

In collaboration
with PwC

Centre for Global Public Goods

WORLD
ECONOMIC
FORUM

Harnessing Technology for the Global Goals: A framework for government action

INSIGHT REPORT
JANUARY 2021



Cover: GettyImages/DiversityStudio;

Inside: GettyImages/mixetto; GettyImages/FGTrade;

Contents

3	Foreword
4	1 About the 2030Vision platform
5	2 Introduction
7	3 Getting to scale: A guiding framework for action
8	4 ‘Tech for good’ checklist
10	5 A leadership framework for governments
10	5.1 Vision and strategy
11	5.2 Governance and accountability
12	5.3 Innovation, research and development
14	5.4 Finance for commercialization
15	5.5 People and skills
17	5.6 Collective action and collaboration
19	6 Conclusion: Delivering on the promise of technology
20	Annex: Action checklist for public sector leaders
21	Contributors
22	Endnotes

© 2020 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system.

Foreword



Antonia Gawel

Head, Innovation and Circular Economy, Centre for Global Public Goods, and Member of the Executive Committee, World Economic Forum



Celine Herweijer

Global Leader, Innovation and Sustainability, and Partner, PwC United Kingdom

Since the start of 2020, when we entered the “decade of action”, progress towards achieving the United Nations’ Sustainable Development Goals (SDGs), or Global Goals, was already behind schedule. Then, the COVID-19 pandemic hit hard, reversing some of the hard-won gains. As a result, millions of people have been pushed back into poverty, healthcare systems have struggled to cope and disrupted supply chains have contributed to increased food scarcity. These impacts, in addition to shocks to education and employment, are further accentuating inequalities between and within countries.

If we are to achieve the systemic change most required to achieve the Global Goals by 2030, and overcome the structural weaknesses exposed by the COVID-19 crisis, then there is an urgent need for global stakeholders to cooperate in managing the fallout from this pandemic. Technology needs to be a key area for cooperation given its widespread and borderless impact. New technologies have played a crucial role in keeping societies functional in a time of lockdowns, underpinning innovations and solutions across sectors. But those less digitally ready have been disadvantaged, as many education and healthcare services move online. The pandemic has broadened the threat of automation to low-skilled, person-to-person services, most notably retail and hospitality, as digitization has been accelerated in all sectors. Likewise, issues around data privacy and cybersecurity have become more prevalent.

Even before the outbreak of COVID-19, Fourth Industrial Revolution technologies were beginning to transform the world in how we do business, how we trade, how we work, how we produce and consume energy and goods, how we learn, and how we manage our healthcare systems. The need to purposefully deploy new technologies to help solve social and environmental challenges was already apparent, from online learning and digital healthcare, to emerging areas of agritech, climate tech and fintech. And while technology might not have been at the top of every country’s agenda pre-pandemic, 2020 has shown how important, pervasive and critical it can be to help economies stay resilient and competitive.

There is a huge opportunity for technological advances to drive a step-change in the pace and scale of progress needed to deliver on the UN’s 2030 Agenda for Sustainable Development and its Global Goals, one that is now more urgent due to a need to make up for lost time. Nevertheless, this significant landscape of opportunity is inevitably conditioned by substantial barriers and risks that persist. Multiple challenges can prevent the scaling of new solutions, from lack of basic infrastructure, expertise, data and adequate market incentives, to concerns regarding trust, performance and security. Moreover, if these technologies are not scaled in a smart and sustainable way, they could exacerbate problems for people and the planet, putting further strains on society and the environment.

Purposeful and effective leadership around technology governance, investment and deployment from the private and public sectors will be critical. This report establishes an initial step for realizing how governments and public sector leadership can drive and harness the uptake of advanced technologies to accelerate action on the Global Goals, offering an action-oriented checklist for governments and public sector leaders to identify where they are on the journey, regardless of their technological maturity. It also serves as a complement to the corporate leadership framework launched in September 2020, as both private and public sector leadership are equally important and need to progress in tandem.¹

We hope these insights and guiding questions will not only spark a sense of urgency within and between the public sector, but that they will drive urgency for public-private collaboration and partnerships. Turning these leadership conversations into effective actions is the crucial next step in ensuring that emerging technologies are fully harnessed to drive transformative change and ensure achieving the Global Goals becomes a reality by 2030.

1

About the 2030Vision platform

The potential of Fourth Industrial Revolution technologies to tackle major global challenges, including poverty, climate change, nature loss and inequality, is immense. Yet, this potential is far from being reached. To this end, the World Economic Forum's Platform for Shaping the Future of Global Public Goods is scaling up efforts to proactively engage stakeholders to channel Fourth Industrial Revolution innovations towards positive social, economic and environmental outcomes through a series of initiatives. In the context of the COVID-19 pandemic and the Forum's resultant Great Reset initiative, this effort is now more important than ever before.

2030Vision – a platform hosted by the Forum – aims to advance work towards the UN's Global Goals through Fourth Industrial Revolution technologies.

This public-private partnership facilitates knowledge and resource sharing, government capacity development, networks of providers and users, and supports the channelling of finance to fast-track new solutions for the Global Goals. The effort is organized and delivered in cooperation with partner institutions, including leading international organizations and global corporations.

Since 2019, PricewaterhouseCoopers (PwC) has served as a knowledge partner for 2030Vision. This partnership has seen PwC and the Forum jointly develop three reports, each shedding light on how to harness technology to drive progress towards the Global Goals. The Forum, PwC and other partners will continue to work with a community of influence to mobilize and scale new technologies for the benefit of the Global Goals.



Introduction

Progress to date

In 2015, the global community of over 190 United Nations Member States committed to achieve the Sustainable Development Goals (SDGs), or Global Goals, by 2030.² Some progress was undeniably made in the latter half of the 2010s. Income inequality had been reduced in some countries, international commitments to advance gender equality had led to improvements in areas of child marriage and female genital mutilation, and strides had been taken towards improving energy efficiency and expanding access to electricity, while the proportion of the global population using safely managed drinking water services had started to rise.

In spite of these gains, progress towards many of the Global Goals was still not on track in early 2020 and some already required a step-change in action to meet the 2030 targets. Against the backdrop, the onset of the COVID-19 pandemic disrupted implementation abruptly and, in some cases, turned back many years of progress on the Global Goals³ (see Table 1), with increased risks destabilizing the economies of many nations.

TABLE 1 Examples of the negative impacts of the COVID-19 pandemic on Global Goals progress⁴

Poverty	Health and well-being	Education	Gender equality
The COVID-19 pandemic has caused the first increase in global poverty in decades, with an expected 71 million people being pushed into poverty.	Healthcare disruptions could reverse decades of improvement on health and well-being , with the potential for hundreds of thousands of additional under-5 deaths expected in 2020.	School closures kept 90% of all students out of school, reversing years of progress on education .	Lockdowns are increasing the risk of violence against women and girls , with cases of domestic violence having increased by 30% in some countries.

The promise of technology and lessons learned from the COVID-19 pandemic

While the COVID-19 pandemic has set back progress on many of the Global Goals, technology – if applied in the right way – can support innovative solutions to the evolving global challenges. Over the past year, technology solutions have been deployed to screen and track the virus, paired with the application of big data, artificial intelligence, smartphones and wearables. Biotechnology has been central to the pharmaceutical sprint to develop new vaccines in a matter of months. Drones have also been used to provide critical supplies to more remote communities, and robotics deployed to assist with sanitation, consultation and testing duties within healthcare facilities.

In the world of work, the pandemic forced millions of office-based businesses to pivot towards virtual operations overnight, with technology playing an essential role in supporting the new model of remote working. Education was digitized rapidly as well, with the rollout of mass media broadcasting, online lessons and national repositories of digital

resources. These examples show how now, more than ever, technology is increasingly vital to the smooth running of the majority of economies and societies. Its presence, however, is not felt everywhere, nor its full potential realized.

Now is the time for technology to be responsibly steered, deployed and scaled to reach the Global Goals, something which is widely recognized by UN Secretary-General António Guterres, who has declared that global efforts to date have been insufficient to deliver the change needed.⁵ Technology needs to be a much bigger part of the solution set. Fortunately, there are many reasons for optimism. The World Economic Forum report, “Unlocking Technology for the Global Goals”,⁶ revealed that over 70% of the Global Goals’ 136 targets could be enabled by technology applications already in deployment; technological innovations have the potential to transform progress on the goals and deliver on this promise.⁷

Surmounting barriers and leveraging enablers

While emerging technologies hold huge potential, many barriers remain and will need to be overcome before the enormous opportunities can be realized. These include poor data access and quality; a lack of basic infrastructure; an inadequate governance and policy environment; upskilling and reskilling needs and – in particular for public goods-focused solutions – a lack of viable business models and commercial incentives for scaling.⁸ In addition, the scaling of new technology applications creates new risks – from security and control risks, to socioeconomic risks including job displacement, embedded data biases or even unintended environmental risks – that also need to be actively and assertively managed by the technology sector, industry and governments alike.⁹ Underpinning these barriers is the pervasive

challenge of inequality; a number of technology solutions leveraged during the pandemic have been disproportionately deployed towards populations that are already at a socio-economic advantage. Not only does this represent a barrier to achieving the Global Goals related to inequality itself, it also embeds inequality across the progress towards a number of other goals.

A number of enablers have been identified (see Table 2) which can help in overcoming these barriers. These enablers are crucial to accelerating innovation and investment into new solutions that help tackle the world's biggest challenges, and to create viable markets for those solutions in the long-term.

TABLE 2 **Key enablers to overcoming barriers to achieving the Global Goals.**

Responsible technology governance	Leadership to mobilize commitment and standards	Partnerships for collaboration and collective action	Public policy and regulation for the Fourth Industrial Revolution
Finance mechanisms to stimulate market solutions	Breakthrough innovation	Data and tools	Capacity development and skills

Source: World Economic Forum and PwC

Private and public sector leaders have pivotal roles to play in advancing each of these enablers. While the corporate leadership framework¹⁰ outlines the role and actions that private sector leaders can play, here, we highlight what governments can do to build partnerships, shape public policy and stimulate the market for tech-enabled innovations,

among other critical enabling actions within and across governments. Working collaboratively and creatively, governments and public sector leaders have the chance to turn these technology opportunities into a reality, and realize the benefits that these applications can contribute towards achieving the Global Goals.

3

Getting to scale:

A guiding framework for action

To mobilize a more concerted and cooperative effort to apply advanced technologies to achieve the Global Goals, as part of 2030Vision, the Forum has developed a framework for governments and other public sector bodies, to be considered and actioned in parallel to the September 2020 corporate framework. The guiding framework for the public sector was developed through a broad stakeholder consultation process, including a global virtual workshop and interviews with government advisers and secretaries, technology and innovation leaders of international development organizations, and public policy representatives from leading technology firms, among others.¹¹ The framework outlines the critical conversations that

need to happen in governments to enable use of technological advancements to deliver progress towards the Global Goals, and the meaningful social and environmental change these goals champion. Although each country is at a different stage in its journey with technology, the framework seeks to offer recommendations at a range of maturity levels, making the report approachable and of value to all countries and regions.

The below graphic summarizes the six key leadership areas that make up the framework. Each of these areas is explored in further detail in the following sections of this report, accompanied by guiding questions and case study examples.

FIGURE 1



4

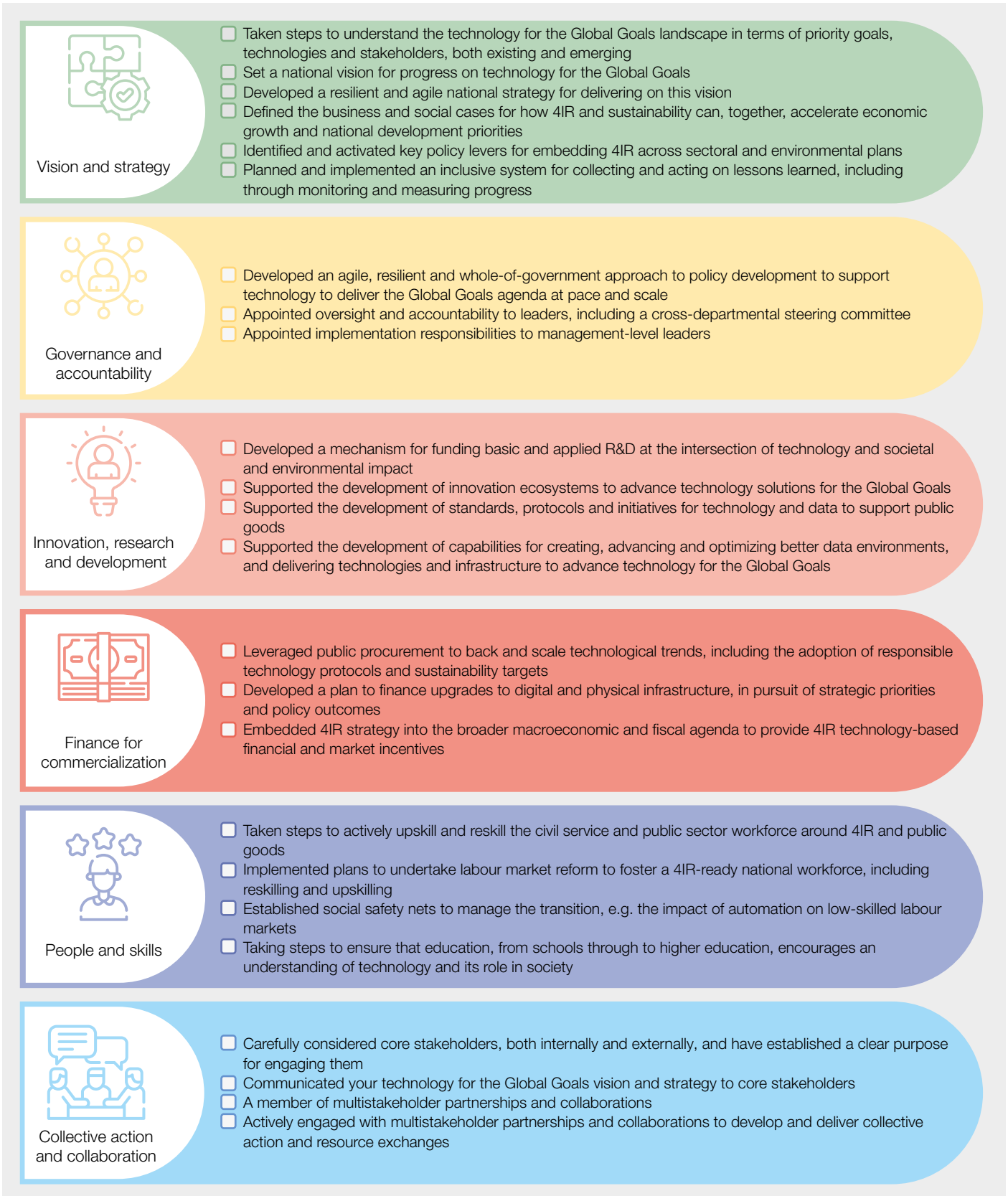
‘Tech for good’ checklist

The below checklist is intended to enable a rapid initial analysis of where any given country might find themselves on their journey of deploying technology in pursuit of the Global Goals. It is composed of a number of key actions that support leaders within the public sector to determine where they have taken clear actions on the “tech for

good” journey and where they could focus their efforts to broaden and deepen their impact. When working through this list, steps that are completed or underway can be ticked off, and those left unchecked can be considered as potential areas in which to focus critical conversations and future efforts.



FIGURE 2



The following chapter sets out the government leadership framework that lies behind this checklist. It is important to note that there is not a one-size-fits-all approach to deploying technology

for the Global Goals. While there are some steps that could be considered more fundamental, the journey is complex and will vary from one public sector body to the next.

A leadership framework for governments



5.1 Vision and strategy

The technology for the Global Goals landscape is multifaceted and needs to be approached with deliberate planning and coordination. Governments can achieve this by articulating a vision for driving progress on technology for the Global Goals and developing strategies to deliver on this vision. A clear and decisive vision is essential to set ambitions, enable action and encourage investment.

Purpose and actions

In many cases, significant groundwork is needed before governments are ready to set a national vision and strategy that leverages technology to drive progress on the Global Goals, starting first with agreement on which goals they are proactively driving progress towards. Governments must have a clear understanding of existing and emerging technologies, their own capacity and capabilities, and how these can potentially support and enhance wider policy goals and agendas. Governments must also understand the different stakeholders, including those already financing these technologies and those involved in development and scaling deployment.

Once the groundwork has been established, leaders need to define the vision for leveraging technology to deliver on the Global Goals. This vision can be aligned to the national development agenda (including target goals) and leverage international collaboration for exchange of resources to maximize impact. This needs to then be underpinned by a strategy for delivery. It will be important to align this delivery approach with the broader national development strategy, as well as other national goals and priorities.

This alignment could consider sectoral policy and development plans in addition to cross-sector collaboration opportunities. Often, this will involve including innovation as a distinct objective in sectoral planning, such that it shapes investment decisions around targeted physical and digital connectivity infrastructure.

A clear “business case” and an accompanying “social case” need to support the vision and strategy by clearly setting out how “tech for good” can accelerate economic growth and national development priorities, including progress on the Global Goals. The business and social cases can then be fed into agile and responsive strategy development, so that planning can be adaptive to lessons learned along the way.

Innovation policy should then be integrated into sectoral policies to support Fourth Industrial Revolution integration, with innovation as an embedded objective in sectoral development; horizontal policies and governance structures are essential to achieve a cross-sectoral innovation ecosystem, which is crucial in accelerating technology-enabled progress towards the Global Goals. This includes investment into targeted physical and digital connectivity infrastructure to enable penetration of technology solutions to achieve the greatest impact.

Guiding questions

Have you:

- taken steps to understand the technology for the Global Goals landscape in terms of priority goals, technologies and stakeholders, both existing and emerging?
 - set a national vision for progress on technology for the Global Goals?
 - developed a resilient and agile national strategy for delivering on this Global Goals vision?
 - defined the business and social cases for how Fourth Industrial Revolution technologies and sustainability can, together, accelerate economic growth and national development priorities, in line with the Global Goals?
- identified and activated key policy levers for embedding Fourth Industrial Revolution technologies across sectoral and environmental plans, in support of the Global Goals?
 - planned and implemented an inclusive system for collecting and acting on lessons learned on deploying technology for the Global Goals, including through monitoring and measuring progress?

CASE STUDY:

Government of Malaysia

Malaysia has recently developed a resilient and agile national strategy on the Fourth Industrial Revolution, which will guide their action on the Global Goals.

The Malaysian government has formulated an outcome-oriented National Policy Framework on the Fourth Industrial Revolution to enhance policy coherence in harnessing the potential of Fourth Industrial Revolution technologies to support its wider development goal. The human-centric framework adopts a whole-of-nation approach, i.e. people-public-private partnership in delivering its vision to achieve inclusive, responsible, balanced and sustainable socioeconomic development. This vision emphasizes the utilization of technologies for good by all levels of society, in particular to be aligned with the country's commitments to the SDGs. To facilitate its implementation, Malaysia is targeting performance improvement in the Environmental Performance Index and Malaysia Well-being Index beyond just productivity growth.

The policy framework has outlined clear national focus on the necessary action plans, which are aligned with its key economic areas and relevant sectoral initiatives, including foundational technologies for the country to embark on the Fourth Industrial Revolution journey. To elevate the agility, accountability and efficiency of the government, the framework has introduced a clear implementation and delivery-driven cluster-governance framework. The six clusters (digital talent, digital infra and data, emerging technology, economy, society and government) are supported by a strategic change management office, which aims to facilitate cross-sectoral innovation and institutionalise changes across the nation through enhanced collaboration.



5.2

Governance and accountability

To deliver on the Global Goals vision and strategy, governments need to assign accountability to members of leadership across government and implement effective oversight mechanisms.

Purpose and actions

Effective governance and accountability structures will support governments in establishing appropriate policies and regulations to ensure that the benefits of the Fourth Industrial Revolution can more effectively support positive environmental and societal outcomes, including those related to the Global Goals.

To support the delivery of the strategy and vision, it is essential to assign accountability to relevant members of senior government leadership. It is important that governance mechanisms related to technology use are aligned across government, meaning that responsibilities and approaches to implementing the vision are consistent and communicated

between and among areas of government and their respective agendas. This will likely require a top-down and cross-cutting assessment to identify and remedy potential conflicting policies, processes and legislation, all of which could impede progress towards the Global Goals.

When developing this approach to governance, an effort should be made to strike a balance between traditional oversight mechanisms and more unconventional approaches, which allow greater space for experimentation and innovation. Alternative governance approaches could include:

- Favouring outcomes over rules-based compliance
- Employing flexible action plans that adapt to change
- Offering open and transparent collaboration with citizens and interest groups
- Using technology to support decentralization, empowering policy-makers
- Facilitating sandboxing (safe testing within a controlled environment) to allow for the time-bound testing of innovations under leadership oversight

Guiding questions

Have you:

- developed an agile, resilient and whole-of-government approach to policy development to support technology to deliver on the Global Goals agenda at pace and scale?
- appointed oversight and accountability to leaders driving the agenda, including a cross-departmental steering committee?
- appointed implementation responsibilities to management-level leaders driving the agenda?

CASE STUDY

Government of Colombia

Colombia is developing a policy approach to support technology, particularly artificial intelligence (AI), to deliver on the Global Goals through smart regulation.

The Presidential Advisory for Economic Affairs and Digital Transformation of the Presidency of the Republic of Colombia has been developing specific policies related to the future of AI in Colombia. This process has enabled Colombia to begin building a route towards smart regulation, across the following actions:

- Implementation of the Colombian AI Ethical Framework
- Conceptual model for the design of regulatory sandboxes in AI
- Governance model of data infrastructure for the development of emerging technologies
- Rollout of a sandbox on privacy and AI projects
- Task forces for the development and implementation of AI in Colombia



5.3 Innovation, research and development

When leveraging technology for the Global Goals, governments have an important role to play in supporting riskier, early-stage innovative technology solutions – from ideation to basic and applied R&D and demonstration.

Purpose and actions

Many innovative technology-driven solutions for the Global Goals will not be immediately attractive to private sector investment, if at all. Therefore, governments have a role to play in supporting many of these riskier and most innovative ideas and early-stage ventures, from basic and applied R&D¹² to demonstration and commercialization.

To support startups, governments could consider open and agile approaches such as establishing

a marketplace for technology innovation and co-creation, including such initiatives as innovation partnership procedures and design contests. Other options include blended finance support for demonstrating commercial viability and for the scaling of new technology solutions through government-backed innovation incubators, accelerators, dedicated funds and mission-driven prizes; price-support mechanisms; and targeted patient and/or concessional capital to enable

scaling of technological solutions for the public good. These could incentivize and enable technology-driven innovations, allowing them to be deployed for progress on the Global Goals.

Governments also have a role to play in bridging some of the incentive-related barriers between innovative solutions developed in research institutions and scaling them commercially. Governments can work closely with the private sector and academia to better understand the technologies they are developing, their applications, the support they require and the potential impacts of such technologies. This innovative collaboration is important in identifying where impact on Global Goals progress can be realized and maximized.

In addition, governments can work to advance better data environments by supporting and investing in open data initiatives that democratize critical Fourth Industrial Revolution knowledge

and data for business and society (for instance, incentivization for making data public and interoperable). Alongside this, governments need to develop and enforce a policy framework for the broader R&D environment, including codes and standards that support technology companies, research institutions and universities to embed responsible data use, data identity management and data security.

Governments can offer financial and other forms of support that encourage entrepreneurship, ranging from basic R&D finance to support for commercialization. Additionally, in situations where technology solutions have been developed outside of the country in which they are being deployed, governments have a role to play as a facilitator for entrepreneurs. They can help them navigate the unique regulatory and market environment of that particular country, removing barriers to deployment and potentially unlocking Global Goals progress.

Guiding questions

Do you:

- have a mechanism for funding basic and applied R&D at the intersection of technology and societal and environmental impact for the Global Goals?
- support the development of innovation ecosystems to advance technology solutions for the Global Goals?

- support and develop standards, protocols and initiatives for technology and data to support public goods in pursuit of the Global Goals?
- support and develop capabilities for creating, advancing and optimizing better data environments, and delivering technologies and infrastructure to advance technology for the Global Goals?

CASE STUDY

X and the Government of Kenya

In Kenya, capabilities for creating, advancing and optimizing better data environments and connectivity infrastructure are being rolled out in rural areas.

X is tech giant Alphabet's "moonshot factory". Its Project Taara mission aims to bring affordable and abundant high-speed internet to more than 4 billion people around the world who are unconnected and under-connected. Taara is developing wireless optical communication (WOC) technology that delivers high-speed, high-capacity connectivity using beams of light. In consultation with Kenya's Ministry of ICT, Innovation and Youth Affairs, Taara conducted its first pilots in Africa. The ministry's priority is to support innovations that seek to provide solutions to everyday challenges. In particular, Taara was seen to solve for high-speed connectivity in marginalized and hard

to reach places, or where deploying fiber might be too costly – for example, in mountainous terrain and rural towns – or to add resilience in long-haul settings. The ministry helped X identify regions that would benefit from connectivity and assigned a member of their team to help X understand and comply with import and regulatory hurdles. X will continue work with the ministry to help bring gigabit internet to thousands of Kenyans.

Innovate UK and the Knowledge Transfer Network support the development of innovation ecosystems to advance technology solutions for the Global Goals.

Innovate UK

Innovate UK and the Knowledge Transfer Network support the development of innovation ecosystems to advance technology solutions for the Global Goals

Innovate UK is a part of UK Research and Innovation, the national funding agency investing in science and research in the United Kingdom. It is a non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy. The body has undertaken a number of actions to develop and support innovation ecosystems.

Innovate UK has launched a Knowledge Transfer Network (KTN) to connect ideas, people and communities to respond to societal, environmental and economic challenges, and drive positive change through innovation. This innovation ecosystem draws together:

- SMEs and large companies
- Technology hubs and startups
- Universities and research organizations
- Government agencies and public funding bodies¹³

Also established by Innovate UK, the Catapult Network links elite technology centres with businesses to help accelerate the development and deployment of innovative technology to the global market. The Catapult Network has driven investment of over £2.5 billion into cutting-edge research to ensure the UK can capitalize on the new technology and industries this century has to offer.¹⁴



5.4 Finance for commercialization

Governments have the capacity to create the conditions for the successful deployment, market expansion and commercialization of technology for the Global Goals. This can be done by investing in foundational infrastructure, leveraging government procurement, and updating financial and market policies.

Purpose and actions

Governments can play an important role in creating demand signals through their own digital/technology procurement policies, which can help drive deployment and commercialization of new technologies. They can also integrate responsible technology considerations into their procurement processes, from requiring technology suppliers to adopt established targets and sustainability standards (such as science-based decarbonization targets and environmental management requirements), to adopting wider responsible technology procurement protocols, including integrating environmental, social and corporate governance (ESG) assessment and ethics guidelines, and applying tools and principles.

Traditional procurement processes, however, can make it difficult for governments to be sufficiently selective in the technology contracts they award due to cost or other technical conditions that dominate the decision process. In essence, this means that governments will need to revisit their procurement practices to ensure their decision criteria are more multifaceted and meet a broader set of performance indicators aligned to their Global Goals agenda, to be met by the organizations whose technology they procure.

In addition, new financing approaches and instruments are needed that support continued innovation, including options that move beyond some of the limitations of annual planning cycles associated with donor funding and government budgeting. Governments also have the opportunity

to move towards co-financing in order to leverage the resources of all partners, from funding to expertise (see Collective action and collaboration). This is particularly important given the agility and adaptability needed to effectively respond to the change demanded by the Global Goals.

Governments also have a role to play in supporting deployment and commercialization of new technology by investing in the necessary foundational infrastructure, including internet and cloud infrastructure. This extends to Fourth Industrial Revolution-appropriate infrastructure investment decisions – for example, considering wireless technologies alongside fiber optics or distributed renewables alongside traditional transmission and distribution power grids – as well as broader investments in electricity access, smart water and energy grids, earth observation and smart and connected urban areas. These technology-enabled infrastructural investments provide crucial foundations for progress on the wide range of Global Goals.

Reforms to product and financial markets can also be considered. Product market reforms can boost diffusion of Fourth Industrial Revolution technologies, increasing competition among corporates by providing incentives. Financial market reforms, such as setting the market conditions, for example price controls, can support Fourth Industrial Revolution technology-based entrepreneurial initiatives and, in turn, enable their deployment towards the Global Goals.

Guiding questions

Have you:

- leveraged public procurement to fund and scale technological trends in pursuit of the Global Goals, including the adoption of responsible technology protocols and sustainability targets?
- developed a plan to finance upgrades to digital and physical infrastructure, in pursuit of strategic

priorities and policy outcomes related to the Global Goals?

- embedded Fourth Industrial Revolution strategy into the broader macroeconomic and fiscal agenda to provide Fourth Industrial Revolution technology-based financial and market incentives for progress on the Global Goals?

CASE STUDY

Government of Botswana

In Botswana, increased connectivity is allowing for remote provision of services addressing the Global Goals.

Without government intervention, it would be a challenge to deploy technologies and services in rural areas. As such, the Government of Botswana has mandated that state-owned BoFiNet facilitate the deployment of these in rural areas. In the advent of the COVID-19 pandemic, remote provision of services like health information and education has become imperative.

In this regard, BoFiNet has embarked on a partnership with the Ministry of Local Government for the installation of Wi-Fi in 50 customary courts across the country by March 2021, with a target to install the service in 399 customary courts by 2025. This is expected to improve, among others, economic activities in the rural areas, realization of the knowledge-based economy goal and broadband penetration, bridging the urban-rural digital divide.



5.5 People and skills

Governments need to understand the ways in which technology will disrupt, and ultimately transform, the labour market. They can then take the necessary measures to support a smooth workforce transition towards deploying technology for the Global Goals, including through labour market policy interventions.

Purpose and actions

The scaling of emerging technologies and innovations will drive significant disruption to the labour market. Governments have an essential role to play in upskilling and reskilling across society to build collective adaptability and resilience to change. They should actively seek to understand the skills needed in the 2020s and beyond in order to shape their approach to upskilling and reskilling accordingly.

Governments could collaborate with the private sector and academia to drive this targeted approach to upskilling and reskilling, built upon the broader Global Goals vision and strategy. One example of this is allocating funds to adult life-time learning, which, through retraining and reskilling, will help protect those whose jobs are vulnerable to technology disruption. Upskilling efforts can include leadership skills, alongside technical skills, both of which are essential in harnessing technology to make gains across the Global Goals.

Governments can also support active labour market policies that adequately take into account the impact of automation and other technological

trends on future skills demand and supply, including bolstering social safety nets where relevant. It is also important to recognize the current formal and informal skills that are present, or lacking, in the emerging Fourth Industrial Revolution labour market and evaluate industry-specific skills demand. This could include developing labour demand forecasting models based on real-time data industry foresight, tallied against previous economic needs and the scale of changes likely to be seen.

Finally, governments are also encouraged to provide accessible resources to support an equitable uptake of Fourth Industrial Revolution technologies harnessed for the Global Goals. Governments could collaborate with other stakeholders, including academics and think tanks, to better understand the biases and discrimination within labour markets, such as gender inequality in artificial intelligence. This will enhance understanding around the impact of technologies on their users, enabling for the development and implementation of more inclusive and effective technology applications.

Across the skills-related actions outlined above, there is a need to monitor the impact and effectiveness of policy interventions, which can often be difficult to measure. Governments can build in such considerations from the outset of intervention design to both ease existing difficulties

with monitoring and enhance effectiveness in the longer term. Not only is this particularly relevant in the context of Global Goals specific to quality education and productive employment, but it is also important to unlock and accelerate progress across the broader spectrum of the Goals.

Guiding questions

Are you:

- taking steps to actively upskill and reskill the civil service and public sector workforce around the Fourth Industrial Revolution and public goods related to the Global Goals agenda?
- implementing plans to undertake labour market reform to foster a Fourth Industrial Revolution-ready national workforce, including reskilling and upskilling?
- establishing social safety nets to manage the skills transition (e.g. the impact of automation on low-skilled labour markets), enabling citizens to contribute towards technology-enabled progress on the Global Goals?
- taking steps to ensure that education, from lower schools to higher education, encourages an understanding of Technology and its role in society?

CASE STUDY

Government of Colombia

Over the course of the COVID-19 pandemic, Colombia has leveraged technology to facilitate the continuation of education and upskilling for the Fourth Industrial Revolution.

The Government of Colombia has leveraged technology to enhance educational access during the COVID-19 pandemic. The government has leveraged digital technologies to stimulate innovation and skills development in students of preschool to secondary education through such interventions as:

- Innovation ecosystems for education
- Curriculum design
- Training processes
- Talent development and management
- National debt strategy
- Engaging with STEM (science, technology, engineering and mathematics) students and dedicated schools of innovation

In light of COVID-19, the government has moved to a virtual education model for the country's 9.5 million students. A number of digital education offers have been designed, including a portal

containing 80,000 lessons for 6 million users. Additionally, "Computers to Educate" seeks to promote access to ICT through the provision of computers to students around the country. Computers are preloaded to allow them to have a comprehensive STEAM education through primary, middle and secondary school.

The presidency has also promoted several initiatives on digital learning. To directly confront the skills challenges of the Fourth Industrial Revolution, MissionTIC seeks to train 100,000 young and adult Colombians in programming, as well as 300,000 digital citizens through the public education institution SENA. These strategies have also been developed to strengthen the technical and social-emotional skills of public sector apprentices (trained through the National Training Service) in areas related to programming, web and software design and development.



5.6

Collective action and collaboration

Collective and collaborative action is essential in driving progress towards the Global Goals. Governments could seek to participate in and establish multistakeholder partnerships and alliances to jointly deliver action and exchange resources.

Purpose and actions

Individual leadership is necessary, but not sufficient for the pace of change nor the scale of impact needed to achieve the Global Goals. Collective and collaborative action across the public, private and civil society sectors are required through large partnerships, networks and coalitions in order to create impact and systemic change at scale. Previously presented leadership areas can be enabled, reinforced and amplified through such engagement. Meaningful conversations that gather the perspectives of a broad set of stakeholders will enable more successful rollouts of initiatives or interventions.

“Coalitions of the willing” led by government leaders can help rally peers and build momentum around bold commitments to direct technology towards the global challenges encompassed by the Global Goals. They can also be vital for building consensus on frameworks and standards to inform norms, or change awareness and markets with scale and reach.

When engaging with stakeholders on the Global Goals agenda, it is important to be clear about the purpose of that engagement, whether it is establishing accountability, garnering feedback from prospective users, or mobilizing a group to deliver a collective goal. Governments can ensure

citizens are included in these conversations when appropriate, to better understand their needs and stimulate buy-in on the impacts and outcomes of technology interventions.

In the context of research and innovation, governments could collaborate on solutions that are likely to offer the best global scale – engagement and partnerships between nations can reduce R&D costs at an international level and support wider uptake, both of which are crucial to making gains towards achieving the Global Goals. This process can support countries in bypassing traditional stages of growth, allowing for the quicker development and deployment of technologies for good. It is here that the concept of co-financing becomes relevant.

While regulations on Fourth Industrial Revolution and associated technologies are critical to managing the risks to society and the environment, they are largely developed on a jurisdiction-by-jurisdiction basis. Given the distributed and transboundary nature of many Fourth Industrial Revolution technologies, governments can collaborate to build a globally coordinated and coherent approach to developing such regulations and monitoring compliance with them.

Guiding questions

Do you:

- know who your core stakeholders are, both internally and externally, and have you established a clear purpose for engaging them with regards to the Global Goals agenda?
- communicate your technology for the Global Goals vision and strategy to core stakeholders?

- take part in multistakeholder partnerships and collaborations in relation to leveraging technology for the Global Goals?
- actively engage with multistakeholder partnerships and collaborations to develop and deliver collective action and resource exchanges in relation to leveraging technology for the Global Goals?

CASE STUDY

Government of Botswana

Botswana has collaborated regionally to use resources and enhance digital connectivity for citizens.

The Botswana government, through state-owned BoFiNet, has been collaborating with other African countries on the East Africa Cable System (EASSy) that connects African countries on the East African coastline and the West Africa Cable System (WACS). The goal is to pool resources together and use technology infrastructure to address common challenges. This consortium provides

traffic protection and ensures uninterrupted flow of services into and out of Botswana. In addition, Botswana has entered into partnerships with service providers in the region, Namibia and South Africa, with the objective of reducing transit backhaul costs, which would in turn reduce bandwidth costs for the citizens.

Sierra Leone developed a multistakeholder partnership to collaborate and develop responses to the pandemic.

The Government of Sierra Leone developed their National COVID-19 Emergency Response Center (NACOVERC), which includes an ICT Response Pillar, comprising public, private and international partners. It harnesses information technology to develop COVID-19 interventions that provide data to inform and guide policy-makers, citizens and public health experts on infection prevention and continued service delivery. It is guided by three goals: integrating all datasets using one secure platform for real-time analysis, improving connectivity and infrastructural support preparedness and intervention, and mobilizing national ICT expertise to support Sierra Leone's response.

Through the ICT Response Pillar, the government has rolled out the following tech-enabled responses:

- **Electronic Pass Management System:**
The electronic issuance of passes makes it easier and faster to process requests and authorize the movement of essential goods and service providers during the lockdown and curfew, in a transparent and auditable process.

- **USSD and SMS Solutions:**
Expansion of the existing Public Information System provides citizens with accurate and timely public health information and serves as a self-check for citizens against symptoms.
- **Quarantine Tracking Application:**
[The Quarantine App](#) makes it easier for officials to track services at quarantine facilities, by logging and tracking food deliveries, admission and leave dates of quarantined persons, psychosocial support and other services in real time.
- **Analytics on mobility from call data records:**
The partnership allows for the aggregation of call data records which, when layered with toll road and case level data, inform policy decisions on pandemic responses. Ongoing data analytics is continuing to inform curfews and restrictions on a district-by-district basis.

Sierra Leone attributes its success in managing the pandemic to the strategic partnerships built and the continuous stakeholder engagement at NACOVERC, with direct involvement of the President's Office via a presidential task force.

Conclusion:

Delivering on the promise of technology

Even before the COVID-19 pandemic gripped the world in early 2020, progress towards achieving the UN Sustainable Development Goals was not on track. Achieving the Global Goals will require immense political will and ambitious action by all stakeholders.¹⁵ Action from the public sector in driving tech-enabled sustainable outcomes is a key piece of this puzzle.

The pandemic has offered further lessons on how the power, pervasiveness and impact of new technologies can be harnessed to not only manage the current crisis, but also to recover and rebuild, potentially steering progress towards the Global Goals in a more concerted, cohesive and efficient way.

This report offers a guiding framework on how governments and other public sector stakeholders can approach the deployment of technology for Global Goals. Key takeaways include:

- **Within the public sector, leaders need to lay the groundwork for their “tech for good” journey by understanding the landscape and recognizing the need for action.** A concerted effort will mean that leaders are equipped and ready to set a national vision and strategy for driving progress on the Global Goals. It is important that this vision and strategy remains agile, underpinned by both a business case and social case for how Fourth Industrial Revolution technologies and sustainability can accelerate economic growth and national development.
- **The public sector has a key role to play in incentivizing and fostering deployment of technology for good, supporting the lifecycle of technology development.** Governments have a number of potential roles to play, including bridging incentive-related barriers between innovative research and commercial scaling, acting as a facilitator for entrepreneurs entering into unfamiliar and unique regulatory environments, and

developing new financing approaches and instruments that support agile innovation.

- **For the broader policy and regulatory environment, there is a need to strike a balance between traditional oversight mechanisms and those which allow space for experimentation.** These mechanisms will need to take a whole-of-government approach and may require an approach that is both top-down and cross-cutting; looking for flexible ways to enable the right pace and scale of impact while managing risks.
- **Targeted skills and talent development, including reskilling, upskilling and engagement processes will be required.** The right leadership and expertise can accelerate progress and foster successful interventions. This talent and skills piece is vital to support the strategy setting, research and development financing, and innovation governance.

According to UN Secretary-General António Guterres, achieving the Global Goals requires renewed ambition, mobilization, leadership and collective action to not only overcome the COVID-19 pandemic, but for the global community to recover better, together.¹⁶ It is widely recognized that there is not a one-size-fits-all approach to deploying technology for the Global Goals. There are, however, some fundamentals offered within this report, which leaders within the public sector can consider within the context of their unique “tech for good” journey.

This guiding framework, when used in conjunction with the Forum’s complementary framework for businesses, provides a starting point for critical conversations within and between the public and private sectors – the conversations needed to steer the capability, resources and talent required to not only reach the Global Goals, but also realize the promise of technology in enabling a more sustainable world.

Annex:

Action checklist for public sector leaders

This checklist contains key actions leaders within the public sector should consider when leveraging technology for the Sustainable Development Goals. These questions are structured under six key leadership areas, as outlined in the 2021 report *Harnessing Technology for the Global Goals*:

A framework for government action. The checklist can be used as a starting point for discussions on this topic. Steps that are completed or underway can be ticked off, while those left unchecked can be considered as potential areas for future conversations and efforts.

Vision and strategy	
<input type="checkbox"/>	Taken steps to understand the technology for the Global Goals landscape in terms of priority goals, technologies and stakeholders, both existing and emerging
<input type="checkbox"/>	Set a national vision for progress on technology for the Global Goals
<input type="checkbox"/>	Developed a resilient and agile national strategy for delivering on this vision
<input type="checkbox"/>	Defined the business and social cases for how the Fourth Industrial Revolution and sustainability can, together, accelerate economic growth and national development priorities
<input type="checkbox"/>	Identified and activated key policy levers for embedding Fourth Industrial Revolution technologies across sectoral and environmental plans
<input type="checkbox"/>	Planned and implemented an inclusive system for collecting and acting on lessons learned, including through monitoring and measuring progress
Governance and accountability	
<input type="checkbox"/>	Developed an agile, resilient and whole-of-government approach to policy development to support technology to deliver on the Global Goals agenda at pace and scale
<input type="checkbox"/>	Appointed oversight and accountability to leaders, including a cross-departmental steering committee
<input type="checkbox"/>	Appointed implementation responsibilities to management-level leaders
Innovation, research and development	
<input type="checkbox"/>	Developed a mechanism for funding basic and applied R&D at the intersection of technology and societal and environmental impact
<input type="checkbox"/>	Supported the development of innovation ecosystems to advance technology solutions for the Global Goals
<input type="checkbox"/>	Supported the development of standards, protocols and initiatives for technology and data to support public goods
<input type="checkbox"/>	Supported the development of capabilities for creating, advancing, and optimizing better data environments, and delivering technologies and infrastructure to advance technology for the Global Goals
Finance for commercialization	
<input type="checkbox"/>	Leveraged public procurement to back and scale technological trends, including the adoption of responsible technology protocols and sustainability targets
<input type="checkbox"/>	Developed a plan to finance upgrades to digital and physical infrastructure, in pursuit of strategic priorities and policy outcomes
<input type="checkbox"/>	Embedded Fourth Industrial Revolution strategy into the broader macroeconomic and fiscal agenda to provide Fourth Industrial Revolution technology-based financial and market incentives
People and skills	
<input type="checkbox"/>	Taken steps to actively upskill and reskill the civil service and public sector workforce around the Fourth Industrial Revolution and public goods
<input type="checkbox"/>	Implemented plans to undertake labour market reform to foster a Fourth Industrial Revolution-ready national workforce, including reskilling and upskilling
<input type="checkbox"/>	Established social safety nets to manage the transition, e.g. the impact of automation on low-skilled labour markets
<input type="checkbox"/>	Taking steps to ensure that education, from primary and secondary schools to higher education, encourages an understanding of technology and its role in society
Collective action and collaboration	
<input type="checkbox"/>	Carefully considered core stakeholders, both internally and externally, and have established a clear purpose for engaging them
<input type="checkbox"/>	Communicated your technology for the Global Goals vision and strategy to core stakeholders
<input type="checkbox"/>	Are a member of multistakeholder partnerships and collaborations
<input type="checkbox"/>	Actively engaged with multistakeholder partnerships and collaborations to develop and deliver collective action and resource exchanges

Contributors

We would like to acknowledge the valuable contributions of the following people in the development of this document:

Lead authors

Celine Herweijer

Global Leader, Innovation and Sustainability, and Partner, PwC United Kingdom

Benjamin Combes

Assistant Director, Innovation and Sustainability, PwC United Kingdom

Marisa Donnelly

Manager, Innovation and Sustainability, PwC United Kingdom

Frankie Howland

Senior Associate, Innovation and Sustainability, PwC United Kingdom

Antonia Gawel

Head, Innovation and Circular Economy, Centre for Global Public Goods, and Member of the Executive Committee, World Economic Forum

Eniola Mafe

Lead, 2030Vision, Technology and Sustainable Development, World Economic Forum

Other contributors

Jonathan Bahmani

Platform Curator, Information and Communications Technology Industry, World Economic Forum

Mary Davies

Senior Associate, Innovation and Sustainability, PwC United Kingdom

Pablo Gómez Ayerbe

Advisor to the Presidential Council for Economic Affairs and Digital Transformation, Government of Colombia

Sarah Hunter

Director, Global Public Policy, X, USA

Sheikh Tanjeb Islam

Head, Government Affairs, Centre for the Fourth Industrial Revolution, World Economic Forum

Kyle Laing

Associate, Innovation and Sustainability, PwC United Kingdom

Yolanda Jinxin Ma

Digital Transformation Specialist, United Nations Development Programme (UNDP), New York

Michala Mackay

Director and Chief Operating Officer, Directorate of Science, Technology and Innovation, Government of Sierra Leone

Victor Manuel Muñoz Rodríguez

High Presidential Adviser for Technology Transformation and Economic Affairs, Government of Colombia

Adetola 'Tola Onayemi

Assistant Chief Negotiator, Nigerian Office for Trade Negotiations (NOTN), Government of Nigeria

Robert Opp

Chief Digital Officer, United Nations Development Programme (UNDP), New York

Stephen Pattison

Vice-President, Public Affairs, Arm Holdings, United Kingdom

Emmah Peloetletse

Deputy Permanent Secretary to the President, Government of Botswana

Said Rutabayiru

Manager, Technology Innovation Division, Rwanda Information Society Authority, Government of Rwanda

Patrick Seitiso

Chief Economist, Population and Development Coordination, Ministry of Finance and Economic Development, Government of Botswana

Louise Shaxson

Director, Digital Societies Programme, Overseas Development Institute (ODI), United Kingdom

Philip Thigo

Senior Adviser, Data, Innovation and Open Government, Office of the Deputy President of Kenya

Dato' V Valluvan Veloo

Director of Economic Planning, Manufacturing Industry Science and Technology, Government of Malaysia

Tim van den Bergh

Specialist, 2030Vision, World Economic Forum

Hannah Wang

Special Assistant to the Chief Digital Officer, United Nations Development Programme (UNDP), New York

Jessica Wrigley

Senior Associate, Innovation and Sustainability, PwC United Kingdom

Zunika Binti Mohamed

Deputy Director-General, Economic Planning Unit, Government of Malaysia

Endnotes

1. World Economic Forum and PwC, *Harnessing Technology for the Global Goals: A framework for corporate action*, 2020, http://www3.weforum.org/docs/WEF_Framework_for_Future_Leadership_on_Tech_for_SDGs_Report_2020.pdf.
2. United Nations, *The Sustainable Development Goals Report*, 2020, <https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf>.
3. Ibid.
4. Ibid.
5. Ibid.
6. World Economic Forum and PwC, *Unlocking Technology for the Global Goals*, 2020, http://www3.weforum.org/docs/Unlocking_Technology_for_the_Global_Goals.pdf.
7. Ibid. See page 12 for a summary of high-impact Global Goals.
8. Ibid.
9. Ibid.
10. World Economic Forum & PwC, *Harnessing Technology for the Global Goals: A framework for corporate action*, 2020, http://www3.weforum.org/docs/WEF_Framework_for_Future_Leadership_on_Tech_for_SDGs_Report_2020.pdf
11. A full list of contributors can be found on page 22 of this report.
12. Basic R&D refers to research that aims to add theoretical knowledge, while applied R&D concerns research that is geared towards solving or addressing specific practical problems.
13. Knowledge Transfer Network, <https://ktn-uk.org>.
14. Catapult Network, <https://catapult.org.uk>.
15. United Nations, *The Sustainable Development Goals Report*, 2020, <https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf>.
16. Ibid.



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org