



The Quality Infrastructure for Sustainable Development Index for Africa

Summary Report

William Becker
Hedvig Norlén

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1 Background

The Quality Infrastructure for Sustainable Development (QI4SD) Index is a project developed by the United Nations Industrial Development Organisation (UNIDO) to measure the contribution of quality infrastructure to sustainable development goals, at the national level.

Quality infrastructure (QI) is a multidimensional concept. According to UNIDO's definitions, its dimensions can be summarised as:

1. Accreditation
2. Conformity assessment
3. Metrology
4. Policy
5. Standards

The QI4SD Index aims to “measure” QI using indicators for each of these dimensions, which are aggregated into a “composite indicator”, i.e. a single aggregate score, for each country. Moreover, the QI4SD Index gives scores for each of the three main pillars of sustainable development: People, Planet and Prosperity (see Figure 1). These scores aim to measure the contribution and readiness of a country to tackle sustainable development in these specific pillars.



Figure 1: Grouping of SDGs into the 3 Ps (Peace and partnerships is omitted from this work)

Indicators were selected for each dimension following a literature review and rounds of discussion with partner organisations. Data was then collected where possible, typically through partner organisations, since no centralised statistics exist on QI. Indicators were further screened based on criteria including relevance, value added, data availability, and others.

The final resulting indicators were aggregated into an index following state of the art composite indicator methodology, including data treatment, normalisation and aggregation. The result is a list of 36 indicators covering 137 countries worldwide.

For each country, apart from indicator data, there are scores for each dimension of QI, as well as an overall aggregate index score.

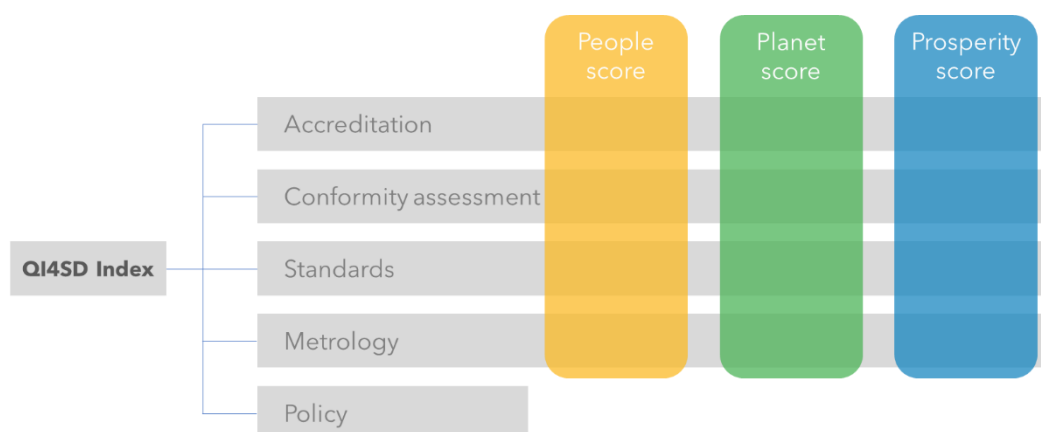


Figure 2: Conceptual framework of the QI4SD Index, illustrating the five dimensions of QI and the intersection of the People, Planet and Prosperity pillars

Additionally, each country has a score representing the state of QI in the People, Planet and Prosperity pillars, using data e.g. on specific standards relating to social, environmental and economic issues respectively. These scores are calculated using a subset of the 9 indicators in the Accreditation, Conformity Assessment, Metrology and Standards dimensions, because no sufficiently detailed data was available in the Policy dimension.

To summarise the general index, QI4SD Index, is composed of 5 dimensions and 36 indicators

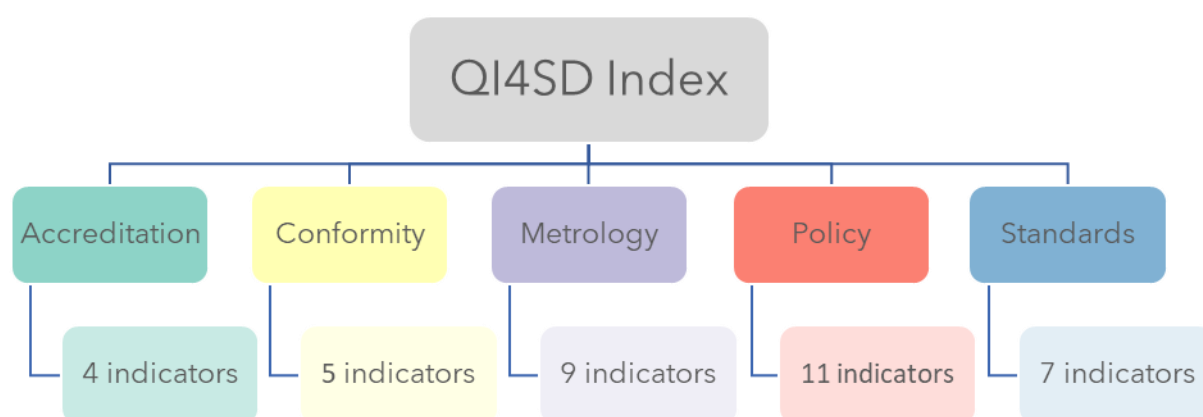


Figure 3: 5 QI dimensions and 36 indicators that constitute the QI4SD Index

The “3P” (People, Planet and Prosperity) indexes are composed of 4 dimensions and 9 indicators:

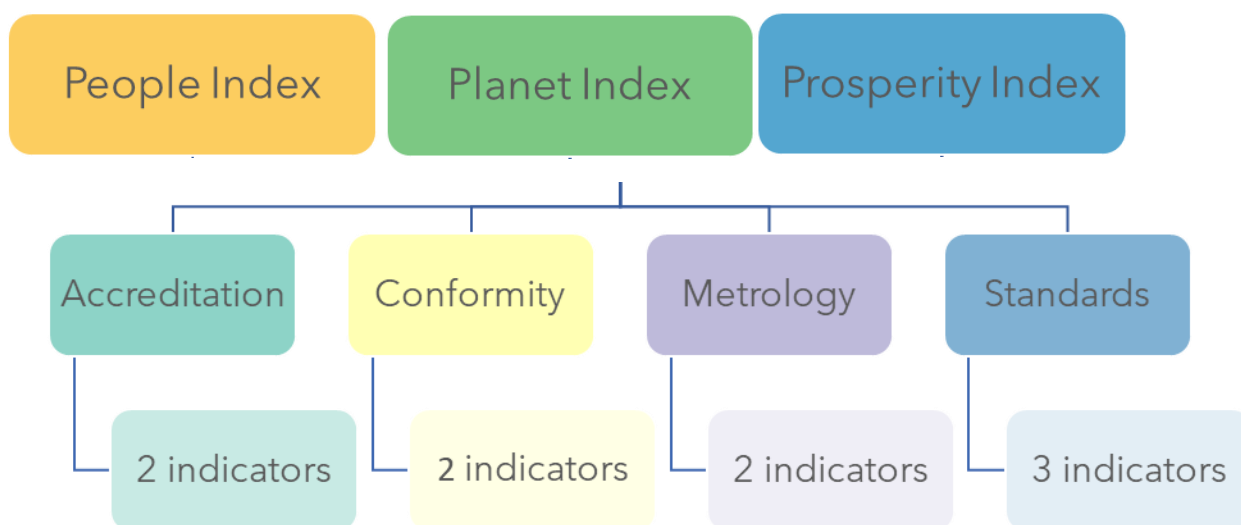


Figure 4: 4 QI dimensions and 9 indicators that constitute the “3P” (People, Planet and Prosperity) indexes

Each country has a general QI score, plus a score for each of the People, Planet and Prosperity pillars/indexes. One level below, are the scores for the 5 QI dimensions for the general index and 4 QI dimensions for the 3P indexes. Moreover, QI has a strong association with the size of the economy. For this reason, scores are good when they presented by *GDP groups* to more meaningfully compare countries with their peers. We recall that the objective is not to say that countries are better or worse than others, but to show how different countries are placed in terms of QI, and what they may wish to improve or learn from others.

Tables 1 and 2 illustrate the indicators in the framework.

Dimension	Name	Unit	Organisation	Type	Weight
Accreditation	Scopes of IAF accreditation bodies	Number	IAF	P	1
	Signatory to the IAF MLA	Yes/no	IAF	G	1
	Scopes of ILAC accreditation bodies	Number	ILAC	P	1
	Signatory to the ILAC MRA	Yes/no	ILAC	G	1
Conformity	Membership of IEC conformity assessment systems	Number	IEC	G	1
	Number of IECEE certificates recognised	Number	IEC	G	1
	Number of recognised certificates (IQNet)	Number	IQNet	P	0.5
	Membership of IQNet	Composite score	IQNet	G	1
	Number of recognised certificates (ISO)	Number	ISO	P	0.5
Metrology	Participation in CIPM Consultative Committees	Number	BIPM	G	1
	Participation in key and supplementary comparisons	Number	BIPM	G	1
	Number of CMCs	Number	BIPM	P	0.5
	Breadth of CMCs	Number of types	BIPM	P	0.5
	Membership of BIPM	Categorical	BIPM	G	1
	Membership of OIML	Categorical	OIML	G	1
	OIML-CS - number of services offered	Number	OIML	G	0.5
	OIML-CS - number of services recognised	Number	OIML	G	0.5
	Involvement in OIML project groups	Composite score	OIML	G	1
Policy	Participation in capacity building programmes	Number of types	None	G	1
	Quality policy in place	Yes/no	None	G	1
	Dimensions of QI addressed by quality policy	Number	None	G	1
	Support and funding for quality policy	Yes/no	None	G	1
	Government/political endorsement for quality policy	Yes/no	None	G	1
	Government approval of quality policy	Yes/no	None	G	1
	Stakeholder involvement of quality policy	Yes/no	None	G	1
	Consideration of diversity in quality policy	Yes/no	None	G	1
	Implementation plan for quality policy	Yes/no	None	G	1
	Monitoring and evaluation for quality policy	Yes/no	None	G	1
	Reviewing and updating for quality policy	Yes/no	None	G	1
Standards	Adopted ISO standards	Number	ISO	P	1
	Adopted IEC standards	Number	IEC	P	1
	Membership of IEC	Categorical	IEC	G	1
	Participation in IEC technical committees	Number	IEC	P	1
	Membership of ISO	Categorical	ISO	G	1
	Participation in ISO technical committees	Number	ISO	G	1
	Membership of ITU	Composite score	ITU	G	1

Table 1: Indicators in the full QI4SD Index. Type “P” refers to “P-indicators”; “G” refers to “general indicators”

Dimension	Name	Unit	Organisation	Type	Weight
Accreditation	Scopes of IAF accreditation bodies	Number	IAF	P	1
	Scopes of ILAC accreditation bodies	Number	ILAC	P	1
Conformity	Number of recognised certificates (IQNet)	Number	IQNet	P	0.5
	Number of recognised certificates (ISO)	Number	ISO	P	0.5
Metrology	Number of CMCs	Number	BIPM	P	0.5
	Breadth of CMCs	Number of types	BIPM	P	0.5
Standards	Adopted ISO standards	Number	ISO	P	1
	Adopted IEC standards	Number	IEC	P	1
	Participation in IEC technical committees	Number	IEC	P	1

Table 2: Indicators in the P-Indexes. Type “P” refers to “P-indicators” as defined previously

2 Region Africa

Raw indicator data for (all) 54 countries in Africa have been collected. However 40% of the countries have data gaps and are consequently excluded from the QI4SD index calculation.

Nr	ISO 3166-1 alpha-3	Country	Region	GDP group	Income group
1	DZA	Algeria	Middle East & North Africa	L	Lower middle
2	AGO	Angola	Sub-Saharan Africa	M	Lower middle
3	BEN	Benin	Sub-Saharan Africa	M	Lower middle
4	BWA	Botswana	Sub-Saharan Africa	M	Upper middle
5	BFA	Burkina Faso	Sub-Saharan Africa	M	Low
6	BDI	Burundi	Sub-Saharan Africa	S	Low
7	CPV	Cabo Verde	Sub-Saharan Africa	S	Lower middle
8	CMR	Cameroon	Sub-Saharan Africa	M	Lower middle
9	CAF	Central African Republic	Sub-Saharan Africa	S	Low
10	TCD	Chad	Sub-Saharan Africa	M	Low
11	COM	Comoros	Sub-Saharan Africa	S	Lower middle
12	COD	DR Congo	Sub-Saharan Africa	M	Low
13	COG	Republic of the Congo	Sub-Saharan Africa	M	Lower middle
14	CIV	Côte d'Ivoire	Sub-Saharan Africa	M	Lower middle
15	DJI	Djibouti	Middle East & North Africa	S	Lower middle
16	EGY	Egypt	Middle East & North Africa	L	Lower middle
17	GNQ	Equatorial Guinea	Sub-Saharan Africa	M	Upper middle
18	ERI	Eritrea	Sub-Saharan Africa		Low
19	SWZ	Eswatini	Sub-Saharan Africa	S	Lower middle
20	ETH	Ethiopia	Sub-Saharan Africa	L	Low
21	GAB	Gabon	Sub-Saharan Africa	M	Upper middle
22	GMB	Gambia (the)	Sub-Saharan Africa	S	Low
23	GHA	Ghana	Sub-Saharan Africa	M	Lower middle
24	GIN	Guinea	Sub-Saharan Africa	M	Low
25	GNB	Guinea-Bissau	Sub-Saharan Africa	S	Low
26	KEN	Kenya	Sub-Saharan Africa	M	Lower middle
27	LSO	Lesotho	Sub-Saharan Africa	S	Lower middle
28	LBR	Liberia	Sub-Saharan Africa	S	Low
29	LYB	Libya	Middle East & North Africa	M	Upper middle
30	MDG	Madagascar	Sub-Saharan Africa	M	Low
31	MWI	Malawi	Sub-Saharan Africa	M	Low
32	MLI	Mali	Sub-Saharan Africa	M	Low
33	MRT	Mauritania	Sub-Saharan Africa	S	Lower middle
34	MUS	Mauritius	Sub-Saharan Africa	M	Upper middle
35	MAR	Morocco	Middle East & North Africa	L	Lower middle
36	MOZ	Mozambique	Sub-Saharan Africa	M	Low
37	NAM	Namibia	Sub-Saharan Africa	M	Upper middle
38	NER	Niger	Sub-Saharan Africa	M	Low
39	NGA	Nigeria	Sub-Saharan Africa	L	Lower middle
40	RWA	Rwanda	Sub-Saharan Africa	M	Low
41	STP	Sao Tome and Principe	Sub-Saharan Africa	S	Lower middle
42	SEN	Senegal	Sub-Saharan Africa	M	Lower middle
43	SYC	Seychelles	Sub-Saharan Africa	S	High
44	SLE	Sierra Leone	Sub-Saharan Africa	S	Low
45	SOM	Somalia	Sub-Saharan Africa	S	Low
46	ZAF	South Africa	Sub-Saharan Africa	L	Upper middle
47	SSD	South Sudan	Sub-Saharan Africa		Low
48	SDN	Sudan	Sub-Saharan Africa	M	Low
49	TZA	Tanzania, the United Republic of	Sub-Saharan Africa	M	Lower middle
50	TGO	Togo	Sub-Saharan Africa	S	Low
51	TUN	Tunisia	Middle East & North Africa	M	Lower middle
52	UGA	Uganda	Sub-Saharan Africa	M	Low
53	ZMB	Zambia	Sub-Saharan Africa	M	Lower middle
54	ZWE	Zimbabwe	Sub-Saharan Africa	M	Lower middle

Table 3: Indicator data have been collected for 54 countries in Africa

2.1 General Index results – QI4SD Index

The QI4SD Index framework for **Africa covers 31 countries**. These countries were selected based on data availability rules. Countries were excluded if they have, less than 60% data availability over all indicators, or, more than 66% zero values across all indicators Figure 5 illustrates the QI4SD Index scores for the countries included in the framework and Figure 6 zooms in the countries in Africa. South Africa followed by Tunisia, Egypt and Kenya are scoring highest on QI.

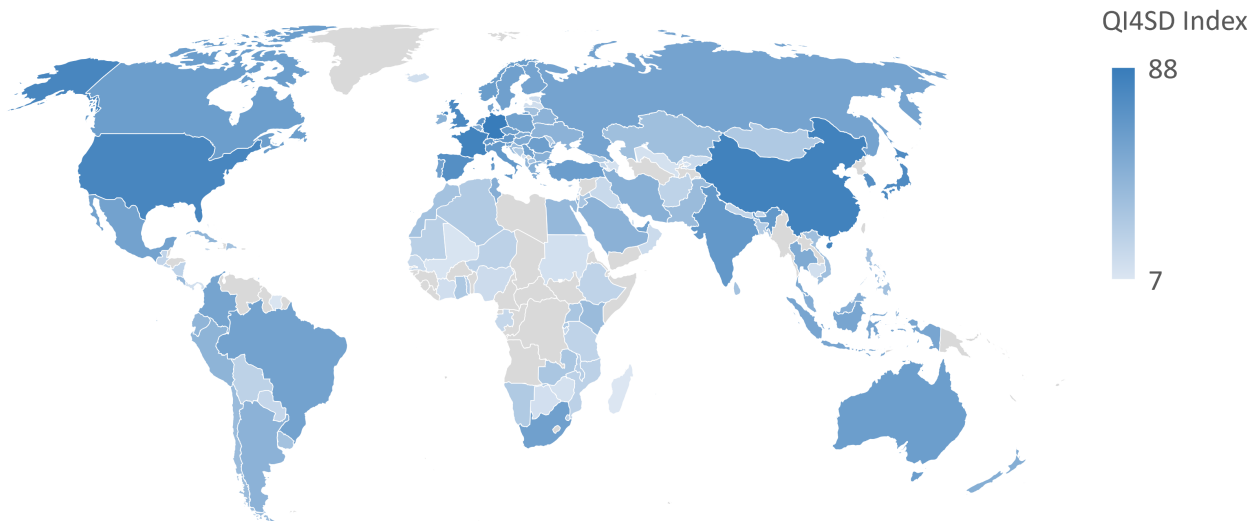


Figure 5: QI4SD Index scores

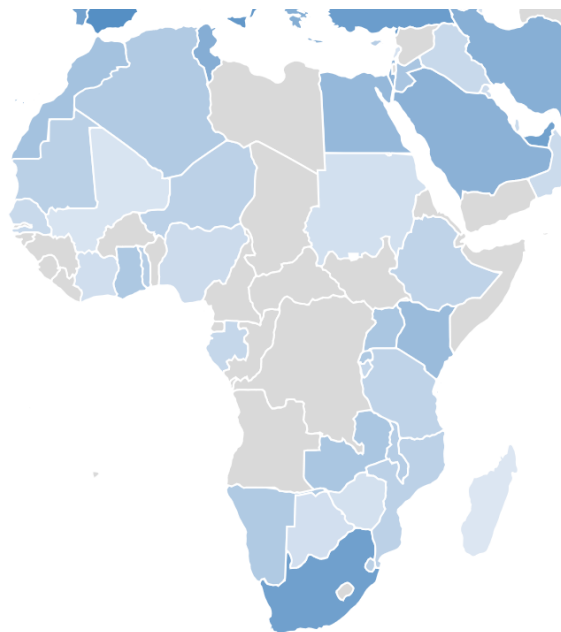


Figure 6: QI4SD Index scores for countries in Africa

The complete QI4SD scores (index and dimensions) for the 31 African countries are presented in Table 4. South Africa has the highest scores in all dimensions apart from the Policy dimension (due to a missing value). Some countries shown have missing data values in the Policy dimension. The Policy score is only calculated when at least 60% of its indicators have data available, and since the Policy dimension was based on the UNIDO/ISO survey, missing data occurs for countries

that did not respond to the survey, or did not respond to the Policy questions in the survey. The index-level ranks of these countries should be treated with a little caution since they are based on four dimension scores rather than five. This includes countries such as South Africa (as mentioned above), Egypt and Kenya in the top four of the countries.

Country	Africa Rank	Overall Rank	Index	Standards	Conformity	Metrology	Accreditation	Policy
South Africa	1	20	60	63	19	70	88	
Tunisia	2	39	50	43	4	35	75	93
Egypt	3	56	42	51	4	37	75	
Kenya	4	60	39	40	8	38	72	
Morocco	5	68	34	44	3	30	1	94
Zambia	6	73	31	28	1	27	1	100
Uganda	7	74	31	44	2	9	1	100
Ghana	8	76	30	44	2	15	1	88
Rwanda	9	78	29	41	1	14	1	89
Namibia	10	80	28	25	3	22	1	91
Mauritius	11	84	28	32	2	15	62	
Algeria	12	85	28	43	2	15	51	
Malawi	13	88	26	34	1	8	1	84
Togo	14	89	26	40	1	1	1	85
Mauritania	15	91	24	15	1	1	1	100
Eswatini	16	92	23	22	2	1	1	92
Mozambique	17	93	23	21	2	8	1	82
Niger	18	94	23	18	1	1	1	92
Seychelles	19	99	21	21	1	16	1	68
Tanzania	20	101	21	32	1	24	1	47
Ethiopia	21	102	21	36	2	8	38	
Burundi	22	108	18	22	1	1	1	66
Gabon	23	109	18	42	1	1	1	44
Senegal	24	112	17	24	2	1	1	55
Nigeria	25	118	15	41	8	9	1	
Côte d'Ivoire	26	124	13	42	8	1	1	
Botswana	27	128	12	29	1	16	1	
Sudan	28	129	12	30	1	15	1	
Zimbabwe	29	132	11	32	1	8	1	
Mali	30	134	9	24	1	8	1	
Madagascar	31	137	7	16	2	8	1	
min			7	6	1	1	1	35
max			88	89	77	92	100	100

Table 4: QI4SD Scores for countries in Africa (grey boxes indicate missing data)

Figure 7-Figure 11 illustrate the scores in the five dimensions.

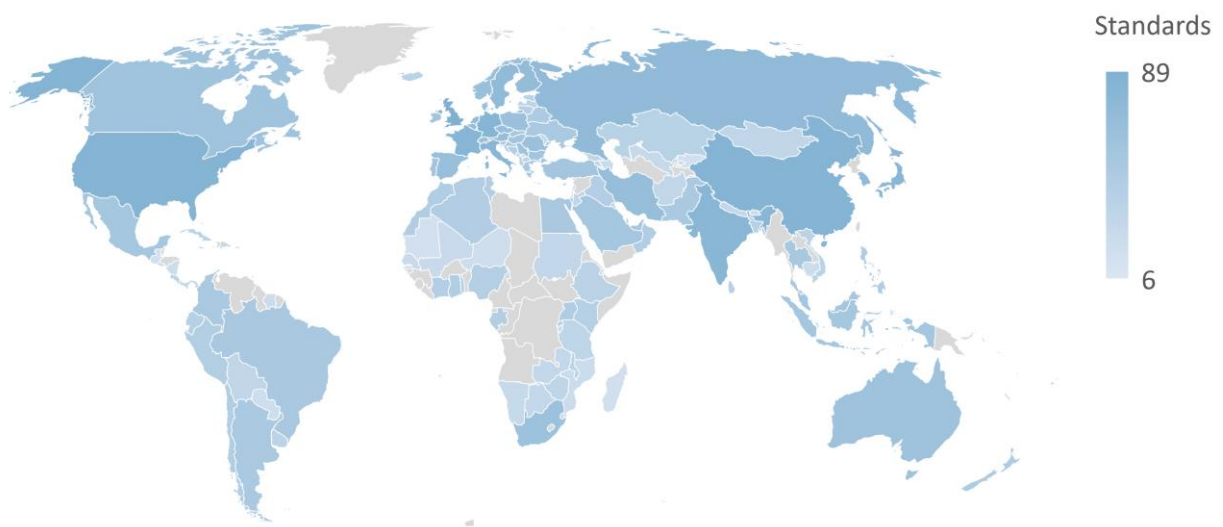


Figure 7: The scores in the Standards dimension

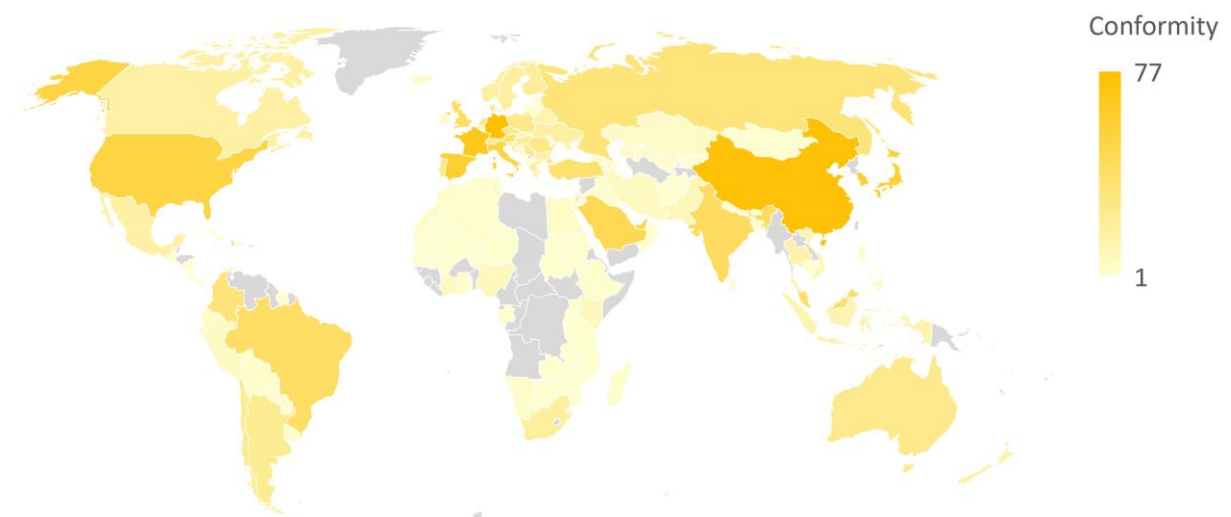


Figure 8: The scores in the Conformity dimension

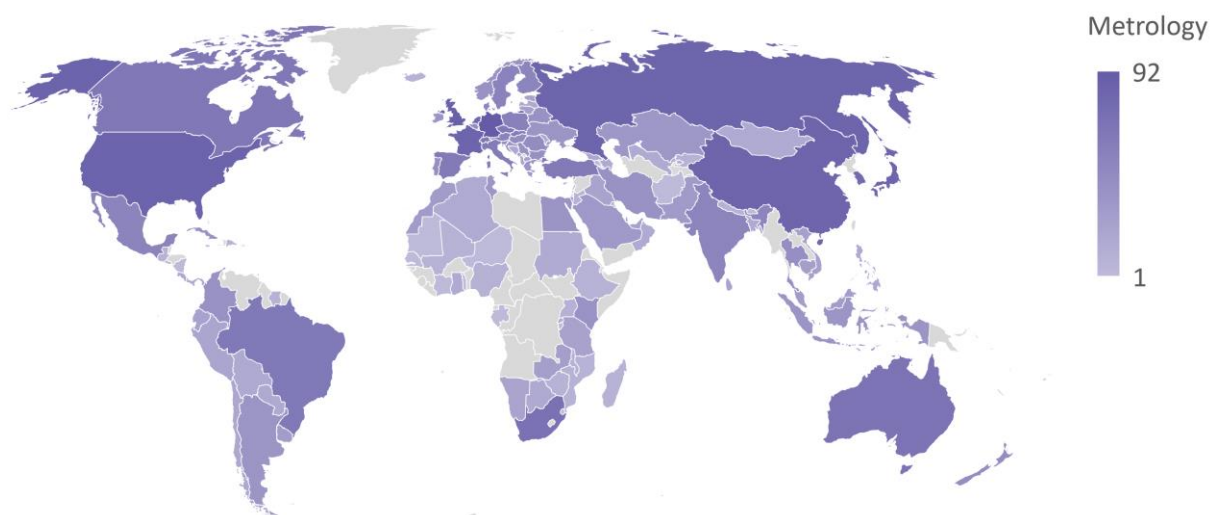


Figure 9: The scores in the Metrology dimension

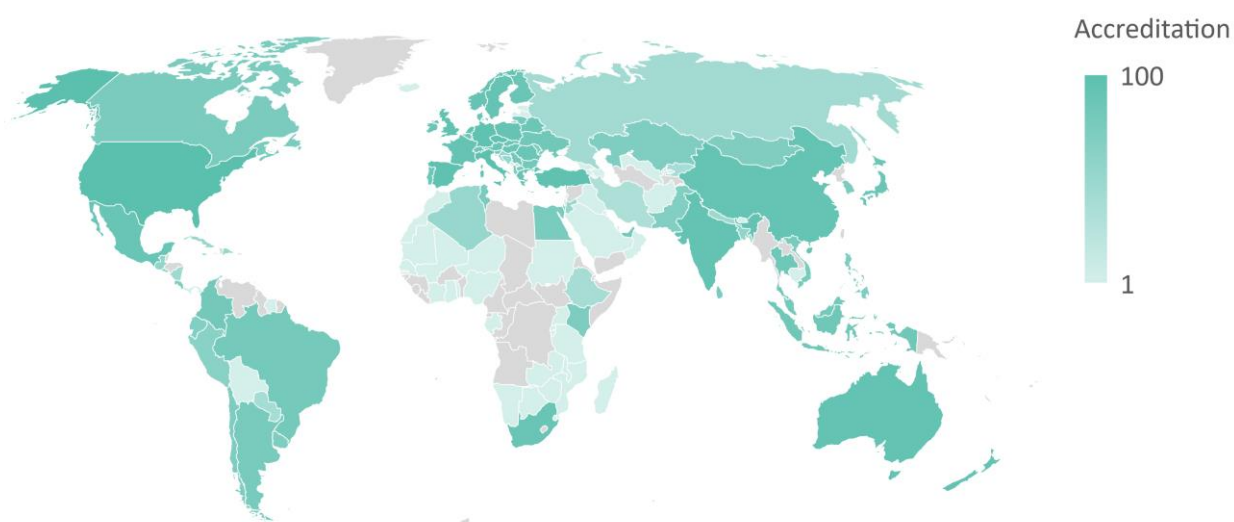


Figure 10: The scores in the Accreditation dimension

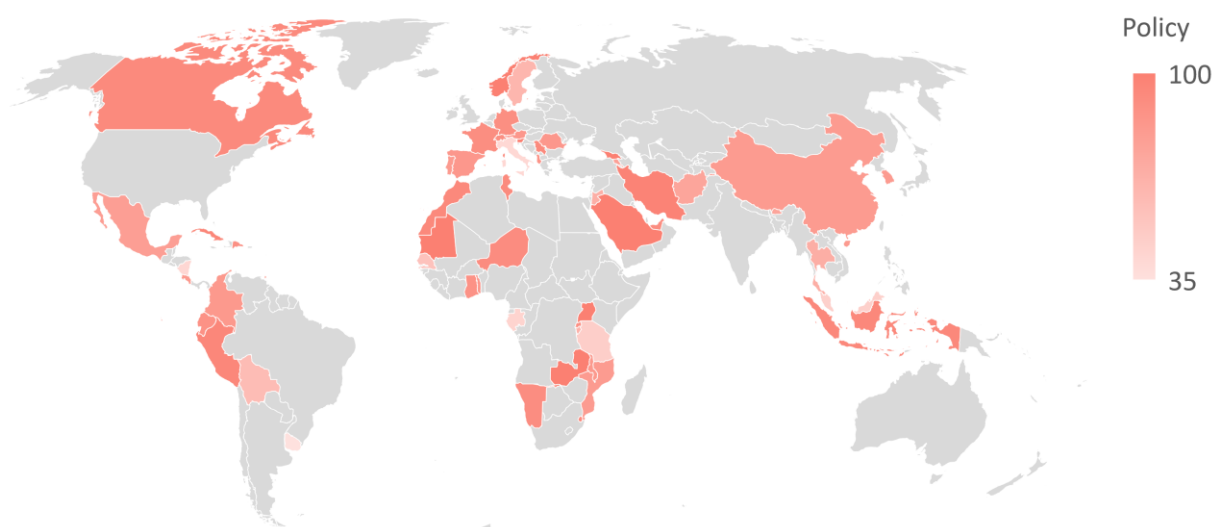


Figure 11: The scores in the Policy dimension

2.2 “3P” Index results - People, Planet and Prosperity indexes

The P-indexes are not strictly comparable with the general index described in the previous section, because the indicators in the P-indexes are a *subset* of the indicators in the general index. The ranks of the P indexes, People, Planet and Prosperity indexes are shown Table 5. (full scores can be found in the Appendix). The data show that countries have quite similar ranks in each of the three Ps. This means that if a country is doing well in People, for example, it is probably doing well in Planet and Prosperity. South Africa, followed by Egypt and Tunisia, have the highest ranks in all three P-indexes (which is also the case for the general QI4SD Index). Kenya ranks 4th in the People index (as with the general QI4SD Index) but only ranks 8th in the Planet index and 6th in the Prosperity index. Other major rank differences are found for Morocco, Sudan, Seychelles, Algeria and Côte d'Ivoire with more than eight rank differences. Exploring the underlying data is crucial to understand these differences.

Country	People Index Rank	Planet Index Rank	Prosperity Index Rank
South Africa	1	1	1
Egypt	2	2	2
Tunisia	3	3	3
Kenya	4	8	6
Togo	5	4	4
Mauritius	6	5	8
Ghana	7	12	9
Morocco	8	6	14
Uganda	9	10	10
Ethiopia	10	13	11
Gabon	11	11	5
Rwanda	12	7	7
Zambia	13	9	16
Malawi	14	18	13
Sudan	15	26	24
Seychelles	16	21	25
Zimbabwe	17	14	21
Eswatini	18	20	20
Nigeria	19	19	17
Tanzania	20	15	19
Mozambique	21	23	23
Botswana	22	24	22
Algeria	23	17	15
Namibia	24	22	18
Côte d'Ivoire	25	16	12
Niger	26	25	26
Madagascar	27	29	27
Senegal	28	27	28
Mauritania	29	31	30
Burundi	30	28	29
Mali	30	30	31

Table 5: Ranks of the three P-indexes; People, Planet and Prosperity for the countries in Africa

Appendix

Country	Africa People Index Rank	Index	Standards	Conformity	Metrology	Accreditation
South Africa	1	55	68	22	52	79
Egypt	2	28	43	12	15	44
Tunisia	3	27	42	8	1	56
Kenya	4	18	3	6	10	52
Togo	5	17	65	1	1	1
Mauritius	6	14	31	2	1	24
Ghana	7	14	43	11	1	1
Morocco	8	13	47	4	1	1
Uganda	9	13	47	3	1	1
Ethiopia	10	13	15	2	1	32
Gabon	11	12	43	1	1	1
Rwanda	12	11	40	1	1	1
Zambia	13	9	34	1	1	1
Malawi	14	9	31	2	1	1
Sudan	15	9	32	1	1	1
Seychelles	16	9	30	3	1	1
Zimbabwe	17	8	29	2	1	1
Eswatini	18	8	25	4	1	1
Nigeria	19	8	25	4	1	1
Tanzania	20	8	26	2	1	1
Mozambique	21	7	26	2	1	1
Botswana	22	7	24	2	1	1
Algeria	23	6	1	3	1	20
Namibia	24	6	12	9	1	1
Côte d'Ivoire	25	5	16	1	1	1
Niger	26	4	12	2	1	1
Madagascar	27	3	5	4	1	1
Senegal	28	3	7	2	1	1
Mauritania	29	1	1	3	1	1
Burundi	30	1	2	1	1	1
Mali	30	1	2	1	1	1
min		1	1	1	1	1
max		98	100	100	100	100

Table 6: People index scores for countries in Africa

Country	Africa Planet Index Rank	Index	Standards	Conformity	Metrology	Accreditation
South Africa	1	49	53	19	47	77
Egypt	2	28	32	11	7	63
Tunisia	3	22	31	8	1	47
Togo	4	17	65	1	1	1
Mauritius	5	17	32	1	1	32
Morocco	6	14	50	4	1	1
Rwanda	7	14	54	1	1	1
Kenya	8	14	4	3	1	47
Zambia	9	13	49	1	1	1
Uganda	10	12	45	3	1	1
Gabon	11	12	46	1	1	1
Ghana	12	11	38	4	1	1
Ethiopia	13	10	16	2	1	21
Zimbabwe	14	9	33	2	1	1
Tanzania	15	9	32	2	1	1
Côte d'Ivoire	16	9	32	2	1	1
Algeria	17	9	1	3	1	31
Malawi	18	8	31	1	1	1
Nigeria	19	7	24	3	1	1
Eswatini	20	7	25	2	1	1
Seychelles	21	6	21	1	1	1
Namibia	22	6	12	10	1	1
Mozambique	23	5	16	2	1	1
Botswana	24	5	16	1	1	1
Niger	25	5	15	1	1	1
Sudan	26	5	15	1	1	1
Senegal	27	4	11	1	1	1
Burundi	28	2	5	1	1	1
Madagascar	29	2	4	2	1	1
Mali	30	1	2	1	1	1
Mauritania	31	1	1	1	1	1
min		1	1	1	1	1
max		96	99	100	100	100

Table 7: Planet index scores for countries in Africa

Country	Africa Prosperity Index Rank	Index	Standards	Conformity	Metrology	Accreditation
South Africa	1	55	57	29	59	74
Egypt	2	31	34	13	27	52
Tunisia	3	25	34	9	10	46
Togo	4	16	62	1	1	1
Gabon	5	16	60	1	1	1
Kenya	6	14	4	8	8	34
Rwanda	7	13	49	1	1	1
Mauritius	8	13	24	5	1	23
Ghana	9	13	44	5	1	1
Uganda	10	11	39	5	1	1
Ethiopia	11	11	20	2	1	21
Côte d'Ivoire	12	11	40	2	1	1
Malawi	13	10	36	4	1	1
Morocco	14	10	34	4	3	1
Algeria	15	9	2	2	1	31
Zambia	16	9	30	1	3	1
Nigeria	17	8	23	5	1	1
Namibia	18	7	11	14	3	1
Tanzania	19	7	20	5	1	1
Eswatini	20	6	17	6	1	1
Zimbabwe	21	6	21	2	1	1
Botswana	22	5	14	3	3	1
Mozambique	23	5	17	2	1	1
Sudan	24	5	17	1	1	1
Seychelles	25	5	11	5	1	1
Niger	26	4	13	2	1	1
Madagascar	27	3	6	5	1	1
Senegal	28	3	8	3	1	1
Burundi	29	2	4	1	1	1
Mauritania	30	2	1	3	1	1
Mali	31	1	2	1	1	1
	min	1	1	1	1	1
	max	92	98	100	100	100

Table 8: Prosperity index scores for countries in Africa