophistication | 62.3 | 13 ● |
| 4.1 | Credit | 55.2 | 17 |
| 4.1.1 | Ease of getting credit* | 60.0 | 53 |
| 4.1.2 | Domestic credit to private sector, % GDP | 129.1 | 17 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |

| | | | |
|----------|---|-------------|-----------|
| 4.2 | Investment | 51.4 | 22 |
| 4.2.1 | Ease of protecting minority investors* | 65.0 | 28 |
| 4.2.2 | Market capitalization, % GDP | 71.9 | 23 |
| 4.2.3 | Total value of stocks traded, % GDP | 73.1 | 11 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.1 | 25 |
| 4.3 | Trade, competition, & market scale | 80.1 | 8 ● |
| 4.3.1 | Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 | Intensity of local competition [†] | 76.9 | 18 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 1,572.1 | 16 |
| 5 | Business sophistication | 36.5 | 43 |
| 5.1 | Knowledge workers | 49.4 | 32 |
| 5.1.1 | Knowledge-intensive employment, % | 33.1 | 40 |
| 5.1.2 | Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 | GERD performed by business, % of GDP | 0.6 | 29 |
| 5.1.4 | GERD financed by business, % [Ⓓ] | 46.3 | 26 |
| 5.1.5 | Females employed w/advanced degrees, % total | 21.5 | 20 |
| 5.2 | Innovation linkages | 27.4 | 75 ○ |
| 5.2.1 | University/industry research collaboration [†] | 46.2 | 56 |
| 5.2.2 | State of cluster development [†] | 48.7 | 49 |
| 5.2.3 | GERD financed by abroad, % [Ⓓ] | 7.4 | 54 ○ |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 46 ○ |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.7 | 29 |
| 5.3 | Knowledge absorption | 32.7 | 44 |
| 5.3.1 | Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 | High-tech imports less re-imports, % total trade | 6.6 | 74 ○ |
| 5.3.3 | ICT services imports, % total trade | n/a | n/a |
| 5.3.4 | FDI net inflows, % GDP | 2.5 | 69 ○ |
| 5.3.5 | Research talent, % in business enterprise | 36.5 | 35 |
| 6 | Knowledge & technology outputs | 38.6 | 26 |
| 6.1 | Knowledge creation | 32.6 | 29 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 2.8 | 38 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.9 | 29 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | 1.7 | 17 |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 32.2 | 23 |
| 6.1.5 | Citable documents H index | 591.0 | 12 ● |
| 6.2 | Knowledge impact | 45.7 | 27 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.1 | 87 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 3.0 | 38 |
| 6.2.3 | Computer software spending, % GDP | 0.6 | 6 ● |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 22.9 | 15 ● |
| 6.2.5 | High- & medium-high-tech manufactures, % | 34.4 | 31 |
| 6.3 | Knowledge diffusion | 37.5 | 29 |
| 6.3.1 | Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 | High-tech exports less re-exports, % total trade | 3.8 | 36 |
| 6.3.3 | ICT services exports, % total trade | n/a | n/a |
| 6.3.4 | FDI net outflows, % GDP | 2.3 | 28 |
| 7 | Creative outputs | 43.6 | 28 |
| 7.1 | Intangible assets | 55.9 | 19 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | 58.7 | 33 |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 13.7 | 9 ● |
| 7.1.3 | ICTs & business model creation [†] | 68.9 | 29 |
| 7.1.4 | ICTs & organizational model creation [†] | 57.5 | 44 |
| 7.2 | Creative goods & services | 26.9 | 48 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 6.9 | 25 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | 25.0 | 25 |
| 7.2.4 | Printing & publishing manufactures, % | 1.4 | 41 |
| 7.2.5 | Creative goods exports, % total trade | 0.8 | 44 |
| 7.3 | Online creativity | 35.8 | 26 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 29.7 | 22 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 19.5 | 31 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 5,678.2 | 20 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 52.1 | 18 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 20.7 |
| GDP (US\$ billions) | 82.1 |
| GDP per capita, PPP\$ | 10,566.2 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 28.9 | 91 |
| Innovation Output Sub-Index | 23.8 | 78 |
| Innovation Input Sub-Index | 34.1 | 98 |
| Innovation Efficiency Ratio | 0.7 | 54 |
| Global Innovation Index 2015 (out of 141) | 30.8 | 85 |

1 Institutions 44.3 116 ○

| | | |
|--|------|-------|
| 1.1 Political environment | 49.1 | 68 |
| 1.1.1 Political stability & safety* | 56.6 | 83 |
| 1.1.2 Government effectiveness* | 41.5 | 66 |
| 1.2 Regulatory environment | 21.5 | 125 ○ |
| 1.2.1 Regulatory quality* | 42.7 | 76 |
| 1.2.2 Rule of law* | 43.4 | 69 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 58.5 | 126 ○ |
| 1.3 Business environment | 62.2 | 88 |
| 1.3.1 Ease of starting a business* | 85.0 | 75 |
| 1.3.2 Ease of resolving insolvency* | 46.4 | 70 |
| 1.3.3 Ease of paying taxes* | 55.2 | 110 ○ |

2 Human capital & research 18.3 107

| | | |
|---|-------|-------|
| 2.1 Education | 29.3 | 111 ○ |
| 2.1.1 Expenditure on education, % GDP | 1.7 | 117 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 6.9 | 105 ○ |
| 2.1.3 School life expectancy, years | 14.0 | 60 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 17.3 | 75 |
| 2.2 Tertiary education | 23.7 | 99 |
| 2.2.1 Tertiary enrolment, % gross | 20.7 | 91 |
| 2.2.2 Graduates in science & engineering, % | 19.9 | 57 |
| 2.2.3 Tertiary inbound mobility, % | 0.3 | 94 ○ |
| 2.3 Research & development (R&D) | 2.1 | 90 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 110.9 | 82 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓓ] | 0.1 | 102 ○ |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 5.7 | 67 |

3 Infrastructure 44.9 58

| | | |
|---|-------|------|
| 3.1 Information & communication technologies (ICTs) | 46.5 | 74 |
| 3.1.1 ICT access* | 41.7 | 94 |
| 3.1.2 ICT use* | 14.4 | 100 |
| 3.1.3 Government's online service* | 65.4 | 37 ● |
| 3.1.4 E-participation* | 64.7 | 33 ● |
| 3.2 General infrastructure | 32.9 | 69 |
| 3.2.1 Electricity output, kWh/cap | 587.1 | 100 |
| 3.2.2 Logistics performance* | 2.7 | 84 |
| 3.2.3 Gross capital formation, % GDP | 29.8 | 21 ● |
| 3.3 Ecological sustainability | 55.3 | 23 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 17.2 | 2 ● |
| 3.3.2 Environmental performance* | 65.6 | 91 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.8 | 70 |

4 Market sophistication 38.1 97

| | | |
|--|------|-------|
| 4.1 Credit | 18.2 | 110 ○ |
| 4.1.1 Ease of getting credit* | 45.0 | 81 |
| 4.1.2 Domestic credit to private sector, % GDP | 26.8 | 100 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 67 |

| | | |
|--|-------|------|
| 4.2 Investment | 34.1 | 74 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 30.0 | 50 |
| 4.2.3 Total value of stocks traded, % GDP | 3.3 | 47 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 62.0 | 58 |
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓓ] | 6.3 | 93 |
| 4.3.2 Intensity of local competition [†] | 77.8 | 16 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 218.2 | 59 |

5 Business sophistication 24.8 102

| | | |
|---|------|------|
| 5.1 Knowledge workers | 24.0 | 100 |
| 5.1.1 Knowledge-intensive employment, % | 16.9 | 82 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 18.4 | 83 ○ |
| 5.1.3 GERD performed by business, % of GDP [Ⓓ] | 0.0 | 70 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 40.7 | 34 ● |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓓ] | 7.6 | 70 |
| 5.2 Innovation linkages | 22.2 | 100 |
| 5.2.1 University/industry research collaboration [†] | 34.6 | 100 |
| 5.2.2 State of cluster development [†] | 45.9 | 60 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 5.0 | 67 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 33 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 92 |
| 5.3 Knowledge absorption | 28.1 | 67 |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.8 | 98 |
| 5.3.3 ICT services imports, % total trade | 2.0 | 18 ● |
| 5.3.4 FDI net inflows, % GDP | 1.2 | 96 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 30.7 | 41 |

6 Knowledge & technology outputs 22.4 76

| | | |
|---|-------|-------|
| 6.1 Knowledge creation | 5.5 | 91 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓓ] | 1.6 | 53 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 71 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 2.9 | 110 ○ |
| 6.1.5 Citable documents H index | 107.0 | 74 |
| 6.2 Knowledge impact | 33.2 | 79 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.4 | 11 ● |
| 6.2.2 New businesses/th pop. 15–64 [Ⓓ] | 0.5 | 89 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 28 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 3.3 | 73 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓓ] | 6.3 | 88 ○ |
| 6.3 Knowledge diffusion | 28.4 | 43 ● |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.4 | 84 |
| 6.3.3 ICT services exports, % total trade | 3.7 | 17 ● |
| 6.3.4 FDI net outflows, % GDP | 0.1 | 81 |

7 Creative outputs 25.2 84

| | | |
|--|-------|------|
| 7.1 Intangible assets | 38.9 | 80 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 27.4 | 71 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓓ] | 1.3 | 59 |
| 7.1.3 ICTs & business model creation [†] | 61.1 | 52 |
| 7.1.4 ICTs & organizational model creation [†] | 57.0 | 47 |
| 7.2 Creative goods & services | 21.2 | 69 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 1.0 | 71 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓓ] | 1.9 | 27 ● |
| 7.2.5 Creative goods exports, % total trade | 0.3 | 71 |
| 7.3 Online creativity | 1.7 | 98 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.8 | 100 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.2 | 102 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 536.6 | 88 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Sweden

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 9.8 |
| GDP (US\$ billions) | 492.6 |
| GDP per capita, PPP\$ | 47,922.2 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 63.6 | 2 ● |
| Innovation Output Sub-Index | 58.7 | 2 ● |
| Innovation Input Sub-Index | 68.5 | 5 ● |
| Innovation Efficiency Ratio | 0.9 | 10 |
| Global Innovation Index 2015 (out of 141) | 62.4 | 3 |

1 Institutions **88.3** **11**

| | | |
|--|------|------|
| 1.1 Political environment | 89.2 | 10 |
| 1.1.1 Political stability & safety* | 89.6 | 13 |
| 1.1.2 Government effectiveness* | 88.7 | 10 |
| 1.2 Regulatory environment | 90.2 | 14 |
| 1.2.1 Regulatory quality* | 89.4 | 9 |
| 1.2.2 Rule of law* | 96.8 | 6 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 14.4 | 59 ○ |
| 1.3 Business environment | 85.6 | 18 |
| 1.3.1 Ease of starting a business* | 94.6 | 16 |
| 1.3.2 Ease of resolving insolvency* | 78.8 | 18 |
| 1.3.3 Ease of paying taxes* | 83.5 | 33 |

2 Human capital & research **64.8** **5 ●**

| | | |
|---|---------|------|
| 2.1 Education | 69.1 | 9 |
| 2.1.1 Expenditure on education, % GDP | 7.7 | 5 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 31.1 | 16 |
| 2.1.3 School life expectancy, years | 18.1 | 9 |
| 2.1.4 PISA scales in reading, maths, & science | 482.1 | 34 ○ |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓓ] | 9.5 | 20 |
| 2.2 Tertiary education | 46.9 | 25 |
| 2.2.1 Tertiary enrolment, % gross | 63.4 | 35 |
| 2.2.2 Graduates in science & engineering, % | 25.7 | 24 |
| 2.2.3 Tertiary inbound mobility, % | 5.8 | 29 |
| 2.3 Research & development (R&D) | 78.4 | 4 ● |
| 2.3.1 Researchers, FTE/mn pop. | 6,868.1 | 5 |
| 2.3.2 Gross expenditure on R&D, % GDP | 3.2 | 5 ● |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 1,996.3 | 11 |
| 2.3.4 QS university ranking, average score top 3* | 71.6 | 13 |

3 Infrastructure **66.3** **5 ●**

| | | |
|---|----------|------|
| 3.1 Information & communication technologies (ICTs) | 75.7 | 20 |
| 3.1.1 ICT access* | 89.0 | 10 |
| 3.1.2 ICT use* | 83.2 | 6 ● |
| 3.1.3 Government's online service* | 70.1 | 28 |
| 3.1.4 E-participation* | 60.8 | 45 ○ |
| 3.2 General infrastructure | 64.0 | 5 ● |
| 3.2.1 Electricity output, kWh/cap. | 15,889.2 | 7 |
| 3.2.2 Logistics performance* | 4.0 | 6 ● |
| 3.2.3 Gross capital formation, % GDP | 24.5 | 45 |
| 3.3 Ecological sustainability | 59.3 | 15 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.6 | 61 ○ |
| 3.3.2 Environmental performance* | 90.4 | 3 ● |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 8.9 | 10 |

4 Market sophistication **66.2** **9**

| | | |
|--|-------|------|
| 4.1 Credit | 53.3 | 18 |
| 4.1.1 Ease of getting credit* | 55.0 | 63 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 131.8 | 13 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|------|-----|
| 4.2 Investment | 72.2 | 7 |
| 4.2.1 Ease of protecting minority investors* | 71.7 | 14 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 11 |

4.3 Trade, competition, & market scale **73.0** **23**

| | | |
|---|-------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 74.3 | 32 |
| 4.3.3 Domestic market scale, bn PPP\$ | 450.5 | 39 |

5 Business sophistication **56.8** **5 ●**

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 77.6 | 2 ● |
| 5.1.1 Knowledge-intensive employment, % | 49.4 | 5 |
| 5.1.2 Firms offering formal training, % firms | 70.3 | 3 ● |
| 5.1.3 GERD performed by business, % of GDP | 2.1 | 5 |
| 5.1.4 GERD financed by business, % [Ⓓ] | 61.0 | 8 |
| 5.1.5 Females employed w/advanced degrees, % total | 23.3 | 12 |

5.2 Innovation linkages **45.7** **17**

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 72.1 | 11 |
| 5.2.2 State of cluster development [†] | 63.7 | 18 |
| 5.2.3 GERD financed by abroad, % [Ⓓ] | 6.7 | 59 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 21 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 7.7 | 4 ● |

5.3 Knowledge absorption **47.1** **13**

| | | |
|--|-------|-------|
| 5.3.1 Intellectual property payments, % total trade | 1.6 | 13 |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.0 | 48 ○ |
| 5.3.3 ICT services imports, % total trade | 3.2 | 6 ● |
| 5.3.4 FDI net inflows, % GDP | (0.4) | 127 ○ |
| 5.3.5 Research talent, % in business enterprise | 66.7 | 6 |

6 Knowledge & technology outputs **63.9** **2 ●**

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 78.7 | 2 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 13.0 | 9 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 8.3 | 1 ● |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 52.9 | 6 ● |
| 6.1.5 Citable documents H index | 614.0 | 11 |

6.2 Knowledge impact **49.1** **20**

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.9 | 69 ○ |
| 6.2.2 New businesses/th pop. 15–64 | 6.9 | 16 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 17 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 11.1 | 34 |
| 6.2.5 High- & medium-high-tech manufactures, % | 47.3 | 10 |

6.3 Knowledge diffusion **64.0** **4 ●**

| | | |
|--|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade | 3.7 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 8.8 | 24 |
| 6.3.3 ICT services exports, % total trade | 6.7 | 6 ● |
| 6.3.4 FDI net outflows, % GDP | 3.6 | 14 |

7 Creative outputs **53.4** **9**

| | | |
|---|------|----|
| 7.1 Intangible assets | 55.7 | 21 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 52.2 | 41 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 5.0 | 27 |
| 7.1.3 ICTs & business model creation [†] | 77.3 | 9 |
| 7.1.4 ICTs & organizational model creation [†] | 75.7 | 9 |

7.2 Creative goods & services **42.0** **14**

| | | |
|---|------|------|
| 7.2.1 Cultural & creative services exports, % of total trade [Ⓓ] | 0.7 | 17 |
| 7.2.2 National feature films/mn pop. 15–69 | 9.0 | 14 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 70.5 | 5 |
| 7.2.4 Printing & publishing manufactures, % | 1.4 | 38 ○ |
| 7.2.5 Creative goods exports, % total trade | 1.7 | 26 |

7.3 Online creativity **60.2** **12**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 45.7 | 17 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 73.8 | 9 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 7,625.1 | 12 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 64.8 | 14 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 8.3 |
| GDP (US\$ billions) | 664.6 |
| GDP per capita, PPP\$ | 58,551.5 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 66.3 | 1 ● |
| Innovation Output Sub-Index | 64.2 | 1 ● |
| Innovation Input Sub-Index | 68.4 | 6 |
| Innovation Efficiency Ratio | 0.9 | 5 |
| Global Innovation Index 2015 (out of 141) | 68.3 | 1 |

| | | |
|--|-------------|----------|
| 1 Institutions | 90.3 | 9 |
| 1.1 Political environment | 96.0 | 3 ● |
| 1.1.1 Political stability & safety* | 93.8 | 5 |
| 1.1.2 Government effectiveness* | 98.2 | 2 ● |
| 1.2 Regulatory environment | 94.7 | 9 |
| 1.2.1 Regulatory quality* | 89.8 | 8 |
| 1.2.2 Rule of law* | 97.4 | 5 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 10.1 | 34 |
| 1.3 Business environment | 80.1 | 31 |
| 1.3.1 Ease of starting a business* | 88.5 | 57 ○ |
| 1.3.2 Ease of resolving insolvency* | 62.6 | 41 |
| 1.3.3 Ease of paying taxes* | 89.1 | 18 |

| | | |
|---|-------------|----------|
| 2 Human capital & research | 63.3 | 6 |
| 2.1 Education | 57.6 | 32 |
| 2.1.1 Expenditure on education, % GDP | 5.0 | 47 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 26.1 | 28 |
| 2.1.3 School life expectancy, years [Ⓐ] | 15.8 | 35 |
| 2.1.4 PISA scales in reading, maths, & science | 518.4 | 11 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 9.3 | 17 |
| 2.2 Tertiary education | 55.7 | 11 |
| 2.2.1 Tertiary enrolment, % gross | 56.3 | 46 |
| 2.2.2 Graduates in science & engineering, % | 22.1 | 44 ○ |
| 2.2.3 Tertiary inbound mobility, % | 16.9 | 7 |
| 2.3 Research & development (R&D) | 76.6 | 6 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 4,481.1 | 14 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 3.0 | 8 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 5,207.0 | 3 ● |
| 2.3.4 QS university ranking, average score top 3* | 87.2 | 3 ● |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 61.0 | 15 |
| 3.1 Information & communication technologies (ICTs) | 64.9 | 39 |
| 3.1.1 ICT access* | 92.0 | 6 |
| 3.1.2 ICT use* | 80.1 | 9 |
| 3.1.3 Government's online service* | 50.4 | 64 ○ |
| 3.1.4 E-participation* | 37.3 | 84 ○ |
| 3.2 General infrastructure | 52.4 | 14 |
| 3.2.1 Electricity output, kWh/cap | 8,546.4 | 18 |
| 3.2.2 Logistics performance* | 3.8 | 14 |
| 3.2.3 Gross capital formation, % GDP | 23.8 | 51 |
| 3.3 Ecological sustainability | 65.6 | 3 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 13.9 | 9 |
| 3.3.2 Environmental performance* | 86.9 | 16 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 6.2 | 18 |

| | | |
|--|-------------|----------|
| 4 Market sophistication | 69.8 | 7 |
| 4.1 Credit | 63.7 | 11 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 171.1 | 6 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|-------|------|
| 4.2 Investment | 70.3 | 9 |
| 4.2.1 Ease of protecting minority investors* | 50.0 | 86 ○ |
| 4.2.2 Market capitalization, % GDP | 213.3 | 1 ● |
| 4.2.3 Total value of stocks traded, % GDP | 105.3 | 5 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 13 |
| 4.3 Trade, competition, & market scale | 75.2 | 19 |
| 4.3.1 Applied tariff rate, weighted mean, % | 0.0 | 1 ● |
| 4.3.2 Intensity of local competition [†] | 75.3 | 29 |
| 4.3.3 Domestic market scale, bn PPP\$ | 473.3 | 37 |

| | | |
|---|-------------|------------|
| 5 Business sophistication | 57.6 | 3 ● |
| 5.1 Knowledge workers | 71.0 | 3 ● |
| 5.1.1 Knowledge-intensive employment, % | 52.1 | 3 ● |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP [Ⓐ] | 2.1 | 7 |
| 5.1.4 GERD financed by business, % [Ⓐ] | 60.8 | 10 |
| 5.1.5 Females employed w/advanced degrees, % total | 17.0 | 30 |

| | | |
|---|------|-----|
| 5.2 Innovation linkages | 51.7 | 6 |
| 5.2.1 University/industry research collaboration [†] | 79.8 | 3 ● |
| 5.2.2 State of cluster development [†] | 71.7 | 6 |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 12.1 | 41 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 13 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 6.9 | 5 |

| | | |
|--|------|------|
| 5.3 Knowledge absorption | 50.0 | 9 |
| 5.3.1 Intellectual property payments, % total trade | 3.1 | 4 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 8.1 | 56 ○ |
| 5.3.3 ICT services imports, % total trade | 3.3 | 5 |
| 5.3.4 FDI net inflows, % GDP | 3.2 | 53 ○ |
| 5.3.5 Research talent, % in business enterprise [Ⓐ] | 46.2 | 28 |

| | | |
|--|-------------|------------|
| 6 Knowledge & technology outputs | 67.0 | 1 ● |
| 6.1 Knowledge creation | 88.2 | 1 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 17.6 | 1 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 8.9 | 1 ● |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 55.8 | 4 ● |
| 6.1.5 Citable documents H index | 686.0 | 9 |

| | | |
|--|------|------|
| 6.2 Knowledge impact | 55.5 | 6 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.3 | 83 ○ |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 2.5 | 40 |
| 6.2.3 Computer software spending, % GDP | 0.8 | 3 ● |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 23.7 | 14 |
| 6.2.5 High- & medium-high-tech manufactures, % | 66.1 | 2 ● |
| 6.3 Knowledge diffusion | 57.3 | 7 |
| 6.3.1 Intellectual property receipts, % total trade | 4.1 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 14.2 | 11 |
| 6.3.3 ICT services exports, % total trade | 3.0 | 25 |
| 6.3.4 FDI net outflows, % GDP | 2.6 | 25 |

| | | |
|---|-------------|----------|
| 7 Creative outputs | 61.4 | 5 |
| 7.1 Intangible assets | 61.1 | 13 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 73.0 | 20 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 9.0 | 14 |
| 7.1.3 ICTs & business model creation [†] | 78.3 | 8 |
| 7.1.4 ICTs & organizational model creation [†] | 70.9 | 17 |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 57.1 | 2 ● |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 17.4 | 5 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 85.9 | 2 ● |
| 7.2.4 Printing & publishing manufactures, % | 1.3 | 45 ○ |
| 7.2.5 Creative goods exports, % total trade | 3.7 | 12 |

| | | |
|--|---------|-----|
| 7.3 Online creativity | 66.2 | 5 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 64.9 | 12 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 4,555.6 | 32 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 66.2 | 12 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Tajikistan

Key indicators

| | |
|-----------------------------|---------------------------|
| Population (millions) | 8.5 |
| GDP (US\$ billions) | 7.8 |
| GDP per capita, PPP\$ | 2,749.4 |
| Income group | Lower-middle income |
| Region | Central and Southern Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 29.6 | 86 |
| Innovation Output Sub-Index | 25.7 | 69 |
| Innovation Input Sub-Index | 33.5 | 102 |
| Innovation Efficiency Ratio | 0.8 | 29 ● |
| Global Innovation Index 2015 (out of 141) | 27.5 | 114 |

1 Institutions 46.6 109

| | | |
|--|------|------|
| 1.1 Political environment | 32.2 | 107 |
| 1.1.1 Political stability & safety* | 46.0 | 96 |
| 1.1.2 Government effectiveness* | 18.3 | 111 |
| 1.2 Regulatory environment | 53.3 | 101 |
| 1.2.1 Regulatory quality* | 19.7 | 120 |
| 1.2.2 Rule of law* | 23.1 | 119 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 15.5 | 66 |
| 1.3 Business environment | 54.3 | 115 |
| 1.3.1 Ease of starting a business* | 90.3 | 47 ● |
| 1.3.2 Ease of resolving insolvency* | 29.0 | 118 |
| 1.3.3 Ease of paying taxes* | 43.5 | 119 |

2 Human capital & research 26.3 84

| | | |
|---|------|------|
| 2.1 Education | 44.6 | 71 |
| 2.1.1 Expenditure on education, % GDP | 4.0 | 81 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | 11.3 | 94 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 15.4 | 67 |
| 2.2 Tertiary education | 33.7 | 69 |
| 2.2.1 Tertiary enrolment, % gross | 24.5 | 86 |
| 2.2.2 Graduates in science & engineering, % | 28.1 | 12 ● |
| 2.2.3 Tertiary inbound mobility, % | 0.6 | 88 |
| 2.3 Research & development (R&D) | 0.6 | 110 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.1 | 100 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 21.6 123

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 9.0 | 126 ○ |
| 3.1.1 ICT access* | n/a | n/a |
| 3.1.2 ICT use* | n/a | n/a |
| 3.1.3 Government's online service* | 6.3 | 125 ○ |
| 3.1.4 E-participation* | 11.8 | 122 |
| 3.2 General infrastructure | 17.0 | 126 ○ |
| 3.2.1 Electricity output, kWh/cap | 2,084.7 | 77 |
| 3.2.2 Logistics performance* | 2.5 | 104 |
| 3.2.3 Gross capital formation, % GDP | 13.0 | 119 |
| 3.3 Ecological sustainability | 38.7 | 84 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.2 | 66 |
| 3.3.2 Environmental performance* | 73.1 | 66 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.0 | 125 ○ |

4 Market sophistication 50.4 32 ●

| | | |
|--|------|------|
| 4.1 Credit | 40.7 | 43 ● |
| 4.1.1 Ease of getting credit* | 40.0 | 92 |
| 4.1.2 Domestic credit to private sector, % GDP | 21.5 | 106 |
| 4.1.3 Microfinance gross loans, % GDP | 6.1 | 5 ● |

| | | |
|--|------|------|
| 4.2 Investment | 65.0 | 12 |
| 4.2.1 Ease of protecting minority investors* | 65.0 | 28 ● |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 45.6 113

| | | |
|---|------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 5.7 | 90 |
| 4.3.2 Intensity of local competition [†] | 59.8 | 102 |
| 4.3.3 Domestic market scale, bn PPP\$ | 22.4 | 115 |

5 Business sophistication 22.7 113

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 26.8 | 94 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 33.1 | 47 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % ^② | 1.6 | 84 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 21.0 108

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 37.9 | 85 |
| 5.2.2 State of cluster development [†] | 33.2 | 110 |
| 5.2.3 GERD financed by abroad, % ^② | 0.2 | 96 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |

5.3 Knowledge absorption 20.2 99

| | | |
|--|-----|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.0 | 114 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 1.0 | 57 ● |
| 5.3.4 FDI net inflows, % GDP | 2.8 | 62 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 27.0 54 ●

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 24.3 | 37 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.0 | 112 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP ^② | 3.2 | 8 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 3.0 | 108 |
| 6.1.5 Citable documents H index | 28.0 | 125 ○ |

6.2 Knowledge impact 34.0 77

| | | |
|--|-----|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.7 | 9 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.3 | 94 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.2 | 126 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % | 5.8 | 89 |

6.3 Knowledge diffusion 22.8 74

| | | |
|--|-------|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 80 |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 3.8 | 15 ● |
| 6.3.4 FDI net outflows, % GDP ^② | (1.9) | 114 |

7 Creative outputs 24.5 86

| | | |
|--|------|-------|
| 7.1 Intangible assets | 28.7 | 114 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP ^② | 12.0 | 95 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP ^② | 0.0 | 107 ○ |
| 7.1.3 ICTs & business model creation [†] | 49.1 | 99 |
| 7.1.4 ICTs & organizational model creation [†] | 45.1 | 89 |

7.2 Creative goods & services 40.1 17

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 1.8 | 58 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 2.4 | 16 ● |
| 7.2.5 Creative goods exports, % total trade | n/a | n/a |

7.3 Online creativity 0.4 111

| | | |
|--|------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 125 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.4 | 95 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 97.5 | 109 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 53.5 |
| GDP (US\$ billions) | 44.9 |
| GDP per capita, PPP\$ | 2,904.0 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 26.4 | 105 |
| Innovation Output Sub-Index | 23.6 | 80 |
| Innovation Input Sub-Index | 29.1 | 117 |
| Innovation Efficiency Ratio | 0.8 | 22 ● |
| Global Innovation Index 2015 (out of 141) | 27.0 | 117 |

| | | |
|--|-------------|--------------|
| 1 Institutions | 54.1 | 83 |
| 1.1 Political environment | 35.4 | 101 |
| 1.1.1 Political stability & safety* | 49.5 | 92 |
| 1.1.2 Government effectiveness* | 21.2 | 104 |
| 1.2 Regulatory environment | 67.0 | 65 ● |
| 1.2.1 Regulatory quality* | 36.2 | 90 |
| 1.2.2 Rule of law* | 36.9 | 87 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 9.3 | 28 ● |
| 1.3 Business environment | 59.9 | 96 |
| 1.3.1 Ease of starting a business* | 79.6 | 97 |
| 1.3.2 Ease of resolving insolvency* | 41.0 | 87 |
| 1.3.3 Ease of paying taxes* | 59.3 | 103 |
| 2 Human capital & research | 9.7 | 126 ○ |
| 2.1 Education | 23.0 | 123 |
| 2.1.1 Expenditure on education, % GDP | 3.5 | 93 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 12.1 | 93 |
| 2.1.3 School life expectancy, years | 8.4 | 111 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 26.4 | 97 |
| 2.2 Tertiary education | 2.6 | [124] |
| 2.2.1 Tertiary enrolment, % gross | 3.6 | 119 ○ |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 3.5 | 81 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 18.5 | 96 ○ |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.5 | 60 ● |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 2.5 | 71 ● |
| 3 Infrastructure | 26.8 | 111 |
| 3.1 Information & communication technologies (ICTs) | 24.2 | 107 |
| 3.1.1 ICT access* | 24.8 | 119 ○ |
| 3.1.2 ICT use* | 2.7 | 123 ○ |
| 3.1.3 Government's online service* | 29.9 | 101 |
| 3.1.4 E-participation* | 39.2 | 80 |
| 3.2 General infrastructure | 28.6 | 89 |
| 3.2.1 Electricity output, kWh/cap. | 113.2 | 115 ○ |
| 3.2.2 Logistics performance* | 2.3 | 117 |
| 3.2.3 Gross capital formation, % GDP | 30.9 | 15 ● |
| 3.3 Ecological sustainability | 27.5 | 119 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 4.3 | 108 |
| 3.3.2 Environmental performance* | 58.3 | 105 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 110 |
| 4 Market sophistication | 31.9 | 116 |
| 4.1 Credit | 20.8 | 106 |
| 4.1.1 Ease of getting credit* | 25.0 | 118 |
| 4.1.2 Domestic credit to private sector, % GDP | 13.8 | 121 |
| 4.1.3 Microfinance gross loans, % GDP | 2.7 | 16 ● |

| | | |
|--|-------|------|
| 4.2 Investment | 23.7 | 122 |
| 4.2.1 Ease of protecting minority investors* | 45.0 | 97 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.1 | 80 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 58 |
| 4.3 Trade, competition, & market scale | 51.1 | 97 |
| 4.3.1 Applied tariff rate, weighted mean, % | 8.4 | 106 |
| 4.3.2 Intensity of local competition [†] | 58.8 | 105 |
| 4.3.3 Domestic market scale, bn PPP\$ | 128.2 | 70 ● |

5 Business sophistication **22.8** **112**

| | | |
|--|------|-------|
| 5.1 Knowledge workers | 13.3 | 121 |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 2.6 | 105 ○ |
| 5.1.2 Firms offering formal training, % firms | 30.7 | 58 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % [Ⓐ] | 0.1 | 93 ○ |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 0.7 | 86 ○ |
| 5.2 Innovation linkages | 33.2 | 55 ● |
| 5.2.1 University/industry research collaboration [†] | 39.5 | 79 |
| 5.2.2 State of cluster development [†] | 41.0 | 82 |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 42.0 | 9 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 63 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓐ] | 0.0 | 103 |
| 5.3 Knowledge absorption | 22.0 | 94 |
| 5.3.1 Intellectual property payments, % total trade [Ⓐ] | 0.0 | 107 |
| 5.3.2 High-tech imports less re-imports, % total trade | 7.8 | 58 ● |
| 5.3.3 ICT services imports, % total trade [Ⓐ] | 0.5 | 99 |
| 5.3.4 FDI net inflows, % GDP | 4.3 | 37 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **17.0** **108**

| | | |
|--|-------|-------|
| 6.1 Knowledge creation | 6.2 | 85 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 90 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.6 | 82 |
| 6.1.5 Citable documents H index | 113.0 | 70 ● |
| 6.2 Knowledge impact | 42.5 | 37 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.3 | 12 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.6 | 114 |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 10.0 | 77 |
| 6.3 Knowledge diffusion | 2.2 | 126 ○ |
| 6.3.1 Intellectual property receipts, % total trade [Ⓐ] | 0.0 | 103 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.3 | 91 |
| 6.3.3 ICT services exports, % total trade [Ⓐ] | 0.6 | 93 |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs **30.3** **61** ●

| | | |
|--|------|------|
| 7.1 Intangible assets | 43.5 | 60 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 47.4 | 104 |
| 7.1.4 ICTs & organizational model creation [†] | 39.7 | 109 |
| 7.2 Creative goods & services | 34.2 | 31 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 2.8 | 8 ● |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 91 |
| 7.3 Online creativity | 0.2 | 119 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.2 | 118 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 107 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 38.6 | 113 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Thailand

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 68.0 |
| GDP (US\$ billions) | 395.3 |
| GDP per capita, PPP\$ | 16,097.4 |
| Income group | Upper-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 36.5 | 52 |
| Innovation Output Sub-Index | 30.0 | 50 |
| Innovation Input Sub-Index | 43.0 | 57 |
| Innovation Efficiency Ratio | 0.7 | 53 |
| Global Innovation Index 2015 (out of 141) | 38.1 | 55 |

1 Institutions **54.7** **81**

| | | |
|--|------|-------|
| 1.1 Political environment | 44.4 | 82 |
| 1.1.1 Political stability & safety* | 40.3 | 107 ○ |
| 1.1.2 Government effectiveness* | 48.5 | 50 |
| 1.2 Regulatory environment | 46.0 | 111 ○ |
| 1.2.1 Regulatory quality* | 51.3 | 60 |
| 1.2.2 Rule of law* | 43.4 | 70 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 36.0 | 120 ○ |
| 1.3 Business environment | 73.9 | 54 |
| 1.3.1 Ease of starting a business* | 85.1 | 73 |
| 1.3.2 Ease of resolving insolvency* | 58.8 | 46 |
| 1.3.3 Ease of paying taxes* | 77.7 | 57 |

2 Human capital & research **30.7** **70**

| | | |
|---|-------|------|
| 2.1 Education | 43.3 | 78 |
| 2.1.1 Expenditure on education, % GDP | 4.9 | 53 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 19.7 | 58 |
| 2.1.3 School life expectancy, years | 13.6 | 65 |
| 2.1.4 PISA scales in reading, maths, & science | 437.3 | 44 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 19.9 | 83 |
| 2.2 Tertiary education | 25.2 | 92 |
| 2.2.1 Tertiary enrolment, % gross | 51.4 | 52 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % ^② | 0.8 | 83 ○ |
| 2.3 Research & development (R&D) | 23.5 | 43 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 543.5 | 59 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.4 | 72 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 41.4 | 38 |
| 2.3.4 QS university ranking, average score top 3* | 38.2 | 36 |

3 Infrastructure **42.8** **68**

| | | |
|---|---------|----|
| 3.1 Information & communication technologies (ICTs) | 48.4 | 71 |
| 3.1.1 ICT access* | 52.0 | 77 |
| 3.1.2 ICT use* | 42.8 | 60 |
| 3.1.3 Government's online service* | 44.1 | 73 |
| 3.1.4 E-participation* | 54.9 | 54 |
| 3.2 General infrastructure | 40.1 | 46 |
| 3.2.1 Electricity output, kWh/cap | 2,472.9 | 70 |
| 3.2.2 Logistics performance* | 3.4 | 34 |
| 3.2.3 Gross capital formation, % GDP | 24.7 | 42 |
| 3.3 Ecological sustainability | 39.8 | 78 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.2 | 87 |
| 3.3.2 Environmental performance* | 69.5 | 81 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 3.1 | 30 |

4 Market sophistication **51.4** **28**

| | | |
|--|-------|------|
| 4.1 Credit | 34.2 | 60 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 |
| 4.1.2 Domestic credit to private sector, % GDP | 146.8 | 8 ● |
| 4.1.3 Microfinance gross loans, % GDP ^② | 0.0 | 82 ○ |

| | | |
|--|-------|------|
| 4.2 Investment | 48.8 | 24 ● |
| 4.2.1 Ease of protecting minority investors* | 63.3 | 35 |
| 4.2.2 Market capitalization, % GDP | 106.3 | 9 ● |
| 4.2.3 Total value of stocks traded, % GDP | 76.7 | 8 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 77 ○ |

| | | |
|--|---------|------|
| 4.3 Trade, competition, & market scale | 71.2 | 31 |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 4.8 | 84 |
| 4.3.2 Intensity of local competition [†] | 72.7 | 41 |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,069.6 | 20 ● |

5 Business sophistication **35.3** **49**

| | | |
|---|------|------|
| 5.1 Knowledge workers | 46.6 | 37 |
| 5.1.1 Knowledge-intensive employment, % | 13.8 | 90 ○ |
| 5.1.2 Firms offering formal training, % firms ^② | 75.3 | 2 ● |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.2 | 52 |
| 5.1.4 GERD financed by business, % ^② | 51.7 | 18 ● |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 7.5 | 71 ○ |

| | | |
|---|------|----|
| 5.2 Innovation linkages | 25.2 | 84 |
| 5.2.1 University/industry research collaboration [†] | 49.2 | 44 |
| 5.2.2 State of cluster development [†] | 51.2 | 38 |
| 5.2.3 GERD financed by abroad, % ^② | 2.5 | 75 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 29 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 85 |

| | | |
|--|------|-------|
| 5.3 Knowledge absorption | 33.9 | 40 |
| 5.3.1 Intellectual property payments, % total trade | 1.5 | 17 ● |
| 5.3.2 High-tech imports less re-imports, % total trade | 14.9 | 12 ● |
| 5.3.3 ICT services imports, % total trade | 0.3 | 115 ○ |
| 5.3.4 FDI net inflows, % GDP | 0.9 | 99 |
| 5.3.5 Research talent, % in business enterprise ^② | 36.1 | 36 |

6 Knowledge & technology outputs **29.0** **46**

| | | |
|--|-------|----|
| 6.1 Knowledge creation | 15.2 | 54 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.9 | 67 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 59 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 1.6 | 18 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 6.2 | 86 |
| 6.1.5 Citable documents H index | 213.0 | 38 |

| | | |
|---|------|-------|
| 6.2 Knowledge impact | 41.1 | 44 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 3.1 | 24 |
| 6.2.2 New businesses/th pop. 15–64 | 0.9 | 75 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 31 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 8.4 | 43 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 42.3 | 20 |
| 6.3 Knowledge diffusion | 30.7 | 38 |
| 6.3.1 Intellectual property receipts, % total trade | 0.1 | 57 |
| 6.3.2 High-tech exports less re-exports, % total trade | 14.4 | 10 ● |
| 6.3.3 ICT services exports, % total trade | 0.2 | 113 ○ |
| 6.3.4 FDI net outflows, % GDP | 1.9 | 33 |

7 Creative outputs **31.1** **57**

| | | |
|---|------|----|
| 7.1 Intangible assets | 40.4 | 76 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 25.7 | 73 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 2.8 | 42 |
| 7.1.3 ICTs & business model creation [†] | 63.6 | 41 |
| 7.1.4 ICTs & organizational model creation [†] | 56.5 | 49 |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 34.9 | 27 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 1.0 | 74 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 4.7 | 46 |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.8 | 76 ○ |
| 7.2.5 Creative goods exports, % total trade | 9.6 | 5 ● |

| | | |
|--|-------|----|
| 7.3 Online creativity | 8.7 | 65 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 5.7 | 53 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.4 | 94 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 944.0 | 74 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 21.5 | 48 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 2.1 |
| GDP (US\$ billions) | 9.9 |
| GDP per capita, PPP\$ | 14,009.1 |
| Income group | Upper-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.4 | 58 |
| Innovation Output Sub-Index | 28.5 | 55 |
| Innovation Input Sub-Index | 42.3 | 62 |
| Innovation Efficiency Ratio | 0.7 | 56 |
| Global Innovation Index 2015 (out of 141) | 38.0 | 56 |

1 Institutions **71.4** **39**

| | | |
|--|------|------|
| 1.1 Political environment | 56.1 | 50 |
| 1.1.1 Political stability & safety* | 69.1 | 49 |
| 1.1.2 Government effectiveness* | 43.2 | 60 |
| 1.2 Regulatory environment | 70.7 | 47 |
| 1.2.1 Regulatory quality* | 56.4 | 52 |
| 1.2.2 Rule of law* | 46.3 | 61 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.0 | 51 |
| 1.3 Business environment | 87.3 | 12 ● |
| 1.3.1 Ease of starting a business* | 99.9 | 2 ● |
| 1.3.2 Ease of resolving insolvency* | 67.7 | 34 ● |
| 1.3.3 Ease of paying taxes* | 94.2 | 7 ● |

2 Human capital & research **33.4** **54**

| | | |
|---|-------|------|
| 2.1 Education | 63.6 | 13 |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years [Ⓐ] | 12.9 | 77 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 10.5 | 31 ● |
| 2.2 Tertiary education | 31.8 | 77 |
| 2.2.1 Tertiary enrolment, % gross | 39.4 | 64 |
| 2.2.2 Graduates in science & engineering, % | 21.2 | 47 |
| 2.2.3 Tertiary inbound mobility, % | 2.2 | 63 |
| 2.3 Research & development (R&D) | 4.8 | 74 |
| 2.3.1 Researchers, FTE/mn pop. | 838.4 | 49 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.4 | 64 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure **34.5** **94**

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 40.3 | 83 |
| 3.1.1 ICT access* | 67.5 | 51 |
| 3.1.2 ICT use* | 47.6 | 55 |
| 3.1.3 Government's online service* | 24.4 | 106 ○ |
| 3.1.4 E-participation* | 21.6 | 111 ○ |
| 3.2 General infrastructure | 15.5 | 127 ○ |
| 3.2.1 Electricity output, kWh/cap | 2,888.2 | 64 |
| 3.2.2 Logistics performance* | 2.5 | 107 ○ |
| 3.2.3 Gross capital formation, % GDP | n/a | n/a |
| 3.3 Ecological sustainability | 47.8 | 46 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 7.2 | 66 |
| 3.3.2 Environmental performance* | 78.0 | 49 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 4.9 | 22 ● |

4 Market sophistication **40.7** **81**

| | | |
|--|------|----|
| 4.1 Credit | 29.0 | 81 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 |
| 4.1.2 Domestic credit to private sector, % GDP | 49.6 | 67 |
| 4.1.3 Microfinance gross loans, % GDP | 0.3 | 46 |

| | | |
|--|------|------|
| 4.2 Investment | 36.4 | 65 |
| 4.2.1 Ease of protecting minority investors* | 71.7 | 14 ● |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 5.7 | 87 ○ |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.3 | 68 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale **56.8** **81**

| | | |
|--|------|-------|
| 4.3.1 Applied tariff rate, weighted mean, % [Ⓐ] | 1.8 | 48 |
| 4.3.2 Intensity of local competition [†] | 74.5 | 30 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 27.7 | 108 ○ |

5 Business sophistication **31.5** **65**

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 39.0 | 60 |
| 5.1.1 Knowledge-intensive employment, % | 26.3 | 50 |
| 5.1.2 Firms offering formal training, % firms | 46.9 | 29 |
| 5.1.3 GERD performed by business, % of GDP [Ⓐ] | 0.0 | 72 |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | 11.9 | 57 |

5.2 Innovation linkages **34.1** **51**

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 45.2 | 58 |
| 5.2.2 State of cluster development [†] | 44.3 | 68 |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓐ] | 0.1 | 63 |

5.3 Knowledge absorption **21.5** **96**

| | | |
|--|------|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.8 | 37 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.7 | 72 |
| 5.3.3 ICT services imports, % total trade | 1.4 | 35 ● |
| 5.3.4 FDI net inflows, % GDP | 0.5 | 113 ○ |
| 5.3.5 Research talent, % in business enterprise | 11.7 | 62 |

6 Knowledge & technology outputs **21.9** **78**

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 6.2 | 83 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.0 | 114 ○ |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 67 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.6 | 54 |
| 6.1.5 Citable documents H index | 74.0 | 95 |

6.2 Knowledge impact **42.0** **40**

| | | |
|---|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.1 | 38 |
| 6.2.2 New businesses/th pop. 15–64 | 3.7 | 32 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 16.1 | 23 ● |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 19.6 | 60 |

6.3 Knowledge diffusion **17.6** **110 ○**

| | | |
|--|-------|-------|
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 38 |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.1 | 50 |
| 6.3.3 ICT services exports, % total trade | 2.5 | 37 |
| 6.3.4 FDI net outflows, % GDP | (2.1) | 115 ○ |

7 Creative outputs **35.1** **46**

| | | |
|--|------|------|
| 7.1 Intangible assets | 50.7 | 32 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP [Ⓐ] | 4.0 | 32 |
| 7.1.3 ICTs & business model creation [†] | 61.3 | 50 |
| 7.1.4 ICTs & organizational model creation [†] | 54.9 | 61 |

7.2 Creative goods & services **25.5** **53**

| | | |
|--|-----|------|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.2 | 43 |
| 7.2.2 National feature films/mn pop. 15–69 | 1.9 | 55 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 2.6 | 12 ● |
| 7.2.5 Creative goods exports, % total trade | 0.2 | 77 |

7.3 Online creativity **13.2** **53**

| | | |
|--|---------|----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 6.9 | 50 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 1.6 | 71 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 3,131.7 | 43 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 21.3 | 49 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Togo

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 7.3 |
| GDP (US\$ billions) | 4.2 |
| GDP per capita, PPP\$ | 1,483.4 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|--------------|
| Global Innovation Index (out of 128) | 18.4 | 126 ○ |
| Innovation Output Sub-Index | 9.7 | 126 ○ |
| Innovation Input Sub-Index | 27.1 | 125 ○ |
| Innovation Efficiency Ratio | 0.4 | 124 ○ |
| Global Innovation Index 2015 (out of 141) | 18.4 | 140 |

| | | |
|--|-------------|--------------|
| 1 Institutions | 48.8 | 100 |
| 1.1 Political environment | 31.4 | 108 |
| 1.1.1 Political stability & safety* | 58.8 | 78 ● |
| 1.1.2 Government effectiveness* | 4.1 | 126 ○ |
| 1.2 Regulatory environment | 57.3 | 88 |
| 1.2.1 Regulatory quality* | 24.4 | 113 |
| 1.2.2 Rule of law* | 25.3 | 114 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.1 | 53 ● |
| 1.3 Business environment | 57.7 | 104 |
| 1.3.1 Ease of starting a business* | 78.4 | 100 |
| 1.3.2 Ease of resolving insolvency* | 43.1 | 83 |
| 1.3.3 Ease of paying taxes* | 51.7 | 112 |
| 2 Human capital & research | 14.9 | 113 |
| 2.1 Education | 35.8 | 96 |
| 2.1.1 Expenditure on education, % GDP | 4.8 | 56 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 15.4 | 80 |
| 2.1.3 School life expectancy, years ^② | 12.0 | 90 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 26.2 | 96 |
| 2.2 Tertiary education | 7.9 | 116 |
| 2.2.1 Tertiary enrolment, % gross | 10.1 | 105 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % ^② | 1.4 | 75 |
| 2.3 Research & development (R&D) | 1.1 | 102 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 35.9 | 93 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.2 | 84 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 18.1 | 127 ○ |
| 3.1 Information & communication technologies (ICTs) | 12.5 | 125 ○ |
| 3.1.1 ICT access* | 25.9 | 117 |
| 3.1.2 ICT use* | 3.3 | 118 |
| 3.1.3 Government's online service* | 11.0 | 121 ○ |
| 3.1.4 E-participation* | 9.8 | 123 ○ |
| 3.2 General infrastructure | 22.5 | 115 |
| 3.2.1 Electricity output, kWh/cap. | 16.3 | 119 ○ |
| 3.2.2 Logistics performance* | 2.3 | 118 |
| 3.2.3 Gross capital formation, % GDP | 24.6 | 44 ● |
| 3.3 Ecological sustainability | 19.4 | 125 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 2.6 | 116 ○ |
| 3.3.2 Environmental performance* | 46.1 | 116 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.2 | 105 |
| 4 Market sophistication | 30.2 | 120 |
| 4.1 Credit | 27.2 | 84 |
| 4.1.1 Ease of getting credit* | 30.0 | 106 |
| 4.1.2 Domestic credit to private sector, % GDP | 34.1 | 84 |
| 4.1.3 Microfinance gross loans, % GDP | 3.2 | 13 ● |

| | | |
|---|-------------|--------------|
| 4.2 Investment | 38.3 | 59 |
| 4.2.1 Ease of protecting minority investors* | 38.3 | 115 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |
| 4.3 Trade, competition, & market scale | 25.1 | 127 ○ |
| 4.3.1 Applied tariff rate, weighted mean, % | 9.4 | 112 |
| 4.3.2 Intensity of local competition [†] | n/a | n/a |
| 4.3.3 Domestic market scale, bn PPP\$ | 10.2 | 125 ○ |
| 5 Business sophistication | 23.4 | 108 |
| 5.1 Knowledge workers | 36.4 | 71 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms ^② | 31.0 | 56 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 15.4 | [125] |
| 5.2.1 University/industry research collaboration [†] | n/a | n/a |
| 5.2.2 State of cluster development [†] | n/a | n/a |
| 5.2.3 GERD financed by abroad, % ^② | 12.1 | 42 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | n/a | n/a |
| 5.3 Knowledge absorption | 18.5 | 108 |
| 5.3.1 Intellectual property payments, % total trade ^② | 0.1 | 95 |
| 5.3.2 High-tech imports less re-imports, % total trade ^② | 2.0 | 120 ○ |
| 5.3.3 ICT services imports, % total trade ^② | 0.6 | 90 |
| 5.3.4 FDI net inflows, % GDP | 6.5 | 20 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |
| 6 Knowledge & technology outputs | 16.0 | 114 |
| 6.1 Knowledge creation | 4.4 | 98 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 86 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 7.1 | 76 ● |
| 6.1.5 Citable documents H index | 37.0 | 124 ○ |
| 6.2 Knowledge impact | 1.7 | [125] |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | n/a | n/a |
| 6.2.2 New businesses/th pop. 15–64 | 0.3 | 94 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.9 | 107 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 41.9 | 22 ● |
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.0 | 97 |
| 6.3.2 High-tech exports less re-exports, % total trade ^② | 0.0 | 114 |
| 6.3.3 ICT services exports, % total trade ^② | 0.9 | 84 |
| 6.3.4 FDI net outflows, % GDP ^② | 10.7 | 1 ● |
| 7 Creative outputs | 3.5 | 126 ○ |
| 7.1 Intangible assets | 6.6 | 126 ○ |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 17.4 | 86 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 90 |
| 7.1.3 ICTs & business model creation [†] | n/a | n/a |
| 7.1.4 ICTs & organizational model creation [†] | n/a | n/a |
| 7.2 Creative goods & services | 0.6 | [127] |
| 7.2.1 Cultural & creative services exports, % of total trade ^② | 0.0 | 76 |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade ^② | 0.0 | 105 |
| 7.3 Online creativity | 0.3 | 115 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.7 | 102 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 123 ○ |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 13.6 | 123 ○ |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 11.3 |
| GDP (US\$ billions) | 43.6 |
| GDP per capita, PPP\$ | 11,428.2 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 30.6 | 77 |
| Innovation Output Sub-Index | 23.0 | 84 |
| Innovation Input Sub-Index | 38.1 | 82 |
| Innovation Efficiency Ratio | 0.6 | 86 |
| Global Innovation Index 2015 (out of 141) | 33.5 | 76 |

| | | | |
|----------|--|-------------|--------------|
| 1 | Institutions | 58.3 | 70 |
| 1.1 | Political environment | 37.6 | 96 |
| 1.1.1 | Political stability & safety* | 39.6 | 110 ○ |
| 1.1.2 | Government effectiveness* | 35.5 | 76 |
| 1.2 | Regulatory environment | 66.0 | 69 |
| 1.2.1 | Regulatory quality* | 36.1 | 91 |
| 1.2.2 | Rule of law* | 44.2 | 68 |
| 1.2.3 | Cost of redundancy dismissal, salary weeks | 12.1 | 45 |
| 1.3 | Business environment | 71.2 | 62 |
| 1.3.1 | Ease of starting a business* | 83.6 | 78 |
| 1.3.2 | Ease of resolving insolvency* | 54.5 | 54 |
| 1.3.3 | Ease of paying taxes* | 75.5 | 66 |
| 2 | Human capital & research | 38.0 | 45 |
| 2.1 | Education | 51.0 | 55 |
| 2.1.1 | Expenditure on education, % GDP | 6.2 | 23 ● |
| 2.1.2 | Gov't expenditure/pupil, secondary, % GDP/cap [Ⓐ] | 24.4 | 35 ● |
| 2.1.3 | School life expectancy, years | 14.7 | 53 |
| 2.1.4 | PISA scales in reading, maths, & science | 396.6 | 56 ○ |
| 2.1.5 | Pupil-teacher ratio, secondary [Ⓐ] | 13.6 | 54 |
| 2.2 | Tertiary education | 55.1 | 14 ● |
| 2.2.1 | Tertiary enrolment, % gross | 34.6 | 74 |
| 2.2.2 | Graduates in science & engineering, % | 44.1 | 3 ● |
| 2.2.3 | Tertiary inbound mobility, % | 1.8 | 67 |
| 2.3 | Research & development (R&D) | 7.9 | 66 |
| 2.3.1 | Researchers, FTE/mn pop. [Ⓐ] | 1,393.1 | 42 |
| 2.3.2 | Gross expenditure on R&D, % GDP [Ⓐ] | 0.7 | 50 |
| 2.3.3 | Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 | QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 | Infrastructure | 41.6 | 70 |
| 3.1 | Information & communication technologies (ICTs) | 53.0 | 55 |
| 3.1.1 | ICT access* | 50.0 | 80 |
| 3.1.2 | ICT use* | 33.7 | 72 |
| 3.1.3 | Government's online service* | 63.8 | 39 ● |
| 3.1.4 | E-participation* | 64.7 | 33 ● |
| 3.2 | General infrastructure | 24.7 | 107 |
| 3.2.1 | Electricity output, kWh/cap. | 1,687.9 | 81 |
| 3.2.2 | Logistics performance* | 2.6 | 103 ○ |
| 3.2.3 | Gross capital formation, % GDP | 21.5 | 70 |
| 3.3 | Ecological sustainability | 47.1 | 47 |
| 3.3.1 | GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 10.0 | 29 ● |
| 3.3.2 | Environmental performance* | 77.3 | 52 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP\$ GDP | 1.1 | 60 |
| 4 | Market sophistication | 29.0 | 123 ○ |
| 4.1 | Credit | 22.4 | 103 |
| 4.1.1 | Ease of getting credit* | 35.0 | 101 |
| 4.1.2 | Domestic credit to private sector, % GDP | 76.5 | 37 ● |
| 4.1.3 | Microfinance gross loans, % GDP | 0.3 | 48 |

| | | | |
|-------|--|-------|-------|
| 4.2 | Investment | 24.4 | 114 ○ |
| 4.2.1 | Ease of protecting minority investors* | 50.0 | 86 |
| 4.2.2 | Market capitalization, % GDP | 19.2 | 67 |
| 4.2.3 | Total value of stocks traded, % GDP [Ⓐ] | 2.8 | 49 |
| 4.2.4 | Venture capital deals/bn PPP\$ GDP | 0.0 | 41 |
| 4.3 | Trade, competition, & market scale | 40.0 | 120 ○ |
| 4.3.1 | Applied tariff rate, weighted mean, % [Ⓐ] | 15.9 | 127 ○ |
| 4.3.2 | Intensity of local competition [†] | 62.5 | 86 |
| 4.3.3 | Domestic market scale, bn PPP\$ | 124.7 | 71 |

5 Business sophistication **23.7** **107**

| | | | |
|-------|---|------|-------|
| 5.1 | Knowledge workers | 31.4 | 85 |
| 5.1.1 | Knowledge-intensive employment, % [Ⓐ] | 20.9 | 67 |
| 5.1.2 | Firms offering formal training, % firms | 28.9 | 60 |
| 5.1.3 | GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 | GERD financed by business, % [Ⓐ] | 18.7 | 65 |
| 5.1.5 | Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 | Innovation linkages | 20.2 | 110 ○ |
| 5.2.1 | University/industry research collaboration [†] | 32.0 | 107 ○ |
| 5.2.2 | State of cluster development [†] | 38.8 | 91 |
| 5.2.3 | GERD financed by abroad, % [Ⓐ] | 4.4 | 71 |
| 5.2.4 | JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 | Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 107 ○ |
| 5.3 | Knowledge absorption | 19.4 | 103 |
| 5.3.1 | Intellectual property payments, % total trade [Ⓐ] | 0.1 | 104 ○ |
| 5.3.2 | High-tech imports less re-imports, % total trade [Ⓐ] | 8.2 | 55 |
| 5.3.3 | ICT services imports, % total trade [Ⓐ] | 0.5 | 102 |
| 5.3.4 | FDI net inflows, % GDP | 2.1 | 78 |
| 5.3.5 | Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs **19.9** **89**

| | | | |
|-------|---|-------|-------|
| 6.1 | Knowledge creation | 14.8 | 56 |
| 6.1.1 | Patents by origin/bn PPP\$ GDP | 1.1 | 61 |
| 6.1.2 | PCT patent applications/bn PPP\$ GDP | 0.1 | 69 |
| 6.1.3 | Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 | Scientific & technical articles/bn PPP\$ GDP | 28.5 | 26 ● |
| 6.1.5 | Citable documents H index | 109.0 | 73 |
| 6.2 | Knowledge impact | 33.1 | 80 |
| 6.2.1 | Growth rate of PPP\$ GDP/worker, % | 0.7 | 73 |
| 6.2.2 | New businesses/th pop. 15–64 [Ⓐ] | 1.5 | 55 |
| 6.2.3 | Computer software spending, % GDP | 0.3 | 36 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP\$ GDP | 5.6 | 57 |
| 6.2.5 | High- & medium-high-tech manufactures, % [Ⓐ] | 32.4 | 35 |
| 6.3 | Knowledge diffusion | 11.9 | 122 ○ |
| 6.3.1 | Intellectual property receipts, % total trade [Ⓐ] | 0.1 | 49 |
| 6.3.2 | High-tech exports less re-exports, % total trade [Ⓐ] | 3.3 | 39 ● |
| 6.3.3 | ICT services exports, % total trade [Ⓐ] | 1.7 | 56 |
| 6.3.4 | FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs **26.1** **81**

| | | | |
|-------|--|-------|-------|
| 7.1 | Intangible assets | 38.1 | 85 |
| 7.1.1 | Trademarks by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.2 | Industrial designs by origin/bn PPP\$ GDP | 1.3 | 58 |
| 7.1.3 | ICTs & business model creation [†] | 51.2 | 89 |
| 7.1.4 | ICTs & organizational model creation [†] | 40.6 | 105 ○ |
| 7.2 | Creative goods & services | 24.4 | 58 |
| 7.2.1 | Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 | National feature films/mn pop. 15–69 | 1.0 | 73 |
| 7.2.3 | Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 | Printing & publishing manufactures, % [Ⓐ] | 0.7 | 78 |
| 7.2.5 | Creative goods exports, % total trade [Ⓐ] | 2.6 | 19 ● |
| 7.3 | Online creativity | 3.6 | 83 |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 2.9 | 67 |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 0.2 | 101 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 499.9 | 89 |
| 7.3.4 | Video uploads on YouTube/pop. 15–69 | 7.8 | 62 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Turkey

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 78.7 |
| GDP (US\$ billions) | 733.6 |
| GDP per capita, PPP\$ | 20,437.8 |
| Income group | Upper-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 39.0 | 42 |
| Innovation Output Sub-Index | 35.5 | 37 |
| Innovation Input Sub-Index | 42.5 | 59 |
| Innovation Efficiency Ratio | 0.8 | 13 ● |
| Global Innovation Index 2015 (out of 141) | 37.8 | 58 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 54.6 | 82 |
| 1.1 Political environment | 43.1 | 88 |
| 1.1.1 Political stability & safety* | 36.5 | 116 ○ |
| 1.1.2 Government effectiveness* | 49.6 | 47 |
| 1.2 Regulatory environment | 54.2 | 96 |
| 1.2.1 Regulatory quality* | 54.8 | 54 |
| 1.2.2 Rule of law* | 48.0 | 59 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 29.8 | 115 ○ |
| 1.3 Business environment | 66.6 | 74 |
| 1.3.1 Ease of starting a business* | 85.2 | 72 |
| 1.3.2 Ease of resolving insolvency* | 35.1 | 104 ○ |
| 1.3.3 Ease of paying taxes* | 79.4 | 51 |

| | | |
|--|-------------|-----------|
| 2 Human capital & research | 39.2 | 43 |
| 2.1 Education | 50.0 | 57 |
| 2.1.1 Expenditure on education, % GDP ^② | 2.9 | 103 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | 16.4 | 24 |
| 2.1.4 PISA scales in reading, maths, & science | 462.3 | 40 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 20.1 | 84 |
| 2.2 Tertiary education | 39.1 | 49 |
| 2.2.1 Tertiary enrolment, % gross | 79.0 | 16 ● |
| 2.2.2 Graduates in science & engineering, % ^② | 20.9 | 49 |
| 2.2.3 Tertiary inbound mobility, % | 1.1 | 79 |
| 2.3 Research & development (R&D) | 28.6 | 38 |
| 2.3.1 Researchers, FTE/mn pop. | 1,156.5 | 45 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.0 | 35 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 50.8 | 36 |
| 2.3.4 QS university ranking, average score top 3* | 33.5 | 39 |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 43.6 | 62 |
| 3.1 Information & communication technologies (ICTs) | 50.7 | 63 |
| 3.1.1 ICT access* | 60.0 | 66 |
| 3.1.2 ICT use* | 37.7 | 66 |
| 3.1.3 Government's online service* | 55.9 | 53 |
| 3.1.4 E-participation* | 49.0 | 64 |
| 3.2 General infrastructure | 38.2 | 60 |
| 3.2.1 Electricity output, kWh/cap | 3,265.5 | 59 |
| 3.2.2 Logistics performance* | 3.5 | 29 |
| 3.2.3 Gross capital formation, % GDP | 20.6 | 78 |
| 3.3 Ecological sustainability | 42.1 | 66 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 9.1 | 43 |
| 3.3.2 Environmental performance* | 67.7 | 86 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.5 | 52 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 47.7 | 46 |
| 4.1 Credit | 26.2 | 91 |
| 4.1.1 Ease of getting credit* | 50.0 | 69 |
| 4.1.2 Domestic credit to private sector, % GDP | 74.6 | 39 |
| 4.1.3 Microfinance gross loans, % GDP ^② | 0.0 | 79 ○ |

| | | |
|--|------|------|
| 4.2 Investment | 38.6 | 56 |
| 4.2.1 Ease of protecting minority investors* | 68.3 | 20 ● |
| 4.2.2 Market capitalization, % GDP | 27.5 | 53 |
| 4.2.3 Total value of stocks traded, % GDP | 46.3 | 16 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 64 |

| | | |
|---|---------|------|
| 4.3 Trade, competition, & market scale | 78.3 | 12 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 2.8 | 58 |
| 4.3.2 Intensity of local competition [†] | 81.2 | 9 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 1,514.9 | 17 ● |

5 Business sophistication 27.6 **86**

| | | |
|--|------|------|
| 5.1 Knowledge workers | 32.8 | 83 |
| 5.1.1 Knowledge-intensive employment, % | 19.7 | 71 |
| 5.1.2 Firms offering formal training, % firms | 28.4 | 61 |
| 5.1.3 GERD performed by business, % of GDP | 0.5 | 36 |
| 5.1.4 GERD financed by business, % | 50.9 | 20 |
| 5.1.5 Females employed w/advanced degrees, % total | 7.4 | 72 ○ |

| | | |
|---|------|------|
| 5.2 Innovation linkages | 22.9 | 93 |
| 5.2.1 University/industry research collaboration [†] | 44.8 | 59 |
| 5.2.2 State of cluster development [†] | 48.6 | 50 |
| 5.2.3 GERD financed by abroad, % | 1.1 | 87 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 56 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 39 |

| | | |
|--|------|-------|
| 5.3 Knowledge absorption | 27.0 | 72 |
| 5.3.1 Intellectual property payments, % total trade | 0.3 | 72 |
| 5.3.2 High-tech imports less re-imports, % total trade | 8.9 | 49 |
| 5.3.3 ICT services imports, % total trade | 0.1 | 118 ○ |
| 5.3.4 FDI net inflows, % GDP | 1.6 | 89 |
| 5.3.5 Research talent, % in business enterprise | 46.7 | 26 |

6 Knowledge & technology outputs 29.1 **45**

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 27.0 | 35 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 3.4 | 33 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.6 | 30 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 2.3 | 11 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 16.8 | 44 |
| 6.1.5 Citable documents H index | 266.0 | 36 |

| | | |
|---|------|-----|
| 6.2 Knowledge impact | 38.6 | 53 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.2 | 58 |
| 6.2.2 New businesses/th pop. 15–64 | 1.1 | 64 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 9 ● |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 5.9 | 55 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 28.2 | 43 |

| | | |
|--|------|-------|
| 6.3 Knowledge diffusion | 21.7 | 81 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.2 | 62 |
| 6.3.3 ICT services exports, % total trade | 0.1 | 116 ○ |
| 6.3.4 FDI net outflows, % GDP | 0.9 | 50 |

7 Creative outputs 42.0 **31**

| | | |
|---|-------|-----|
| 7.1 Intangible assets | 67.5 | 5 ● |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 131.2 | 4 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 27.2 | 1 ● |
| 7.1.3 ICTs & business model creation [†] | 61.2 | 51 |
| 7.1.4 ICTs & organizational model creation [†] | 52.0 | 68 |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 23.0 | 63 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 72 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | 1.6 | 60 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 5.5 | 42 |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.1 | 57 |
| 7.2.5 Creative goods exports, % total trade | 3.0 | 14 ● |

| | | |
|--|-------|----|
| 7.3 Online creativity | 9.8 | 62 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 13.2 | 35 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.5 | 65 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 793.9 | 81 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 17.9 | 56 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|--------------------|
| Population (millions) | 39.0 |
| GDP (US\$ billions) | 24.7 |
| GDP per capita, PPP\$ | 2,002.6 |
| Income group | Low income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 27.1 | 99 |
| Innovation Output Sub-Index | 18.6 | 105 |
| Innovation Input Sub-Index | 35.6 | 91 |
| Innovation Efficiency Ratio | 0.5 | 106 |
| Global Innovation Index 2015 (out of 141) | 27.6 | 111 |

| | | |
|---|-------------|------------|
| 1 Institutions | 53.7 | 85 |
| 1.1 Political environment | 33.9 | 103 |
| 1.1.1 Political stability & safety* | 39.7 | 108 |
| 1.1.2 Government effectiveness* | 28.0 | 91 |
| 1.2 Regulatory environment | 67.6 | 61 |
| 1.2.1 Regulatory quality* | 35.7 | 92 |
| 1.2.2 Rule of law* | 37.4 | 86 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.7 | 21 ● |
| 1.3 Business environment | 59.6 | 97 |
| 1.3.1 Ease of starting a business* | 67.8 | 120 |
| 1.3.2 Ease of resolving insolvency* | 39.8 | 92 |
| 1.3.3 Ease of paying taxes* | 71.3 | 79 |
| 2 Human capital & research | 19.8 | 102 |
| 2.1 Education | 27.1 | 114 |
| 2.1.1 Expenditure on education, % GDP | 2.2 | 112 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 19.4 | 59 |
| 2.1.3 School life expectancy, years [Ⓐ] | 10.0 | 105 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 21.3 | 87 |
| 2.2 Tertiary education | 29.7 | 82 |
| 2.2.1 Tertiary enrolment, % gross [Ⓐ] | 4.5 | 115 ○ |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % [Ⓐ] | 10.7 | 12 ● |
| 2.3 Research & development (R&D) | 2.6 | 87 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 38.1 | 91 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 0.5 | 61 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |
| 3 Infrastructure | 37.8 | 83 |
| 3.1 Information & communication technologies (ICTs) | 15.8 | 123 ○ |
| 3.1.1 ICT access* | 23.5 | 120 ○ |
| 3.1.2 ICT use* | 11.0 | 106 |
| 3.1.3 Government's online service* | 15.0 | 116 |
| 3.1.4 E-participation* | 13.7 | 120 ○ |
| 3.2 General infrastructure | 57.9 | [7] |
| 3.2.1 Electricity output, kWh/cap | n/a | n/a |
| 3.2.2 Logistics performance* | n/a | n/a |
| 3.2.3 Gross capital formation, % GDP | 33.4 | 10 ● |
| 3.3 Ecological sustainability | 39.6 | 79 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | n/a | n/a |
| 3.3.2 Environmental performance* | 57.6 | 107 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.5 | 79 |
| 4 Market sophistication | 35.0 | 107 |
| 4.1 Credit | 29.6 | 77 |
| 4.1.1 Ease of getting credit* | 65.0 | 39 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 14.4 | 118 |
| 4.1.3 Microfinance gross loans, % GDP | 1.6 | 23 ● |

| | | |
|--|------|------|
| 4.2 Investment | 24.3 | 116 |
| 4.2.1 Ease of protecting minority investors* | 51.7 | 83 |
| 4.2.2 Market capitalization, % GDP [Ⓐ] | 31.4 | 48 |
| 4.2.3 Total value of stocks traded, % GDP [Ⓐ] | 0.0 | 81 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 62 |
| 4.3 Trade, competition, & market scale | 51.0 | 100 |
| 4.3.1 Applied tariff rate, weighted mean, % | 8.6 | 110 |
| 4.3.2 Intensity of local competition [†] | 71.4 | 49 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 75.1 | 81 |

| | | |
|---|-------------|-----------|
| 5 Business sophistication | 31.9 | 61 |
| 5.1 Knowledge workers | 17.7 | 115 |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 4.1 | 101 ○ |
| 5.1.2 Firms offering formal training, % firms | 34.7 | 45 |
| 5.1.3 GERD performed by business, % of GDP [Ⓐ] | 0.2 | 55 |
| 5.1.4 GERD financed by business, % [Ⓐ] | 13.7 | 67 |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓐ] | 2.7 | 82 |
| 5.2 Innovation linkages | 45.8 | 16 ● |
| 5.2.1 University/industry research collaboration [†] | 44.7 | 60 |
| 5.2.2 State of cluster development [†] | 41.5 | 81 |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 57.3 | 3 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP [Ⓐ] | 0.0 | 89 |
| 5.3 Knowledge absorption | 32.3 | 45 ● |
| 5.3.1 Intellectual property payments, % total trade | 0.2 | 83 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.2 | 77 |
| 5.3.3 ICT services imports, % total trade | 1.2 | 54 |
| 5.3.4 FDI net inflows, % GDP | 4.2 | 38 ● |
| 5.3.5 Research talent, % in business enterprise [Ⓐ] | 50.6 | 23 ● |

| | | |
|---|-------------|-----------|
| 6 Knowledge & technology outputs | 19.0 | 92 |
| 6.1 Knowledge creation | 6.9 | 77 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 109 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP [Ⓐ] | 0.1 | 75 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 11.6 | 60 |
| 6.1.5 Citable documents H index | 118.0 | 67 |
| 6.2 Knowledge impact | 31.6 | 86 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.2 | 60 |
| 6.2.2 New businesses/th pop. 15–64 [Ⓐ] | 1.2 | 63 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.4 | 100 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 18.5 | 107 |
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 32 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 99 |
| 6.3.3 ICT services exports, % total trade | 0.8 | 86 |
| 6.3.4 FDI net outflows, % GDP [Ⓐ] | 0.2 | 74 |

| | | |
|--|-------------|------------|
| 7 Creative outputs | 18.3 | 107 |
| 7.1 Intangible assets | 36.1 | 93 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 14.3 | 89 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 55.3 | 75 |
| 7.1.4 ICTs & organizational model creation [†] | 45.6 | 87 |
| 7.2 Creative goods & services | 0.9 | [123] |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 81 ○ |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 99 |
| 7.3 Online creativity | 0.2 | 118 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.3 | 114 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.1 | 116 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 46.5 | 111 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 0.2 | 73 ○ |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Ukraine

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 44.8 |
| GDP (US\$ billions) | 90.5 |
| GDP per capita, PPP\$ | 7,518.8 |
| Income group | Lower-middle income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.7 | 56 |
| Innovation Output Sub-Index | 32.5 | 40 |
| Innovation Input Sub-Index | 38.9 | 76 |
| Innovation Efficiency Ratio | 0.8 | 12 ● |
| Global Innovation Index 2015 (out of 141) | 36.5 | 64 |

1 Institutions 48.7 101

| | | |
|--|------|-------|
| 1.1 Political environment | 21.7 | 123 ○ |
| 1.1.1 Political stability & safety* | 14.9 | 125 ○ |
| 1.1.2 Government effectiveness* | 28.5 | 88 |
| 1.2 Regulatory environment | 59.2 | 84 |
| 1.2.1 Regulatory quality* | 29.2 | 105 |
| 1.2.2 Rule of law* | 27.5 | 110 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 13.0 | 49 |
| 1.3 Business environment | 65.2 | 79 |
| 1.3.1 Ease of starting a business* | 93.9 | 29 |
| 1.3.2 Ease of resolving insolvency* | 31.1 | 113 ○ |
| 1.3.3 Ease of paying taxes* | 70.7 | 81 |

2 Human capital & research 40.8 40

| | | |
|---|---------|------|
| 2.1 Education | 60.9 | 20 ● |
| 2.1.1 Expenditure on education, % GDP | 6.7 | 18 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 30.4 | 18 ● |
| 2.1.3 School life expectancy, years | 15.3 | 40 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | 11.8 | 42 |
| 2.2 Tertiary education | 47.1 | 24 ● |
| 2.2.1 Tertiary enrolment, % gross | 82.3 | 10 ● |
| 2.2.2 Graduates in science & engineering, % | 25.5 | 27 |
| 2.2.3 Tertiary inbound mobility, % | 2.8 | 57 |
| 2.3 Research & development (R&D) | 14.4 | 50 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 1,165.2 | 44 |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.7 | 54 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 29.2 | 45 |

3 Infrastructure 32.3 99

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 38.6 | 87 |
| 3.1.1 ICT access* | 62.7 | 62 |
| 3.1.2 ICT use* | 21.7 | 92 |
| 3.1.3 Government's online service* | 26.8 | 105 |
| 3.1.4 E-participation* | 43.1 | 74 |
| 3.2 General infrastructure | 24.3 | 110 |
| 3.2.1 Electricity output, kWh/cap | 4,258.2 | 49 |
| 3.2.2 Logistics performance* | 3.0 | 59 |
| 3.2.3 Gross capital formation, % GDP | 11.6 | 123 ○ |
| 3.3 Ecological sustainability | 34.1 | 100 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 3.0 | 115 ○ |
| 3.3.2 Environmental performance* | 79.7 | 44 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.5 | 81 |

4 Market sophistication 42.1 75

| | | |
|--|------|------|
| 4.1 Credit | 34.7 | 58 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 76.2 | 38 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 81 ○ |

| | | |
|--|------|-------|
| 4.2 Investment | 24.5 | 113 ○ |
| 4.2.1 Ease of protecting minority investors* | 53.3 | 77 |
| 4.2.2 Market capitalization, % GDP ^② | 11.8 | 76 |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.7 | 63 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 42 |

| | | |
|--|-------|----|
| 4.3 Trade, competition, & market scale | 67.1 | 46 |
| 4.3.1 Applied tariff rate, weighted mean, % ^② | 2.1 | 51 |
| 4.3.2 Intensity of local competition [†] | 60.9 | 94 |
| 4.3.3 Domestic market scale, bn PPP\$ | 371.8 | 46 |

5 Business sophistication 30.6 73

| | | |
|---|------|-----|
| 5.1 Knowledge workers | 42.4 | 48 |
| 5.1.1 Knowledge-intensive employment, % ^② | 33.7 | 39 |
| 5.1.2 Firms offering formal training, % firms | 22.6 | 76 |
| 5.1.3 GERD performed by business, % of GDP | 0.4 | 40 |
| 5.1.4 GERD financed by business, % | 35.2 | 44 |
| 5.1.5 Females employed w/advanced degrees, % total ^② | 28.1 | 4 ● |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 23.7 | 88 |
| 5.2.1 University/industry research collaboration [†] | 41.7 | 72 |
| 5.2.2 State of cluster development [†] | 32.5 | 113 ○ |
| 5.2.3 GERD financed by abroad, % | 19.8 | 21 ● |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 74 ○ |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.3 | 43 |

| | | |
|--|------|-----|
| 5.3 Knowledge absorption | 25.6 | 82 |
| 5.3.1 Intellectual property payments, % total trade | 0.8 | 38 |
| 5.3.2 High-tech imports less re-imports, % total trade | 6.7 | 73 |
| 5.3.3 ICT services imports, % total trade | 0.9 | 68 |
| 5.3.4 FDI net inflows, % GDP | 0.6 | 110 |
| 5.3.5 Research talent, % in business enterprise ^② | 35.3 | 38 |

6 Knowledge & technology outputs 34.1 33

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 46.2 | 16 ● |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 6.6 | 19 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.4 | 41 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 24.9 | 1 ● |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.6 | 57 |
| 6.1.5 Citable documents H index | 174.0 | 44 |

| | | |
|--|-------|------|
| 6.2 Knowledge impact | 30.4 | 90 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (0.4) | 96 ○ |
| 6.2.2 New businesses/th pop. 15–64 ^② | 0.9 | 74 |
| 6.2.3 Computer software spending, % GDP | 0.4 | 20 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 3.5 | 71 |
| 6.2.5 High- & medium-high-tech manufactures, % | 26.5 | 45 |

| | | |
|--|------|------|
| 6.3 Knowledge diffusion | 25.6 | 61 |
| 6.3.1 Intellectual property receipts, % total trade | 0.2 | 35 |
| 6.3.2 High-tech exports less re-exports, % total trade | 2.9 | 45 |
| 6.3.3 ICT services exports, % total trade | 3.0 | 23 ● |
| 6.3.4 FDI net outflows, % GDP | 0.4 | 62 |

7 Creative outputs 31.0 58

| | | |
|---|------|------|
| 7.1 Intangible assets | 49.0 | 42 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 68.2 | 24 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 13.3 | 10 ● |
| 7.1.3 ICTs & business model creation [†] | 47.0 | 106 |
| 7.1.4 ICTs & organizational model creation [†] | 51.0 | 71 |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 12.2 | 87 |
| 7.2.1 Cultural & creative services exports, % of total trade | 0.2 | 40 |
| 7.2.2 National feature films/mn pop. 15–69 | 0.4 | 94 ○ |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | 0.7 | 79 |
| 7.2.5 Creative goods exports, % total trade | 0.6 | 56 |

| | | |
|--|---------|----|
| 7.3 Online creativity | 13.8 | 51 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 4.6 | 57 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 6.0 | 48 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,472.1 | 64 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 33.7 | 34 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 9.2 |
| GDP (US\$ billions) | 345.5 |
| GDP per capita, PPP\$ | 67,616.9 |
| Income group | High income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 39.4 | 41 |
| Innovation Output Sub-Index | 24.2 | 75 |
| Innovation Input Sub-Index | 54.5 | 25 |
| Innovation Efficiency Ratio | 0.4 | 117 ○ |
| Global Innovation Index 2015 (out of 141) | 40.1 | 47 |

| | | |
|---|-------------|-----------|
| 1 Institutions | 80.9 | 22 |
| 1.1 Political environment | 81.6 | 18 |
| 1.1.1 Political stability & safety* | 83.1 | 27 |
| 1.1.2 Government effectiveness* | 80.1 | 19 |
| 1.2 Regulatory environment | 83.4 | 22 |
| 1.2.1 Regulatory quality* | 69.0 | 33 |
| 1.2.2 Rule of law* | 64.8 | 37 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 77.7 | 39 |
| 1.3.1 Ease of starting a business* | 90.0 | 50 |
| 1.3.2 Ease of resolving insolvency* | 43.7 | 81 |
| 1.3.3 Ease of paying taxes* | 99.4 | 1 ● |
| 2 Human capital & research | 40.7 | 41 |
| 2.1 Education | 43.8 | 76 |
| 2.1.1 Expenditure on education, % GDP | n/a | n/a |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 18.3 | 65 |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | 468.7 | 38 |
| 2.1.5 Pupil-teacher ratio, secondary | 13.3 | 52 |
| 2.2 Tertiary education | 49.2 | 20 |
| 2.2.1 Tertiary enrolment, % gross | 22.0 | 89 ○ |
| 2.2.2 Graduates in science & engineering, % | 20.4 | 51 |
| 2.2.3 Tertiary inbound mobility, % | 44.8 | 1 ● |
| 2.3 Research & development (R&D) | 29.1 | 37 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | 0.7 | 48 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 32.5 | 41 |
| 2.3.4 QS university ranking, average score top 3* | 32.5 | 40 |
| 3 Infrastructure | 57.5 | 23 |
| 3.1 Information & communication technologies (ICTs) | 80.2 | 12 ● |
| 3.1.1 ICT access* | 78.6 | 26 |
| 3.1.2 ICT use* | 69.9 | 20 |
| 3.1.3 Government's online service* | 88.2 | 12 ● |
| 3.1.4 E-participation* | 84.3 | 13 ● |
| 3.2 General infrastructure | 52.5 | 13 ● |
| 3.2.1 Electricity output, kWh/cap | 11,360.6 | 10 ● |
| 3.2.2 Logistics performance* | 3.5 | 26 |
| 3.2.3 Gross capital formation, % GDP | 24.2 | 46 |
| 3.3 Ecological sustainability | 39.9 | 77 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.9 | 71 |
| 3.3.2 Environmental performance* | 69.4 | 82 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.3 | 42 |
| 4 Market sophistication | 48.7 | 42 |
| 4.1 Credit | 34.9 | 57 |
| 4.1.1 Ease of getting credit* | 45.0 | 81 ○ |
| 4.1.2 Domestic credit to private sector, % GDP | 65.4 | 47 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|-------------|-----------|
| 4.2 Investment | 38.6 | 55 |
| 4.2.1 Ease of protecting minority investors* | 60.0 | 47 |
| 4.2.2 Market capitalization, % GDP | 50.5 | 32 |
| 4.2.3 Total value of stocks traded, % GDP | 35.9 | 20 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.1 | 34 |
| 4.3 Trade, competition, & market scale | 72.7 | 26 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.6 | 66 |
| 4.3.2 Intensity of local competition† | 82.6 | 7 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 617.1 | 31 |
| 5 Business sophistication | 44.8 | 24 |
| 5.1 Knowledge workers | 56.5 | 25 |
| 5.1.1 Knowledge-intensive employment, % ^② | 36.1 | 32 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 0.5 | 33 |
| 5.1.4 GERD financed by business, % | 74.3 | 4 ● |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 53.0 | 5 ● |
| 5.2.1 University/industry research collaboration† | 62.1 | 21 |
| 5.2.2 State of cluster development† | 74.8 | 1 ● |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 9 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.1 | 68 |
| 5.3 Knowledge absorption | 24.8 | 85 |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade ^② | 5.5 | 89 ○ |
| 5.3.3 ICT services imports, % total trade | n/a | n/a |
| 5.3.4 FDI net inflows, % GDP | 2.5 | 67 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |
| 6 Knowledge & technology outputs | 20.8 | 86 |
| 6.1 Knowledge creation | 3.7 | 102 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.1 | 108 ○ |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.1 | 58 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 3.2 | 106 ○ |
| 6.1.5 Citable documents H index | 112.0 | 72 |
| 6.2 Knowledge impact | 31.8 | 85 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 1.5 | 51 |
| 6.2.2 New businesses/th pop. 15–64 ^② | 1.4 | 58 |
| 6.2.3 Computer software spending, % GDP | 0.3 | 57 ○ |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 7.1 | 48 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |
| 6.3 Knowledge diffusion | 26.9 | 53 |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade ^② | 0.1 | 111 ○ |
| 6.3.3 ICT services exports, % total trade | n/a | n/a |
| 6.3.4 FDI net outflows, % GDP | 0.8 | 54 |
| 7 Creative outputs | 27.6 | 70 |
| 7.1 Intangible assets | 45.7 | 56 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 11.3 | 96 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.1 | 102 ○ |
| 7.1.3 ICTs & business model creation† | 79.1 | 7 ● |
| 7.1.4 ICTs & organizational model creation† | 74.8 | 10 ● |
| 7.2 Creative goods & services | 4.1 | [109] |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 12.1 | 29 |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 121 ○ |
| 7.3 Online creativity | 14.8 | 49 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 11.9 | 38 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 6.8 | 45 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,889.2 | 54 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 26.6 | 47 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

United Kingdom

Key indicators

| | |
|-----------------------------|-------------|
| Population (millions) | 64.7 |
| GDP (US\$ billions) | 2,849.3 |
| GDP per capita, PPP\$ | 41,158.9 |
| Income group | High income |
| Region | Europe |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 61.9 | 3 ● |
| Innovation Output Sub-Index | 56.3 | 4 ● |
| Innovation Input Sub-Index | 67.5 | 7 |
| Innovation Efficiency Ratio | 0.8 | 14 |
| Global Innovation Index 2015 (out of 141) | 62.4 | 2 |

1 Institutions 87.6 13

| | | |
|--|------|------|
| 1.1 Political environment | 78.9 | 22 |
| 1.1.1 Political stability & safety* | 73.8 | 45 ○ |
| 1.1.2 Government effectiveness* | 83.9 | 14 |
| 1.2 Regulatory environment | 94.7 | 8 |
| 1.2.1 Regulatory quality* | 90.1 | 7 |
| 1.2.2 Rule of law* | 94.2 | 13 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 9.3 | 28 |
| 1.3 Business environment | 89.3 | 7 |
| 1.3.1 Ease of starting a business* | 94.6 | 17 |
| 1.3.2 Ease of resolving insolvency* | 82.0 | 12 |
| 1.3.3 Ease of paying taxes* | 91.3 | 15 |

2 Human capital & research 62.6 7

| | | |
|---|---------|------|
| 2.1 Education | 58.4 | 28 |
| 2.1.1 Expenditure on education, % GDP | 5.7 | 31 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 22.5 | 47 ○ |
| 2.1.3 School life expectancy, years | 17.8 | 10 |
| 2.1.4 PISA scales in reading, maths, & science | 502.5 | 17 |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 15.9 | 71 ○ |
| 2.2 Tertiary education | 60.1 | 6 |
| 2.2.1 Tertiary enrolment, % gross | 56.9 | 45 ○ |
| 2.2.2 Graduates in science & engineering, % | 25.2 | 29 |
| 2.2.3 Tertiary inbound mobility, % | 17.5 | 6 |
| 2.3 Research & development (R&D) | 69.4 | 10 |
| 2.3.1 Researchers, FTE/mn pop. | 4,252.4 | 17 |
| 2.3.2 Gross expenditure on R&D, % GDP | 1.7 | 21 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 2,813.4 | 7 |
| 2.3.4 QS university ranking, average score top 3* | 97.8 | 2 ● |

3 Infrastructure 66.4 4 ●

| | | |
|---|---------|-------|
| 3.1 Information & communication technologies (ICTs) | 90.6 | 2 ● |
| 3.1.1 ICT access* | 92.4 | 4 ● |
| 3.1.2 ICT use* | 84.2 | 3 ● |
| 3.1.3 Government's online service* | 89.8 | 11 |
| 3.1.4 E-participation* | 96.1 | 4 |
| 3.2 General infrastructure | 44.4 | 34 |
| 3.2.1 Electricity output, kWh/cap | 5,149.3 | 39 |
| 3.2.2 Logistics performance* | 4.0 | 4 ● |
| 3.2.3 Gross capital formation, % GDP | 17.5 | 104 ○ |
| 3.3 Ecological sustainability | 64.2 | 6 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 12.8 | 12 |
| 3.3.2 Environmental performance* | 87.4 | 12 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 6.5 | 17 |

4 Market sophistication 71.6 4 ●

| | | |
|--|-------|-----|
| 4.1 Credit | 64.7 | 10 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 |
| 4.1.2 Domestic credit to private sector, % GDP | 138.9 | 11 |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|--|-------|----|
| 4.2 Investment | 65.8 | 11 |
| 4.2.1 Ease of protecting minority investors* | 78.3 | 4 |
| 4.2.2 Market capitalization, % GDP | 106.5 | 8 |
| 4.2.3 Total value of stocks traded, % GDP | 41.6 | 18 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.2 | 7 |

4.3 Trade, competition, & market scale 84.3 5

| | | |
|---|---------|-----|
| 4.3.1 Applied tariff rate, weighted mean, % | 1.0 | 9 |
| 4.3.2 Intensity of local competition [†] | 83.7 | 3 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 2,569.2 | 10 |

5 Business sophistication 49.2 14

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 61.5 | 16 |
| 5.1.1 Knowledge-intensive employment, % | 47.4 | 8 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP | 1.1 | 20 |
| 5.1.4 GERD financed by business, % | 46.5 | 25 |
| 5.1.5 Females employed w/advanced degrees, % total | 21.7 | 18 |

5.2 Innovation linkages 50.1 8

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 77.8 | 4 ● |
| 5.2.2 State of cluster development [†] | 71.7 | 7 |
| 5.2.3 GERD financed by abroad, % | 18.9 | 24 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 11 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 2.2 | 16 |

5.3 Knowledge absorption 36.1 33

| | | |
|--|------|------|
| 5.3.1 Intellectual property payments, % total trade | 1.0 | 27 |
| 5.3.2 High-tech imports less re-imports, % total trade | 12.3 | 23 |
| 5.3.3 ICT services imports, % total trade | 1.5 | 33 |
| 5.3.4 FDI net inflows, % GDP | 1.5 | 92 ○ |
| 5.3.5 Research talent, % in business enterprise | 38.2 | 33 ○ |

6 Knowledge & technology outputs 50.2 9

| | | |
|--|---------|-----|
| 6.1 Knowledge creation | 58.7 | 9 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 7.8 | 16 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 2.0 | 18 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 41.1 | 14 |
| 6.1.5 Citable documents H index | 1,015.0 | 1 ● |

6.2 Knowledge impact 55.4 8

| | | |
|--|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.7 | 72 ○ |
| 6.2.2 New businesses/th pop. 15–64 ^② | 12.9 | 9 |
| 6.2.3 Computer software spending, % GDP | 0.6 | 8 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 15.6 | 24 |
| 6.2.5 High- & medium-high-tech manufactures, % | 41.4 | 21 |

6.3 Knowledge diffusion 36.4 34

| | | |
|--|-------|-------|
| 6.3.1 Intellectual property receipts, % total trade | 1.8 | 11 |
| 6.3.2 High-tech exports less re-exports, % total trade | 8.9 | 23 |
| 6.3.3 ICT services exports, % total trade | 2.5 | 39 |
| 6.3.4 FDI net outflows, % GDP | (2.6) | 116 ○ |

7 Creative outputs 62.5 3 ●

| | | |
|---|------|------|
| 7.1 Intangible assets | 62.9 | 9 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 51.5 | 42 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 80.9 | 2 ● |
| 7.1.4 ICTs & organizational model creation [†] | 79.4 | 1 ● |

7.2 Creative goods & services 48.6 7

| | | |
|--|------|----|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.8 | 15 |
| 7.2.2 National feature films/mn pop. 15–69 | 5.3 | 34 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 64.4 | 6 |
| 7.2.4 Printing & publishing manufactures, % | 2.2 | 21 |
| 7.2.5 Creative goods exports, % total trade | 2.9 | 15 |

7.3 Online creativity 75.8 4 ●

| | | |
|--|---------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 65.8 | 11 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 83.9 | 7 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 9,652.4 | 4 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 82.4 | 4 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|------------------|
| Population (millions) | 321.8 |
| GDP (US\$ billions) | 17,947.0 |
| GDP per capita, PPP\$ | 55,805.2 |
| Income group | High income |
| Region | Northern America |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|----------|
| Global Innovation Index (out of 128) | 61.4 | 4 |
| Innovation Output Sub-Index | 54.1 | 7 |
| Innovation Input Sub-Index | 68.7 | 3 ● |
| Innovation Efficiency Ratio | 0.8 | 25 |
| Global Innovation Index 2015 (out of 141) | 60.1 | 5 |

1 Institutions **85.7** **17**

| | | |
|--|------|-----|
| 1.1 Political environment | 78.9 | 21 |
| 1.1.1 Political stability & safety* | 78.3 | 38 |
| 1.1.2 Government effectiveness* | 79.5 | 20 |
| 1.2 Regulatory environment | 90.9 | 13 |
| 1.2.1 Regulatory quality* | 76.2 | 19 |
| 1.2.2 Rule of law* | 87.4 | 18 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 8.0 | 1 ● |
| 1.3 Business environment | 87.4 | 11 |
| 1.3.1 Ease of starting a business* | 91.2 | 41 |
| 1.3.2 Ease of resolving insolvency* | 90.1 | 5 |
| 1.3.3 Ease of paying taxes* | 80.8 | 47 |

2 Human capital & research **57.0** **14**

| | | |
|---|---------|------|
| 2.1 Education | 54.9 | 39 |
| 2.1.1 Expenditure on education, % GDP [Ⓐ] | 5.2 | 43 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | 22.8 | 44 |
| 2.1.3 School life expectancy, years | 16.5 | 20 |
| 2.1.4 PISA scales in reading, maths, & science | 492.1 | 25 |
| 2.1.5 Pupil-teacher ratio, secondary [Ⓐ] | 14.7 | 62 |
| 2.2 Tertiary education | 38.5 | 50 |
| 2.2.1 Tertiary enrolment, % gross | 88.8 | 5 |
| 2.2.2 Graduates in science & engineering, % | 14.9 | 85 ○ |
| 2.2.3 Tertiary inbound mobility, % | 3.9 | 41 |
| 2.3 Research & development (R&D) | 77.7 | 5 |
| 2.3.1 Researchers, FTE/mn pop. [Ⓐ] | 4,018.6 | 21 |
| 2.3.2 Gross expenditure on R&D, % GDP [Ⓐ] | 2.7 | 10 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 7,293.4 | 2 ● |
| 2.3.4 QS university ranking, average score top 3* | 99.1 | 1 ● |

3 Infrastructure **61.7** **13**

| | | |
|---|----------|------|
| 3.1 Information & communication technologies (ICTs) | 85.9 | 8 |
| 3.1.1 ICT access* | 78.2 | 27 |
| 3.1.2 ICT use* | 78.6 | 11 |
| 3.1.3 Government's online service* | 94.5 | 4 |
| 3.1.4 E-participation* | 92.2 | 9 |
| 3.2 General infrastructure | 56.5 | 11 |
| 3.2.1 Electricity output, kWh/cap | 13,515.1 | 8 |
| 3.2.2 Logistics performance* | 3.9 | 9 |
| 3.2.3 Gross capital formation, % GDP | 20.3 | 80 ○ |
| 3.3 Ecological sustainability | 42.8 | 60 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.7 | 79 ○ |
| 3.3.2 Environmental performance* | 84.7 | 26 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 88 ○ |

4 Market sophistication **86.6** **1 ●**

| | | |
|--|-------|-----|
| 4.1 Credit | 86.5 | 1 ● |
| 4.1.1 Ease of getting credit* | 95.0 | 2 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 197.1 | 3 ● |
| 4.1.3 Microfinance gross loans, % GDP | n/a | n/a |

| | | |
|---|----------|-----|
| 4.2 Investment | 80.0 | 1 ● |
| 4.2.1 Ease of protecting minority investors* | 64.7 | 34 |
| 4.2.2 Market capitalization, % GDP | 151.2 | 5 |
| 4.2.3 Total value of stocks traded, % GDP | 236.9 | 1 ● |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.4 | 1 ● |
| 4.3 Trade, competition, & market scale | 93.4 | 1 ● |
| 4.3.1 Applied tariff rate, weighted mean, % | 1.5 | 42 |
| 4.3.2 Intensity of local competition [†] | 83.6 | 4 |
| 4.3.3 Domestic market scale, bn PPP\$ | 17,348.1 | 2 ● |

5 Business sophistication **52.4** **11**

| | | |
|---|------|-------|
| 5.1 Knowledge workers | 63.8 | 10 |
| 5.1.1 Knowledge-intensive employment, % [Ⓐ] | 38.0 | 26 |
| 5.1.2 Firms offering formal training, % firms | n/a | n/a |
| 5.1.3 GERD performed by business, % of GDP [Ⓐ] | 1.9 | 10 |
| 5.1.4 GERD financed by business, % [Ⓐ] | 60.9 | 9 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |
| 5.2 Innovation linkages | 45.1 | 19 |
| 5.2.1 University/industry research collaboration [†] | 80.8 | 2 ● |
| 5.2.2 State of cluster development [†] | 74.8 | 2 ● |
| 5.2.3 GERD financed by abroad, % [Ⓐ] | 4.5 | 70 ○ |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 17 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 2.7 | 13 |
| 5.3 Knowledge absorption | 48.4 | 12 |
| 5.3.1 Intellectual property payments, % total trade | 1.6 | 12 |
| 5.3.2 High-tech imports less re-imports, % total trade | 16.4 | 9 |
| 5.3.3 ICT services imports, % total trade | 1.3 | 44 |
| 5.3.4 FDI net inflows, % GDP | 0.8 | 104 ○ |
| 5.3.5 Research talent, % in business enterprise [Ⓐ] | 68.7 | 5 |

6 Knowledge & technology outputs **56.5** **4**

| | | |
|---|---------|------|
| 6.1 Knowledge creation | 67.0 | 5 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 16.4 | 6 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 3.2 | 14 |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 19.9 | 38 |
| 6.1.5 Citable documents H index | 1,648.0 | 1 ● |
| 6.2 Knowledge impact | 55.6 | 5 |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 0.8 | 70 ○ |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 1.1 | 1 ● |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.9 | 88 ○ |
| 6.2.5 High- & medium-high-tech manufactures, % [Ⓐ] | 43.3 | 15 |
| 6.3 Knowledge diffusion | 47.0 | 12 |
| 6.3.1 Intellectual property receipts, % total trade | 5.1 | 1 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 6.8 | 26 |
| 6.3.3 ICT services exports, % total trade | 1.3 | 71 ○ |
| 6.3.4 FDI net outflows, % GDP | 2.1 | 31 |

7 Creative outputs **51.6** **13**

| | | |
|--|---------|------|
| 7.1 Intangible assets | 48.3 | 45 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 20.8 | 78 ○ |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 1.2 | 62 |
| 7.1.3 ICTs & business model creation [†] | 75.4 | 14 |
| 7.1.4 ICTs & organizational model creation [†] | 79.4 | 2 ● |
| 7.2 Creative goods & services | 49.8 | 6 |
| 7.2.1 Cultural & creative services exports, % of total trade | 1.7 | 1 ● |
| 7.2.2 National feature films/mn pop. 15–69 | 3.3 | 45 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 77.7 | 3 ● |
| 7.2.4 Printing & publishing manufactures, % [Ⓐ] | 1.9 | 26 |
| 7.2.5 Creative goods exports, % total trade | 1.7 | 27 |
| 7.3 Online creativity | 60.2 | 11 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 100.0 | 1 ● |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 2.6 | 63 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 5,148.4 | 25 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 100.0 | 1 ● |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓐ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Uruguay

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 3.4 |
| GDP (US\$ billions) | 53.8 |
| GDP per capita, PPP\$ | 21,506.5 |
| Income group | High income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 34.3 | 62 |
| Innovation Output Sub-Index | 26.2 | 66 |
| Innovation Input Sub-Index | 42.3 | 61 |
| Innovation Efficiency Ratio | 0.6 | 81 |
| Global Innovation Index 2015 (out of 141) | 35.8 | 68 |

1 Institutions 69.0 47

| | | |
|--|------|------|
| 1.1 Political environment | 70.1 | 38 ● |
| 1.1.1 Political stability & safety* | 87.7 | 19 ● |
| 1.1.2 Government effectiveness* | 52.4 | 44 |
| 1.2 Regulatory environment | 67.7 | 60 |
| 1.2.1 Regulatory quality* | 57.7 | 49 |
| 1.2.2 Rule of law* | 64.0 | 38 ● |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 20.8 | 88 |
| 1.3 Business environment | 69.2 | 68 |
| 1.3.1 Ease of starting a business* | 89.9 | 51 |
| 1.3.2 Ease of resolving insolvency* | 52.4 | 59 |
| 1.3.3 Ease of paying taxes* | 65.3 | 91 |

2 Human capital & research 29.3 78

| | | |
|--|-------|------|
| 2.1 Education | 43.3 | 77 |
| 2.1.1 Expenditure on education, % GDP ^② | 4.4 | 72 |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 10.7 | 97 ○ |
| 2.1.3 School life expectancy, years ^② | 15.5 | 37 |
| 2.1.4 PISA scales in reading, maths, & science | 412.2 | 52 ○ |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 11.3 | 37 |
| 2.2 Tertiary education | 37.8 | 53 |
| 2.2.1 Tertiary enrolment, % gross ^② | 63.1 | 36 ● |
| 2.2.2 Graduates in science & engineering, % ^② | 15.6 | 83 |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 6.9 | 70 |
| 2.3.1 Researchers, FTE/mn pop. | 504.2 | 60 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.3 | 75 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 15.0 | 60 |

3 Infrastructure 51.8 37 ●

| | | |
|---|---------|------|
| 3.1 Information & communication technologies (ICTs) | 77.2 | 18 ● |
| 3.1.1 ICT access* | 71.5 | 44 |
| 3.1.2 ICT use* | 54.1 | 42 |
| 3.1.3 Government's online service* | 85.0 | 14 ● |
| 3.1.4 E-participation* | 98.0 | 3 ● |
| 3.2 General infrastructure | 26.7 | 97 |
| 3.2.1 Electricity output, kWh/cap. | 3,419.9 | 55 |
| 3.2.2 Logistics performance* | 2.7 | 86 |
| 3.2.3 Gross capital formation, % GDP | 19.4 | 91 |
| 3.3 Ecological sustainability | 51.7 | 32 ● |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 12.5 | 13 ● |
| 3.3.2 Environmental performance* | 74.0 | 61 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 2.1 | 46 |

4 Market sophistication 35.9 104

| | | |
|--|------|------|
| 4.1 Credit | 23.1 | 97 |
| 4.1.1 Ease of getting credit* | 60.0 | 53 |
| 4.1.2 Domestic credit to private sector, % GDP | 26.9 | 99 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 71 ○ |

| | | |
|--|------|------|
| 4.2 Investment | 30.0 | 94 |
| 4.2.1 Ease of protecting minority investors* | 45.0 | 97 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.0 | 84 ○ |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 54.6 87

| | | |
|---|------|----|
| 4.3.1 Applied tariff rate, weighted mean, % | 4.7 | 83 |
| 4.3.2 Intensity of local competition [†] | 62.3 | 88 |
| 4.3.3 Domestic market scale, bn PPP\$ | 71.7 | 82 |

5 Business sophistication 25.6 95

| | | |
|--|------|------|
| 5.1 Knowledge workers | 34.2 | 77 |
| 5.1.1 Knowledge-intensive employment, % | 20.9 | 66 |
| 5.1.2 Firms offering formal training, % firms ^② | 48.6 | 27 ● |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 73 ○ |
| 5.1.4 GERD financed by business, % ^② | 10.2 | 70 |
| 5.1.5 Females employed w/advanced degrees, % total | 13.7 | 45 |

5.2 Innovation linkages 22.6 95

| | | |
|---|------|-----|
| 5.2.1 University/industry research collaboration [†] | 43.2 | 68 |
| 5.2.2 State of cluster development [†] | 38.6 | 92 |
| 5.2.3 GERD financed by abroad, % ^② | 5.4 | 64 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 79 |

5.3 Knowledge absorption 19.9 100

| | | |
|--|-----|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.3 | 73 |
| 5.3.2 High-tech imports less re-imports, % total trade | 9.3 | 44 |
| 5.3.3 ICT services imports, % total trade | 0.4 | 105 ○ |
| 5.3.4 FDI net inflows, % GDP | 4.9 | 31 ● |
| 5.3.5 Research talent, % in business enterprise | 1.0 | 76 ○ |

6 Knowledge & technology outputs 21.3 80

| | | |
|--|-------|-----|
| 6.1 Knowledge creation | 8.7 | 68 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.5 | 74 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.3 | 36 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 12.6 | 56 |
| 6.1.5 Citable documents H index | 124.0 | 63 |

6.2 Knowledge impact 35.3 69

| | | |
|---|------|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.9 | 28 ● |
| 6.2.2 New businesses/th pop. 15–64 ^② | 2.5 | 41 |
| 6.2.3 Computer software spending, % GDP | 0.2 | 60 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 13.0 | 29 ● |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 12.9 | 70 |

6.3 Knowledge diffusion 20.1 97

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade | 0.0 | 86 ○ |
| 6.3.2 High-tech exports less re-exports, % total trade | 1.3 | 59 |
| 6.3.3 ICT services exports, % total trade | 2.2 | 43 |
| 6.3.4 FDI net outflows, % GDP | 0.1 | 82 |

7 Creative outputs 31.1 56

| | | |
|---|------|------|
| 7.1 Intangible assets | 43.0 | 64 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 53.4 | 39 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.3 | 92 ○ |
| 7.1.3 ICTs & business model creation [†] | 65.0 | 38 |
| 7.1.4 ICTs & organizational model creation [†] | 55.3 | 57 |

7.2 Creative goods & services 17.6 76

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | 4.8 | 37 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.4 | 39 |
| 7.2.5 Creative goods exports, % total trade | 0.1 | 92 |

7.3 Online creativity 20.9 41

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 7.0 | 49 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 11.4 | 38 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 6,005.2 | 18 ● |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------------------|
| Population (millions) | 31.1 |
| GDP (US\$ billions) | 239.6 |
| GDP per capita, PPP\$ | 16,672.7 |
| Income group | High income |
| Region | Latin America and the Caribbean |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|------------|
| Global Innovation Index (out of 128) | 22.3 | 120 |
| Innovation Output Sub-Index | 14.1 | 119 |
| Innovation Input Sub-Index | 30.5 | 112 |
| Innovation Efficiency Ratio | 0.5 | 114 |
| Global Innovation Index 2015 (out of 141) | 22.8 | 132 |

1 Institutions **16.0** **128** ○

| | | |
|---|------|-------|
| 1.1 Political environment | 23.6 | 121 |
| 1.1.1 Political stability & safety* | 42.3 | 102 |
| 1.1.2 Government effectiveness* | 4.9 | 125 |
| 1.2 Regulatory environment | 0.0 | 128 ○ |
| 1.2.1 Regulatory quality* | 0.0 | 128 ○ |
| 1.2.2 Rule of law* | 0.0 | 128 ○ |
| 1.2.3 Cost of redundancy dismissal, salary weeks [Ⓓ] | 82.3 | 126 ○ |
| 1.3 Business environment | 24.4 | 128 ○ |
| 1.3.1 Ease of starting a business* | 40.4 | 128 ○ |
| 1.3.2 Ease of resolving insolvency* | 19.1 | 126 ○ |
| 1.3.3 Ease of paying taxes* | 13.6 | 127 ○ |

2 Human capital & research **37.5** **46** ●

| | | |
|--|-------|------|
| 2.1 Education | 51.8 | 54 |
| 2.1.1 Expenditure on education, % GDP [Ⓓ] | 6.9 | 13 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap [Ⓓ] | 16.6 | 72 |
| 2.1.3 School life expectancy, years [Ⓓ] | 14.0 | 59 |
| 2.1.4 PISA scales in reading, maths, & science [Ⓓ] | 413.4 | 50 |
| 2.1.5 Pupil-teacher ratio, secondary | 7.9 | 6 ● |
| 2.2 Tertiary education | 35.0 | 65 |
| 2.2.1 Tertiary enrolment, % gross [Ⓓ] | 77.0 | 19 ● |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % [Ⓓ] | 0.1 | 104 |
| 2.3 Research & development (R&D) | 25.8 | 42 ● |
| 2.3.1 Researchers, FTE/mn pop. [Ⓓ] | 290.9 | 66 |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 100.8 | 29 ● |
| 2.3.4 QS university ranking, average score top 3* | 22.1 | 50 ● |

3 Infrastructure **39.4** **76**

| | | |
|---|---------|-----|
| 3.1 Information & communication technologies (ICTs) | 51.1 | 61 |
| 3.1.1 ICT access* | 54.4 | 73 |
| 3.1.2 ICT use* | 38.0 | 65 |
| 3.1.3 Government's online service* | 55.1 | 55 |
| 3.1.4 E-participation* | 56.9 | 51 |
| 3.2 General infrastructure | 27.7 | 93 |
| 3.2.1 Electricity output, kWh/cap. | 4,050.0 | 52 |
| 3.2.2 Logistics performance* | 2.8 | 73 |
| 3.2.3 Gross capital formation, % GDP | 17.8 | 100 |
| 3.3 Ecological sustainability | 39.5 | 81 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq. | 6.9 | 71 |
| 3.3.2 Environmental performance* | 76.2 | 55 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.1 | 113 |

4 Market sophistication **33.4** **112**

| | | |
|---|------|-----|
| 4.1 Credit | 17.5 | 112 |
| 4.1.1 Ease of getting credit* | 40.0 | 92 |
| 4.1.2 Domestic credit to private sector, % GDP [Ⓓ] | 29.9 | 95 |
| 4.1.3 Microfinance gross loans, % GDP | 0.2 | 55 |

| | | |
|--|------|-------|
| 4.2 Investment | 31.7 | 86 |
| 4.2.1 Ease of protecting minority investors* | 31.7 | 128 ○ |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

| | | |
|---|-------|-------|
| 4.3 Trade, competition, & market scale | 51.1 | 98 |
| 4.3.1 Applied tariff rate, weighted mean, % | 8.4 | 107 |
| 4.3.2 Intensity of local competition [†] | 29.1 | 123 ○ |
| 4.3.3 Domestic market scale, bn PPP\$ | 540.9 | 33 ● |

5 Business sophistication **26.2** **91**

| | | |
|---|------|------|
| 5.1 Knowledge workers | 49.6 | 31 ● |
| 5.1.1 Knowledge-intensive employment, % [Ⓓ] | 19.2 | 74 |
| 5.1.2 Firms offering formal training, % firms [Ⓓ] | 56.0 | 15 ● |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total [Ⓓ] | 16.7 | 32 ● |

| | | |
|---|------|-------|
| 5.2 Innovation linkages | 16.4 | 123 |
| 5.2.1 University/industry research collaboration [†] | 35.4 | 97 |
| 5.2.2 State of cluster development [†] | 22.1 | 122 ○ |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 67 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 101 |

5.3 Knowledge absorption **12.7** **127** ○

| | | |
|--|-----|-----|
| 5.3.1 Intellectual property payments, % total trade | 0.6 | 50 |
| 5.3.2 High-tech imports less re-imports, % total trade | n/a | n/a |
| 5.3.3 ICT services imports, % total trade | 0.6 | 88 |
| 5.3.4 FDI net inflows, % GDP [Ⓓ] | 0.6 | 112 |
| 5.3.5 Research talent, % in business enterprise [Ⓓ] | 4.5 | 73 |

6 Knowledge & technology outputs **11.1** **120**

| | | |
|--|-------|------|
| 6.1 Knowledge creation | 5.0 | 93 |
| 6.1.1 Patents by origin/bn PPP\$ GDP [Ⓓ] | 0.1 | 110 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 1.6 | 122 |
| 6.1.5 Citable documents H index | 155.0 | 53 ● |

6.2 Knowledge impact **2.8** **124**

| | | |
|--|-------|-------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (8.1) | 109 ○ |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.2 | 70 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 1.0 | 105 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion **25.4** **62**

| | | |
|--|-----|-----|
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | n/a | n/a |
| 6.3.3 ICT services exports, % total trade | 0.1 | 117 |
| 6.3.4 FDI net outflows, % GDP [Ⓓ] | 0.4 | 66 |

7 Creative outputs **17.1** **110**

| | | |
|---|------|-----|
| 7.1 Intangible assets | 29.3 | 111 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP [Ⓓ] | 22.1 | 77 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | n/a | n/a |
| 7.1.3 ICTs & business model creation [†] | 36.6 | 121 |
| 7.1.4 ICTs & organizational model creation [†] | 39.5 | 110 |

7.2 Creative goods & services **3.6** **111**

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | 0.0 | 68 |
| 7.2.2 National feature films/mn pop. 15–69 | 1.0 | 72 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 4.8 | 44 |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | n/a | n/a |

7.3 Online creativity **6.4** **71**

| | | |
|--|---------|------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.1 | 78 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 5.2 | 53 ● |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 1,623.9 | 59 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

Ⓓ indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---|
| Population (millions) | 93.4 |
| GDP (US\$ billions) | 191.5 |
| GDP per capita, PPP\$ | 6,024.4 |
| Income group | Lower-middle income |
| Region | South East Asia, East Asia, and Oceania |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|-----------|
| Global Innovation Index (out of 128) | 35.4 | 59 |
| Innovation Output Sub-Index | 32.3 | 42 |
| Innovation Input Sub-Index | 38.4 | 79 |
| Innovation Efficiency Ratio | 0.8 | 11 ● |
| Global Innovation Index 2015 (out of 141) | 38.3 | 52 |

| | | |
|--|-------------|-----------|
| 1 Institutions | 51.7 | 93 |
| 1.1 Political environment | 50.0 | 65 |
| 1.1.1 Political stability & safety* | 62.8 | 66 |
| 1.1.2 Government effectiveness* | 37.3 | 72 |
| 1.2 Regulatory environment | 51.0 | 106 |
| 1.2.1 Regulatory quality* | 30.1 | 103 |
| 1.2.2 Rule of law* | 39.4 | 76 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 24.6 | 101 |
| 1.3 Business environment | 54.2 | 116 ○ |
| 1.3.1 Ease of starting a business* | 81.3 | 88 |
| 1.3.2 Ease of resolving insolvency* | 35.8 | 103 |
| 1.3.3 Ease of paying taxes* | 45.4 | 115 ○ |

| | | |
|---|-------------|-----------|
| 2 Human capital & research | 30.1 | 74 |
| 2.1 Education | 61.0 | 19 |
| 2.1.1 Expenditure on education, % GDP | 6.3 | 21 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | 28.3 | 84 |
| 2.2.1 Tertiary enrolment, % gross | 30.5 | 76 |
| 2.2.2 Graduates in science & engineering, % | 22.4 | 39 |
| 2.2.3 Tertiary inbound mobility, % | 0.1 | 103 ○ |
| 2.3 Research & development (R&D) | 1.1 | 99 |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.2 | 89 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

| | | |
|---|-------------|-----------|
| 3 Infrastructure | 36.7 | 90 |
| 3.1 Information & communication technologies (ICTs) | 41.3 | 82 |
| 3.1.1 ICT access* | 44.3 | 89 |
| 3.1.2 ICT use* | 30.1 | 78 |
| 3.1.3 Government's online service* | 41.7 | 78 |
| 3.1.4 E-participation* | 49.0 | 64 |
| 3.2 General infrastructure | 34.5 | 65 |
| 3.2.1 Electricity output, kWh/cap | 1,416.0 | 87 |
| 3.2.2 Logistics performance* | 3.2 | 46 |
| 3.2.3 Gross capital formation, % GDP | 23.9 | 49 |
| 3.3 Ecological sustainability | 34.4 | 99 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 6.8 | 77 |
| 3.3.2 Environmental performance* | 58.5 | 104 |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 1.6 | 50 |

| | | |
|--|-------------|-----------|
| 4 Market sophistication | 43.0 | 64 |
| 4.1 Credit | 38.1 | 48 |
| 4.1.1 Ease of getting credit* | 70.0 | 27 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 100.3 | 25 ● |
| 4.1.3 Microfinance gross loans, % GDP | 0.4 | 37 |

| | | |
|--|------|-------|
| 4.2 Investment | 22.9 | 125 ○ |
| 4.2.1 Ease of protecting minority investors* | 45.0 | 97 |
| 4.2.2 Market capitalization, % GDP | 24.7 | 56 |
| 4.2.3 Total value of stocks traded, % GDP | 11.7 | 31 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 66 |

| | | |
|---|-------|------|
| 4.3 Trade, competition, & market scale | 68.0 | 44 |
| 4.3.1 Applied tariff rate, weighted mean, % | 3.5 | 63 |
| 4.3.2 Intensity of local competition [†] | 67.3 | 69 |
| 4.3.3 Domestic market scale, bn PPP\$ | 512.6 | 35 ● |

| | | |
|--|-------------|-----------|
| 5 Business sophistication | 30.6 | 72 |
| 5.1 Knowledge workers | 27.8 | 93 |
| 5.1.1 Knowledge-intensive employment, % | 10.3 | 94 ○ |
| 5.1.2 Firms offering formal training, % firms ^② | 43.5 | 31 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 68 |
| 5.1.4 GERD financed by business, % ^② | 28.4 | 54 |
| 5.1.5 Females employed w/advanced degrees, % total | 6.6 | 74 ○ |

| | | |
|---|------|-----|
| 5.2 Innovation linkages | 22.2 | 101 |
| 5.2.1 University/industry research collaboration [†] | 37.8 | 86 |
| 5.2.2 State of cluster development [†] | 47.0 | 56 |
| 5.2.3 GERD financed by abroad, % ^② | 4.0 | 72 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 42 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 90 |

| | | |
|--|------|-------|
| 5.3 Knowledge absorption | 41.9 | 20 ● |
| 5.3.1 Intellectual property payments, % total trade | n/a | n/a |
| 5.3.2 High-tech imports less re-imports, % total trade | 19.8 | 6 ● |
| 5.3.3 ICT services imports, % total trade | 0.1 | 120 ○ |
| 5.3.4 FDI net inflows, % GDP | 4.9 | 29 ● |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

| | | |
|--|-------------|-----------|
| 6 Knowledge & technology outputs | 31.9 | 39 |
| 6.1 Knowledge creation | 6.8 | 80 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 1.0 | 66 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | 0.0 | 81 ○ |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.5 | 34 |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 5.0 | 95 |
| 6.1.5 Citable documents H index | 133.0 | 58 |

| | | |
|---|------|------|
| 6.2 Knowledge impact | 46.7 | 25 ● |
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 4.5 | 10 ● |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | 0.3 | 33 |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 7.4 | 47 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 26.2 | 48 |

| | | |
|--|------|-------|
| 6.3 Knowledge diffusion | 42.3 | 20 ● |
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 22.5 | 4 ● |
| 6.3.3 ICT services exports, % total trade | 0.1 | 119 ○ |
| 6.3.4 FDI net outflows, % GDP ^② | 1.1 | 45 |

| | | |
|---|-------------|-----------|
| 7 Creative outputs | 32.6 | 52 |
| 7.1 Intangible assets | 46.3 | 54 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 75.8 | 17 ● |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 3.4 | 36 |
| 7.1.3 ICTs & business model creation [†] | 57.7 | 66 |
| 7.1.4 ICTs & organizational model creation [†] | 53.4 | 65 |

| | | |
|--|------|------|
| 7.2 Creative goods & services | 31.5 | 40 |
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 ^② | 1.2 | 68 |
| 7.2.3 Global ent. & media market/th pop. 15–69 | 0.5 | 58 ○ |
| 7.2.4 Printing & publishing manufactures, % ^② | 1.3 | 49 |
| 7.2.5 Creative goods exports, % total trade | 5.1 | 9 ● |

| | | |
|--|-------|----|
| 7.3 Online creativity | 6.4 | 72 |
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 2.7 | 70 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 3.2 | 60 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 267.7 | 95 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 17.9 | 55 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|----------------------------------|
| Population (millions) | 26.8 |
| GDP (US\$ billions) | 36.9 |
| GDP per capita, PPP\$ | 2,670.6 |
| Income group | Lower-middle income |
| Region | Northern Africa and Western Asia |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|--------------|
| Global Innovation Index (out of 128) | 14.6 | 128 ○ |
| Innovation Output Sub-Index | 7.4 | 128 ○ |
| Innovation Input Sub-Index | 21.7 | 128 ○ |
| Innovation Efficiency Ratio | 0.3 | 126 |
| Global Innovation Index 2015 (out of 141) | 20.8 | 137 |

1 Institutions 32.2 126

| | | |
|--|------|-------|
| 1.1 Political environment | 0.0 | 128 ○ |
| 1.1.1 Political stability & safety* | 0.0 | 128 ○ |
| 1.1.2 Government effectiveness* | 0.0 | 128 ○ |
| 1.2 Regulatory environment | 41.2 | 117 |
| 1.2.1 Regulatory quality* | 23.8 | 114 |
| 1.2.2 Rule of law* | 17.9 | 126 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 27.4 | 107 |
| 1.3 Business environment | 55.3 | 113 |
| 1.3.1 Ease of starting a business* | 74.2 | 113 |
| 1.3.2 Ease of resolving insolvency* | 28.1 | 120 |
| 1.3.3 Ease of paying taxes* | 63.7 | 93 ● |

2 Human capital & research 15.8 111

| | | |
|--|------|-------|
| 2.1 Education | 32.1 | 106 |
| 2.1.1 Expenditure on education, % GDP ^② | 4.6 | 65 ● |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap ^② | 12.1 | 95 |
| 2.1.3 School life expectancy, years ^② | 9.0 | 108 |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary ^② | 16.1 | 72 ● |
| 2.2 Tertiary education | 15.3 | 106 |
| 2.2.1 Tertiary enrolment, % gross ^② | 10.0 | 106 |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % ^② | 4.3 | 35 ● |
| 2.3 Research & development (R&D) | 0.0 | 115 ○ |
| 2.3.1 Researchers, FTE/mn pop. | n/a | n/a |
| 2.3.2 Gross expenditure on R&D, % GDP | n/a | n/a |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 18.0 128 ○

| | | |
|--|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 29.1 | 101 |
| 3.1.1 ICT access* | n/a | n/a |
| 3.1.2 ICT use* | n/a | n/a |
| 3.1.3 Government's online service* | 30.7 | 97 |
| 3.1.4 E-participation* | 27.5 | 103 |
| 3.2 General infrastructure | 0.4 | 128 ○ |
| 3.2.1 Electricity output, kWh/cap. | 348.3 | 107 |
| 3.2.2 Logistics performance* | 2.2 | 123 ○ |
| 3.2.3 Gross capital formation, % GDP | 2.3 | 125 ○ |
| 3.3 Ecological sustainability | 24.5 | 122 |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 10.1 | 26 ● |
| 3.3.2 Environmental performance* | n/a | n/a |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP ^② | 0.0 | 127 ○ |

4 Market sophistication 33.8 111

| | | |
|---|-----|-------|
| 4.1 Credit | 0.4 | 128 ○ |
| 4.1.1 Ease of getting credit* | 0.0 | 127 ○ |
| 4.1.2 Domestic credit to private sector, % GDP ^② | 6.3 | 125 ○ |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 69 |

| | | |
|--|------|-----|
| 4.2 Investment | 45.0 | 32 |
| 4.2.1 Ease of protecting minority investors* | 45.0 | 97 |
| 4.2.2 Market capitalization, % GDP | n/a | n/a |
| 4.2.3 Total value of stocks traded, % GDP | n/a | n/a |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | n/a | n/a |

4.3 Trade, competition, & market scale 56.0 83 ●

| | | |
|---|-------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 4.1 | 72 ● |
| 4.3.2 Intensity of local competition [†] | n/a | n/a |
| 4.3.3 Domestic market scale, bn PPP\$ | 104.0 | 74 ● |

5 Business sophistication 8.6 128 ○

| | | |
|--|------|-----|
| 5.1 Knowledge workers | 14.4 | 119 |
| 5.1.1 Knowledge-intensive employment, % | n/a | n/a |
| 5.1.2 Firms offering formal training, % firms | 14.3 | 88 |
| 5.1.3 GERD performed by business, % of GDP | n/a | n/a |
| 5.1.4 GERD financed by business, % | n/a | n/a |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 0.3 [128]

| | | |
|---|-----|-----|
| 5.2.1 University/industry research collaboration [†] | n/a | n/a |
| 5.2.2 State of cluster development [†] | n/a | n/a |
| 5.2.3 GERD financed by abroad, % | n/a | n/a |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | n/a | n/a |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP ^② | 0.0 | 105 |

5.3 Knowledge absorption 11.1 128 ○

| | | |
|--|-------|-----|
| 5.3.1 Intellectual property payments, % total trade ^② | 0.0 | 106 |
| 5.3.2 High-tech imports less re-imports, % total trade | 4.6 | 103 |
| 5.3.3 ICT services imports, % total trade ^② | 0.4 | 107 |
| 5.3.4 FDI net inflows, % GDP ^② | (0.4) | 126 |
| 5.3.5 Research talent, % in business enterprise | n/a | n/a |

6 Knowledge & technology outputs 10.6 124

| | | |
|--|------|-------|
| 6.1 Knowledge creation | 1.3 | 127 ○ |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.3 | 88 ● |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | 0.0 | 62 ○ |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 2.4 | 114 |
| 6.1.5 Citable documents H index | 46.0 | 119 |

6.2 Knowledge impact 12.3 117

| | | |
|---|-------|-----|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | (4.4) | 108 |
| 6.2.2 New businesses/th pop. 15–64 | n/a | n/a |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.4 | 122 |
| 6.2.5 High- & medium-high-tech manufactures, % ^② | 1.9 | 96 |

6.3 Knowledge diffusion 18.3 108

| | | |
|--|-----|------|
| 6.3.1 Intellectual property receipts, % total trade ^② | 0.4 | 25 ● |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.0 | 116 |
| 6.3.3 ICT services exports, % total trade ^② | 3.4 | 19 ● |
| 6.3.4 FDI net outflows, % GDP | n/a | n/a |

7 Creative outputs 4.2 125

| | | |
|---|------|-----|
| 7.1 Intangible assets | 7.1 | 125 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 19.4 | 82 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.2 | 100 |
| 7.1.3 ICTs & business model creation [†] | n/a | n/a |
| 7.1.4 ICTs & organizational model creation [†] | n/a | n/a |

7.2 Creative goods & services 2.2 115

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % ^② | 0.4 | 90 |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 122 |

7.3 Online creativity 0.5 109

| | | |
|--|-------|-----|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.4 | 111 |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 121 |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 117.5 | 106 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | 0.7 | 71 |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.

Key indicators

| | |
|-----------------------------|---------------------|
| Population (millions) | 16.2 |
| GDP (US\$ billions) | 21.9 |
| GDP per capita, PPP\$ | 3,868.1 |
| Income group | Lower-middle income |
| Region | Sub-Saharan Africa |

| | Score 0–100 or value (hard data) | Rank |
|---|-------------------------------------|--------------|
| Global Innovation Index (out of 128) | 19.9 | 125 ○ |
| Innovation Output Sub-Index | 15.6 | 118 |
| Innovation Input Sub-Index | 24.3 | 126 ○ |
| Innovation Efficiency Ratio | 0.6 | 72 |
| Global Innovation Index 2015 (out of 141) | 24.6 | 124 |

1 Institutions 47.4 105

| | | |
|--|------|-------|
| 1.1 Political environment | 47.0 | 73 |
| 1.1.1 Political stability & safety* | 68.0 | 51 ● |
| 1.1.2 Government effectiveness* | 26.0 | 96 |
| 1.2 Regulatory environment | 26.1 | 124 ○ |
| 1.2.1 Regulatory quality* | 32.0 | 101 |
| 1.2.2 Rule of law* | 40.8 | 73 |
| 1.2.3 Cost of redundancy dismissal, salary weeks | 50.6 | 124 ○ |
| 1.3 Business environment | 69.1 | 69 |
| 1.3.1 Ease of starting a business* | 86.7 | 59 ● |
| 1.3.2 Ease of resolving insolvency* | 39.0 | 94 |
| 1.3.3 Ease of paying taxes* | 81.7 | 40 ● |

2 Human capital & research 0.7 128 ○

| | | |
|---|------|-------|
| 2.1 Education | 0.0 | [128] |
| 2.1.1 Expenditure on education, % GDP ^② | 1.1 | 118 ○ |
| 2.1.2 Gov't expenditure/pupil, secondary, % GDP/cap | n/a | n/a |
| 2.1.3 School life expectancy, years | n/a | n/a |
| 2.1.4 PISA scales in reading, maths, & science | n/a | n/a |
| 2.1.5 Pupil-teacher ratio, secondary | n/a | n/a |
| 2.2 Tertiary education | n/a | n/a |
| 2.2.1 Tertiary enrolment, % gross | n/a | n/a |
| 2.2.2 Graduates in science & engineering, % | n/a | n/a |
| 2.2.3 Tertiary inbound mobility, % | n/a | n/a |
| 2.3 Research & development (R&D) | 1.5 | 96 |
| 2.3.1 Researchers, FTE/mn pop. ^② | 40.9 | 88 |
| 2.3.2 Gross expenditure on R&D, % GDP ^② | 0.3 | 79 |
| 2.3.3 Global R&D companies, avg. expend. top 3, mn \$US | 0.0 | 45 ○ |
| 2.3.4 QS university ranking, average score top 3* | 0.0 | 73 ○ |

3 Infrastructure 19.2 125 ○

| | | |
|---|-------|-------|
| 3.1 Information & communication technologies (ICTs) | 16.1 | 121 ○ |
| 3.1.1 ICT access* | 26.3 | 116 ○ |
| 3.1.2 ICT use* | 6.2 | 113 |
| 3.1.3 Government's online service* | 14.2 | 118 |
| 3.1.4 E-participation* | 17.6 | 115 |
| 3.2 General infrastructure | 31.5 | 76 |
| 3.2.1 Electricity output, kWh/cap | 916.0 | 93 |
| 3.2.2 Logistics performance* | 2.5 | 112 |
| 3.2.3 Gross capital formation, % GDP | 30.9 | 14 ● |
| 3.3 Ecological sustainability | 10.0 | 128 ○ |
| 3.3.1 GDP/unit of energy use, 2005 PPP\$/kg oil eq | 5.1 | 96 |
| 3.3.2 Environmental performance* | n/a | n/a |
| 3.3.3 ISO 14001 environmental certificates/bn PPP\$ GDP | 0.4 | 85 |

4 Market sophistication 36.6 100

| | | |
|--|------|------|
| 4.1 Credit | 26.9 | 87 |
| 4.1.1 Ease of getting credit* | 75.0 | 18 ● |
| 4.1.2 Domestic credit to private sector, % GDP | 17.1 | 112 |
| 4.1.3 Microfinance gross loans, % GDP | 0.0 | 66 |

| | | |
|--|------|-------|
| 4.2 Investment | 23.6 | 123 ○ |
| 4.2.1 Ease of protecting minority investors* | 53.3 | 77 |
| 4.2.2 Market capitalization, % GDP ^② | 13.4 | 74 |
| 4.2.3 Total value of stocks traded, % GDP ^② | 0.8 | 58 |
| 4.2.4 Venture capital deals/bn PPP\$ GDP | 0.0 | 56 |

4.3 Trade, competition, & market scale 59.2 71

| | | |
|---|------|------|
| 4.3.1 Applied tariff rate, weighted mean, % | 3.4 | 62 ● |
| 4.3.2 Intensity of local competition [†] | 75.7 | 25 ● |
| 4.3.3 Domestic market scale, bn PPP\$ | 61.4 | 90 |

5 Business sophistication 17.4 126 ○

| | | |
|---|------|------|
| 5.1 Knowledge workers | 15.2 | 118 |
| 5.1.1 Knowledge-intensive employment, % ^② | 7.3 | 97 |
| 5.1.2 Firms offering formal training, % firms | 28.2 | 63 |
| 5.1.3 GERD performed by business, % of GDP ^② | 0.0 | 82 ○ |
| 5.1.4 GERD financed by business, % ^② | 3.2 | 83 |
| 5.1.5 Females employed w/advanced degrees, % total | n/a | n/a |

5.2 Innovation linkages 22.0 103

| | | |
|---|------|------|
| 5.2.1 University/industry research collaboration [†] | 41.4 | 73 |
| 5.2.2 State of cluster development [†] | 51.2 | 37 ● |
| 5.2.3 GERD financed by abroad, % ^② | 1.6 | 82 |
| 5.2.4 JV-strategic alliance deals/bn PPP\$ GDP | 0.0 | 58 |
| 5.2.5 Patent families 2+ offices/bn PPP\$ GDP | 0.0 | 96 |

5.3 Knowledge absorption 15.1 122 ○

| | | |
|--|-----|-------|
| 5.3.1 Intellectual property payments, % total trade | 0.0 | 110 ○ |
| 5.3.2 High-tech imports less re-imports, % total trade | 3.4 | 112 |
| 5.3.3 ICT services imports, % total trade | 0.4 | 106 |
| 5.3.4 FDI net inflows, % GDP | 5.6 | 24 ● |
| 5.3.5 Research talent, % in business enterprise ^② | 4.9 | 72 |

6 Knowledge & technology outputs 15.6 115

| | | |
|--|------|-----|
| 6.1 Knowledge creation | 4.5 | 97 |
| 6.1.1 Patents by origin/bn PPP\$ GDP | 0.2 | 91 |
| 6.1.2 PCT patent applications/bn PPP\$ GDP | n/a | n/a |
| 6.1.3 Utility models by origin/bn PPP\$ GDP | n/a | n/a |
| 6.1.4 Scientific & technical articles/bn PPP\$ GDP | 4.6 | 100 |
| 6.1.5 Citable documents H index | 83.0 | 89 |

6.2 Knowledge impact 34.6 73

| | | |
|--|-----|------|
| 6.2.1 Growth rate of PPP\$ GDP/worker, % | 2.2 | 35 ● |
| 6.2.2 New businesses/th pop. 15–64 | 1.3 | 59 |
| 6.2.3 Computer software spending, % GDP | n/a | n/a |
| 6.2.4 ISO 9001 quality certificates/bn PPP\$ GDP | 0.8 | 111 |
| 6.2.5 High- & medium-high-tech manufactures, % | n/a | n/a |

6.3 Knowledge diffusion 7.8 123 ○

| | | |
|--|-------|-------|
| 6.3.1 Intellectual property receipts, % total trade | n/a | n/a |
| 6.3.2 High-tech exports less re-exports, % total trade | 0.2 | 97 |
| 6.3.3 ICT services exports, % total trade | 0.3 | 108 |
| 6.3.4 FDI net outflows, % GDP | (3.6) | 117 ○ |

7 Creative outputs 15.5 117

| | | |
|---|------|-----|
| 7.1 Intangible assets | 30.5 | 107 |
| 7.1.1 Trademarks by origin/bn PPP\$ GDP | 8.6 | 101 |
| 7.1.2 Industrial designs by origin/bn PPP\$ GDP | 0.5 | 80 |
| 7.1.3 ICTs & business model creation [†] | 52.5 | 84 |
| 7.1.4 ICTs & organizational model creation [†] | 48.8 | 78 |

7.2 Creative goods & services 1.1 [122]

| | | |
|--|-----|-----|
| 7.2.1 Cultural & creative services exports, % of total trade | n/a | n/a |
| 7.2.2 National feature films/mn pop. 15–69 | n/a | n/a |
| 7.2.3 Global ent. & media market/th pop. 15–69 | n/a | n/a |
| 7.2.4 Printing & publishing manufactures, % | n/a | n/a |
| 7.2.5 Creative goods exports, % total trade | 0.0 | 102 |

7.3 Online creativity 0.1 121 ○

| | | |
|--|------|-------|
| 7.3.1 Generic top-level domains (TLDs)/th pop. 15–69 | 0.1 | 122 ○ |
| 7.3.2 Country-code TLDs/th pop. 15–69 | 0.0 | 127 ○ |
| 7.3.3 Wikipedia edits/mn pop. 15–69 | 44.3 | 112 |
| 7.3.4 Video uploads on YouTube/pop. 15–69 | n/a | n/a |

NOTES: ● indicates a strength; ○ a weakness; * an index; † a survey question.

② indicates that the country's data are older than the base year; see Appendix II for details, including the year of the data.

Square brackets indicate a top 10 or 100 or below sub-pillar ranking in the presence of a relevant number of missing variables; see page 172 of this appendix for details.