



COUNTRY BRIEFS

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COUNTRY REPORTS

Introduction

This report provides an overview of the status of science, technology and innovation (STI) in form of country briefs for 19 FCDO priority countries using a proposed set of core indicators that are comparable (regionally and internationally). The country reports are based on the assessment of the Science Technology and Innovation Metrics in Africa research; aimed at developing an integrated set of indicators (scoreboard) that can be applied to assess STI progress and performance in African countries. Through this research we developed 19 country¹ profiles to provide policy and decision makers a snapshot of the STI indicators collected and analysed for the period-2010-2019 in their respective countries. The country briefs presents; the general STI outlay and prospects while outlining top 10 best performing indicators in the country; STI indicator categories that are prioritised; country's progress/trend in data collection of STI indicators; the data gaps/challenges in terms of missing data for the selected countries. The indicators organised in form of individual country briefs are grouped according to the logical framework developed by the research (enablers' indicators, linkages indicators, input indicators, output indicators and impact indicators). We rely on data and information from the scoreboard developed which sourced data from various scoreboards such as GII, AIOIII, OECD, UNESCO Science report, RICYT scoreboard, and national scoreboard. Other useful databases that we relied upon include the World Bank and UNESCO.

These country reports make it easy for the individual country performance to compare with the world's as well as Africa's average. We present this data in Tables and Figures for the 19 priority countries. The data sources as identified in the scoreboards are translated to allow for cross country comparison. It is important to note that while a number of indicators exists and were identified in the scoreboard, these indicators vary across the countries and what the country briefs attempt, is to demonstrate this variation by indicating the number of indicators in the logical framework in each of the country. We reckon that countries are different economically and in terms of their national priorities. In considering this uniqueness, we deviate from making any cross comparison in terms of indicator performance and specifically ranking of the various indicators in the respective countries. We only outline the top ranked indicators in each of these countries to give an overview of the country's performance which we find is unique in each country. We have not provided country background information as the data from these briefs are drawn mainly from the scoreboard that this research developed.

¹ These countries are identified as FCDO priority countries.

1.0 BURUNDI

Burundi has about 212 indicators out of the possible 263 indicators we collected reflecting its good performance compared to other African countries. Table 1 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 1: Number of indicators in Burundi measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Burundi	Number of indicators in the STI scoreboard
	Enabler	110	128
	Impact	28	33
	Input	61	67
	Linkages	4	14
	Output	9	21
STI ACTIVITIES MAIN SUBJECTS	Creative outputs	1	1
	Education and training	30	32
	Expenditure on R&D	22	23
	Expenditure on STI	8	10
	Financial system	8	8
	Governance and institutional development	24	25
	Human and sustainable development	28	32
	ICT readiness	10	10
	Infrastructure	3	6
	Innovation activities	5	11
	Innovation outputs	10	23
	Job and product market	22	26
	Knowledge flows	5	15
	Research activities	28	29
	Science and technology outputs	8	9
ACTORS	Brokers and suppliers	12	13
	Education and training organisations	31	33

	Financial organisations and venture capitalists	10	11
	Firms in the formal sector	19	50
	Multiple actors	25	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organisations and personnel	33	34
	Users/consumers	8	8
	State Institutions	73	84

1.1 Key indicator performance

We outline performance of the indicators as per the availability of 212 indicators out of the possible collected 263 indicators African STI indicators. Seventy-eight (78) of these indicators were collected in 2018 while 63 were collected in 2017. 2010 and 2015 recorded lowest count of indicators reporting only 1 indicator. Table 2 presents the country's top 5 indicators in terms of performance ranked the first among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Burundi.

Table 2: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Actors	STI activities main subjects
Enablers	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	2019	Brokers and suppliers	Job and product market
	Self-employed, total (% of total employment) (modelled ILO estimate)	WDI 2020	2019	Brokers and suppliers	Job and product market
	(M) No days to start a business - Value (Modified - Inverse value)	GCI 2007 - 2019	2017	State Institutions	Governance and institutional development
	Percentage of graduates from	UN-EDUN	2018	Education and training organisations	Education and training

	primary education who are female (%)				
	Employment by industry: Agriculture (%) Female	UN - Other indicators	2019	State Institutions	Governance and institutional development

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 3 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 3: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	7
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	15
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	30
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	11
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	33
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	22
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	10
	Red List Index	UN-SDGs	30
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	48
	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	5

1.2. Country core indicators comparability

We show the radar plot in Figure 1 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. On average Burundi seems to be doing better in input indicators compared to other indicator category. The performance is similar to lower middle-income countries and performs poorly compared to upper middle-income countries and high-income countries.

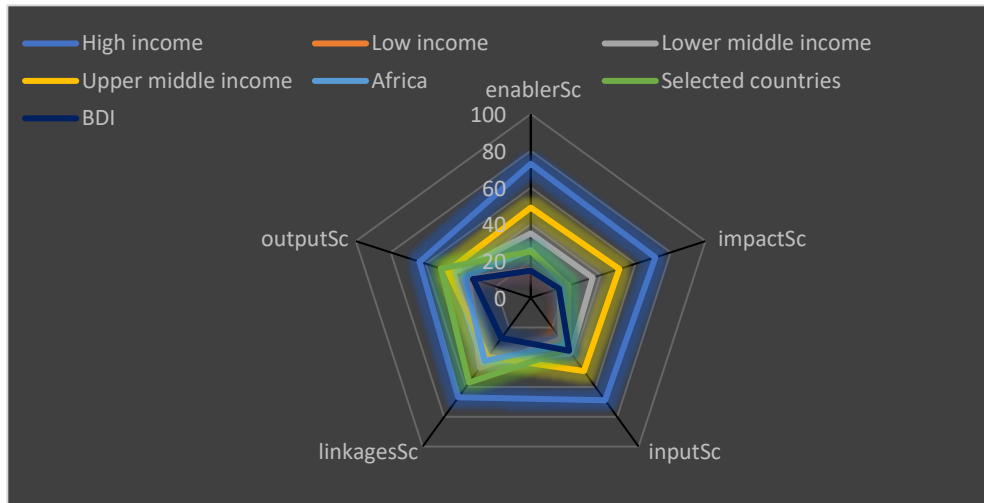


Figure 1: Strength of Burundi compared to the rest of the World

In terms of various cluster groups, Figure 2 shows that Burundi is in the same cluster group with countries such as Liberia, Malawi, Mozambique, Benin, Burkina Faso, Cameroon, DRC Congo, Guinea, Madagascar, Togo and Mali. Cluster groups show countries that perform like Burundi in inputs, impacts, linkages, outputs, and enablers' indicators. Countries in dark green are closer to Burundi's performance than countries in light green.

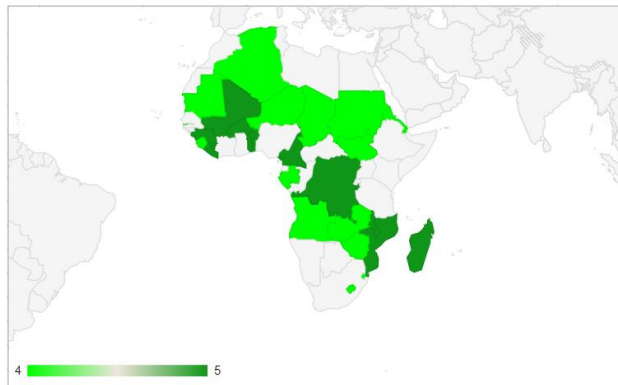


Figure 2: Cluster map of Burundi

1.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 3 demonstrates that Burundi performs poorly in input indicators and thus worse in completeness.

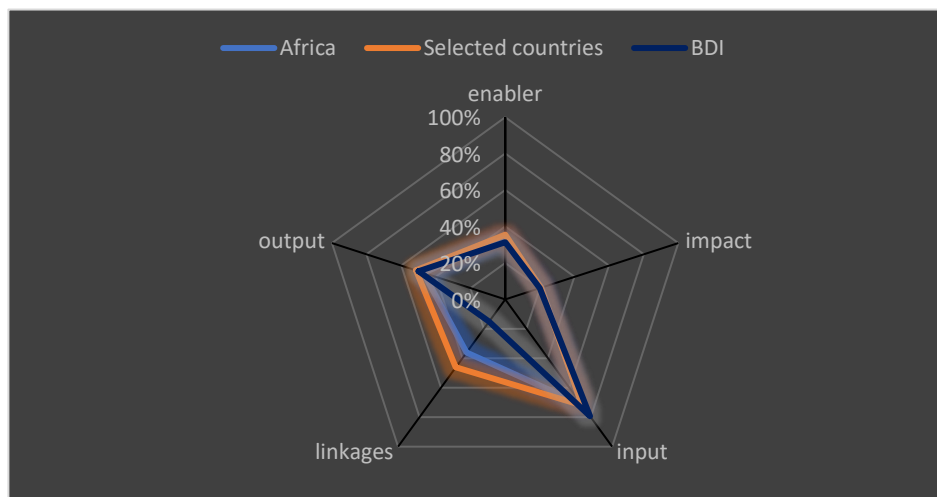


Figure 3: Comparison of missing data in the number of indicators in Nigeria compared to selected countries and rest of the World

2.0 DEMOCRATIC REPUBLIC OF CONGO

Democratic Republic of Congo has about 182 indicators available out of possible 263 reflecting. Table 4 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 4: Number of indicators in Democratic Republic of Congo measured in the logical framework

LOGICAL FRAMEWORK COMPONENT	Number of indicators available for Democratic Republic of Congo	Number of indicators in the STI scoreboard
Enabler	100	128
Impact	23	33
Input	49	67
Linkages	4	14

	Output	6	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	25	32
	Expenditure on R&D	18	23
	Expenditure on STI	7	10
	Financial system	5	8
	Governance and institutional development	19	25
	Human and sustainable development	26	32
	ICT readiness	9	10
	Infrastructure	6	6
	Innovation activities	4	11
	Innovation outputs	7	23
	Job and product market	24	26
	Knowledge flows	5	15
	Research activities	22	29
	Science and technology outputs	5	9
ACTORS	Brokers and suppliers	9	13
	Education and training organisations	26	33
	Financial organisations and venture capitalists	7	11
	Firms in the formal sector	17	50
	Multiple actors	19	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organisations and personnel	26	34
	State Institutions	69	84

	Users / consumers	8	8
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2.1 Key indicator performance

We outline performance of the available 182 STI indicators out of the possible collected 263 indicators African STI indicators. Forty seven (47) and 44 indicators were reported in 2015 and 2017 respectively. 2014 recorded the lowest indicator with only 4 were reported. Table 5 presents the country's top 5 indicators in terms of performance ranked the first among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Democratic Republic of Congo.

Table 5: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Input	GERD - financed by Higher education %	UN-Sci	2015	1	State Institutions	Expenditure on R&D
	Researchers (FTE) - Government %	UN-Sci	2015	2	Science, technology, and R&D organisations and personnel	Research activities
	Female researchers as a percentage of total researchers (FTE) - ISCED 5	UN-Sci	2015	4	Science, technology, and R&D organisations and personnel	Research activities
Impact	Manufacturing, value added (% of GDP)	WDI 2020	2019	3	Firms in the formal sector	Innovation outputs
Enabler	Human capital index, based on years of schooling and returns to education; see Human capital in PWT9.	Penn World Tables 9.1 2020	2017	3	State Institutions	Human and sustainable development

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 3 provides the best indicators in completeness and timeliness. In other words these indicators have been collected and have data available in the 10 year period (2009-2019).

Table 6: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Red List Index	UN-SDGs	31
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	25
	CPIA social protection rating (1=low to 6=high)	WDI 2020	36
	Domestic credit to private sector (% of GDP)	WDI 2020	50
Impact	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	11
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	45
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	27
	Exports of goods and services (% of GDP)	WDI 2020	23
	Annual growth rate of real GDP per employed person (%)	UN-SDGs	31
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	24

2.2 Country core indicators comparability

We show the radar plot in Figure 4 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. On average Democratic Republic of Congo performs well in output indicators compared to other indicator category although similar to the performance of upper middle-income countries.

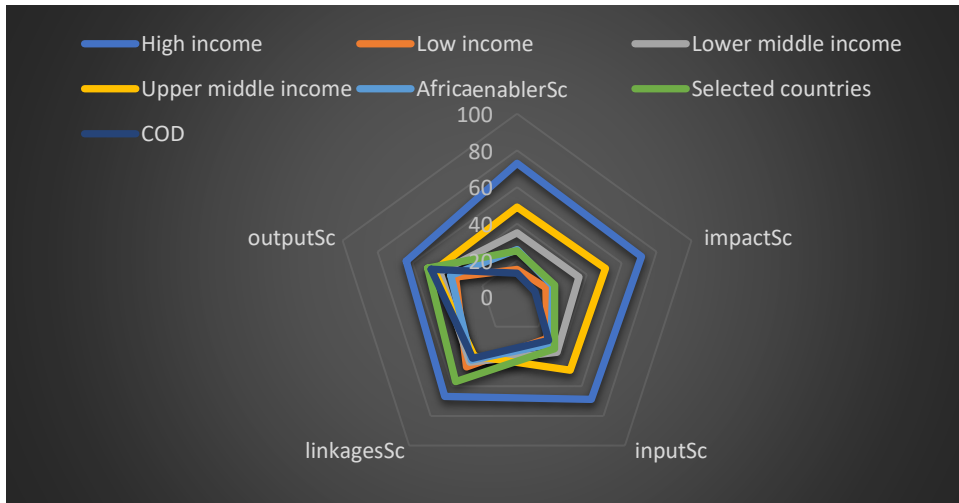


Figure 4: Strength of Democratic Republic of Congo compared to the rest of the World

In terms of various cluster groups, Figure 5 shows that Democratic Republic of Congo is in the same cluster group with countries such as Burundi, Liberia, Malawi, Mozambique, Benin, Burkina Faso, Cameroon, DRC Congo, Guinea, Madagascar, Togo and Mali. Cluster groups show countries that perform like Democratic Republic of Congo in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Democratic Republic of Congo's performance than countries in light green.

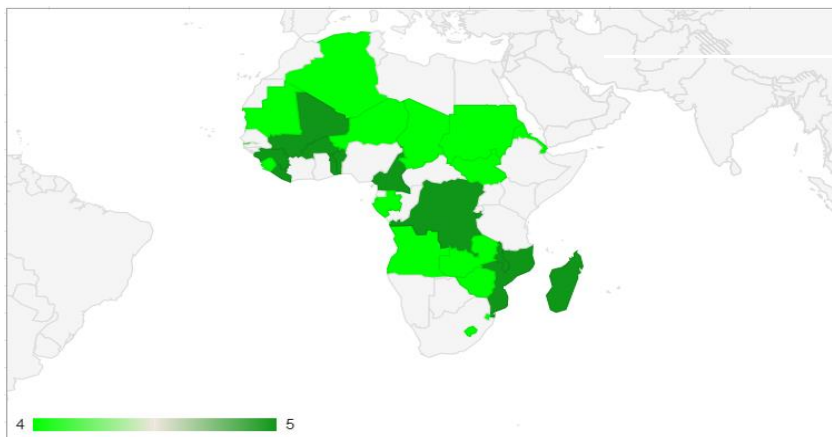


Figure 5: Cluster map of Democratic Republic of Congo

2.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 6 demonstrates that Democratic Republic of Congo performs poorly in input indicators and thus worse in completeness.

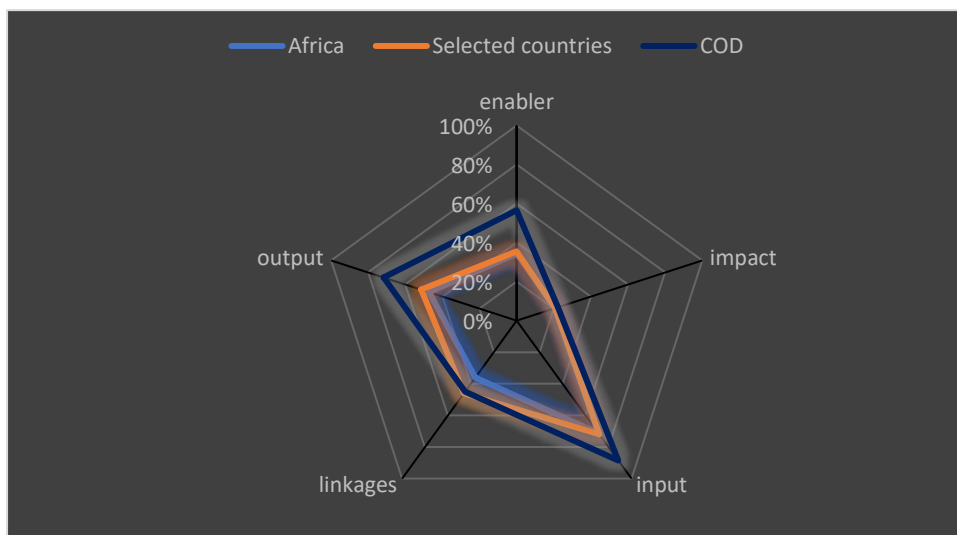


Figure 6: Comparison of missing data in the number of indicators in Democratic Republic of Congo compared to selected countries and rest of the World

3.0 ETHIOPIA

Ethiopia has about 237 indicators available in this classification reflecting good performance compared to other African countries. Table 4 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 4: Number of indicators in Ethiopia measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Ethiopia	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	109	128
	Impact	32	33
	Input	64	67
	Linkages	14	14
	Output	18	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	25	32
	Expenditure on R&D	22	23
	Expenditure on STA	10	10

	Financial system	5	8
	Governance and institutional development	25	25
	Human and sustainable development	30	32
	ICT readiness	9	10
	Infrastructure	5	6
	Innovation activities	10	11
	Innovation determinants	3	3
	Innovation outputs	20	23
	Job and product market	23	26
	Knowledge flows	15	15
	Research activities	27	29
	Science and technology outputs	8	9
ACTORS	Brokers and suppliers	12	13
	Education and training organisations	26	33
	Financial organisations and venture capitalists	6	11
	Firms in the formal sector	46	50
	Multiple actors	27	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organisations and personnel	32	34
	State Institutions	80	84
	Users / consumers	7	8

3.1 Key indicator performance

We outline performance of the available 237 STI indicators out of the possible collected 263 indicators African STI indicators. In 2017, 100 indicators were reported, the highest since 2009. In 2019 (most recent) only 41 STI indicators were reported. Table 5 presents the country's top 5 indicators in terms of performance ranked the first among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Ethiopia.

Table 5: Top 5 STI indicators (performance)

Indicator	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities
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category						main subjects
Impact	High-technology exports (% of manufactured exports)	WDI 2020	2017	1	Brokers and suppliers	Science and technology outputs
Enabler	(M) Central government debt, total (% of GDP) (Modified - Inverse value)	WDI 2020	2013	1	State Institutions	Governance and institutional development
	Percentage of manufacturing firms that engaged in acquisition of machinery, equipment and software	UN-Inno	2014	1	State Institutions	Expenditure on STA
	Human capital index, based on years of schooling and returns to education; see Human capital in PWT9.	Penn World Tables 9.1 2020	2017	2	State Institutions	Human and sustainable development
	Pupil-teacher ratio, secondary	WDI 2020	2012	2	Education and training organisations	Education and training

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 6 provides the best indicators in completeness and timeliness. In other words these indicators have been collected and have data available in the 10 year period (2009-2019).

Table 6: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	29
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	28
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	20
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	35

	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	35
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	32
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	5
	Red List Index	UN-SDGs	38
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	5
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	8

3.2 Country core indicators comparability

We show the radar plot in Figure 7 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. On average Ethiopia performs well in both linkages and output indicators compared to other indicator category and the rest of the world.

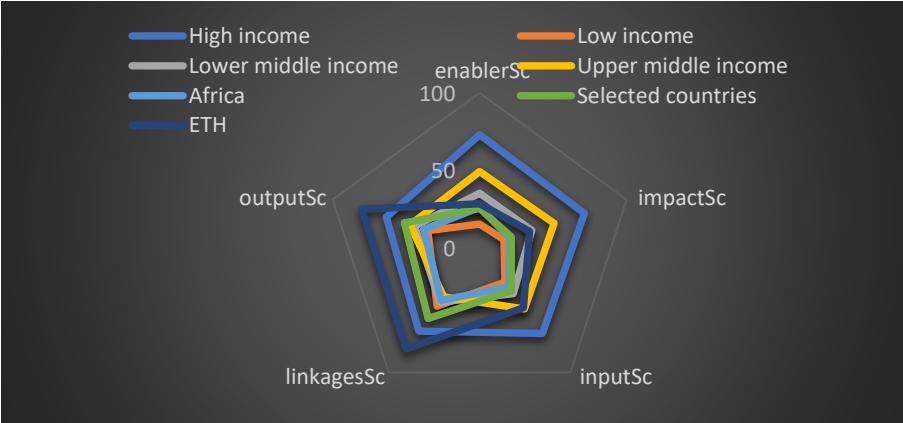


Figure 7: Strength of Ethiopia compared to the rest of the World

In terms of various cluster groups, Figure 8 shows that Ethiopia is in the same cluster group with countries such as Kenya, South Africa, Tanzania, Uganda and Egypt. Cluster groups show countries that perform like Ethiopia in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Ethiopia’s performance than countries in light green.

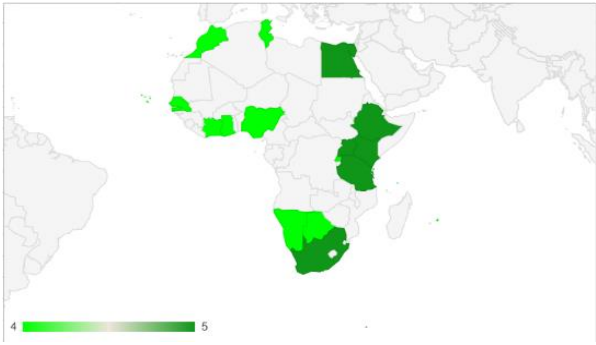


Figure 8: Cluster map of Ethiopia

3.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 9 demonstrates that Ethiopia performs poorly in input indicators and thus worse in completeness.

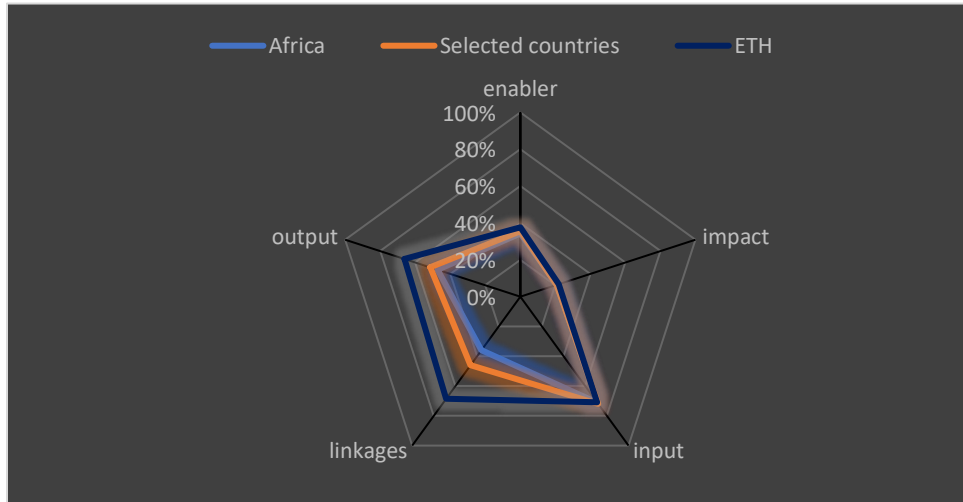


Figure 9: Comparison of missing data in the number of indicators in Ethiopia compared to selected countries and rest of the World

4.0 GHANA

Ghana has about 213 indicators available in this classification reflecting good coverage of the indicators. Table 7 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 7: Number of indicators in Ghana measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Ghana	Number of indicators in the STI scoreboard
	Enabler	117	128
	Impact	29	33
	Input	53	67
	Linkages	4	14
	Output	10	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	29	32
	Expenditure on R&D	21	23
	Expenditure on STA	9	10
	Financial system	8	8
	Governance and institutional development	24	25
	Human and sustainable development	29	32
	ICT readiness	10	10
	Infrastructure	6	6
	Innovation activities	9	11
	Innovation outputs	13	23
	Job and product market	26	26
	Knowledge flows	5	15
	Research activities	18	29
	Science and technology outputs	6	9
ACTORS	Brokers and suppliers	12	13
	Education and training organisations	30	33
	Financial organisations and venture capitalists	11	11
	Firms in the formal sector	24	50
	Multiple actors	25	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organisations and personnel	23	34
	State Institutions	79	84
	Users / consumers	8	8

4.1 Key indicator performance

We outline performance of the available 213 STI indicators out of the possible collected 263 indicators African STI indicators. In 2017, 51 indicators were reported, the highest since 2009. 2011 and 2012 had the lowest indicators. Only 2 were reported. Table 8 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Ghana.

Table 8: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	Mobile broadband subscriptions - 100 pop	GCI 2007 - 2019	2017	1	Users / consumers	ICT readiness
	[World Bank] Proportion of population covered by labour market programs (%)	UN-SDGs	2012	1	State Institutions	Job and product market
Output	Percentage of product innovators in manufacturing (total size classes)	UN-Inno	2010	1	Firms in the formal sector	Innovation outputs
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	2019	2	State Institutions	Governance and institutional development
Enabler	Extent of market dominance - 1-7 Best	GCI 2007 - 2019	2017	3	State Institutions	Job and product market

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 9 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 9: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers Impact	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	10
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	11
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	6
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	23
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	8
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	26
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	16
	Annual growth rate of real GDP per employed person (%)	UN-SDGs	2
	Red List Index	UN-SDGs	37
Impact	Proportion of teachers who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country, by sex and education level (%)	UN-SDGs	28

4.2 Country core indicators comparability

We show the radar plot in Figure 10 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. On average Ghana performs well in output indicators which is similar to the high-income countries.

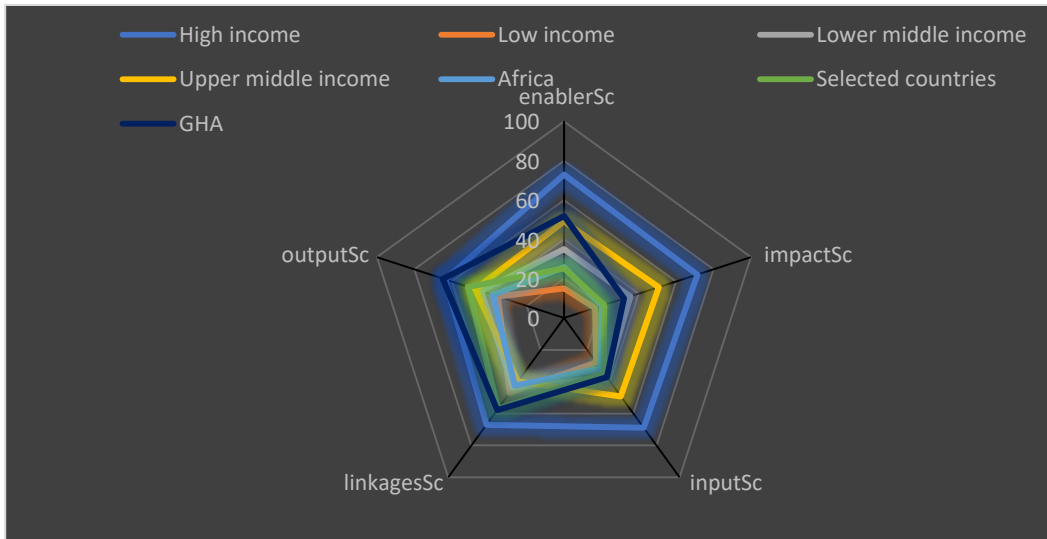


Figure 10: Strength of Ghana compared to the rest of the World

In terms of various cluster groups, Figure 11 shows that Ghana is in the same cluster group with countries such as Nigeria, Rwanda, Cote d'Ivoire, Namibia and Senegal. Cluster groups show countries that perform like Ghana in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Ghana's performance than countries in light green.

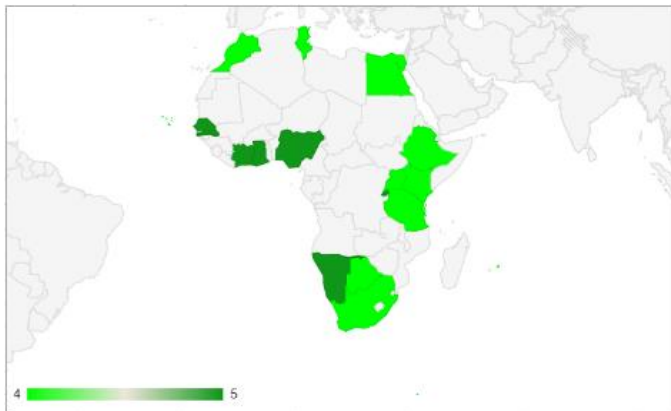


Figure 11: Cluster map of Ghana

4.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 12 demonstrates that Ghana performs poorly in input indicators and thus worse in completeness.

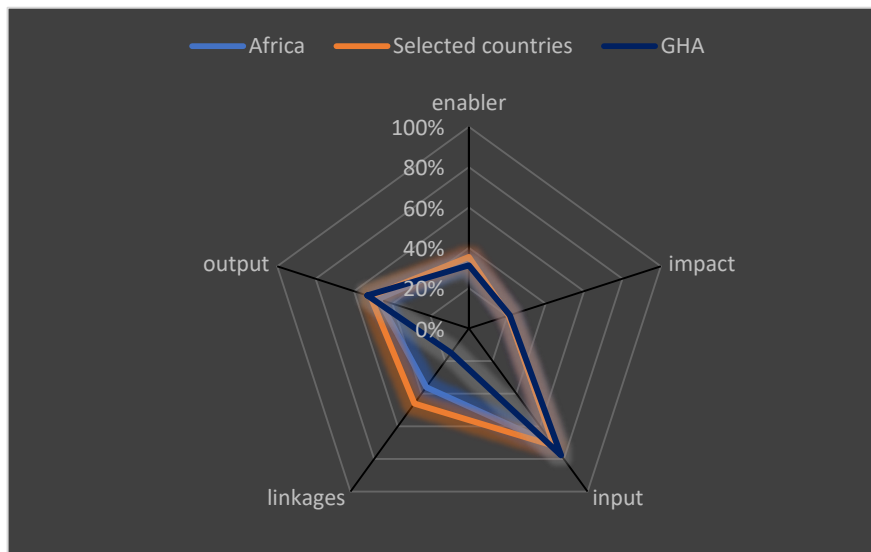


Figure 12: Comparison of missing data in the number of indicators in Ghana compared to selected countries and rest of the World

5.0 KENYA

We present the number of indicators that the country has measured in each of our classifications; indicators available based on the logical framework; Table 10 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category. Kenya has over 90% of indicators available in this classification outlining its good performance compared to its African counterparts.

Table 10: Number of indicators in Kenya measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Kenya	Number of indicators in the STI scoreboard
	Enabler	110	128
	Impact	33	33
	Input	62	67
	linkages	14	14
	output	15	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	24	32
	Expenditure on R&D	23	23
	Expenditure on STI	8	10
	Financial system	8	8

	Governance and institutional development	23	25
	Human and sustainable development	30	32
	ICT readiness	9	10
	Infrastructure	6	6
	Innovation activities	11	11
	Innovation determinants	3	3
	Innovation outputs	18	23
	Job and product market	24	26
	Knowledge flows	15	15
	Research activities	23	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organizations	25	33
	Financial organizations and venture capitalists	11	11
	Firms in the formal sector	43	50
	Multiple actors	28	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organizations and personnel	28	34
	State Institutions	78	84
	Users / consumers	7	8

5.1 Key indicator performance

This performance is reflected and confirmed by availability of 243 indicators out of the possible collected 263 indicators African STI indicators. Most of these indicators (55), were collected in 2017. Table 11 presents the country's top 5 indicators in terms of performance ranked based on best value 1, among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Kenya.

Table 11: Top 5 STI indicators (performance)

Indicator name	Source/origin	Latest year	Actors	STI activities main subjects
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Output 12th pillar Innovation - Value	GCI 2007 - 2019	2017	Firms in the formal sector	Innovation outputs
Input Researchers (FTE) - ISCED 5	GCI 2007	2017	Science, technology, and R&D organisations and personnel	Job and product market
Linkages FDI and technology transfer - 1-7 Best	GCI 2007 - 2019	2017	Brokers and suppliers	Knowledge flows
Percentage of manufacturing firms that cooperated with universities or other higher education institutions	UN-Inno	2014	Firms in the formal sector	Knowledge flows
Enabler Quality of the education system, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2017	Education and training organisations	Education and training

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 12 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 12: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	9
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	19
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	7
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	31
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	21
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	14
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	11
	Red List Index	UN-SDGs	46
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	20

	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	1
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5.2 Country core indicators that are comparable (regionally and international).

We show the radar plot in Figure 13 which shows the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Kenya on average ranks as the best country in linkages indicators with the best score. The radar is based on a normalisation of rankings where the best ranking was given a score of 100.

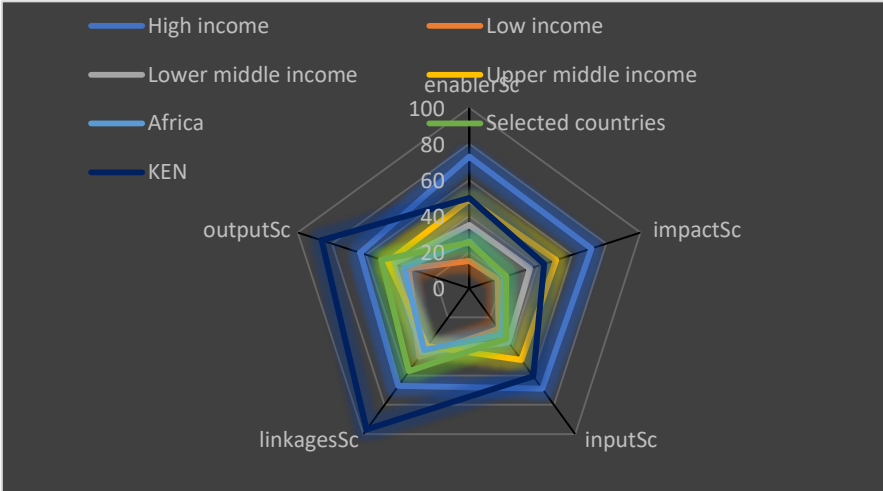


Figure 13: Strength of Kenya compared to the rest of the World

In terms of various cluster groups, Figure 14 shows that Kenya is in the same cluster group with countries such as South Africa, Egypt, Ethiopia, Tanzania, and Uganda. Cluster groups show countries that perform like Kenya in inputs, impacts, linkages, outputs, and enablers. Countries in dark green closer to Kenya’s performance than countries in light green.

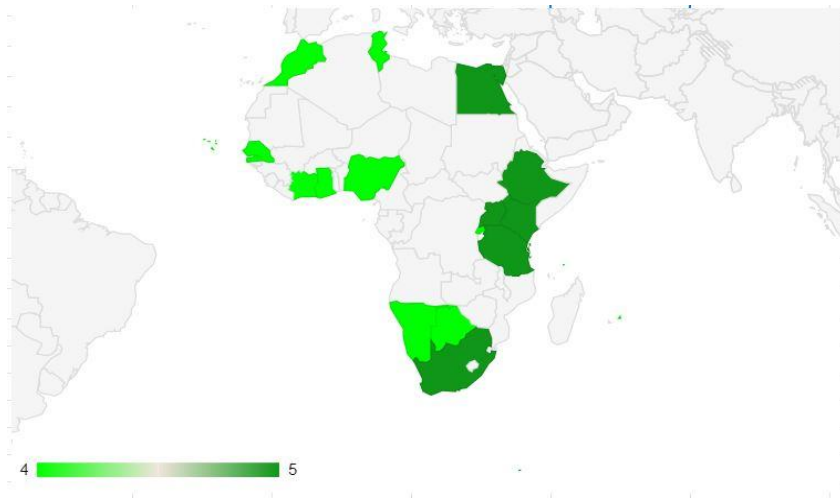


Figure 14: Cluster map of Kenya

5.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. As per Figure 15 Kenya performs poorly in terms of input indicators which have lots of missing data and thus worse in completeness.

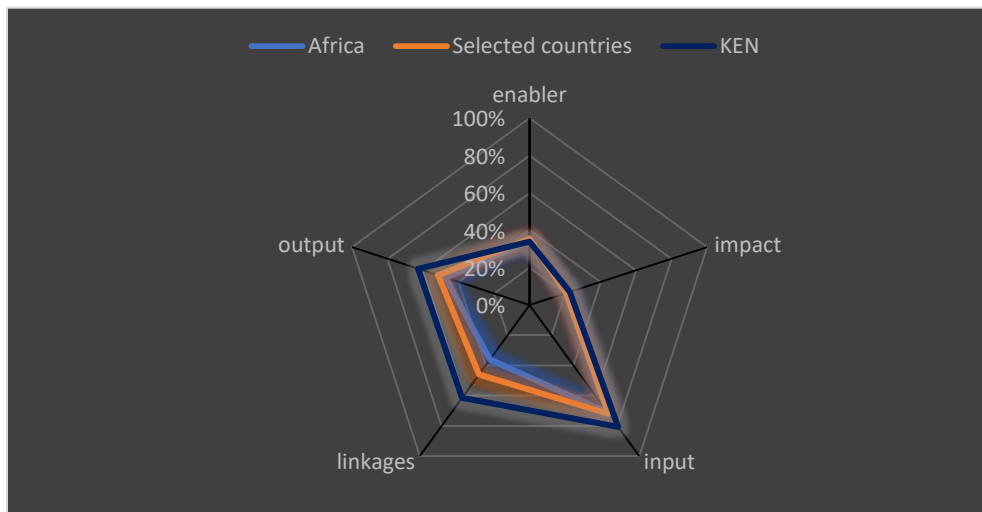


Figure 15: Comparison of missing data in the number of indicators in Kenya compared to selected countries and rest of the World

6.0 LIBERIA

Liberia has about 141 (54%) indicators available in this classification reflecting average coverage of the indicators. Table 13 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 13: Number of indicators in Liberia measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Liberia	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	99	128
	Impact	22	33
	Input	10	67
	Linkages	4	14
	Output	6	21
	STI ACTIVITIES MAIN SUBJECTS	Education and training	21
Expenditure on STA		5	10
Financial system		6	8
Governance and institutional development		25	25
Human and sustainable development		27	32
ICT readiness		9	10
Infrastructure		5	6
Innovation activities		4	11
Innovation outputs		7	23
Job and product market		23	26
Knowledge flows		5	15
Research activities		1	29
Science and technology outputs		3	9
ACTORS		Brokers and suppliers	8
	Education and training organisations	22	33
	Financial organisations and venture capitalists	8	11
	Firms in the formal sector	17	50
	Multiple actors	5	29
	Science, technology, and R&D organisations and personnel	3	34
	State Institutions	71	84
	Users / consumers	7	8

6.1 Key indicator performance

We outline performance of the available 141 STI indicators out of the possible collected 263 indicators African STI indicators. In 2017, 62 indicators were reported, the highest since 2009. 2014 had the least coverage with only 4 indicators reported. Table 14 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Liberia.

Table 14: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	Labor force with advanced education, female (% of female working-age population with advanced education)	WDI 2020	2016	1	Education and training organisations	Education and training
	Imports of goods and services (% of GDP)	WDI 2020	2019	2	State Institutions	Job and product market
	(M) No days to start a business - Value (Modified - Inverse value)	GCI 2007 - 2019	2017	3	State Institutions	Governance and institutional development
	(M) Unemployment rate, by sex and age (%) (Modified - Inverse value)	UN-SDGs	2016	3	State Institutions	Job and product market
Output	Percent of firms whose new product/service is also new to the main market	WEF Enterprise Survey	2017	2	Firms in the formal sector	Innovation outputs

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 15 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 15: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	10
	CPIA social protection rating (1=low to 6=high)	WDI 2020	10
	GDP (current US\$)	WDI 2020	44
	Red List Index	UN-SDGs	25
Impact	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	4
	Annual growth rate of real GDP per employed person (%)	UN-SDGs	47
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	27
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	21
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	10
	Exports of goods and services (% of GDP)	WDI 2020	28

6.2 Country core indicators comparability

We show the radar plot in Figure 16 that depicts the strength of the country compared to the mean values of high-income countries, upper middle income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. On average Liberia performs well in output indicators, similar to the upper middle-income countries.

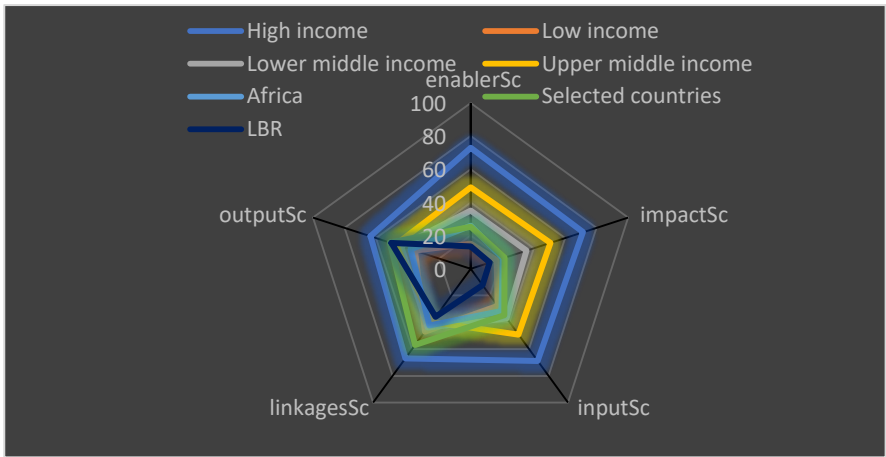


Figure 16: Strength of Liberia compared to the rest of the World

In terms of various cluster groups, Figure 17 shows that Liberia is in the same cluster group with countries such as Burundi, Malawi, Mozambique, Benin, Burkina Faso, Cameroon, Dem. Rep. Congo, Guinea, Madagascar and Togo. Cluster groups show countries that perform like Liberia in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Liberia’s performance than countries in light green.

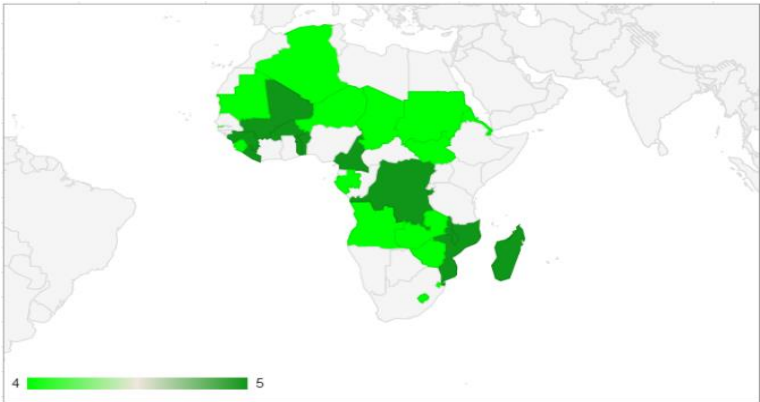


Figure 17: Cluster map of Liberia

6.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 18 demonstrates that Liberia performs poorly in input indicators and thus worse in completeness.

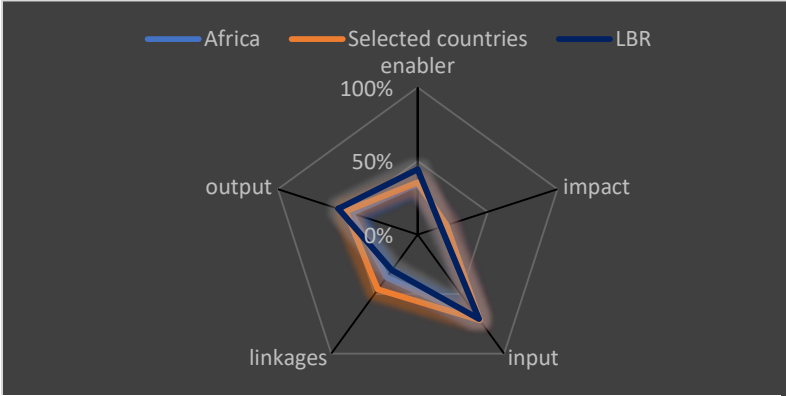


Figure 18: Comparison of missing data in Liberia compared to selected countries and rest of the World

7.0 MALAWI

Malawi has about 172 indicators available in this classification reflecting 65% coverage of the indicators. Table 16 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 16: Number of indicators in Malawi measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Malawi	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	103	128
	Impact	30	33
	Input	27	67
	Linkages	4	14
	Output	8	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	21	32
	Expenditure on STA	7	10
	Financial system	8	8
	Governance and institutional development	25	25
	Human and sustainable development	29	32
	ICT readiness	9	10
	Infrastructure	4	6
	Innovation activities	8	11
	Innovation outputs	10	23
	Job and product market	23	26
	Knowledge flows	5	15
	Research activities	15	29
	Science and technology outputs	8	9
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	22	33
	Financial organisations and venture capitalists	10	11
	Firms in the formal sector	19	50
	Multiple actors	10	29
	Science, technology, and R&D organisations and personnel	18	34
	State Institutions	73	84
	Users / consumers	7	8

7.1 Key indicator performance

We outline performance of the available 172 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=52) reported in 2017. Table 17 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Malawi.

Table 17: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	Pupil-teacher ratio, secondary	WDI 2020	2018	1	Education and training organisations	Education and training
Input	Researchers (FTE) - Government %	UN-Sci	2010	3	Science, technology, and R&D organisations and personnel	Research activities
	Researchers (FTE) - ISCED 7 %	UN-Sci	2010	3	Science, technology, and R&D organisations and personnel	Research activities
Impact	ICT service exports (% of service exports, BoP)	WDI 2020	2017	4	Brokers and suppliers	Science and technology outputs
	(M) Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%) (Modified - Inverse value)	UN-SDGs	2019	4	State Institutions	Human and sustainable development

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 18 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10 year period (2009-2019).

Table 18: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	19
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	32
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	26
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	16
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	5
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	15
	Red List Index	UN-SDGs	44
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	35
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	33
	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	4

7.2 Country core indicators comparability

We show the radar plot in Figure 19 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Malawi is at par with the Lower income countries in terms of impact indicators which are the best performed indicators in relation to other indicators in the logical framework.

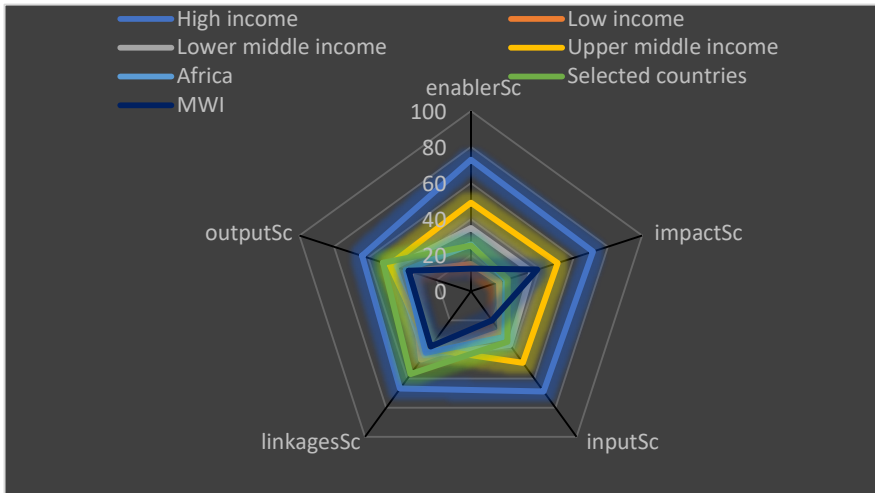


Figure 19: Strength of Malawi compared to the rest of the World

In terms of various cluster groups, Figure 20 shows that Malawi is in the same cluster group with countries such as Burundi, Liberia, Mozambique, Benin, Burkina Faso, Cameroon, Dem Re Congo, Guinea, Madagascar, Mali and Togo. Cluster groups show countries that perform like Malawi in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Malawi's performance than countries in light green.

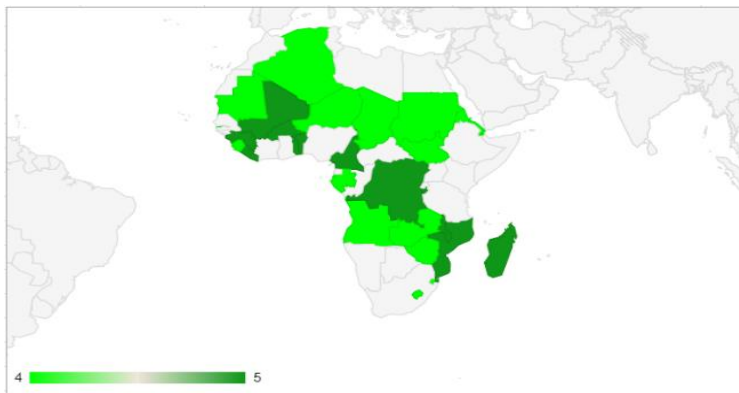


Figure 20: Cluster map of Malawi

7.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 21 demonstrates that Malawi performs poorly in input indicators and thus worse in completeness.

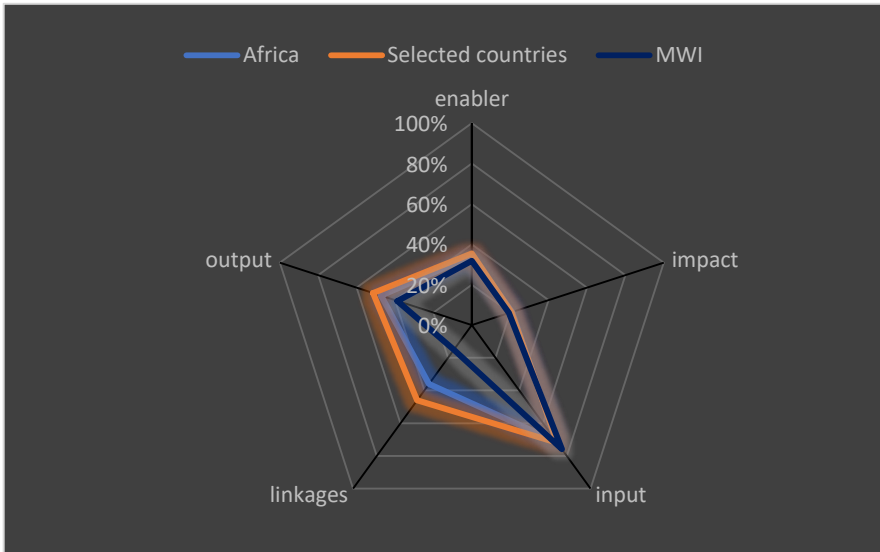


Figure 21: Comparison of missing data in Malawi compared to selected countries and rest of the World

8.0 MOZAMBIQUE

Mozambique has about 219 indicators available in this classification reflecting 83% coverage of the indicators. Table 19 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 19: Number of indicators in Mozambique measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Mozambique	Number of indicators in the STI scoreboard
	Enabler	110	128
	Impact	31	33
	Input	65	67
	Linkages	4	14
	Output	9	21
STI ACTIVITIES MAIN SUBJECTS	Creative outputs	1	1
	Education and training	28	32
	Expenditure on R&D	23	23
	Expenditure on STA	8	10
	Financial system	6	8
	Governance and institutional development	24	25
	Human and sustainable development	28	32
	ICT readiness	9	10
	Infrastructure	6	6
	Innovation activities	9	11
	Innovation outputs	10	23
	Job and product market	24	26
	Knowledge flows	5	15
	Research activities	29	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	29	33
	Financial organisations and venture capitalists	8	11
	Firms in the formal sector	20	50
	Multiple actors	29	29
	Non-profit institutions serving households	1	1

	Science, technology, and R&D organisations and personnel	34	34
	State Institutions	78	84
	Users / consumers	7	8

8.1 Key indicator performance

We outline performance of the available 219 STI indicators out of the possible collected 263 indicators African STI indicators with 57 and 55 reported in 2017 and in 2015 respectively. Table 20 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Mozambique.

Table 20: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	Global Competitiveness Index - Rank	GCI 2007 - 2019	2017	2	Firms in the formal sector	Innovation outputs
	Government expenditure per student, secondary (% of GDP per capita)	WDI 2020	2013	2	State Institutions	Expenditure on STA
	GERD - financed by Not specified source %	UN-Sci	2015	2	Multiple actors	Expenditure on R&D
	Researchers (FTE) - ISCED 6 %	UN-Sci	2015	2	Science, technology, and R&D organisations and personnel	Research activities
Output	Pupil-teacher ratio, secondary	WDI 2020	2017	3	Education and training organisations	Education and training

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 21 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 21: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	34
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	37
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	37
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	39
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	37
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	34
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	32
	Annual growth rate of real GDP per employed person (%)	UN-SDGs	43
	Red List Index	UN-SDGs	41
	Impact	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs

8.2 Country core indicators comparability

We show the radar plot in Figure 22 that depicts the strength of the country compared to the mean values of high-income countries, upper middle income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Mozambique performs is as par with the rest of its African counterpart in linkages indicators and input indicators.

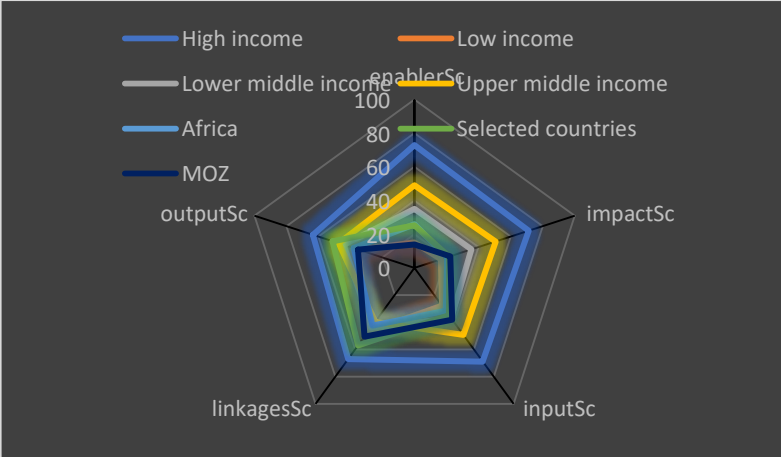


Figure 22: Strength of Mozambique compared to the rest of the World

In terms of various cluster groups, Figure 23 shows that Mozambique is in the same cluster group with countries such as Burundi, Liberia, Malawi, Benin, Burkina Faso, Cameroon, Dem Re Congo, Guinea, Madagascar, Mali and Togo. Cluster groups show countries that perform like Mozambique in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Mozambique’s performance than countries in light green.

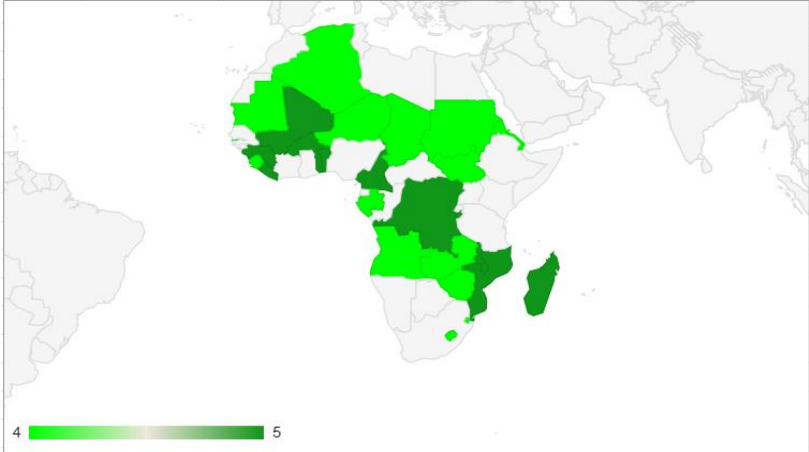


Figure 23: Cluster map of Mozambique

8.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 24 demonstrates that Mozambique performs poorly in input indicators and thus worse in completeness.

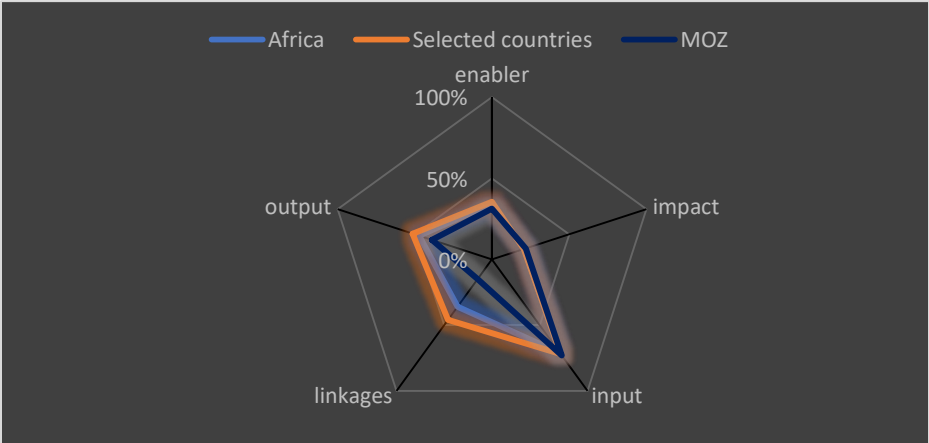


Figure 24: Comparison of missing data in Mozambique compared to selected countries and rest of the World

9.0 NIGERIA

Nigeria has over 90% of indicators available out of the 263 indicators outlining its good performance compared to its African counterparts. Table 22 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 22: Number of indicators in Nigeria measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Nigeria	Number of indicators in the STI scoreboard
	enabler	107	128
	impact	30	33
	input	13	67
	linkages	13	14
	output	12	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	24	32
	Expenditure on R&D	23	23
	Expenditure on STI	8	10
	Financial system	8	8
	Governance and institutional development	23	25
	Human and sustainable development	30	32
	ICT readiness	9	10
	Infrastructure	6	6
	Innovation activities	11	11
	Innovation determinants	3	3
	Innovation outputs	18	23
	Job and product market	24	26
	Knowledge flows	15	15
	Research activities	23	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	19	33
	Financial organisations and venture capitalists	11	11
	Firms in the formal sector	39	50
	Multiple actors	11	29
	Science, technology, and R&D organisations and personnel	3	34
	State Institutions	72	84

9.1 Key indicator performance

This performance is reflected and confirmed by availability of 175 indicators out of the possible collected 263 indicators African STI indicators. Fifty (50) of these indicators were collected in 2017 while 45 collected in 2019. Table 23 presents the country's top 5 indicators in terms of performance ranked the first among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Kenya.

Table 23: Top 5 STI indicators (performance)

Indicator name	Source/origin	Latest year	Actors	STI activities main subjects
Enabler Human capital index, based on years of schooling and returns to education; see Human capital in PWT9.	Penn World Tables 9.1 2020	2017	State Institutions	Human and sustainable development
Percentage of manufacturing firms that engaged in acquisition of external knowledge	UN-Inno	2010	Firms in the formal sector	Expenditure on STI
Impact Proportion of medium and high-tech industry value added in total value added (%)	UN-SDGs	2017	Firms in the formal sector	Innovation outputs
Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2019	State Institutions	Job and product market
output (M) Total number of national feature films produced (Modified - Per capita)	UN-films	2011	Firms in the formal sector	Creative outputs
linkages Percentage of manufacturing firms for which competitors or other enterprises in their sector were a highly important source of information	UN-Inno	2010	Firms in the formal sector	Knowledge flows

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 24 have the best completeness and timeliness. In other words they have been collected and have data available in the 10 year period and data is available until 2019.

Table 24: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	38
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	35
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	22
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	32
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	18
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	33
	Non-performing loans to total gross loans (%)	UN-SDGs	8
	Red List Index	UN-SDGs	36
	Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs

9.2 Country core indicators comparability

We show the radar plot in Figure 25 which shows the strength of the country compared to the mean values of high income countries, upper middle income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Nigeria on average ranks as the best country in outputs indicators with the best score. The radar is based on a normalisation of rankings where the best ranking was given a score of 100.

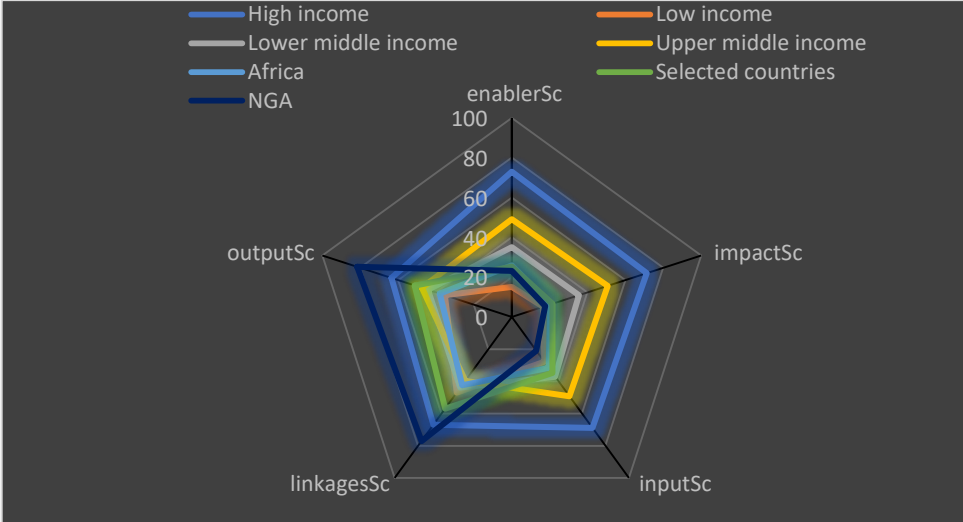


Figure 25: Strength of Nigeria compared to the rest of the World

In terms of various cluster groups, Figure 26 shows that Nigeria is in the same cluster group with countries such as Ghana, Rwanda, Cote dlvoire, Namibia and Senegal. Cluster groups show countries that perform like Nigeria in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Nigeria’s performance than countries in light green.

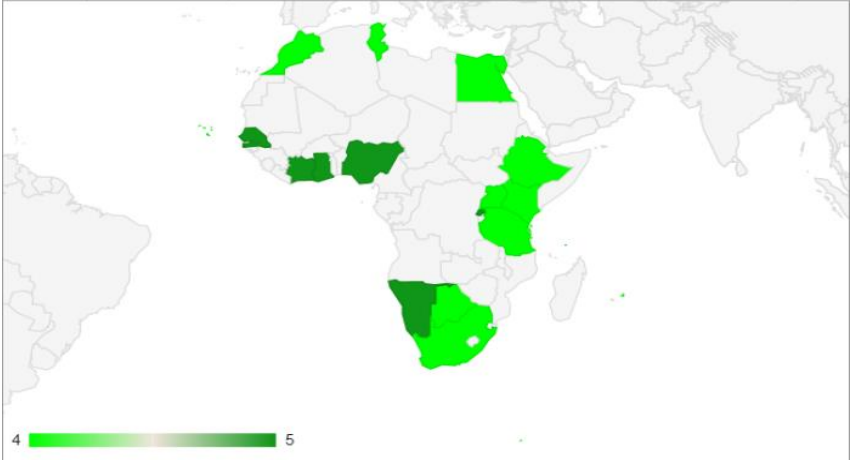


Figure 26: Cluster map of Nigeria

9.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. As per Figure 27, Nigeria performs poorly in terms of input indicators which have lots of missing data and thus worse in completeness.

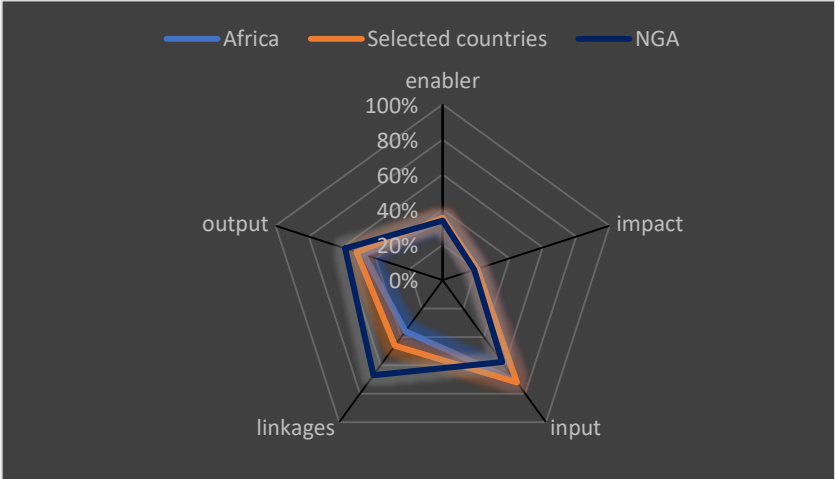


Figure 27: Comparison of missing data in the number of indicators in Nigeria compared to selected countries and rest of the World

10.0 RWANDA

Rwanda has about 208 indicators reflecting 79% coverage of the 263 indicators available. Table 25 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 25: Number of indicators in Rwanda measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Rwanda	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	111	128
	Impact	29	33
	Input	56	67
	Linkages	4	14
	Output	8	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	28	32
	Expenditure on R&D	19	23
	Expenditure on STA	8	10
	Financial system	8	8
	Governance and institutional development	24	25
	Human and sustainable development	28	32
	ICT readiness	10	10
	Infrastructure	3	6
	Innovation activities	9	11
	Innovation outputs	10	23
	Job and product market	25	26
	Knowledge flows	5	15
	Research activities	24	29
	Science and technology outputs	7	9
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	29	33
	Financial organisations and venture capitalists	11	11
	Firms in the formal sector	19	50
	Multiple actors	24	29
	Non-profit institutions serving households	1	1

	Science, technology, and R&D organisations and personnel	28	34
	State Institutions	75	84
	Users / consumers	8	8

10.1 Key indicator performance

We outline performance of the available 208 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=55) reported in 2018. Table 26 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Rwanda.

Table 26: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	(M) Cost of business start-up procedures (% of GNI per capita) (Modified - Inverse value)	WDI 2020	2018	1	State Institutions	Governance and institutional development
Input	GDP growth (annual %)	WDI 2020	2010	1	State Institutions	Governance and institutional development
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2010	1	Financial organisations and venture capitalists	Financial system
Impact	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2017	1	State Institutions	Governance and institutional development
	Government procurement of advanced tech products - 1-7 Best	GCI 2007 - 2019	2019	1	State Institutions	Expenditure on STI

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 27 provides the best indicators in completeness and timeliness. In other words these indicators have been collected and have data available in the 10 year period (2009-2019).

Table 27: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers	Red List Index	UN-SDGs	33
	Bank capital to assets ratio (%)	WDI 2020	5
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	1
	CPIA social protection rating (1=low to 6=high)	WDI 2020	3
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	3
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	16
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	15
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	40
Impact	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	2
	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	4

10.2 Country core indicators comparability

We show the radar plot in Figure 28 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Rwanda's strength is in linkages indicators and this compares well to high income countries.

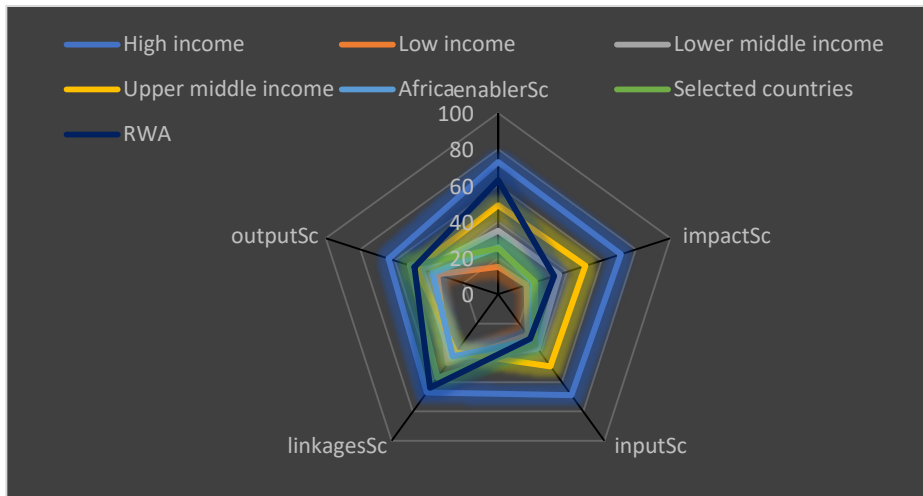


Figure 28: Strength of Rwanda compared to the rest of the World

In terms of various cluster groups, Figure 29 shows that Rwanda is in the same cluster group with countries such as Ghana, Nigeria, Cote d'Ivoire, Namibia, Senegal. Cluster groups show countries that perform like Rwanda in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Rwanda's performance than countries in light green.

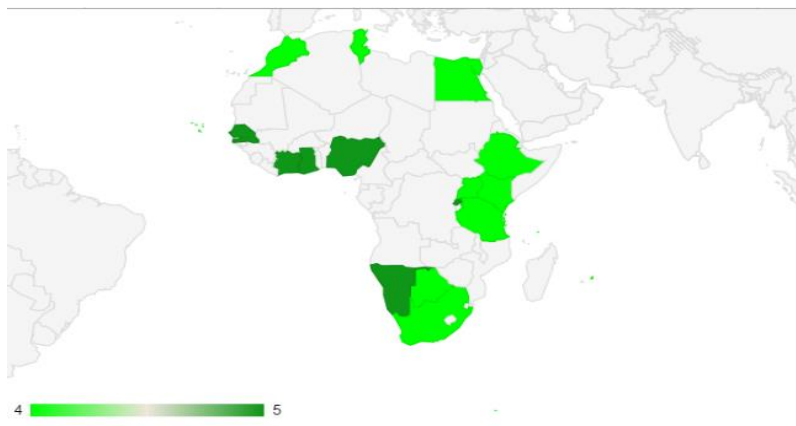


Figure 29: Cluster map of Rwanda

10.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 30 demonstrates that Rwanda performs poorly in input indicators and thus worse in completeness.

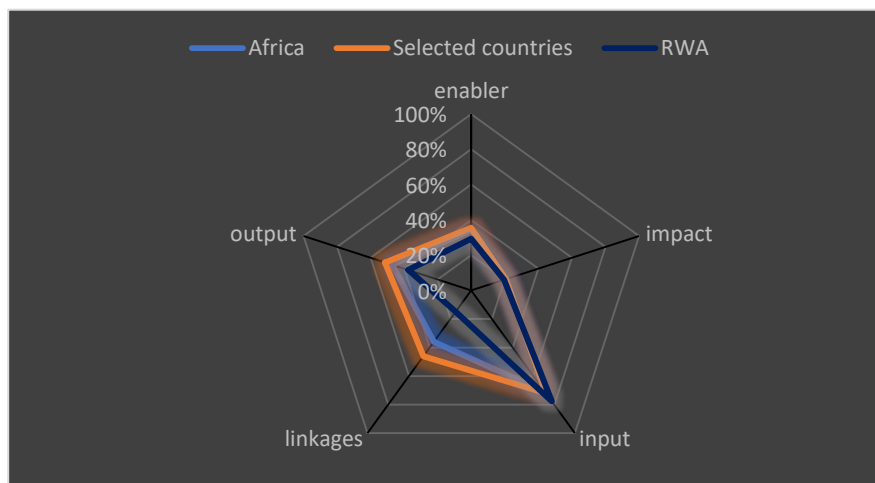


Figure 30: Comparison of missing data in Rwanda compared to selected countries and rest of the World

11.0 SIERRA LEONE

Sierra Leone has about 145 indicators available out of the 263 indicators available. Table 28 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 28: Number of indicators in Sierra Leone measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Sierra Leone	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	98	128
	Impact	27	33
	Input	9	67
	Linkages	4	14
	Output	7	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	18	32
	Expenditure on STI	7	10
	Financial system	6	8
	Governance and institutional development	24	25
	Human and sustainable development	27	32
	ICT readiness	9	10
	Infrastructure	5	6
	Innovation activities	6	11
	Innovation outputs	7	23
	Job and product market	23	26

	Knowledge flows	5	15
	Research activities	1	29
	Science and technology outputs	7	9
ACTORS	Brokers and suppliers	11	13
	Education and training organisations	19	33
	Financial organisations and venture capitalists	8	11
	Firms in the formal sector	18	50
	Multiple actors	8	29
	Science, technology, and R&D organisations and personnel	3	34
	State Institutions	71	84
	Users / consumers	7	8

11.1 Key indicator performance

We outline performance of the available 145 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=63) reported in 2017. Table 29 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Sierra Leone.

Table 29: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Impact	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	2019	1	Firms in the formal sector	Job and product market
	ICT service exports (% of service exports, BoP)	WDI 2020	2016	1	Brokers and suppliers	Science and technology outputs
Enabler	Government expenditure on education, total (% of GDP)	WDI 2020	2018	1	State Institutions	Education and training
Input	(M) Over-age students, primary (% of enrollment)	WDI 2020	2018	2	Education and training organisations	Education and training

	(Modified - Inverse value)					
	Expenditure on tertiary education (% of government expenditure on education)	WDI 2020	2018	3	Education and training organisations	Expenditure on STA

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 30 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10 year period (2009-2019).

Table 30: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enablers	Red List Index	UN-SDGs	16
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	11
	CPIA social protection rating (1=low to 6=high)	WDI 2020	18
	Domestic credit to private sector (% of GDP)	WDI 2020	51
	GDP (current US\$)	WDI 2020	48
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	16
	Employment in agriculture (% of total employment) (modeled ILO estimate)	WDI 2020	19
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	26
	CPIA social protection rating (1=low to 6=high)	WDI 2020	30
	Domestic credit to private sector (% of GDP)	WDI 2020	33

11. 2 Country core indicators comparability

We show the radar plot in Figure 31 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Sierra Leone performs well in output indicators, similar to most of the countries in Africa.

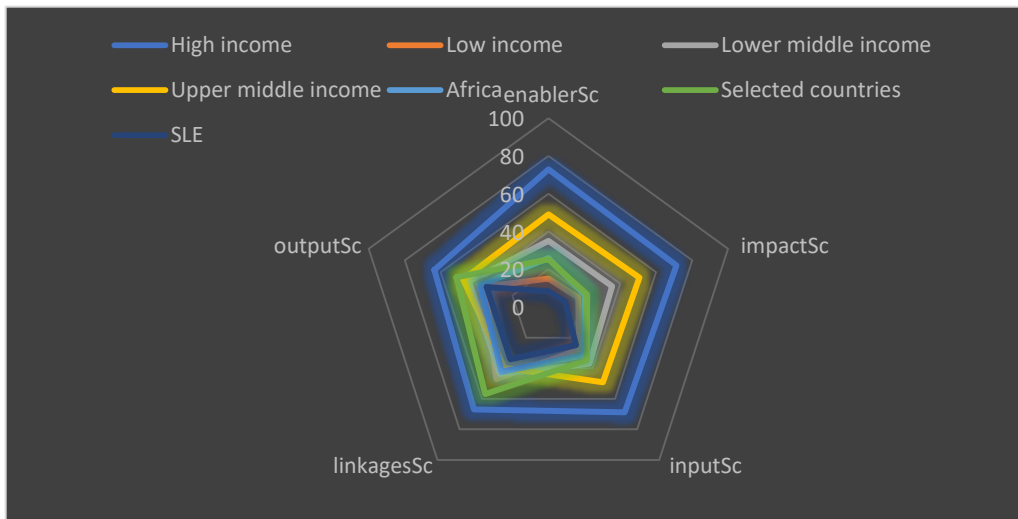


Figure 31: Strength of Sierra Leone compared to the rest of the World

In terms of various cluster groups, Figure 32 shows that Sierra Leone is in the same cluster group with countries such as South Sudan, Sudan, Angola, Chad and Mauritania. Cluster groups show countries that perform like Sierra Leone in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Sierra Leone's performance than countries in light green.

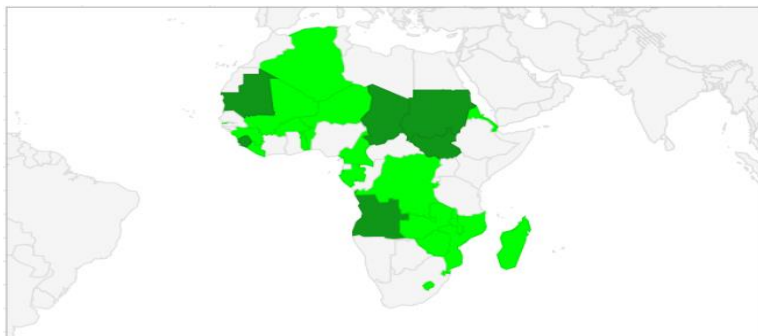


Figure 32: Cluster map of Sierra Leone

11.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 33 demonstrates that Sierra Leone performs poorly in input indicators compared to Africa and selected countries and thus worse in completeness.

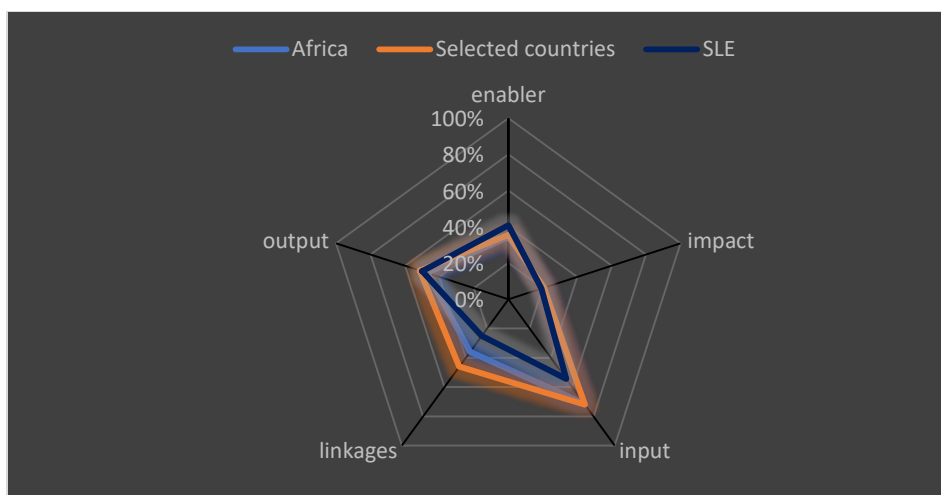


Figure 33: Comparison of missing data in Sierra Leone compared to selected countries and rest of the World

12.0 SOMALIA

Somalia has about 49 indicators available out of possible 263 the indicators. Table 31 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 31: Number of indicators in Somalia measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Somalia	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	32	128
	Impact	14	33
	Linkages	2	14
	Output	1	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	1	32
	Financial system	1	8
	Governance and institutional development	10	25
	Human and sustainable development	18	32
	ICT readiness	5	10
	Infrastructure	3	6
	Job and product market	8	26
	Knowledge flows	2	15

	Science and technology outputs	1	9
ACTORS	Brokers and suppliers	6	13
	Education and training organisations	2	33
	Firms in the formal sector	2	50
	Multiple actors	1	29
	Science, technology, and R&D organisations and personnel	1	34
	State Institutions	33	84
	Users / consumers	4	8

12.1 Key indicator performance

We outline performance of the available 49 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=21) reported in 2019. Table 32 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Somalia.

Table 32: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Impact	(M) Total debt service (% of GNI) (Modified - Inverse value)	UN-Demo	2018	1	State Institutions	Financial system
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	2019	2	Brokers and suppliers	Job and product market
Enabler	Employment by industry: Agriculture (%) Female	UN - Other indicators	2019	3	State Institutions	Governance and institutional development
Input	(M) Number of new HIV infections per 1,000 uninfected population, by sex	UN-SDGs	2018	5	State Institutions	Human and sustainable development

	and age (per 1,000 uninfected population) (Modified - Inverse value)					
	Self-employed, total (% of total employment) (modelled ILO estimate)	WDI 2020	2019	9	Brokers and suppliers	Job and product market

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 33 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 33: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	39
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	2
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	52
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	43
	Labor force participation rate, total (% of total population ages 15+) (modelled ILO estimate)	WDI 2020	46
	Self-employed, total (% of total employment) (modelled ILO estimate)	WDI 2020	9
	Unemployment, total (% of total labour force) (modelled ILO estimate)	WDI 2020	39
	Red List Index	UN-SDGs	24
Enablers	Labor force, female (% of total labor force)	WDI 2020	52
	Secure Internet servers (per 1 million people)	WDI 2020	37

12.2 Country core indicators comparability

We show the radar plot in Figure 34 depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Somalia performs well in linkages indicators and this compares well to selected countries.

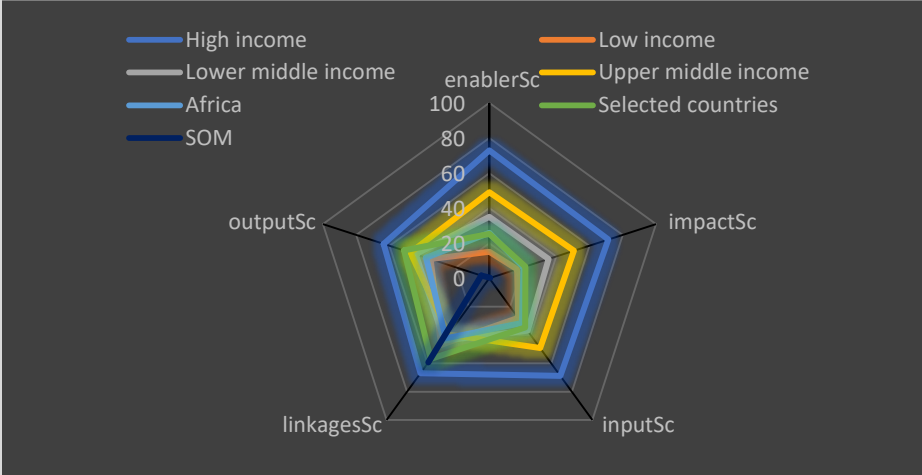


Figure 34: Strength of Somalia compared to the rest of the World

In terms of various cluster groups, Figure 35 shows that Somalia is in the same cluster group with only Libya. Cluster groups show countries that perform like Somalia in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Somalia's performance than countries in light green.

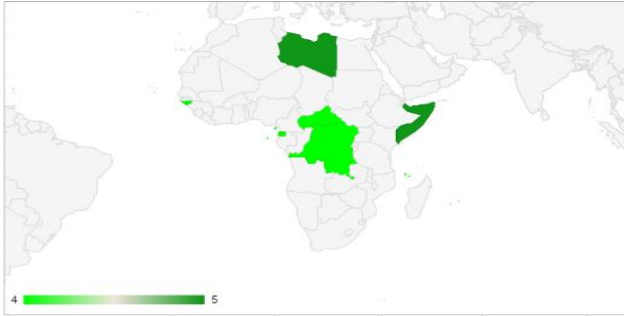


Figure 35: Cluster map of Somalia

12.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 36 demonstrates that Somalia performs poorly enabler indicators compared to Africa and selected countries and thus worse in completeness.

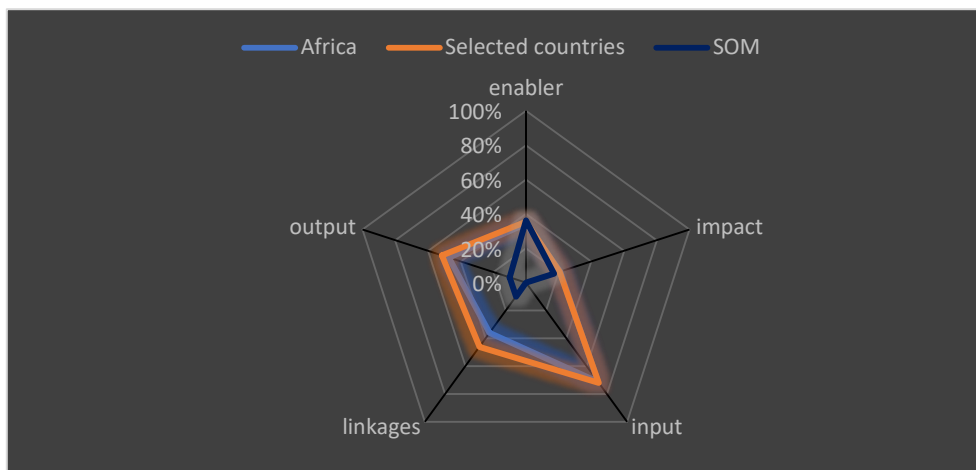


Figure 36: Comparison of missing data in Somalia compared to selected countries and rest of the World

13.0 SOUTH AFRICA

South Africa has 199 indicators out of the possible 263 indicators. Table 34 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 34: Number of indicators in South Africa measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Count indicators in South Africa	Count indicators in the STI scoreboard
	enabler	107	128
	impact	33	33
	input	48	67
	linkages	4	14
	output	7	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	1	32
	Expenditure on R&D	26	23
	Expenditure on STI	19	10
	Financial system	7	8
	Governance and institutional development	8	25
	Human and sustainable development	23	32
	ICT readiness	30	10
	Infrastructure	9	6

	Innovation activities	6	11
	Innovation determinants	6	3
	Innovation outputs	8	23
	Job and product market	23	26
	Knowledge flows	5	15
	Research activities	19	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organizations	27	33
	Financial organizations and venture capitalists	11	11
	Firms in the formal sector	14	50
	Multiple actors	24	29
	Non-profit institutions serving households	1	1
	Science, technology, and R&D organizations and personnel	24	34
	State Institutions	78	84
	Users / consumers	7	8

13.1 Key indicator performance

Performance is reflected and confirmed by availability of 199 indicators out of the possible collected 263 indicators African STI indicators. Most of these indicators (n=98) were available in 2017. Table 35 presents the country's top 5 indicators in terms of performance ranked number one among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in South Africa.

Table 35: Top 5 STI indicators (performance)

	Indicator name	Source/ origin	Latest year	Actors	STI activities main subjects
impact	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	2019	Firms in the formal sector	Job and product market

input	Company spending on Research & Development - 1-7 Best	GCI 2007 - 2019	2018	Financial organisations and venture capitalists	Financial system
Enabler			2017	Financial organisations and venture capitalists	Expenditure on STA
	Strength of auditing and reporting standards - 1-7 Best	GCI 2007 - 2019	2017	State Institutions	Governance and institutional development
	Availability of latest technologies - 1-7 Best	GCI 2007 - 2019	2017	Users / consumers	ICT readiness

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 36 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 36: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	33
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	4
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	38
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	13
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	2
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	9
	Red List Index	UN-SDGs	48
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	35
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	50

13.2 Country core indicators that are comparable (regionally and international).

We show the radar plot in Figure 37 which shows the strength of the country compared to the mean values of high-income countries, upper middle income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. South Africa on average ranks as the best country in input indicators and output indicators with the best score compared to the rest of the World and Africa.

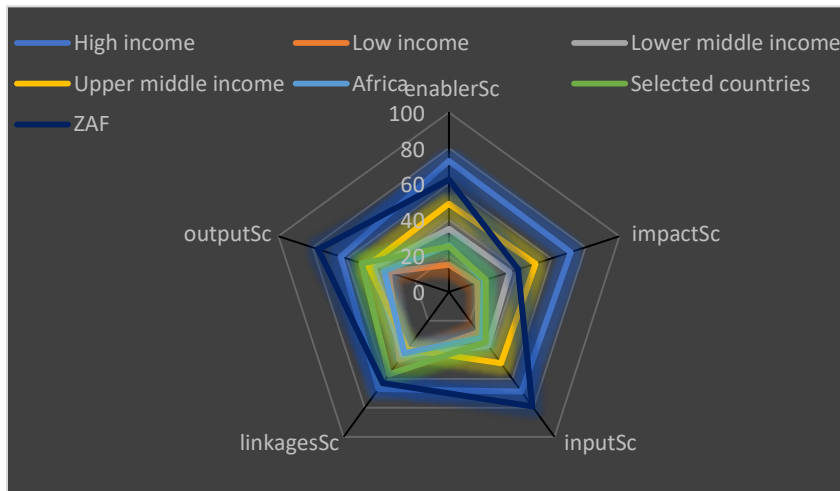


Figure 37: Strength of South Africa compared to the rest of the World

In terms of various cluster groups, Figure 38 shows that South Africa is in the same cluster group with countries such as Uganda, Egypt, Ethiopia, and Kenya.

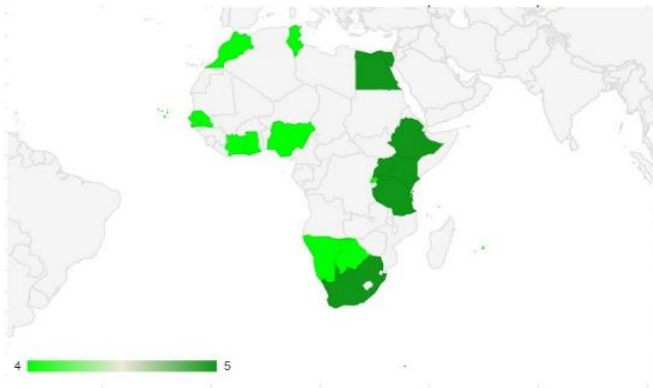


Figure 38: Cluster map of South Africa

13.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. Figure 39 outlines that South Africa performs poorly in terms of both enablers and input indicators. In comparison to selected countries and Africa in general, South Africa performs better in missing data. The rest of Africa countries are worse in completeness.

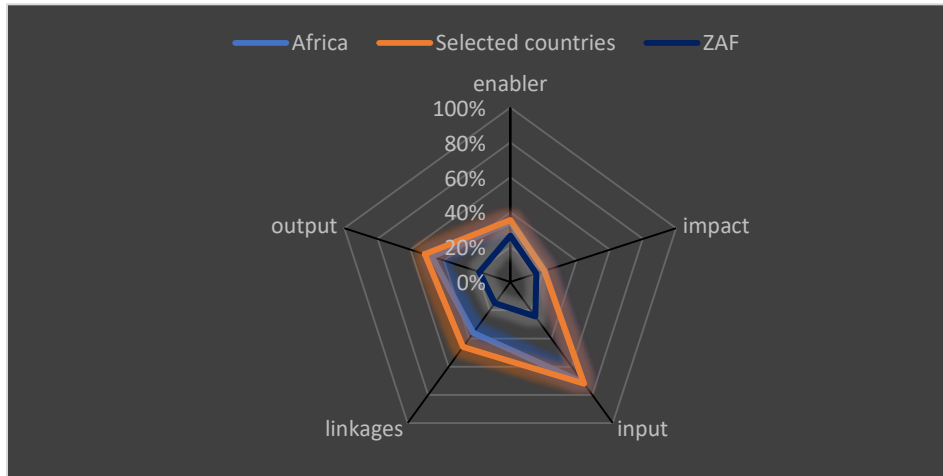


Figure 39: Comparison of missing data in South Africa compared to selected countries and rest of the World

14 SOUTH SUDAN

South Sudan has about 83 indicators available out of the 263 indicators. Table 37 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 37: Number of indicators in South Sudan measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for South Sudan	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	50	128
	Impact	22	33
	Input	5	67
	Linkages	2	14
	Output	4	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	1	32
	Expenditure on STI	10	10
	Financial system	4	8
	Governance and institutional development	1	25
	Human and sustainable development	14	32
	ICT readiness	18	10
	Infrastructure	5	6
	Innovation activities	2	11
	Innovation outputs	3	23
	Job and product market	4	26
	Knowledge flows	12	15
	Research activities	3	29
	Science and technology outputs	6	9
ACTORS	Brokers and suppliers	8	13
	Education and training organisations	10	33
	Financial organisations and venture capitalists	3	11
	Firms in the formal sector	15	50
	Multiple actors	4	29
	Science, technology, and R&D organisations and personnel	1	34
	State Institutions	38	84
	Users / consumers	4	8

14.1 Key indicator performance

We outline performance of the available 83 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=21) reported in 2019. Table 38 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in South Sudan.

Table 38: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	GDP per unit of energy use (PPP \$ per kg of oil equivalent)	WDI 2020	2014	1	State Institutions	Infrastructure
	Current education expenditure, tertiary (% of total expenditure in tertiary public institutions)	WDI 2020	2016	4	State Institutions	Expenditure on STA
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	2019	1	State Institutions	Governance and institutional development
	(M) Charges for the use of intellectual property, receipts (BoP, current US\$) (Modified - Per capita)	WDI 2020	2018	2	Multiple actors	Science and technology outputs
Output	(M) Total number of national feature films produced (Modified - Per capita)	UN-films	2015	3	Firms in the formal sector	Creative outputs

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 39 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 39: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	1
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	18
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	39
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	24
	Labor force participation rate, total (% of total population ages 15+) (modelled ILO estimate)	WDI 2020	16
	Self-employed, total (% of total employment) (modelled ILO estimate)	WDI 2020	10
	Unemployment, total (% of total labour force) (modelled ILO estimate)	WDI 2020	42
Enablers	Wage and salaried workers, female (% of female employment) (modelled ILO estimate)	WDI 2020	43
	Red List Index	UN-SDGs	17
	Domestic credit to private sector (% of GDP)	WDI 2020	33

14.2 Country core indicators comparability

We show the radar plot in Figure 40 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. South Sudan performs well in output indicators in the logical framework and this performance is similar to a number of selected countries although higher compared to Africa’s percentage.

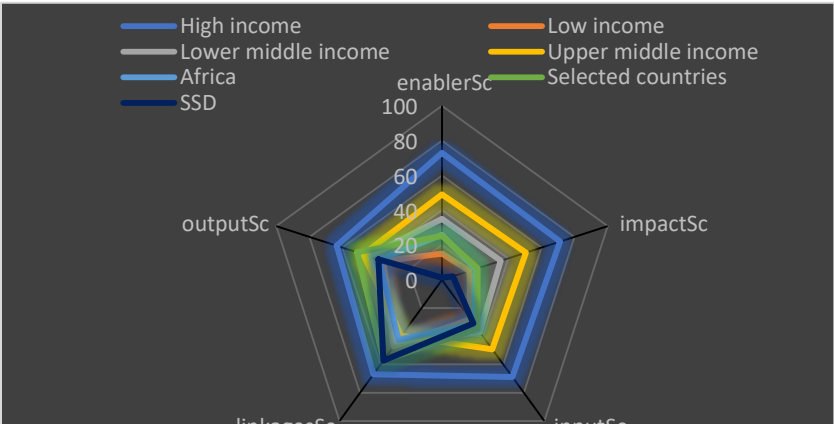


Figure 40: Strength of South Sudan compared to the rest of the World

In terms of various cluster groups, Figure 41 shows that South Sudan is in the same cluster group with countries such as Sierra Leone, Sudan, Angola, Chad and Mauritania. Cluster groups show countries that perform like South Sudan in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to South Sudan’s performance than countries in light green.

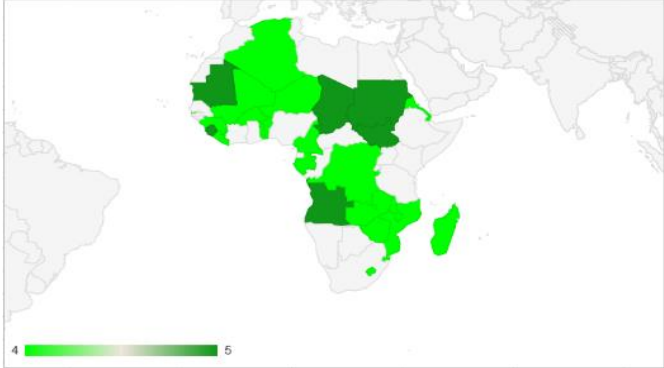


Figure 41: Cluster map of Sudan

14.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 42 demonstrates that South Sudan performs poorly in all the indicator categories in terms of missing data compared to Africa and is leading in particular in input indicators.

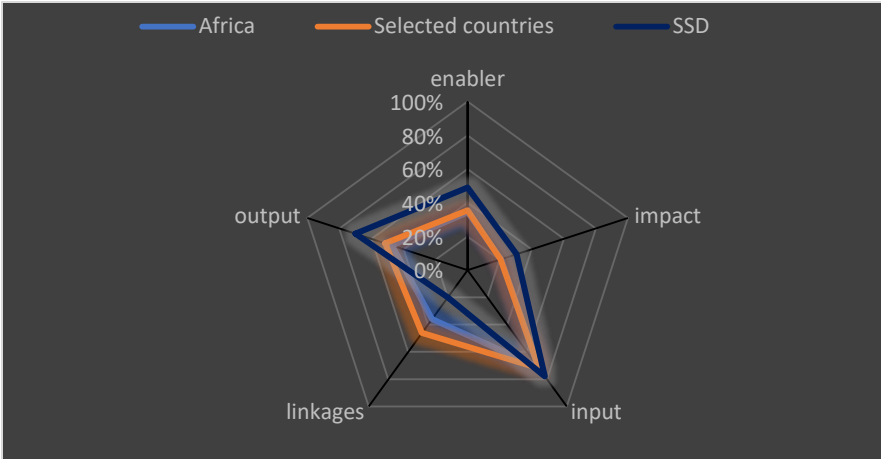


Figure 42: Comparison of missing data in South Sudan compared to selected countries and rest of the World

15 SUDAN

Sudan has about 105 indicators available out of the 263 indicators. Table 40 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category.

Table 40: Number of indicators in Sudan measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Sudan	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	60	128
	Impact	28	33
	Input	10	67
	Linkages	2	14
	Output	5	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	16	32
	Expenditure on STI	2	10
	Financial system	3	8
	Governance and institutional development	15	25
	Human and sustainable development	23	32
	ICT readiness	5	10
	Infrastructure	4	6
	Innovation activities	8	11
	Innovation outputs	4	23
	Job and product market	14	26
	Knowledge flows	3	15
	Research activities	1	29
Science and technology outputs	7	9	
ACTORS	Brokers and suppliers	10	13
	Education and training organisations	17	33
	Financial organisations and venture capitalists	3	11
	Firms in the formal sector	14	50
	Multiple actors	9	29
	Science, technology, and R&D organisations and personnel	2	34
	State Institutions	46	84
	Users / consumers	4	8

15.1 Key indicator performance

We outline performance of the available 105 STI indicators out of the possible collected 263 indicators African STI indicators with the highest number of indicators (n=34) reported in 2019. Table 41 presents the country's top 5 indicators in terms of performance ranked among top out of the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Sudan.

Table 41: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Input	Percentage of graduates from Science, Technology, Engineering and Mathematics programmes in tertiary education who are female (%)	UN-EDUN	2014	4	Education and training organisations	Education and training
	Percent of firms that introduced a new product/service	WEF Enterprise Survey	2014	4	Firms in the formal sector	Innovation activities
	Percent of firms that spend on R&D	WEF Enterprise Survey	2015	4	Firms in the formal sector	Innovation activities
	(M) Patent applications, residents (Modified - Per capita)	WDI 2020	2018	6	Multiple actors	Innovation activities
	Firms that spend on R&D (% of firms)	WDI 2020	2014	6	Firms in the formal sector	Innovation activities

In order to assess quality of the indicators, we rely on completeness and timeliness of the indicators. Table 42 provides the best indicators in completeness and timeliness. In other words, these indicators have been collected and have data available in the 10-year period (2009-2019).

Table 42: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)

Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	50
	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	10
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	13
	Employment in agriculture (% of total employment) (modelled ILO estimate)	WDI 2020	30
	Employment in services (% of total employment) (modelled ILO estimate)	WDI 2020	23
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	50
Enablers	Red List Index	UN-SDGs	18
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	26
	CPIA social protection rating (1=low to 6=high)	WDI 2020	30
	Domestic credit to private sector (% of GDP)	WDI 2020	33

15.2 Country core indicators comparability

We show the radar plot in Figure 43 that depicts the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Sudan's performs well in output indicators compared to low-income countries and is at par with upper middle-income countries in relation to the output indicators.

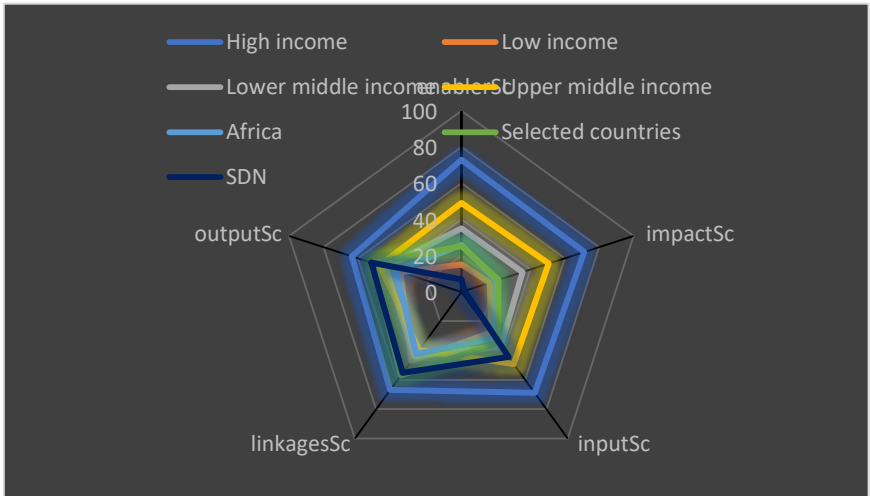


Figure 43: Strength of Sudan compared to the rest of the World

In terms of various cluster groups, Figure 44 shows that Sudan is in the same cluster group with countries such as Sierra Leone, South Sudan, Angola, Chad and Mauritania. Cluster groups show countries that perform like Sudan in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Sudan’s performance than countries in light green.

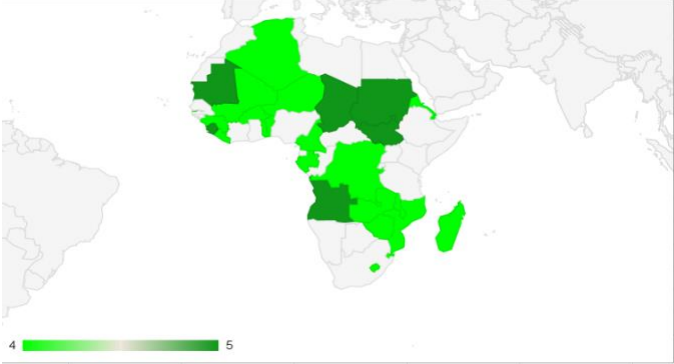


Figure 44: Cluster map of Sudan

15.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in missing data. Figure 45 demonstrates that Sudan performs poorly in input indicators compared to Africa and selected countries and thus worse in completeness.

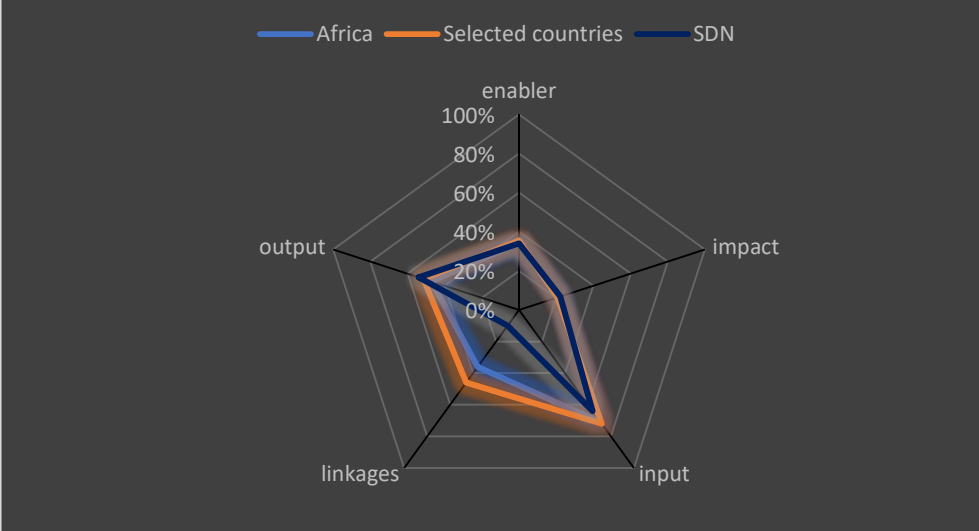


Figure 45: Comparison of missing data in Sudan compared to selected countries and rest of the World

16 TANZANIA

Table 43 outlines the number of indicators that the country has measured in each of our classifications outlining indicators available based on the logical framework; STI main subjects; and the actor category. Tanzania has over 82% of the available 263 indicators available in this classification outlining its good performance compared to its African counterparts.

Table 43: Number of indicators in Tanzania measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Count indicators in Tanzania	Count indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	enabler	111	128
	impact	32	33
	input	49	67
	linkages	13	14
	output	10	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	22	32
	Expenditure on R&D	17	23
	Expenditure on STI	8	10
	Financial system	8	8
	Governance and institutional development	24	25
	Human and sustainable development	30	32
	ICT readiness	9	10
	Infrastructure	6	6
	Innovation activities	8	11
	Innovation determinants	3	3
	Innovation outputs	13	23
	Job and product market	25	26
	Knowledge flows	14	15
	Research activities	19	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organizations	23	33
	Financial organizations and venture capitalists	9	11
	Firms in the formal sector	37	50
	Multiple actors	23	29
	Non-profit institutions serving households	24	1

	Science, technology, and R&D organizations and personnel	79	34
	State Institutions	7	84
	Users / consumers	13	8

16.1 Key indicator performance

This performance is reflected and confirmed by availability of 215 indicators out of the possible collected 263 indicators African STI indicators. Most of these indicators (60), were collected in 2017. Table 44 presents the country's top 5 indicators in terms of performance ranked number one among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Tanzania.

Table 44: Top 5 STI indicators (performance)

	Indicator name	Source/o rigin	Latest year	Actors	STI activities main subjects
Enabler	CPIA social protection rating (1=low to 6=high)	WDI 2020	2017	State Institutions	Human and sustainable development
	Percentage of manufacturing firms that engaged in market introduction of innovations	UN-Inno	2014	Firms in the formal sector	Innovation outputs
Input	(M) Over-age students, primary (% of enrolment) (Modified - Inverse value)	WDI 2020	2017	Education and training organisations	Education and training
	GERD - Applied research %	UN-Sci	2017	Multiple actors	Expenditure on R&D
Linkages	Percentage of manufacturing firms for which clients or customers were a highly important source of information	UN-Inno	2017	Firms in the formal sector	Knowledge flows

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 45 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 45: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	11
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	13
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	16
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	21
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	26
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	24
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	8
	Red List Index	UN-SDGs	52
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	22
	Proportion of local breeds classified as being at risk as a share of local breeds with known level of extinction risk (%)	UN-SDGs	8

16.2 Country core indicators that are comparable (regionally and international).

We show the radar plot in Figure 46 which shows the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Tanzania on average ranks as the best country in linkages indicators with the best score.

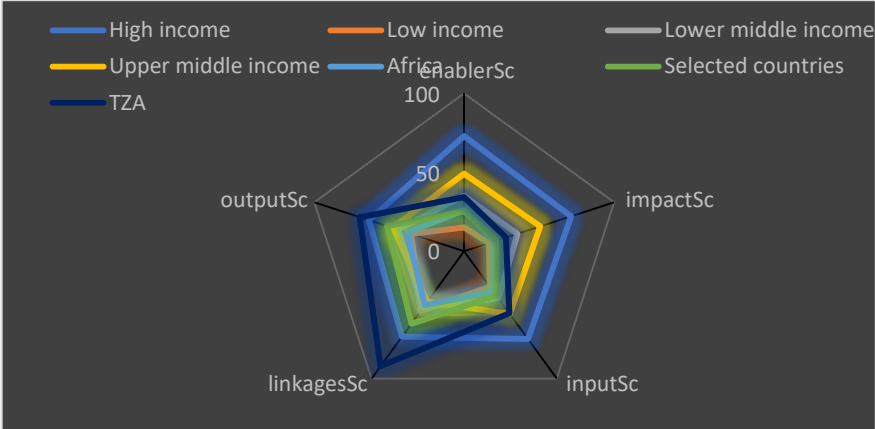


Figure 46: Strength of Tanzania compared to the rest of the World

In terms of various cluster groups, Figure 47 shows that Tanzania is in the same cluster group with countries such as South Africa, Egypt, Ethiopia, Kenya, and Uganda.

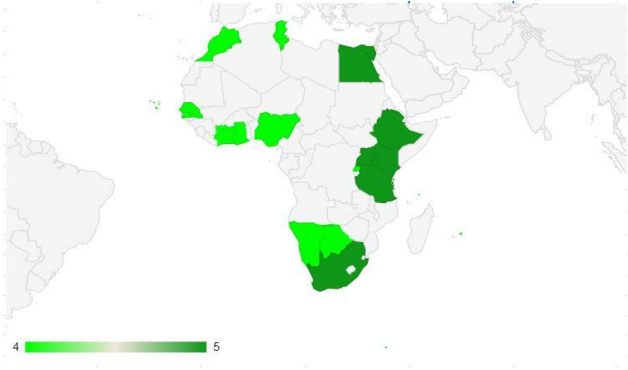


Figure 47: Cluster map of Tanzania

16.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. As per Figure 48 Tanzania performs poorly in terms of input indicators which have lots of missing data and thus worse in completeness.

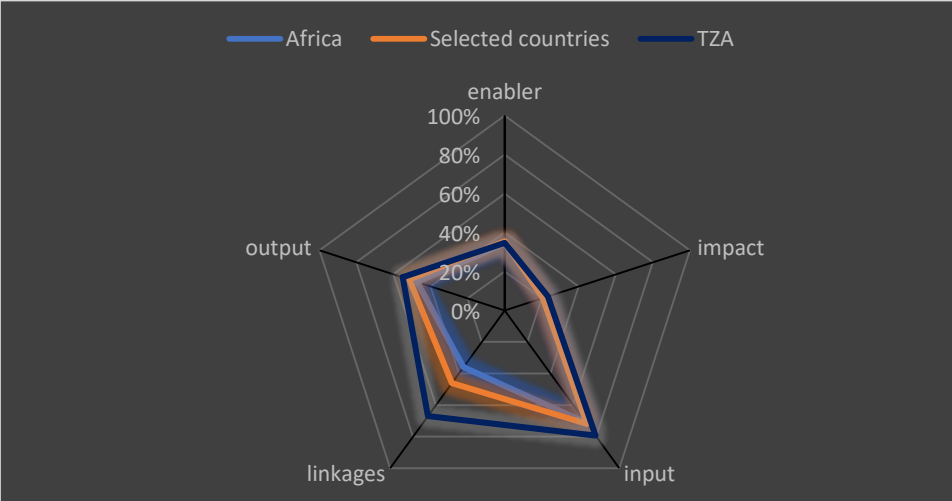


Figure 48: Comparison of missing data in the number of indicators in Tanzania compared to selected countries and rest of the World

17 UGANDA

We present the number of indicators that the country has measured in each of our classifications that includes the following; logical framework; STI main subjects; and the actor category, as outlined in Table 46. Uganda has over 86% of the indicators available in this classification outlining its good performance compared to its African counterparts.

Table 46: Number of indicators in Uganda measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Count indicators in Uganda	Count indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	enabler	109	128
	impact	30	33
	input	63	67
	linkages	13	14
	output	11	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	22	32
	Expenditure on R&D	23	23
	Expenditure on STI	9	10
	Financial system	8	8
	Governance and institutional development	24	25
	Human and sustainable development	27	32
	ICT readiness	9	10
	Infrastructure	4	6
	Innovation activities	9	11
	Innovation determinants	3	3
	Innovation outputs	14	23
	Job and product market	24	26
	Knowledge flows	14	15
	Research activities	27	29
	Science and technology outputs	9	9
ACTORS	Brokers and suppliers	13	13
	Education and training organizations	23	33
	Financial organizations and venture capitalists	10	11
	Firms in the formal sector	38	50
	Multiple actors	28	29
	Non-profit institutions serving households	1	1

	Science, technology, and R&D organizations and personnel	32	34
	State Institutions	74	84
	Users / consumers	7	8

17.1 Key indicator performance

This performance is reflected and confirmed by availability of 226 indicators out of the possible collected 263 indicators African STI indicators. Most of these indicators 57 and 55 were collected in 2014 and 2017 respectively. Table 47 presents the country's top 5 indicators in terms of performance ranked number one among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Uganda.

Table 47: Top 5 STI indicators (performance)

	Indicator name	Source/origin	Latest year	Actors	STI activities main subjects
Inputs	GERD - financed by Rest of the world (abroad) %	UN-Sci	2014	Multiple actors	Expenditure on R&D
	Percent of firms that introduced a new product/service	WEF Enterprise Survey	2013	Firms in the formal sector	Innovation activities
	Percentage of innovation-active firms in manufacturing (total size classes)	UN-Inno	2010	Firms in the formal sector	Innovation outputs
Outputs	Percentage of process innovators in manufacturing (total size classes)	UN-Inno	2010	Firms in the formal sector	Innovation outputs
	Percent of firms that introduced a process innovation	WEF Enterprise Survey	2013	Firms in the formal sector	Innovation outputs

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 48 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 48: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	16

	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	22
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	17
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	29
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	9
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	12
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	24
	Red List Index	UN-SDGs	50
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	24
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	20

17.2 Country core indicators that are comparable (regionally and international).

We show the radar plot in Figure 49 which shows the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Uganda on average ranks as the best country in linkages indicators and output indicators with the best score.

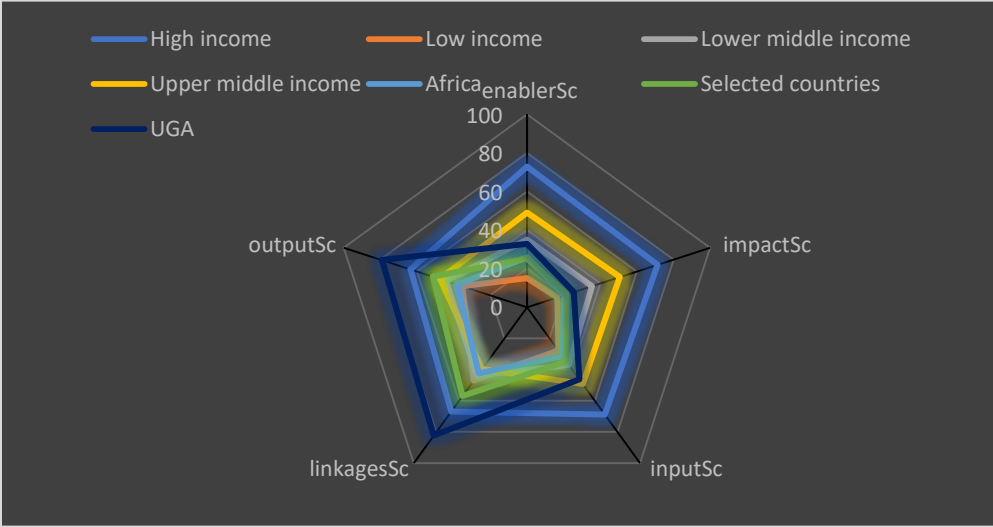


Figure 49: Strength of Uganda compared to the rest of the World

In terms of various cluster groups, Figure 50 shows that Uganda is in the same cluster group with countries such as South Africa, Egypt, Ethiopia, Kenya, and Uganda.

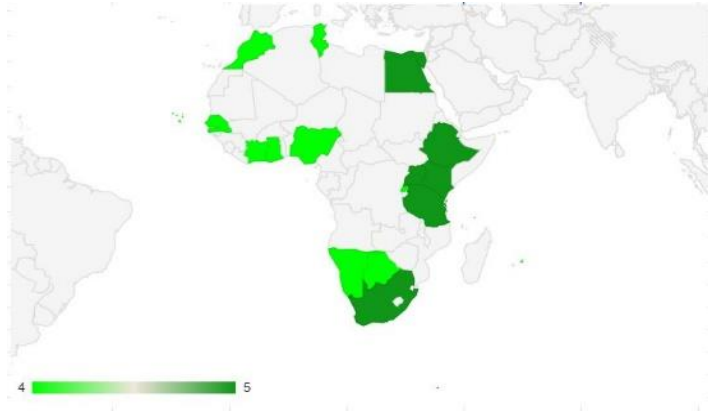


Figure 50: Cluster map of Uganda

17.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. Figure 51 outlines that Uganda performs poorly in terms of input indicators which have lots of missing data and thus worse in completeness.

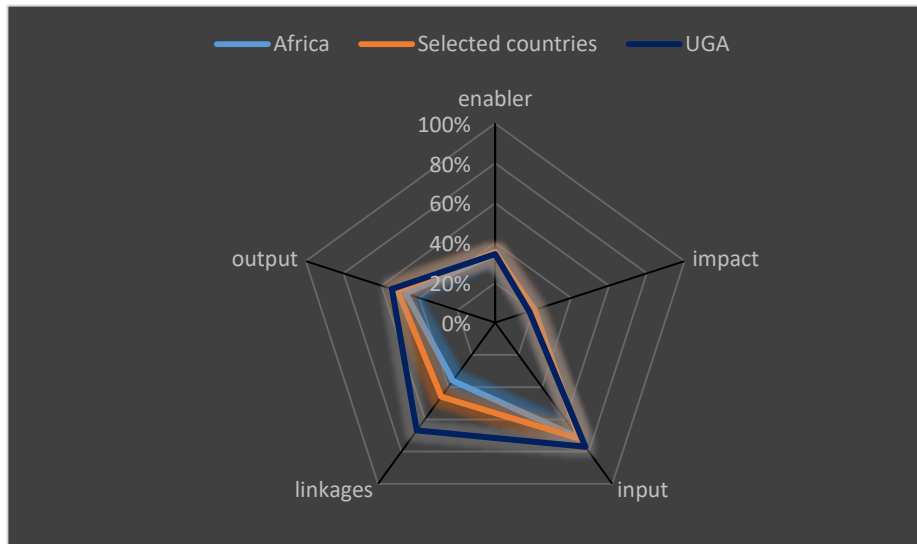


Figure 51: Comparison of missing data in the number of indicators in Uganda compared to selected countries and rest of the World

18 ZAMBIA

We present the number of indicators that the country has measured in each of our classifications; indicators available based on the logical framework; STI main subjects; and the actor category (Table 49). Zambia has about 159 indicators available in this classification outlining its good performance compared to its African counterparts.

Table 49: Number of indicators in Zambia measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Number of indicators available for Zambia	Number of indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	Enabler	105	128
	Impact	30	33
	Input	12	67
	Linkages	4	14
	Output	8	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	20	32
	Expenditure on STI	6	10
	Financial system	8	8
	Governance and institutional development	25	25
	Human and sustainable development	28	32
	ICT readiness	10	10
	Infrastructure	5	6
	Innovation activities	9	11
	Innovation outputs	10	23
	Job and product market	24	26
	Knowledge flows	5	15
	Research activities	1	29
	Science and technology outputs	8	9
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	21	33
	Financial organisations and venture capitalists	11	11
	Firms in the formal sector	20	50
	Multiple actors	11	29
	Science, technology, and R&D organisations and personnel	3	34
	State Institutions	72	84
	Users / consumers	8	8

18.1 Key indicator performance

This performance is reflected and confirmed by availability of 159 indicators out of the possible collected 263 indicators African STI indicators. Fifty-six (56) of these indicators were collected in 2017 while 50 collected in 2019. Table 50 presents the country's top 5 indicators in terms of performance ranked the first among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Zambia.

Table 50: Top 5 STI indicators (performance)

Indicator category	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enablers	(M) Time to resolve insolvency (years) (Modified - Inverse value)	WDI 2020	2019	1	Financial organisations and venture capitalists	Financial system
	Foreign direct investment, net outflows (% of GDP)	WDI 2020	2019	1	Financial organisations and venture capitalists	Innovation outputs
	Proportion of youth and adults with information and communications technology (ICT) skills, by sex and type of skill (%)	UN-SDGs	2018	1	Education and training organisations	Education and training
	Prevalence of foreign ownership - 1-7 Best	GCI 2007 - 2019	2017	3	State Institutions	Governance and institutional development
	Gross capital formation (% of GDP)	WDI 2020	2019	4	Multiple actors	Governance and institutional development

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 51 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 51: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	21
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	27
	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	24
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	18
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	18
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	16
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	38
	Red List Index	UN-SDGs	34
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	45
	Agriculture, forestry, and fishing, value added (% of GDP)	WDI 2020	46

18.2 Country core indicators comparability

We show the radar plot in Figure 52 which shows the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. Zambia on average ranks performs well in linkages indicators compared to upper middle-income countries and poorly in all other indicator categories in relation to other countries. The radar is based on a normalisation of rankings where the best ranking was given a score of 100.

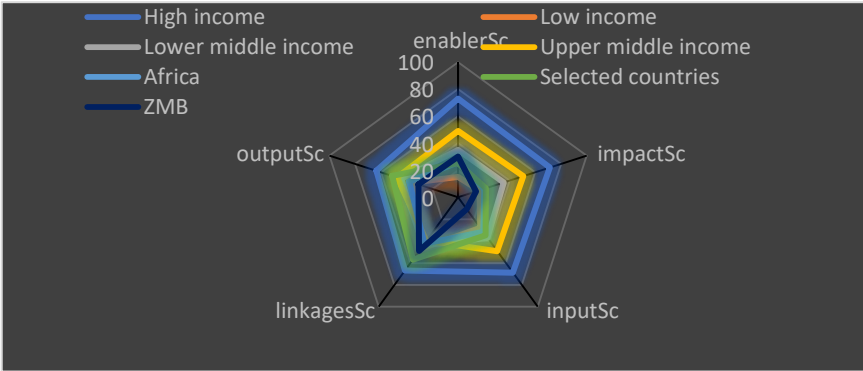


Figure 52: Strength of Zambia compared to the rest of the World

In terms of various cluster groups, Figure 53 shows that Zambia is in the same cluster group with countries such as Zimbabwe, Djibouti, Eritrea and Niger. Cluster groups show countries that perform like Zambia in inputs, impacts, linkages, outputs, and enablers. Countries in dark green are closer to Zambia’s performance than countries in light green.

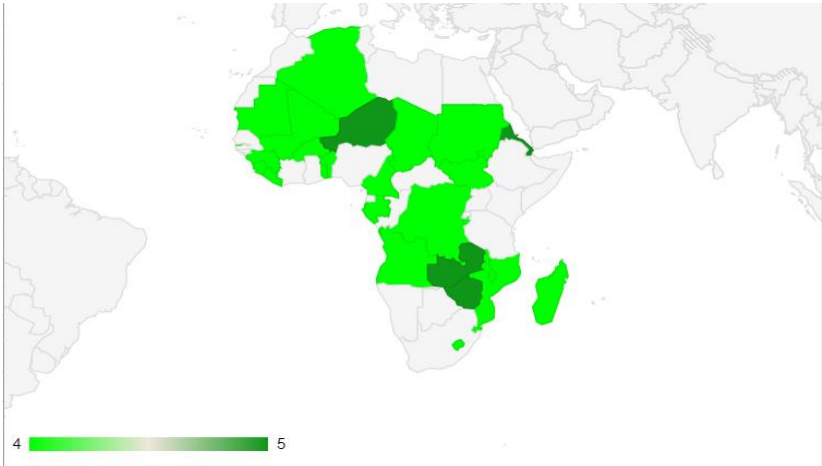


Figure 53: Cluster map of Zambia

18.3 Significant gaps or weaknesses in the completeness of the data available.

The higher the percentage, the poorer the country performs in terms of the indicator category in terms of missing data. Figure 54 demonstrates that Zambia performs poorly in terms of input indicators which have lots of missing data and thus worse in completeness.

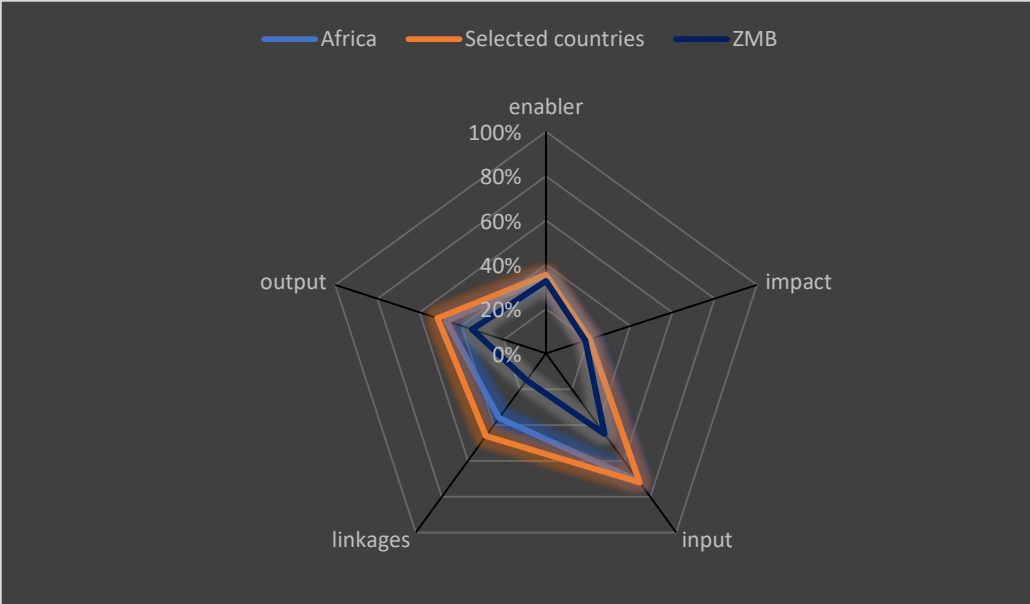


Figure 54: Comparison of missing data in the number of indicators in Nigeria compared to selected countries and rest of the World

19 ZIMBABWE

We present the number of indicators that the country has measured in each of our classifications that includes the following; logical framework; STI main subjects; and the actor category (Table 52). Zimbabwe has 165 indicators which is over 63% of the indicators available in this classification outlining good coverage of the indicators compared to its African counterparts.

Table 52: Number of indicators in Zimbabwe measured in the logical framework

LOGICAL FRAMEWORK COMPONENT		Count indicators in Zimbabwe	Count indicators in the STI scoreboard
LOGICAL FRAMEWORK COMPONENT	enabler	108	128
	impact	31	33
	input	14	67
	linkages	4	14
	output	8	21
STI ACTIVITIES MAIN SUBJECTS	Education and training	28	32
	Expenditure on STA	6	10
	Financial system	6	8
	Governance and institutional development	24	25
	Human and sustainable development	29	32
	readiness	9	10
	Infrastructure	5	6
	Innovation activities	8	11
	Innovation outputs	10	23
	Job and product market	23	26
	Knowledge flows	5	15
	Research activities	3	29
Science and technology outputs	9	9	
ACTORS	Brokers and suppliers	13	13
	Education and training organisations	29	33
	Financial organisations and venture capitalists	8	11
	Firms in the formal sector	20	50
	Multiple actors	11	29
	Science, technology, and R&D organisations and personnel	5	34
	State Institutions	72	84
	Users / consumers	7	8

19.1 Key indicator performance

Performance is reflected and confirmed by availability of 165 indicators out of the possible collected 263 indicators African STI indicators. Most of these indicators (n=53) were available in 2017. Table 53 presents the country's top 5 indicators in terms of performance ranked number one among the 54 African countries. While there were more than 5, we have selected 5 best that are desirable for STI ecosystem in Zimbabwe.

Table 53: Top 5 STI indicators (performance)

	Indicator name	Source/origin	Latest year	Ranking	Actors	STI activities main subjects
Enabler	Labor force with advanced education, female (% of female working-age population with advanced education)	WDI 2020	2014	2	Education and training organisations	Education and training
	Benefit incidence of social safety net programs to poorest quintile (% of total safety net benefits)	WDI 2020	2019	3	State Institutions	Human and sustainable development
	Energy intensity level of primary energy (megajoules per constant 2011 purchasing power parity GDP)	UN-SDGs	2017	4	State Institutions	Human and sustainable development
Impact	Labor force participation rate, total (% of total population ages 15+) (modelled ILO estimate)	WDI 2020	2019	4	Firms in the formal sector	Job and product market
	Employment to population ratio, 15+, total (%) (modelled ILO estimate)	WDI 2020	2019	4	Brokers and suppliers	Job and product market

At the country level, we provide rely on completeness and timeliness of the indicator to assess quality of the indicator. These indicators presented in Table 54 have the best completeness and timeliness. In other words, they have been collected and have data available in the 10-year period and data is available until 2019.

Table 54: Quality of the indicators available based on completeness and timeliness

Logical framework	Indicator name	Source/origin	Ranking (performance)
Enabler	Burden of government regulation, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	41
	Efficiency of legal framework in settling disputes, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	30

	Extent of staff training, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	14
	Organized crime, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	10
	Prevalence of trade barriers, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	20
	Soundness of banks, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	35
	Venture capital availability, 1-7 (best) - 1-7 Best	GCI 2007 - 2019	31
	Red List Index	UN-SDGs	47
	Cost of business start-up procedures (% of GNI per capita)	WDI 2020	48
Impact	Annual growth rate of real GDP per employed person (%)	UN-SDGs	52

19.2 Country core indicators that are comparable (regionally and international).

We show the radar plot in Figure 55 that outlines the strength of the country compared to the mean values of high-income countries, upper middle-income countries, middle income countries, and lower income countries, as well as Africa and the selected countries. According to our logical framework, Zimbabwe performs better in impact indicator although the mean average is lower in comparison to rest of the world.

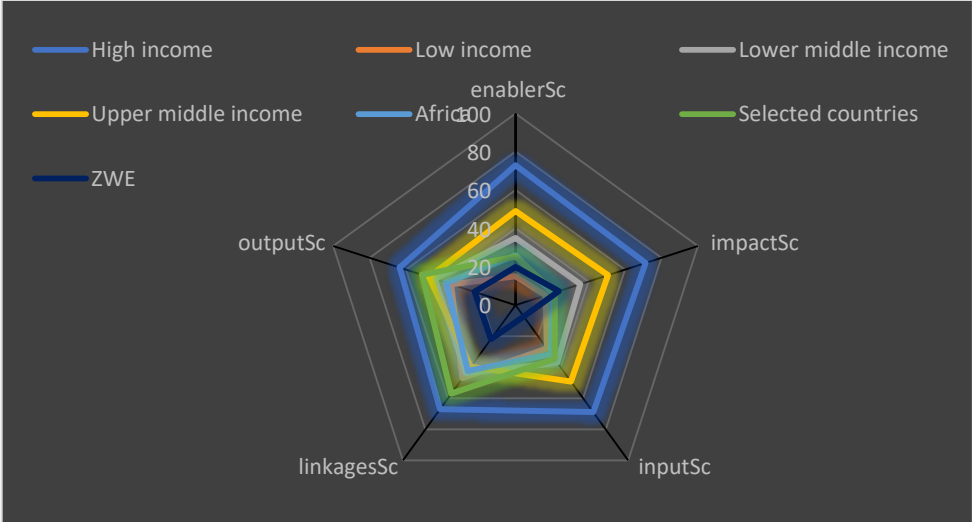


Figure 55: Strength of Zimbabwe compared to the rest of the World

In terms of various cluster groups, Figure 56 shows that Zimbabwe is in the same cluster group with countries such as Zambia, Djibouti, Eritrea and Niger.

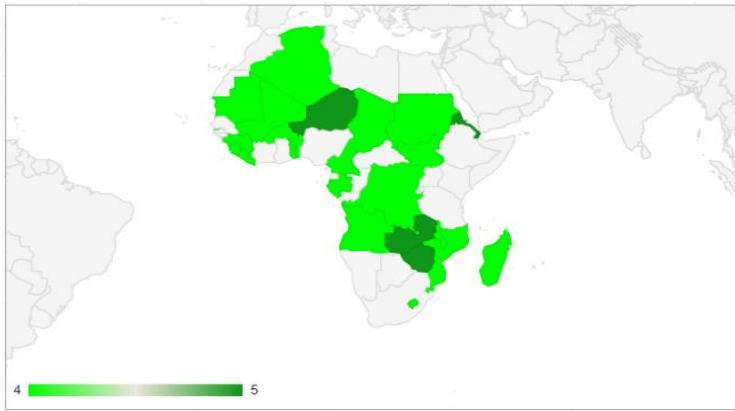


Figure 56: Cluster map of Zimbabwe

19.3 Significant gaps or weaknesses in the completeness of the data available.

Despite the information around availability of the various indicators, there is still missing data in the 10-year period that is worrying. While on average there is 60% data missing for African scoreboard, we find that missing data is different in each of the various indicators. Figure 57 outlines that Zimbabwe performs poorly in input indicators and thus worse in completeness although this is lower compared to other selected countries in Africa.

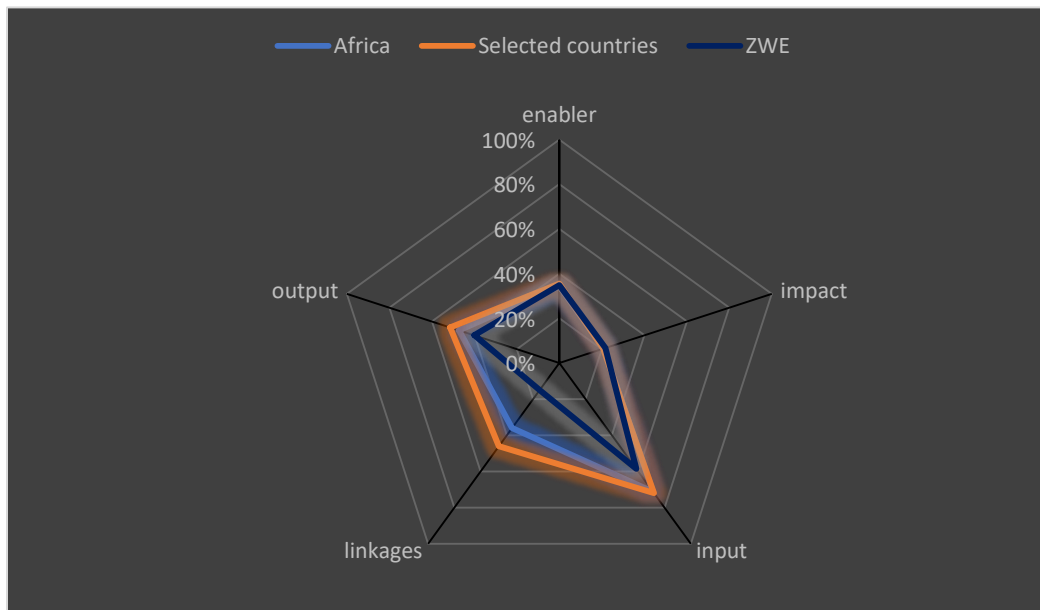


Figure 57: Comparison of missing data in the number of indicators in Zimbabwe compared to selected countries and rest of the World

