

A renewed, future-ready Network Readiness Index

Executive Summary



Digital technologies have progressed at a rapid pace over the last few decades, and they today permeate all aspects of business and society, opening up new opportunities and bringing benefits to many. As digital disruptions gain momentum, the challenge of how to best combine technological opportunities and human well-being is high on the agenda of global leaders. If we are not able to leverage technology to bring out the best in people, we are potentially headed for scenarios in which society is fractured, and some of our core organizational principles, such as democracy, can be corrupted. Moreover, if the benefits of technology are not shared in an inclusive fashion, they will create new inequalities or reinforce existing ones.

Against this backdrop, the two co-editors of the Network Readiness Index (NRI)—one of the leading global indices on the application and utilization of information and communication technology (ICT)—decided to update the index in close dialogue with chosen experts in ICT. The end result is a redesigned, future-ready index that will continue the NRI tradition of providing policymakers, business leaders, academia and the civil society with a trusted and valuable tool to evaluate progress and set the action agenda for more inclusive and sustainable growth in the digital age.

Key messages from the Network Readiness Index 2019

Message 1:

The champions of 2019 were already highly ranked in 2016.

This stickiness in the rankings of the leading nations reflects the results of determined efforts over the years in these economies to prioritize investments in digital technologies while ensuring that a supportive ecosystem for digital leadership is put in place across all key stakeholders.

Message 2:

The ability to integrate people and technology with the right governance structures is key to a collective prosperous future.

Technology can have an important positive impact on national economies and on their ability to reach

the Sustainable Development Goals (SDGs), but this will not be achieved unless we are able to set up effective governance mechanisms to integrate technology with the three key stakeholder groups: individuals, businesses and governments.

Message 3:

The technological divide remains a key concern at the global level.

Because high-income countries have traditionally invested heavily in their technology infrastructure (boosting both access and content) and continue to monitor and invest in future technologies, they generally remain better positioned to leverage the opportunities afforded by technological innovations.

Message 4:

Technology and the impact of ICT are the key drivers that differentiate regions.

There can be considerable variations in network readiness across countries within any particular region. However, some regional differences can be identified through NRI data and analyses. For instance, Asia & Pacific and Commonwealth of Independent States do comparatively well in terms of Impact of ICT, while access to and production of technology remains a challenge. In Africa and the Arab region, on the other hand, technologies and infrastructure often remain the first obstacle to network readiness.

Message 5:

Policy measures are urgently needed to allow a large part of mankind to be future-ready.

The results of the NRI 2019 show a persistent and important digital divide across nations, in all pillars of the model. Given the rapid pace of progress in underlying technology trends, it is important for governments to exhibit leadership and put in place appropriate policy measures to enable individuals and businesses to benefit from technological progress within the context of a trusted ecosystem.

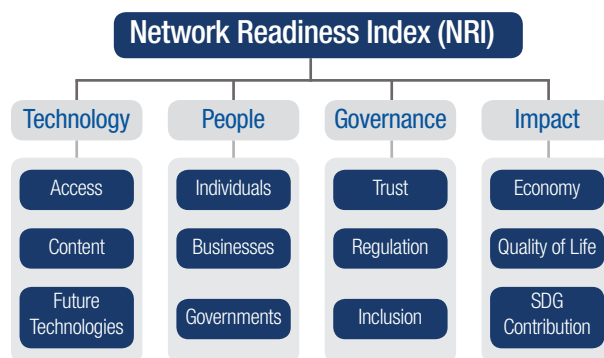
Message 6:

Technological innovation is a powerful tool to achieve the SDGs.

In the face of growing distrust vis-à-vis governments (compounded by privacy concerns) on the one hand, and technological innovations on the other (artificial intelligence and cybersecurity being two areas in point in this regard), it is critically important to rebuild the human face and values base of information technology. Linkages between technological progress and our collective ability to reach the SDGs will continue to be crucially important in this regard.

The NRI model

The redesigned NRI is based on four pillars: Technology, People, Governance and Impact. Each pillar is further composed of three sub-pillars as indicated in the figure below. *“People and technology will increasingly interact as collaborators and partners. To ensure a positive and inclusive impact on society and business, appropriate governance mechanisms need to be implemented to address issues related to trust, security and inclusion”,* said Soumitra Dutta.



Note: SDG = Sustainable Development Goal.

Sweden, Singapore and the Netherlands lead the overall NRI rankings

The Network Readiness Index 2019 ranks a total of 121 economies. The top performer in this year's index is Sweden, which is just ahead of Singapore in 2nd place and the Netherlands in 3rd place. The top 10 countries in the NRI 2019 are shown in the table below. The top of the rankings is dominated by European nations, with the region claiming 8 of the top 10 positions. The United States is ranked 8th globally.

Country	NRI rank	NRI score
Sweden	1	82.65
Singapore	2	82.13
Netherlands	3	81.78
Norway	4	81.30
Switzerland	5	81.08
Denmark	6	81.08
Finland	7	80.34
United States	8	80.32
Germany	9	78.23
United Kingdom	10	77.73

Sweden claims the top spot in the renewed NRI. One of the country's greatest strengths is its consistency across the pillars: It ranks in the top 10 in all four pillars and in the top 5 in three of them. Singapore is a top 10 country in all four pillars and is in the top position when it comes to the Impact pillar, where it does particularly well in terms of the impact of its readiness on the Economy (1st).

Similarly, Netherlands performs well in all four pillars, ranking in the top 10 in each of them. The country is particularly strong when it comes to Technology (2nd), where it is the global leader in the Content sub-pillar and has a high level of Future Technologies (8th). Norway is the world's top-performing country when it comes to issues

of Governance that are relevant to the network economy. It enjoys high levels of Trust (2nd) and Regulation (3rd) and is also one of the top 10 countries in the Inclusion (8th) sub-pillar. Norway is the global leader with regard to Quality of Life and also has a strong SDG Contribution (4th), which are the main factors behind the country's high Impact (4th).

The United States leads the way when it comes to Technology, where it is the top performer in Future Technologies and has the second-highest score in Content. Its weaker performance in the Access (29th) sub-pillar stands in stark contrast to this. The country also does very well in the Governance (4th) pillar, where it has the world's best Regulation relevant to the network economy and is a leading country in terms of Inclusion (4th). The United Kingdom makes it into the top 5 in the Governance (5th) pillar, where it benefits from solid performances in all three sub-pillars: Trust (5th), Regulation (10th) and Inclusion (5th).

Performance by pillar of the NRI

The highest-ranked country in the **Technology** pillar is the United States, followed by the Netherlands and Switzerland. All three countries perform well at the sub-pillar level and are the three top-performing countries in the Content sub-pillar. Luxembourg leads the way with respect to the Access sub-pillar, and the United States is top-ranked in the sub-pillar of Future Technologies.

The **People** pillar is headed by two Scandinavian countries, Denmark and Sweden, which are strong in all dimensions related to the usage and skills in digital technologies among individuals, businesses and governments. They are also the two leading countries when it comes to the Businesses sub-pillar, and are ranked 3rd and 4th, respectively, in the Governments sub-pillar.

Another Scandinavian country—Norway—is top-ranked in the **Governance** pillar. It performs particularly well with respect to the Trust and Regulation sub-pillars, but it is also a top 10 country in the Inclusion sub-pillar. There are three different global leaders in the three sub-pillars: Luxembourg is the highest-ranked country when it comes to Trust, the United States leads the way in Regulation, and New Zealand ranks first in matters related to Inclusion.

Singapore is the highest-ranked country in the pillar related to **Impact** followed by Switzerland and Sweden. Singapore is also the leader when it comes to the Economy sub-pillar. Switzerland is a more consistent performer, with high rankings in all three

sub-pillars. Sweden performs particularly well with respect to the Economy and Quality of Life sub-pillars. The latter dimension is primarily dominated by the Nordic countries, with Norway leading the way.

Regional performance

The top regional performers are indicated in the table below.

Africa	Arab States	Asia & Pacific
1. Mauritius (53)	1. United Arab Emirates (29)	1. Singapore (2)
2. South Africa (72)	2. Qatar (33)	2. Japan (12)
3. Rwanda (89)	3. Bahrain (40)	3. Australia (13)

CIS	Europe	The Americas
1. Russia (48)	1. Sweden (1)	1. United States (8)
2. Kazakhstan (60)	2. Netherlands (3)	2. Canada (14)
3. Belarus (61)	3. Norway (4)	3. Chile (42)

Note: Global ranks in parentheses. CIS = Commonwealth of Independent States.

Europe dominates the NRI rankings, with eight countries in the top 10. In addition to the high-ranked performances of Sweden and the Netherlands, other countries also come up with excellent results. Switzerland, ranked 5th globally, is ranked high (2nd) in the Impact pillar, primarily as a result of its high scores in the Economy (3rd) and SDG Contribution (2nd) sub-pillars. Switzerland is also impressive when it comes to the Technology (3rd) pillar, where it enjoys superior levels of Access (4th), Content (3rd) and Future Technologies (7th). Denmark, ranked 6th globally, is one of the top 5 countries in all three sub-pillars of the People pillar: Individuals (5th), Businesses (2nd) and Governments (3rd). Finland ranks in the top 10 in each of the four pillars. Its highest placement is in the Technology and People (5th in both) pillars. Germany finds itself in the top 10 in three pillars: Technology (10th), People (10th) and Impact (8th). Its strong performance with respect to the Impact pillar is primarily due to its positive SDG Contribution (6th) and outcomes in the Economy (7th) sub-pillar.

The Asia & Pacific region is only behind Europe in many of the dimensions included in the NRI. Asia & Pacific has a wide dispersion of performances in the NRI, ranging from Singapore in 2nd to Lao P.D.R. in 108th. After Singapore, the next highest-ranked country in the region is Japan (12th), which makes it into the top 10 in two pillars: People (7th) and Impact (10th). Japan is also a world-class performer in Future Technologies (5th), but its overall score in Technology is weakened by its levels of Access (35th) and Content (27th). Ranked just below Japan is Australia (13th), which also enjoys high ICT usage

and skills among Individuals (6th) that contribute to making People (11th) its best-ranked pillar. Australia's performances in Governance (13th) and Technology (16th) are primarily boosted by high levels of, respectively, Trust (9th) and Access (8th).

Further down the rankings of the Asia & Pacific region, one finds the highest-scoring South Asian country: India (79th). Its key strength lies in Governance (52nd), as a result of consistent performances in all three sub-pillars: Trust (49th), Regulation (59th) and Inclusion (58th). The relatively high score in the Governments (36th) sub-pillar is offset by weak ICT usage and skills by Individuals (103rd) and Businesses (87th), which leads to a rank of 81st in the People pillar. Slightly better is the Technology (79th) pillar, mainly because of the level of Future Technologies (46th). India's greatest challenge is to raise its ranking in the Impact (100th) pillar, where there is much scope for improvement in issues related to Quality of Life (93rd) and SDG Contribution (108th).

The group of Arab States also shows a large dispersion of overall scores in the NRI, despite the region being represented by only 13 countries in the index. The region can, in effect, be broken down further into Middle East and Northern Africa, where most of the former countries clearly outperform the latter economies. The regional leader, United Arab Emirates (29th), is the only Arab State ranked in the top quartile. The high ICT usage of its population makes it the top-performing country in the Individuals sub-pillar, but lower digital usage and skills by firms and national authorities (34th in Businesses; 59th in Governments) put a damper on the overall score in the People (24th) pillar. The UAE performs equally well in the Governance (24th) pillar, boosted by consistent performances in all three sub-pillars (Trust, 21st; Regulation, 32nd; Inclusion, 28th). Its most pressing need is to improve the Impact (38th) of the network economy, where much could be done to raise SDG Contribution (75th).

The group of Commonwealth of Independent States (CIS) is headed by Russia (48th). Its best performance relates to People (38th), especially the ICT usage and skills of firms and national authorities (35th in Businesses and 32nd in Governments). At the level of the sub-pillar, meanwhile, the country does even better when it comes to Inclusion (29th). However, the same pillar — Governance (56th) — also includes Russia's weakest dimension in the NRI: Regulation (91st). Other areas in need of improvement include Future Technologies (72nd) in the Technology (51st) pillar and Quality of Life (85th) in the Impact pillar (59th). The associated pillars, Technology and Governance, are also the two weakest dimensions of the CIS, which suggests that many countries in the region should pay more attention to promoting online safety and ICT

regulation and to preparing themselves for disruptive technologies like artificial intelligence and Internet of Things.

In the Americas region, after the U.S., Canada (14th) is a solid performer in all four pillars, ranking in the top 20 in each. It is one of the leading countries when it comes to Inclusion (3rd) of various groups in the network economy, which—together with high levels of Trust (14th) and Regulation (15th)—leads to good Governance (11th). Canada ranks 10th in the two sub-pillars related to Governments and Quality of Life, but relatively weak ICT usage among Individuals (47th) dampens the People (17th) pillar, while the Impact (19th) would improve by boosting the role of ICT in the Economy (29th) and SDG Contribution (27th).

Chile (42nd) is the leading Latin American country in no small part because of its levels of ICT usage and skills among Individuals (20th) and Businesses (41st), which boosts the People (41st) pillar. The country also performs relatively well with respect to Governance (39th), where it enjoys solid levels of Trust (42nd) and Regulation (39th). Its main weakness relates to Impact (54th), where much could be done to raise the Economy (70th) sub-pillar. The three largest Latin American economies — Mexico (57th), Argentina (58th) and Brazil (59th) — are all ranked next to each other in the NRI. All three do comparatively well in the People pillar (Mexico, 55th; Argentina, 46th; Brazil, 48th), and all three countries can do more to increase their readiness for Future Technologies (Mexico, 80th; Argentina, 103rd; Brazil, 95th).

In Africa, there is a significant gap even within the top 3, with Mauritius ranked 53rd and Rwanda ranked 89th. In between these two is South Africa (72nd), where the levels of Trust (38th) and Inclusion (46th) contribute to making Governance (47th) its best pillar. South Africa also finds itself in the third quartile with respect to Technology (58th), primarily as a result of the country's position in Content (54th) and Future Technologies (53rd). Its greatest challenge, meanwhile, concerns the Impact (99th) of the network economy, especially as it relates to improving Quality of Life (118th). As for Mauritius, its level of Trust (32nd) also makes a significant positive contribution to the Governance (41st) pillar. Its weakest dimension is People (70th), with considerable room for improvement in all three sub-pillars (Individuals, 73rd; Businesses, 68th; Governments, 69th). It is interesting to note that Africa ranks ahead of CIS in the sub-pillars of Future Technologies and Trust.



About the Network Readiness Index:

The Network Readiness Index (NRI) was first published in 2002 and provided a holistic framework for assessing the multi-faceted impact of ICT on society and the development of nations. Until 2016, the NRI was part of the Global Information Technology Report (GITR) published by the World Economic Forum (WEF), Cornell University, and INSEAD. The NRI anticipated various aspects that would become critical in the following years: early on, it identified three essential stakeholders for ICT: individuals/society, businesses, and governments, and it included elements of ICT application that were novel for the time. At a time when the primary concerns in ICT revolved around infrastructure issues, the NRI provided a forward-looking and a holistic perspective on the application of ICT within national economies.

The NRI rapidly developed into a global benchmark for the application and utilization of ICT. Many economies utilized the NRI to design their ICT strategies, and the NRI was used and frequently quoted by leaders from the public and private sectors. Over the ensuing two decades, the NRI framework underwent one major revision, which allowed an explicit focus on the impact of ICT. Despite the challenges inherent in collecting data from more than 120 economies, the NRI retained its extensive global coverage as the key metric of the use of ICT for development and competitiveness.

This year, the renewed and revised NRI covers more than 120 nations based on 62 variables and is a publication of the Portulans Institute, whose co-founders - Bruno Lanvin and Soumitra Dutta - have also been the co-editors of the GITR in previous years.