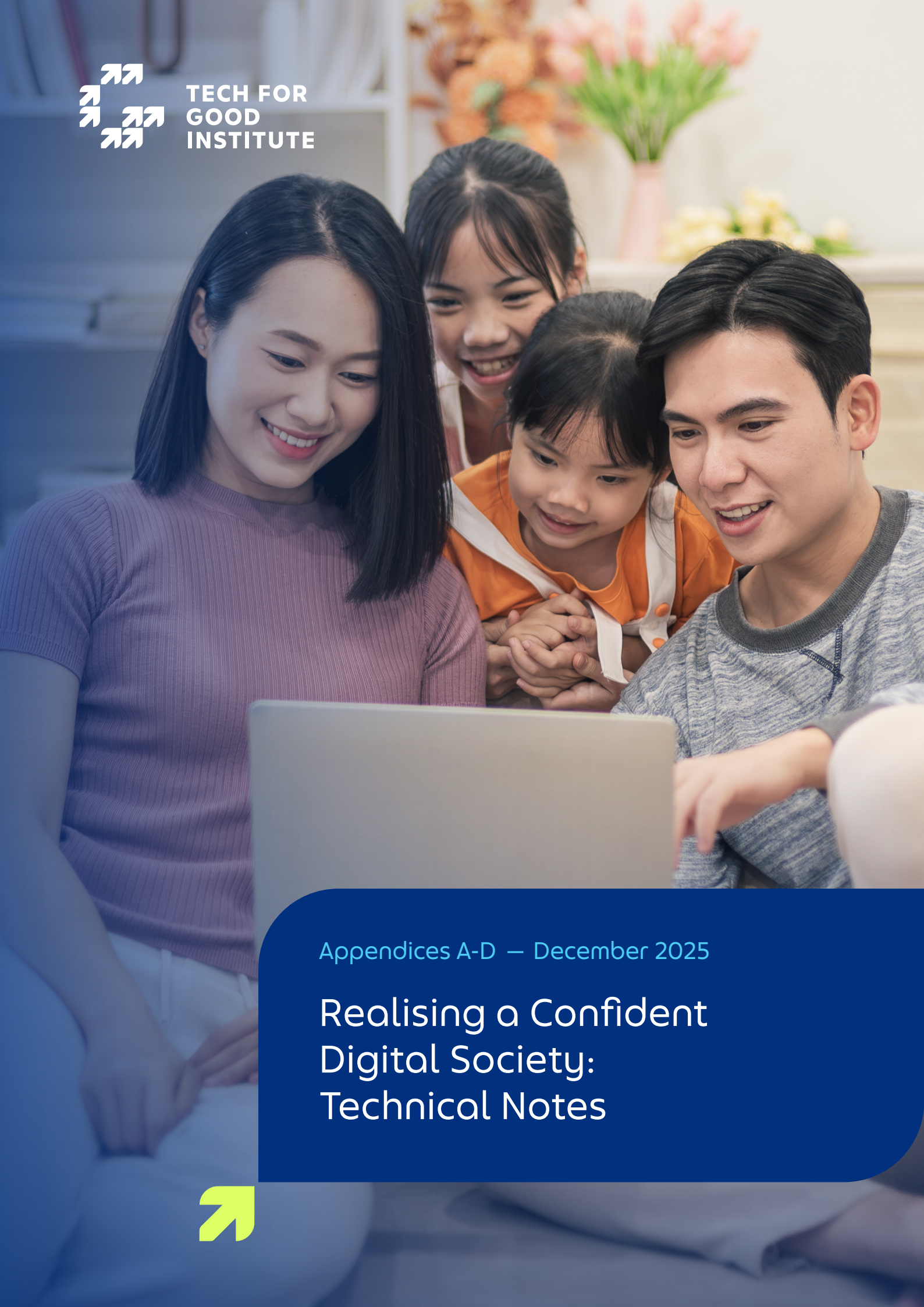




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Appendices A-D — December 2025

Realising a Confident Digital Society: Technical Notes



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About The Technical Notes

This *Technical Notes* document is meant to accompany the main report, *Realising a Confident Digital Society*, and provide additional detail to support and contextualise its findings.

This contains a series of appendices that elaborate on the analytical foundations of the report. While Appendix A is published in the main report, the remaining appendices are presented here to offer further explanation of the indicators used, the methodological choices made, and the sources that underpin the Confident Digital Society Index. They also provide greater transparency around methodological decisions, including aggregation approaches and limitations, which may not be fully detailed in the main report due to space constraints.

The purpose of this supplementary document is twofold. First, it is intended to enhance understanding of the index by providing readers with deeper technical and methodological context. Second, it reflects a commitment to transparency and explicability in the construction of the Confident Digital Society Index, recognising the importance of clear documentation in supporting credibility, comparability, and informed use of the findings.

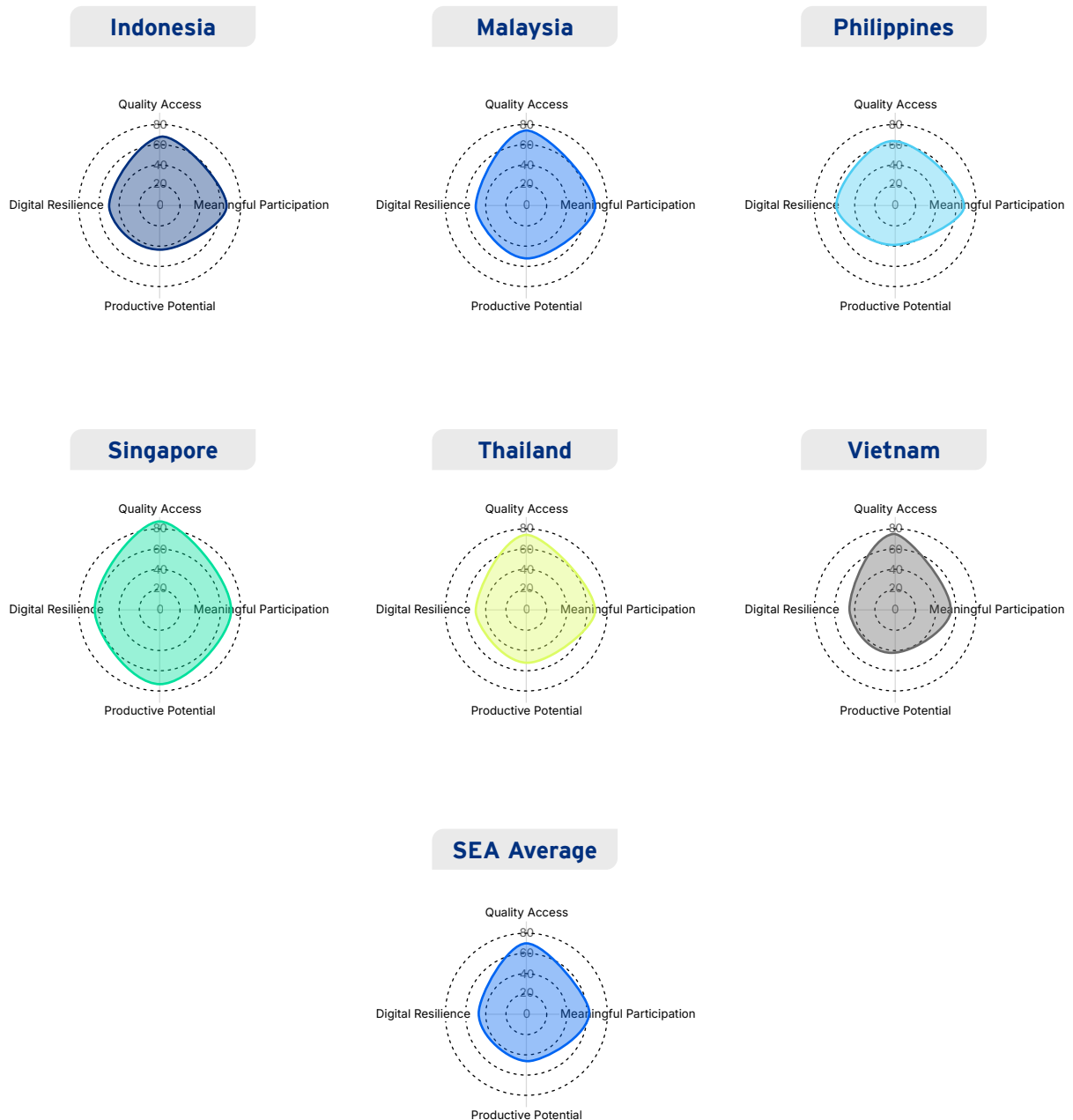
We welcome feedback, additional data sources, and methodological suggestions that could strengthen future iterations of the index. Comments and contributions from researchers, policymakers, and practitioners will be valuable in refining the indicators and improving the robustness and relevance of subsequent versions. Readers may send their comments to info@techforgoodinstitute.org.



Appendix A. SEA-6 Country Profiles

The Southeast Asian nations are diverse in their strengths and opportunities for growth. This chapter details individual country performance, broken down by pillar, and includes the highlights of their digital society development.

■ Indonesia
 ■ Malaysia
 ■ Philippines
 ■ Singapore
 ■ Thailand
 ■ Vietnam
 ■ SEA Average



The table below provides an overview of each SEA-6 country's scores by dimension, pillar and sub-pillar. Full country profiles are published in the main report.

Figure 1. Overview of Country Performance by Dimension, Pillar and Sub-Pillar

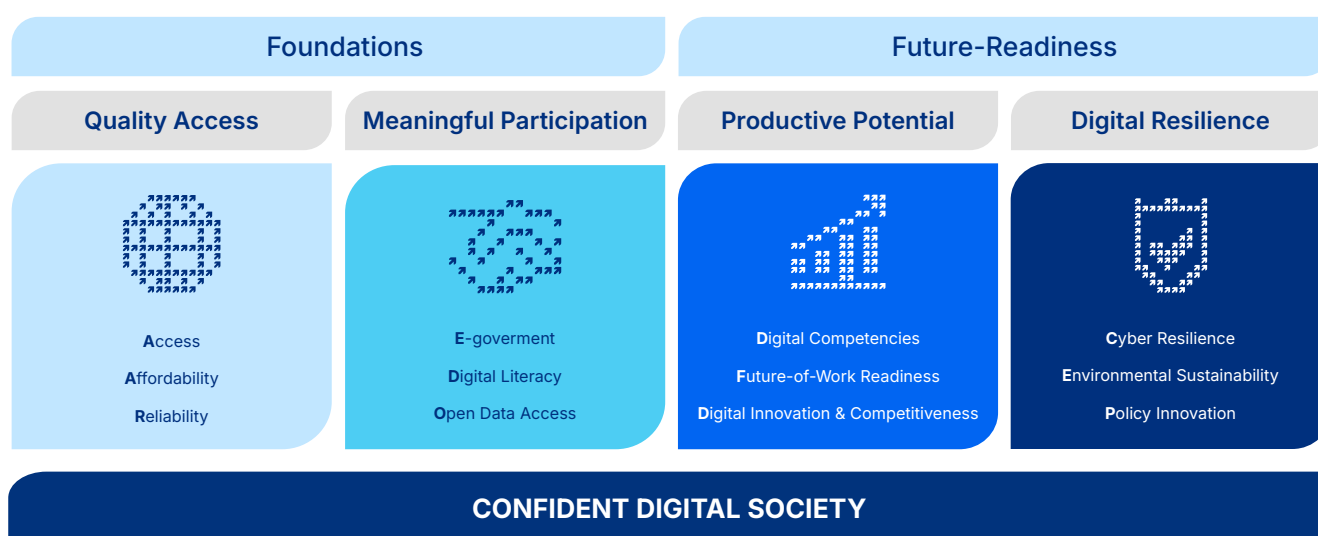
Country	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Foundations	67.0	70.9	66.6	78.5	70.5	66.0
Quality Access	67.9	74.3	62.9	86.6	73.1	74.7
Access	67.1	78.9	68.9	85.0	75.9	74.0
Affordability	87.9	81.5	67.9	99.2	77.3	82.5
Reliability	48.7	62.4	51.8	75.7	66.0	67.5
Meaningful Participation	66.1	67.6	70.4	70.4	67.8	57.2
E-Government	77.7	79.2	68.9	74.7	73.4	61.9
Digital Literacy	60.7	66.7	62.7	67.8	59.8	55.0
Open Data Access	59.8	56.9	79.6	68.8	70.3	54.9
Future-Readiness	48.0	50.5	47.5	69.7	48.6	43.9
Productive Potential	44.7	52.2	39.4	74.8	45.4	44.1
Digital Competencies	41.8	52.7	27.6	72.4	35.1	37.6
Future-of-Work Readiness	54.0	55.7	53.6	68.2	63.2	53.9
Digital Innovation and Competitiveness	38.2	48.1	36.9	83.9	38.1	40.8
Digital Resilience	51.4	48.8	55.6	64.7	51.8	43.7
Cyber Resilience	50.8	47.5	61.7	64.9	54.3	40.1
Environmental Sustainability	41.6	29.9	33.2	41.0	37.2	38.3
Policy Innovation	61.9	69.0	71.8	88.1	64.0	52.6

Appendix B. List of Indicators

The Confident Digital Society index is a composite index constructed in three levels — sub-pillar, pillar and dimension — to reflect the different elements of sustainable digital society development. The framework levels were formulated through stakeholder consultations to articulate the initial pillars; review of related indices to gauge coverage of key dimensions; and workshops with industry experts, government and the academe to stress-test the proposed conceptual framework and illustrative indicators.

The figure below shows an overview of the conceptual framework:

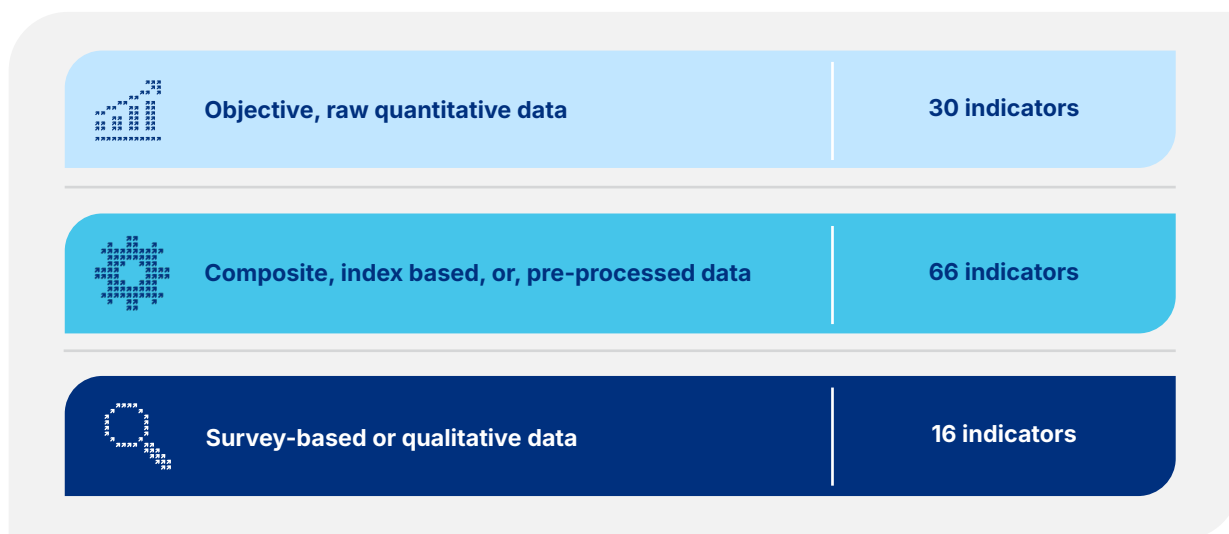
Figure 1. The Confident Digital Society Framework



Source: Tech for Good Institute, 2025

Broadly, indicators were selected based on: (a) **relevance** to the definitions and comprising dimensions of each pillar, and (b) **data availability** through publicly accessible data sources with extensive country coverage, particularly for SEA-6 economies, and supplemented by private data sources to proxy for dimensions that are not widely measured. On (b), sources are prioritised based on their use in other widely recognised and reputable indices, which demonstrates that these are indicators commonly held to be representative of certain aspects of digital society. Where possible, indicators are each obtained from the same source and year to ensure the same data collection methods were used and that results are comparable.

The Confident Digital Society Index utilises **112 indicators** in total, which fall into the following categories:



The following sub-sections provide an overview of the indicators selected per sub-pillar, including unit of measure, year that data was collected, and source of data.

B.1 Quality Access

Access

Code	Indicator	Unit of Measure	Year	Data Source
A.1.1	Population using the internet	% of population	2023 ¹ , 24/25 ¹	ITU ICT Indicators Database
A.1.2	Percentage of households with access to internet	% of households	2023 ¹ , 24/25 ²	ITU ICT Indicators Database
A.1.3	Active mobile broadband subscriptions	Ratio per 100 inhabitants	2024 ¹ , 23 ³	ITU ICT Indicators Database
A.1.4	Fixed broadband subscriptions	per 100 inhabitants	2024 ¹ , 23 ⁴	ITU ICT Indicators Database
A.1.5	Individuals owning a mobile phone	% of population	2024	Global Findex Database
A.1.6	Gender gap in mobile ownership	Score out of 100	2024	GSMA Mobile Connectivity Index
A.1.7	Gender gap in mobile internet	Score out of 100	2024	GSMA Mobile Connectivity Index
A.1.8	Net freedom: obstacles to access	Score out of 25	2024	Freedom House - Freedom on the Net 2024

Affordability

Code	Indicator	Unit of Measure	Year	Data Source
A.2.1	Device affordability	Score out of 100	2024	GSMA Mobile Connectivity Index
A.2.2	Device affordability for poorest 40%	Score out of 100	2024	GSMA Mobile Connectivity Index
A.2.3	Fixed broadband internet basket price	% of GNI per capita	2024	ITU ICT Indicators Database
A.2.4	High usage bundle	% of GNI per capita	2024	ITU ICT Indicators Database
A.2.5	Low usage bundle	% of GNI per capita	2024	ITU ICT Indicators Database
A.2.6	Affordability of entry basket (1GB)	Score out of 100	2024	GSMA Mobile Connectivity Index
A.2.7	Affordability of entry basket (1GB) for poorest 40%	Score out of 100	2024	GSMA Mobile Connectivity Index

Reliability

Code	Indicator	Unit of Measure	Year	Data Source
A.3.1	Satisfaction with coverage	% of respondents	2025	Statista Consumer Insights
A.3.2	Spectrum assigned in bands below 1GHz	Score out of 100	2024	GSMA Mobile Connectivity Index
A.3.3	Fixed broadband download speed	Average speed mbps	2025	Ookla SpeedTest Global Index
A.3.4	Fixed broadband latency	Average latency ms	2025	Ookla SpeedTest Global Index
A.3.5	Fixed broadband upload speed	Upload speed mbps	2025	Ookla SpeedTest Global Index
A.3.6	Mobile download speed	Average speed mbps	2025	Ookla SpeedTest Global Index
A.3.7	Mobile latency	Average latency ms	2025	Ookla SpeedTest Global Index
A.3.8	Mobile upload speed	Average upload speed mbps	2025	Ookla SpeedTest Global Index
A.3.9	4G video experience	Score out of 100	2024*, 25 ⁵	OpenSignal Mobile Network Experience
A.3.10	4G games experience	Score out of 100	2024*, 25 ⁶	OpenSignal Mobile Network Experience
A.3.11	Reliability experience	Scale, 100-1000, where 1000=best	2024*, 25 ⁷	OpenSignal Mobile Network Experience
A.3.12	4G download speed	Mbps	2025	OpenSignal Global Network Excellence Index
A.3.13	Excellent consistent quality	% of tests	2025	OpenSignal Global Network Excellence Index

B.2 Meaningful Participation

E-Government

Code	Indicator	Unit of Measure	Year	Data Source
B.1.1	Digital ID with fully enabled remote authentication	Availability	2022	GovTech Maturity Index
B.1.2	Core Government Systems Index	Score, 0-1, where 1 = perfect	2022	GovTech Maturity Index
B.1.3	Public Service Delivery Index	Score, 0-1, where 1 = perfect	2022	GovTech Maturity Index
B.1.4	Digitised national ID records	Availability	2022	GovTech Maturity Index
B.1.5	E-participation index	Score, 0-1, where 1 = perfect	2024	UN E-government Knowledgebase
B.1.6	GovTech / Digital Transformation strategy	Score, 0-9, where 9 is the best	2022	GovTech Maturity Index
B.1.7	Public sector innovation strategy	Score, 0-12, where 9 is the best	2022	GovTech Maturity Index

Digital Literacy

Code	Indicator	Unit of Measure	Year	Data Source
B.2.1	Safe participation in digital platforms	Score, 0-1, where 1 = perfect	2024	Global Cybersecurity Index
B.2.2	Net freedom: violations of user rights	Score out of 40	2024	Freedom House - Freedom on the Net 2024
B.2.3	Net freedom: limits on content	Score out of 35	2024	Freedom House - Freedom on the Net 2024
B.2.4	Press freedom index: overall score	Score out of 100	2024	Reporters without Borders
B.2.5	Freedom of expression and alternative sources of information index	Score, 0-1, where 1 = perfect	2023	V-Dem Core
B.2.6	Human capital index (HCI)	Score, 0-1, where 1 = perfect	2020	World Bank
B.2.7	Confidence in using technology	% of respondents	Q3 2024 - Q2 2025	GWI Core
B.2.8	Trust in the internet	% of respondents	Q3 2024 - Q2 2025	GWI Core
B.2.9	Use of non-financial digital platforms	% of respondents	Q3 2024 - Q2 2025	GWI Core
B.2.10	Use of digital financial services	% of respondents	2024	Global Findex Database
B.2.11	Digital language support	Score out of 100	2024	GSMA Mobile Connectivity Index
B.2.12	Mobile social media penetration	Score out of 100	2024	GSMA Mobile Connectivity Index

Open Data Access

Code	Indicator	Unit of Measure	Year	Data Source
B.3.1	Strategic enablers for open data access	Score out of 100	2024	Digital Trade and Data Governance Hub
B.3.2	Regulatory enablers for open data access	Score out of 100	2024	Digital Trade and Data Governance Hub
B.3.3	Structural enablers for open data access	Score out of 100	2024	Digital Trade and Data Governance Hub
B.3.4	International enablers for open data access	Score out of 100	2024	Digital Trade and Data Governance Hub
B.3.5	Diversity of data products for publicly available data	Score out of 100	2023	Statistical Performance Indicators
B.3.6	Diversity of sources for publicly available data	Score out of 100	2023	Statistical Performance Indicators
B.3.7	Right to Information (RTI) laws	Score, 0-6, where 6 is the best	2022	GovTech Maturity Index
B.3.8	Open Data Inventory (ODIN) open data openness	Score, 0-1, where 1 = perfect	2023	Open Data Inventory
B.3.9	Cross-border data policy index	Score, 1-4, where 1 is the best	2023	Global Data Alliance

B.3 Productive Potential

Digital Competencies

Code	Indicator	Unit of Measure	Year	Data Source
C.1.1	ICT skills in the education system	Score out of 100	2024	Network Readiness Index
C.1.2	Individual ICT skills: Communication and collaboration - sending e-mails with attached files	% of population	2023*, 17/19/20/21/22 ⁸	ITU ICT Indicators Database
C.1.3	Individual ICT skills: Digital content creation - creating electronic presentations with presentation software	% of population	2023*, 17/19/20 ⁹	ITU ICT Indicators Database
C.1.4	Individual ICT skills: Problem solving - Finding, downloading, installing and configuring software	% of population	2023*, 17/19/20 ¹⁰	ITU ICT Indicators Database
C.1.5	Github commits	Score out of 100	2024	Network Readiness Index
C.1.6	Training for cybersecurity professionals	Score, 0-1, where 1 = perfect	2024	Global Cybersecurity Index
C.1.7	Educational programs or academic curricula in cybersecurity	Score, 0-1, where 1 = perfect	2024	Global Cybersecurity Index
C.1.8	Proportion of youth and adults who have written a computer program using a specialised programming language	% of respondents	2021*, 17/19/20 ¹¹	UNESCO Education Statistics
C.1.9	Researchers in R&D	Ratio per million people	2022*, 17/18/19/20 ¹²	World Development Indicators

Future-of-Work Readiness

Code	Indicator	Unit of Measure	Year	Data Source
C.2.1	Optimism for emerging technologies	% of respondents	Q3 2024 - Q2 2025	GWI Core
C.2.2	Frontier technology readiness - R&D activity	Score, 0-1, where 1 = perfect	2023	UNCTAD Frontier Technology Readiness Index
C.2.3	Frontier technology readiness - Access to finance	Score, 0-1, where 1 = perfect	2023	UNCTAD Frontier Technology Readiness Index
C.2.4	AI readiness - vision	Score out of 100	2024	Oxford AI Readiness Index
C.2.5	Graduates from STEM programmes in tertiary education	% of graduates	2023*, 22/21/18/16 ¹³	UNESCO Education Statistics
C.2.6	Research talent	% of talent in business	2024	Global Innovation Index
C.2.7	Social protection effective coverage	% of population	2023	ILO World Social Protection Data Dashboard
C.2.8	Flexible working arrangements	Score, 1-7, where 7 is the best	2024	WEF Travel & Tourism Development Index
C.2.9	Use of digital platform for providing hotels, restaurants and leisure activities services	Score, 1-7, where 7 is the best	2024	WEF Travel & Tourism Development Index

Digital Innovation and Competitiveness

Code	Indicator	Unit of Measure	Year	Data Source
C.3.1	Frontier technology readiness - Industry activity	Score, 0-1, where 1 = perfect	2023	UNCTAD Frontier Technology Readiness Index
C.3.2	Investment in advanced compute, storage and infrastructure	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
C.3.3	Industry digital transformation spending	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
C.3.4	Locally developed apps per person	Score out of 100	2024	GSMA Mobile Connectivity Index
C.3.5	Top-level domains (TLDs)	Score out of 100	2024	GSMA Mobile Connectivity Index
C.3.6	Number of startups	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
C.3.7	Operational stability for businesses	Score out of 100	2025	Global Innovation Index
C.3.8	Investment environment	Score out of 100	2025	Global Innovation Index
C.3.9	Business environment	Score out of 100	2025	Global Innovation Index
C.3.10	Regulatory environment	Score out of 100	2025	Global Innovation Index
C.3.11	Innovation linkages	Score out of 100	2025	Global Innovation Index

B.4 Digital Resilience

Cyber Resilience

Code	Indicator	Unit of Measure	Year	Data Source
D.1.1	Cybersecurity policy	Score out of 100	2023	National Cybersecurity Index
D.1.2	Cyber threat analysis and awareness raising	Score out of 100	2023	National Cybersecurity Index
D.1.3	Cyber incident response	Score out of 100	2023	National Cybersecurity Index
D.1.4	Cyber crisis management	Score out of 100	2024 [*] /23/21 ¹⁴	National Cybersecurity Index
D.1.5	Fight against cybercrime	Score out of 100	2024 [*] /23/21	National Cybersecurity Index
D.1.6	Secure Internet servers	Per million people	2023	World Development Indicators
D.1.7	Confidence in recognising scams	% of respondents	2024	GASA Global State of Scams Report
D.1.8	Response to scams/scam attempts	% of respondents	2024	GASA Global State of Scams Report
D.1.9	Reported scam attempts	% of respondents	2024	GASA Global State of Scams Report
D.1.10	Reported financial losses to scams and fraud	USD value	2024	GASA Global State of Scams Report
D.1.11	Organised crime	Scale, 1-10, where 10 is the worst	2024	Global Organized Crime Index

Environmental Sustainability

Code	Indicator	Unit of Measure	Year	Data Source
D.2.1	E-waste legislation	Score out of 100	2022	Global E-Waste Statistics Partnership
D.2.2	Climate driven INFORM risk indicator	Scale, 0-10, where 10 is the highest risk	2022	IMF Climate Change Dashboard
D.2.3	Leveling the playing field for renewables	Score out of 100	2023	Regulatory Indicators for Sustainable Energy
D.2.4	Renewable energy governance	Score out of 100	2023	Regulatory Indicators for Sustainable Energy
D.2.5	Total greenhouse gas emissions per capita excluding land-use change and forestry	Tonnes of CO2 per person	2023	Our World in Data
D.2.6	Renewable electricity investment	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
D.2.7	Renewable electricity utilization rate	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
D.2.8	Green energy policy	Scale, 1-10, where 10 is the best	2024	Huawei Global Digitalization Index
D.2.9	Ecological sustainability	Score out of 100	2025	Global Innovation Index

Policy Innovation

Code	Indicator	Unit of Measure	Year	Data Source
D.3.1	Government effectiveness	Score, -2.5 to 2.5, where 2.5 = best	2023	Worldwide Governance Indicators
D.3.2	ICT regulatory regime	Score out of 30	2022	ITU ICT Regulatory Tracker
D.3.3	ICT policy design principles (G5 benchmark)	Score out of 20	2023	ITU ICT Regulatory Tracker
D.3.4	ICT digital development toolbox (G5 benchmark)	Score out of 32	2023	ITU ICT Regulatory Tracker
D.3.5	ICT digital economy policy agenda (G5 benchmark)	Score out of 24	2023	ITU ICT Regulatory Tracker
D.3.6	Policy coordination	Scale, 1-10, where 10 is the best	2024	Bertelsmann Transformation Index

Appendix C. Methodology

This section discusses the overall methodology of the study, including notes on country and data coverage, treatment of missing values and outliers, normalisation, weighting and aggregation, and sensitivity analysis applied.

C.1 Data Coverage and Treatment of Missing Data

The report focuses on the Southeast Asia-6 (SEA-6) countries, namely Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam, for the primary analysis. The report also includes Brunei, Cambodia and Laos to contextualise the overall regional performance. Indicators are included based on whether there is data available for at least all the SEA-6 countries. For each sub-pillar, indicators come from at least two different data sources to ensure a holistic and unbiased assessment of performance.

Generally, data for each indicator is collected from the same year, within the period of 2020 to 2025. In the case where data for the same year is not available but there is data for the preceding and/or succeeding years, replacement with the most recent data is applied, prioritising the next observed value carried backward (NOCB), followed by the last observed value carried forward (LOCF).¹⁵

Given that modelling using data from other sources or through substituting using the performance of other countries limits comparability, no further imputation is applied. In cases where imputing using another data source was considered, such as for Brunei, Cambodia and Laos, the concerned countries tend not to be covered in other feasible datasets. Part of the challenge of collecting indicators for recently developed measures on digitalisation is the lack of coverage for SEA nations.

For computation purposes, a sub-pillar must have a data availability rate of at least 50% to generate a meaningful score.¹⁶ Missing values are excluded from calculation as long as the minimum data availability threshold at the sub-pillar level is met. While Brunei, Cambodia and Laos did not meet this condition for certain sub-pillars, scores were still generated to provide an indicative performance level, though these results should be interpreted with caution.

C.2 Treatment of Outliers

Following data collection and treatment for missing values, certain indicators were treated to reduce bias in the results and avoid an implosion to zero due to extreme observations. The percentile method for winsorisation is applied, trimming the values of not more than six outliers and assigning them the value of the next highest value.¹⁷

Indicators shortlisted for treatment are generally classified as raw, quantitative measures with no explicit minimum or maximum values, and where a full dataset of at least 30 countries in the specified time period is available. As a rule of thumb, the threshold for identifying and subsequently treating outliers is when they exhibit a skewness greater than 2.0 or kurtosis greater than 3.5.¹⁸

Out of 16 indicators classified as raw, quantitative measures, 9 were trimmed for outliers. The rest remained untreated for one of the following reasons: (a) lacked a full dataset, (b) did not meet the threshold for skewness or kurtosis, or (c) exhibited variation too significant for outlier removal. The following table lists the treated indicators:

Code	Indicator	Percentile Cut-Off
A.2.3	Fixed broadband internet basket price	99th
A.2.4	High usage bundle	98th
A.2.5	Low usage bundle	99th
A.3.4	Fixed broadband latency	95th
A.3.5	Fixed broadband upload speed	99th
A.3.6	Mobile download speed	97th
A.3.8	Mobile upload speed	99th
D.1.6	Secure Internet servers (per 1 million people)	86th
D.2.5	Total greenhouse gas emissions per capita, excluding land-use change and forestry	99th

C.3 Normalisation

As the Confident Digital Society Index is a composite indicator that pulls from multiple data sources, selected indicators have differing units of measure and may vary in interpretation. Given this, a normalisation approach is needed to ensure data is comparable across various sources. The indicators used in this report can be grouped into the following types of measures:

- Scored from 0 to 100, where a higher score indicates a better or more positive outcome
- Scored from 0 to 100, where a higher score indicates a worse or more negative outcome
- Scored on a scale that is not 0 to 100 (e.g., 1 to 7), where a higher score indicates a better or more positive outcome
- Scored on a scale that is not 0 to 100 (e.g., 1 to 7), where a higher score indicates a worse or more negative outcome
- Availability or binary logic, where 0 indicates it is not available and 1 indicates it is available, and where 1 is considered a positive result
- Raw quantitative figure (e.g., % of population), where the figure is not benchmarked, measured relative to another figure, and/or without an explicit minimum or maximum value

For indicators **scored from 0 to 100, where a higher score indicates a better outcome**, there is no need for normalisation as this will be used as the prevailing format across illustrative indicators.

The figure below lists the different types of measures, and if applicable, their corresponding preparation and normalisation approaches:

Type of Measure	Pre-Normalisation Preparation	Normalisation Approach ¹⁹	Formula, ²⁰ where input X denotes the original value, input X_{max} denotes the maximum value for X , input X_{min} denotes the minimum value for X , and output \bar{x} denotes the normalised indicator value
Score, 0-100, where higher means positive outcomes	N/A	None	$\bar{x} = x$
Score, 0-100, where higher means negative outcomes	N/A	Reverse min-max transformation	$\bar{x} = \frac{X_{max} - X}{X_{max} - X_{min}} \times 100$
Score or scale, not 0-100, where higher means positive outcomes	N/A	Linear min-max transformation	$\bar{x} = \frac{X - X_{min}}{X_{max} - X_{min}} \times 100$
Score or scale, not 0-100, where higher means negative outcomes	N/A	Reverse min-max transformation	$\bar{x} = \frac{X_{max} - X}{X_{max} - X_{min}} \times 100$
Raw quantitative figure, with no explicit min-max value, where higher means positive outcomes	Ranked largest to smallest, take the minimum and maximum values post-winsorisation out of full dataset	Linear min-max transformation	$\bar{x} = \frac{X - X_{min}}{X_{max} - X_{min}} \times 100$
Raw quantitative figure, with no explicit min-max value, where higher means negative outcomes	Ranked largest to smallest, take the minimum and maximum values post-winsorisation out of full dataset	Reverse min-max transformation	$\bar{x} = \frac{X_{max} - X}{X_{max} - X_{min}} \times 100$
Binary, 0 or 1, where 1 is a positive result	N/A	Categorical transformation	$\bar{x} = 0$ if $x = 0$ $\bar{x} = 100$ if $x = 1$

C.4 Weighing and Aggregation

The Confident Digital Society index utilises successive aggregations via a simple average. This comprises an unweighted arithmetic mean aggregating (i) individual indicators within each sub-pillar, (ii) sub-pillars within each pillar, (iii) the pillars comprising each dimension, and lastly, (iv) the overall index. This method of aggregation hinges on the basis that the defined pillars and sub-pillars are equally important and are interlinked in the broader objective of improving society's confidence in the use of, participation in and co-creation with digital technologies.

Regarding the weighting of individual indicators within each sub-pillar, both statistical "objective" and participatory methods were considered.

Statistical methods



Statistical methods were not employed in the construction of this index. Rather, the indicators went through a normalisation method that standardised all raw data to have the same variance. While some indicators may exhibit a high degree of correlation, many lack sufficient longitudinal data to run a meaningful statistical analysis on the relationships between them. Applying such methods to the current dataset may bias weights toward indicators with higher data availability, which may undervalue forward-looking indicators that are important for assessing society's future-readiness but remain in the early stages of measurement.²¹

Participatory methods



Participatory methods, such as budget allocation, may be more appropriate as experts may be better able to assess how the importance of certain indicators and policy areas change over time. However, as a rule of thumb established by the OECD, participatory methods of establishing weights are best used on smaller groups of indicators (e.g., 10 to 12), as having to assign weights across larger sets of indicators is likely to cause cognitive stress and may result in arbitrary values.²² Currently, the Confident Digital Society Index is proposed to utilise over 100 individual indicators.

Given these considerations, and noting that this is the initial run of the Confident Digital Society index, a weight of 1 is applied equally across all individual indicators.

C.5 Sensitivity Analysis

A scenario-based sensitivity analysis was conducted to determine the impact of various methodological choices on the index results. Eight scenarios were constructed to compare the chosen and the preferred alternative method for the following aspects of the data model:

Treatment of missing value	With or without interpolation (i.e., carrying values forward or backward)
Treatment of outliers	With or without winsorisation
Aggregation	Arithmetic or geometric

Results showed little variance in country rankings across the different scenarios, typically landing within a range of 1 to 2 spots. The shift from arithmetic to geometric mean as the method of aggregation had the most notable impact; however, this did not significantly change the overall country ranking. Instead, it affected country categorisations, as these are based on the specific score in each dimension.

Overall, the index rankings appear not to be significantly sensitive to the modelling assumptions made regarding missing values treatment, outlier mitigation, and aggregation methods.

Appendix D. Indicator Sources and Definitions

This section provides detailed information about how each indicator is collected and what it measures, to guide deeper interpretation of the index results. The following notation is used to denote data specification:



*

A * on the year typically indicates the primary year of data collection, i.e., the year when most countries' data in the set was collected, in cases when data from other years is used for some countries due to lack of data from the primary year.



^

A ^ on the year indicates that data is collected outside of the desired timeframe (2020 to 2025) and may be considered outdated, but is used when no viable recent proxy exists.



+

A + on the indicator name means it is considered a proxy, and the accompanying text will define the ideal measure this indicator represents.

D.1 Quality Access

Access

A.1.1 Population using the internet | 2023*

Individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc. The number of in-scope individuals using the Internet is calculated by aggregating the weighted responses. Data is primarily collected by the International Telecommunication Union (ITU).

Source: World Bank. World Development Indicators (WDI). (<https://datatopics.worldbank.org/world-development-indicators/>). Data Year: 2023, 24/25.*

A.1.2 Percentage of households with access to internet | 2023*

The proportion of households with Internet access at home. Access can be via a fixed or mobile network. If one member of the household has a mobile phone with connection to the Internet and makes it available for all members, then it should be considered that the household has access to the Internet.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2023, 24/25.*

A.1.3 Active mobile broadband subscriptions | 2024*

The sum of active handset-based and computer-based (USB/dongles) mobile-broadband subscriptions that allow access to the Internet, divided by population and multiplied by 100.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2024, 23.*

A.1.4 Fixed broadband subscriptions | 2024*

Fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s. This includes cable modem, DSL, fibre-to-the-home/building, other fixed (wired) broadband subscriptions, satellite broadband and terrestrial fixed wireless broadband. This total is measured irrespective of the method of payment. It excludes subscriptions that have access to data communications (including the Internet) via mobile-cellular networks. It should include fixed WiMAX and any other fixed wireless technologies. It includes both residential subscriptions and subscriptions for organisations.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2023, 23.*

A.1.5 Individuals owning a mobile phone | 2024

The proportion of individuals who own a mobile (cellular) or smart telephone. An individual owns a mobile cellular telephone if he/she has a mobile cellular phone device with at least one active SIM card for personal use.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2024.

A.1.6 Gender gap in mobile ownership | 2024

Gender gap ratio for mobile phone ownership and usage. Primarily sourced from GSMA Intelligence and Gallup World Poll.

Further details can be found at <https://www.mobileconnectivityindex.com/index.html>.

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.1.7 Gender gap in mobile internet | 2024

Gender gap ratio for mobile internet usage. Primarily sourced from GSMA Intelligence and Gallup World Poll. Further details can be found at <https://www.mobileconnectivityindex.com/index.html>.

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.1.8 Net freedom: obstacles to access | 2024

Details infrastructural, economic, and political barriers to access; government decisions to shut off connectivity or block specific applications or technologies; legal, regulatory, and ownership control over internet service providers; and independence of regulatory bodies. Captured via questionnaire.

Source: Freedom House. Freedom on the Net. (<https://freedomhouse.org/report/freedom-net>). Data Year: 2024.

Affordability

A.2.1 Device affordability | 2024

Prices of entry-level handsets that allow users access to the internet, rather than high-end devices that are sold at premium prices. Data is primarily collected by Tarifica (<https://tarifica.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.2.2 Device affordability for poorest 40% | 2024

Prices of entry-level handsets that allow users access to the internet, rather than high-end devices that are sold at premium prices, segmented by the poorest 40%. Data is primarily collected by Tarifica (<https://tarifica.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.2.3 Fixed broadband internet basket price | 2024

Entry-level fixed-broadband basket. The basket is composed of the cheapest plan providing at least 1GB of monthly high-speed data (256Kbit/s or higher) from the operator with the largest market share in each economy. From 2018, the basket is composed of the cheapest plan providing at least 5GB of monthly high-speed data (256Kbit/s or higher) from the operator with the largest market share in each economy.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2024.

A.2.4 High usage bundle | 2024

Mobile data and voice high-consumption basket. The basket is based on a monthly usage of a minimum of 140 voice minutes, 70 SMSs and 1.5 GB of data using at least 3G technology. From 2021, the basket is based on a monthly usage of a minimum of 140 voice minutes, 70 SMSs and 2 GB of data using at least 3G technology.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2024.

A.2.5 Low usage bundle | 2024

Mobile data and voice low-consumption basket. The basket is based on a monthly usage of a minimum of 70 voice minutes, 20 SMSs and 500 MB of data using at least 3G technology.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2024.

A.2.6 Affordability of entry basket (1GB) | 2024

The entry-level basket for mobile data is defined as 1GB. Refers to the cheapest available plan under which the basket requirements could be met. Data is primarily collected by Tarifica (<https://tarifica.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.2.7 Affordability of entry basket (1GB) for poorest 40% | 2024

The entry-level basket for mobile data is defined as 1GB. Refers to the cheapest available plan under which the basket requirements could be met, segmented by the poorest 40%. Data is primarily collected by Tarifica (<https://tarifica.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

Reliability

A.3.1 Satisfaction with coverage | 2025

Answered “yes” to the statement, “There is a good mobile network coverage in my area (e.g., data speed, call stability).” Collected via online survey, with a sample representing the population of internet users aged 18 to 64.

Further details can be found at <https://www.statista.com/insights/consumer>.

Source: Statista. Consumer Insights. (<https://www.statista.com/insights/consumer>). Data Year: 2025.

A.3.2 Spectrum assigned in bands below 1GHz | 2024

The availability of low-band spectrum, lower than 1 GHz, on the spectrum chart. Low-band spectrum makes it easier for the wireless signal to penetrate windows and walls.²³ Data is primarily collected by GSMA Intelligence.

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

A.3.3 Fixed broadband download speed | 2025

How quickly data is pulled from a server on the internet to a device, from a fixed connection (Ethernet or Wi-Fi). Download speed is measured in megabits per second (Mbps).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.4 Fixed broadband latency | 2025

How quickly a device gets a response after sending out a request, from a fixed connection (Ethernet or Wi-Fi). Fast latency means a more responsive connection. Latency is measured in milliseconds (ms).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.5 Fixed broadband upload speed | 2025

How quickly data is sent from a device to the internet, from a fixed connection (Ethernet or Wi-Fi). Upload speed is measured in megabits per second (Mbps).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.6 Mobile download speed | 2025

How quickly data is pulled from a server on the internet to a device, from a cellular connection (2G, 3G, 4G LTE or 5G). Download speed is measured in megabits per second (Mbps).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.7 Mobile latency | 2025

How quickly a device gets a response after sending out a request, from a cellular connection (2G, 3G, 4G LTE or 5G). Fast latency means a more responsive connection. Latency is measured in milliseconds (ms).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.8 Mobile upload speed | 2025

How quickly data is sent from a device to the internet, from a cellular connection (2G, 3G, 4G LTE or 5G). Upload speed is measured in megabits per second (Mbps).

Source: Ookla. Speedtest Global Index. (<https://www.speedtest.net/global-index>). Data Year: 2025.

A.3.9 4G video experience | 2024/25

The quality of video streamed to mobile devices is measured through real-world video streams over an operator's networks, on a scale from 0 to 100. The videos tested include a mixture of resolutions — including Full HD (FHD) and 4K / Ultra HD (UHD). The primary data source, OpenSignal, produces a score for each service provider in a country. The average of the top three performers is then calculated to represent the typical experience per country.

Source: OpenSignal. Mobile Network Experience. (<https://www.opensignal.com/market-insights>). Data Year: 2024*/25.

A.3.10 4G games experience | 2024/25t

How mobile users experience real-time multiplayer mobile gaming on an operator's network, on a scale of 0-100. The primary data source, OpenSignal, produces a score for each service provider in a country. The average of the top three performers is then calculated to represent the typical experience per country.

Source: OpenSignal. Mobile Network Experience. (<https://www.opensignal.com/market-insights>). Data Year: 2024*/25.

A.3.11 Reliability experience | 2024/25

The ability of users to connect to and successfully complete (basic) tasks on communication service providers' (CSP) networks. It analyses how much users' experience is affected by the radio access and core network, along with issues that prevent them from connecting to the internet even if they have a connection to their CSP's network. It also factors in users' ability to successfully use lower performance applications, including SD video, over-the-top voice calls and web browsing. The primary data source, OpenSignal, produces a score for each service provider in a country. The average of the top three performers is then calculated to represent the typical experience per country.

Source: OpenSignal. Mobile Network Experience. (<https://www.opensignal.com/market-insights>). Data Year: 2024/25.*

A.3.12 4G download speed | 2025

The average download speeds that users observe when connected to 4G or 5G (as appropriate). These evaluate the capacity of a country's networks to support current and future digital demands.

Source: OpenSignal. Global Network Excellence Index. (<https://insights.opensignal.com/global-network-excellence-index>). Data Year: 2025.

A.3.13 Excellent consistent quality | 2025

How consistently networks support demanding applications such as video streaming, video calls, and gaming, ensuring a seamless user experience. It is measured as a percentage of mobile subscribers' network experience that is above the thresholds required for common demanding digital applications.

Source: OpenSignal. Global Network Excellence Index. (<https://insights.opensignal.com/global-network-excellence-index>). Data Year: 2025.

D.2 Meaningful Participation

E-Government

B.1.1 Digital ID with fully enabled remote authentication | 2022

The availability of a system or systems that provide credentials that enable people to securely authenticate themselves remotely, to access online services and transactions. Data is primarily collected by the World Bank Identification for Development (ID4D) global dataset (<https://id4d.worldbank.org/>), provided by ID authorities in response to questionnaires.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.1.2 Core Government Systems Index | 2022

Composed of 15 indicators which capture the key aspects of a whole-of-government approach, including government cloud, interoperability framework and other platforms. Further details can be found at <https://www.worldbank.org/en/programs/govtech/gtmi-Intro>.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.1.3 Public Service Delivery Index | 2022

Composed of 9 indicators and measures the maturity of online public service portals, with a focus on citizen-centric design and universal accessibility. Further details can be found at <https://www.worldbank.org/en/programs/govtech/gtmi-Intro>.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.1.4 Digitised national ID records | 2022

The availability of a digital ID that can be used for online identification and services. Data is primarily collected by the World Bank Identification for Development (ID4D) global dataset (<https://id4d.worldbank.org/>), provided by ID authorities in response to questionnaires.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.1.5 E-Participation Index | 2024

Derived as a supplementary index to the UN E-Government Survey. It extends the dimension of the Survey by focusing on the use of online services to facilitate the provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision-making").

Source: United Nations. E-Government Development Index.

(<https://publicadministration.un.org/egovkb/en-us/About/Overview/-E-Government-Development-Index>). Data Year: 2024.

B.1.6 GovTech / Digital Transformation strategy | 2022

The availability of a digital transformation strategy in a country, collected through desk research relying on official sources, such as government websites, press releases, reports from UN agencies, and other development partners. Possible values are: 0 for none; 1 for if a strategy is planned or in progress; 2 if a strategy has existed in 2014 or earlier; and 3 if a strategy has existed since 2015.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.1.7 Public sector innovation strategy | 2022

The availability of a strategy or program to improve public sector innovation in a country, collected through desk research relying on official sources, such as government websites, press releases, reports from UN agencies, and other development partners. Possible values are: 0 for none; 1 if a strategy OR program exists; and 2 if both a strategy AND program exist.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

Digital Literacy

B.2.1 Safe participation in digital platforms | 2024

The safety and security of participation in digital platforms through the availability of baseline cybersecurity measures. Aggregates the scores of the following dimensions from the Global Cybersecurity Index: (i) Cybercrime law, (ii) Cybercrime regulations, (iii) Child online protection, and (iv) Public cybersecurity awareness campaigns.

Source: International Telecommunication Union (ITU). *Global Cybersecurity Index*. (<https://www.itu.int/en/ITU-D/Cybersecurity/pages/global-cybersecurity-index.aspx>). Data Year: 2024.

B.2.2 Net freedom: violations of user rights | 2024

Captured via questionnaire. Tackles legal protections and restrictions on free expression; surveillance and privacy; and legal and extralegal repercussions for online speech and activities, such as imprisonment, cyberattacks, or extralegal harassment and physical violence.

Source: Freedom House. *Freedom on the Net*. (<https://freedomhouse.org/report/freedom-net>). Data Year: 2024.

B.2.3 Net freedom: limits on content | 2024

Captured via questionnaire. Analyses legal regulations on content, technical filtering and blocking of websites, other forms of censorship and self-censorship, the vibrancy and diversity of online information space, and the use of digital tools for civic mobilisation.

Source: Freedom House. *Freedom on the Net*. (<https://freedomhouse.org/report/freedom-net>). Data Year: 2024.

B.2.4 Freedom of expression and alternative sources of information index | 2023

Records answer to the survey question: "To what extent does the government respect press and media freedom, the freedom of ordinary people to discuss political matters at home and in the public sphere, as well as the freedom of academic and cultural expression?" Response is on an interval scale, from low to high (0-1).

Source: Varieties of Democracy Institute (V-Dem). *V-Dem Core*. (<https://www.v-dem.net/data/the-v-dem-dataset/>). Data Year: 2023.

B.2.5 Human capital index (HCI) | 2020

The amount of human capital that a child born today can expect to attain by age 18, given the risks of poor health and poor education that prevail in the country where she lives. It is designed to highlight how improvements in current health and education outcomes shape the productivity of the next generation of workers, assuming that children born today experience over the next 18 years the educational opportunities and health risks that children in this age range currently face.

Source: World Bank. Human Capital Index. (https://data360.worldbank.org/en/dataset/WB_HCI). Data Year: 2020.

B.2.6 Confidence in using technology | Q3 2024-Q2 2025

Aggregates scores (% of respondents who answered Yes) from the following survey questions: (i) "I'm concerned that my data is being misused on the internet" and (ii) "Saving sensitive data online is too insecure for me." Collected via online survey, with a sample representing the population of internet users aged 16 to 64. Further details can be found at <https://www.gwi.com/>.

Source: Global Web Index (GWI). GWI Core - Tech Attitudes and Trends. (<https://www.gwi.com/>). Data Year: Q3 2024-Q2 2025.

B.2.7 Trust in the internet | Q3 2024-Q2 2025

Aggregates scores (% of respondents who answered Yes) from the following survey questions: (i) "I feel using social media causes me anxiety," (ii) "I worry about how companies use my personal data online," (iii) "Use adblockers/anti-scam/others: To protect privacy," (iv) "Use adblockers/anti-scam/others: To stop companies collecting data about me," and (v) "Use adblockers/anti-scam/others: To stop any inappropriate content being shown." Collected via online survey, with a sample representing the population of internet users aged 16 to 64. Further details can be found at <https://www.gwi.com/>.

Source: Global Web Index (GWI). GWI Core - Tech Attitudes and Trends. (<https://www.gwi.com/>). Data Year: Q3 2024-Q2 2025.

B.2.8 Use of non-financial digital platforms⁺ | Q3 2024-Q2 2025

Use of digital platforms is used as a proxy measure for basic digital skills.

Percentage of respondents who have selected options other than "None" on the question: "Websites and apps used in the last month (excl. banking/finance)." Collected via online survey, with a sample representing the population of internet users aged 16 to 64. Further details can be found at <https://www.gwi.com/>.

Source: Global Web Index (GWI). GWI Core - Tech Attitudes and Trends. (<https://www.gwi.com/>). Data Year: Q3 2024-Q2 2025.

B.2.9 Use of digital financial services* | 2024*

Use of digital platforms is used as a proxy measure for basic digital skills.

Aggregates the scores on the following survey responses from the Global Findex Database: (i) Mobile money account ownership (% age 15+), and (ii) Made or received digital payments in the past year (% age 15+).

Source: World Bank. Global Findex Database. (<https://www.worldbank.org/en/publication/globalfindex>). Data Year: 2024*, 21.

B.2.10 Digital language support | 2023

The aggregated digital capabilities for all living languages within a country, based upon the availability and accessibility of language-specific hardware/software support. Data is primarily collected by Derivation (<https://derivation.co/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2023.

B.2.11 Mobile social media penetration | 2024

Data published by various social media platforms and government authorities to inform figures for social media users taken as a share of the population. However, due to issues such as duplicate accounts and the potential misattribution of "non-human" accounts (e.g. business, pets, music bands, etc.) in source data, the figures for social media users may not equate to unique, individual human users. Data is primarily collected by DataReportal (<https://datareportal.com/>). For further details, see <https://datareportal.com/notes-on-data>.

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

Open Data Access

B.3.1 Strategic enablers for open data access | 2024

The availability of the government's vision or plan for different types of data in the economy and polity. Indicators include: National Data Strategy, Public Administration Strategy, AI Strategy and Strategy for Data in Emerging Digital Ecosystems.

*Source: Digital Trade & Data Governance Hub. Global Data Governance Mapping Project. (<https://globaldatagovernancemapping.org/>).
Data Year: 2024.*

B.3.2 Regulatory enablers for open data access | 2024

The availability of the government's legal regime around data types and/or uses. Includes: Personal Data Protection Law, Open Data Law for the proactive release of government information, Freedom of Information Act, Right to be protected from Automated Decision-Making, and Right of Data Portability.

*Source: Digital Trade & Data Governance Hub. Global Data Governance Mapping Project. (<https://globaldatagovernancemapping.org/>).
Data Year: 2024.*

B.3.3 Structural enablers for open data access | 2024

The change of institutional structures that the government makes in response to data-driven transformation. Includes: Personal Data Protection Body, Open Data Portal, Open Data Coordinating Body, and Public Sector Data Governance Body.

*Source: Digital Trade & Data Governance Hub. Global Data Governance Mapping Project. (<https://globaldatagovernancemapping.org/>).
Data Year: 2024.*

B.3.4 International enablers for open data access | 2024

The extent to which the government participated in shared international efforts to establish data governance rules and norms. Includes: Convention 108+, Open Government Partnership, OECD AI Principles, Binding Trade Agreements on Cross-Border Data Flows, and Budapest Convention.

*Source: Digital Trade & Data Governance Hub. Global Data Governance Mapping Project. (<https://globaldatagovernancemapping.org/>).
Data Year: 2024.*

B.3.5 Diversity of data products for publicly available data | 2023

Segmented by topic and organised into social, economic, environmental and institutional domains using the typology of the Sustainable Development Goals. This approach enables comparisons across countries and anchors the system in the 2030 agenda so that a global view can be generated while enabling different emphasis to be applied in different countries to reflect the user needs of that country.

Source: World Bank. Statistical Performance Indicators. (<https://www.worldbank.org/en/programs/statistical-performance-indicators>).
Data Year: 2023.

B.3.6 Diversity of sources for publicly available data | 2023

Segmented between sources generated by the statistical office (censuses and surveys) and sources accessed from elsewhere (administrative data, geospatial data, private sector data and citizen-generated data). The appropriate balance between these types of sources will vary depending on the institutional setting and maturity of the statistical system in each country. High scores should reflect the extent to which the sources being utilised enable the necessary statistical indicators to be generated. For example, a low score on environment statistics may reflect a lack of use of (and low score for) geospatial data. This linkage, which is inherent in the data cycle approach, should help highlight areas for investment if country needs are to be met."

Source: World Bank. Statistical Performance Indicators. (<https://www.worldbank.org/en/programs/statistical-performance-indicators>).
Data Year: 2023.

B.3.7 Right to Information (RTI) laws | 2022

Answer to the question, "Are there RTI Laws to make data/info available to the public online or digitally?" Collected through desktop research. Assigns the following possible values: 0 for none; 1 if there is a draft law or there are consultations in progress; and 2 if laws exist and are in effect.

Source: World Bank. GovTech Maturity Index. (<https://www.worldbank.org/en/programs/govtech/gtmi>). Data Year: 2022.

B.3.8 Open Data Inventory (ODIN) open data openness | 2023

The online availability of data in a format that is machine-readable, in a nonproprietary format, downloadable, with metadata available and terms of use. Scores range from 0-1. Further details can be found at https://docs.google.com/document/d/1MBK0hN6MoQriiZ_E1bmRXmsUcE8Fbb-Q32nxm8d8qTw/edit?tab=t.0.

Source: Open Data Watch. Open Data Inventory (ODIN). (<https://odin.opendatawatch.com/>). Data Year: 2023.

B.3.9 Cross-Border Data Policy Index | 2023

Each economy's national laws, regulations, and other measures that either restrict data transfers or mandate data localisation. The Index is built on legal analyses of measures relating to artificial intelligence, cybersecurity, privacy, law enforcement access, and international trade (among other topics).

*Source: Global Data Alliance. Cross-Border Data Policy Index. (<https://globaldataalliance.org/resource/cross-border-data-policy-index/>).
Data Year: 2023.*

B.3.10 Open budget data score | 2018

The extent to which the government publishes data related to the budget and spending. The scale ranges from 0 (low transparency) to 100 (high transparency), as a 2017-2018 weighted average or from the most recent period available. The score is based on the evaluation of 20 key criteria related to government practices in publishing open budget data. Further details can be found at <http://www.worldbank.org/publicfinance/fmis>.

*Source: World Economic Forum. Global Competitiveness Index (GCI) 4.0. (https://data360.worldbank.org/en/dataset/WEF_GCI).
Data Year: 2018.*

D.3 Productive Potential

Digital Competencies

C.1.1 ICT skills in the education system | 2024

Average answer to the question: "In your country, to what extent is the workforce proficient in the following skills? Technology skills [1 = Not at all; 7 = To a great extent]" asked through the annual World Economic Forum's Executive Opinion Survey (EOS), which gathers information from business leaders on topics with scarce or non-existent data. Further details can be found at <http://reports.weforum.org>.

*Source: Portulans Institute, Said Business School and University of Oxford. Network Readiness Index. (<https://networkreadinessindex.org/>).
Data Year: 2024.*

C.1.2 Individual ICT skills: Communication and collaboration - sending e-mails with attached files* | 2023**

Data may be outdated for certain countries, but it is considered the best available data at this time. This measure is used as a proxy for proficiency in digital skills required for work.

Proportion of individuals with ICT skills related to "Communication and collaboration", defined as having undertaken certain activities in the last three months, independent of the device(s) used. Individuals can have carried out multiple activities and therefore be considered to possess several ICT skills. The data is collected directly from governments by means of annual questionnaires sent to the national statistical offices or those responsible for conducting household surveys on ICT use and access.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2023, 17/19/20/21/22.*

C.1.3 Individual ICT skills: Digital content creation - creating electronic presentations with presentation software* | 2023**

Data may be outdated for certain countries, but it is considered the best available data at this time. This measure is used as a proxy for proficiency in digital skills required for work.

Proportion of individuals with ICT skills related to "Digital content creation", defined as having undertaken certain activities in the last three months, independent of the device(s) used. Individuals can have carried out multiple activities and therefore be considered to possess several ICT skills. The data is collected directly from governments by means of annual questionnaires sent to the national statistical offices or those responsible for conducting household surveys on ICT use and access.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2023, 17/19/20.*

C.1.4 Individual ICT skills: Problem solving - Finding, downloading, installing and configuring software* | 2023*^

Data may be outdated for certain countries, but it is considered the best available data at this time. This measure is used as a proxy for proficiency in digital skills required for work.

Proportion of individuals with ICT skills related to "Problem solving", defined as having undertaken certain activities in the last three months, independent of the device(s) used. Individuals can have carried out multiple activities and therefore be considered to possess several ICT skills. The data is collected directly from governments by means of annual questionnaires sent to the national statistical offices or those responsible for conducting household surveys on ICT use and access.

Source: International Telecommunication Union (ITU). ITU Datahub. (<https://datahub.itu.int/>). Data Year: 2023, 17/19/20.*

C.1.5 Github commits* | 2024

This measure is used as a proxy for advanced proficiency in programming languages.

The sum of the number of batched changes received and sent by projects on GitHub that are publicly available within a specific economy. GitHub is the world's largest host of source code, and a commit is the term used for a saved change on this platform. One or more commits can be saved (or pushed) to projects (or repositories). Thus, "GitHub commit pushes received and sent" referring to automated activity resulting in non-productive commits, is excluded. Data is primarily collected by the Global Innovation Index Database, WIPO 2024; GitHub (<https://github.com>); and United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects 2024 (April 2024 update) (<https://population.un.org/wpp>).

Source: Portulans Institute, Said Business School and University of Oxford. Network Readiness Index. (<https://networkreadinessindex.org/>). Data Year: 2024.

C.1.6 Training for cybersecurity professionals | 2024

The existence of sector-specific professional training programs for raising awareness for the general public (i.e., national cybersecurity awareness day, week, or month), promoting cybersecurity education for the workforce of different profiles (technical, social sciences, etc.) and promoting certification of professionals in either the public or the private sector. This Indicator also includes the existence of a government-approved (or endorsed) framework (or frameworks) for the certification and accreditation of professionals by internationally recognised cybersecurity standards. These certifications, accreditations, and standards include, but are not limited to, the following: Cloud Security knowledge (Cloud Security Alliance), CISSP, SSCP, CSSLP CBK, Cybersecurity Forensic Analyst (ISC²), and others.

Source: International Telecommunication Union (ITU). Global Cybersecurity Index. (<https://www.itu.int/en/ITU-D/Cybersecurity/pages/global-cybersecurity-index.aspx>). Data Year: 2024.

C.1.7 Educational programmes or academic curricula in cybersecurity | 2024

Establishment and promotion of national education courses and programmes to train the younger generation in cybersecurity-related skills and professions in schools, colleges, universities, and other learning institutions. Cybersecurity-related professions include, but are not limited to, cryptanalysts, digital forensics experts, incident responders, security architects and penetration testers.

Source: International Telecommunication Union (ITU). Global Cybersecurity Index.

(<https://www.itu.int/en/ITU-D/Cybersecurity/pages/global-cybersecurity-index.aspx>). Data Year: 2024.

C.1.8 Proportion of youth and adults who have written a computer program using a specialised programming language* | 2021*

This measure is used as a proxy for advanced proficiency in programming languages.

The proportion of youth and adults with information and communications technology (ICT) skills, by type of skill as defined as the percentage of individuals who have undertaken certain ICT-related activities in the last 3 months. The data are self-reported information on the use of ICT skills in household surveys.

Source: UN Educational, Scientific and Cultural Organization (UNESCO). Education Statistics. (<https://datatopics.worldbank.org/education/>).

Data Year: 2021*, 17/19/20.

C.1.9 Researchers in R&D | 2022*

This measure is used as a proxy for research and development talent specialising in new and emerging technologies.

Data are for full-time equivalent (FTE); the FTE of R&D personnel is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group. The data are obtained through statistical surveys, which are regularly conducted at the national level covering R&D performing entities in the private and public sectors.

Source: World Bank. World Development Indicators (WDI). (<https://datatopics.worldbank.org/world-development-indicators/>). Data Year:

2022*, 17/18/19/20.

Future-of-Work Readiness

C.2.1 Optimism for emerging technologies | Q3 2024-Q2 2025

Aggregates scores (% of respondents who answered Yes) from the following survey questions: (i) "Excited about: AI", (ii) "Excited about: AR", (iii) "Excited about: Blockchain", (iv) "Excited about: Metaverse", (v) "Excited about: Robotics", and (vi) "Excited about: IoT." Collected via online survey, with a sample representing the population of internet users aged 16 to 64. Further details can be found at <https://www.gwi.com/>.

Source: Global Web Index (GWI). GWI Core - Tech Attitudes and Trends. (<https://www.gwi.com/>). Data Year: Q3 2024-Q2 2025.

C.2.2 Frontier technology readiness - R&D activity | 2023

R&D activity is needed not just for the production of frontier technologies, but also for adoption and adaptation, as these technologies often require adjustment or modification for local use. R&D activities are measured using the number of publications and patents filed on the 17 frontier technologies in a country. The publication and patent search queries used are the same as shown in the Technical note in Annexe I in chapter I, of the Technology and Innovation Report 2025, while extending the year to 2023. The countries of publication of authors and patent assignees were analysed. It should be noted that, especially in developing countries, there are informal R&D activities that do not result in a publication or patent, so the R&D scores might not reflect the actual scale of activities.

Source: United Nations Trade and Development (UNCTAD). Frontier Technology Readiness Index (FTRI). (<https://unctadstat.unctad.org/datacentre/dataviewer/US.FTRI>). Data Year: 2023.

C.2.3 Frontier technology readiness - Access to finance | 2023

The availability of finance to the private sector. Better access to finance could accelerate the use, adoption and adaptation of frontier technologies. For this purpose, domestic credit to the private sector as a percentage of GDP was selected as part of the index. This indicator measures resources provided by financial corporations such as finance and leasing companies, money lenders, insurance corporations, pension funds and foreign exchange companies. It also includes various financial instruments, including loans, purchases of non-equity securities, and trade credits and other accounts receivable. However, there could also be other, unconventional financing providers or financial instruments that are not covered sufficiently by this indicator.

Source: United Nations Trade and Development (UNCTAD). Frontier Technology Readiness Index (FTRI). (<https://unctadstat.unctad.org/datacentre/dataviewer/US.FTRI>). Data Year: 2023.

C.2.4 AI readiness - vision | 2024

The answer to the following question: "Does the government have a vision for implementing AI?" The following possible values are assigned to each economy: 100 if a national AI strategy has been officially released; 50 if a draft strategy exists, or there is clear evidence of a strategy being developed (e.g., public consultations, published roadmap); and 0 if there is no evidence of a national AI strategy. Data is primarily collected through desktop research, from sources like the OECD AI Policy Observatory (<https://oecd.ai/>) and the UN IDIR AI policy portal (<https://aipolicyportal.org/>).

Source: Oxford Insights. Government AI Readiness Index. (<https://oxfordinsights.com/ai-readiness/ai-readiness-index/>). Data Year: 2024.

C.2.5 Graduates from STEM programmes in tertiary education* | 2023**

Data may be outdated for certain countries, but it is considered the best available data at this time. This measure is used as a proxy for the national digital talent pipeline.

Number of graduates from STEM programmes in tertiary education, expressed as a percentage of the total number of graduates in tertiary education.

Source: UN Educational, Scientific and Cultural Organization (UNESCO). UNESCO Education Statistics. (<https://databrowser.uis.unesco.org/browser/EDUCATION/>). Data Year: 2023*, 22/21/18/16.

C.2.6 Research talent, % in businesses* | 2024

This measure is used as a proxy for research talent in businesses that specialise in new and emerging technologies, including developing and publishing digital technology patents.

Researchers in the business enterprise sector, measured in full-time equivalence (FTE), refers to researchers as professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, as well as in the management of these projects, broken down by the sectors in which they are employed (business enterprise, government, higher education and private non-profit organizations). In the context of R&D statistics, the business enterprise sector includes all firms, organizations and institutions whose primary activity is the market production of goods or services (other than higher education) for sale to the general public at an economically significant price, and the mainly private non-profit institutions serving them; the core of this sector is made up of private enterprises. Data is primarily collected from various sources: UNESCO Institute for Statistics (UIS) online database (<http://data.uis.unesco.org>); Eurostat database (<https://ec.europa.eu/eurostat/data/database>); OECD, Main Science and Technology Indicators (MSTI) database (<https://data-explorer.oecd.org>); and Ibero-American and Inter-American Network of Science and Technology Indicators (RICYT) (www.ricyt.org/en).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2024.

C.2.7 Social protection effective coverage | 2023

The social protection effective coverage (e.g., health insurance, unemployment benefits) related to sustainable development goals (SDG), including SDG indicators 1.3.1 and 3.8.1. Expressed as a percentage of the population.

Source: International Labour Organization (ILO). World Social Protection Data Dashboards.

(<https://www.social-protection.org/gimi/ShowMainPage.action>). Data Year: 2023.

C.2.8 Flexible working arrangements | 2024

Response to the survey question: "In your country, to what extent do companies offer flexible working arrangements such as remote and part-time work?" [1 = Not at all; 7 = To a great extent] Taken as a 2022–2023 weighted average. Data is primarily collected by the World Economic Forum's Executive Opinion Survey

(<https://centres.weforum.org/centre-for-new-economy-and-society/executive-opinion-survey>).

Source: World Economic Forum (WEF). Travel & Tourism Development Index.

(<https://www.weforum.org/publications/travel-tourism-development-index-2024/>). Data Year: 2024.

C.2.9 Use of digital platform for providing hotels, restaurants and leisure activities services* | 2024

This measure is used as a proxy for the digitalisation of services by enterprises in non-financial services sectors.

Response to the survey question: "In your country, to what extent are digital platforms* used to provide the following service: Hotels, restaurants and leisure activities?" [1 = Not at all; 7 = To a great extent] *Digital platforms refer to services and labour markets available through a digital interface, often focused on short-term contracts and task-based work. Taken as a 2020–2021 weighted average. Data is primarily collected by the World Economic Forum's Executive Opinion Survey

(<https://centres.weforum.org/centre-for-new-economy-and-society/executive-opinion-survey>).

Source: World Economic Forum. World Economic Forum Travel & Tourism Development Index.

(<https://www.weforum.org/publications/travel-tourism-development-index-2024/>). Data Year: 2024.

Digital Innovation and Competitiveness

C.3.1 Frontier technology readiness - Industry activity | 2023

Ongoing activities in an industry related to the use, adoption and adaptation of frontier technologies. It considers three sectors that are early adopters: manufacturing, with high-tech manufacturing as the frontrunner; finance; and ICT, which tends to interact with other technologies. Then it uses export data on high-technology manufactures, as well as on digitally deliverable services which cover both finance and ICT. However, especially in developing countries, activities are also undertaken by firms in the informal sector, which are often outside official statistics. The scores from these countries could therefore be lower than the actual activity.

Source: United Nations Trade and Development (UNCTAD). Frontier Technology Readiness Index (FTRI).

(<https://unctadstat.unctad.org/datacentre/dataviewer/US.FTRI>). Data Year: 2023.

C.3.2 Investment in advanced compute, storage and infrastructure | 2024

Aggregates scores for data centre, advanced storage and computing power investments. Data centre investments are calculated per GDP, and are defined as the total investment in IT infrastructures for all data centres, encompassing both on-premises and off-premises environments. This includes the cost of servers and storage systems, covering all components such as processors, memory, disk storage, and bundled operating systems and software. Advanced storage investments are scaled per GDP and total storage size, and are defined as the investment in enterprise storage systems, which are crucial for processing, managing, and storing digital data. It includes components like power supplies, cooling systems, storage controllers, and media such as hard disk drives (HDDs) and flash. The focus is on the proportion of advanced storage solutions, like full-flash systems and high-performance AI storage, relative to the total data storage capacity. This reflects a country's capability to support advanced productivity in data management, measured in Terabytes (TB). Advanced storage investments are calculated per GDP, and is evaluated by defining a server system as a multiuser computing device that accesses and delivers services via a network. A typical server system entails one or more processors, a motherboard, memory, internal disk or flash storage, a bundled operating system (OS), power supply units, and network interfaces. The computing power is measured by the total investment in the server system market of the country.

Source: Huawei. Global Digitalization Index. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

C.3.3 Industry digital transformation spending | 2024

The ongoing process by which enterprises adapt to or drive disruptions in their markets, leveraging digital capabilities to innovate new business solutions that integrate digital and physical experiences, enhancing operational efficiency and organisational performance. Spending is calculated per GDP.

Source: Huawei. Global Digitalization Index. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

C.3.4 Locally developed apps per person | 2024

Number of active mobile apps developed per person. Data is primarily collected by Appfigures (<https://appfigures.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

C.3.5 Top-level domains (TLDs) | 2024

Number of domains per 100 people. Data is primarily collected by ZookNIC (<https://www.zooknic.com/>).

Source: GSM Association. GSMA Mobile Connectivity Index. (<https://www.mobileconnectivityindex.com/index.html>). Data Year: 2024.

C.3.6 Number of startups* | 2024

This measure is used as a proxy for digital startup ecosystem size.

The number of startups in the country, where a startup is defined as any business that applies an innovative, technology-enabled solution with the potential to achieve scalability. Calculated per 1000 people.

Source: Huawei. Global Digitalization Index. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

C.3.7 Operational stability for businesses | 2025

The likelihood and severity of political, legal, operational or security risks affecting business operations. Scores are annualised, standardised and aggregated for end Q1, Q2, Q3 and Q4. Data is primarily collected by: S&P Global, Market Intelligence, Country Risk Dataset ([www.marketplace.spglobal.com/en/datasets/country-risk-\(255\)](http://www.marketplace.spglobal.com/en/datasets/country-risk-(255))).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2025.

C.3.8 Investment environment | 2025

Aggregates the following: (i) Market capitalization as a % GDP, three-year average, (ii) Number of venture capital (VC) received (deal count/bn PPP\$ GDP), (iii) Late-stage VC deal count (% global VC), (iv) VC investors (deal count/bn PPP\$ GDP), and (v) VC investor co-participation/bn PPP\$ GDP. Data is primarily collected by: World Federation of Exchanges database (www.world-exchanges.org/our-work/statistics) and extracted from the World Bank's World Development Indicators database (<https://databank.worldbank.org/source/world-development-indicators>); Refinitiv (a London Stock Exchange Group (LSEG) business) Eikon (private equity screener) (<https://solutions.refinitiv.com/eikon-trading-software>) and International Monetary Fund World Economic Outlook Database (www.imf.org/en/Publications/WEO/weo-database/2023/October).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2025.

C.3.9 Business environment | 2025

Aggregates the following: (i) Policy stability for doing business, and (ii) Entrepreneurship policies and culture index. Data is primarily collected by: World Economic Forum, Executive Opinion Survey (www.weforum.org); Global Entrepreneurship Monitor (GEM), National Expert Survey (NES) (www.gemconsortium.org/wiki/1142).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2025.

C.3.10 Regulatory environment | 2025

Aggregates the following: (i) Regulatory quality, and (ii) Rule of law. Data is primarily collected by: World Bank, Worldwide Governance Indicators (www.govindicators.org).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2025.

C.3.11 Innovation linkages | 2025

Aggregates the following: (i) Public-private co-authored research publications (% of total research publications, five-year average), (ii) University-industry R&D collaboration, (iii) State of cluster development, (iv) Number of joint venture/strategic alliance deals, fractional counting (per billion PPP\$ GDP, three-year average), and (v) Number of patent families filed in at least two offices (per billion PPP\$ GDP). Data is primarily collected by: Centre for Science and Technology Studies (CWTS), Leiden University, based on Clarivate Web of Science (www.cwts.nl); World Economic Forum, Executive Opinion Survey 2023 (www.weforum.org); Refinitiv (an LSEG business) SDC Platinum database (www.refinitiv.com/en/financial-data/deals-data/joint-venture-deals); International Monetary Fund World Economic Outlook Database (www.imf.org/en/Publications/WEO/weo-database/2023/October); World Intellectual Property Organization, Intellectual Property Statistics (www.wipo.int/ipstats).

Source: World Intellectual Property Organization (WIPO). Global Innovation Index. (<https://www.wipo.int/gii-ranking/en/>). Data Year: 2025.

D.4 Digital Resilience

Cyber Resilience

D.1.1 Cybersecurity policy | 2023

The availability of a coherent strategic approach to cybersecurity in a country through the key components of high-level leadership, policy development and coordination, and an articulated national cybersecurity strategy.

Source: e-Governance Academy. National Cybersecurity Index. (<https://ncsi.ega.ee/>). Data Year: 2023.

D.1.2 Cyber threat analysis and awareness raising | 2023

The capacities and practices related to aggregating, analysing, and communicating cyber threat information. These activities are undertaken with two purposes: to raise public awareness about cybersecurity and to offer situational awareness and guidance to various actors so they can take measures to protect themselves. The indicators cover aspects such as cyber threat assessment and analytical capacity; public threat alerts and the provision of public cybersecurity guidance, advisories, and awareness resources; and ensuring coherent awareness raising through national coordination.

Source: e-Governance Academy. National Cybersecurity Index. (<https://ncsi.ega.ee/>). Data Year: 2023.

D.1.3 Cyber incident response | 2023

The establishment and sustainability of effective national capabilities to prevent, detect, respond to, and recover from cyber incidents. The central aspect of this capacity is the presence of an established, functioning national computer security incident response team (CSIRT), also known as a computer emergency response team (CERT) or cyber incident response team (CIRT). The remaining indicators in this area address the key facets and tools of CSIRT operation: the national CSIRTs relations and communication with its constituency, as well as its engagement in international cooperation networks.

Source: e-Governance Academy. National Cybersecurity Index. (<https://ncsi.ega.ee/>). Data Year: 2023.

D.1.4 Cyber crisis management | 2024*

Factors that determine the country's readiness to deal with large-scale cyber incidents or cyber-induced crises on a national level. It examines the preventive aspects of crisis management, such as consideration of cyber risks in national crisis scenarios and crisis plans. It also tracks whether such plans, crisis management processes, and skills are regularly tested and practised in crisis exercises nationally and internationally. Finally, it surveys the level of readiness to engage other actors in support of the government's crisis management activities.

Source: e-Governance Academy. National Cybersecurity Index. (<https://ncsi.ega.ee/>). Data Year: 2024, 23/21.*

D.1.5 Fight against cybercrime | 2024*

The country's preparedness and commitment to combat cybercrime by establishing the necessary legislative measures, organisational frameworks, and international cooperation. Cybercrime involves criminal activities where computer systems and computer data are either a primary tool to commit a crime or a primary target of the crime. It includes offences against the confidentiality, integrity, and availability of computer systems or data, as well as traditional offences committed using computer systems (e.g. fraud, forgery) and content-related offences (e.g. online distribution of child pornography). The NCSI's main focus is on offences against the confidentiality, integrity, and availability of computer data and computer systems, as described in Articles 2-6 of the Convention on Cybercrime (Budapest Convention) concerning illegal access, illegal interception, data interference, system interference, and misuse of devices.

Source: e-Governance Academy. National Cybersecurity Index. (<https://ncsi.ega.ee/>). Data Year: 2024, 23/21.*

D.1.6 Secure Internet servers | 2023

The number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey (by hosting country), per 1 million people.

*Source: World Bank. World Development Indicators (WDI). (<https://datatopics.worldbank.org/world-development-indicators/>).
Data Year: 2023.*

D.1.7 Confidence in recognising scams | 2024

Response to the survey question, "How confident are you that you can recognise scams?"

Source: Global Anti-Scam Alliance (GASA). State of Scams Report. (<https://www.gasa.org/research>). Data Year: 2024.

D.1.8 Reported scam attempts | 2024

Response to the survey question, "In the last 12 months, how often have you been exposed to scam attempts?"

Source: Global Anti-Scam Alliance (GASA). State of Scams Report. (<https://www.gasa.org/research>). Data Year: 2024.

D.1.9 Reported financial losses to scams and fraud | 2024

Response to the survey question, "In the last 12 months, in total, how much money did you lost to scams before trying to recover the funds?"

Source: Global Anti-Scam Alliance (GASA). State of Scams Report. (<https://www.gasa.org/research>). Data Year: 2024.

D.1.10 Did you report a scam or scam attempt to the police or authorities in the last 12 months? | 2024

Response to the survey question, "Did you report a scam or scam attempt to the police or authorities in the last 12 months?"

Source: Global Anti-Scam Alliance (GASA). State of Scams Report. (<https://www.gasa.org/research>). Data Year: 2024.

D.1.11 Organised crime | 2024

Criminality and resilience for each country on a scale of 1 to 10. Countries' criminality scores are made up of the average of ten criminal markets and four criminal actor types. While encompassing a range of activities, criminal markets can be thought of as the political, social and economic systems surrounding all stages of the illicit trade and/or exploitation of commodities or people. Criminal actor scores are based on assessments of the structure, control and influence of groups engaged in organised criminal activities. The higher the criminality score a country has, the more severe its criminality conditions are.

Source: Global Initiative Against Transnational Organized Crime (GI-TOC). Global Organized Crime Index. (<https://ocindex.net/>).

Data Year: 2024.

Environmental Sustainability

D.2.1 E-waste legislation | 2022

Aggregate score based on whether legislation exists for four dimensions: National, EPR, Collection Target, Recycling Target, where 25 = Yes, 0 = No.

Source: The Global E-Waste Statistics Partnership. *Global E-Waste Monitor*. (<https://globalewaste.org/>). Data Year: 2022.

D.2.2 Climate-driven INFORM risk indicator* | 2022

This measure is a proxy for the environmental impact of digital technology use.

A global, open source risk assessment for crises and disasters. The Climate-driven INFORM Risk is an adaptation of the INFORM Risk Index, adjusted by IMF staff to distil and centralise on climate-driven risks. It has three dimensions: climate-driven hazard & exposure, vulnerability, and lack of coping capacity. The maps below, available in two different tabs, present the composite Climate-driven INFORM Risk indicator and Climate-driven Hazard and Exposure component.

Source: International Monetary Fund (IMF). *Climate Change Dashboard*. (<https://climatedata.imf.org/pages/country-data>). Data Year: 2022.

D.2.3 Levelling the playing field for renewables* | 2023

This measure is a proxy for the sustainability of resource consumption related to digital technology use.

Aggregates responses to the following survey questions: (i) Is there GHG emissions coverage under any carbon pricing mechanism?; (ii) Are there mechanisms to compensate or protect low-income households for the regressive effects of carbon pricing?; (iii) Is there a renewable certificate tradable system for new projects in any sector? (e.g. electricity, heating and cooling, digital sector, etc.); (iv) Has a fossil fuel subsidy removal reform been enacted?; (v) Are there mechanisms to compensate or protect low-income households for the regressive effects of fossil fuel subsidy phase-out/removal?

Source: World Bank. *Regulatory Indicators for Sustainable Energy (RISE)*. (<https://rise.esmap.org/>). Data Year: 2023.

D.2.4 Renewable energy governance⁺ | 2023

This measure is a proxy for enablers in facilitating the sustainability of resource consumption related to digital technology use.

Aggregates responses to the following survey questions: (i) Is there an institution responsible for tracking progress in renewable energy development?; (ii) Is there any periodic reporting mechanism for renewable energy progress?; (iii) Is there a mechanism for adjusting renewable energy planning based on reporting of renewable energy deployment?; (iv) Is there a framework to monitor and penalise non-compliance of the mandates in ALL sectors?; (v) Is there a framework to monitor and penalise non-compliance of the tradable system?; (vi) Is there a monitoring, reporting and verification system for greenhouse gas emissions in place?

Source: World Bank. *Regulatory Indicators for Sustainable Energy (RISE)*. (<https://rise.esmap.org/>). Data Year: 2023.

D.2.5 Total greenhouse gas emissions per capita, excluding land-use change and forestry⁺ | 2023

This measure is a proxy for the environmental impact of digital technology use.

Tonnes of carbon dioxide-equivalents per person. Contributions from land-use change and forestry are not included. Data is primarily collected from various sources: Zenodo (<https://doi.org/10.5281/zenodo.16640595>) and UN World Population Prospects (<https://population.un.org/wpp/>).

Source: Our World in Data. (<https://ourworldindata.org/grapher/per-capita-ghg-excl-land-use>). Data Year: 2023.

D.2.6 Renewable electricity investment | 2024

This measure is a proxy for enablers in facilitating the sustainability of resource consumption related to digital technology use.

Total spending on installation cost per kw/mw of Renewable Energy technology in a country (e.g., labour costs, materials costs (purchase price of materials, including feeder materials for biogas/biomass), land costs, BPL costs and FX of local currency to USD, excludes cost of manufacturing parts). Calculated per GDP.

Source: Huawei. *Global Digitalization Index*. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

D.2.7 Renewable electricity utilisation rate⁺ | 2024

This measure is a proxy for the sustainability of resource consumption related to digital technology use.

A ratio of the absolute value of power generation by renewable energy to the absolute value of total national power generation, weighted by the electrification rate.

Source: Huawei. *Global Digitalization Index*. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

D.2.8 Green energy policy | 2023

This measure is a proxy for the integration of environmental sustainability goals into digital transformation policies.

Evaluation of power policies and green policies, including net zero target, renewable energy target, feed-in tariff/ premium payment and net metering/billing.

Source: Huawei. Global Digitalization Index. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

D.2.9 Ecological sustainability | 2024

This measure is a proxy for the sustainability of resource consumption related to digital technology use.

Aggregates the following: (i) GDP/unit of energy use, (ii) Low-carbon energy use (%), and (iii) ISO 14001 environment/bn PPP\$ GDP. (i) is defined as the purchasing power parity gross domestic product (2015 PPP\$ GDP) per total energy supply (TES). GDP/TES is an indicator of energy productivity. (ii) is defined as the low-carbon intensive energy share, which is calculated based on its share of a country's total primary energy consumption (expressed in petajoules). For (iii), ISO 14001 specifies the requirements for an environmental management system that an organisation can use to enhance its environmental performance.

Source: Huawei. Global Digitalization Index. (<https://www.huawei.com/en/gdi>). Data Year: 2024.

Policy Innovation

D.3.1 Government effectiveness | 2023

Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: World Bank. Worldwide Governance Indicators (WGI). (www.govindicators.org). Data Year: 2023.

D.3.2 ICT regulatory regime | 2022

What regulation exists in major areas, including types of licenses, interconnection prices made public, Quality of Service (QoS) monitoring required, infrastructure sharing, and national plans for broadband, among others.

Source: International Telecommunication Union (ITU). ICT Regulatory Tracker. (<https://app.gen5.digital/tracker/about>). Data Year: 2022.

D.3.3 ICT policy design principles (G5 benchmark) | 2023

The design of frameworks and their coherence. As all sectors' regulation shifts from rules to principles, new elements have become paramount in ensuring that regulatory processes and policy implementation are delivering as they should – from applying tools for evidence-based decision-making, to providing space for regulatory experimentation, to strengthening the accountability of multistakeholder policy initiatives, to ethics.

Source: International Telecommunication Union (ITU). ICT Regulatory Tracker. (<https://app.gen5.digital/tracker/about>). Data Year: 2023.

D.3.4 ICT digital development toolbox (G5 benchmark) | 2023

The tools needed by regulators to stimulate the development of a sustainable digital economy. It considers new consumer needs, business models and market dynamics. The G5 toolbox spans areas such as cybersecurity, data protection, emergency telecommunications and cross-sector infrastructure sharing. The toolbox also includes universal instruments geared towards the achievement of mid- to long-term social and economic goals – such as youth employment and sustainable consumption and production – where digital has a central role to play.

Source: International Telecommunication Union (ITU). ICT Regulatory Tracker. (<https://app.gen5.digital/tracker/about>). Data Year: 2023.

D.3.5 ICT digital economy policy agenda (G5 benchmark) | 2023

Country policies and interventions for promoting the digital economy, entrepreneurship and investment. The areas covered range from an innovation framework to digital transformation to sector taxation and adherence to international and regional integration initiatives.

Source: International Telecommunication Union (ITU). ICT Regulatory Tracker. (<https://app.gen5.digital/tracker/about>). Data Year: 2023.

D.3.6 Policy coordination | 2024

To what extent the government can coordinate conflicting objectives into a coherent policy. As many policies have conflicting objectives, reflect competing political interests and affect other policies, the government has to ensure that its overall policy is coherent. Successful coordination should: (i) assure that trade-offs between policy goals are well balanced, (ii) introduce horizontal forms of coordination to mediate between different departments of the state administration, and (iii) ascribe responsibilities in a transparent manner to avoid the negligence of tasks, redundancies or friction between different government branches. Various coordination styles — hierarchic-bureaucratic, informal-network, personalist, centralised, decentralised, etc. — are possible and may be functionally equivalent. What matters is their impact on policy coherence. Further details can be found at

<http://bti-project.org/en/methodology#Measurement%20and%20review%20process>.

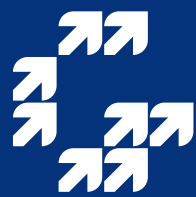
Source: Bertelsmann Stiftung Foundation. The Bertelsmann Stiftung's Transformation Index (BTI).

(<https://www.bertelsmann-stiftung.de/en/publications/publication/did/transformation-index-bti-2024-all>). Data Year: 2024.

References

1	Utilised the most recent figure for each country with data recorded, with * as the primary year of data collection.
2	Ibid.
3	Ibid.
4	Ibid.
5	Ibid.
6	Ibid.
7	Ibid.
8	Ibid.
9	Ibid.
10	Ibid.
11	Ibid.
12	Ibid.
13	Ibid.
14	Ibid.
15	Alwateer, M. et al. (2024, November). Missing Data Imputation: A Comprehensive Review. <i>Journal of Computer and Communications</i> , 12(11), 53-75. Retrieved April 8, 2025 from di: 10.4236/jcc.2024.1211004.
16	Benchmarked against indices that set a minimum threshold of data availability for number of indicators in a sub-pillar to calculate a score and still ensure representativeness: at least 40% of indicators in a sub-pillar for the Network Readiness Index (NRI); at least 66% of indicators for each of the major sub-indices, with scores for at least 2 sub-pillars, for a pillar in the Global Innovation Index (GII).
17	Da Silva, C. (2025, March 23). Winsorization: handling outliers in machine learning. <i>Train in Data</i> . Retrieved July 2, 2025 from https://web.archive.org/web/20260127075513/https://www.blog.trainindata.com/winsorization-handling-outliers-in-machine-learning/

18	Groeneveld, R. & Meeden, G. (1984). Measuring Skewness and Kurtosis. <i>Journal of the Royal Statistical Society</i> , 33(4), 391-399. Retrieved July 2, 2025 from https://doi.org/10.2307/2987742
19	OECD. (2008, August 22). Handbook on Constructing Composite Indicators: Methodology and User Guide, 30. Retrieved April 8, 2025 from https://doi.org/10.1787/9789264043466-en
20	Ibid.
21	OECD. (2008, August 22). Handbook on Constructing Composite Indicators: Methodology and User Guide, 32. Retrieved April 8, 2025 from https://doi.org/10.1787/9789264043466-en
22	Ibid.



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