

Governance Report Indicators 2016:

Codebook

Draft Version

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This document contains information on the methodology and data sources used for the development of the Governance Report 2016 Indicators.

The data cover 29 OECD member states and seven non-OECD countries. The data files list the standardized mean scores (z-scores) of each indicator together with a lower and upper bound 95% credible interval estimate (an estimate of uncertainty around the mean. In other words, each indicator comes in three varieties:

mean_indicator = standardized mean Bayesian factor analysis score

lower_indicator = standardized lower bound of the 95% credible interval around the mean

upper_indicator = standardized upper bound of the 95% credible interval around the mean

Methodology

We consider infrastructure governance and its three dimensions to be latent concepts that cannot be measured directly. Each of our variables, therefore, is a realization of some underlying level of governance relating to one of the three dimensions, and this information can be used to estimate countries' underlying levels of infrastructure governance.

Specifically, we generated our estimates of countries' levels of infrastructure governance from a Bayesian factor analysis (BFA) model.

More formally, given K indicators, denote y_{ik} the observation of indicator $k \in \{1, 2, \dots, K\}$ for country i , and let θ_i be the the unobservable underlying level of governance for country i . The model is then,

$$y_{ik} = \alpha_k + \beta_k \theta_i + \varepsilon_{ik}$$

where β_k is the discrimination parameter mentioned previously, α_k is an indicator specific intercept term, and ε_{ik} is the error term. This error term is assumed to be distributed according to a normal distribution with mean 0 and standard deviation σ_k , capturing the previous intuition that some variables may be more 'noisy' than others.

Before estimating a BFA model, we must first form prior beliefs, or assign weights, in terms of the extent to which our observed variables are linked to the dimension of infrastructure governance. We impose the following prior distributions upon the parameters of interest in the model: $\alpha_k \sim \text{Normal}(0, \sigma_a)$, $\beta_k \sim \text{Normal}(0, 5)$, $\theta_i \sim \text{Normal}(0, 1)$, $\sigma_a \sim \text{Uniform}(0, 5)$, $\sigma_k \sim \text{Uniform}(0, 5)$. Note that our prior on the level of association between the observed variables and the underlying governance score is sufficiently wide so that the results are data-driven. In addition, the distributional assumption on θ_i results in a model that is practically identified locally. This means that our parameters are identified up to a 180 degree rotation of the latent scale. Rather than impose a sign restriction on one of the variables used, which would ensure global identification, we instead simply rotate the latent scale so that it follows a natural interpretation of higher values, meaning better performance on this index.

To prepare the data for our BFA, we standardized all of our variables by subtracting the mean and dividing by the standard deviation. Finally, to simplify the presentation of our results, we rescaled all scores to fit between 0 and 100, with countries with stronger performances receiving higher scores.

Top Level Dimensions

INFRASTRUCTURE GOVERNANCE

Overall average of the *Infrastructure Planning, Infrastructure Management* and *Infrastructure Outcomes* dimension scores.

Infrastructure Planning

Infrastructure planning requires expansive analytical capacity on the part of governments and concerns the organization of knowledge and type of advice that informs governmental policy-making. It involves project and policy analytics related to making decisions about planning and funding infrastructure projects.

Included Indicators: *Funding, Involving Multiple Actors, Planning*

Infrastructure Management

Infrastructure management, captures governments' coordination and regulatory capacities. While regulation is about control and oversight over project and decision-making processes, coordination capacity is the ability to coordinate between multiple actors and organizations with diverse interests and goals.

Included Indicators: *Coordination, Procurement, Construction and Monitoring, Public Private Partnerships, Use of Best Practices, Preventing Corruption*

Infrastructure Outcomes

Infrastructure outcomes captures governments' delivery capacity in terms of the ways in which they execute policies and provide quality services.

Included Indicators: *Infrastructure Access, Project Delivery, Infrastructure Quality*

Indicators

Variable name [source variable name | source | year]

Funding

5 year change of infrastructure investment [q4 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

5 year change of infrastructure investment per sector [q5_1:7 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Funding gaps per sector [q7_1:7 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Change of funding sources [q14_1:8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Involving Multiple Actors

Actors involved in planning [q10_1:8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Private actors involved in planning per sector [q11_1:7 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Planning

Existence of a national plan [q8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Relevance of national plan [q9 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Development delivery modalities [q15_1:7 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Coordination

Coordination challenges in planning [q13_1:10 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Procurement

Procurement challenges [q16_1:11 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Construction and Monitoring

Construction and monitoring challenges [q17_1:8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Public Private Partnerships

Involving private actors challenges [q18_1:8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Use of Best Practices

Instruments helpful in procurement [q19_1:14 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Instruments helpful in construction and monitoring [q20_1:8 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015]

Preventing Corruption

% of single bidder contracts in infrastructure public procurement [singleb | Composite Corruption Risk Index | 2014]

Infrastructure Access

ICT Access [ICT Access Index | Global Innovations Index 2015 | 2013]

ICT Usage [ICT Use Index | Global Innovations Index 2015 | 2013]

Access to electricity (% of population) [EG.ELC.ACCS.ZS | World Bank Development Indicators | 2012]

Improved water source (% of population with access) [**SH.H2O.SAFE.ZS | World Bank Development Indicators | 2015**]

Improved sanitation facilities (% of population with access) [**SH.STA.ACSN | World Bank Development Indicators | 2015**]

Project Delivery

Management performance per sector [**q21_1:7 | Hertie School-OECD Global Expert Survey on Public Infrastructure | 2015**]

Infrastructure Quality

Quality of overall infrastructure [**EOSQ056 | Global Competitiveness Report 2015-2016 | 2015**]

Quality of roads [**EOSQ057 | Global Competitiveness Report 2015-2016 | 2015**]

Quality of railroad infrastructure [**EOSQrailroad | Global Competitiveness Report 2015-2016 | 2015**]

Quality of port infrastructure [**EOSQ353 | Global Competitiveness Report 2015-2016 | 2015**]

Quality of air transport infrastructure [**EOSQ061 | Global Competitiveness Report 2015-2016 | 2015**]

Available airline seat km per week [**AIRSEATKM | Global Competitiveness Report 2015-2016 | 2015**]

Quality of electricity supply [**EOSQ064 | Global Competitiveness Report 2015-2016 | 2015**]

Quality of electricity supply [**EOSQ064 | Global Competitiveness Report 2015-2016 | 2015**]

Quality of electricity supply [**EOSQ064 | Global Competitiveness Report 2015-2016 | 2015**]

Perceived quality of public transport [**Quality of Public Transport | Gallup | 2015**]

Perceived quality of water supply [**Quality of Water | Gallup | 2015**]

Perceived quality of roads [**Quality of Roads | Gallup | 2015**]

Number of electrical outages in a typical month [**in2 | Enterprise Surveys | 2014**]

Duration of a typical electrical outage (hours) [**in3 | Enterprise Surveys | 2014**]

Losses due to electrical outages (% of annual sales) [in4 | Enterprise Surveys | 2014]

Percent of firms owning or sharing a generator [in9 | Enterprise Surveys | 2014]

Proportion of electricity from a generator (%) [in10 | Enterprise Surveys | 2014]

Days to obtain an electrical connection (upon application) [in1 | Enterprise Surveys | 2014]

Percent of firms identifying electricity as a major constraint [in12 | Enterprise Surveys | 2014]

Number of water insufficiencies in a typical month [in6 | Enterprise Surveys | 2014]

Proportion of products lost to breakage or spoilage during shipping to domestic markets (%) [in14 | Enterprise Surveys | 2014]

Percent of firms identifying transportation as a major constraint [in11 | Enterprise Surveys | 2014]

Logistic Performance Index [LP.LPI.OVRL.XQ | World Bank Development Indicators | 2014]

Road Safety [ITF_ROAD_ACCIDENTS | OECD Stats | 2014]

Links to Original Data Sources

Global Competitiveness Report 2015-2016 http://www3.weforum.org/docs/gcr/2015-2016/GCI_Dataset_2006-2015.xlsx

Global Innovations Index 2015 <https://www.globalinnovationindex.org/content/page/gii-full-report-2015/>

Hertie School-OECD Global Expert Survey on Public Infrastructure
<http://www.governancereport.org/home/governance-indicators/2016-governance-indicators/global-expert-survey/>

OECD Stats <http://stats.oecd.org/>

World Bank Enterprise Surveys
<http://www.enterprisesurveys.org/data/exploretopics/infrastructure?topic=infrastructure&ajax=1&excel=1&cut=>

World Bank World Development Indicators: <http://data.worldbank.org/data-catalog/world-development-indicators>