



# Towards a new ITU index

Background document for the Expert Group Meeting on the ITU Index, Geneva, 10  
February 2020

## Introduction

With the systematic collection and dissemination of statistical evidence, based on the intensive collaboration with its stakeholders, ITU is a forum of reference for measuring the development of information and communication technologies (ICTs) across the globe. This also presents an ongoing challenge, to remain relevant amidst the evolving global priorities. One of the main challenges is to be relevant to the global community's efforts to achieve the Sustainable Development Goals.

The Plenipotentiary Conference of the ITU provided indications for how to make the measurement tools of ITU more relevant. Resolution 131 (rev. Dubai, 2018) recognises that an ITU index is important for measuring the information society and the extent of the digital divide in international comparisons and stipulates that such an index should reflect the real development of the ICT sector, taking into consideration different levels of development and national circumstances as well as ICT trends, in application of the WSIS outcomes.

Resolution 71 (rev. Dubai, 2018) states the mission of the ITU as “(t)o promote, facilitate and foster affordable and universal access to telecommunication/information and communication technology networks, services and applications and their use for social, economic and environmentally sustainable growth and development.”

An index that reflects the real development of the ICT sector, takes into account ICT trends and the WSIS outcomes and is faithful to the ITU mission at the same time should have a broad focus, taking into account social, economic and environmental aspects. A framework with that scope already exists in the form of the 17 Sustainable Development Goals (SDGs), adopted by the Heads of State and Government and High Representatives, meeting at United Nations Headquarters in New York in September 2015.<sup>1</sup> The 2030 Agenda for Sustainable Development was a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030.

## ICTs and sustainable development

Digital technologies are an important catalyst to enable progress towards achieving the SDGs. This is recognised in the 2030 Agenda, which states that “the spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to

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<sup>1</sup> See

<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>.

bridge the digital divide and to develop knowledge societies.” Digital change will have impacts – some of them helpful, others detrimental – on every single SDG, ranging from poverty alleviation to resource efficiency, from governance to energy and mobility systems, from employment to transnational partnerships. Digital technology is speeding up fundamental societal and economic change.<sup>2</sup>

In September 2019, the UN Secretary-General called on all sectors of society to mobilize for a decade of action. 2020 needs to usher in a decade of ambitious action to deliver the Goals by 2030.<sup>3</sup> ITU Secretary-General, Houlin Zhao, said that “digital technologies are moving all 17 SDGs from vision to action. Together, let’s use these technologies to protect our planet and improve people’s lives the world over. In this decade of action, let’s transform the digital revolution into a development revolution”.<sup>4</sup>

The German Advisory Council on Global Change recently published a flagship report with the title: “Towards our common digital future”, which highlighted two important, paradoxical points:

- Digital technologies have the potential to facilitate rapid transformations towards a green economy (by fostering decarbonisation in many sectors, multiplying resource and energy efficiency, and improving the surveillance and protection of ecosystems), but
- Ever-faster digitalisation has so far not brought about the sustainability U-turn we need. Instead, it is deepening and extending unsustainable growth patterns.<sup>5</sup>

The UN Panel on Digital Cooperation and the scientific consortium “The World in 2050” have also come to these two conclusions in recent publications.<sup>6</sup> There is no simple automatism between digitalisation and sustainability transformations. The missing link is governance. Policy makers must act fast for humanity to rise to the climate challenge and achieve the SDGs and build the bridges between digital innovation and sustainability transformations.<sup>7</sup> In order to build those bridges, policy makers need evidence.

### **ICT Development Index (IDI)**

From 2009 until 2017, the ITU published the ICT Development Index (IDI), a composite index designed to allow assessing and comparing the state of ICT development within and between countries. The objective was to monitor changes in the development of ICTs over time so that forward-looking policy can be informed.

The need to continuously improve measurement methods and to update the composition of the IDI in response to technological developments was recognized from the beginning. As broadband and advanced wireless connectivity became more critical for countries to fully realize the benefits of ICTs, the initial set of indicators needed to be reviewed. To address these issues, in 2016 the ITU launched a process of revising the indicators included in the IDI, through an external consultancy and

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<sup>2</sup> See [https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/190830-Six-Transformations\\_working-paper.pdf](https://irp-cdn.multiscreensite.com/be6d1d56/files/uploaded/190830-Six-Transformations_working-paper.pdf).

<sup>3</sup> See <https://www.un.org/sustainabledevelopment/decade-of-action/>.

<sup>4</sup> See <https://www.youtube.com/watch?v=nZTwVkBHqqU>.

<sup>5</sup> See

[https://www.wbgu.de/fileadmin/user\\_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/wbgu\\_hg2019\\_en.pdf](https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/wbgu_hg2019_en.pdf).

<sup>6</sup> See <https://www.un.org/en/pdfs/DigitalCooperation-report-for%20web.pdf> and <http://publications.iass-potsdam.de/pubman/item/escidoc:4507896:3/component/escidoc:4507897/4507896.pdf>.

<sup>7</sup> See <https://council.science/current/news/why-we-need-a-un-charter/>.

a subgroup of the Expert Group on Telecommunication/ICT Indicators (EGTI). The results of the two studies were discussed at an Extraordinary Meeting of EGTI and the Expert Group on Household Indicators (EGH), held in March 2017, and a revised set of indicators was adopted. The meeting, however, did not engage in the other methodological steps required for the development and calculation of a composite index.

After collecting the data for 2018 from Member States, the ITU Secretariat had to conclude that the IDI based on the revised set of indicators could not be calculated and released, for reasons of data quality, data quantity as well as a number of flaws that occurred in the process of revising the indicators included in the IDI.<sup>8</sup> In 2019, these problems persisted, resulting in the IDI again not being published.

The IDI had three pillars: access, use and skills, with indicators covering the telecommunication infrastructure, household access to ICTS and ICT use and skills of individuals. This rather narrow focus does not take into account the role of digital technologies in the digital transformation that is transforming the planet, with a major impact on all sectors of the economy, in all countries.

While the IDI was successful in what it was trying to achieve in the earlier stages of the digital transformation, a simple revision of the IDI would not do justice to the digital transformation that is sweeping the planet today and the role of digital technologies in achieving the SDGs. A revised index needs to take into account not merely the development of the digital infrastructure, but also what technologies are used for in the entire digital ecosystem. This will help countries identify areas where they need to focus in order to leverage the sustainable social benefits of digital technologies.

### **A new index**

With this as background, and in observation of Resolution 71 and Resolution 131, the ITU Secretariat is proposing to develop a composite index that will provide a monitoring tool for governments to assess how digital transformations may impact our ability to achieve the SDGs. The index will embody a move beyond the often technical world of digital technologies to a more human side touching on well-being and sustainability by addressing all of the SDGs. The index would go beyond measuring telecommunication infrastructure and include dimensions that will measure the availability and use of digital technologies by households and individuals, and in sectors such as health, education, business, government, employment, food and agriculture, as well as the gender and poverty dimensions. It will allow countries to assess their status and evolution of meaningful connectivity taking into account broader development goals. It will also help elevate the importance of ICT for development by bringing it to the attention of heads of government.

Some of the advantages of this approach are the following:

- **Forward-looking** – focused on digital development/transformation.
- **Broad focus** – the new index will measure the level of digital technology adoption in different sectors of the economy. As such it will be **more relevant and meaningful** as it takes into consideration the entire digital ecosystem and will help countries to identify areas where they need to focus in order to leverage the benefits of digital technologies.
- **Flexible** – in view of its broader dimension and larger number of indicators included (where each individual indicator has less weight).

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<sup>8</sup> For more information on this, please consult the following [background document](#), which was also part of Circular Letter [Circular/BDT/DKH/IDA/026](#).

- **Partnership** – creates opportunities for strategic partnerships and collaborations with other UN agencies, industry associations, the private sector and academia. Cooperation can be envisioned in areas including joint research, publications and projects

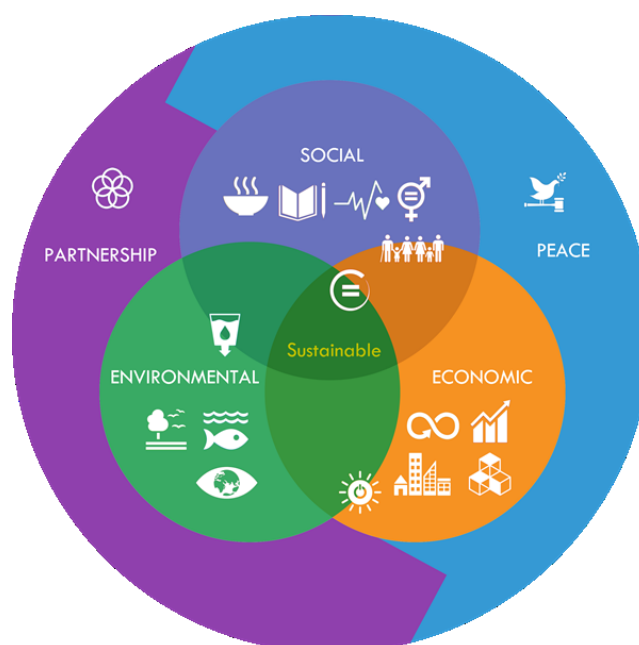
## Framework and pillars

The Sustainable Development Goals encompass seventeen dimensions around which countries should mobilize efforts to end poverty, inequality, tackle climate change, environmental degradation, and strive for peace and justice. In order to help focus attention, the SDGs have been grouped into five themes: People, Prosperity, Planet, Peace and Partnerships. The five-theme structure offers an intuitive, multi-dimensional measurement framework for gauging in a comprehensive way how the digital transformation contributes to countries' capacity to meet the different SDGs.

While digital technologies affect all of the SDGs, it is useful to generalize their main role in each of these themes:

- *People* includes goals largely related to improving lives. Here digital technologies play an enabling role by enhancing opportunities for increasing income (e.g., easier access to productive information, devices for increasing agricultural production), improving health (e.g., drones delivering medical supplies), expanding educational opportunities (e.g., distance education), accessing public services (e.g. birth certificates) and facilitating female employment via flexible ICT-enabled options that balance work and family.
- *Prosperity* covers goals largely relating to the economy. Here digital technologies play a role in transformational diversification to a digital economy. Digital technologies enhance productivity and create opportunities for new ways of organizing and carrying out economic activities, transforming industries from transportation (e.g., ride hailing, online ticket ordering, etc.) to manufacturing (e.g., Industry 4.0) and tourism (e.g., home sharing) to retail (e.g., e-commerce) and trade in services. At the same time, the possession of digital skills creates opportunities for quality employment.
- *Planet* consists of goals largely relating to the environment. Digital technologies play a crucial role in earth monitoring, sharing climate and weather information, forecasting and early warning systems, using satellites, drones or sensors.
- *Peace* regroups just one SDG. Here the most important contribution of digital technologies would be transparency. Whether it means open data sets or online public services, the overarching consideration is that transparency is increased and corruption likely reduced. Open data provides free and public information about government operations allowing users to scrutinize the figures. Online transactions and digital IDs reduce the scope for corruption.
- Similar to peace, *Partnerships* include just one SDG. Though digital technologies are very relevant for enhancing communications across many stakeholders, their biggest impact for this theme would be the ability to use new data collection techniques for monitoring the SDGs. Given the vast amount of money estimated for collecting data for the targets established to monitor the SDGs using traditional methods, digital technologies using big data and machine learning could significantly reduce the costs and greatly increase the likelihood that needed data will be available for all countries to understand their level of sustainable development.

**Figure 1: Mapping the SDGs to the 5 P's**



*Note:* the people pillar is called social in the Figure, the planet pillar environmental and the prosperity pillar economic.

*Source:* <https://www.unssc.org/news-and-insights/blog/sustainable-development-what-there-know-and-why-should-we-care/>

An index built on the “5 Ps” framework offers numerous advantages. It allows to advocate, using the power of numbers, the central role of ICTs and digital technologies for the many dimensions of development. The framework is easy to understand for non-experts and resonates with the priorities of the global community.

The Annex provides a short description of how digital technologies contribute to each of SDGs individually. Some concrete impacts are shown in Figure 2 below and are also available on the ITU website.<sup>9</sup> The cross-cutting nature of ICTs can also be explored from a different perspective where one single digital technology, digital finance, has an impact on many of the SDGs.<sup>10</sup>

<sup>9</sup> See <https://www.itu.int/en/sustainable-world/Pages/default.aspx>.

<sup>10</sup> See <https://www.unCDF.org/article/3951/igniting-sdg-progress-through-digital-financial-inclusion>.

**Figure 2: Examples of the contribution of digital technologies to the SDGs**



Digital technologies assist, accelerate and provide alternative and more affordable ways for realizing the SDGs. They assist sustainable development through complementation. Take clean and affordable energy for example. While solar solutions are attractive for localities not close to electrical grids, the high upfront costs of panels are often prohibitive. Mobile money provides an option for purchasing solar panels on credit. Another example is education where digital technologies can assist teachers fill in gaps in learning materials through online access to educational material or substitute for a shortage of teachers through video conferencing.

Acceleration is another characteristic of digital technologies, particularly relevant for monitoring SDGs where it is far quicker to use big data than to carry out time-consuming surveys. Another example is the provision of online public services, which are quicker than having to go to a government office.

Digital technologies provide alternative and often innovative methods for achieving the SDGs, such as 3D printing of prosthetics or using blockchain technology to monitor food chains. Costs are lowered with digital technologies making them a more affordable alternative such as saving money for governments and citizens through provision of online services instead of face-to-face encounters.

The new index should help measure how digital technologies in the different sectors of the economy and in social interactions help accelerate the achievements of SDGs. However, while there is much excitement about the potential of digital technologies for enhancing sustainable development, the reverse is also true. Not all anecdotal stories about the benefits of digital technologies bear fruit under the scope of empirical analysis particularly in areas related to health and education (SDGs 2 and 4). Digital technologies can also be disruptive with consequences for many industries and implications for employment (SDG 8). Digital products often contain environmentally unfriendly components raising disposal concerns (SDG 12). Misuse such as attacks on computer systems (SDG 9) and spread of false information over social media (SDG 16) can have dire consequences such as spreading violence and undermining confidence in institutions. The framework will therefore take into consideration the potential negative effects, where measurable.

## Measurement

The purpose of the new index is to take a comprehensive view and include dimensions that will measure the availability and use of digital technologies by households and individuals, and in sectors such as health, education, business, government, employment, food and agriculture, as well as the gender and poverty dimensions, cybersecurity, etc. The index may also include policy indicators, in addition to statistical indicators.

The selection of specific indicators will be based on their coherence with the overall conceptual framework and its dimensions. The purpose of this document is to provide the background for the development of the new index. The selection of indicators will follow in the next stage. At the initial stage, it is important to recognize a set of core characteristics for the types of indicators that will be considered in the index, to ensure that these are fit for purpose and stand the test of time.

Indicators will be selected based on their availability for a majority of countries and for a sufficient number of years, for which metadata can be traced. In case existing indicators do not allow to fully capture certain dimensions, 'placeholders' or proxy indicators can flag the focus of future data collection efforts. This flexible approach ensures that the index can fully serve its purpose as an appropriate measurement tool.

The Annex provides a number of examples of the type of indicators that could be included. In addition, the Partnership on Measuring ICT for Development has compiled a comprehensive list of thematic ICT indicators related to the SDGs featuring 26 indicators covering 27 targets in 11 goals.<sup>11</sup> The list is useful as a starting point towards creation of an SDG Digital Technology index consisting of indicators that can be directly mapped to SDG impacts based on empirical statistical evidence.

The new index will feature indicators from ITU's database, as well as indicators collected by other UN agencies. This will require close cooperation with these agencies in the calculation of the index. A first effort to reach out to potential partners from the UN family has been made and a brainstorming discussion was held on 28 January 2020.

Aggregation of the indicators and validation of results will follow the established good practices of developing composite indicators.<sup>12</sup> This entails testing the statistical coherence and performing sensitivity analysis on the robustness of country rankings.

## Way forward

Following the Expert Group Meeting on 10 February 2020, the conceptual framework will be finalized, and work will commence to check the availability and quality of potential indicators that could be included in the new index. This will be done in close consultation with other UN agencies. Progress will be presented during the 17<sup>th</sup> World Telecommunication/ICT Indicators Symposium (WTIS), which will be held in Geneva from 15 to 17 April 2020. Subsequently the methodology will be finalized, the new index will be calculated and a sensitivity analysis will be conducted, and the final results computed. The new index could be launched in the second half of 2020.

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<sup>11</sup> See <https://www.itu.int/en/ITU-D/Statistics/Documents/intlcoop/partnership/Thematic ICT indicators for the SDGs.pdf>.

<sup>12</sup> See <https://www.oecd.org/sdd/42495745.pdf>.

## Annex: Examples of how ICTs contribute to achieving the SDGs



### **End poverty in all its forms everywhere**

*Digital technologies can raise incomes through better access to market information and by widening financial inclusion. New digital techniques are emerging that can substantially lower costs and time required for poverty measurement.*



### **End hunger, achieve food security and improved nutrition and promote sustainable agriculture**

*Information on prices, weather conditions and production techniques help to increase production and mitigate risks. Sensors coupled with software analysis provide real-time monitoring that improve agricultural efficiency.*

*To feed a growing population, agriculture is increasingly knowledge-intensive. ICTs help farmers improve crop yields and business productivity through better access to market information, weather forecasts, training programmes, and other online content tailored to their needs.*



### **Ensure healthy lives and promote well-being for all at all ages**

*Connectivity benefits health in various ways such as improving the speed and accountability of administrative processes, increasing efficiency, lowering costs and offering new ways to deliver medical services and products.*

*ICTs have the potential to deliver benefits across the global healthcare ecosystem.*

*Patients can contact health care services remotely regardless of their proximity to a healthcare centre. Health care workers can, for example, learn and prepare for disease outbreaks, identify patient symptoms, follow established treatment protocols, perform remote diagnostics, access expert support and so on. Big Data analytics can help produce snapshots, analyze trends, and make projections about disease outbreaks, health service usage, and patient knowledge, attitudes, and practices.*



### **Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

*Connectivity can supplement shortages of schools, teachers and learning materials through distance education and online educational content.*

*ICTs are powering a revolution in digital learning, which has become one of the world's fastest-growing industries. Mobile devices now allow students to access learning assets anytime, anywhere. Teachers are now using mobile devices for everything from literacy and numerical training to interactive tutoring. Indeed, mobile learning has the ability to help break down economic barriers, divides between rural and urban, as well as the gender divide.*



### **Achieve gender equality and empower all women and girls**

*ICTs enhance gender empowerment and livelihoods through expanded access to information. Digital technology also enables flexible labour arrangements helping to balance work and family.*

*ICTs can provide great opportunities for gender equality by enabling everyone to have access to the same online resources and opportunities. They enable women to gain a stronger voice in their communities, their government and at the global level. ICTs can also provide new*



opportunities for women's economic empowerment by creating business and employment opportunities for women as owners and managers of ICT-accessed projects, as well as employees of new business ventures. Yet, over 400 million fewer women are online than men. The gender gap in access to ICTs needs to be urgently addressed if the benefits of ICTs to gender equality and gender empowerment are to be achieved.



**Ensure availability and sustainable management of water and sanitation for all**

*ICTs help to manage water resources and quality through satellite imagery, sensors and smart meters. Digital finance enables lower income users access to water systems.*

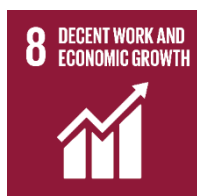
*More than 800'000 deaths are caused each year by unsafe water and poor sanitation. ICTs are particularly important for smart water management, facilitating the measurement and monitoring of water supplies as well as necessary interventions, and enabling practitioners at the local level to ensure the equitable and sustainable extension of water, sanitation and hygiene (WASH) services. As the costs of ICTs continues to fall, governments will be able to better integrate ICTs into monitoring and evaluation frameworks to optimize operations and improve the quality of service.*



**Ensure access to affordable, reliable, sustainable and modern energy for all**

*Smart metering and grids are improving electricity efficiency and lowering consumption while mobile-enabled payment is expanding access to solar energy.*

*ICTs and energy efficiency can be connected in two ways: 'Greening of ICTs' and 'Greening through ICTs'. In the first case, ICTs are being transformed and developed to be more environmentally sound and less carbon-intensive. In the second case, ICT-enabled solutions (for example smart grids, smart buildings, smart logistics and industrial processes) are helping to transform the world towards a more sustainable and energy efficient future. These green technologies and processes have the potential to play a significant role in significantly reducing global greenhouse gas emissions.*



**Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

*ICT raises productivity and hence economic growth. Digital technology is transforming business models from manufacturing to transportation. ICT is important for economic diversification both as an important sector in its own right as well for ICT-enabled services.*

*ICT skills have already become a prerequisite for almost all forms of employment, and ICT capacity-building must therefore be prioritized in national youth employment and entrepreneurship strategies in all countries. It is not simply that most jobs and businesses now require ICT skills, but also that ICTs themselves are transforming the way that business is being done everywhere and creating new employment opportunities.*



**Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**

*ICTs are an important infrastructure in their own right, the presence of which enables enterprises and entrepreneurs to increase productivity and launch new types of businesses. A bottom-up, grass roots innovation model has emerged revolving around digital technologies.*

Without the digital infrastructure that powers our wireless world and forms the backbone of our digital economy, the world would not be able to deliver the ICT applications that enable scalable solutions to the SDGs. ITU believes broadband must be considered essential infrastructure for the 21st-century due to its capacity to power industry and innovation. And ITU's role in the adopting of globally harmonized spectrum and standards is essential to facilitate the development of transformative digital infrastructure, such as 5G systems, that will drive scalable solutions to all 17 SDGs.



### **Reduce inequality within and among countries**

*ICTs can help to reduce inequalities by facilitating access to information and improve the situation of migrants and refugees enabling them to communicate with friends and family. Mobile money enables safe cash transfers to vulnerable populations and often reduces the cost of migrant remittances.*

*ICTs have the potential to help reduce inequality both within and between countries by enabling access to information and knowledge to disadvantaged segments of society – including those living with disabilities, as well as women and girls. However, by the end of 2019, almost half of the world's population – 3.6 billion people – were not yet using the Internet and access was uneven between genders and geographically. Reducing inequalities cannot be achieved without addressing these underlying issues.*



### **Make cities and human settlements inclusive, safe, resilient and sustainable**

*Digital technologies have wide application for cities in areas such as transport, safety, environment and utilities. Interconnected sensors and meters coupled with big data analysis are improving transport and utility efficiency. Mobile phone data are used by public administrations to optimize services and the public uses apps to interact with city governments.*

*interact with city governments.*



### **Ensure sustainable consumption and production patterns**

*ICT enables sustainable consumption through more proficient monitoring of resources, digital innovations for higher efficiency and using digital applications to foster awareness and lifestyle changes by the public.*

*Cloud computing, smart grids, smart metering, and reduced energy consumption of ICTs all have a positive impact on reducing our consumption. However, ICTs themselves require energy consumption. Therefore, effective policies are needed to ensure the negative impacts of ICTs, such as e-waste, are minimized.*



### **Take urgent action to combat climate change and its impacts**

*ICTs, including satellite monitoring, play a crucial role in earth monitoring, sharing climate and weather information, forecasting, and early warning systems. ICTs strengthen resilience by helping mitigate the effects of climate change through forecasting and early warning systems.*



### **Conserve and sustainably use the oceans, seas and marine resources for sustainable development**

*Monitoring of oceans using satellites, drones and sensors provides essential information for weather forecasts and climate change impacts. Digital technologies track undersea life and ships enhancing safety and sustainability. Big*

*data can be used to analyse short- and long-term trends in terms of biodiversity, pollution, weather patterns and ecosystem evolution, and to plan mitigation activities.*



### **Halt and reverse land degradation**

*Digital technologies are critical for monitoring terrestrial ecosystems and counteracting environmental crimes. Satellites, sensors and crowdsourcing distribute real time data for analysis, awareness and mitigation.*



### **Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**

*ICT is a powerful tool for expanding transparency and empowering citizens in areas such as digital identification, elections, online public services and open data. ICTs can play an important role in crisis management, humanitarian aid and peacebuilding, and have proved to be a powerful aid in areas such as electoral monitoring. The growing use of open data by governments increases transparency, empowers citizens, and helps to drive economic growth. ICTs are also essential in terms of record-keeping and tracking government data and local demographics.*



### **Strengthen the means of implementation & partnerships for development**

*ICTs are indispensable for supporting partnerships by enhancing communication such as email, video conferencing and access to information enabling stakeholders to dialogue no matter where they are in the world. Digital technologies will also be essential to lower the costs of monitoring the SDGs.*