International Telecommunication Union Development Sector

# Global Cybersecurity Index 2024

5<sup>th</sup> Edition

# Global Cybersecurity Index 2024

**5th Edition** 



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# Foreword



Over the past decade since the launch of the first Global Cybersecurity Index in 2015, 2.5 billion people have come online. The past 10 years have witnessed a significant evolution in the cybersecurity landscape, driven in part by the emergence of new technologies like artificial intelligence (AI), blockchain, and the potential of quantum computing. However, one constant remains: the human element. Cybersecurity efforts and the responsible use of digital technologies by individuals are paramount in shaping the future of this domain, and for working towards meaningful connectivity.

Recognizing the centrality of people, ITU Member States adopted the Kigali Action Plan in 2022 and highlighted the need for inclusive and secure telecommunications/ ICTs for sustainable development through supporting components like cybersecurity, in addition to digital literacy, strengthening the security of users online, assisting Member States with national cybersecurity strategies and computer incident response teams (CIRTs), digital skills and digital trainings, and secure infrastructure.

This edition of the Global Cybersecurity Index features record engagement by countries and is our most rigorous yet. Each country submission has been independently verified for accuracy, against consistent baselines and definitions. As a result, users of the Index can feel assured in its quality and applicability. Indeed, we have been encouraged to learn that Member States are incorporating GCI-based metrics into their national plans and activities.

The results of this edition of the GCI highlights significant improvements made by countries such as adding foundational legislation, establishing incident response efforts, developing clearer national plans, training people across society, and working together with national and international partners. In particular, many countries have been increasingly targeting their cybersecurity efforts toward vulnerable and underrepresented populations.

However, while the rise in cybersecurity initiatives is encouraging, a crucial next step for Member States lies in ensuring that these efforts are effective. Simply committing to action is not enough, we need to make sure that cyber commitments are implemented through high-quality, highimpact activities. In the future, we hope to support countries in enhancing the steps they have already been taking through the GCI.

This need is more important than ever, as this edition of the Global Cybersecurity Index shows, given that the gaps between Least Developed Countries (LDCs), Small Island Developing States (SIDS), Land Landlocked Developing Countries (LLDCs), and developed countries continues to persist. As countries work to bridge these gaps on their path towards meaningful connectivity, I hope that they work to draw on good practices, and to develop well-defined, relevant and applicable legal frameworks, set up technical teams in incidence response, to address lack of skilled talent, and to enhance collaboration, particularly around issues impacting vulnerable populations.

Furthermore, international cooperation emerges as an indispensable component in addressing the transnational nature of cyber threats. Collaborative endeavours facilitate the sharing of best practices, intelligence, and resources, strengthening the collective cyber resilience. However, to fully harness the benefits of international cooperation, it is imperative to support the development of requisite capacities to meaningfully engage in collaborative efforts. Building and fortifying national cybersecurity capabilities lays the groundwork for countries to actively contribute to global cybersecurity endeavours and navigate the complexities of cyberspace with confidence and competence.

The Global Cybersecurity Index is only part of the puzzle in improving countries' commitments to cybersecurity. I hope that countries find ways to use the Global Cybersecurity Index in their efforts to develop secure and trustworthy ICTs.

Allong

Dr Cosmas Luckyson Zavazava Director of the Telecommunication Development Bureau International Telecommunication Union

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### **Report summary**

The fifth edition of the Global Cybersecurity Index (GCI) measures the commitment of countries to cybersecurity in the context of measures across the following five pillars:



The GCI, launched in 2015 by the International Telecommunication Union, seeks to help countries to identify areas of improvement and encourage countries to act in building capacity and capabilities under each pillar. The GCI has been continuously adapted across editions to respond to changing risks, priorities and resources, in order to provide a more relevant snapshot of cybersecurity measures taken by countries.

Countries measured	Collection years	Focal points from countries	Average overall score growth since 2020
194	2023-2024	172	27%
83 questions	20 indicators	5 pillars	Overall Score

Since 2021, countries have on average taken more cybersecurity-related actions and improved their commitments to cybersecurity. The global average country score has risen to 65.7/100.

Across the five GCI pillars, most countries are strongest in the legal pillar. By contrast, the average country is weakest in the capacity-development and technical pillars.

Each region has countries that are role-modelling or are advancing, and each region also has countries that are in the beginning stages of building their cybersecurity commitments. To capture these differences, country performance is measured across five tiers, with Tier 1 being the highest and Tier 5 the lowest. These tiers provide peer groups based on scores to help countries to understand and identify role models for improvement.



### Figure 1: Tier performance, by region

Source: ITU

### Key statistics by pillar

$\frown$	Legal				
() Ista	Measuring the laws and regulations on cyber- crime and cybersecurity	177	Countries had at least one regulation on either personal data protection, privacy protection, or breach notification in force or in progress.		
		151	Countries with data protection regulations in force		
		104	Countries with critical infrastructure regulations		
$\bigcirc$	Technical				
	Measuring the imple-	139	Countries with active CIRTs		
۲ <sub>۳</sub> ۴	mentation of technical capabilities through national and sector-spe-	83	Countries engaged with a regional CIRT association		
<b>\$</b>	cific agencies	110	Countries with frameworks to adopt cybersecurity standards		
$\bigcirc$	Organizational				
	Measuring national strat- egies and organizations implementing cyberse- curity	132	Countries with national cybersecurity strat- egies		
		161	Countries with cybersecurity agencies		
629		94	Countries with child online protection strat- egies and initiatives reported		
$\bigcirc$	Capacity development				
	Measuring awareness campaigns, training,	152	Countries conducting cyber-awareness initiatives		
ହିହ	education and incen- tives for cybersecurity capacity development	153	Countries with cybersecurity at some level of national curricula		
		99	Countries with cybersecurity capacity-devel- opment incentives		
$\bigcirc$	Cooperation				
	Measuring partnerships between agencies, firms and countries	108	Countries engaged or will be engaged in domestic or international cybersecurity public-private partnerships		
6-2		166	Countries with international cybersecurity agreements		
		122	Countries reporting inter-agency collaboration		

### Introduction

Robust and coordinated cybersecurity efforts by countries have become more important since the previous edition of the Global Cybersecurity Index (GCI). With approximately 5.4 billion people online,<sup>1</sup> even offline populations are impacted by continued acceleration of technological developments with the adoption of artificial intelligence, renewed efforts towards digitalization and widespread advances toward universal and meaningful connectivity.<sup>2</sup>

Cybersecurity issues have become more prominent, owing *inter alia* to:

- 1) **Increased ransomware**: growing reports of ransomware attacks targeting government services and other critical sectors in many countries.<sup>3</sup>
- 2) Breaches affecting core industries: the scale, frequency and intensity of cybersecurity incidents or breaches affecting individuals and various sectors including education, manufacturing, energy and IT services, to name but a few.
- 3) **Privacy concerns**: data breaches resulted in European data protection authorities issuing General Data Protection Regulation (GDPR) fines worth over EUR 1.9 billion in 2023,<sup>4</sup> with total GDPR fines issued since 2018 estimated to be currently worth more than EUR 4.5 billion.<sup>5</sup>
- 4) **Cost to businesses**: the global average cost of a data breach was estimated at USD 4.45 million in 2023.
- 5) **Outages**: information technology disruptions affecting the integrity and availability of systems, services and supply chains.<sup>6</sup>

It has been 35 years since the first International Telecommunication Union (ITU) cybersecurity standard, Recommendation ITU-T X.509, and a decade since the launch of the first GCI. During this time, ITU has worked with over 140 different Member States on their cybersecurity readiness, as cybersecurity has firmly emerged as a strategic imperative for governments, as well as for critical and non-critical sectors of society. Measuring the efforts towards improving cybersecurity has become a crucial touchstone for governments in driving development in the area. The GCI sits at the nexus of cybersecurity metrics, by assessing the measures taken by countries at the national level to improve their cybersecurity Agenda, i.e. legal measures, technical and procedural measures, organizational structures, capacity building and international cooperation, the GCI scores complement output-based measurements, such as number of cyberattacks and extent of vulnerabilities, among others. By contrasting the efforts taken by countries with cybersecurity outputs, countries, companies and civil society organizations can identify whether existing efforts need to be revisited or strengthened, how to prioritize future interventions, and how to begin to evaluate the effectiveness of these measures.

<sup>5</sup> <u>https://www.enforcementtracker.com/?insights</u>

<sup>&</sup>lt;sup>1</sup> <u>https://www.itu.int/itu-d/reports/statistics/2023/10/10/ff23-internet-use/</u>

<sup>&</sup>lt;sup>2</sup> Measuring digital development - ICT Development Index 2024, <u>https://www.itu.int/hub/publication/D-IND</u> -ICT\_MDD-2024-3/

<sup>&</sup>lt;sup>3</sup> <u>https://www.fortinet.com/resources/cyberglossary/ransomware-statistics</u>

European Data Protection Board, Annual Report 2023, <u>https://www.edpb.europa.eu/our-work-tools/our-documents/annual-report/edpb-annual-report-2023\_en</u>

<sup>&</sup>lt;sup>6</sup> CrowdStrike disruption in July 2024: <u>https://www.nytimes.com/2024/07/19/business/microsoft-outage</u> <u>-cause-azure-crowdstrike.html; https://www.wired.com/story/microsoft-windows-outage-crowdstrike-global</u> <u>-it-probems/; https://www.bloomberg.com/news/articles/2024-07-19/microsoft-cloud-service-issues-disrupt</u> <u>-air-travel-operations</u>

The fifth edition of the GCI explores the current level of cybersecurity commitment among 193 Member States and the State of Palestine and the progress made since the last edition. The GCI report examines the implications of the results for governments and policy-makers as they navigate national and regional circumstances, as well as global developments, while planning cybersecurity measures and initiatives. One of the key changes made in this edition is a shift from ranking countries to using a five-level tier for viewing countries' cybersecurity commitments. This tier-based perspective allows for greater focus on the extent of advances in cybersecurity commitments and what this may mean for countries. Moreover, given the nature of the cybersecurity landscape, there is always room for growth, refinement and adaptation regardless of a country's GCI score. While a score of 100/ 100 reflects a strong cybersecurity commitment, it does not mean further work is not required in terms of adopting appropriate cybersecurity measures in response to countries' shifting operating environments and the evolving cybersecurity ecosystem.

The GCI is used by countries, investment groups, development organizations, companies and other actors as an important tool in understanding cybersecurity commitments for several reasons, including:

- **Comprehensive evidence-based cybersecurity measures:** the GCI takes a multidimensional approach to cybersecurity and relies on either publicly available data or verifiable evidence provided by countries. This approach leads to a trustworthy, more reliable view of cybersecurity commitments. As a result, countries have come to rely on the GCI to inform their national cybersecurity plans.
- **Informing national policies:** countries can better understand their progress in key areas of cybersecurity and identify opportunities for further developments and innovations aligned with their national priorities and situational contexts.
- **Fostering research and development:** the cybersecurity landscape's dynamism necessitates proactive responses that include the identification or collection of data and the investigation and development of relevant cybersecurity artefacts, including new policies, laws and regulations, products and standards, among others.
- **Benchmarking:** countries can assess their level of cybersecurity commitment and progress over time against global and regional averages.
- **Enhancing cooperation:** with cooperation being a central part of good cybersecurity measures, opportunities for various levels of cooperation can be found and leveraged to support mutual strategic, operational and tactical cybersecurity responses.

To help countries consider their cybersecurity commitments considering the above issues, this edition of the GCI aims to be the most robust yet. It features greater clarity and refinement in questions, greater efforts to ensure consistency in verification and validation, while maintaining high-quality analysis. However, the GCI should be used with consideration for its limitations as it does not measure the quality of actions; it only assesses whether they are in place, partially in place/in progress or do not exist. ITU, in collaboration with the GCI Expert Group, will continue actively to seek ways of improving the relevance, rigour and validity of the indicators relied on and to better communicate results.

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## **Global view**

Overall, the fifth edition of the GCI presents many countries working to improve their cybersecurity commitments through implementing relevant measures across the five pillars: legal, technical, organizational, capacity development and cooperation. To give a more accurate view of the clusters of performance within the GCI, the GCI has shifted to a tier-based presentation of country scores, using score ranges set by the GCI Expert Group. (For more information on the tiers and their development, see section *Tiers*.)



### Figure 2: GCI tier performance, by region (with counts)

Source: ITU

Almost every region has high and low performing countries. This edition of the GCI has placed 46 countries in Tier 1 (T1), the highest tier. If the tier-based system had been applied to the fourth edition of the GCI<sup>7</sup>, 30 countries would have been placed in T1. Much of the movement to T1 comes from countries in Europe, Asia and the Pacific, the Arab States and Africa. These countries made significant improvements across the five GCI pillars since the last edition.

Most countries (105) were placed in T3 and T4, representing the many countries that have been expanding digital services and bringing people online but still have work to do to ensure that cybersecurity becomes part of their meaningful connectivity objectives.

Many of these countries also have a significant cyber-capacity gap: they are looking to enhance their cybersecurity but face resource limitations in terms of staffing, access to equipment and sustainable funding.

When comparing GCI scores against general information and communication technology (ICT) development, it should be noted that the scores do not necessarily trend in line with the ITU ICT Development Index (IDI), which measures universal connectivity and meaningful connectivity. There are many countries that are active on cybersecurity but still have a lower level of overall ICT development, meaning that they are well positioned to create a safe and trustworthy cyberspace as people come online. Inversely, there are many countries which perform above the IDI median

<sup>&</sup>lt;sup>7</sup> https://www.itu.int/epublications/publication/D-STR-GCI.01-2021-HTM-E

score but lack many cybersecurity measures. While these countries may have prioritized initial ICT development over integrating cybersecurity as they contend with limited resources, they risk a more insecure and less resilient cyberspace for people already online.



Figure 3: ITU ICT Development Index (2024) as compared to the Global Cybersecurity Index

Global Cybersecurity Index 5th Edition Score (out of 100)

Source: ITU

### Legal measures

Legal measures tend to be countries' strongest area of cybersecurity, but more still needs to be done.



Figure 4: Legal measures, by region (one dot = one country)

Source: ITU

Legal measures continue to be countries' strongest pillar on average. More countries have implemented legal measures designating and clarifying cybersecurity-related concerns, from

data protection to illegal online activities. There is evidence of increased harmonization among these laws and regulations, at least in terms of nomenclatures, such as aligning with GDPR or international cybercrime treaties. More countries are also adding or updating measures framed with technology-neutral language, creating increased flexibility in interpretation, and alignment between online and offline offences or obligations.

Efforts are still needed to ensure the specificity and application of laws and regulations. For example, some countries have ambiguities in breach notification requirements and their applications.

#### Privacy laws and regulations are increasing, and increasingly needed.

# Figure 5: Number of countries with regulations on personal data protection, privacy protection and/or breach notification



#### Source: ITU

With 8 billion records being breached in 2023 across over 2 800 reported breaches,<sup>8</sup> the average cost of a data breach has increased by 15 per cent over the past three years.<sup>9</sup> These incidents can be costly: for small businesses in North America alone, the average breach is estimated to cost USD 3.3 million.<sup>10</sup> Countries also risk users losing trust in ICTs due to these breaches. To provide recourse and rights for users as well as clear expectations for organizations handling data, countries have implemented regulations on personal data protection, privacy protection and/or breach notification.

The previous edition of the GCI noted that GDPR and similar legislation had driven an increase in the number of countries which had adopted privacy legislation and breach notification requirements. While the trend has begun to level out, more countries have also worked to ensure comparability between privacy regimes.

However, many countries can further clarify their privacy, data protection and breach notification laws and regulations. For example, not all countries have clearly defined what is the expected notification period for breaches, or the mandate of competent authorities to monitor and respond to breaches. In addition, these efforts can be complemented by capacity development, to ensure that relevant actors are well trained and aware of current cybersecurity threats.

<sup>&</sup>lt;sup>8</sup> <u>https://www.itgovernance.co.uk/blog/list-of-data-breaches-and-cyber-attacks-in-2023</u>

<sup>&</sup>lt;sup>9</sup> <u>https://www.ibm.com/reports/data-breach</u>

<sup>&</sup>lt;sup>10</sup> <u>https://www.ibm.com/reports/data-breach</u>

### **Technical measures**

The data show a high disparity in implementation of technical measures as a means of supporting cybersecurity efforts at the national level.



Figure 6: Technical measures, by region (one dot = one country)

Source: ITU

Together with legal measures, technology plays a pivotal role as a line of defence against malicious online actors. Robust cybersecurity mechanisms require a combination of competent individuals, well-documented processes and procedures, and technology. These elements prepare and empower countries to prevent, protect and respond effectively to cybersecurity incidents.

Activities to detect, prevent, respond to and mitigate cyberthreats and incidents take place in a variety of structures such as computer incident response teams (CIRTs), computer security incident response teams (CSIRTs) and Computer Emergency Response Teams (CERTs). Security operation centres (SOCs) and information-sharing and analysis centres (ISACs) can also perform some or all of these activities.

The relation between CIRTs and other agencies, particularly national cybersecurity coordination centres (NCCCs) or national cybersecurity authorities (NCAs), varies significantly between countries. While many countries have a national CIRT responsible for, *inter alia*, cyber-awareness activities, data collection and standards implementation, numerous NCCCs and NCAs have taken on these duties.

CIRTs are not only domestic focal points on incident response, they also serve as important international nodes to connect transnational cybersecurity incident response efforts. Events like regional and international cyber -drills can be important in this regard, as national CIRTs can interact with peers and establish informal and formal connections.

Moreover, participation in international fora, such as the Forum of Incident Response and Security Teams (FIRST), as well as regional fora, such as the Asia Pacific Computer Emergency Response Team (APCERT), the Pacific Cyber Security Operational Network (PaCSON), AfricaCERT, the European Union Cyber Security Agency (ENISA), the Organisation of Islamic Cooperation and the Organization of American States, is of paramount importance for CIRTs, as it provides a platform for knowledge-sharing, collaboration and capacity development among cybersecurity professionals worldwide. Some 98 countries reported being part of FIRST or listed TF-CSIRT, with six in the process of joining, while 115 reported being part of regional CIRT organizations.

Standards also figure among best practices for implementation under the technical pillar. As standards undergo rigorous evaluation by experts, they can provide clear roadmaps on how to structure cybersecurity initiatives, teams and technologies. With a proliferation of relevant standards and qualifications, 110 countries had some sort of framework in place for the implementation of cybersecurity standards.

Standards can also help to bridge certain fundamental security gaps that still persist. Globally, between 14 per cent and 35 per cent of regions' mail services are not using secure sockets layer/ transport layer security (SSL/TLS) protocols or ciphers, or are using insecure or weak ones.<sup>11</sup> Between only 1 per cent and 4.6 per cent of mail services use the recommended implementation of SSL/TLS, with the rest using some sort of secure protocol.

#### CIRTs are playing a key role in the cybersecurity ecosystem.

# Figure 7: Percentage of countries with a CIRT, by region/income group/development status



Countries with a CIRT, by region/income group/development status

Source: ITU

CIRTs, CSIRTs, CERTs, SOCs, ISACs and other teams monitor threats and help to respond in the event of a cybersecurity incident. With an estimated 68 per cent of organizations suffering a cyberattack in 2023,<sup>12</sup> CIRTs have become more important than ever. Based on current data, 139 countries have a national CIRT, while 55 do not have a CIRT or national CIRT in progress.

<sup>&</sup>lt;sup>11</sup> Dreamlab Technologies research data on SSL/TLS implementation for mail protocols (SMTPS, POP3S, IMAPS), November 2023.

<sup>&</sup>lt;sup>12</sup> <u>https://www.netwrix.com/2023\_hybrid\_security\_trends\_report.html</u>

Beyond their immediate function of incident response, CIRTs serve as a catalyst for broader engagement within organizations, fostering a culture of cybersecurity awareness and resilience. By conducting coordinated responses to cyber-incidents, CIRTs not only mitigate immediate risks but also lay the groundwork for proactive security measures and continuous improvement in organizational cybersecurity posture. For example, CIRTs can monitor and drive implementation of best practices, such as Domain Name System Security Extensions (DNSSEC) and security vulnerability disclosure.

For example, to ensure that the domain name system (DNS) is safe and authenticates responses to domain name lookups, only 0.43 per cent of African providers have implemented DNSSEC, compared to a higher adoption rate of 13.13 per cent in the Commonwealth of Independent States (CIS) region. Regions with high numbers of Internet users, such as Asia and the Pacific, only have a 1.52 per cent adoption of DNSSEC, versus 11.28 per cent in Europe.<sup>13</sup>

CIRTs can also drive security disclosures. For example, websites can adopt security.txt,<sup>14</sup> which includes key contact information in the event of a vulnerability discovery, as well as relevant policies and acknowledgements. Currently, this is underused globally, with less than 0.7 per cent of sites using this mechanism.<sup>15</sup>

The presence of a CIRT is most likely in high-income countries (globally, 89 per cent of such countries have a national CIRT), with upper-middle and lower-middle income countries less likely (70 per cent and 67 per cent, respectively). Some 46 per cent of lower-income countries had an operational national CIRT as of 2024.

The ability to respond to an incident varies based on the country's investment, local capacity and overall organization.

To enhance preparedness and capabilities, CIRTs, as well as cybersecurity authorities, are increasingly running cybersecurity simulation exercises (cyber drills) among stakeholders. While 140 countries participated in regional cyber drills organized by ITU in 2023, running national cyber drills remains important to engage domestic stakeholders in hands-on exercises. National cyber drills can engage a wider set of domestic actors than regional or international cyber drills do and can be better tailored to the national context.

<sup>&</sup>lt;sup>13</sup> Dreamlab Technologies research data on global DNSSEC implementation, November 2023

<sup>&</sup>lt;sup>14</sup> RFC9116. Note that other mechanisms may be used by organizations.

<sup>&</sup>lt;sup>15</sup> Dreamlab Technologies research data on adoption of security.txt for vulnerability disclosure, January 2023.





Countries running CyberDrills, by region/income group

Sectoral CIRTs are being implemented to address specific sectoral needs.



### Figure 9: Countries with a sectoral CIRT, by region/income group/development status

Source: ITU

While some countries choose to rely on national CIRTs to support all sectors, sectoral CIRTs also have an important role to play. Specific sectors of industry face different threats and have different incident-response needs depending on whether they are part of critical infrastructure and on their supply chain, etc. For example, 25.7 per cent of all cyberattacks in 2023 targeted

the manufacturing sector; of those attacks, 45 per cent used malware and 17 per cent used ransomware. By contrast 18.2 per cent of all cyberattacks targeted the finance and insurance sectors, with 38 per cent of the attacks using malware and 25 per cent using ransomware.<sup>16</sup> Sectoral CIRTs can be better positioned than national CIRTs to respond to a particular sector's profile in terms of the technologies used, specific vulnerabilities and remediation needs in the event of an attack.

As was the case in the fourth edition of the GCI, sectoral CIRTs are less common than national CIRTs. A number of countries participate in regional sectoral CIRTs, such as regional financial CIRTs, which allow for the leveraging of joint resources with other countries to tackle common issues.

Not all countries have the capacity and resources to implement sectoral CIRTs. For them, as well as countries with sectoral CIRTs, prioritization is key to ensure that relevant sectors receive the tailored support needed to manage cybersecurity risks. Low-income countries and small island developing States in particular are less likely to have sectoral CIRTs, as many have focused their efforts on the process of developing, or enhancing, their national CIRT. As these countries' ICT infrastructure continues to develop, addressing the cybersecurity needs of sectors can be met domestically or through regional CIRTs.

### **Organizational measures**

Greater coordination and alignment are necessary for shaping more data-driven and inclusive national cybersecurity efforts.





Source: ITU

Organizational measures are necessary for the proper implementation of a national cybersecurity posture and help to guide effective implementation. Many countries have made strides in ensuring that there are clear strategic objectives, with a comprehensive plan in implementation, delivery and measurement. Without a well-defined organizational network of partners, working together across industry, civil society and academia efforts in different sectors and industries

<sup>&</sup>lt;sup>16</sup> https://www.ibm.com/downloads/cas/L0GKXDWJ

become disparate and unconnected, thwarting efforts towards national harmonization in cybersecurity development.

National cybersecurity strategies are a primary tool towards developing an effective organizational framework. Beyond national cybersecurity strategies, countries have also been working to develop clear metrics and measures to understand how to track outputs of cybersecurity at the national level, and track in-depth inputs of cybersecurity such as audits. Translating these metrics to policy and implementation requires clear roles and responsibilities, as well as responsive organizational frameworks.

#### More countries have a national cybersecurity strategy.

National cybersecurity strategies (NCSs) have become an increasingly common tool for governments to organize around cybersecurity. As of 2024, 132 countries have an NCS, up from 107 in 2020. Much of this progress can be attributed to the Africa region, where nine countries have ushered in their first NCS. In addition, many countries have worked to revise and update their existing strategies.

The breadth and depth of NCSs vary considerably. The second edition of the Guide to Developing a National Cybersecurity Strategy recommends several key areas for countries to consider incorporating into their NCSs. Only 85 out of the 132 countries with an NCS include the following measures:

- cybersecurity of critical infrastructure;
- lifecycle management principles;
- stakeholder engagement; and
- an action plan.

The quality of each of these measures can also be addressed. Countries most often implement practices like stakeholder engagement and lifecycle management at the beginning or end of their NCS, instead of integrating these concepts through the NCS lifecycle. As a result, they miss out on valuable feedback related to the NCS, opportunities to ensure that domestic stakeholders are aligned on key priorities and the chance to adapt where necessary to help to ensure that the NCS remains relevant and effective over time.

For example, some countries leveraged their action plans to ensure that best practices and recommended activities were implemented, and used lessons learned from the action plan to update and revise their NCS.

Having an action plan does not guarantee that all best practices are prioritized or incorporated. For example, cybersecurity audits are a commonly accepted best practice to assess and analyse organizations' cybersecurity and cyber-risks. Yet many countries do not have them in their action plan. As shown in Figure 11, while there are 64 countries that have an NCS with an action plan and have carried out national cybersecurity audits, 19 countries with an NCS and an action plan did not do national cybersecurity audits.





Source: ITU

Critical information infrastructure efforts often lack supporting legal measures.

# Figure 12: Percentage of countries which have measures in force related to critical information infrastructure, by region



Percentage of countries which have measures in force related to Critical Information Infrastructure

#### Source: ITU

Critical information infrastructure (CII) is tackled in the GCI through questions under the legal, technical, organizational and capacity-development pillars. Developing a synergistic CII ecosystem involves addressing all these pillars in concert and ensuring that the measures reflect current threats and vulnerabilities. Considering the questions on CII under the legal and organizational pillars, the most common feature is to have an agency responsible for CII cybersecurity.

With 54 per cent of countries globally having an agency, ministry or other entity bearing responsibility for CII cybersecurity, only 49 per cent of countries globally have such a framework in place, or being put in place, to implement cybersecurity standards in relation to CII.

To ensure that professionals working on CII, such as those in the telecommunication or energy sectors, are well prepared to manage cybersecurity risks and respond to incidents, training is important. Some 90 per cent of countries with an NCS that addresses CII and with a responsible agency have conducted sector-specific training for cybersecurity professionals.

Implementation of child online protection strategies and initiatives remains limited.

15

# Figure 13: Countries with national child online protection strategies, with associated current child online protection initiatives, by region



Countries with Child Online Protection national strategies, with associated current Child Online Protection initiatives

Source: ITU

It is estimated that every half a second, a child goes online for the first time.<sup>17</sup> In addition, the 2023 Child Online Safety Index (COSI) found that nearly 70 per cent of children and adolescents aged 8-18 years old worldwide have experienced at least one cyber-risk incident in the past year.<sup>18</sup> With this in mind, child online protection has long been a building block for collaboration between law enforcement, policy-makers, educators, parents, advocates and other stakeholders. To coordinate these stakeholders' efforts, child online protection strategies with associated initiatives are needed.

In this edition, 164 countries reported having legal measures on child online protection, compared to 130 countries in the previous edition of the GCI.<sup>19</sup> These measures were sometimes part of other rules and regulations, such as on online crime or sexual exploitation. Despite most countries having laws and regulations on child online protection, only 94 countries globally have strategies with associated current child online protection initiatives in place. Activities included awareness-raising campaigns, training for educators, training for police, and reporting mechanisms, among others. These activities are targeting a wide range of ages, as not only young children are at risk.

<sup>&</sup>lt;sup>17</sup> https://www.unicef.org/protection/violence-against-children-online

<sup>&</sup>lt;sup>18</sup> <u>https://www.dqinstitute.org/child-online-safety/</u>

<sup>&</sup>lt;sup>19</sup> https://www.itu.int/epublications/publication/D-STR-GCI.01-2021-HTM-E





Source: ITU

As children continue to come online, they need to be both protected and empowered in order to become active participants in creating a safe and trustworthy cyberspace. For this to happen, parents, teachers, policy-makers, law enforcement, public sector actors and other stakeholders need to be able to support children and youth in their digital journeys and need to understand the risks and challenges facing children online.

### **Capacity-development measures**

Cybersecurity training and awareness efforts vary across regions against the backdrop of efforts to develop a strong industry.



Figure 15: Capacity-development measures, by region (one dot = one country)

Source: ITU

Capacity development is key to building a robust cybersecurity ecosystem. Countries risk eroding progress that has been made in enhancing full and universal connectivity if they do not support cybersecurity skills and awareness-raising. Over 95 per cent of countries have some activity under the capacity-development pillar, with the most activities reported in the awareness-raising campaign category.

Efforts to develop a domestic cybersecurity industry were also present in many countries, taking the form of incentive mechanisms, such as grants and scholarships, and organizations acting to promote the cybersecurity industry. Such initiatives can increase the level of cybersecurity in a country beyond the level that may have developed without government support.

Research and development (R&D) was also tracked as part of efforts to develop domestic capacity. Some 127 countries reported some form of R&D, whether through the private sector, public sector or academia, with academia being the most common centre for R&D.

Countries are increasingly targeting specific demographics as part of cyber-awareness campaigns.

# Figure 16: Number of countries with targeted cyber-awareness campaigns beyond the general population, global





#### Source: ITU

Creating a culture of cybersecurity is an ongoing challenge for all countries. Awareness-raising campaigns, which seek to inform users and change behaviours, are developed or supported, with 152 countries reporting having a cybersecurity awareness-raising campaign aimed at the general public. In addition, 130 countries had some form of targeted cyber-awareness campaign carried out or planned, with 52 per cent of those targeting four or more different demographic groups. Some 20 countries reported upcoming, planned or in-progress targeted cybersecurity awareness campaigns.

Targeted awareness-raising campaigns serve as vital tools in identifying specific threats and educating individuals and organizations about cybersecurity threats and best practices. The effectiveness of such campaigns, however, often hinges on the metrics used to track impact, particularly when the campaigns are primarily conducted on social media platforms. While social media offer extensive reach and engagement potential, relying solely on metrics such as likes, shares and comments may not accurately gauge the campaigns' true efficacy

in raising awareness and changing behaviour. Instead, there is a growing recognition of the need for human-centred approaches that resonate with people's realities and address their specific concerns and challenges in navigating the digital landscape securely. This requires the tailoring of awareness-raising campaigns to diverse audiences, considering factors such as cultural context, digital literacy levels and socio-economic backgrounds. By adopting a more nuanced approach that prioritizes meaningful engagement and behavioural outcomes over superficial metrics, organizations can ensure that their awareness campaigns effectively empower individuals to protect themselves against cyberthreats and contribute to building a safer online environment for all.

### Many countries still lack cybersecurity skill development programmes across educational levels.

### Figure 17: Percentage of countries in region with curricula or training, at various stages of education, by region



Percentage of countries within region with curricula or trainings, at

Source: ITU

While the cybersecurity workforce grew 8.7 per cent from 2022 to 2023, the gap between the workers needed and the number available has also grown, by 12.6 per cent.<sup>20</sup> To address this gap, countries are increasingly seeking to develop cybersecurity skills within their population by incorporating cybersecurity into school curricula at the primary (61 countries) and secondary (68 countries) levels, as well as in university-level courses and programmes (137 countries).

Beyond formal schooling, countries are offering training programmes that target youth (85 countries) and cybersecurity professionals (123 countries).

To ensure that a domestic cybersecurity industry can flourish, countries can work to ensure that the variety of educational opportunities available at different ages sufficiently prepare students and professionals for their careers.

https://media.isc2.org/-/media/Project/ISC2/Main/Media/documents/research/ISC2\_Cybersecurity Workforce Study 2023.pdf?rev=28b46de71ce24e6ab7705f6e3da8637e

### **Cooperation measures**

Operationalization and impact of agreements and frameworks remains a challenge.



Figure 18: Cooperation measures, by region (one dot = one country)

#### Source: ITU

Cybersecurity is a complex, interconnected challenge necessitating a holistic, multistakeholder approach. Given its transnational character, effective response demands cooperation across public, private and government sectors. The past decades have been characterized by a variety of efforts to build international cooperation and coordination, including the Budapest Convention on Cybercrime, which entered into force in 2004; the African Union Convention on Cyber Security and Personal Data Protection (Malabo Convention), which came into effect in 2023; and the Commonwealth of Independent States Agreement on Cooperation in the Fight Against Crimes in the Field of Information Technologies (Dushanbe Agreement), which came into force in 2020. In addition, cybersecurity efforts have increased in the context of many other international, regional and sectoral agreements around cybersecurity. Still, many countries are not part of these agreements, whether due to conflict, lack of human resourcing or unclear benefits.

On the domestic front, working with the private sector offers governments a chance to leverage private sector insights and expertise to improve cybersecurity. Almost 63 per cent of countries reported having inter-agency processes for cybersecurity within their governments. However, collaboration is less common with the private sector, with less than half of countries reported being part of public-private partnerships (PPPs) with domestic or foreign companies.

The test of success of these agreements, partnerships and processes will be whether they move beyond paper and promote action. By fostering information sharing, capacity building and joint threat assessment, the international community can more effectively address the evolving cyberlandscape, including the increasing intersection of cybersecurity and artificial intelligence.

#### Many countries are part of international cybersecurity agreements.

# Figure 19: Percentage of regions part of any bilateral or multilateral agreement that addresses information-sharing or capacity development, by region



Percentage of regions that part of any bilateral or multilateral agreement that addresses information sharing or capacity development, by region

Source: ITU

In verifying data for this edition of the GCI, many countries were found to be party to, or in the process of becoming party to, international agreements of which their focal points were not aware. Policing was a common area in the development of cybersecurity agreements, often done with organizations such as INTERPOL, or regional organizations. The types of agreements related to cybersecurity and their specifics varied significantly; some countries used general agreements to form a basis for further projects and implementation related to cybersecurity capacity development and information-sharing, while other countries developed more specific agreements from the start.

### Building domestic collaboration remains an area for improvement.

Cybersecurity is more than simply a hardware or software issue: coordination between capable domestic actors is an important component for coherent commitments. Effective coordination requires the clear identification of roles and responsibilities: the second edition of the Guide to Developing a National Cybersecurity Strategy recommends that countries should ensure that all stakeholders, including various government agencies, ministries and entities, the private sector and civil society, involved in cybersecurity "should have a clear understanding of their respective roles and responsibilities."<sup>21</sup>

In 2020, 136 countries had an agency designated as responsible for cybersecurity at the national level, 95 reported having inter-agency cooperation, and 92 were found to have both. By this edition of the GCl, 161 countries had an agency designated as responsible for cybersecurity at the national level, 122 reported having inter-agency cooperation, and 118 reported having both. This upward trend is encouraging as responsible agencies can help to drive more cohesive and collaborative approaches to cybersecurity.

<sup>&</sup>lt;sup>21</sup> <u>https://ncsguide.org/the-guide/principles/</u>



# Figure 20: Intersection of countries with a responsible agency and inter-agency collaboration (compared to the fourth edition of the GCI in 2021)

Source: ITU



# Conclusion

There has been much improvement since the previous edition of the Global Cybersecurity Index (GCI). Still, more needs to be done to meet the evolving digital threat landscape. Cyberattacks are perceived to be the fifth most likely risk to present a material crisis on a global scale in 2024.<sup>22</sup> Recent global technical outages demonstrated the world's dependency on the digital infrastructure and the need for resilience. If countries want to benefit from the promise of information and communication technologies (ICTs), they need to think about cybersecurity.

Across the GCI and its legal, technical, organizational, capacity-development and cooperation pillars, countries need to carefully prioritize high-impact activities in their efforts, rather than surface-level documents or campaigns. Countries may want to consider efforts to:

- implement legal measures that can be clearly and fairly applied across all sectors;
- foster cross-functional efforts that address more than just information technology;
- maintain well-trained and responsive national institutions, including computer incident response teams;
- engage a wide range of stakeholders across all cybersecurity initiatives;
- develop and regularly update the national cybersecurity strategy with an implementable action plan;
- implement effective child online protection measures;
- address cybersecurity challenges faced by critical infrastructure;
- run cyber-awareness campaigns that address relevant issues;
- provide training opportunities for cybersecurity professionals, critical infrastructure actors and youth in order to build and enhance cybersecurity skills;
- create incentive mechanisms to encourage cybersecurity capacity development and research and development; and
- foster domestic and international cooperation and collaboration in information-sharing and capacity development.

Cybersecurity is continuing to evolve. For countries working to achieve cybersecure meaningful connectivity, the GCI offers a clear picture of where they are and a roadmap of activities to make progress. Countries must, however, be willing to engage in the ongoing processes of enhancing cybersecurity and working to enhance the quality and impact of their activities. The GCI will continue to capture countries' work and progress as they strive to meet future challenges and bring meaningful connectivity to all.

<sup>&</sup>lt;sup>22</sup> <u>https://www.weforum.org/publications/global-risks-report-2024/digest/</u>



### Annexes

# Tier performance: Global

# Tier 1 - Role-modelling (score of 95-100)

Australia	Ghana	Morocco	Singapore
Bahrain	Greece	Netherlands (Kingdom	Slovenia
Bangladesh	Iceland	of the)	Spain
Belgium	India	Norway	Sweden
Brazil	Indonesia	Oman	Tanzania
Cyprus	Italy	Pakistan	Thailand
Denmark	Japan	Portugal	Türkiye
Egypt	Jordan	Qatar	United Arab Emirates
Estonia	Kenya	Korea (Republic of)	United Kingdom
Finland	Luxembourg	Rwanda	United States
France	Malaysia	Saudi Arabia	Viet Nam
Germany	Mauritius	Serbia	

## Tier 2 - Advancing (score of 85-95)

Albania	Ecuador	Mexico	Switzerland
Austria	Georgia	Philippines	Тодо
Azerbaijan	Hungary	Poland	Uruguay
Benin	Ireland	Romania	Uzbekistan
Canada	Israel	Russian Federation	Zambia
China	Kazakhstan	Slovakia	
Croatia	Lithuania	South Africa	
Czech Republic	Malta	Sri Lanka	

### Tier 3 - Establishing (score of 55-85)

Algeria	Cuba	Libya	Papua New Guinea
Andorra	Dem. Rep. of the Congo	Malawi	Paraguay
Belarus	Dominican Rep.	Moldova	Peru
Bhutan	Eswatini	Monaco	Senegal
Botswana	Ethiopia	Mongolia	Sierra Leone
Brunei Darussalam	Gambia	Montenegro	Trinidad and Tobago
Bulgaria	Guinea	Mozambique	Tunisia
Burkina Faso	Iran (Islamic Republic of)	Myanmar	Uganda



## (continued)

Cameroon	Jamaica	Nepal (Republic of)	Ukraine
Chile	Kiribati	New Zealand	Vanuatu
Colombia	Kuwait	Nigeria	
Costa Rica	Kyrgyzstan	North Macedonia	
Côte d'Ivoire	Latvia	Panama	

### Tier 4 - Evolving (score of 20-55)

Angola	Dominica	Liechtenstein	Seychelles
Argentina	El Salvador	Madagascar	Somalia
Armenia	Equatorial Guinea	Mali	South Sudan
Bahamas	Fiji	Mauritania	State of Palestine
Barbados	Gabon	Namibia	Sudan
Belize	Grenada	Nauru	Suriname
Bolivia (Plurinational	Guatemala	Nicaragua	Syrian Arab Republic
State of)	Guyana	Niger	Tajikistan
Bosnia and Herzegovina	Haiti	Saint Kitts and Nevis	Tonga
Cabo Verde	Honduras	Saint Lucia	Turkmenistan
Cambodia	Iraq	Saint Vincent and	Tuvalu
Chad	Lao P.D.R.	the Grenadines	Venezuela
Comoros	Lebanon	Samoa	Zimbabwe
Congo (Rep. of the)	Lesotho	San Marino	
Djibouti	Liberia	Sao Tome and Principe	

## Tier 5 - Building (score of 0-20)

Afghanistan	Dem. People's Rep. of	Maldives	Timor-Leste
Antigua and Barbuda	Korea	Marshall Islands	Vatican
Burundi	Eritrea	Micronesia	Yemen
Central African Rep.	Guinea-Bissau	Solomon Islands	

# **Tier Performance: Africa**

<b>T5</b>	<b>T4</b>	<b>T3</b>	<b>T2</b>	<b>T1</b>
Building	Evolving	Establishing	Advancing	Role-modelling
Burundi Central African Rep. Eritrea Guinea-Bissau	Angola Cabo Verde Chad Congo (Rep. of the) Equatorial Guinea Gabon Lesotho Liberia Madagascar Mali Namibia Niger Sao Tome and Principe Seychelles South Sudan Zimbabwe	Botswana Burkina Faso Cameroon Côte d'Ivoire Dem. Rep. of the Congo Eswatini Ethiopia Gambia Guinea Malawi Mozambique Nigeria Senegal Sierra Leone Uganda	Benin South Africa Togo Zambia	Ghana Kenya Mauritius Rwanda Tanzania

<b>T5</b>	<b>T4</b>	<b>T3</b>	<b>T2</b>	<b>T1</b>
Building	Evolving	Establishing	Advancing	Role-modelling
Antigua and Barbuda	ArgentinaBahamasBarbadosBelizeBolivia (Plurina- tional State of)DominicaEl SalvadorGrenadaGuyanaHaitiHondurasNicaraguaSaint Kitts and NevisSaint LuciaSaint Vincent and the Grena- 	Chile Colombia Costa Rica Cuba Dominican Rep. Jamaica Panama Paraguay Peru Trinidad and Tobago	Canada Ecuador Mexico Uruguay	Brazil United States

# **Tier Performance: Americas**

# Tier Performance: Arab States

<b>T5</b> Building	<b>T4</b> Evolving	<b>T3</b> Establishing	<b>T2</b> Advancing	<b>T1</b> Role-modelling
Yemen	Comoros	Algeria	(none)	Bahrain
	Djibouti	Kuwait		Egypt
	Iraq	Libya		Jordan
	Lebanon	Tunisia		Morocco
	Mauritania			Oman
	Somalia			Qatar
	State of Palestine			Saudi Arabia
	Sudan			United Arab Emir-
	Syrian Arab Republic			ates
<b>T5</b>	<b>T4</b>	<b>T3</b>	<b>T2</b>	<b>T1</b>
---	---	--	-----------------------------------	---
Building	Evolving	Establishing	Advancing	Role-modelling
Afghanistan Dem. People's Rep. of Korea Maldives Marshall Islands Micronesia Solomon Islands Timor-Leste	Cambodia Fiji Lao P.D.R. Nauru Samoa Tonga Tuvalu	Bhutan Brunei Darussalam Iran (Islamic Republic of) Kiribati Mongolia Myanmar Nepal (Republic of) New Zealand Papua New Guinea Vanuatu	China Philippines Sri Lanka	Australia Bangladesh India Indonesia Japan Malaysia Pakistan Republic of Korea Singapore Thailand Viet Nam

## Tier Performance: Asia and the Pacific

# **Tier Performance: CIS**

<b>T5</b>	<b>T4</b>	<b>T3</b>	<b>T2</b>	<b>T1</b>
Building	Evolving	Establishing	Advancing	Role-modelling
(none)	Armenia Tajikistan Turkmenistan	Belarus Kyrgyzstan	Azerbaijan Kazakhstan Russian Feder- ation Uzbekistan	(none)

# Tier Performance: Europe

<b>T5</b>	<b>T4</b>	<b>T3</b>	<b>T2</b>	<b>T1</b>
Building	Evolving	Establishing	Advancing	Role-modelling
Vatican	Bosnia and Herzegov- ina Liechtenstein San Marino	Andorra Bulgaria Latvia Moldova Monaco Montenegro North Macedonia Ukraine	Albania Austria Croatia Czech Republic Georgia Hungary Ireland Israel Lithuania Malta Poland Romania Slovakia Switzerland	Belgium Cyprus Denmark Estonia Estonia Finland France Germany Greece Iceland Italy Luxembourg Italy Luxembourg Italy Netherlands (Kingdom of the) Norway Portugal Serbia Slovenia Slovenia Slovenia Sisweden Türkiye United Kingdom

## **Country Profiles**

## Africa

Angola

## Angola





\*Countries are classified according to www.itu.int

#### Benin

Benin





Areas of Relative Strength Legal Measures Technical Measures Organization Measures

#### **Areas of Potential Growth**

Capacity Development Measures Cooperation Measures

# Tier Performance T2: Advancing

T5 T4 T3 T2 T1					
	T5	T4	T3	T2	T1
Building Evolving Establishing Advancing Role-mod	Building	Evolving	Establishing	Advancing	Role-modellin

#### Botswana



## Burkina Faso

## **Burkina Faso**

 Burkina Faso
Africa Region Average Score Legal Measures 20 15 10 Cooperation Measures Technical Measures 5 0 Capacity Development Measures Organizational Measures Country Score out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development 11.61 Measures 14.18 Measures Measures Measures 12.7 15.16 16.58

GCI 5<sup>th</sup> Edition CountryPerformance



\*Countries are classified according to www.itu.int

## Burundi



Cabo Verde



GCI 5<sup>th</sup> Edition CountryPerformance



#### Cameroon



## Central African Republic

**Central African Republic** 



GCI 5<sup>th</sup> Edition CountryPerformance







## Congo (Republic of the)

Congo (Republic of the)



\*Countries are classified according to <u>www.itu.int</u>

GCI 5th Edition CountryPerformance



## Côte d'Ivoire



## Democratic Republic of the Congo



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance

#### Areas of Relative Strength Legal Measures Organization Measures Areas of Potential Growth

Technical Measures Capacity Development Measures Cooperation Measures



## Equatorial Guinea



Eritrea

## Eritrea

 Africa Region Average Score
Eritrea Score Legal Measures 20 15 10 Cooperation Measures Technical Measures 5 0 Capacity Development Measures Organizational Measures Country Score out of maximum 20 points per pillar Legal Technical Capacity Organization Cooperation Development Measures Measures Measures Measures 1.76 0 0 0 0.45

GCI 5th Edition CountryPerformance



#### Eswatini



## Ethiopia



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance



## Gabon



Gambia



GCI 5<sup>th</sup> Edition CountryPerformance

Areas of Relative Strength Legal Measures Organization Measures

Areas of Potential Growth Technical Measures Capacity Development Measures

Cooperation Measures **Tier Performance** T3: Establishing

T5 T4 T3 T2 T1 Building Evolving Establishing Advancing Rolemodelling Cybersecurity Commitment

## Ghana



Guinea



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance

#### Areas of Relative Strength Legal Measures Organization Measures

## Areas of Potential Growth

Technical Measures Capacity Development Measures Cooperation Measures



#### Guinea-Bissau



## Kenya



GCI 5th Edition CountryPerformance

Areas of Relative Strength Cooperation Measures Capacity Development Measures Organization Measures

**Areas of Potential Growth** Legal Measures Technical Measures



#### Global Cybersecurity Index 2024

#### Lesotho



## Liberia



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance

#### Areas of Relative Strength Legal Measures Cooperation Measures Areas of Potential Growth Technical Measures

Organization Measures Capacity Development Measures



#### Madagascar



## Malawi



GCI 5<sup>th</sup> Edition CountryPerformance

Areas of Relative Strength Legal Measures Organization Measures



\*Countries are classified according to www.itu.int

#### Mali



## Mauritius

Mauritius

#### Mauritius Score Africa Region Average Score Legal Measures 20 👞 15 10 Cooperation Measures Technical Measures 5 ñ Capacity Developn Measures Organizational Measures Country Score out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures 20 Measures Measures 20 20 20 20

GCI 5th Edition CountryPerformance

Areas of Relative Strength

# Legal Measures Technical Measures Organizational Measures Capacity Development Measures Cooperation Measures Tier Performance T1: Role-modelling

## Mozambique



## Namibia



GCI 5<sup>th</sup> Edition CountryPerformance



#### Niger



## Nigeria



GCI 5<sup>th</sup> Edition CountryPerformance



T5 T4 T3 T2 T1 Building Evolving Establishing Advancing Rolemodelling Cybersecurity Commitment

\*Countries are classified according to www.itu.int

#### Rwanda



## Sao Tome and Principe

Sao Tome and Principe



\*Countries are classified according to <u>www.itu.int</u>

GCI 5th Edition CountryPerformance



#### Senegal



## Seychelles



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance

#### Areas of Relative Strength Legal Measures Cooperation Measures Areas of Potential Growth Technical Measures

Organizational Measures Capacity Development Measures



#### Sierra Leone



South Africa



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance

Areas of Relative Strength Legal Measures Technical Measures Cooperation Measures **Areas of Potential Growth** Capacity Development Measures Organizational Measures Tier Performance T2: Advancing



## South Sudan



#### Tanzania



GCI 5th Edition CountryPerformance







## Uganda



GCI 5<sup>th</sup> Edition CountryPerformance

Areas of Relative Strength Technical Measures Organizational Measures Cooperation Measures

Areas of Potential Growth

Legal Measures Capacity Development Measures



## Zambia



## Zimbabwe



\*Countries are classified according to www.itu.int

GCI 5th Edition CountryPerformance



## Americas

Antigua and Barbuda

## Antigua and Barbuda

GCI 5th Edition Country Performance



\*Countries are classified according to www.itu.int

#### Argentina



GCI 5<sup>th</sup> Edition Country Performance







1.88

8.41

#### Bahamas



## Barbados



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Performance



#### Belize



## Bolivia (Plurinational State of)



GCI 5th Edition Country Performance



\*Countries are classified according to www.itu.int

#### Brazil



## Canada

Canada Canada Score Legal Measures Americas Region Average Score 20 15 10 Cooperation Measures Technical Measures Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 18.9 15.3 20 18.98 20

GCI 5th Edition Country Performance



#### Chile



## Colombia



GCI 5th Edition Country Performance



#### Costa Rica



## Cuba

## Cuba

GCI 5<sup>th</sup> Edition Country Performance



Area(s) of Relative Strength Legal Measures Capacity Development Measures

#### Area(s) of Potential Growth Technical Measures

Organizational Measures Cooperation Measures



#### Dominica



## Dominican Republic

## **Dominican Republic**





\*Countries are classified according to www.itu.int

Area(s) of Relative Strength Organizational Measures Legal Measures Technical Measures Area(s) of Potential Growth Capacity Development Measures Cooperation Measures Tier Performance T3: Establishing



## Ecuador



## El Salvador

## Sierra Leone

GCI 5th Edition CountryPerformance



\*Countries are classified according to www.itu.int

Areas of Relative Strength

## Legal Measures Organizational Measures Areas of Potential Growth Technical Measures Capacity Development Measures Cooperation Measures Tier Performance T3: Establishing



### Grenada



Guatemala



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Performance



#### Guyana



#### Haiti

## Haiti

GCI 5th Edition Country Performance



.

## Cooperation Measures Area(s) of Potential Growth Capacity Development Measures

Area(s) of Relative Strength

Technical Measures Legal Measures Organizational Measures



\*Countries are classified according to www.itu.int

## Honduras



#### Jamaica



GCI 5th Edition Country Performance



#### Mexico



#### Nicaragua



GCI 5th Edition Country Performance


#### Panama



Paraguay



GCI 5th Edition Country Performance



Building Evolving Establishing Advancing Role-modelling Cybersecurity Commitment





## Saint Kitts and Nevis



GCI 5<sup>th</sup> Edition Country Performance



#### Saint Lucia



## Saint Vincent and the Grenadines

Saint Vincent and the Grenadines



GCI 5th Edition Country Performance

Legal Measures

Cooperation Measures Technical Measures Organizational Measures

**Tier Performance** T4: Evolving

\*Countries are classified according to www.itu.int

Τ4 Т3 T2 Establishing Evolving Advancing Role Cybersecurity Commitment

T1

odelling

#### Suriname



## Trinidad and Tobago



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\*Countries are classified according to www.itu.int

GCI 5<sup>th</sup> Edition Country Performance



## United States



Uruguay



GCI 5th Edition Country Performance



#### Venezuela



## **Arab States**

#### Algeria



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



Legal Measures

**Bahrain** 

Bahrain



GCI 5th Edition Country Profile

Т4 Т3 Т2

Organizational Measures

Technical Measures Capacity Development Measures Legal Measures

Cooperation Measures **Tier Performance** T1: Role-modelling

Establish Advancing Role Evol ing Cybersecurity Commitment

#### Comoros



## Djibouti



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile







Iraq

#### Iraq

GCI 5th Edition Country Profile

Τ1

Rolei delling



#### Jordan



#### Kuwait

## Kuwait

GCI 5th Edition Country Profile



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\*Countries are classified according to <u>www.itu.int</u>

Legal Measures<br/>Cooperation MeasuresArea(s) of Potential Growth<br/>Organizational Measures<br/>Technical Measures<br/>Capacity Development MeasuresTier Performance<br/>T3: EstablishingT4T3T2T1

Area(s) of Relative Strength

T5 T4 T3 T2 T1 Building Evolving Establishing Advancing Rolemodelling Cybersecurity Commitment

#### Lebanon



#### Libya

## Libya

Libya Score Arab Region Average Score Legal Measures 20 15 10 Cooperation Measures Technical Measures Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 16.75 11.2 14 15.75 10.39

GCI 5th Edition Country Profile



\*Countries are classified according to <u>www.itu.int</u>

#### Mauritania



#### Morocco



GCI 5th Edition Country Profile



#### Oman



Qatar

#### Qatar

GCI 5<sup>th</sup> Edition Country Profile



Area(s) of Relative Strength

Legal Measures Technical Measures Organizational Measures Capacity Development Measures Cooperation Measures

#### Tier Performance T1: Role-modelling



## Saudi Arabia



## Somalia



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



## State of Palestine



#### Sudan

## Sudan

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

# Area(s) of Potential Growth

Capacity Development Measures Cooperation Measures Legal Measures



## Syrian Arab Republic



## Tunisia



Legal Measures Technical Measures Area(s) of Potential Growth Organizational Measures Capacity Development Measures Cooperation Measures **Tier Performance** T3: Establishing

T5

Building

Т4

Evolving

тз

Establishing

Cybersecurity Commitment

Т2

Advancing

T1

Role-modelling

Area(s) of Relative Strength

GCI 5th Edition Country Profile

Legal	Technical	Organization	Capacity	Cooperation
Measures	Measures	Measures	Development	Measures
19.18	17.8	14.23	14.97	15.82

#### United Arab Emirates



\*Countries are classified according to <u>www.itu.int</u>

#### Yemen

Yemen

GCI 5<sup>th</sup> Edition Country Profile

Establishing

Cybersecurity Commitment

Evolving

Building

Role-modelling

Advancing



Legal	Technical	Organization	Capacity	Cooperation
Measures	Measures	Measures	Development	Measures
5.29	1.9	0	0	

## Asia and the Pacific

#### Afghanistan



#### Australia



GCI 5th Edition Country Profile





#### Bangladesh



#### Bhutan



GCI 5th Edition Country Profile



Areas of Relative Strength

#### Brunei Darussalam



Cambodia



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



#### China



## Democratic People's Republic of Korea

**Democratic People's Republic of Korea** 



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



Т3

Establishing

T2

Advancing

T1

Rolen odelling Fiji



#### India

## India

GCI 5th Edition Country Profile

T2

Advancing

Τ1

Role-modelling



#### Indonesia



## Iran (Islamic Republic of)

Iran (Islamic Republic of)



GCI 5th Edition Country Profile







## Kiribati

Kiribati Asia Pacific Region Average Score Legal Measures Kiribati Score 15 10 Cooperation Measures Technical Measures 5 city Develo Measures Ca Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 16.8 10.49 14.34 2.41 11.6

GCI 5<sup>th</sup> Edition Country Profile

#### Legal Measures Organizational Measures Areas of Potential Growth Technical Measures Capacity Development Measures Cooperation Measures **Tier Performance** T3: Establishing T5 Τ4 Т3 T2 Τ1 Building Establishing Advancing Evolving Role-modelling Cybersecurity Commitment

**Areas of Relative Strength** 

#### Lao P.D.R.



#### Malaysia



GCI 5th Edition Country Profile



#### Maldives



## Marshall Islands

## **Marshall Islands**

GCI 5th Edition Country Profile





#### Micronesia



#### Mongolia



GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

#### Myanmar



#### Nauru

## Nauru

GCI 5th Edition Country Profile



#### **Areas of Potential Growth** Technical Measures Organizational Measures Capacity Development Measures **Tier Performance** T4: Evolving т4 T5 Т3 Т2 Τ1 Building Evolving Establishing Advancing Role-modelling Cybersecurity Commitment

**Areas of Relative Strength** 

Legal Measures Cooperation Measures

## Nepal (Republic of)



## New Zealand

## New Zealand

GCI 5th Edition Country Profile



Areas of Relative Strength Legal Measures Organizational Measures

#### Areas of Potential Growth Technical Measures

Capacity Development Measures Cooperation Measures



#### Pakistan



#### Papua New Guinea



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



#### Philippines



## Republic of Korea

## **Republic of Korea**

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

#### Samoa



#### Singapore

## Singapore

GCI 5th Edition Country Profile



Legal Measures Technical Measures Organizational Measures Cooperation Measures

**Areas of Relative Strength** 

Areas of Potential Growth Capacity Development Measures



#### Solomon Islands



## Sri Lanka



GCI 5th Edition Country Profile



## Thailand



## Timor-Leste

**Timor-Leste** 



\*Countries are classified according to <u>www.itu.int</u>

GCI 5th Edition Country Profile



#### Tonga



## Tuvalu

## Tuvalu

Asia Pacific Region Average Score Tuvalu Score Legal Measures 20 15 10 Technical Measures Cooperation Measures 5 0 Capacity Development Measures Organizational Measures Country Score out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 7.28 0 3.57 2.34 7.15

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

#### Vanuatu



#### Viet Nam



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile


## **Commonwealth of Independent States**

Armenia



#### Azerbaijan

20

\*Countries are classified according to www.itu.int

18.02



18.05

17.69

20

GCI 5th Edition Country Profile



Establishing

Cybersecurity Commitment

Advancing

Role-m

Building

Evolv

Area(s) of Relative Strength

#### Belarus



### Kazakhstan

## Kazakhstan

Legal Measures

15

10

0

Organization

Measures

18.3

🖉 Kazakhstan Score

CIS Region Average Score

Cooperation Measures



Cooperation

Measures

20

Organizational Measures

Capacity

Development

16.36



GCI 5<sup>th</sup> Edition Country Profile

\*Countries are classified according to <u>www.itu.int</u>

Capacity Development Measures

out of maximum 20 points per pillar

Technical

Measures

19.38

**Country Score** 

Legal

Measures

#### Kyrgyzstan



### **Russian Federation**



GCI 5<sup>th</sup> Edition Country Profile



CCI 5 Edition Country Prome



#### Global Cybersecurity Index 2024

#### Tajikistan



#### Turkmenistan

#### **Turkmenistan** CIS Region Average Score Legal Measures Turkmenistan Score 15 10 Cooperation Measures Technical Measures Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 10.12 0 10.67 1.85 3.21

GCI 5th Edition Country Profile



### Uzbekistan



### Europe

#### Albania



#### Andorra



GCI 5th Edition Country Profile



Т2

Advancing

Τ1

Role-model

Т4

Es

Cybersecurity Commitment

**Areas of Relative Strength** 

#### Austria



Belgium



GCI 5th Edition Country Profile



**Areas of Relative Strength** 

Legal Measures Cooperation Measures Organizational Measures

#### Bosnia and Herzegovina



#### Bulgaria



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



#### Croatia



\*Countries are classified according to www.itu.int

### Cyprus

Cyprus Cyprus Score Legal Measures Europe Region Average Score 20 15 10 Technical Measures Cooperation Measures 5 0 Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 20 19.38 20 18.64 20

GCI 5th Edition Country Profile



#### Czech Republic



Denmark

Denmark

GCI 5th Edition Country Profile



Legal Measures Technical Measures Organizational Measures Capacity Development Measures Cooperation Measures

Areas of Relative Strength



\*Countries are classified according to www.itu.int

#### Estonia



### Finland

Finland Finland Score Legal Measures 20 Europe Region Average Score 15 10 Technical Measures Cooperation Measures 5 0 Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 20 20 20 20 20

GCI 5th Edition Country Profile



#### France



### Georgia



GCI 5th Edition Country Profile



#### Germany



\*Countries are classified according to www.itu.int

#### Greece

Greece Greece Score Legal Measures 20 Europe Region Average Score 15 10 Cooperation Measures Technical Measures 5 0 Capacity Development Measures Organizational Measures **Country Score** out of maximum 20 points per pillar Legal Technical Organization Capacity Cooperation Development Measures Measures Measures Measures 20 20 19.22 17.89 20

GCI 5<sup>th</sup> Edition Country Profile



\*Countries are classified according to www.itu.int

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#### Hungary



### Iceland



GCI 5th Edition Country Profile



#### Ireland



#### Israel

### Israel

GCI 5th Edition Country Profile

Τ1

delling

**Areas of Relative Strength** Legal Measures Technical Measures

Organizational Measures

Areas of Potential Growth Capacity Development Measures Cooperation Measures

> **Tier Performance** T2: Advancing



T5 Т4 Т3 Т2 lving Establishing Advancing Cybersecurity Commitment Building Evolving Role





#### Latvia

### Latvia

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

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T5

Building

Т4

Evolving

тз

Establishing

Cybersecurity Commitment

Т2

Advancing

Τ1

Role-modelling

. 11:

#### Liechtenstein



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### Lithuania



GCI 5th Edition Country Profile



#### Luxembourg



#### Malta

### Malta

GCI 5th Edition Country Profile



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\*Countries are classified according to www.itu.int

#### Moldova



#### Monaco



GCI 5th Edition Country Profile

Cooperation Measures
Areas of Potential Growth

Areas of Relative Strength Legal Measures Technical Measures

Organizational Measures Capacity Development Measures



#### Montenegro



### Netherlands (Kingdom of the)



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



#### Norway



### North Macedonia

## North Macedonia

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

**Areas of Relative Strength** Legal Measures Organizational Measures Areas of Potential Growth Technical Measures Capacity Development Measures Cooperation Measures **Tier Performance** T3: Establishing

T5

Т4

Evolving

тз

Establishing

Cybersecurity Commitment

Т2

Advancing

Τ1

Role delling

### Poland



### Portugal



GCI 5th Edition Country Profile



Areas of Relative Strength Legal Measures Technical Measures Organizational Measures

Area of Potential Growth Capacity Development Measures

Cooperation Measures



\*Countries are classified according to www.itu.int

#### Romania



### San Marino



GCI 5th Edition Country Profile



Area of Relative Strength Legal Measures

Areas of Potential Growth Technical Measures Organizational Measures

Capacity Development Measures Cooperation Measures

**Tier Performance** 

\*Countries are classified according to www.itu.int

### Serbia



### Slovakia



GCI 5th Edition Country Profile



#### Slovenia



Spain

### Spain

GCI 5th Edition Country Profile



Areas of Relative Strength Legal Measures Technical Measures Organizational Measures Cooperation Measures

Area of Potential Growth Capacity Development Measures



#### Sweden



### Switzerland

### Switzerland

GCI 5th Edition Country Profile



\*Countries are classified according to www.itu.int

Areas of Relative Strength Legal Measures Technical Measures

## Areas of Potential Growth

Organizational Measures Capacity Development Measures Cooperation Measures

## Tier Performance



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#### Türkiye



#### Ukraine



GCI 5<sup>th</sup> Edition Country Profile



\*Countries are classified according to www.itu.int

Cybersecurity Commitment

### United Kingdom

# United Kingdom

GCI 5th Edition Country Profile



Vatican



\*Countries are classified according to www.itu.int

GCI 5th Edition Country Profile



# Methodology

### Scope and objectives

The Global Cybersecurity Index (GCI) is formulated based on data provided by the ITU membership, including interested individuals, experts and industry stakeholders as contributing partners. The mandate for the GCI is derived from Resolution 130 (Rev. Bucharest, 2022) of the ITU Plenipotentiary Conference, on strengthening the role of ITU in building confidence and security in the use of information and communication technologies (ICTs), which, in particular, invites Member States to support ITU initiatives on cybersecurity, including the GCI, in order to promote government strategies and the sharing of information on efforts across industries and sectors.

The fifth edition of the GCI continues this tradition and builds on earlier iterations. This is manifested in areas such as a refined methodology, increased participation and collaboration throughout the process, greater availability and accessibility of relevant inputs, developments in questionnaire designs, and the strengthening of evidence-based data collection and analysis.

The GCI is a composite index of indicators that monitors the cybersecurity measures across the five work areas of the Global Cybersecurity Agenda (GCA). The GCI measures:

- the type, level and extent of progress of cybersecurity activities within countries and relative to other countries;
- the progress in cybersecurity commitment of countries from a global perspective;
- the progress in cybersecurity activities from a regional perspective;
- the cybersecurity divide (i.e. the difference between countries and regions in terms of their level of engagement in cybersecurity initiatives).

Collectively, these measures represent a country's level of cybersecurity commitments.

The GCI seeks to foster a global culture of cybersecurity, so that ICTs incorporate cybersecurity in their development and adoption. Further, the GCI aims to assist countries in identifying areas of relative strength in managing cybersecurity and cybercrime, in addition to identifying areas of improvement, and to encourage them to take proactive measures towards further development and innovations in those areas. It is anticipated that this perspective will provide an opportunity to help raise the overall level of cybersecurity at the national, regional and global levels. To this end, the GCI shares practical insights that might serve as good practices, lessons and guidelines for countries with similar national environments.

### Structure

### Cybersecurity framework

Cybersecurity is a multidisciplinary field, and its application involves all sectors, industries and stakeholders, both vertically and horizontally. To increase the development of national capabilities, efforts must be made by political, economic and social forces. This can be achieved through the efforts of good actors within the ecosystem, such as law enforcement, justice departments, educational institutions, ministries, private sector operators, ICT developers, public-private partnerships and intra-State cooperation.

	GClv1	GClv2	GClv3	GClv4	GClv5
Publishing year	2015	2017	2019	2021	2024
Data collection years	2013-2014	2016	2017-2018	2020	2023-2024
Countries providing a focal point	105	136	155	169	172
Question type	Open-ended	Closed- ended, binary	Closed- ended, binary	Closed- ended, ternary	Closed- ended, ternary
Scoring method	Benchmark scores	Rank-based weighted scores	Rank-based weighted scores	Aggregate weighted average score	Aggregate weighted average score
Total indicators	17	25	25	20	20
Total questions	17	153 + 4 optional questions on child online protection	50	82	82 + 1 optional question on training for MSMEs

## Figure 21: GCI evolution over time through a basic comparison of its different editions

The ITU framework for international multistakeholder cooperation in cybersecurity aims to build synergies between current and future initiatives. It focuses on the following five pillars, which shape the inherent building blocks of a national cybersecurity culture:

- Legal measures
- Technical measures
- Organizational measures
- Capacity-development measures
- Cooperation measures





The five pillars are described in detail below and presented in a flowchart in Figure 22: Structure of the fifth edition of the GCI.

## Legal measures



Measures based on the existence of legal frameworks dealing with cybersecurity and cybercrime.

Legal measures authorize a State to set up basic response mechanisms through the criminalization of certain acts, the investigation and prosecution of crimes, the imposition of sanctions for offences, non-compliance or breaches, and the establishment of institutional frameworks for managing or governing cybersecurity.

A legislative framework sets the minimum foundation of behaviour on which further cybersecurity capabilities can be built. Fundamentally, the objective is to have sufficient legislation in place to harmonize practices at the regional/international level, strengthen cybersecurity systems, and simplify international frameworks to combat cybercrime.

## **Technical measures**



Measures based on the existence of technical institutions, standards and frameworks dealing with cybersecurity and cybercrime.

Efficient ICT development and use can only prosper in an environment of trust and security. Countries therefore need to have the technical capabilities and capacity to be able to effectively identify, detect, protect and respond to cyber-risks and cyberthreats, and to recover from attacks, as well as to promote information-sharing and evaluate and implement standards, good cybersecurity practices, and schemes for secure ICTs.

### **Organizational measures**



Measures based on the existence of coordination institutions, policies and strategies for cybercrime management and cybersecurity development at the national level.

Organizational measures include the identification of cybersecurity objectives and strategic plans, as well as the formal definition of institutional roles, responsibilities and accountabilities to ensure implementation and achievement of objectives. These measures are indispensable for endorsing the elaboration and implementation of an effective cybersecurity posture. Broad strategic targets and goals need to be set by the State, along with a comprehensive plan for implementation, delivery and measurement. National agencies must be present to implement the strategy and evaluate outcomes. Without a national strategy, governance model or supervisory body, efforts in different sectors become conflicted, undermining efforts to obtain an effective harmonization in cybersecurity development.

### **Capacity-development measures**



Measures based on the existence of research and development, awareness raising, education and training programmes, certified professionals and public sector agencies fostering capacity development.

Capacity development includes public awareness-raising campaigns, frameworks for certification and accreditation of cybersecurity professionals, professional training courses in cybersecurity, educational programmes or academic curricula, etc. This pillar is intrinsic to the first three pillars (legal, technical and organizational). Cybersecurity is most often tackled from a technological perspective even though there are numerous socio-economic and political implications. Human and institutional capacity development is essential to increasing awareness, knowledge and know-how across sectors for systematic and appropriate solutions and to promoting the development of qualified professionals.

### **Cooperation measures**



Measures based on the existence of partnerships, cooperation frameworks and information sharing networks at the national, regional and global levels.

Due to the unprecedented level of interconnection between states, cybersecurity is a shared responsibility and a transnational challenge. Greater cooperation can enable the development of much stronger cybersecurity capabilities, helping to mitigate cyber-risks and enable better investigation, apprehension and prosecution of malicious agents.

## **Computational methodology**

The GCI is based on cybersecurity measures that a country can undertake as part of strengthening their cybersecurity commitment. The GCI questionnaire provides a value for the 20 indicators constructed through 83 questions, where one question is not scored. Countries can submit ternary responses (yes; partial/in progress; no) to all questions.

To ensure accuracy, countries were required to support their answer through evidence, such as an active URL, pdf, photo or other document which can reasonably substantiate their response. Countries can also comment on their submission to contextualize their evidence.

### Weighting

This fifth iteration of the GCI is on a scale of 0 to 100, with each pillar weighted at 20 points.

As a composite weighted index, each indicator, sub-indicator and micro-indicator is assigned a weight given the relative importance to the indicator group. Weighting can have a significant impact on final scores, and different techniques will produce different overall scores.

Weighting recommendations were done using a budget allocation method.<sup>23</sup> Experts were asked to contribute weighting recommendations for pillars in which they had expertise. Experts were given a "budget" that they could distribute within an indicator group, thereby allocating a greater amount towards indicators that were assessed as more important within their relative group. The average weighting recommendations were adopted.

These weightings were not shared with countries during the GCI data collection period so as not to influence country responses. The weighting does not account for the accuracy of the data.

## Aggregation

Indicator groups were aggregated using weighted arithmetic averages. As a result, a country scoring poorly in one area could compensate by performing well elsewhere. However, for the purposes of clarity and comprehension, a linear approach was deemed more understandable.

A country's score aggregation for each pillar is expressed as follows:

$$GCI_p = \left(\frac{\sum_{i=1}^n (q_i \times w_i)}{\sum_{i=1}^n w_i}\right) \times 20$$

Where:

 $GCI_p$  = each pillar of the GCI

 $q_i$  = the score associated with a ternary response to a question within a pillar

 $w_i$  = weight assigned to a question within that pillar

n = total number of questions in each pillar

20 is the value of each pillar weighting

A country's overall score is the summation of its scores in each pillar, GCI<sub>p</sub>.

<sup>&</sup>lt;sup>23</sup> <u>https://www.oecd-ilibrary.org/docserver/533411815016.pdf?expires=1722358078&id=id&accname=ocid195767&checksum=D06A2D569CE2B1DC75AAF3967AEBEFE3</u>

### **Tiers**

As noted in in the methodology section on the move to a tier-based model, this edition presents country performance in tiers, rather than ranks. Tiers represent several benefits over ranks, as differences between country scores can be very narrow and include an error range based on the accuracy of questionnaire responses, clarifications provided or country engagement. Each tier groups similarly scoring countries together, thereby presenting a group of similarly performing peers.

The tier-based model has been set for overall scores. As the overall score is a weighted average of a country's cybersecurity activities across all five pillars in the questionnaire, countries with similar scores may still have significant differences on a pillar, indicator, sub-indicator or micro-indicator level. Countries' activities across pillars and indicators will vary in terms of quality and impact, factors not measured by the GCI.

Countries may choose to develop their own rankings or tiers for the GCI; it must be noted, however, that alternative ways of comparing countries are not endorsed by ITU.

The absolute-score method for tiers was applied based on the following, as described above in Table 1:

- T1  $95 \le x \le 100$
- T2 85 ≤ x < 95
- T3 55 ≤ x < 85
- T4 20 ≤ x < 55
- T5 0 ≤ x < 20

The tiers may be interpreted as follows:

- **Tier 1 (T1) Role-modelling** represents countries that obtained an overall GCI score of at least 95/100 by demonstrating a strong cybersecurity commitment to coordinated and government-driven actions that encompass evaluating, establishing and implementing certain generally accepted cybersecurity measures across all five pillars or up to all indicators.
- **Tier 2 (T2) Advancing** represents countries that have obtained an overall score of at least 85/100 by demonstrating a strong cybersecurity commitment to coordinated and government-driven actions that encompass evaluating, establishing or implementing certain generally accepted cybersecurity measures in up to four pillars or a substantial number of indicators.
- **Tier 3 (T3) Establishing** represents countries that obtained an overall score of at least 55/100 by demonstrating a basic cybersecurity commitment to government-driven actions that encompass evaluating, establishing or implementing certain generally accepted cybersecurity measures across a moderate number of pillars or indicators.
- **Tier 4 (T4) Evolving** represents countries that obtained an overall score of at least 20/100 by demonstrating a basic cybersecurity commitment to government-driven actions that encompass evaluating, establishing or implementing certain generally accepted cybersecurity measures in at least one pillar, or several indicators and/or sub-indicators.
- **Tier 5 (T5) Building** represents countries that obtained an overall score below 20/100 by demonstrating a basic cybersecurity commitment to government-driven actions that encompass evaluating, establishing or implementing certain generally accepted cybersecurity measures in at least one indicator and/or sub-indicator.

The tier-based model underscores that a cybersecurity commitment requires an adaptive stance in evaluating, establishing or implementing appropriate actions to effectively meet the demands

of the rapidly evolving cybersecurity landscape. Under these circumstances, opportunities will exist for further coordinated actions, improvements and expansions of the breadth and depth of cybersecurity measures, irrespective of a country's overall score.

## Key changes and limitations in the fifth edition of the GCI

The GCI has been updated to ensure greater methodological consistency, clarify questions, reflect current weighting recommendations and better represent country performance, including in the following areas:

- **Questionnaire**: based on a series of meetings of the GCI Expert Group, questions were clarified and refined. This included expanding on the rationales for each question. A final version of the questionnaire was approved by the ITU Telecommunication Development Bureau (BDT) management.
- Weightings: as country scores are calculated using a weighted average, the GCI Expert Group was invited to update their weighting recommendations. Some 140 experts were tasked with providing weighting recommendations in pillars related to their areas of expertise. Based on their recommendations, an arithmetic average is taken and used in computation.
- **Tier model**: the GCI Expert Group met and put forward several possible models for a tier-based GCI scoring model to replace the existing model, which ranked country performance. For the final selection of the model, BDT management relied on the preferred choice of the Expert Group.

As cybersecurity continues to be an area of change and countries have innovated to find ways forward, the aim is for GCI questions not to be overly prescriptive and instead to capture the wide variety of tools, programmes, initiatives and other methods countries may use to accomplish various objectives; the trade-off with this less prescriptive approach, however, is that questions might contain ambiguities.

The GCI verification team worked to ensure consistency through regular meetings and communications to ensure that verification decisions were coherent across countries. While feedback from countries was solicited where necessary, the risk of inconsistencies in the verifications remains, particularly in edge cases.

### Changes and limitations by pillar

The changes made across the pillars include:

#### Legal measures

The legal pillar has been updated to better reflect:

• legislation that is in force versus partial/in progress.

Notable limitations that arose during verification include:

- comparability of laws, regulations and decrees what can be considered a law in one country may have lower enforceability or implementation in another country; and
- applicability of laws and regulations while some countries used targeted laws that directly addressed issues at hand, other countries reported using general laws and regulations and applying them to cybersecurity; for the latter, verification was challenging as it was not always clear whether the law or regulation could be applied in a cyber-context.

### Technical measures

The technical pillar has been restructured to better reflect how computer incident response teams (CIRTs) operate, including by:

- clarifying that CIRTs do not need to develop and deliver cyber awareness activities, but their involvement is desirable; and
- better reflecting that national CIRTs often develop and deliver cyber drills, while sectoral CIRTs may only participate in them.

Notable limitations that arose included:

- the relevance of certain types of cybersecurity standards and certification;
- the definition of a "framework" for implementation of standards;
- roles and functions of information-sharing and analysis centres (ISACs);
- key activities by CIRTs, particularly around cyber-awareness campaigns and threat notifications.

### Organizational measures

The organizational pillar has been updated to better reflect:

- the second edition of the Guide to Developing a National Cybersecurity Strategy;
- regional CIRT membership;
- the need for national CIRTs to assist in conducting cyber drills, while sectoral CIRTs need only to participate.

Notable limitations that arose included:

- the comparability of draft status of national cybersecurity strategies (NCSs);
- perspectives on the life of NCSs;
- depth and specificity of NCS action plans;
- assessment of outcomes of the adoption of cybersecurity metrics; and
- many countries' national CIRTs participated in regional cyber drills but did not organize their own.

#### Capacity-development measures

The capacity-development pillar has been updated to better reflect:

- diversity in the types of targeted cyber-awareness campaigns;
- promotion and development of the cybersecurity private sector; and
- cybersecurity certification schemes.

Notable limitations that arose included:

- evaluation of whether cybersecurity was substantially present in academic curricula in primary and secondary education;
- lack of data about reach and impact of cyber-awareness campaigns;
- measurement of the cybersecurity industry; and
- evaluation of the presence of research and development in academia and the private and public sectors.

### Cooperation measures

The cooperation pillar has been updated to better reflect:

- types of bilateral and multilateral agreements that are to be considered; and
- cooperation agreements that have been signed or ratified the Budapest Convention had been previously counted under international mechanisms, which is no longer a question, and is now counted under multilateral agreements.

Notable limitations that arose included:

- definition of what an "agreement" should be (e.g. joint statement or signed treaty); and
- assessment of the outcomes of cooperation agreements.

The verification team has noted areas of ambiguity and has striven to apply any decisions as evenly as possible to country verifications. The GCI team will present their observations to the GCI Expert Group for feedback and input ahead of the next edition.

### Changes to the weighted average scoring

As with the previous edition of the GCI, weightings have been updated as the relative importance and influence of questions and measures may have changed. These changes reflect the dynamism of the cybersecurity landscape and access to an enlarged and more diverse GCI Expert Group. In the future, it is reasonable to expect central tendency effects should there be a sufficiently large expert group.

As always, individual countries may judge that their ideal weighting mix is different, based on their own priorities and dependencies.

### Move to a tier-based model

Through Resolution 45 (Rev. Kigali, 2022) of the World Telecommunication Development Conference and Resolution 130 (Rev. Bucharest, 2022) of the Plenipotentiary Conference, BDT was instructed by Member States to move from a rank-based presentation of GCI scoring to a tier-based model.

The GCI Expert Group developed and presented recommendations on how these tiers could be set. After six meetings, the group arrived at two proposals for BDT management. The final proposals are reflected in Table 1.

Based on the recommendations of the GCI Expert Group, ITU management approved the use of the "absolute score" method.

	Absolute score	Quantiles	
Proposed	T1 $95 \le x \le 100$	T1 Top 10% of countries	
Tiers	T2 85 ≤ x < 95	T2 Next 20%	
	T3 55 ≤ x < 85	T3 Next 25%	
	T4 $20 \le x < 55$	T4 Next 25%	
	T5 $0 \le x < 20$	T5 Next 20%	
Benefits	<ul> <li>Country performance is primarily gauged against the country itself.</li> <li>Tier score boundaries remain constant over time</li> </ul>	<ul> <li>Distribution of countries across tiers will remain constant over time.</li> <li>Easier for countries to assess their progress against the rest of the world.</li> </ul>	
Limitations	As time goes on, more countries may end up in the top tier, limiting differen- tiation among them.	Country absolute scores can improve, but their relative position can decrease, potentially demotivating further cybersecurity efforts.	

### Table 1: Tier-based model

## GCI report development process

### Figure 23: GCI report development process



The GCI report is produced according to the following steps, as shown in Figure 23.

- 1) **GCI survey refinement**: a multistakeholder approach is undertaken in the review and refinement of the GCI indicators and questions. This includes considering the lessons and opportunities for refinements and improvements from previous iterations, feedback from the GCI Expert Group and an assessment of the evolving state of the cybersecurity field. The GCI questionnaire is thereafter reviewed, refined, finalized and approved for dissemination.
- 2) **Invitation**: a letter of invitation is sent to all ITU Member States and the State of Palestine, informing them of the initiative and requesting a focal point responsible for collecting all relevant data and for completing the online GCI questionnaire. During the online survey, the approved focal point is officially invited by BDT to answer the questionnaire.

- 3) **Data collection**: primary and secondary data collection techniques are used to reflect the current state of cybersecurity commitment.
  - **Primary data collection**: the online questionnaire is used to collect responses from countries;
  - **Secondary data collection**: desk research, using publicly available data sources, is relied on in instances where a country did not respond to the questionnaire.

Note: Should a country not provide a focal point for the GCI questionnaire, BDT shall attempt to establish contact with the institutional focal point in the ITU Global Directory.

#### 1) Verification and validation

A comprehensive iterative process of reviews, analyses, revisions and approvals is established throughout this phase and applied to both data collection methods. Once completed, consistency checks are conducted to help to ensure reliability.

- A. Online questionnaire:
  - ITU identifies any missing responses, supporting documents, links, etc.
  - The focal point improves the accuracy of responses where necessary, including by offering relevant evidence.
  - Validated questionnaires are used for analysis and scoring.
- B. Desk research questionnaire:
  - A draft questionnaire is sent to focal points for review.
  - Focal points improve accuracy and return the draft questionnaire.
  - BDT reviews responses against the evidence provided and identifies any missing responses, supporting documents, links, etc.
  - The corrected draft questionnaire is sent to each focal point for final approval.
  - The validated questionnaire is used for analysis and scoring.

#### 2) Scoring and analysis

- Scores associated with ternary responses to the validated questionnaire for each country are collated for analysis.
- Scoring methodology is applied to assign each country to the established tiers.
- Identification of findings from the GCI that provide insights into regional and world trends.
- 3) **Report development and publication** 
  - A GCI report is drafted, reviewed and approved for publication.
  - The GCI report becomes available to countries, stakeholders and members of the public.

# Areas for further research

As part of the intrinsic review and analysis, ITU has identified areas for development and improvements. This includes refinements of questions to improve clarity and reduce ambiguity, as well as to enhance validity and reliability of measures.

Several areas were identified for further research, including:

• What are effective approaches for managing and conducting national cybersecurity audits?

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- What are the most effective strategies for conducting cybersecurity awareness activities? Do these strategies differ based on the target group?
- How can the effectiveness of cyber development activities be evaluated in the short term?
- How can countries improve utilization of bilateral and multilateral cybersecurity agreements?
- What are the barriers to establishing and adopting effective cooperation measures, such as bilateral and multilateral cybersecurity agreements?
- How effective are government incentives at developing the cybersecurity industry?
- How effective are government incentives at driving cybersecurity research and development?
- Based on a country's level of digitalization, what activities are needed from CIRTs?

The GCI team hopes that researchers continue to explore these and other cybersecurity-related areas.



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