GQII Report 2020

Measuring the development and comparison of quality infrastructure in 184 economies worldwide

GLOBAL QUALITY INFRASTRUCTURE INDEX

By Ulrich Harmes-Liedtke and Juan José Oteiza Di Matteo

mesopartner connect the dots

analyticar

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The essence of the GQII

Key statements on the index and report

The starting point

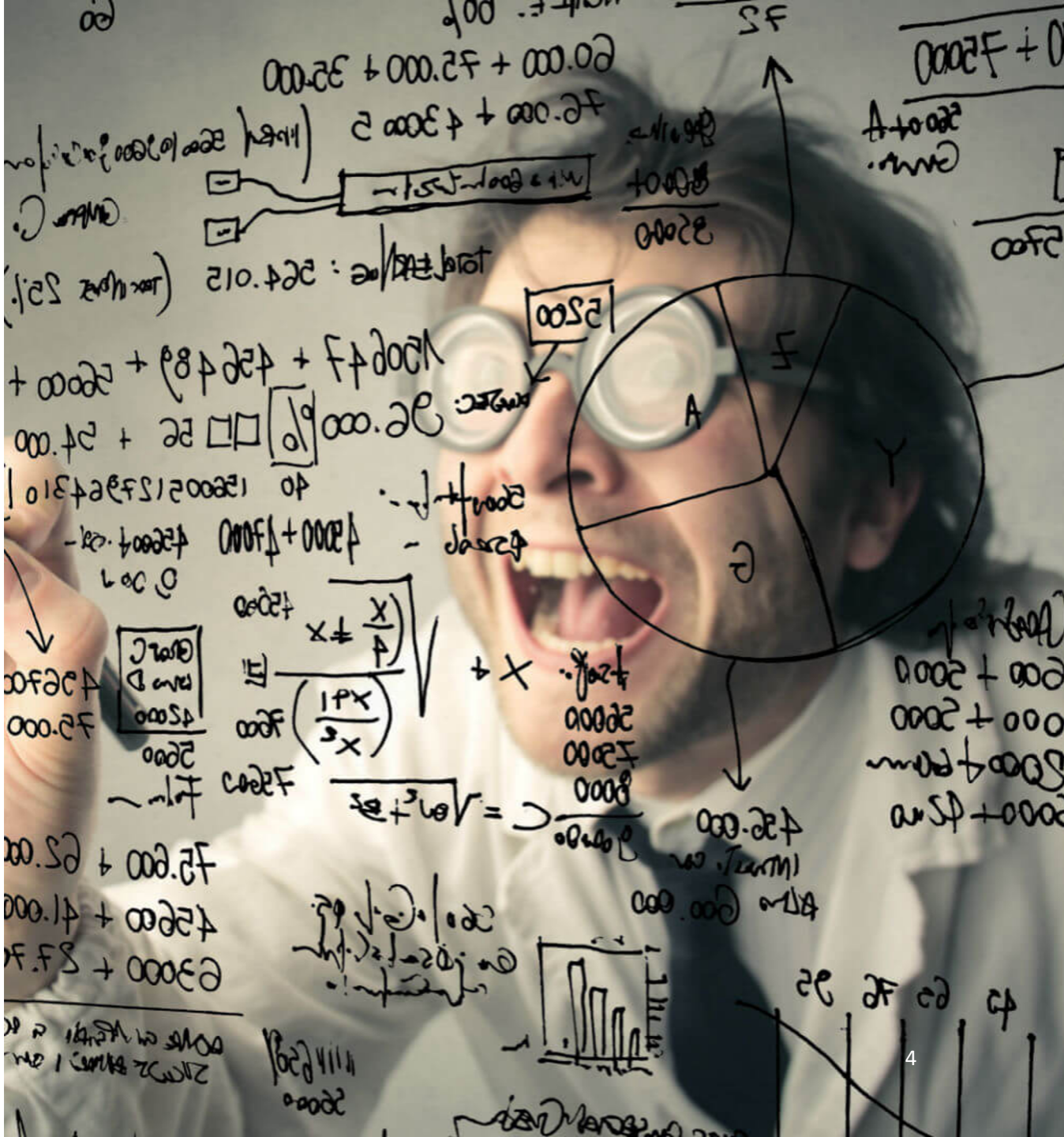
So far, there is no benchmark to measure the level of QI development in a country.

QI bodies have a lot of data at their disposal, but they do not systematically process it and make it comparable.

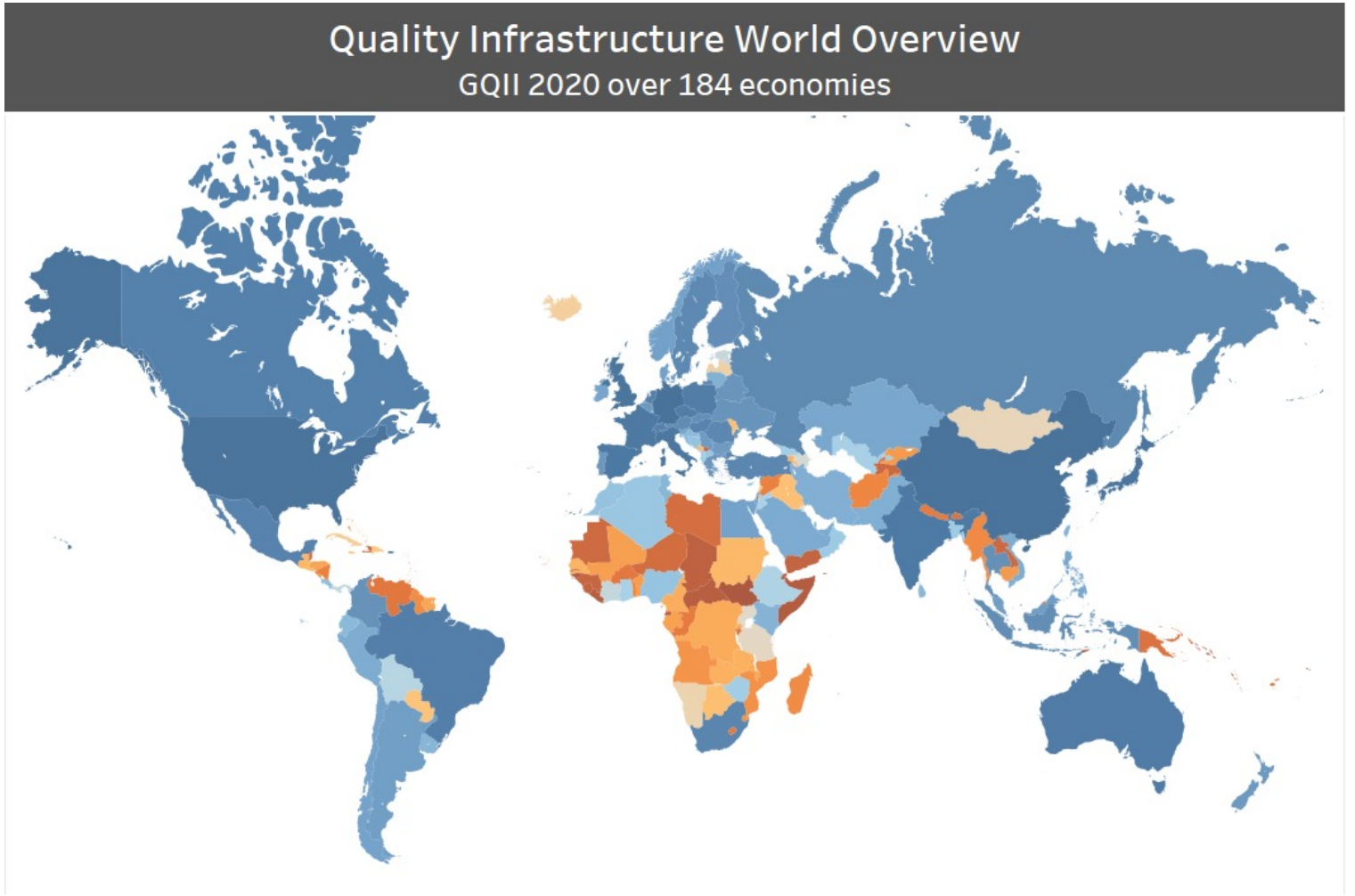
There is hardly any data exchange between the QI components - accredited, standardisation and metrology.

Who benefits from the GQII index?

- QI Body representatives, to be able to quantify the state of development of QI in the country and to be able to compare it with other countries.
- National policy makers and business representatives to sensitise them for the promotion and use of QI.
- Trade policy official to be informed about the QI capabilities of trading partners
- Social researchers working on sustainable development and promotion of institutions.
- International cooperation representatives, who want to better understand the context of their interventions.



What are the unique features of the GQII?



Global Map: QI data

Global Rankings

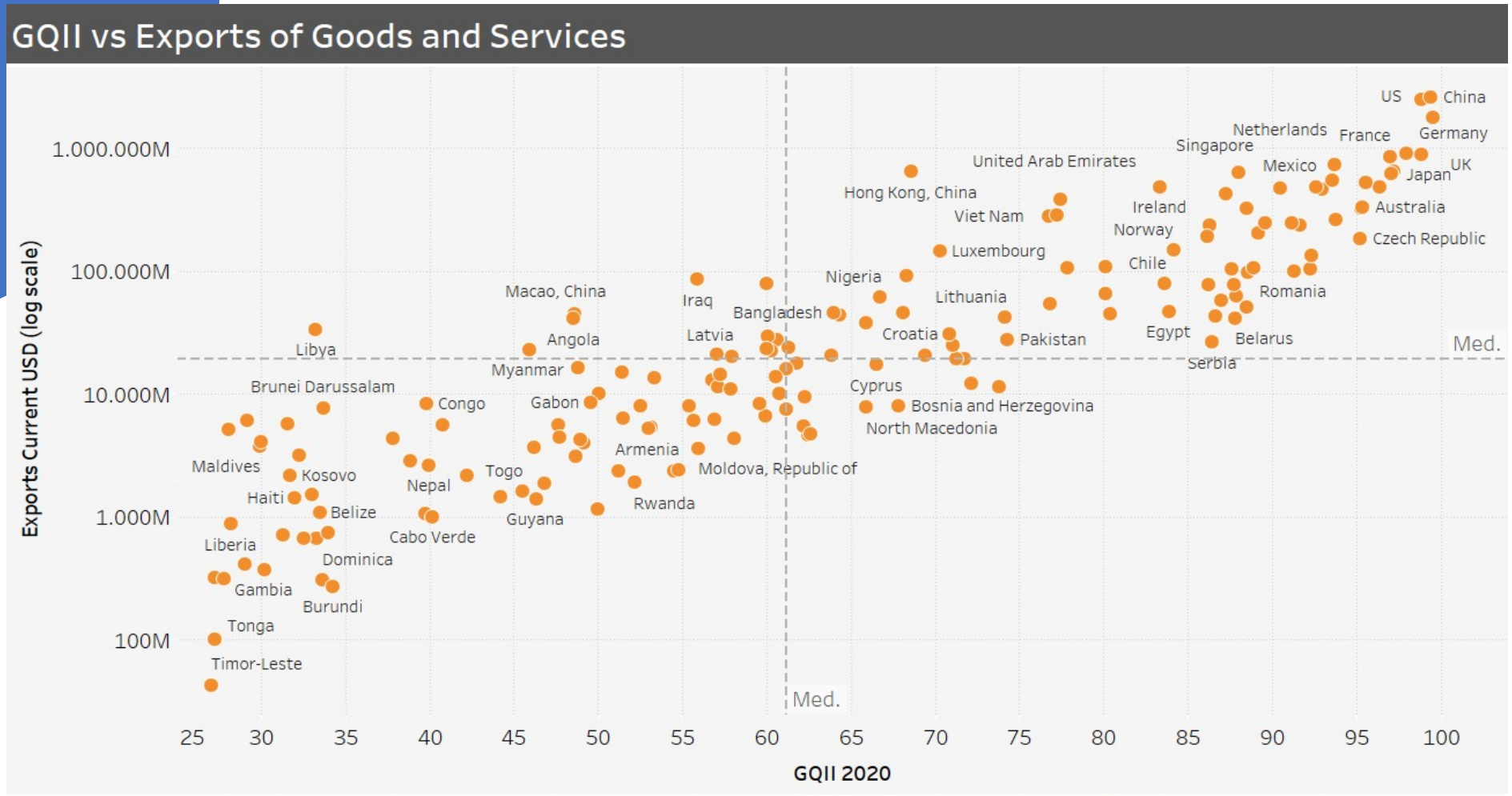
GQII 2020 | Global Ranking and Sub Rankings

Economy	GQII 2020	Rank GQII 2020	Rank GQII Metrology	Rank GQII Standard	Rank GQII Accreditation
Seychelles	50,0	121	94	143	114
Gabon	49,6	122	127	119	125
Mali	49,2	123	137	112	129
Benin	49,0	124	123	122	123
Cambodia	48,8	125	132	128	113
Kyrgyz Republic	48,7	126	125	154	84
Macao, China	48,6	127	135	133	111
Angola	48,6	128	120	136	118
Bahamas	47,7	129	137	131	120
Mozambique	47,7	130	137	137	116
Eswatini	46,8	131	118	156	106
Guyana	46,3	132	104	150	123
Madagascar	46,2	133	137	141	120
Myanmar	45,9	134	157	120	132
Togo	45,5	135	137	143	125
Afghanistan	44,2	136	157	138	128
Liechtenstein	43,5	137	157	148	119
Barbados	42,2	138	104	115	151
Syrian Arab Republic	40,9	139	100	118	160
Nicaragua	40,8	140	117	145	140
Saint Lucia	40,5	141	104	124	149

GQII 2020 | Global Ranking and Sub Rankings

Economy	GQII 2020	Rank GQII 2020	Rank GQII Metrology	Rank GQII Standard	Rank GQII Accreditation
Germany	99,5	1	2	2	2
China	99,4	2	3	1	3
US	98,9	3	1	10	1
UK	98,8	4	6	3	5
Japan	98,0	5	4	4	13
Korea, Republic of	97,2	6	7	8	14
Italy	97,0	7	16	4	4
France	97,0	8	4	6	20
Spain	96,4	9	12	8	10
India	95,6	10	19	7	9
Australia	95,4	11	8	19	6
Poland	95,3	12	15	12	7
Czech Republic	95,2	13	14	11	12
Brazil	93,8	14	9	16	26
Netherlands	93,7	15	21	12	15
Canada	93,6	16	10	27	16
Switzerland	93,0	17	13	14	33
Mexico	92,6	18	16	40	8
Hungary	92,4	19	18	19	18
South Africa	92,3	20	11	30	22

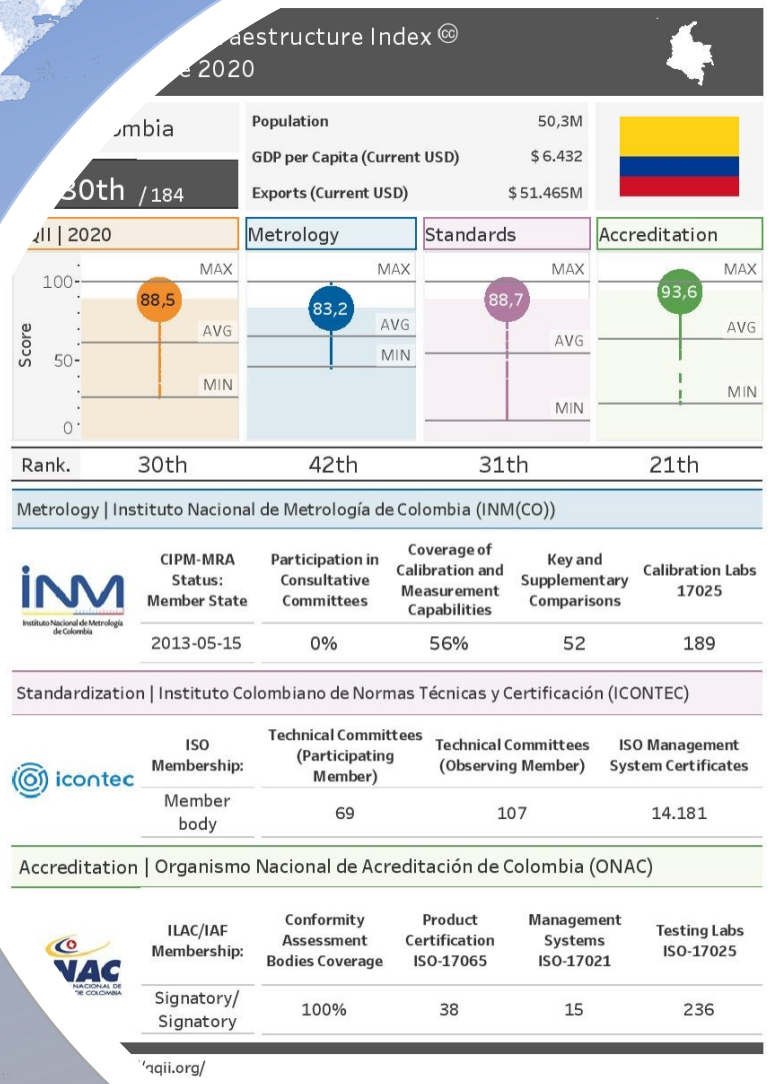
QI and exports correlate strongly

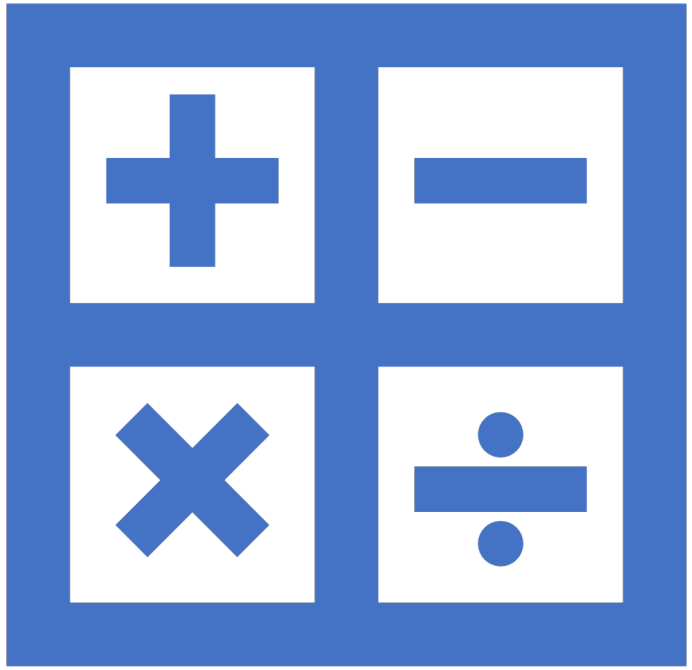


Notes: Exports of goods and services 2019 in current USD (World Bank). Own calculations for GQII 2020. Log scale for Export axis. Significant correlation of 0,89.

Country profiles

- Country profiles visualise the development status of the QI.
- Country profiles inform the QI bodies and about the data sources.
- So far, six country profiles have been prepared.





History, data sources, and formula fundamentals

The GQII formula

History: The formula has been evolving through the years

2010

- **6 components formula**
- **Weighting with population**
- **Normalisation with max values**

$$Index(QI/Pop) = \frac{Index\left(\frac{CMC}{Pop}, \frac{ISO}{Pop}, \frac{TAB}{Pop}\right) + Index\,(K\&SComp.,\ Tech.\ Comm.,\ Membership)}{2}$$

2018

- **7 components formula**
- **Weighting with population**
- **Normalisation with max values**
- **Same weights for each pillar**

$$GQII_i = \left(\beta_1 \times \frac{CMC_i/Pop_i}{max.\ value} + \beta_2 \times \frac{K\&SC_i}{max.\ value} + \beta_3 \times \frac{ISO_i/Pop_i}{max.\ value} + \beta_4 \times \frac{Tech.Comm._i}{max.\ value} + \beta_5 \times \frac{CABs\ (9001)_i/Pop_i}{max.\ value} + \beta_6 \times \frac{CABs\ (17025)_i/Pop_i}{max.\ value} + \beta_7 \times \frac{Member_i}{max.\ value}\right)$$

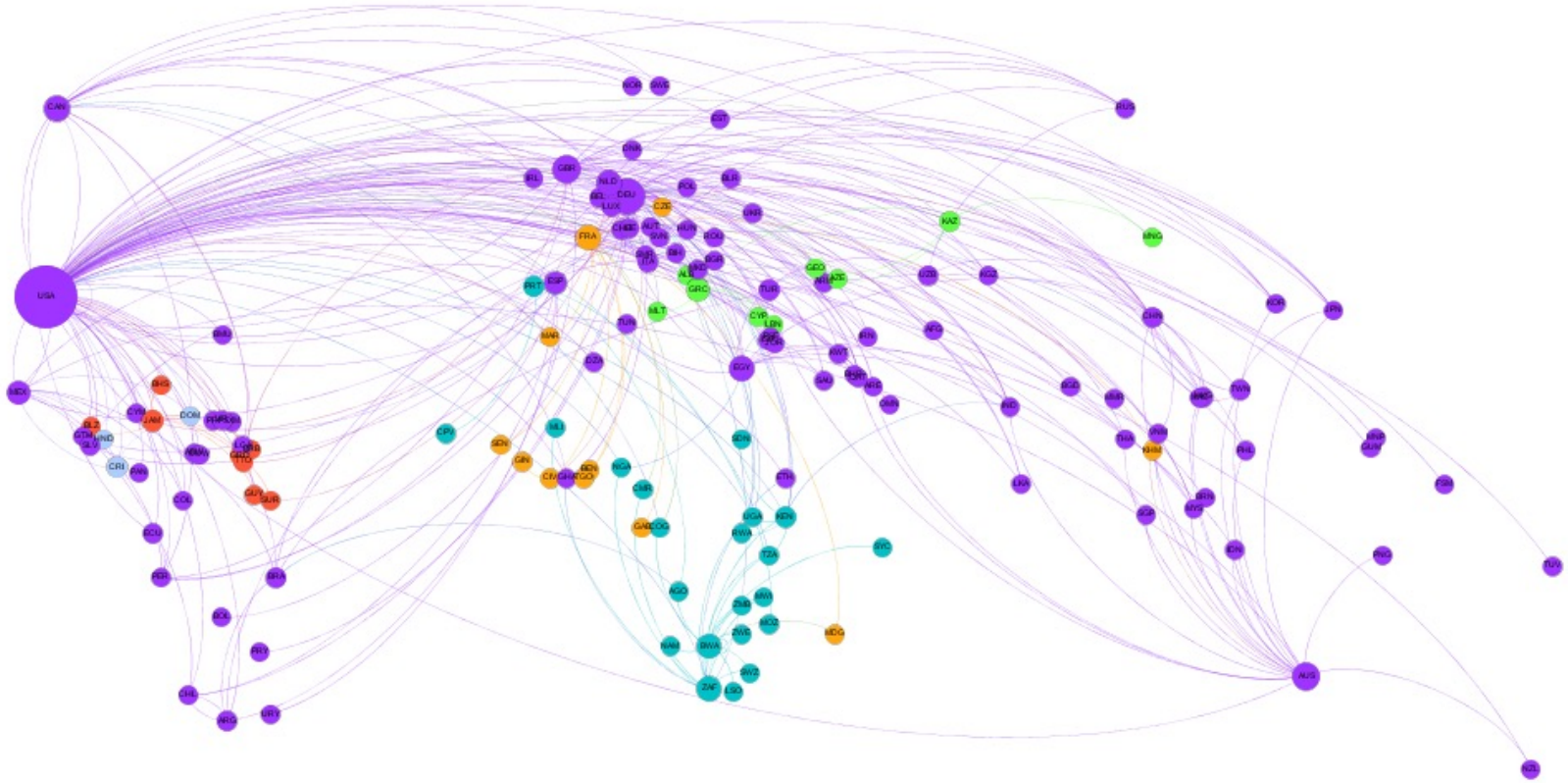
2020

- **13 components formula**
- **No weighting factors**
- **Size effect attenuation improvement**
- **Normalisation with Rank percentiles**
- **Data collection improvement**
- **Data validation with original source**
- **Expert validation**

GQII Data: 13 components

QI Pillar	Membership (not correlated to size)	Count of	Coverage (%) (not correlated to size)
Metrology (5)	• CIPM MRA status • Regional Metrology Org. status	• CABs - Calibration Labs.* • KCDB – Key and Supplementary Comparisons	• KCDB - Calibration and Measurement Capabilities • CIPM - Consultative Committees
Standardization (3)	• ISO status	• ISO MS certificates • ISO Technical Committees Participation	
Accreditation (5)	• IAF status • ILAC status • Regional Accreditation Org. status	• CABs – Product* • CABs – MS* • CABs – Testing Labs.*	• CABs coverage – Scope Level 3*

GQII Data: Cross border accreditation



Fundamentals: Equal weight to each component and sub-components

$$GQII_i = \{ \text{Metrology} + \text{Standardization} + \text{Accreditation} \} \times \frac{1}{3}$$

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Fundamentals: Equal weight to each component and sub-components

$$GQII_i = \left\{ \left[M_1 + M_2 + M_3 + M_4 + M_5 \right] \times \frac{1}{5} + \left[S_1 + S_2 + S_3 \right] \times \frac{1}{3} + \left[A_1 + A_2 + \left(A_{31} + A_{32} + A_{33} \right)/3 \right] \times \frac{1}{3} \right\} \times \frac{1}{3}$$

Notes: All values in the formula are expressed in Percentile Ranks.

GLOBAL QUALITY INFRASTRUCTURE INDEX

GQII Formula

$$GQII_i =$$

$$\Big\{\left[Membership_i + CMC\ Coverage_i + CIPM\ Cons.Comm._i + K\&SC_i + CABs\ (Calbr.\ Labs.)^*{}_i\right] \times \frac{1}{5}$$

$$+\ \left[Membership_i + ISO\ Tech.\ Comm._i + ISO\ Survey_i\right] \times \frac{1}{3}$$

$$+\ \left[Membership_i + CAB\ Coverage_i + \left(CABs\ (ISO\ 17065)_i + CABs\ (ISO\ 17021)_i + CABs\ (Tst.\ Labs.)^*{}_i/3\right)\right] \times \frac{1}{3}\Big\} \times \frac{1}{3}$$

Notes: All values in the formula are expressed in Percentile Ranks. *ISO/IEC 17025

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The way forward

New ideas for the GQII programme

Improve data collection and include in digitisation strategy.

Current situation

- QI bodies usually provide data only for validation of information
- Data is usually not machine-readable
- Prioritisation of trade secrets prevents transparency
- Information on websites is often inconsistent
- Some data is outdated and does not represent always the true capabilities
- Data is not always presented in a user-friendly way
- Useful search functions e.g. by country or scope are often missing
- Certificates in PDF attachments are not machine-readable

Potential for improvement

- QI bodies could make their data available to internal and external statistical use.
- The quality of data could be improved by developing guidelines for data collection and publication.
- Regional cooperation could compile data and make it comparable.
- QI data could be a new source of income.
- Blockchain technology can combine privacy and transparency.
- The chain of trust can be visualised via QI interoperable systems.

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The GQII programme is open and invite you to participate!

- Country Profiles for all 184 economies
- Collection of data in 2021 for the construction of time series
- Interoperability of QI data
- Analysis of the Crossborder QI activities
- Development of QI intelligence systems