SDG Digital Acceleration Agenda

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Foreword

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The recent breakthroughs in digital technology have unleashed unprecedented opportunities, and with them new avenues for digital innovation in our race against time to fulfil the promise of the 2030 Agenda – our global community's shared plan for a greener, more sustainable, and more inclusive future for all. With 2.6 billion people globally still offline, unable to take advantage of our ever-accelerating digital world, the International Telecommunication Union (ITU) and the United Nations Development Programme (UNDP) are driving new efforts to ensure that everyone can benefit from the ongoing digital transformation including through universal and meaningful connectivity.

As part of this effort, ITU and UNDP have launched the Sustainable Development Goal (SDG) Digital Acceleration Agenda. Informed by the latest data, it covers a range of key areas including digital skills, governance and regulations, financing, infrastructure, and security, as well as applications and services. With a range of real-world examples, this agenda shows how game-changing digital solutions can accelerate progress in climate action, education, hunger, poverty and at least 70 per cent of the 169 SDG targets.

While we celebrate the potential of these technologies, we also recognize that they are not without risks. From cyberthreats to Artificial Intelligence (AI), addressing these challenges is vital to design the digital solutions that can support progress across all 17 SDGs. So is the need to empower individuals and communities with the right digital skills, especially in developing countries. Digital technologies must be developed and deployed in a safe, responsible, and equitable manner. We cannot allow for digital innovation and power to be concentrated in the hands of a privileged few, not when just five countries already register 85 per cent of the world's patents.

We stand at a moment in history when technology is moving at an exponential rate, and this can be unsettling. Yet we need to remember that how our shared digital future unfolds is up to us. With only a fraction of the SDGs on track at the halfway point of the 2030 Agenda, it is urgent to ensure that everyone, everywhere can build their own digital futures. Together, the entire United Nations family and our many partners are committed to harnessing data and digital technologies to drive down poverty and inequalities, advance climate action, restore our natural world, and put the 2030 Agenda back on track with time now of the essence.

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EXECUTIVE SUMMARY

Digital technologies – from mobile phones, to more emerging innovations leveraging artificial intelligence and other technologies – are having exciting and important impact around the world. They are improving financial inclusion, increasing the effectiveness of government and public service delivery, and providing people with platforms and channels to ensure that their voices are heard. Digital is transforming countries, communities, economies, and societies, and could be a crucial catalyst for achieving the Sustainable Development Goals (SDGs).

The SDGs, adopted in 2015, are a global call-to-action for people, the planet, prosperity, and for global peace. Despite important progress, an era of polycrisis – including the COVID-19 pandemic, climate change, and conflict – have pushed many of the SDGs off-track. Progress has slowed, stopped, and even reversed in some areas and contexts. At the mid-point toward the 2030 SDG deadline, focused and urgent efforts are needed to ensure the global community can achieve these essential targets. In this context, digital can play three crucial roles: as a core channel, and platform, for the delivery of vital services; as a tool to deliver data and insights to achieve each of the SDGs, and as a catalyst for wider progress. This includes driving new ways of working, thinking, and financing to deliver the Global Goals.

However, these functions are not guaranteed – and digital technologies are not a panacea. They are also not neutral and need to be applied in an inclusive and considered way. Digital technologies have a powerful multiplier effect, both positive and negative, and so it is vital to ensure that their use minimizes any increase, entrenchment, or exacerbation of inequality, especially as very real gender, location, and broader digital and data divides exist. Intentionally-inclusive approaches to digital development — which place people and the protection of human rights at the centre — are vital in ensuring that the risks of digital transformation are proactively addressed, and that no one is left behind. This includes building and embedding protections to maximize the benefits of digital technologies, whilst also tackling and mitigating associated risks.

This Agenda explores how digital technologies are already being used to accelerate progress toward the SDGs, and how inclusive digital transformation can be scaled further. The Agenda also showcases 34 digital solutions, two for each SDG, highlighting the power and potential of digital. The solutions represent a range of different products and stakeholders; for example, some are open-source and supported by non-profit organizations or public sector institutions, while others are proprietary solutions developed by companies or entrepreneurs. However, they are all grounded in their positive impacts in achieving SDG targets – and their potential for scalability, replicability, and global relevance. These solutions chosen offer a snapshot of the scale, breadth, and possibilities of digital transformation for countries around the world.

Although diverse in implementation – from foundational digital payment initiatives, to cutting-edge supply chain traceability tools and data-driven platforms – altogether, they highlight key priorities and principles to ensure that digital can support the SDGs. Each solution reaffirms the importance of designing based on needs and realities, and the essential components of collaboration and co-design that need to guide the development of any digital initiative. This range of solutions also highlights the appropriate use of technology, and the importance of grounding technologies in a people-centred, inclusive, and safe-and-secure approach.

However, although each digital solution is operating in multiple countries, digital development is not centred around individual products, services, or initiatives. National digital transformation must be a whole-of-society effort – including leveraging the catalytic power of a whole-of-government approach, the digital talents and expertise of the private sector, and most crucially the credibility and expertise of civil society. The latter is an especially important asset in ensuring that populations which risk being marginalized from digital transformation – including women and girls – become partners, innovators, and advocates for digital.

Recognizing the importance of this holistic approach in ensuring that digital can best support and catalyse the SDGs – and based on the global digital transformation experience of ITU, UNDP, IDB, and BCG – the Agenda also examines national successes of countries in exploring, applying, and scaling digital. It sets out key 'Digital Transformation Enablers' that can support other countries on their digital transformation journeys. These components include the importance of an overarching national digital vision and strategy, the relevance of digital applications, products, and services in driving SDG (and other national) priorities, and the need to shape crucial technical and non-technical enablers.

Technical enablers are secure-by-design technical elements that support the development and growth of a functioning digital ecosystem. They include interoperable Digital Public Infrastructure (DPI), connectivity, and technologies such as cloud and high-performance computing infrastructure. Non-technical enablers comprise the essential policies, programmes, initiatives, resources, and capacities to shape, embed, and scale digital transformation and digital ecosystems in an inclusive, accessible, transparent, and participatory way. Each of these different components – from strategy to systems – is explored based on country examples.

Importantly, each digital solution innovation, and national example, reaffirms that digital transformation is not the domain, responsibility, or ownership of a single institution or sector. Collaborative efforts are needed, including finding opportunities to highlight, discuss, and learn from what is and is not working. Collaboration also extends to showcasing digital innovations, and identifying opportunities to scale existing and proven solutions – including common and replicable components such as Digital Public Goods (DPG), and Digital Public Infrastructure that could support and catalyse digital innovation for national development.

Digital transformation is a journey currently being navigated by all countries and communities worldwide. It is a marathon and not a sprint. It requires sustained efforts around strategy, implementation, and investment. Digital tools and technologies are already leading to important outcomes across all 17 SDGs. Telehealth solutions are improving the accessibility and effectiveness of healthcare. The Internet of Things (IoT) is providing unprecedented data to improve agricultural, conservation, and industry practices. Digital platforms and channels are delivering education to some of the most marginalized populations, while connectivity is re-shaping commerce, connection, and communication around the world.

Although progress against the SDGs has hit real challenges, the efforts, innovations, and implementations highlighted and discussed in this study provide real hope. They are an equally real demonstrator of how digital – if applied inclusively, thoughtfully, and strategically – could support in transforming our world, and in delivering the 2030 Agenda for sustainable development. With digital directly contributing to around 70 per cent of the targets of all 17 SDGs, and with the potential to inform the achievement of the other 30 per cent of targets, digital is a crucial tool in achieving this essential and urgent ambition.

THE SDG DIGITAL
ACCELERATION AGENDA

Before 2020, the world was seeing some promising progress. Almost one billion people gained access to safely managed sanitation services from 2015 to 2020. Nearly three-quarters of countries had already met or were on track to meet the SDG target to end preventable deaths of newborns and children under 5 years of age.

The year 2020 saw the first increase in global extreme poverty in almost two decades. Growing global turmoil has led to unprecedented reversals in human development progress in 90 per cent of countries. Human development – which measures a nation's health, education, and standard of living – has fallen back to its 2016 levels, reversing much of the progress towards the SDGs. The COVID-19 pandemic, compounded by inequalities, climate shocks, rapid technological shifts, and social mistrust, has whipped up a perfect storm to wipe out human progress.

Important progress has been achieved in the digital landscape. Over 5 billion people are now online. Digital banking services are reducing the 'unbanked' population, including putting many women in control of their financial futures for the first time. And digital public services are saving many citizens and their governments time and money.

Recognizing and championing this progress was the inspiration behind this study. The International Telecommunication Union (ITU), United Nations Development Programme (UNDP), Inter-American Development Bank (IDB), and the Boston Consulting Group (BCG) are working in countries and communities around the world where digital transformation is having a positive impact on people's lives and livelihoods. This Agenda explores how digital technologies can help accelerate progress toward the SDGs, documents 34 exciting and important digital solutions, and highlights many of the key enablers and components that could drive digital transformation (and its benefits) in other contexts.

This Agenda was also shaped in a context of urgency. At the mid-point toward the 2030 deadline for the SDGs, the global community remains off-track, and in some Goals progress is even regressing. Poverty is increasing, inequality is widening, and polarization and discontent are growing. Digital tools and technologies can play a crucial role in turning this around if we harness them with human needs at the centre and as tools, enablers, and catalysts for human development. About 70 per cent of SDG targets directly benefit from digital technologies. When applied inclusively and thoughtfully, while engaging with their very real challenges and limitations, these technologies could be essential parts of the SDG toolkit.

The power of data and digital technologies for the 2030 Agenda

The UN's 2030 Agenda comprising 17 SDGs sets out a plan for action for people, the planet, and prosperity, and to promote universal peace. Ambitious when adopted in 2015, they SDGs are now an even more significant proposition at the halfway point to their 2030 deadline. Against a backdrop of climate change, global conflict, and pandemic recovery, progress toward many of the SDGs remains off-track and some targets have even halted or regressed: in 2020, global poverty increased for the first time in over two decades. Growing global turmoil has led to unprecedented reversals in human development progress in 90 per cent of countries.

Despite these recent challenges, significant achievements have been delivered. Since 2015, 911 million people gained access to safely managed sanitation services and 687 million to clean drinking water. This progress has also been mirrored in the context of digital technologies. 5.3 billion people are now online - whilst 75 per cent of those aged between 15 and 24 were using the internet in 2022. The African continent is now home to 120 'unicorns' – companies with a market valuation of more than USD 1 billion – and advances in digital public service delivery by many national and local governments have saved citizens countless hours in accessing social protection, registering births and businesses, and undertaking other vital functions.

However, progress in relation to digital technologies has diverged across and within regions and countries, resulting in multiple digital divides such as urban-rural and gender divides. Some 2.6 billion people – more than a third of the total population – remain offline, according to ITU's estimates. In 2022, there were 259 million more men than women using the Internet. GSMA reports that in low- and middle-income countries, women are 17 per cent less likely to own a smartphone compared to men. And other offline inequities are surfacing in the digital world. In 2022, there was a 'land grab' of privileged prospectors purchasing virtual real estate in the metaverse. Female start-up founders in Africa

Digital progress has diverged across and within regions and countries, resulting in multiple digital divides such as urban-rural and gender divides.

struggle to secure financing: only 3 per cent of early-stage funding on the continent went to all-female founding teams, compared to 76 per cent for all-male teams. More broadly, some technologies and applications risk exploiting citizens for their data and/or assets in lower-income countries. Digital transformation can only be truly successful if it is inclusive and equitable, and founded on leaving no one behind.

Data and digital technologies as a catalyst for achieving the SDGs

The SDGs represent a wide range of priorities, actions, and activities, from improving the extent and effectiveness of social protection and eradicating poverty, through to trying to preserve marine and other natural resources.

Several SDG targets explicitly call for the use of digital technologies: SDG 9, centred around "Industry, Innovation, and Infrastructure", calls for digital development, including laying the groundwork for ICT infrastructure through universal access to information and communication technology (target 9.b). Other SDGs, too, highlight the role and importance of data and digital technologies.

Our analysis indicates that 70 per cent of the SDG targets — 119 out of the total 169 — would benefit from acceleration through digital technologies, while 13 per cent (22) of the targets even directly call for the utilization of data and digital technologies (see Appendix).

Several SDG targets explicitly call for the use of digital technologies. Other SDGs highlight the role and importance of data and digital technologies.

For example, progress in doubling the productivity and incomes of small-scale food producers (target 2.3) could be accelerated through digital technologies (such as precision agriculture, remote sensing, and data analytics), helping farmers to optimize production and improve yields. Likewise, progress toward achieving universal health coverage (target 3.8) may be accelerated through improved access to health-care services and information via telemedicine and health-monitoring apps. Knowledge sharing and cooperation for access to science, technology and innovation (target 17.6) could benefit from digital platforms and channels which facilitate global collaboration and technology transfer.

These examples illustrate how digital technologies can contribute to various targets by improving data collection, analysis, communication, collaboration, and decision-making processes. Many relevant technological solutions already exist today and have proven track records, as shown by the set of 34 digital solutions featured in section B.

Many of the other targets that do not have direct links with ICT still harbour possibilities for positive influence from digital technologies. For example, pro-poor public spending (target 1.b) could be supported by deploying advanced data analytics and modelling tools, which can help governments to identify areas of high poverty concentration, assess the effectiveness of existing policies with real-time tracking, and design targeted interventions. These interventions could also include government-to-person payments, founded on Digital Public Infrastructure payment mechanisms.

Similarly, equal rights for women to economic resources, property ownership and financial services (target 5.a) may be fostered via digital banking, mobile wallets, and online property registration systems. The responsible management of chemicals and waste (target 12.4) also has the potential to be advanced through digital tracking systems and data analytics that monitor and manage the lifecycle of chemicals and waste, ensuring responsible disposal and recycling.

Digital technologies can play three main roles in achieving the SDGs:

1. **As a core channel for the delivery of vital services:** They can allow people to connect, collaborate, and engage with each other. For example, mobile technology can support their access to health services, educational information, farming and food prices, social media, news, communication, e-government services, ensuring that social protection reaches the people who need it most. The role of M-Pesa, a mobile money service, in alleviating poverty in Africa has been well documented, and the platform now processes over 61 million transactions a day. Many other cash-transfer services are also facilitating a rapid increase in international remittances and transfers from overseas workers.

2. **Providing data and insights to achieve particular goals:** Digital tools and technologies are often sources of important data and increase the opportunity to measure key outcomes of relevance to the SDGs. For example, sensor networks and the Internet of Things play a role in generating biodiversity data from marine and terrestrial ecosystems, to inform policies and interventions. Specifically, in Brazil and Peru, Rainforest Connection uses AI modelling based on data from rainforest sensors to map their growth and produce evidence on higher tree mortality rates in forests around the world.

3. **As a catalyst for wider progress:** They provide the foundations, enablers, and other assets to support the SDGs. This includes the role of digital components in improving data exchange, creating the potential for increased citizen engagement, and enabling greater government transparency. For example, Partner2Connect and Data4SDGs are multistakeholder alliances to foster meaningful connectivity and sustainable digital transformation. They engage stakeholders to mobilize new resources, partnerships and commitments, including for improving data exchange. These partnerships help governments with decision-making; encourage wider collaborative use of datasets; bridge the gap for those who need data, platforms, and technical capacity to make decisions; and find the technical partners to drive positive change.

If these roles are recognized, data and digital technologies – when applied in an inclusive and considered way – can help get the SDGs back on track and accelerate progress towards realizing the 2030 Agenda.

Data and digital technologies can help achieve the SDGs by providing a channel for vital services, yielding data insights, and catalyzing progress.

How data and digital technologies can contribute to bridging the gap

Getting back on track

Between 2015 and 2019, the world was making progress towards achieving the SDGs, although questions remained as to whether it was rapid enough to meet the 2030 targets. Recently, the combined challenges of the COVID-19 pandemic and successive financial crises and conflicts and the increasing impact of climate change have pushed many targets off-track and even led to backsliding in certain areas. The SDG index, published by the Sustainable Development Solutions Network (SDSN), has essentially remained static since 2019. However, some countries have continued to make progress on the SDGs despite these challenges and are providing important inspiration and guidance.

For example, 146 countries are on track to meet the child mortality target (SDG 3, target 3.2), while 47 countries have eliminated at least one neglected disease (target 3.3). During the pandemic, 40 per cent of adults in low- and middle-income countries opened a bank account for the first time. Initiatives to provide water, sanitation, and hygiene in schools in the Philippines have reduced the number of underweight children by 20 per cent and absenteeism by 30 per cent in just one year. In India, the women-led climate resilient farming model has increased yields by 25 per cent for 40,000 female farmers.

SDG completion

Today

2030

① ② ③
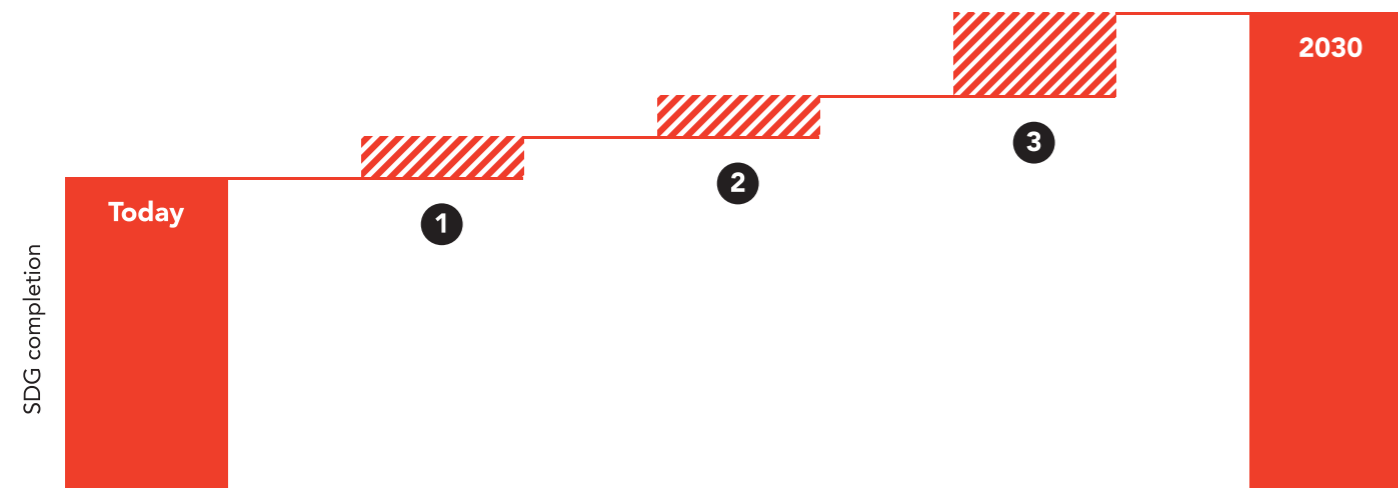
Key levers for bridging the gap

Role of data and digital technologies to drive SDG progress

Getting back on track

Refocus on driving digital transformation for SDG progress

Scale proven digital solutions

Doubling the effort

Push build-out of digital public infrastructure and data

Foster cross-sector collaboration and utilize innovative financing to bridge SDG funding gap

Fostering innovation

Provide prerequisites for innovations across sectors, including technological breakthroughs

Digital technologies can further strengthen this progress through improving the inclusivity, efficiency, effectiveness, and impact of service delivery. For example, the Digital Family Card in Kazakhstan is helping to provide state support to some of the country's most vulnerable families, allowing them to receive any available assistance more readily. This is especially essential for communities in rural areas.

Doubling the effort

Transformative progress against key development outcomes is possible, through shaping collaborations across and between sectors, and identifying and leveraging new financing vehicles to tackle the annual SDG funding gap of USD 3.7 to 4.2 trillion. This includes the opportunity for:

Digital solutions to support the roll-out of energy initiatives, including through collaborations between digital actors and energy players. For example, 'Pay-As-You-Go Solar' initiatives are driving energy and digital inclusion by bringing together mobile network operators and last-mile energy firms. Such schemes are vital for the 675 million people around the world who still lack access to energy.

Digital solutions to improve access to healthcare advice through telehealth, particularly in last-mile, remote and hard-to-reach locations. In sub-Saharan Africa, there are only 2.3 doctors per 10,000 people, and by 2030, a shortage of 10 million health-care workers is expected.

Digital solutions for the training of teachers. Digital Education Hubs and digitally supported Regional Training Centres can increase the number of teachers who are considered qualified according to national standards. Globally, around one teacher in seven does not have this level of qualification, risking sub-par educational outcomes for their students.

Fostering innovation

The global research, development, and innovation landscape is higly unequal with just five countries registering 85 per cent of the world's patents. The risks and challenges of technology and innovation are also likely to disproportionately affect developing countries. Countries on the weaker end of global power dynamics are more likely to suffer negative conseq uences arising from unfair use of intellectual property rights (IPRs). The availability of venture capital and other funding is also highly variable across regions. A Academic publishing in the least developed countries (LDCs) has made remarkable progress since 2015, but still lags far behind wealthier countries. While the total number of scientific publications per million inhabitants in LDCs rose from 15 to 25 by 2019, this total remains a long way behind the global average of 341 and even further behind the high-income country average of 1,227.

The global research, development, and innovation landscape is highly unequal. Digital technologies and services can help reduce these asymmetries.

Digital technologies and services can help reduce these asymmetries. They may improve access to global knowledge and drive local research and development, as well as empower communities with the skills, expertise, and opportunities to develop digital products and services that meet their needs, realities, and aspirations.

For example, Mobile Innovation Hub: Platforms for Tomorrow is an accelerator programme to support local and digital innovation ecosystems by facilitating investment, helping to build start-ups and delivering training. In addition, the Atingi platform, active in Rwanda and Togo among other countries, provides high-quality, inclusive and locally relevant learning opportunities that address critical skill gaps in emerging markets.

The relationship between digital maturity and SDG progress

Understanding the relationship between digital maturity – a broad metric describing the level to which digital technologies have been integrated into society – and progress towards the SDGs is crucial when shaping inclusive and sustainable digital transformation. However, measuring this relationship can be challenging due to a range of factors and complications. In particular, economic growth and prosperity play a significant role in both SDG progress and digital maturity. This can make it difficult to attribute causality between digital transformation and SDG outcomes.

More broadly, gaps in data, especially in lower-income countries, create a 'data divide' that can prevent more comprehensive analysis. The multifaceted nature of both digital maturity and SDG progress also makes it difficult to draw reliable conclusions across all 17 goals. Complex interactions exist between technology, governance, regulation and policy, human capital and foreign direct investment. The unprecedented circumstances of the COVID-19 pandemic may have further complicated these relationships.

Despite these obstacles, an assessment of digital and SDG data across more than 120 countries over the past decade provides intriguing insights in relation to the potential for digital technologies to advance the SDGs. While digital maturity takes many forms, within this assessment it was measured using the Telecommunications Infrastructure Index and the Data-only Mobile Broadband Basket (making use of ITU data). For the purpose of this analysis, these indicators are useful proxies for digital infrastructure and digital affordability - critical components of universal and meaningful connectivity, which in turn is a foundation for digital transformation.

In attempting to quantify SDG progress, the Sustainable Development Solutions Network SDG index (also known as the "SDG score") and its underlying dataset measure national progress against SDG targets – aligning with the UN Statistics Division database which monitors 248 SDG indicators. The SDG score reaffirms the stagnated progress of the SDGs as a result of the COVID-19 pandemic. The global average score across all SDGs stood at 67.4 (out of 100) in 2022. This was largely unchanged since the 2020 score of 67.0. The SDG score for 2010 provides a global average of 63.1 – indicating a mere 3.9 points in total overall progress in a decade.

UN-SDSN SDG Score
Global Average

63.1
2010

+ 3.9

67.0
2020

67.4
2022

Gap
32.6

100.0
2030 Agenda Goal
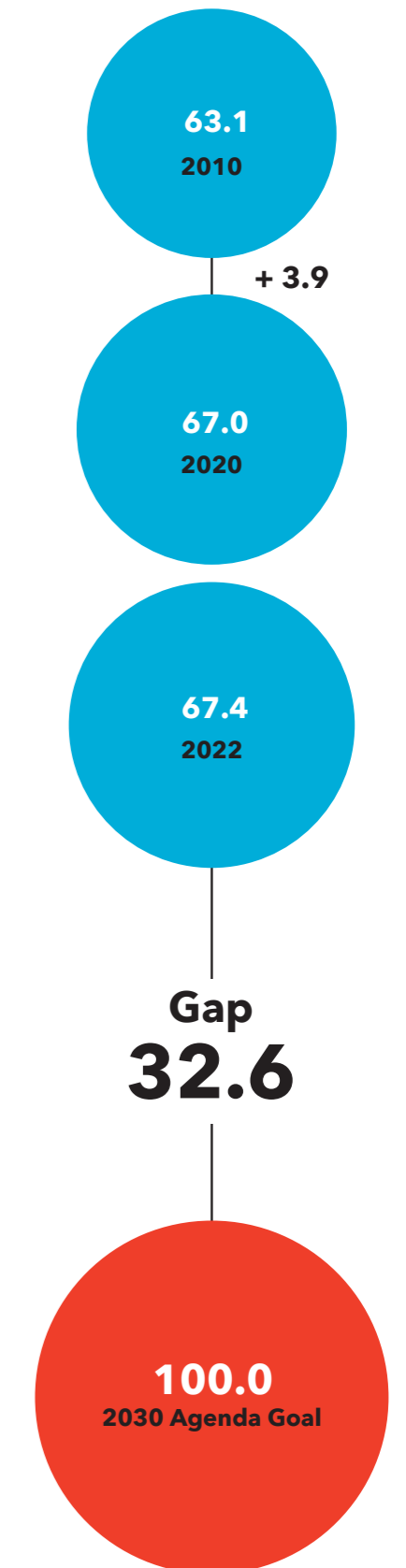
SDG Progress 2010-2020

Digital leaders achieved **more progress** on the SDGs versus peers from the same income group.

Digital leaders | **Peers** | **Global average**
3.9
UN-SDSN SDG Score improvement

Illustrative -Differences by digital maturity dimension and country income group

Looking at progress made on the SDG score relative to progress made on the assessed digital maturity metrics, the data suggests that:

For digital infrastructure (2010-2020): Lower-middle income countries with stronger growth in digital infrastructure (the top 20 per cent of this group) realized a SDG score improvement of 5.9, whereas their remaining peers achieved an increase of 4.2. This is a difference of 1.7 SDG score points, meaning that countries in the top 20 per cent made 40 per cent higher progress across all SDGs. Furthermore, high-income countries with strong growth in digital infrastructure did even better – with a SDG score improvement of 3.6 compared to 2.5 for their peers (a difference of 1.1 SDG score points). This represents a 44 per cent higher gain in progress.

For digital affordability (2014-2020): Countries in the top 40 per cent for digital affordability among high-income countries achieved 1.9 more SDG score points compared to a 1.2 increase by their peers. This is a difference of 0.7 SDG score points. Therefore, countries in this top 40 per cent had 58 per cent more progress across all SDGs.

(See Methodology for details)

While progress on the overall SDG score remains limited, these findings translate into over 40 per cent more SDG progress for digital leaders – countries with stronger digital infrastructure and digital affordability – compared to peer countries in their income group.

However, digital leadership is certainly not limited to digital infrastructure and affordability. Similarly, causality cannot be assumed solely on the basis of a high correlation between SDG progress and digital maturity metrics – it is possible that countries can improve in both SDG outcomes and digital maturity, independently of each other. The relationship between digital maturity, digital transformation, and SDG progress requires further research and analysis. However, these emerging results suggest the promising impact of digital solutions and highlight an opportunity for digital to drive the urgent progress needed to achieve the 2030 Agenda.

In addition, the introduction of any digital technologies must be accompanied by policies and efforts to drive widespread usage and ownership, improved digital literacy and skills, and secure-by-design digital infrastructure. Both ITU's and UNDP's Digital Transformation Frameworks emphasize the importance of a host of factors in achieving digitalization and societal transformation – and put people at the centre of digital transformation. Inclusivity is a crucial component in bridging digital divides and ensuring

that digital solutions benefit everyone, especially marginalized groups such as women, indigenous populations and poorer families. Ensuring equal access and opportunities for these groups is essential in achieving equitable outcomes and sustainable development – and leaving no one behind.

The 34 digital solutions featured later in this study provide further insights into the game-changing role of data and digital technologies for the SDGs, and provide tangible examples of the power of digital transformation.

Telecommunication Infrastructure Index
(Source: UN DESA, ITU)

The Telecommunication Infrastructure Index is an arithmetic average composite of four indicators:

- the estimated **Internet users** per 100 inhabitants, meaning the proportion of individuals who used the Internet from any location in the last three months
- the number of **mobile subscribers** per 100 inhabitants, determined through the number of subscriptions (including prepaid accounts) to mobile services in the last three months
- the number of **wireless broadband subscriptions** per 100 inhabitants, meaning active mobile-broadband subscriptions that cover both data and voice and data-only subscriptions, being used to access the Internet at broadband speeds
- the number of **fixed broadband subscriptions** per 100 inhabitants, meaning high-speed access to the public Internet or a TCP/IP connection

Data-Only Mobile-Broadband Basket
(Source: ITU)

The Data-Only Mobile-Broadband Basket refers to combined time-series data. From 2013 to 2017, the basket is composed of the cheapest post-paid, computer-based plan for a USB or dongle providing a minimum of 1 GB of monthly data using at least 3G technology; from 2018 to 2020, the basket had the cheapest mobile-broadband plan offering 1.5 GB or more of monthly data; from 2021, the basket contains the cheapest mobile broadband plan with at least 2 GB of monthly data.

(See Methodology for details)

Digital transformation must be inclusive, taking a whole-of-government and whole-of-society approach, to prioritize digital inclusion of marginalized groups and communities.

Building and embedding crucial protections as a prerequisite

Data and digital technologies are not a panacea. They are also not neutral and need to be applied in an inclusive and considered way. Digital technologies have a powerful multiplier effect, both positive and negative, so it is vital to ensure that their use does not result in the multiplication of inequality. Data from ITU's Global Cybersecurity Index shows a widening gap between developing and developed countries when it comes to managing the risks related to digital technologies, including resilience, infrastructure, and national strategy, as well as clear regional differences in multilateral engagement around information sharing and capacity development.

Similarly, and as UNDP's Digital Strategy makes clear, intentionally inclusive approaches to digital development — which place people and the protection of human rights at the centre — are vital in ensuring that the risks of digital transformation are proactively addressed, and that no one is left behind. This includes building and embedding protections to maximize the benefits of digital technologies, whilst also tackling and mitigating associated risks.

More needs to be done. Women and girls are often forced to share devices with family members or others, a key constraint limiting deeper digital literacy. Broader challenges, including the under-representation of women in science, technology, engineering, and mathematics exacerbate this. The gender gap is especially stark since women comprise only 3 per cent of tertiary students for ICT studies globally. Beyond the moral importance of closing this gap, there is a sound economic benefit, and 32 low- and middle-income countries have lost an estimated USD 1 trillion in gross domestic product due to the gender digital divide.

National digital inequities also continue to grow, including between rural and urban areas. While 70 per cent of the world was covered by 3G mobile data networks by 2016, only 29 per cent of rural areas were. The share of Internet users in urban areas globally (76 per cent) is nearly double that for rural areas (39 per cent). The gap is not just on the supply side; people in rural areas are much less likely to possess digital skills. Across the European Union, for example, digital literacy in rural areas at all levels lags around 10 per cent behind that in cities.

Digital transformation must be inclusive, taking a whole-of-government and whole-of-society approach, to prioritize the digital inclusion of marginalized groups and communities. Digital transformation can only reach its potential when put into context, including appropriate governance frameworks, regulations and policies.

For more information about digital technologies for the SDGs:

Inclusive by Design: Accelerating Digital Transformation for the Global Goals: This 2022 UNDP policy brief explores the concept of inclusive digital transformation and what it involves in practice. It provides ideas and inspiration for countries aiming to accelerate such transformations and mitigate potential harms through case studies and ten emerging good practices.

Digital Public Goods for the SDGs: This 2023 UNDP research publication looks at four digital solutions relating to how digital public goods (DPGs) – re-usable and open digital components – can be used to advance the SDGs. It discusses emerging insights into the sustainability and replicability of such solutions, and the partnerships necessary to deliver them.

Achieving universal and meaningful digital connectivity: As part of the follow-up to the UN Secretary-General's Roadmap for Digital Cooperation, in 2022 a sub-working group led by ITU was convened and tasked with developing a baseline and formulating targets for digital connectivity. They worked to define a concept of useful and meaningful connectivity, establish what level of such connectivity exists globally, and set out connectivity targets for 2030.

The State of Broadband 2022: Accelerating broadband for new realities: The Broadband Commission for Sustainable Development is a joint venture between ITU and UNESCO. The Commission publishes an annual report providing a global snapshot of broadband network access and affordability, and the outcomes that broadband is enabling.

Strengthening Data to Achieve the 2030 Agenda: This 2022 article by the lead statisticians in the Food and Agriculture Organization of the UN (FAO) highlights the challenges resulting from the ineffective use of food and agriculture data and statistics, including negative policy consequences, impairment of decision-making, and overall detriment to progress toward achieving the SDGs. It sets out the importance of National Statistical Offices in national digital transformation.

SECTION B

GAME-CHANGING SOLUTIONS:
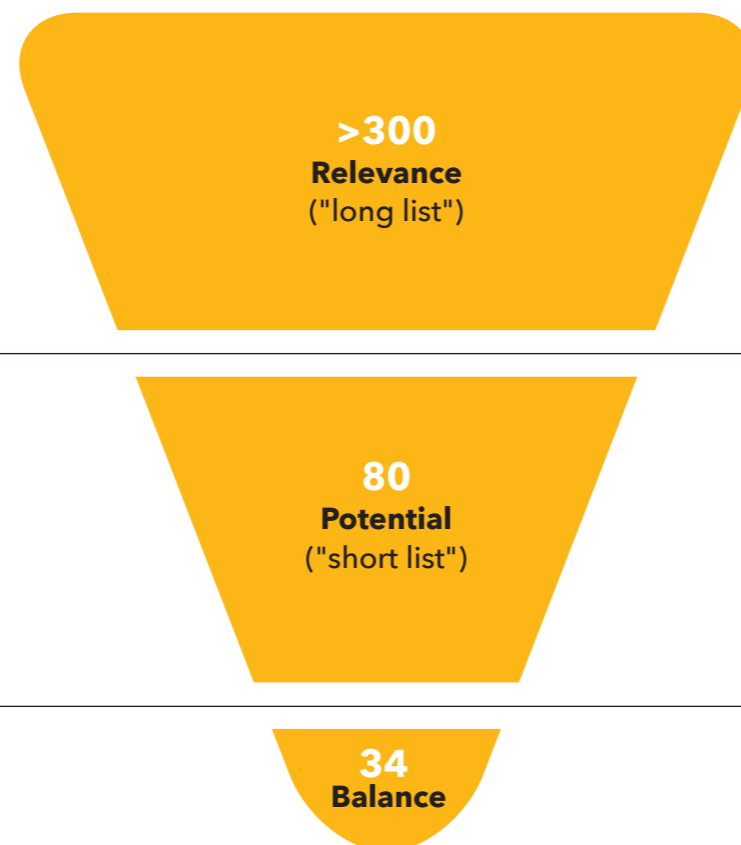# Putting data and digital technologies in action for the SDGs

Data and digital technologies have enormous potential for achieving the SDGs due to the many ways in which they are already improving lives and livelihoods. This section unpacks products, applications, services and initiatives that illustrate the potential power and role of digital solutions in reaching each of the SDGs. It is vital that the impact of digital technologies is inclusive, considered and measured. Solutions are only effective when implemented within the right enabling environments, and when accompanied by the necessary protections and safeguards which are discussed in section C.

10 criteria to select digital solutions

Number of solutions per step

1. **Digital solution:** based at least on one of the Digital Transformation Enablers

2. **SDG-aligned:** contribute to advancing SDG targets, one or more

3. **Implemented:** already live & used[1] in at least one country

4. **Impactful:** showing positive impact on advancing the SDG targets

>300
Relevance
("long list")

5. **Wide-reaching:** potential of wide reach (e.g. % population, sq. m)

6. **Replicable:** problem statement & solution relevant to several countries

7. **Scalable:** low effort due to scalable technology use

8. **Collaborative:** based on public /private/ social sector cooperation

80
Potential
("short list")

9. **Multi-regional:** balanced selection of geographies[2]

10. **Multi-sectoral:** by representing a variety of collaboration

34
Balance

1) Beyond the initial pilot phase to showcase proven solutions with higher degrees of business model sustainability. 2) Representation of six regions. Note: Criteria 1 to 8 for the individual assessment of use cases were derived jointly by the working team to meet the project's objectives, with 9 and 10 being holistic considerations to balance out the solutions. Source: ITU; WSIS; UNDP Digital X report; BCG analysis

This section highlights 34 digital solutions, two for each SDG, that demonstrate the diverse means by which digital technologies can drive progress towards the SDGs. They represent a range of different products and stakeholders; for example, some are open-source and supported by non-profit organizations or public sector institutions, while others are proprietary solutions developed by companies or entrepreneurs.

Importantly, these 34 solutions represent only a tiny percentage of the range of digital products and services being explored and applied across all 17 SDGs. However, they hint at the significant potential of digital technologies to get the SDGs back on track. As more people come online and acquire digital skills, and as affordability and accessibility increase, digital technologies can play a crucial role in achieving the 2030 Agenda.

Each solution was selected from an initial survey of over 300 digital solutions identified through desk research and expert input, based on criteria including their potential for achieving SDG targets, collaborative nature, scalability and replicability. Many of the solutions also adhere to broader best practice and align with the Principles for Digital Development.

The Principles for Digital Development are nine guidelines that have emerged from the combined best practices and learning of the digital development community, in particular from recognizing the sometimes predictable and preventable manner in which certain digitally enabled programmes failed. The Principles were drafted by a coalition of practitioners and international organizations as an attempt to consolidate and improve upon the various competing sets of emerging principles in the digital space. They are not meant to be prescriptive; rather, they aim to help practitioners succeed in applying digital technologies to development priorities. The Principles reaffirm the importance of contextual understanding, the need to design with scaling in mind, and the advantages of approaching digital development in a collaborative way.

Beyond these criteria, a shared range of four attributes helps explain the success of many of these initiatives:

Directly addresses key problems: The innovations are founded on addressing key or urgent challenges faced by their customers, beneficiaries, or partners. For example, GiveDirectly delivers unconditional donations to impoverished individuals, while Audiopedia provides audio education to women and girls in the Global South on critical topics such as health and gender rights. These solutions are directly targeted at delivering improvements to people's lives and livelihoods.

Designed based on needs: Many of the solutions were designed, customized or tailored to meet the unique context of low- and middle-income countries. For example, UNICEF's Learning Passport, a mobile learning platform, can work both online and offline – a crucial feature given that 18 per cent of people living on the African continent do not have access to mobile connectivity (and only half of the population have access to 4G).

Driven by collaboration and co-design: Nearly all initiatives have been devised by governments, the private sector, and civil society. However, many have also been developed through collaborations across these sectors. For example, CounterMEASURE, an initiative to reduce plastic pollution in rivers across Asia, was developed through a collaboration among Google, UNEP, local universities and national governments. Some are based on extensive collaboration and co-design with end-users as well, leveraging approaches such as human-centred design and deep qualitative research.

Focused on using digital components appropriately: None of the innovations uses technology for technology's sake. The role, usefulness, and appropriateness of digital components have been carefully considered. For instance, Connected Mangroves combines solar-powered sensors, mobile connectivity, cloud services, and AI cameras to monitor the health of forest ecosystems and support communities in better managing and protecting them.

Similarly, each solution leverages the digital channel most relevant to its intended audience. For example, the USAID/Microsoft Airband Initiative recognizes the difficulties faced by women in rural communities trying to access the Internet and build digital skills. Working with local Internet Service Providers (ISPs), USAID and Microsoft developed a series of gender-inclusive responses, which included discounted services, network expansion, community engagements, relevant content, and training at physical centers, that were adapted to specific local needs in Colombia, Guatemala, Ghana, India, and Kenya.

How digital can help achieve the 17 SDGs

1 NO POVERTY

Digital IDs linked with bank or mobile-money accounts can improve the delivery of social protection coverage and serve to better reach eligible beneficiaries. Digital technologies may help to reduce leakage, errors and costs in the design of social protection programmes.

2 ZERO HUNGER

Drone technology can monitor crops and provide information on how much water is needed. Software systems available through mobile apps can monitor and analyse data to help farmers to decide when to plant, fertilize, irrigate and harvest their crops.

3 GOOD HEALTH AND WELL-BEING

Novel platform-based vaccine technologies and smart vaccine manufacturing techniques help to produce greater numbers of higher-quality vaccines. Open-source platforms can help accelerate and scale up vaccine delivery.

4 QUALITY EDUCATION

Accessible and affordable connectivity allows young people to use open, free and high-quality digital skills and training platforms. Smart digital platforms can be made accessible in local languages and used to align curricula with internationally recognized standards and certification.

5 GENDER EQUALITY

Connectivity enables women and girls to access information and communicate for their safety and development. It can allow girls to reach support services, learn about sexual and reproductive health and express their views.

6 CLEAN WATER AND SANITATION

Precision irrigation and leakage management systems based on the Internet of Things enable the monitoring and management of water resources. In urban areas, artificial intelligence systems draw upon data such as weather forecasts and the number of rooftops to determine rainfall run-off.

7 AFFORDABLE AND CLEAN ENERGY

Next-generation digital networks have lower energy consumption, and smart grids can support elecrification and more affordable connectivity. Artificial intelligence technology can be used for predictive maintenance of electrical utilities, enabling automatic backups and limiting downtime.

8 DECENT WORK AND ECONOMIC GROWTH

Internet availability leads to more jobs. Labour force participation and wages increase in areas with Internet availability. The use of local-language videos and decision-support applications on smartphones supports personalized advice resulting in better jobs.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Mobile digital technologies are enabling high-quality communications infrastructure and networks to expand into underserved remote and rural areas. Data and artificial intelligence technologies can accelerate innovation and productivity in key sectors such as agriculture and manufacturing.

10 REDUCED INEQUALITIES

Digital public goods and applications such as mobile money are enabling access to financial and other services for all members of societies, including women and girls, rural communities and displaced people.

11 SUSTAINABLE CITIES AND COMMUNITIES

Intelligent systems deploy information from remote sensors to guide traffic signals and maximize the efficient flow of commuters in urban areas. They can be used to design safe transportation for vulnerable and underserved communities.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Digital technologies such as 3D printing, the Internet of Things, big data, cloud computing and blockchain can support a circular economy and supply-chain resilience, particularly in manufacturing industries.

13 CLIMATE ACTION

Information and communication technology solutions can help to cut nearly 10 times more carbon dioxide than they emit. Digital technologies combined with ecological design can help to reduce the amount of natural resources used in products by up to 90 per cent, lessening the impact of material extraction.

14 LIFE BELOW WATER

Satellite imaging and machine learning can help find and collect the 5 trillion pieces of plastic trash in the ocean. Online portals and mobile-based tools can connect the plastics supply chain, track the flow of waste materials, and help create transparent digital marketplaces for plastic waste.

15 LIFE ON LAND

Sensors and monitors connected to the Internet of Things, cloud-based data platforms, blockchain-enabled tracking systems and digital product passports unlock new capabilities for the measurement of environmental and social impacts across value chains.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Public technologies and government services, where well designed and applied, enable people to access public services, reduce waste and corruption and create data that allow public institutions to target needs more effectively.

17 PARTNERSHIPS FOR THE GOALS

Partnerships between States, private sector and civil society leverage the capacity of digital tools to provide solutions for development across the Sustainable Development Goals. Examples include the Digital Public Infrastructure Alliance, the Coalition for Digital Environmental Sustainability and public-private partnerships for disaster response.

Source: Global Digital Compact Policy Brief

Showcasing 34 digital solutions as drivers of SDG progress

SDG	Digital solution name (purpose)	Key partners	Digital solution name (purpose)	Key partners
1	M-Pesa (mobile money service)	Safaricom, Vodafone, FCDO	GiveDirectly (mobile cash transfer)	Google Research, Global Policy Lab and Center for Effective Global Action, Government of Malawi, Government of Nigeria, Government of Bangladesh, and Social Fund of the Democratic Republic of Congo
2	Jiva (supporting smallholder farmers)	Olam, IFC	CODA (Conditional On-Demand Assistance, customizing nutrition programmes)	WFP, Action Against Hunger, and MEDAIR
3	DHIS2 (health-care management system)	DHIS2, HISP Centre, PEPFAR, the US CDC, Gavi, the Global Fund, UNICEF, Norad, and the Gates Foundation	OpenIMIS (open-source software)	German Federal Ministry for Economic Cooperation and Development, Swiss Agency for Development and Cooperation, World Bank, International Labour Organization, World Food Programme, UNICEF, Enabel, and European Union
4	Atingi (online learning platform)	UNICEF, BMZ, Smart Africa, and Cisco	UNICEF Learning Passport (mobile online and offline learning platform)	UNICEF, Microsoft, USAID, University of Cambridge, Generation Unlimited, other local partners from public and private sector
5	Audiopedia (audio app for women with low levels of literacy)	Local NGOs, UNLOCK Accelerator, EU, and GIZ	USAID/Microsoft Airband Initiative (addressing the gender digital divide)	USAID, Microsoft and local partners AirJaldi (India), Anditel (Colombia), Bluetown (Ghana), M-KOPA and Mawingu (Kenya), and New Sun Road (Guatemala)
6	Gybe (targeting water insecurity)	The Nature Conservancy, NASA, ADASA, IDB, USGS, EWEB, WWF, RES, NOAA, and local governments	CityTaps (smart water meters)	GSMA, SEEN, Orange, and France Water Team
7	Nithio (AI-enabled financing for access to energy)	UNDP, local banks, Government of Rwanda, and FSDAi	COMET (Community Energy Toolkit, assessing electricity demand for mini-grids)	UNDP, Arizona State University, Winrock International, Green Empowerment, PACOS, Mentari, Innovate UK, Smart Villages, Clear Sky Power, Mercy Corps, Hivos, AAIBE, Tonibung, Lancaster University, Wisions
8	Mobile Innovation Hub (accelerator programme)	BMZ, GIZ, GSMA, and local governments and partners	SkillLab (mapping and matching people's skills to job requirements)	ILO, Google, GIZ, Adecco Group Innovation Foundation, HIAS, and Education Development Center
9	Giga (school connectivity)	ITU and UNICEF	Smarth Facilities for Health (health-care infrastructure)	UNDP, Gavi and the Global Fund for AIDS, TB and Malaria
10	Digital Family Card (government e-services)	UNDP, Government of Kazakhstan, and UN COVID-19 Fund	MigApp (supporting migrants)	Swiss Development Agency, European Union, Fundo Asilo Migrancaoe intergracao, SGMAI, and Servico de Estrangeiros e Fronteiras
11	Balady (digital city platform)	Ministry of Tourism of Saudi Arabia, NIC, and Ministry of Labor of Saudi Arabia	HOT Tasking Manager (Humanitarian OpenStreetMap Team's datasets for mapping remote communities)	Missing Maps, Kathmandu Living Labs, OpenMap Development Tanzania, UNICEF, UNDP, World Bank, and various HOT chapters
12	OpenSC (initiative for supply-chain transparency)	WWF and Humanity United	Winnow Vision (AI to cut food waste)	IKEA Foundation, Ingka Group, Hilton, Accor, ISS, and Compass Group
13	WIPO GREEN (online platform for technology exchange)	WIPO, Japan Intellectual Property Association, and governments of e.g., Japan, France, Australia, and Brazil	IMEO (International Methane Emissions Observatory, providing data and training to cut greenhouse gas)	UNEP, European Commission, US Government, Global Methane Hub, Bezos Earth Fund, International Energy Agency, and Climate & Clean Air Coalition
14	CounterMEASURE (reducing water pollution)	UNEP, Google, local universities and national governments	Connected Mangroves (managing and preserving forests)	Smart Communications, Digital Nasional Berhad, EDOTCO Group Sdn Bhd, ERICSSON, local communities and NGOs
15	Rainforest Connection (AI to protect the rainforest)	PUMA and Salesforce	UN Biodiversity Lab (conservation and sustainable development)	UNDP, UNEP, UNEP-WCMC, and the CBD Secretariat
16	Mizan II (case-management system for faster and more transparent justice)	UNDP and Palestine	eyeWitness to Atrocities app (collecting evidence for justice)	International Bar Association, LexisNexis
17	Partner2Connect (alliance to foster connectivity for schools and communities)	ITU and global pledgers	Data4SDGs (partnership to provide data and support decision-making)	UNDESA, William and Flora Hewlett Foundation, Microsoft, Sustainable Development Solutions Network, Civicus, and 40+ governments

Disclaimer: List of partners compiled based on most recent available information from 16 August 2023

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1 NO POVERTY

Goal: End poverty in all its forms everywhere

Fighting poverty by increasing financial inclusion and social protection via digital solutions

5 SDG targets (out of 7) strongly impacted by digital technologies

Power of Digital

Digital solutions can help fight poverty by enabling access to financial institutions and services, new economic opportunities and better social protection. Digital technologies can also provide data for decision-making on policy development

Opportunities
- More accessible digital financial services
- More data-driven decision-making and targeted resource mobilization

Potential risks & digital harms
- People without a mobile are left out
- Successful cyberattacks cause more damage
- Societal norms and barriers can cause financial exclusion

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m-pesa

M-Pesa is an USSD based system allowing its 56 million customers to send, withdraw and deposit money with their mobile phones, even if they do not have a bank account. There is no fee to sign up or make deposits, and it has a tiered structure so even the poorest can use it

Power of Digital

1. Customers can access multiple financial services through mobile phones
2. Low transaction fees increase financial inclusion
3. Secure system reduces the need for cash, ATMs and banks

"When M-Pesa came to an area, women shifted their occupations, and their savings went up"

Tayneet Suri, Professor of Applied Economics, MIT

Examples of countries implemented
Kenya, Egypt, Ghana, Lesotho, Mozambique, and Tanzania

7 countries implemented

GiveDirectly

GiveDirectly is the world's largest NGO dedicated exclusively to delivering unconditional cash transfers to people living in poverty. It leverages innovations such as satellite imagery, AI, and phone usage data to identify and send digital transfers to those most in need

Examples of countries implemented
Uganda, Togo, Democratic Republic of the Congo, Liberia, Malawi, Mozambique, Nigeria, Rwanda, and Bangladesh

Power of Digital

1. Solution simplifies donations to a few clicks only
2. Ensures funds donated reach individuals in need quickly and reliably
3. Low tech threshold for adoption: mobile wallet and feature phone

"Data from 75 reports covering 35 countries show conditional and unconditional cash transfers improve the odds of being enrolled in and attending school"

World Bank Group

Mobile connectivity facilitates cash aid to people in extreme poverty

272 million have no mobile wallet

376 million could get direct donations via mobile phone

2 ZERO HUNGER

Goal:
End hunger, achieve food security, improve nutrition, and promote sustainable agriculture

Increasing farmers' income and food security through digital solutions

6 SDG targets (out of 8) strongly impacted by digital technologies

Power of Digital

Digital solutions can help drive efficiencies in local food production and timely access to information for rural farmers, e.g. through better monitoring and learning possibilities. Digitally driven microfinance solutions could also empower underserved populations

Opportunities
- Technology-supported efficiency gains and access to information
- Market linkage platforms and reducing asymmetry with buyers
- Digital early weather-warning systems and parametric insurance

Potential risks & digital harms
- Further alienating marginalized, non-digital farming communities
- Exclusion of people with low levels of literacy and/or digital skills
- Few business models to ensure the affordability and adoption of digital solutions

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Jiva

Jiva provides smallholder farmers in Indonesia and India with a single platform to access microfinancing, market prices, world-class agronomy advice, and an ecosystem to buy agricultural inputs and sell their produce

Examples of countries implemented
Indonesia and India

Power of Digital

1 Helps smallholder farmers to thrive

2 Enables quick, low-cost scaling across regions

3 Ensures cutting-edge knowledge is accessible

"To improve the livelihoods of smallholder farmers, at scale"

Jiva mission statement

Can boost income with e-commerce by

25%
Leaves 75% gap remaining to meet SDG target

CODA
WFP World Food Programme

CODA is a digital solution designed to simplify and streamline nutrition programme guidelines and record and track individual data, using a mobile device and durable smartcard

Examples of countries implemented
South Sudan, Afghanistan, Tajikistan, Uganda, and Madagascar

Power of Digital

1 Allows for customization of any conditional-assistance programme

2 Monitors individual data and type of assistance

3 Accessible via cloud-based platform with offline features for remote settings

"CODA is faster than paperwork and can bring results automatically […] so you can visit more people because you don't have to waste time with paperwork"

Community nutrition volunteer

6
countries implemented

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3 GOOD HEALTH AND WELL-BEING

Goal:
Ensure healthy lives and promote well-being for all ages

Achieving better health outcomes by leveraging digital solutions

12 SDG targets (out of 13) strongly impacted by digital technologies

Power of Digital

Digital solutions in the areas of telemedicine and digital health registers are among the innovative solutions for good health and well-being, with leapfrog opportunities for developing countries to ease access to medical services and information

Opportunities
- Improve access to health services via telemedicine solutions
- Increase accuracy and extent of health information publicly available via digital channels
- Leverage digital technologies to improve supply-chain management of medicines, therapeutics, and medical devices

Potential risks & digital harms
- Data privacy violations
- Exclusion of people with low levels of (digital) literacy
- Worsening mental health outcomes due to misuse of digital technologies

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dhis2

DHIS2 is a web-based platform for collecting, analysing, visualizing and sharing information on health, and for data management in education. Data can be entered online or offline, by web browser, Android app, SMS or direct importation

Examples of countries implemented
Haiti, Honduras, Uganda, Sri Lanka, and The Gambia

Power of Digital

1 Huge data-storage capacity

2 Customized implementation for local needs and country ownership

3 Flexible design, well-suited for various other applications

"Now, at a glance, we know the number of vaccines used, where the gaps are and how to channel the vaccines to where they are most needed"

Jirgi Hosea B, HMIS Officer, Kaduna State, Ministry of Health, Nigeria

100+
countries implemented

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openIMIS

OpenIMIS is a versatile open-source software that supports the administration of health and employment injury insurance, social cash transfers, and voucher schemes. It is designed to manage their complex, high-volume data flows and proven to scale to national contexts

Power of Digital

1 Accessibility due to open-source licensing and diverse community of practice

2 Implements internationally accepted standards for data exchange, making it interoperable

3 Designed for a variety of social protection programmes and easily adaptable to other areas

"Our mission is to ensure that our open-source community continually improves the software and its applicability to efficiently manage social protection schemes"

openIMIS mission statement

Examples of countries implemented
Bangladesh, Cameroon, Chad, DRC, Gambia, Mauritania, Mozambique, Niger, Nigeria, Nepal, Tanzania, and Zambia

12
countries implemented

4 QUALITY EDUCATION

Goal:
Ensure inclusive and quality education and promote lifelong learning opportunities for all

Improving access and quality of education by deploying digital solutions

10 SDG targets (out of 10) strongly impacted by digital technologies

Power of Digital

Digital solutions may be utilized as remote learning tools, supporting many learning types online and offline, while digital learning and skills can help close the digital divide among youth and marginalized individuals

Opportunities
- More remote learning opportunities and access to global content
- AI-powered tutors and teaching assistants, alleviating shortages
- Increased digital and transferable skills

Potential risks & digital harms
- No access to devices outside of school and no safe or productive space for remote learning
- Exclusion of people with low levels of (digital) literacy
- Rapid spread of misinformation caused by overreliance on digital platforms

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atingi

Atingi is a digital learning platform that offers free access to high-quality, inclusive and locally relevant content, addressing employment and educational skill gaps in the Global South with over 360 partners globally

Power of Digital

1 Accessible everywhere and anytime for learners

2 Open-source digital platform for cost-effective, borderless scaling

3 Rapidly expanding partner network fuelling a growing repository of learning content

"Through my smartphone, I can reach top-notch courses at any moment, all without cost. The skills I've acquired through atingi and the certificates I've earned have already had a positive impact on my career"

Jean Paul Ingabire, learner, Rwanda

720 000+
registered learners

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learning passport

Learning Passport, developed by UNICEF, is an online, mobile and offline platform for continuous access to quality education. It can serve up local, contextualized content, as well as global resources

Power of Digital

1 Online, mobile and offline platform for continuous learning access

2 Flexible and adaptable to local content

3 User can take personalized record of learning history across physical and digital borders

"We are looking at this as a great opportunity to reach children"

Dulce De Jesus Soares, Minister of Education, Youth & Sport, Timor-Leste

Examples of countries implemented
Zimbabwe, Egypt, Mexico, Costa Rica, Sudan, and Poland

34
countries implemented

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5 GENDER EQUALITY

Goal:
Achieve gender equality and empower all women and girls

Empowering women and girls through financial inclusion, civic and political engagement, and access to online resources

6 SDG targets (out of 9) strongly impacted by digital technologies

Power of Digital

Digital solutions can support progress towards gender equality through financial inclusion and access to online resources, including for education, health, job opportunities and political participation. Necessary guardrails should be in place

Opportunities
- Financial inclusion through digital technologies
- AI-powered analysis of gender discrimination
- Improving women's agency and shaping female digital leaders to build products and services

Potential risks & digital harms
- Limited device ownership exacerbating gender-based violence and digital divide
- Under-representation of women in STEM fields and decision-making
- AI perpetuating gender-based biases and stereotypes

AUDIOPEDIA

Audiopedia is a digital public good offering accessible audio education on health and gender rights to disadvantaged women and girls in the Global South

Examples of countries implemented
Pakistan, India, Nepal, Nigeria, Uganda, Rwanda, Democratic Republic of the Congo, Tanzania, Ethiopia, Ghana, Nicaragua, and Brazil

Power of Digital

1 Digital audio solution for people with low levels of literacy

2 Ensures accurate information for women and girls in need

3 Increases outreach to all who have a mobile

"With Audiopedia […] we're igniting the transformative power of education to accelerate progress towards gender equality"

Felicitas Heyne, Founder, Audiopedia

Out of an estimated 500 million women globally with low literacy levels:

400
million have no digital access

100
million have an audio-playing device

USAID FROM THE AMERICAN PEOPLE

Microsoft

USAID/Microsoft Airband Initiative brings meaningful connectivity and Internet access to women in remote areas

Examples of countries implemented
Guatemala, Ghana, India, Colombia, and Kenya

Power of Digital

1 Provides implementation grants and ongoing technological assistance

2 Establishes digital community centres

3 Drives Internet access and digital training

"I think that the issue that this initiative is designed to address–the issue of prosperity and opportunity for women around the world when it comes to technology–is one of the issues of our time"

Brad Smith, President, Microsoft

5
countries implemented

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Goal:
Ensure safe drinking water and sanitation for all

Enabling more efficient water use through monitoring and decision-making faciliated by digital solutions

7 SDG targets (out of 8) strongly impacted by digital technologies

Power of Digital

Digital solutions such as smart water management can improve the measuring and monitoring of water supplies to identify interventions and support decision-making, optimizing operations and water service quality

Opportunities
- More efficient use of water resources via smart water management

Potential risks & digital harms
- Investments in smart management need to be calibrated
- Environmental impact of ICT components (water pollution, toxic waste)

Gybe

Gybe uses satellite imagery and ground sensors to provide relevant, up-to-date information to manage water systems, e.g. tracking algal blooms and nutrient polution and understanding soil erosion through sediment flows

Power of Digital

1 Works for any location globally

2 Gives data-driven insights into water management

3 Cuts costs and avoids problems by allowing action to be taken earlier

"Gybe helps me take action quickly, analyse impacts and anticipate future changes"

Brandin Hilbrandt, Watershed Programme Coordinator, Drinking Water

Examples of countries implemented
Viet Nam, Kenya, Spain, Germany, US, Argentina, Brazil, Paraguay, Bolivia, Colombia, and Ecuador

10+
countries implemented

CT CITYTAPS

CityTaps combines a smart prepaid water meter and an integrated software management system. Balance can be topped up from any phone, automatically opening water access

Examples of countries implemented
Niger, Burkina Faso, Senegal, Kenya, Namibia, Ecuador, and Singapore

Power of Digital

1 Simplifies payments with mobile money, complies with step tariffs, and allows daily micropayments of arrears

2 Smart meter and radio signal for remotely transmitted top-ups

3 Real-time dashboard tracks cash balance and water consumption

"CityTaps helps bring water to every urban home, providing water utilities with comprehensive technological and financial smart water solutions to continually improve performance"

CityTaps mission statement

10
countries implemented

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Goal:
Provide affordable, reliable, sustainable energy for all by 2030

Driving new energy opportunities, infrastructure, and access, and monitoring and optimizing energy use through digital solutions

5 SDG targets (out of 5) strongly impacted by digital technologies

Power of Digital

Digital solutions can help optimize physical infrastructure. ICTs and energy efficiency are related in two ways: "Greening of ICTs" and "Greening through ICTs"

Opportunities
- Optimizing renewable energy production, and using smart grids for more efficient consumption
- Transforming ICTs to be less carbon intensive
- Improving the energy density of batteries for better storage

Potential risks & digital harms
- Over-digitalization of smart systems can have adverse environmental impacts

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Nithio

Nithio is a data-driven, blended finance vehicle providing a risk-informed and sustainable approach to finance aggregated receivables for the off-grid solar sector, leveraging a proprietary risk-analytics data engine

Examples of countries implemented
Nigeria, Uganda, Kenya, and Rwanda

Power of Digital

1 Standardizes credit risk using data, AI and financial modelling

2 Investors can quantify and assess risk to inform their financing

3 Companies of all sizes can get loans at scale, unlocking energy access

"By leveraging Nithio [...] communities that need it most are given priority access to renewable electricity"

Anne-Marie Chidzero, Director, FSDAi

4
countries implemented

COMET

COMET is a simulation-based software designed to explore and assess electricity demand for mini-grids through end-user workshops. Both a planning software and community engagement platform, it increases understandings of energy consumption and mitigates demand-side risks

Power of Digital

1 Captures end-user input to align with community needs and insights

2 Offers an engaging, versatile platform for diverse mini-grid communities worldwide

3 Reports help optimize mini-grid design and digital approach streamlines assessments, saving time and resources

"COMET is the only tool designed specifically to help developers work with the community to explore their own long-term demand growth and usage behaviour"

Bernie Jones, Managing Director, Smart Villages UK

Examples of countries implemented
Malaysia, Indonesia, Myanmar, Somaliland, India, Nepal, and Fiji

7
countries implemented

8 DECENT WORK AND ECONOMIC GROWTH

Goal: Promote inclusive and sustainable economic growth, full and productive employment and decent work for all

Driving economic growth through global competitiveness, innovation and efficiencies, enabled by digital solutions

8 SDG targets (out of 12) strongly impacted by digital technologies

Power of Digital

Digital solutions can increase the ICT capacity of citizens and government, a key driver of a country's economic growth. Data-informed governments make better decisions, and a digitally literate and skilled population enjoy greater job opportunities and contribute to productivity and resilience among SMEs

Opportunities
- Economic growth through digital financial and business services
- Efficiency gains through the employment of digital tools
- Access to jobs and business opportunities through digital literacy and skills

Potential risks & digital harms
- Automation and AI drastically change companies' labour needs
- Shortage of digital skills can reinforce inequalities

The Mobile Innovation Hub

The Mobile Innovation Hub is an accelerator programme to support local and digital innovation ecosystems by facilitating investment, helping to build startups and delivering virtual training

Examples of countries implemented
Tunisia and Indonesia

Power of Digital

1 Fosters digital innovation and startups

2 Strengthens digital skills through training

3 Supports countries with digital transformation of their economy

"Provide targeted and customized technical assistance to elected innovators to optimize their solutions"

Mobile Innovation Hub aim

2 countries implemented

SkillLab

SkillLab is an AI-driven software linking labour-market stakeholders with a mobile application that enables people to map and match their skills to the requirements of jobs and education pathways

Examples of countries implemented
Jordan, Iraq, Lebanon, Finland, Mexico, and US

Power of Digital

1 Captures skills and experiences through gamified and AI-enabled interviews

2 Tailors education and career recommendations

3 Enables partners to monitor progress via access to user data

"Empowering people to turn their skills into careers"

SkillLab mission statement

208 million unemployed people could benefit from AI-enabled job matching

Note: Global projections on theoretical reach of digital solution. See appendix for sources and methodology for details

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9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Goal: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

Improving universal and affordable access to ICT by deploying digital solutions

7 SDG targets (out of 8) strongly impacted by digital technologies

Power of Digital

Solutions in the realm of infrastructure are the backbone of the digital economy, which is powered by industry and innovation. Universal and affordable access to ICTs unlocks potential impact across all SDGs

Opportunities
- Empowering more people through Internet connections
- Safer and healthier factories through IoT employment
- Better business decision-making through analytics

Potential risks & digital harms
- Digital divide across and within nations, especially between urban and rural areas

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Giga is a joint ITU-UNICEF initiative that aims to connect every school – and ultimately every community – in the world to the Internet by 2030. It helps governments connect schools in a cost-effective and sustainable manner by providing the latest tools and innovations in mapping, infrastructure planning, contracting, and financing

Examples of countries implemented
Antigua and Barbuda, British Virgin Islands, Kenya, Kyrgyzstan, Niger, Rwanda, Sierra Leone, Uzbekistan

Power of Digital

1 Connected schools access a wider range of educational materials

2 Facilitates the development of digital skills

3 Easily replicable and fosters positive spillover to communities around connected schools

"The Internet has changed the way we teach. We've gone a long way from the normal use of textbooks. First, our pupils are able to explore. Secondly, it is fun. Third, it opens our pupils' minds. Their minds are broadened because they can access any information from any country"

Joseph Waweru, Teacher, Noonkopir Primary School, Kenya

20+ countries implemented

Smart Facilities for Health

Smart Facilities for Health (SFH) are digitally-enabled, green, interoperable, plug-and-play infrastructure solutions to strengthen health systems

Examples of countries implemented
Guinea-Bissau, India, Indonesia, Sao Tome and Principe, South Sudan, and Uganda

Power of Digital

1 Use a suite of digital health, green energy, IoT and ICT components to address persistent operational challenges

2 Strengthen human elements of health systems

3 Address chronic infrastructure gaps

"SFH seek specifically to strengthen health systems by addressing key infrastructure gaps and the digital divide which hamper access to innovations and the delivery of reliable, equitable and quality care"

UNDP statement

10 countries implemented

39

10 REDUCED INEQUALITIES

Goal:
Reduce inequality within and among countries

Giving more people access to new tools, education, and markets via digital solutions

5 SDG targets (out of 10) strongly impacted by digital technologies

Power of Digital

Digital solutions can drive equality by empowering more people to use contemporary tools and best practices. With the right guardrails in place to prevent misuse, better access to markets and education can reduce inequalities

Opportunities
- Empowering remote communities with tools via the Internet
- Access to wealth generation through digital finance
- Access to health care via telemedicine

Potential risks & digital harms
- Tendency for wealth from the digital economy to concentrate in small parts of the population
- Digital invisibility amid the rise of data-driven decision-making

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Digital Family Card

Digital Family Card is an innovative platform that streamlines national efforts to assess families' well-being by delivering government support in a proactive way. It ensures equitable access to social services for the most vulnerable people

Power of Digital

1 Real-time assessments of well-being and visualization of data

2 Proactive service delivery for those in need through big-data analytics and regular updates

3 Robust assessment methodology gives equal access to social security and protection for all

"The Digital Family Card isn't just about technology—it's about timely, effective support for every family in Kazakhstan [...and] a promise of a more inclusive future where no family is left behind"

Katarzyna Wawiernia, UNDP Resident Representative in Kazakhstan

Examples of countries implemented
Kazakhstan

MigApp

MigApp is a smartphone app developed by the International Organization for Migration for migrants to learn about country-specific migration services and make informed decisions during their journeys. Through MigApp, migrants can also access training courses to improve their digital literacy

Power of Digital

1 Free app serving as a one-stop shop and trusted source

2 Ensures access to local information and services

3 Provides platform for governments to directly inform migrants

"IOM supports migrants across the world, developing effective responses to the shifting dynamics of migration and is a key source of advice on migration policy and practice"

IOM mission statement

Examples of countries implemented
Ukraine, Armenia, Georgia, Costa Rica, Mongolia, India, Czech Republic, Azerbaijan, Dominican Republic, and Switzerland

Available globally

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11 SUSTAINABLE CITIES AND COMMUNITIES

Goal:
Make cities and human settlements inclusive, safe, resilient and sustainable

Enhancing local service delivery and residents' engagement to shape liveable communities by deploying digital solutions

5 SDG targets (out of 10) strongly impacted by digital technologies

Power of Digital

Cities can play a role in developing, testing, and scaling digital solutions, which can in turn shape inclusive, liveable, and resilient communities, from enhancing the delivery of local services to engaging residents

Opportunities
- Predictive systems for natural disasters
- Digital service delivery specific to local needs
- Data-driven decision-making for urban planning

Potential risks & digital harms
- Exclusion of marginalized populations
- Misuse of digital solutions for surveillance

بلدي balady

Balady is a national smart-municipalities ecosystem that offers more than 200 services related to e.g. sustainable urban development and city infrastructure. The platform enhances residents' quality of life by accelerating government services, allowing people to access the vast majority of them digitally and making physical visits necessary for less than 5% of services

Power of Digital

1 Increases residents' sense of belonging to their cities

2 Achieves excellence in service delivery

3 Engages communities at a hyperlocal level

"Balady is a world-class government platform that helped me to issue my trade-activity licences instantly"

Noorah Khaled, entrepreneur

Examples of countries implemented
Saudi Arabia

HOT Humanitarian OpenStreetMap Team

HOT Tasking Manager is a tool used by volunteers globally to build a more robust map of the world. Without representation on a map, individuals are not counted or consulted. Billions of people live in areas that are unmapped

Examples of countries implemented
Projects are established any time there is a request, humanitarian need, or information gap; they are not assigned to a specific country or region

Power of Digital

1 Crowdsources mapping data to improve lives

2 Divides the world into tiny grids, each mappable by volunteers

3 Allows mapping of the world's most remote communities

"Engage one million contributors to map an area home to one billion people at risk of disaster or experiencing multi-dimensional poverty"

HOT mission statement

455,000
contributors have conducted mapping across 162 countries

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Goal: Ensure sustainable consumption and production patterns

Promoting sustainability by using digital solutions to monitor supply and demand

6 SDG targets (out of 11) strongly impacted by digital technologies

Power of Digital

Digital solutions can support, monitor and optimize the use and distribution of resources. Even though responsible consumption and production are mostly driven by physical innovation, digital solutions can help to make the patterns more sustainable

Opportunities
- Dematerialization and virtualization supporting more sustainable production and consumption
- ICT applications enabling sustainable practices e.g. for food waste

Potential risks & digital harms
- Increasing e-waste and unsustainable sourcing of resources (rare earths)

OPEN

OpenSC's platform is an automated, data-backed and continuous way of verifying claims about low-carbon, sustainable and ethical production at source, e.g. payments to smallholder farmers, legal fishing locations, and sustainable farming practices

Power of Digital

1. Works for many major food commodities and products

2. Ingests primary data from complex environments at the start of food supply chains

3. Automated and continuous verification of sustainable practices using AI, blockchain and IoT

"Transforming global food systems is key to tackling the climate crisis and protecting people and the planet"

OpenSC mission statement

Examples of countries implemented
Democratic Republic of the Congo, Guatemala, Colombia, India, and Australia

9 countries implemented

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winnow

Winnow Vision is a market-leading AI solution for managing food waste in commercial kitchens. With an in-built camera and connected scales, the system automatically recognizes and accurately measures items being thrown away, saving time whilst decreasing wastage

Examples of countries implemented
UK, US, UAE, Japan, Germany, Mexico, Ireland, Norway, and the Netherlands

Power of Digital

1. Recognizes over 600 food items

2. Saves staff time and increases efficiency

3. Uses comprehensive analytics platform to provide insights into reducing food waste

"We know that food waste is a complex issue, but Winnow Vision demonstrates that solutions to help tackle this don't have to be"

Hege Sæbjørnsen, Sustainability Manager, IKEA UK & Ireland

Saving 36 million meals per year

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13 CLIMATE ACTION

Goal: Take urgent action to combat climate change and its impacts

Leveraging digital technologies for climate action

4 SDG targets (out of 5) strongly impacted by digital technologies

Power of Digital

If appropriately governed, digital technologies can contribute immensely to climate-related mitigation, adaptation, finance and collective action; the dissemination of data and awareness-raising on climate change at a global level; and digital public goods to underpin bold ambitions for climate action

Opportunities
- Possible discovery of new material combinations and process efficiencies to help industries transition to zero emissions
- Leveraging data to inform planning for climate-change scenarios
- Rapid information dissemination for increased awareness

Potential risks & digital harms
- Growing environmental footprint of digital solutions (e.g. increased energy use)

WIPO | GREEN
The Marketplace for Sustainable Technology

WIPO GREEN is an online platform for technology exchange that supports global efforts to address climate change. It leverages AI for auto-matching to connect providers and seekers of environmentally friendly technologies

Examples of countries implemented
China, Cambodia, Indonesia, Kenya, and the Philippines

Power of Digital

1. Innovative green solutions from proof of concept to mature technologies

2. Addresses green technology needs

3. Enables partnerships and unlocks financing by giving entrepreneurs and inventors visibility

"Our experience with WIPO GREEN has been outstanding. Through the LAC Acceleration Project, we have grown together, building bridges among countries towards a more sustainable future"

Instituto Nacional da Propriedade Industrial, Brazil

128,000 technologies, needs, experts and knowledge materials from 140 countries

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IMEO

UNEP's IMEO catalyses the collection and integration of methane emissions data, e.g. from satellite remote sensing, in close to real time. This provides unprecedented climate transparency to dramatically reduce this greenhouse gas. Serving governments, companies, NGOs, investors, and researchers, IMEO is a core implementing partner of the Global Methane Pledge

Power of Digital

1. Provides open, reliable data to reduce methane emissions

2. Reconciles data from direct measurement studies, satellites, industry reporting, and national inventories

3. Delivers capacity-building and methane training series to government stakeholders

"Better satellite monitoring is essential and the EU is proud to support the creation of the IMEO"

Ursula von der Leyen, President, European Commission

Examples of countries implemented
Global, including measurement studies in 18 countries and training in 25 countries

Measurement studies in 18 countries

14 LIFE BELOW WATER

Goal: Conserve the oceans, seas and marine resources for sustainable development

Supporting research and knowledge on ocean health and conservation with digital solutions

5 SDG targets (out of 10) strongly impacted by digital technologies

Power of Digital

Digital solutions can enhance scientific knowledge on ocean health, including on marine pollution and ecosystem conservation, and make the fishing industry sustainable by improving monitoring and simplifying supply chains

Opportunities
- Increasing data and scientific knowledge on ocean health
- Data analytics for monitoring sustainability of fishing
- Improving efficiencies of the fishing supply chain

Potential risks & digital harms
- ICT components increasing water pollution and toxic waste

CounterMEASURE FOR PLASTIC FREE RIVERS

CounterMEASURE uses geographic analysis to collect data and identify sources of plastic waste in rivers. The data are shared with partners and governments who integrate findings into campaigns, legislation, protocols and training

Examples of countries implemented
Thailand, Sri Lanka, and India

Power of Digital

1 Combines citizen science, drone imaging, machine learning and CCTV

2 Augments ground-level research in an efficient and scalable way

3 Reduces plastic pollution entering the sea through rivers

"We appreciate the UNEP initiative to bring global experience […] and cutting-edge technology"

Anil Jasinghe, Secretary, Ministry of Environment, Sri Lanka

3 countries implemented

Connected Mangroves

Connected Mangroves combines cloud, machine-to-machine, AI and mobile broadband to help communities better manage and protect their mangrove forests

Examples of countries implemented
Malaysia, India, and the Philippines

Power of Digital

1 Solar-powered sensors collect critical data and AI cameras help identify bird species by collecting images in real time

2 Dashboard tracks site conditions and allows authorized users to access data and images

3 Standardized technology for replicability and scalability

"The mangrove restoration project not only reduces global emissions, but also has a positive effect on the local community; with the mangroves regrown, they serve as a natural flood and typhoon barrier"

Heather Johnson, Vice President for Sustainability and Corporate Responsibility, Ericsson Group

3 countries implemented

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15 LIFE ON LAND

Goal: Protect, restore and promote the sustainable use of terrestrial ecosystems

Enhancing scientific knowledge with digital solutions to sustainably manage forests and combat desertification and biodiversity loss

10 SDG targets (out of 12) strongly impacted by digital technologies

Power of Digital

Digital solutions that employ environmental and agricultural data can be used for monitoring life on land, scenario-planning, and boosting the efficiency of land use

Opportunities
- Satellite-based monitoring, increasing accountability for conservation
- Big data to analyse trends and plan mitigation strategies for pollution
- More efficient use of land

Potential risks & digital harms
- Environmental impact of digital technologies and ICT components (emissions, deforestation, toxic waste)

RAINFOREST CONNECTION

Rainforest Connection is a scalable acoustic monitoring system combined with AI to halt illegal logging and poaching. Solar-powered acoustic devices transmit audio to the cloud, from which data is analysed and classified by AI to identify signals like chainsaws and gunshots

Power of Digital

1 Protects biodiversity by monitoring acoustic signals

2 Solar-powered acoustic devices upload data to the cloud for global access

3 AI analyses the data to detect potential illegal activity

"This tool is very helpful, as we no longer need to do monthly patrols on foot"

Babak Jas, Forest Patrol Officer, Sirukam

Examples of countries implemented
Peru, Brazil, Tanzania, Indonesia, Poland, Costa Rica, and Ecuador

35 countries implemented

UNBiodiversity Lab

The UN Biodiversity Lab lets users generate maps and apply analytic tools to guide local and national planning and action that will benefit nature, climate and sustainable development

Examples of countries implemented
Costa Rica, Ecuador, Liberia, Peru, South Africa, and Uganda

Power of Digital

1 400+ global spatial data layers on nature, climate, and sustainable development

2 Enables policy-makers to take action for people and the planet, and Parties to achieve their goals under the Rio Convention

3 Secure workspace for users and countries to upload their own data

"I appreciate the openness of the platform. By sharing across organizations, we can unlock additional ways to use the same data and maximize return on investment"

Imai Jen-La Planta, Green Climate Fund

140+ countries engaged

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Goal: Promote peaceful and inclusive societies for sustainable development and provide access to justice for all

Empowering inclusive societies and fostering accountable institutions through digital solutions to promote peace and justice

9 SDG targets (out of 12) strongly impacted by digital technologies

Power of Digital

Digital solutions can support real-time monitoring of conflicts, promote stability, streamline the delivery of public goods and services, broaden the civic space, strengthen democratic processes, enhance the transparency and accountability of public institutions, and facilitate access to justice for marginalized groups

Opportunities
- Providing remote access to legal resources and services
- Increasing transparency of government actions and decisions through open data initiatives and inclusive public participation via online platforms
- Data analytics for real-time governance and rapid responses

Potential risks & digital harms
- Surveillance, data privacy violations, and cybersecurity vulnerabilities
- Dis- and misinformation

Mizan II

Mizan II is an integrated case management system for the judiciary and public prosecution which helps in managing filings and storing evidence, and links courts with ministries and enforcement, corrections and financial institutions

Power of Digital

1 Unifies procedures between courts and across judicial levels

2 Provides easy access for lawyers and the public through a mobile app

3 Speeds up litigation

"UNDP's mandate is to end poverty and build democratic governance, rule of law, and inclusive institutions"

UNDP mission statement

Examples of countries implemented
Palestine

The eyeWitness to Atrocities app is free and designed by legal professionals to capture photo, video, and audio material in a way that facilitates its admissibility in court. It is used to document international crimes and human rights violations for accountability purposes

Examples of countries implemented
Nigeria, Gambia, Senegal, Palestine, Democratic Republic of the Congo, and Ukraine

Power of Digital

1 Footage embedded with metadata to show authenticity

2 Transmission and storage of footage creates chain of custody

3 Anonymous reporting allows for increased witness protection

"Having photo and video that could be authenticated, and included a location and timestamp that could be trusted, was crucial for investigators"

Former UN investigator

Has been used to capture more than

60,000

photos and videos, and submit over 53 dossiers to accountability mechanisms

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17 PARTNERSHIPS FOR THE GOALS

Goal: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Supporting effective partnerships through digital solutions

9 SDG targets (out of 19) strongly impacted by digital technologies

Power of Digital

Digital solutions can connect people across the world, strengthening partnerships through data access and exchange, and fostering remote collaboration

Opportunities
- Facilitate partnerships for sustainable development
- Share knowledge, skills and data via Internet platforms

Potential risks & digital harms
- Monitoring and convening do not automatically translate into action

ITU Partner2Connect

Partner2Connect is a multistakeholder alliance to foster meaningful connectivity globally, focusing on the hardest-to-connect communities in the least-developed countries (LDCs), landlocked developing countries, and small island developing states

Examples of countries implemented
Dominican Republic and Madagascar

Power of Digital

1 Mobilizes resources from many sources

2 Helps create partnerships and unlock foundational digital enablers

3 Aims to be a conduit for delivering innovative services and applications and announcing commitments on universal connectivity

"P2C is a great example (of using technology to empower LDCs for sustainable development)"

Christopher Sharrock, Sector Member, ITU

US$33

billion in P2C pledges has narrowed the connectivity funding gap by 10%

Note: Global projections on theoretical reach of digital solution. See appendix for sources and methodology for details

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Global Partnership for Sustainable Development Data

The Global Partnership for Sustainable Development Data (Data4SDGs) is a global network of 700+ governments and private sector, academic and civil society organizations leveraging the power of data and technology to improve lives and policies

Examples of countries implemented
40+ countries across Africa, Asia, and Latin America and the Caribbean

Power of Digital

1 Drives action through partnerships across sectors and geographies

2 Mobilizes political coalitions and boosts investment in data for decision-making

3 Ensures data is produced, used and governed fairly and responsibly

"Our mission is to connect, strengthen and amplify an action-focused network that uses the power of data and technology to reduce inequality and drive sustainability"

Data4SDGs mission statement

Data partnerships brokered in

40+

countries

Emerging technologies have the capacity to amplify the impact of existing digital solutions

Emerging technologies—digital technologies which have not yet been widely adopted or brought to scale—may enhance the impact of existing solutions, address challenges in new and innovative ways, and further accelerate the achievement of the SDGs. Key emerging technologies include:

1. **AI and machine learning:** These technologies utilize advanced algorithms to learn and perform tasks without explicit programming. By analysing vast amounts of data, they could provide valuable insights, automate processes, and support decision-making across various sectors. For instance, in health care, Generative AI (GenAI) and machine learning could enhance diagnostics, drug discovery, and personalized treatment plans, contributing to SDG 3 ("Good Health and Well-being"). More broadly, the 2022 *United Nations Activities on Artificial Intelligence* report identified almost 300 AI projects being explored by the UN system, covering all 17 SDGs.

2. **Internet of Things (IoT):** This involves large networks of interconnected devices that collect and exchange data. This interconnectedness enables real-time monitoring and control of various systems, leading to increased efficiency, resource optimization, and improved decision-making. For example, in the context of SDG 11 ("Sustainable Cities and Communities"), IoT-based solutions can improve urban management, energy efficiency, and local service delivery. They can also be used to monitor climate change and track the degradation and destruction of the biosphere and natural habitats.

3. **Decentralized ledger technology:** This offers secure and transparent confirmation of transactions through a decentralized network. It can facilitate robust and efficient processes, particularly in supply-chain management, financial services, and identity verification. Through enhancing transparency and trust in these important areas – thus reducing opportunities for corruption – blockchain may contribute to SDG 16 ("Peace, Justice, and Strong Institutions").

4. **5G networks:** The advent of 5G offers faster and more dynamic connectivity, potentially revolutionizing the digital landscape. With its high speed, low latency, and increased capacity, 5G can enable real-time communication, support the growth of IoT devices, and facilitate seamless data transmission. This connectivity could empower various sectors, including health care, transportation, and agriculture, enabling it to contribute to multiple SDGs.

For these emerging technologies to have significant impact, large infrastructural investments are required, such as network upgrades from 3G or 4G connectivity to 5G, as well as funding for research and development in order to explore and leverage the benefits of technologies such as AI. Broader ecosystem efforts will also be needed, including building digital literacy and shaping policies to drive innovation and inclusion.

Moreover, as suggested in the Global Digital Compact Policy Brief 5, published by the UN's Office of the Secretary-General's Envoy on Technology, the deployment of emerging technologies must be coupled with effective risk-management strategies, such as strengthening cybersecurity, addressing the bias and inequities that digital solutions may be founded upon, and enhancing collaboration with policy-makers. For instance, ITU hosts a number of multistakeholder groups on emerging technologies that are open to all and work for the efficient development of specifications to address industry needs as they emerge on various aspects relating to emerging technologies, including building trust and security. Some examples of topics covered include digital agriculture (with FAO), disaster management (with the World Meteorological Organization and UNEP), health (with WHO), autonomous networks, and the metaverse.

Could AI deliver paradigm shifts?

AI has the potential to create paradigm shifts, changing the way we live, work, and play. This may especially be the case in low- and middle-income countries, where AI technologies could be leveraged to improve key development outcomes - for example, in relation to medical care. GenAI tools can generate images, videos, audio, and text in response to specific prompts, requests, or interactions. Such support could enable health workers to focus on deeper interactions with patients, and free up time for other tasks.

These possibilities are already being explored by many countries around the world, and not just in higher-income contexts. Since 2017, ITU in collaboration with 40 other UN agencies and the Government of Switzerland has been hosting the annual AI for Good Global Summit to support efforts to bring AI solutions to global scale. Its delegates explore how AI is being used to advance the SDGs as well as the need for guardrails and global governance frameworks. Similarly, initiatives such as fAIr LAC by the Inter-American Development Bank (IDB) focus on promoting more responsible uses of AI.

Although AI is having an exciting impact in relation to key development priorities and challenges, it is also raising challenges and concerns, for example:

Representation, inclusion, and diversity: These issues range from training data and other datasets being unrepresentative of communities and contexts, to sector-wide under-representation in software development positions. It may be necessary to increase the availability of data, including through the cataloguing of indigenous and non-written languages. In addition, piecework tasks such as data-labelling are frequently undertaken by individuals in poorer countries and communities, who require protection and safeguards to prevent exploitation.

Transparency and accountability: AI tools are increasingly being deployed to make decisions about public and private services, but often the algorithms that drive these processes are not auditable and there may be no mechanisms for people to challenge decisions made by technology. Grievance redressal and liability considerations are crucial components of AI usage, as well as a number of broader governance priorities and mechanisms set out in UNESCO's Recommendation on the Ethics of AI.

Regulation: AI products and services are being developed to focus on specific issues and problems, but without consideration of how these components interact or connect with each other. This fragmentary approach and the broader challenge of legislation keeping pace with AI developments, may be partly addressed through international standards and regulatory harmonization. These could even extend to technical requirements such as interoperability.

Cybersecurity: AI systems, due to their centrality and use of considerable volumes of data, are vulnerable to cyberattacks and can also contribute to cyberthreats. Governments, the private sector, and other security actors need to be equipped to deal with these emerging challenges.

AI can also lead to both positive and negative multiplier effects. The positive effects include a wide range of opportunities for AI to support the SDGs, while the negative effects relate to a growing uncertainty and destabilization arising from the rapid development of AI. It is unclear how automation and other aspects will affect the availability, quantity, and quality of jobs. AI could accelerate and exacerbate disinformation. Aspects such as "deepfakes" – AI-generated realistic photos, videos, and other material – could subvert elections and other social and democratic processes.

In countries where the public sector remains a major employer, large-scale job losses could result in significant unrest. AI products and services trained on datasets developed mainly in richer countries may not meet the needs of people in lower-income countries, and could even deliver the wrong insights or support. Furthermore, the increasing computing power, and skills required to advance AI could risk widening the divide between countries. As AI research and development get more expensive, AI technologies may become the purview of a smaller number of countries and companies.

In sum, deriving positive impacts from AI is a multistakeholder effort. Governments and supranational organizations have a vital role to play in terms of fostering an enabling environment that facilitates multistakeholder

participation and trustworthy innovation. They must build up their AI expertise, strengthen participation in setting technical standards, and shape regulation and other protections to safeguard human rights. In addition, the private sector must be alert to the issues of bias, representation, and inclusion, and actively address them throughout the entire development cycle when creating AI products and services. AI could be a catalyst for the SDGs if it is explored and applied fairly, inclusively, and with the needs of people at the centre.

How young people can drive digital and SDG progress

With more than 1.8 billion young people – individuals aged between 10 and 24 years old – worldwide, this generation of digital developers, advocates, users, and leaders will continue to be a crucial demographic in ensuring digital drives progress towards the SDGs. And there is an exciting opportunity to tap into this passion and expertise, to ensure that digital leaves no one behind.

Many young people are already changemakers and development champions. From their efforts in driving debates and action on climate change (including the rise of youth-led movements like 'Fridays for Future', initiated by Greta Thunberg – the youth climate advocate) to their daily and enduring bravery in preventing violence and consolidating peace in their countries and communities.

In order to support them in playing this role, ITU facilitated an online consultation with young people around the world. They were invited to contribute their thoughts, concerns and ideas on how to advance the SDGs, their perspectives on the power of digital to drive progress on the SDGs, and to share their experiences in deploying digital for the global good.

This survey highlighted that digital is already a key tool for youth. Separate research has noted that young people are more connected than the rest of the population, with 71 per cent of youth using the internet compared to 57 per cent of other age groups. This divergence is even starker in lower-income countries, including LDCs. In LDCs, 34 per cent of young people are connected compared to only 22 per cent of the broader population. Young people are using connectivity for communication, connection, for enterprise, and for education.

Many young people around the world are improving their digital skills to start building locally relevant digital content, products, and services. This includes women and girls, with women in Generation Z, born between 1997 and 2012, becoming coders at an earlier age than their female peers in the previous generation. Echoing these exciting developments, the young people surveyed by ITU are also exploring the role of digital for their livelihoods. For example, some respondents noted the potential for geographic information system (GIS) and remote-sensing to improve farming and agriculture. These tools could provide invaluable insights into critical aspects such as soil water content, and monitoring land use changes.

Young people are keen to use digital tools, technologies, and channels to ensure their voices are heard.

Finally, young people are keen to use digital tools, technologies, and channels to ensure that their voices are heard by decision-makers and that their perspectives inform policy-making, service design and delivery, and local and national development. Digital is providing important opportunities for governments and other stakeholders to engage young people. For example, the UNICEF U-Report platform is now active in over 60 countries around the world – allowing for youth to share their thoughts and perspectives.

But digital isn't working for all young people. A sizeable proportion of them remain offline, with digital access remaining a challenge for many – particularly girls. Boys from lower-income countries are 1.5 times more likely to own a mobile phone than girls. And digital itself may also be leading to harm – from cyberbullying to isolation and alienation. More than half of girls surveyed in a separate global study reported being harassed and abused online, whilst 46 per cent of girls feel '*sad, depressed, stressed, worried or anxious as a result of online misinformation and disinformation*'.

Young people want to be leaders and partners in tackling these issues, and to ensure that digital has the greatest possible impact for their age group and broader society. Individuals surveyed want decision-makers across the public and private sectors, and civil society, to empower young people as digital changemakers in their communities. Some highlighted that investments are needed in digital literacy and digital infrastructure, and in localizing digital solutions (including ensuring accessibility in local languages). They also highlighted the need for forward-looking regulatory frameworks to ensure ethical usage of technology. These frameworks need to encompass data protection, privacy laws, and technology-specific regulations. The digital experiences of young people, both positive and negative, position them to shape and lead the digital and SDG agenda toward 2030 – and beyond.

"Digital solutions are key cross-cutting tools that can accelerate our collective actions for the SDGs, and young people as the largest generation of digital natives have constantly highlighted this [...] Young people of the world have called for intentional technological interventions where digital solutions can truly serve a positive purpose for people and planet [...] [and] immediate action from decision-makers must include both financial and resource commitment to help create an enabling environment that will allow digital solutions for SDGs to thrive, but also concrete action on how young people can actively contribute and [be] recognized as solution-makers, partners, and experts."

Jayathma Wickramanayake, UN Secretary-General's Envoy on Youth

More information about the ITU Consultation with Youth in the lead up to the SDG Digital Day can be found here:

https://www.itu.int/initiatives/sdgdigital/youth-consultation/about/

Immediate actions by decision-makers could be focused on equitable access to quality education, including digital literacy, and remote learning infrastructure.

Helping ensure digital technologies have a positive impact

Exploring, implementing, and scaling digital tools, solutions, and technologies can drive powerful and positive change. However, this change is not guaranteed, and the journey may not always be linear. Digital transformation can have both beneficial and detrimental outcomes, which are often driven by countries' policies, laws, and regulations — in other words, governance. As demonstrated by the digital solutions featured in the previous section, digital technologies must be applied in an inclusive and thoughtful way, founded on the needs and realities of people.

These requirements will only increase in importance as the advancement of technology gathers pace. Each day, millions of terabytes of data are created, captured, copied, and consumed around the world; an additional 175,000 people come online for the very first time; and new technology becomes more accessible.

Leveraging the power and potential of digital transformation, whilst mitigating or eliminating their negative impacts, requires engagement and leadership from people across the public and private sectors and civil society in the following areas:

Collaboration among policy-makers and key stakeholders: collaboration is crucial to establish effective regulations that govern the use of digital technologies. Policy-makers and other stakeholders can jointly develop comprehensive frameworks that balance innovation with accountability and the protection of human rights. The absence of collaboration risks the creation of digital approaches that neglect key perspectives and may result in unenforceable regulatory mechanisms and policy frameworks developed in isolation from the contexts in which they need to be applied.

In contrast, collaboration promotes the buy-in of all key stakeholders and can foster accountability, compliance, the relevance and efficacy of digital technologies, and global best practice. For example, the Digital Public Goods Alliance was formed as a collaboration among UNDP, UNICEF, the development agencies of Norway and Germany, the Government of Sierra Leone, and several other organizations. It identified and drove the implementation of DPGs that could be applied and adapted across countries, resulting in a registry of over 140 digital initiatives.

Convening and discussing can also be valuable aspects of collaboration which give participants the opportunity to learn about shared challenges and potential solutions. For example, the World Summit on the Information Society (WSIS) brings together governments, the private sector, and civil society to discuss and debate digital issues. Similarly, the annual ITU Global Regulatory Symposium connects around 150 regulatory agencies and representatives from industry and government to explore the latest issues in ICTs and digital technologies.

Addressing biases and inequality, and building diversity and representation: Digital solutions carry the risk of replicating, propagating and entrenching biases and prejudices in society. It is important to create diverse teams and promote transparency in digital development, by facilitating access to career pathways and devices for both females and males. In the USA, women make up 57 per cent of professionals generally but only 25 per cent in the field of computing. However, this is changing as nearly one-third of women in Generation Z learn to code before the age of 16, in comparison with less than one-fifth of women in previous generations.

Addressing the biases within digital and data foundations is also crucial. Biases can manifest in a number of ways. Training data may have biases as a result of over- or under-representation of certain groups within the sampling, or simply by reflecting historical inequality. Solutions may not be designed in collaboration with individuals and communities. Programmers might write their implicit biases into the code in various ways or fail to consider the different user experiences of individuals whose lives are very unlike their own. And testing may introduce bias as the solution is "debugged" to make it more accurately replicate the outcomes we expect in our unequal and biased world. Efforts must therefore concentrate

on increasing the breadth of user experiences that are considered and the forms of bias that might manifest. Similarly, transparency in deployment and development can allow biases and their causes to be identified and tackled.

Emerging technologies also pose challenges of bias – from design, to application. Many rely on data and datasets that may not be representative of the realities in other countries or contexts to those they were developed in. These technologies should not be implemented without careful consideration, and in the absence of governance processes to ensure accountability. This includes mechanisms for oversight, impact assessment, audit and due diligence to avoid conflicts with human rights and threats to environmental well-being. Actors working with new technologies should promote social justice, fairness, and non-discrimination while taking an inclusive approach to ensure that the benefits of digital technologies are accessible to all.

Investing in digital infrastructure: Basic connectivity and digital components for payment, storage, and data exchange can enable everyone to participate in the digital economy and may translate into progress towards eradicating poverty. This can help achieve a wide range of development outcomes; for example, the Giga project has connected over 5,000 schools across more than 20 countries, improving the educational outcomes of over 2 million children, and is in the process of developing a significant investment fund to catalyze last-mile public infrastructure in underprivileged areas worldwide.

At least USD 400 billion needs to be mobilized to ensure that everyone has a stable broadband connection. As Internet connections become ever faster, more investment will be needed to narrow the speed gap and deliver universal and meaningful connectivity to all. Much of that investment will likely be generated by the private sector, which has provided the vast majority of funding for digital infrastructure so far. The last to be connected are those who are in the hardest-to-reach locations or have the least ability to pay, or both. In many cases, it is not financially viable for the private sector to bring these people online, requiring either public investment, policies to encourage or mandate universal provision, and/or efforts to tackle the underlying causes of poverty.

Mitigating job displacement: Automation and new technologies will both create and destroy jobs, and generate both solutions and problems, but will not do so evenly. Many low- and middle-income countries could be impacted heavily by automation or wholesale job loss resulting from the digital transformation, particularly as the public sector – a strong explorer of digital tools and technologies – tends to employ a sizeable portion of their working populations. There is an urgent need to focus on re-skilling, up-skilling, and lifelong learning approaches to enable people and communities in these countries to adapt to the changing digital landscape and access new employment opportunities.

Initiatives like SkillLab, an AI-based, digitally enabled solution, support affected individuals to find employment opportunities as well as provide tailored education recommendations, aiding employees to adapt to the rapidly changing labor market caused by digital transformation.

Strengthening cybersecurity: With any digital technology, it is vital to introduce adequate protections and controls over systems, processes, software, data and information resources, and to facilitate the application of international and regional technical standards to address security and privacy concerns arising from breaches or intentional cyberattacks. Robust cybersecurity is a necessity if digital solutions are to support progress toward the SDGs. Cyberattacks have the potential to cripple public systems and the critical infrastructure required to deliver the SDGs, and weak privacy safeguards can leak sensitive data into the hands of malicious actors who can use it to wreak economic and societal harm. ITU's capacity-building work in the National Computer Incident Response Team (CIRT) seeks to help improve countries' advance planning and preparedness for handling such breaches and attacks and addressing cyberthreats.

At an individual level, online bullying, harassment, stalking, surveillance and scams can negatively affect lives and livelihoods, particularly amongst women and other vulnerable and marginalized populations. Cybersecurity is not just about technological defences and security components; crucially, it is also about people's cyber hygiene and digital literacy skills, which include abilities to guard against online fraud, detect dis- and misinformation, and keep personal data safe and secure. Governments, the private sector, and civil society all have key roles to play in helping build awareness.

Establishing and strengthening digital institutions: Reflecting the wide range of digital potential, a coordinated, multistakeholder, and strategic approach to the use and exploration of these technologies is essential. This can include coherence and a longer-term vision being driven by dedicated digital institutions and champions including ICT ministries, national agencies, and higher-level political and official leadership. Digital transformation often requires considerable up-front investment and effort with benefits often seen over the medium or longer term.
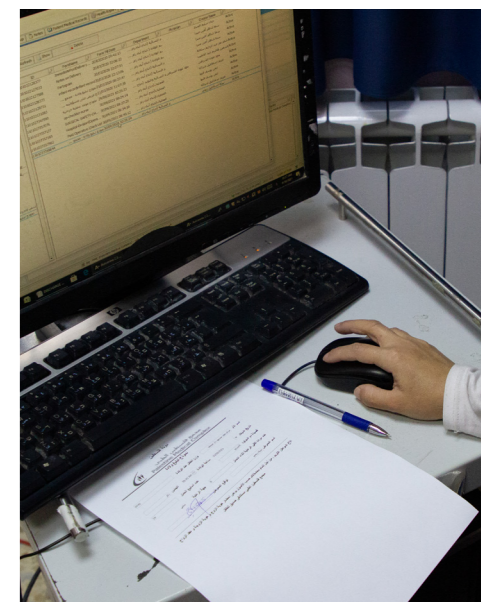
Siloed, short-term, and/or duplicated digital approaches waste investment, expend political capital and public will, and lead to ineffective or inefficient solutions. At the same time, an overly centralized approach to digital transformation often fails to achieve buy-in beyond the centre or may create inefficiencies of its own by applying a one-size-fits-all approach. Instead, digital institutions and champions can secure an inclusive digital transformation by nurturing strategic coherence and coordination among different departments and non-government actors, enabling them to take diverse approaches while still marshalling their efforts toward the same long-term goal. This approach is emphasized in the work of Partner2Connect, a multistakeholder alliance to foster meaningful connectivity and digital transformation, which serves as a leadership-level platform to engage all stakeholders to mobilize new resources, partnerships, and commitments.

Democratizing and demystifying digital: The role and value of digital technologies for improving lives and livelihoods should be clear and understood by people. A key form of inequality that the digital divide threatens to multiply is between people with and without access to digital literacy. This can be mitigated by increasing the availability of devices and training, and by using simple terminology and language.

Digital solutions impact all lives, including active users of technology as well as non-users about whom decisions are made through digitally enabled processes. It is therefore a moral imperative that everyone can shape how digital tools and technologies are implemented. This requires transparency and accountability in digital decision-making and accessible routes to grievance redressal so that people can understand and challenge data-driven outcomes.

For more information about risks and mitigation:

Political affairs chief spells out double-edged nature of digital technologies, in briefing to Security Council: In this press release, Rosemary DiCarlo, Under-Secretary-General for Political and Peacebuilding Affairs, warns the UN Security Council that while digital technologies offer "boundless opportunities" for the United Nations to detect crises and design data-driven humanitarian and peacebuilding programmes, they also pose a number of risks such as exacerbating conflict dynamics by spreading hate speech and misinformation, being used to mount attacks on critical infrastructure, and having the future potential to take lives without legal oversight in the form of lethal autonomous weapons.

Growing up in a digital world: Benefits and risks: This is a summary of research in the *Lancet,* posted on UNICEF's website, which shows that digital technologies have profoundly reshaped childhood and adolescence. They bring benefits in the form of connectivity, social relationships and sometimes mental well-being, but can also bring risks such as cyberbullying, sexual abuse and other forms of exploitation by adults, and are leading to growing inequality between those online and offline.

Online violence has real-life consequences #ItIsMyBusiness: This is a review of a social media campaign by UNDP Serbia which focused on raising awareness about the consequences of online violence against women and encouraging support for survivors. An estimated 23 per cent of women have reported online abuse, and this number more than trebles amongst women who publicly express opinions (rising to 73 per cent for female journalists).

Tech-facilitated gender-based violence: This document by UN Women answers key questions about forms of violence that are directed against women and committed, assisted, aggravated or amplified by the use of ICTs or digital tools. It covers the prevalence of such acts, who is most at risk, and what has been effective in preventing this type of violence.

Public health implications of excessive use of the Internet, computers, smartphones and similar electronic devices: This is a report from the first WHO meeting to discuss health conditions associated with excessive use of the Internet and other communication and gaming platforms. It concluded that there clearly is a public health concern around forms of technology use which resemble gambling or substance abuse disorders, and more research should be conducted into these issues.

CALL TO ACTION

Digital as a catalyst for the SDGs

The SDGs encompass a wide range of targets and priorities, from eradicating extreme poverty for all people everywhere, to delivering affordable and sustainable transport systems, and guaranteeing universal and equitable access to safe and affordable drinking water. Digital technologies can play a role in achieving many of these requirements and shape inclusive enablers to drive SDG progress.

"Digital" comprises a wide range of different products, services, technologies, people, institutions, and processes. For inclusive digital transformation that improves lives and livelihoods, it is necessary to identify and understand the range of digital tools available, and where they can best add value. These are the "digital enablers" of a whole-of-society digital transformation.

When digital technologies are applied inclusively, thoughtfully, and with appropriate safeguards, they improve educational, economic, health-related, and public-service outcomes, and drive opportunity in a wide range of other areas. However, the exploration of these technologies is often happening in a piecemeal or siloed fashion, based on pilot projects that do not scale or sustain, and with government departments and other stakeholders working in isolation from each other, often with nascent cultures and considerable skill gaps. A whole-of-government approach can help overcome silos.

Tackling these challenges, and ensuring that digital can drive the greatest positive impact, requires a holistic and strategic approach to digital transformation.

Tackling these challenges, and ensuring that digital can drive the greatest positive impact, requires a holistic and strategic approach. Drawing on collaboration with other stakeholders, ITU, UNDP, IDB, and BCG have identified a set of "Digital Transformation Enablers" to guide national governments in taking a whole-of-government approach andshaping and embedding digital technologies within their economies and societies to bring about maximal benefits for their citizens.

Digital Transformation Enablers

The Digital Transformation Enablers described here reaffirm the need for fundamental and strategically aligned components to unlock the transformative potential of digital technologies for sustainable development. However, the diagram below is not prescriptive, linear, or exhaustive. Various policies, processes and capabilities have driven digital transformation in different countries. Each component can be tailored to a country's context and priorities, and accompanied by a more detailed national assessment which can be carried out using instruments developed by UN agencies, including UNDP and ITU.

There are four categories: an overarching and guiding vision; digitally driven outcomes; content, applications, and services; and technical and non-technical enablers. Each is discussed below, and a more comprehensive description can be found in the Appendix.
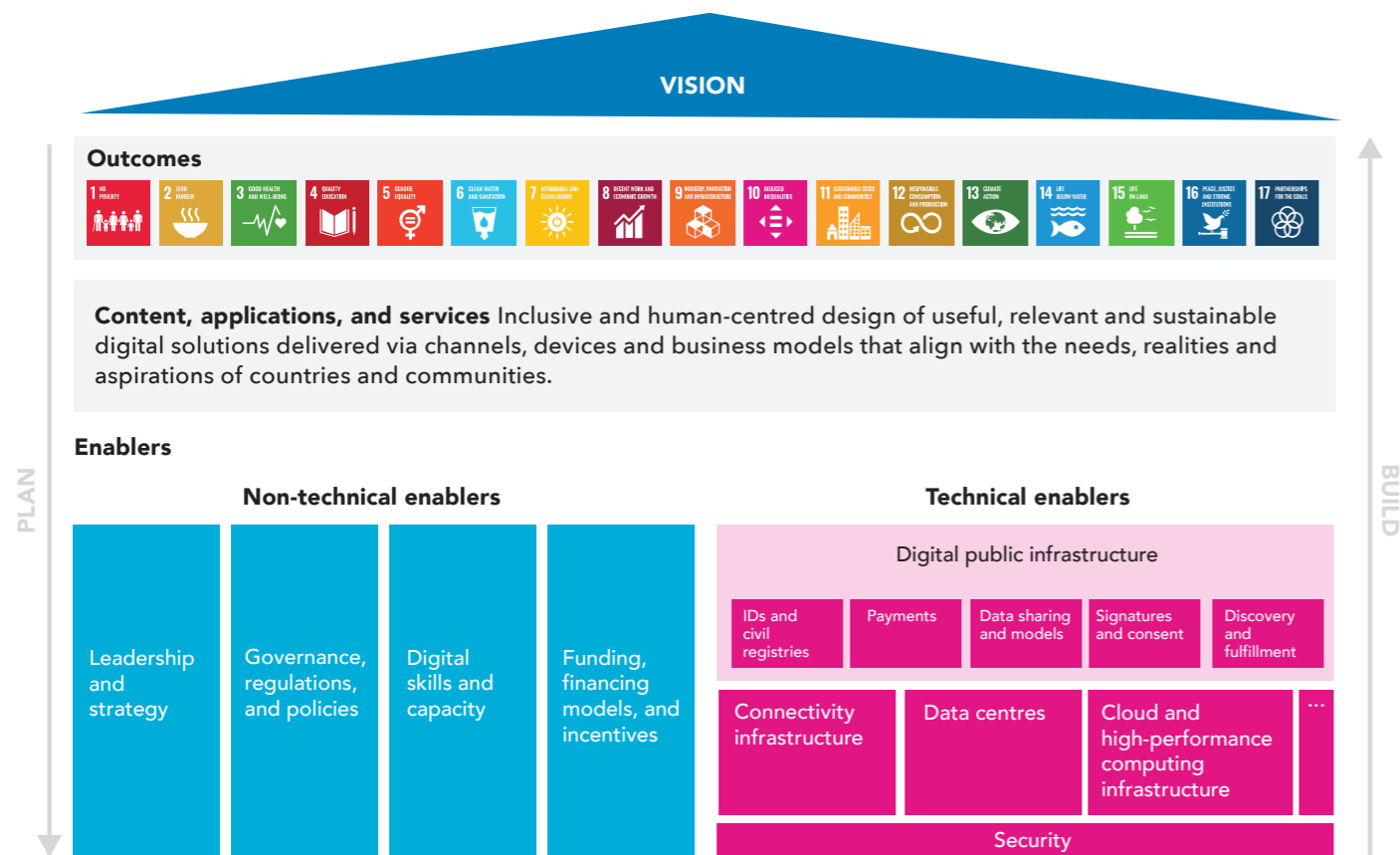
... List of components evolve with tech innovation and national governments' priorities.

Vision

A key component of digital progress is setting out a strong, ambitious, and credible direction for a country's digital transformation journey, grounded in the needs, realities, and aspirations of the population, and aligned with development goals. This vision should propel the creation of digital products and services that are accessible, inclusive, rights-based, gender-responsive, secure and relevant. It should be comprehensive and founded on collaboration since that is critical in shaping, scaling, and strengthening local digital ecosystems and driving the digital transformation as a mechanism of positive change.

Outcomes

In this context, the outcomes are the 17 SDGs, which comprise a plan of action for people, planet, prosperity, peace, and partnership. Countries and societies need to identify where and how digital technologies can best play a role in progressing toward these goals. This requires the SDGs to be localized to align with the contexts of countries and communities, and their local digital landscapes. The outcomes must be measurable so that they can be calculated regularly. Ultimately, the usage and adoption rate of digital technologies are determined in part by the extent to which people find these products and services to be accessible, affordable, and useful for their lives and livelihoods.

Content, applications, and services

Digital transformation needs to add tangible value, and it can do this through creating relevant and useful content, applications, and services that can be used by people to meet their needs and improve their lives. These solutions can be open- or closed-source, self-service or assisted, developed by big or small tech, and delivered online, offline, or a mixture of both. And they can leverage a range of device types such as desktops, laptops, smartphones, feature phones, and radios.

Each of the 34 digital solutions provides an example of content or an application or service. Together they encompass a wide range of delivery mechanisms, technologies, developers, collaborators, and devices. Digital public services provide convenient, efficient, and accessible ways for individuals to interact with the government. While providing public services at societal scale, institutions can explore the creation of replicable DPGs.

Technical and non-technical enablers

These are the catalysts that enable content, applications, and services, and help realize the national vision of digital transformation to help achieve the SDGs. They can be split into technical and non-technical enablers. A more comprehensive description of each technical and non-technical enabler can be found in the Appendix. Examples of enablers are highlighted below, illustrating countries that have done particularly well in building and expanding a specific enabler.

Country case studies are based on expert interviews, and publicly available information.

Non-technical enablers

Non-technical enablers comprise the essential policies, programmes, initiatives, resources, and capacities to shape, embed, and scale digital transformation and digital ecosystems in an inclusive, accessible, transparent, and participatory way.

Leadership and strategy

Leadership is a crucial component for national and digital transformation, including in articulating the country's digital vision. Recognizing that this transformation is about more than technology, effective leaders will be able to break down silos and build longer-term digital foundations. Part of this involves engaging people and maintaining buy-in when difficulties, delays, and other roadblocks arise. Shorter-term benefits can also be powerful in building confidence in and commitment to the digital transformation.

A strategy is an aligned component that provides a clear direction and roadmap for putting the country's vision into practice. The digital strategy must be founded on extensive consultation with stakeholders, giving governments and other partners an effective mandate for whole-of-government and whole-of-society transformation. Where possible, a strategy should be accompanied by a robust and realistic plan for identifying, monitoring, learning from, and evaluating progress, and course-correcting when needed.

Example: Harnessing technological disruption – Smart Nation Singapore
Smart Nation is a whole-of-society initiative that uses digital technology and innovation to improve the lives and livelihoods of Singaporeans and position their country as a global digital leader. This wide-ranging programme encompasses three pillars: digital society, digital economy, and digital government. To put its vision into practice, Singapore established a Smart Nation and Digital Government Office, providing a strong central mandate for the initiative and support from the Prime Minister's leadership.

As a result, in 2023, Singapore was named Top Asian City in the IMD Smart City Index. Today, 99 per cent of its government services are digital end-to-end and it has built robust public infrastructure including digital identity and payment mechanisms. The Government of Singapore was deeply committed to the strategy and designed national ICT projects for priority sectors, involving an array of stakeholders to align on key priorities. Chief Information Officers in each government agency assumed responsibility for specific projects, and digital infrastructure was catalysed by the private sector.

Governance, regulations, and policies

Inclusive digital transformation cannot happen in a vacuum; it must be founded on and driven by governance (regulation, legislation and policies) that seeks the greatest positive impact for individuals and communities. Supportive components can include the sharing of infrastructure between connectivity providers, and incentives for digital entrepreneurship and innovation.

With regard to legislation, of particular importance are data protection and privacy: 71 per cent of countries around the world have data protection and privacy legislation in place and a further 9 per cent have drafted legislation. Given the data-driven nature of many digital products and services, this is a crucial foundation for digital transformation. However, there also needs to be the capacity for enforcement when these laws are violated, and this varies across countries.

Data to boost progress on the SDGs

Data is a key aspect of governance, providing the insights and directions needed to understand what does and does not work. It is especially central in the digital transformation, as reliable data is required to identify and boost the best interventions, monitor their progress, and support the development of a digital ecosystem.

However, digital and ICT usage data is not collected in a number of countries, and broader insights are limited. For example, data on mobile phone ownership among females – a crucial measurement needed for SDG 5 ("Gender Equality") – is insufficient in most regions of the world, rendering it difficult to measure progress. In fact, less than half of the data needed to track progress against SDG 5 is currently available.

Steps to take towards collecting and using reliable data:

- Fund national statistical offices and public databases to increase geographic coverage
- Leverage emerging technologies to capture data
- Build accessible and inclusive data-collection processes, including gender-disaggregated data
- Tackle underlying issues that prevent data collection, such as connectivity gaps
- Review regulatory frameworks and strengthen agencies' abilities to safely collect, handle, and analyse data, and to ensure bias is tackled
- Report more frequently and address reporting delays
- Bring together data users and producers to foster data-sharing across stakeholders.

Example: Inclusive digital transformation – Bangladesh's a2i

In 2008, Bangladesh established the a2i – Aspire to Innovate – digital initiative, to create citizen-centric public services and foster national development. This included removing barriers to digital innovation, such as slow government procurement, and creating policies to mobilize the private sector. In 2015, the country embedded the SDGs into all initiatives and KPIs.

Citizens in Bangladesh have saved more than USD 20 billion due to more efficient public service delivery. The widespread, documented successes of a2i's innovations have meant that they are now being replicated in Fiji and other countries through the Digital Public Goods Alliance and the UN Office for South-South Cooperation. By anchoring the programme in its Vision 2041 national strategy, Bangladesh prioritized inclusion in its digital transformation.

Digital skills and capacity

Digital literacy is a cornerstone of national development, and foundational for digital transformation. It provides individuals with the skills, abilities, and expertise to engage with the potential of digital technologies in all aspects of their lives, from education and communication to businesses and livelihoods. For example, IDB has developed a comprehensive strategy aimed at enhancing the digital skills of citizens in Chile, Colombia, and El Salvador. Beyond building basic digital literacy, it also seeks to address critical issues such as territorial disparities, gender gaps, and digital divides that may hinder equal access to opportunities.

With the increasing digitalization of many aspects of our lives from health care to public services, digital literacy is not static, and countries need a lifelong-learning approach that provides digital upskilling and reskilling outside of traditional educational routes. This is particularly relevant in the context of emerging technologies, including AI, which have the potential to reshape and remake industries and jobs. Tailored national plans to build digital skills can help to shape more comprehensive and extended capacity-building.

Example: Equal access to digital literacy – Rwanda

To work toward achieving universal digital literacy, Rwanda harmonized and targeted policies to expand its e-government platform. The country also boosted access to smartphone ownership through its #ConnectRwanda initiative, which increased Internet affordability as well.

As of 2023, adult digital literacy in Rwanda is approaching 35 per cent, meaning more than one-third of citizens aged 18+ are able to access online services on their own. This is more than four times the rate in 2017 (8 per cent) following information from interviews. By coordinating policies across the government's ministries, Rwanda was able to address the lack of digital literacy, and identify specific needs for each age group and geographic area in order to tailor capacity-building programmes.

Funding, financing models, and incentives

Digital transformation usually requires considerable investment in connectivity infrastructure, as well as funding and financing for digital literacy efforts and the development of a digital public sector with new and specialized job roles. Longer-term funding within government lets departments undertake more significant change management, including breaking down silos between databases and deploying a holistic approach to digital technologies.

Outside of the public sector, funding and financing also extend to the business models used to advance digital transformation. Particularly when delivering digital products and services in low- and middle-income countries, digital innovators and entrepreneurs need to ensure that they are able to cater for the market effectively. This could include subscription-based models and community-sharing approaches (to mitigate up-front investments in technology) and public-private collaborations for last-mile contexts, where financial returns may be more challenging.

Example: Positive societal outcome – Argentina Conectada

In 2010, the Argentina Conectada project established a fibre-optic network called Refefo ("Federal Fibre Optic Network"), connecting public institutions as well as retail providers of telecommunications. Financed by the public sector and IDB, this multi-purpose network effectively allows Argentinian government services to transfer data and share information for the provision of health care, education, social development, public security, and national defence. It now reaches 1,129 locations across the country and has led to large improvements in the quality and affordability of Internet services. With a total investment of USD 13,200 billion, and a deployment of more than 38,800 km of fibre, more than 22 million Argentines will be connected by the end of 2023.

Four financing focus areas for digital transformation in Latin America and the Caribbean

Understanding the need for sustainable and innovative financing to ensure that no one is excluded from the digital transformation, IDB and other development partners have been supporting inclusive national development across Latin America and the Caribbean (LAC). This work has highlighted four important focus areas: digital upskilling, e-government, capacity-building for small enterprises, and regional financing approaches.

First, digital financing is traditionally aimed towards increasing people's access to the Internet by investing in infrastructure. But investments in digital upskilling and the affordability of ICT are equally crucial. In LAC, 31 per cent of people with access to the Internet are not using it, and the main reason why is a lack of opportunities for learning digital skills. ITU data suggests that less than 20 per cent of the population in this region have intermediate or standard digital skills. Advanced skills are especially scarce, which is a particular concern as these are necessary to deepen and expand the national digital transformation. In most LAC countries, less than 40 per cent of government procedures are available online, and foundational applications and infrastructure such as digital IDs and signatures, cybersecurity defences, interoperable data-exchange systems, and AI are not fully implemented.

Second, e-government can drive digital synergies across countries and regions. This can have negative multiplier effects.

Paper-based bureaucracy hinders the private sector's competitiveness and increases the costs of providing government services. With more funding for digital policies and components, governments in this region could implement key enablers such as digital records and electronic notifications and provide more of their procedures online. This could reduce the costs for citizens and businesses by 73 per cent while cutting the government's own costs by 39 per cent.

Third, financing should be directed towards enhancing the digital capacities of local micro-, small-, and medium-sized enterprises (MSMEs) to strengthen digital economies across the region. The need for harnessing the power of MSMEs becomes apparent when considering that MSMEs represent more than 99 per cent of companies in LAC. Only 55 per cent of companies in LAC have a website, pointing to the immense potential for digital development in this region. Empowering MSMEs through digital transformation can contribute to addressing multiple SDGs, for example by promoting sustainable industrialization, fostering innovation, and building resilient infrastructure to meet SDG 9 ("Industry, Innovation and Infrastructure"). Technical assistance and intensive training programmes have proven to be effective means of stimulating this innovation.

Lastly, regional financing approaches can enable LAC countries to leverage synergies and economies of scale. This involves promoting digital connectivity through national broadband plans, creating digital hubs and regional components such as data centres and Internet exchange points, investing in submarine cables, and harmonizing regulations for international and regional network integration.

Technical enablers

Technical enablers are secure-by-design technical elements that support the development and growth of a functioning digital ecosystem. They include interoperable Digital Public Infrastructure, connectivity, and technologies such as cloud and high-performance computing infrastructure.

A full overview of the components can be found in the Appendix.

Connectivity infrastructure

Connectivity infrastructure is the foundation of national digital transformation. It includes wired (particularly fibre-optic) and wireless 3G, 4G, and 5G connectivity, IoT infrastructure, and low-Earth-orbit satellite broadband, with the market for the latter attracting considerable attention and investment. Connectivity is also essential for meeting all 17 SDGs, from mobile money improving the financial inclusion of women for SDG 5 ("Gender Equality") to the role of IoT in monitoring ocean health and water quality for SDG 14 ("Life below Water").

Universal and meaningful connectivity is based on providing connectivity to all, but also ensuring that infrastructure is meaningful in that it meets the daily needs and requirements of users. A sizeable proportion of the population living within the footprint of Internet access are not using it, often due to inadequate affordability, accessibility, and opportunities to gain digital literacy.

Example: Improving rural access to ICT services – China
To help close the rural-urban digital divide, the Government of China focused their efforts alongside operators (including China Telecom, China Mobile, and China Unicom) to put into place targeted measures to make digital technologies affordable and to expand ICT infrastructure. This push began in 2004 with the Villages Access Project and continued in 2009 with subsidies for computers and Internet access points being built in rural areas. In 2013, China's National Broadband Plan was launched, and a year later, Internet penetration in rural areas reached 29 per cent. By 2022, it had grown to almost 62 per cent and more than 97 per cent of counties were also covered by 5G. This progress toward bridging the digital divide was largely due to China's efforts to cut prices for basic ICT services, while local and central governments worked together to boost investments in ICT infrastructure in rural areas.

**Example: Supercharging the digital transformation –
Philippines tower sector reform**
To deal with bureaucratic red tape and limited competition
in telecom infrastructure, the Government of the Philippines
collaborated with the World Bank to enact a series of structural
reforms in the telecommunication sector. The process of issuing
permits for towers was streamlined, and a market was created
for independent tower companies. Additionally, the government
made regulatory changes that encouraged private investments
to help fill gaps in the digital infrastructure. Following
information from interviews, these streamlining efforts shortened
the approval processes for towers in the Philippines from as long
as 241 days to just 16, and this year, free internet service will be
provided in 3,390 geographically isolated and disadvantaged
areas, in addition to 8,404 other areas with free internet access
across the country, which is expected to redound into a more
inclusive digital connectivity especially in rural areas.
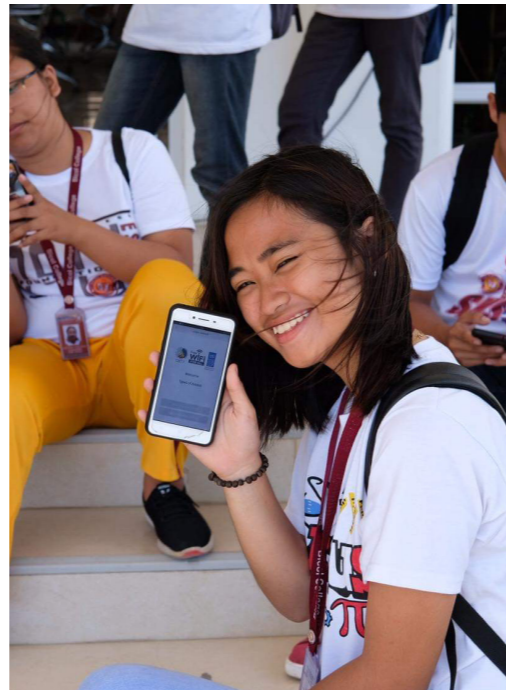
Digital public infrastructure

DPI is the foundation and guide rails of national transformation,
comprising digital components and building blocks to activate
and support public and private service delivery. DPI includes
elements such as digital payment infrastructure, data exchange
layers, document verification and authentication, and digital
identity solutions. However, it also defines the framework
of the broader digital ecosystem, including aspects such as
governance, trust and accountability, data protection and privacy
rights, and other safeguards. DPI may create secure and inclusive
ecosystems that can catalyse digital efforts in the public and
private sectors and civil society.

**Example: Unleashing digital government services –
India's Aadhaar**
The Indian government decided to create a digital ID initiative
as a way for citizens to access government services and
generate digital payments and signatures. In 2009, Aadhaar
was launched and is now the world's largest biometric identity
programme, used by over 90 per cent of Indians.

India's approach to universal IDs prompted rapid enrolment and
adoption. The CEO of Aadhaar estimated that the initiative saved
the government about USD 10 billion over the course of 2.5 years.
Given this success, in 2023, India launched a partnership to share
its experiences with peer countries which are eager to learn.

Example: Interoperable data exchange – Estonia's X-Road
The journey to creating X-Road in Estonia – a centrally managed, open-source
solution for data exchange between organizations in the public and private
sector – began with the country's investment in computer access and network
infrastructure in the early 1990s. In 1994, the government published the first draft
of its strategic outline for ICT development, and over the course of that decade
rolled out its digital infrastructure programme, the Tiger Leap Initiative. Then in
2001, the government launched X-Road, followed by a digital ID system in 2002.

Today, Estonia offers a roadmap to cut red tape and manage essential state
services. E-government and digital signatures, which have been in place for
more than 20 years, allow 99 per cent of public services to be conducted online,
saving people an average of five working days and the government 2 per cent of
GDP. Each year, over 1.5 billion inquiries are made through X-Road. All of this is
made possible through Estonia's adoption of a holistic approach of investing in a
strong technological base guided by national development priorities.

Digital public infrastructure is a critical enabler of digital transformation and can help improve public and private service delivery at scale

Digital public infrastructure (DPI) is an evolving concept. Recently recognized by the G20 New Delhi Leaders Declaration, it is a set of shared digital systems, built and leveraged by both the public and private sectors, based on secure and resilient infrastructure, and built on open standards and specifications, as well as opensource software that can enable delivery of services at societal-scale. It should be secure, interoperable, and governed by applicable legal frameworks and enabling rules to drive development, inclusion, innovation, trust, and competition and respect human rights and fundamental freedoms.

Why does it matter?
The scale and scope of digital transformation globally necessitates DPI approaches to maximize the opportunities to accelerate the SDGs and reduce the risks that digital technologies bring. DPI provides an opportunity to drive societal-level digital transformation through building digital components and capabilities that can enable public and private service delivery. As infrastructure, they cut through the siloed approach of designing and implementing digital solutions with interoperable, society-scale programmes that shift innovation and competition to activities that take place atop it.

The conventional approach is to create specific solutions to specific problems that work in specific contexts only. An alternative approach is to think 'DPI' – a combination of the right technology architecture, transparent, accountable and participatory governance-enabling local digital ecosystems to drive sustainable innovation and scale, and support the creation of local digital ecosystems.

DPI offers countries unprecedented agency over their own digital journeys, designed to ensure the sovereignty of core public services, enabling capabilities that are critical to the SDGs. Although each piece of DPI can have impact on its own, the interaction of this infrastructure can unlock the most significant impacts in countries and across the SDGs.

What does it consist of?
In aggregate, DPI components form the backbone of a country's digital infrastructure. They should be made interoperable and secure by design and implementation – ensuring effective data exchange and robust governance. Examples of DPI components include:

IDs and civil registries. Civil registries provide canonical data to inform public and private service delivery, while digital IDs ensure verification of an individual (or organization) – all of which enables access to relevant products and services. Components include individual and business ID, as well as population and other registries.

Payments. Digital infrastructure that enables everyone in society to access and make seamless financial payments – democratizing access to financial services,

and improving public and private service delivery. Components include person-to-person payments, bill payment protocols, and more specialized tools such as electronic toll collection.

Data sharing and models. Digital and data components that enable secure data transfer (which adheres to privacy-centric approaches such as data minimization and audit trails) and focused data models that enable peer-to-peer and public data-sharing. Examples include APIs (Application Programming Interfaces) to open-for-reuse AI and machine learning models

Signatures and consent. Ensuring digital products, processes, and services are rigorous and authentic, which enables broader outcomes such as trust, verifiable agreements, and revocable consent. Components include digital signatures to ensure documents are tamper-proof, and electronic signatures via mobile devices.

Discovery and fulfillment. Open APIs and other components that enable services such as business registration, tax filing, and e-commerce, as well as more focused initiatives including open protocols for mobility and transport infrastructure.

Governance is a critical part of DPI that can drive development, inclusion, innovation, trust, competition, and respect human rights and fundamental freedoms. Governance foundations of DPI include independent and accountable institutions to prevent misuses, legislative and regulatory frameworks to maintain competition, resolve disputes and encode respect for privacy, and strategic leadership to set long-term ambition and align policy and financing.

Putting it into practice

The Digital Transformation Enablers set out the key priorities for national digital transformation. Putting these into practice will require shaping a process founded on monitoring, learning, and evaluation and continuous improvement, including the role of testing and safely experimenting with digital technologies, besides requiring a multistakeholder effort, focusing on the needs and priorities of people.

While governments are the drivers, all stakeholders – including the private sector, civil society, financing institutions, and international organizations – need to play a role.

While national governments are the drivers of the agenda for digital transformation, all stakeholders – including the private sector, civil society (especially women's and youth groups), financing institutions, and international organizations – need to play a role. This collaboration is crucial for an inclusive and sustainable transformation that places people at the centre of all efforts and priorities. Putting the enablers into practice requires four major components to be explored in parallel: scaling proven solutions; elevating the ambition of key stakeholders and improving collaboration; expanding funding and financing approaches; and unlocking the private sector's potential for positive societal impact.

Scaling proven solutions

As exemplified by the 34 digital solutions, digital is already having an exciting impact and countries are hardly starting from scratch. To accelerate progress toward the SDGs, greater attention must be given to scaling proven digital solutions such as DPGs, which have demonstrated measurable impact in other contexts. Countries should also focus on moving away from piloting isolated solutions, and instead take a broader approach, concentrating on scaling what works and identifying how and where digital technologies are most useful and appropriate.

Moreover, it is crucial to invest efforts in developing DPI to expand the reach of different solutions, as noted in the UN Global Digital Compact Policy Brief. DPI can be an important catalyst for public and private service delivery and support broader digital transformation and innovation. For example, a focus on interoperability can break down silos, whilst an ecosystem approach can prove highly effective in shaping a whole-of-society digital impact. Lastly, strengthening national data capacity and statistical systems (including the availability of gender-disaggregated data), as well as a reporting culture, is imperative to better comprehend the impact of digital advancements on SDG fulfilment.

Elevating ambition and improving collaboration among key stakeholders

Achieving digital transformation demands a collective effort from all stakeholders: national governments, the private sector, civil society, and international partners, including financing institutions.

To enable this approach, there must be an alignment of digital capacity-building, implementation, and financing efforts, and the establishment of new kinds of partnerships where each participant brings unique value. Multistakeholder partnerships at the country level hold the potential to localize development agendas and tailor solutions to specific contexts. Collaborative international ecosystems can facilitate the sharing of development gains and benefits across stakeholders. By embracing step-changes in their approach and evaluating progress along the way, all institutions and sectors can collectively advance digital transformation and the SDGs.

Expanding funding and financing approaches

An estimated annual funding gap of between USD 3.7 to 4.2 trillion needs to be filled in order to achieve the SDGs by 2030. This situation requires identifying new and innovative financing vehicles and improving the utilization of existing sources. It is also necessary to fund foundational enablers with systems that unlock multiple digital solutions for SDG progress, rather than bespoke tools in isolation. This can become possible through collaboration and alignment across funders and financers, who may be able to pool resources and leverage synergies on the most critical topics.

Dedicated and longer-term funding is also needed for many countries, particularly to break down silos within the public sector and shape a whole-of-government approach to digital transformation. More predictable funding sources would be valuable. For example, the Broadband Commission's 2021 report on financing models calls for expanding the base of contributors for universal service and access funds, which traditionally rely on contributions from nationally licensed network operators. These can fund investments in last-mile infrastructure, as well as broader digital inclusion initiatives.

Public-private partnerships are needed to drive substantial investments towards meeting the SDGs, and to expand the digital connectivity frontier.

With regard to new financing vehicles, the mobilization of private capital for development must increase. Social impact bonds, results-based financing instruments, and outcome-payer funds can all play a role (see boxout). More blended-finance approaches can attract a diverse range of investors, and public-private partnerships (PPPs) may bring about substantial investments towards meeting the SDGs and expanding the connectivity frontier, as discussed by IDB in 2022. PPPs can also close the "finance divide", whereby developing countries face much higher borrowing costs than developed countries when recovering from crises such as the COVID-19 pandemic. This can make national investment in sustainable development even more challenging.

Innovative financing mechanisms for SDG progress

A coordinated approach among donors and financial institutions could provide an opportunity for financing partners – including multilateral development banks (MDBs) and development financing institutions (DFIs) – to jointly develop instruments or mechanisms to drive digital transformation. Such instruments can maximize public and private resources to fund digital investments at national and regional levels. Using digital infrastructure to highlight this potential, broader and more innovative financing options for digital transformation could include (but are not limited to):

Dedicated and focused funds. For example, a digital connectivity infrastructure fund to support public and private initiatives. This fund would pool resources from MDBs, DFIs, other donors and potentially the private sector to offer project preparation and debt funding for digital connectivity projects.
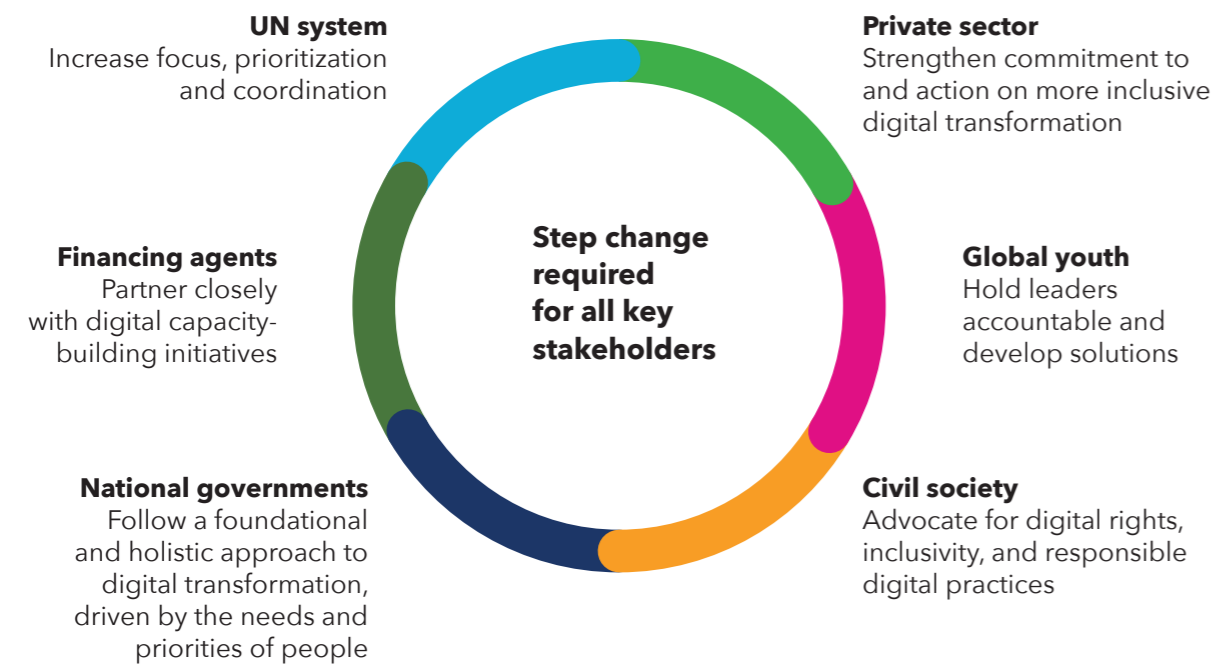
Opportunities to mobilize new investors. This could include a facility to boost the credit of digital bonds so that they can be used to back public and private initiatives. Such a facility would provide credit-enhancement instruments to sovereign and corporate digital bonds to provide better financial conditions and so increase demand from investors.

De-risking digital investment for private-led projects. With resources from MDBs, DFIs and other donors, such a facility would offer blended finance and risk mitigation instruments to improve the bankability of projects, thus attracting more private investment in infrastructure and other aspects of digital transformation.

In addition, MDBs and DFIs could provide technical assistance to support the conceptualization and testing of new financial solutions for digital transformation and strengthen the capacity of governments to close the infrastructure gap. This may include conducting pre-feasibility studies and financial modelling; contributing to the dialogue between the public and private sector; supporting MDB and DFI members with interventions to bolster digital skills; and supporting the assessment, design and implementation of regulatory reforms and public policies.

Unlocking the private sector's potential for positive societal impact

The private sector plays a significant role as a catalyst for both innovation and investment to achieve the SDGs, as discussed in July 2023 at the SDG Global Business Forum. They are similarly crucial partners in driving national digital transformation, including through building foundational infrastructure and leading the development of content, applications and services. In doing so, the private sector can also encourage open-source innovation to motivate collaboration among businesses and communities and improve the digital expertise of MSME leaders and customers. More broadly, the private sector is able to foster knowledge-sharing and cooperation on a global scale, for instance through participation in business networks such as the UN Global Compact or International Organisation of Employers.

UN system
Increase focus, prioritization and coordination

Private sector
Strengthen commitment to and action on more inclusive digital transformation

Financing agents
Partner closely with digital capacity-building initiatives

Step change required for all key stakeholders

Global youth
Hold leaders accountable and develop solutions

National governments
Follow a foundational and holistic approach to digital transformation, driven by the needs and priorities of people

Civil society
Advocate for digital rights, inclusivity, and responsible digital practices

Digital transformation presents additional roles for the private sector as well, for example tackling the risks of digital obsolescence, privacy violations, data breaches, cybercrime, e-waste, and disinformation. For some organizations, this may mean redoubling their commitment to environmental, social and governance priorities and shaping tangible pledges, including those featured within ITU's Partner2Connect Digital Coalition of governments, businesses, and UN agencies.

The private sector plays a significant role as a catalyst for both innovation and investment to achieve the SDGs.

Conclusion

The world is far behind in achieving the SDGs. Extreme poverty is rising, and progress is stalling with respect to key development targets including those on health, education, and gender. There is an urgent need to re-focus efforts and attention on the SDGs, get back on track, and support people, peace, and prosperity around the world.

Digital technologies are catalysing positive transformation alongside economic and societal growth. Countries with digital foundations may find it easier to meet key development outcomes. Leveraging digital tools, technologies and data can help accelerate progress towards 70 per cent of SDG targets directly, while indirectly supporting the other 30 per cent. As highlighted by the 34 digital solutions presented here, digital transformation are having real and exciting impact and accelerating progress towards the SDGs: from ensuring financial inclusion, to building crucial skills and knowledge and improving the effectiveness of public and private service delivery. Emerging technologies could yet accelerate many of these benefits.

However, they also bring challenges. Globally, 2.6 billion people remain offline, and 259 million more men than women are using the Internet. New technologies risk entrenching and exacerbating these and other digital divides. Protections need to be built and enforced. Inclusive research, co-design, feedback loops and engagement are required to ensure that the digital transformation benefits everyone, and no one is left behind. Digital technologies are not a panacea nor a neutral tool. They can have positive and negative multiplier effects, which need to be identified, managed and tackled accordingly. This includes technological challenges – including ensuring the safety and security of digital solutions – but also non-technological aspects. For example, tackling underlying social norms that prevent marginalized populations from engaging with digital solutions in the first place, shaping digital skills to enable everyone to participate in increasingly digital economies and societies; and building grievance redressal, accountability and other governance mechanisms to ensure that no one is disadvantaged by digital transformation.

Digital transformation is a journey, one being navigated by all countries and communities worldwide, providing an exciting opportunity to learn from each other. The Digital Transformation Enablers presented highlight the key digital, technological and non-technological components essential for inclusive and sustainable digital transformation. Recognizing this, a foundational and holistic approach is needed, which focuses on identifying, embedding and scaling the enablers that can unlock digital technologies' potential to contribute to human development. Scaling proven digital solutions requires moving beyond individual digital pilots, breaking down silos to ensure progress toward the SDGs.

Inclusive digital transformation cannot be led or achieved by a single actor, institution or sector. This means it should be founded on open innovation, global collaboration and the sharing of learning and knowledge. In doing so, the transformation can optimally leverage the catalytic power of government, the digital talents and expertise of the private sector, and most crucially the deep expertise and credibility within communities of civil society, especially in populations that risk being marginalized such as women and young people. A sustainable and human-centred digital transformation at the local, national and international levels demands our collaborative efforts in shaping a global digital experience that enhances the lives and livelihoods of all.

Glossary

Term	Our definition
Artificial intelligence (AI)	Computer systems that can perform tasks which normally require human intelligence. Examples of such tasks include but are not limited to speech recognition, computer vision, data analysis, decision-making and language translation.
Cybersecurity	A range of behaviours, tools, policies and security concepts, with the general aim to safeguard the data of individuals, organizations and governments against risks in the cyber environment, such as the unauthorized access and usage of data etc.
Digitalization	The process of transforming existing systems using digital technologies.
Digitization	Converting information from its original analogue (e.g. paper-based) to digital form.
Digital ecosystem	A set of interconnected digital technologies, services, actors, or platforms that interact with each other to provide value to society.
Digital maturity	The level of digitalization in a country, relating to various dimensions including digital infrastructure, affordability, regulation and protections, economic activity, policy and governance, and skills. Digital maturity is defined via the Telecommunications Infrastructure Index and the Data-Only Mobile Broadband Basket, both building on data from ITU (see Methodology for further details). "Digital leaders" refers here to countries that achieve stronger progress on digital maturity compared to others at the same income level and with a similar digital starting point.
Digital public goods (DPG)	Open-source software, open data, open AI models, open standards and open content that adhere to privacy and other applicable laws and best practices, do no harm by design and help attain the Sustainable Development Goals (SDGs).
Digital public infrastructure (DPI)	DPI is an evolving concept, but there is growing consensus on it being a combination of 1) networked open-technology standards built for the public interest; 2) enabling governance; and 3) a community of innovative and competitive market players working to drive innovation, especially across public programmes. In line with UNDP's whole-of-society approach to digital transformation, work towards building an inclusive and rights-based DPI focuses on partnerships, government support, population-scale technology, local digital ecosystems, human rights advocacy, and research and learning exchanges.
Digital skills	The abilities and knowledge required to effectively engage with and navigate digital technologies, enabling individuals to create, access, evaluate and communicate information, content and services.
Digital solution	This generally refers to a digital product, service or application that performs a manual or analogue process digitally, usually reducing the need for human intervention. Section B showcases 34 exemplary digital solutions.
Digital technologies	For example mobile technologies, machine-learning algorithms, and the Internet of Things.
Digital transformation	A journey whereby digital technologies are integrated across all sectors of society, including governments, businesses, education, and health care, to provide services, increase efficiency, promote economic growth, and fundamentally drive social change. This process should ideally be planned and executed with intention and appropriate regulation to avoid the risks associated with haphazardly using untested and potentially harmful digital technologies.
Emerging technologies	New or developing technologies with considerable potential to drive significant change in how we live, work and/or play, albeit with associated uncertainties regarding risks and the direction of development.

Term	Our definition
Environmental, Social and (Corporate) Governance (ESG)	Environmental, Social, and (Corporate) Governance – also known as ESG – aims to broaden the measurement of private sector outcomes beyond purely financial metrics. This can have wide-ranging relevance, including unpacking the impact of products, services, and value and supply chains in relation to the three ESG areas. ESG is often explored in alignment with the Sustainable Development Goals, but can also use other frameworks and reporting metrics. ESG can shape broader corporate and business strategy, market differentiation, and governance and decision-making - including investment decisions. Similarly, ESG can also be an important external aspect, of particular interest to consumers, partners, investors, and other stakeholders.
Gender bias	The preference of one gender over another. In a digital context, gender bias can refer to the outcome of discriminatory algorithmic results, the exclusion of (usually) women in the usage and ownership of technologies, and a gender-blind approach to design, all of which contribute to creating and perpetuating gender gaps.
Gender digital divide	Broadly speaking, there are four main categories of the global gender digital divide: 1) gaps in access to and use of the Internet; 2) gaps in digital skills and the use of digital tools; 3) gaps in participation in science, technology, engineering and mathematics (STEM) fields; and 4) gaps in tech-sector leadership and entrepreneurship.
Information and communication technology (ICT) infrastructure	All systems used to enable digital services and solutions, including software, hardware, networks, and platforms.
Multilateral development banks (MDBs) and development finance institutions (DFIs)	Development finance institutions (which include multilateral development banks) are key players in financing sustainable development, for example by leveraging private sector funds but also taking an advisory role in the creation of national policies and regulatory frameworks.
Multistakeholder approach	Collaboration among various actors, decision-makers and beneficiaries, including the public and private sector as well as civil society. Here it is proposed that a multistakeholder approach is required to unlock the power of digital transformation for sustainable development.
Sustainable Development Goals (SDGs)	The 17 goals set out in the United Nations 2030 Agenda, aimed at eradicating poverty, protecting the planet, and promoting prosperity and peace all over the globe by 2030.
Universal and meaningful connectivity	"Universal connectivity" means connectivity for all, while "meaningful connectivity" is a level of connectivity that allows users to have a safe, satisfying, enriching and productive online experience at an affordable cost.
Whole-of-government approach	A cross-sector and cross-departmental way of dealing with digital transformation that puts citizens' needs at the centre to deliver integrated and coordinated e-government services, including breaking down internal barriers and silos.
Whole-of-society approach	A coordinated way of pursuing digital transformation that engages all parts of society, including governments, civil society, and the private sector to build digital ecosystems that are inclusive, sustainable and just, and leave no one behind.

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