Microsoft

Digital Pathways

Presentation to the Africa Group
of Ambassadors in Geneva

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Foreword

We believe there is a direct correlation between Africa's sustainable prosperity and its ongoing digital transformation. In the three decades since Microsoft entered the African continent, the company has invested in the technology ecosystem, including in cloud infrastructure, development centers, skilling, and capacity building. These factors, along with government policies to facilitate innovation, catalyze a thriving digital economy by leveraging trustworthy and inclusive technology.

In this paper, we set out to examine 15 "digital pathways" which offer promising opportunities for empowering people, businesses, governments, and societies across Africa to achieve their development goals. In each pathway, we provide examples of how Microsoft supports or spearheads partnerships to deliver technology, investments, innovation, data services, and capacity building to help stakeholders in Africa achieve more.

For example, the Microsoft Airband Initiative contributes to eliminating the broadband gap in remote areas across Ghana, Kenya, Nigeria, South Africa, and Uganda, among others. The initiative sees Microsoft partner with internet and energy access providers, telecom equipment makers, nonprofits, and local entrepreneurs to advance digital equity. Some of our most eminent partners in this vision include Bluetown, M-KOPA, Mawingu, New Sun Road, and 9mobile, who share our belief in access to affordable internet, affordable devices, and digital skills as a platform for empowerment and digital transformation.

On another front, the Africa Development Center (ADC), representing the first-ever Microsoft engineering offices in Africa, launched with two initial sites in Nairobi, Kenya, and Lagos, Nigeria. Now in its second year, the ADC brings together Africa's world-class talent to create innovative solutions fueled by artificial intelligence and machine learning to impact their communities in areas that include healthcare, agriculture, finance, and human-centric automation.

Microsoft is working with our myriad partners across Africa on various other promising digital pathways, ranging from open data governance and smart government solutions to cybersecurity and digital skilling. The first wave of digital dividends on the continent has resulted in meaningful changes to business and everyday life. Undeniably, the economic and societal effects of proliferating technology, rapid interconnection, and digital skills are far from reaching all of Africa's 1+ billion people. We believe digital technologies and transformations will play an instrumental role in bridging this digital divide and reinventing the continent to achieve its Agenda 2063: The Africa We Want.

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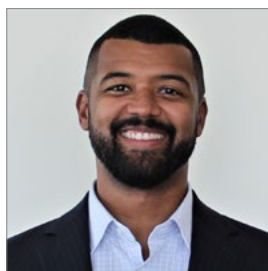
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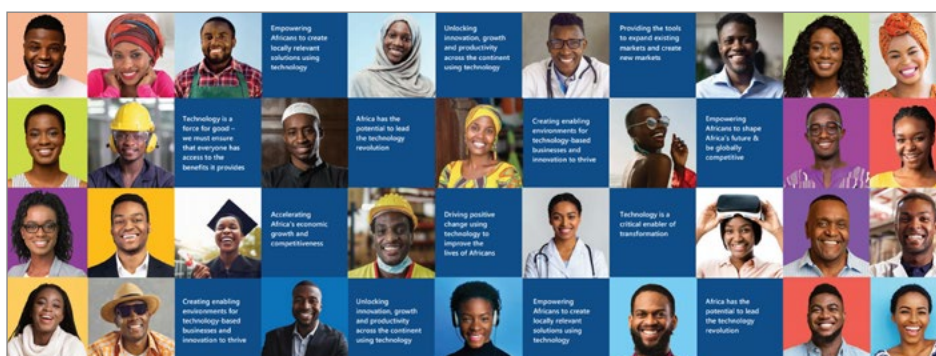
Introduction

Much has changed in the three decades that Microsoft has been present on the African continent. New nations have been born, societies have gone through dynamic changes, and the continent has navigated an array of economic, health, and governance challenges. At the same time, Microsoft's mission remains to empower every person and every organization on the planet to achieve more.

This vision guides our work across the African continent. It is against this backdrop that we are honored to present to the Africa Group of Ambassadors in Geneva an overview of how Microsoft aligns its business objectives with the development goals of African governments for the benefit of their citizens.
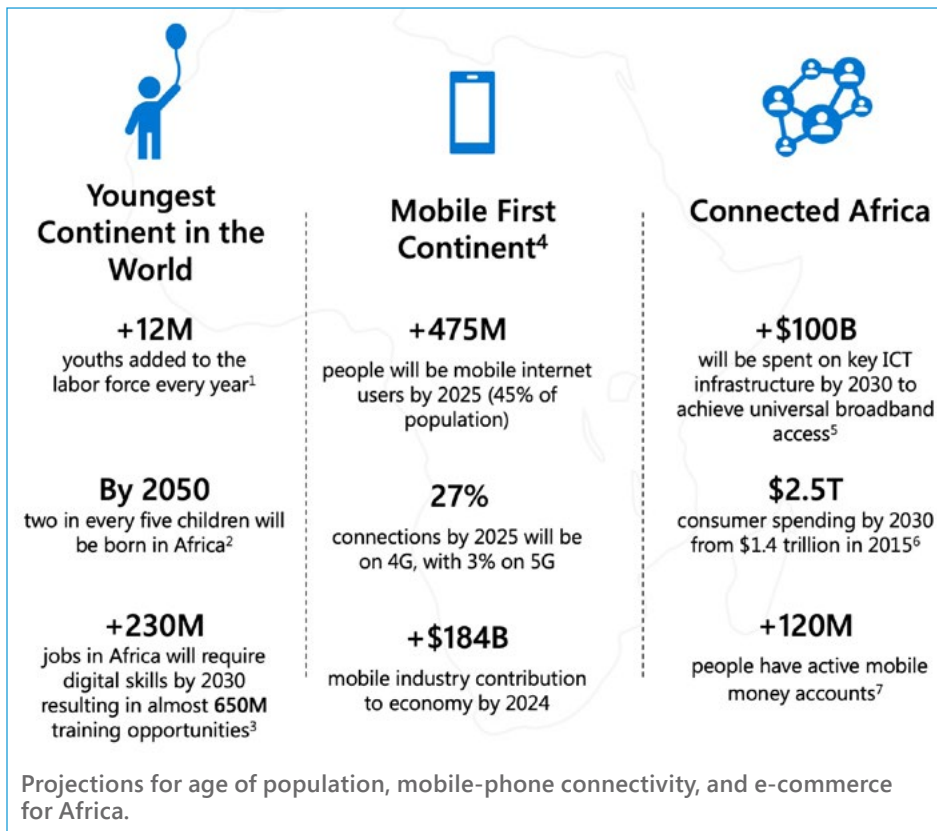
New services powered by cloud computing are bringing the benefits of digital trade, e-learning, online banking, and precision farming to millions of Africans. Microsoft is fortunate to be playing a part in Africa's digital transformation. In March 2019, Microsoft launched its first enterprise-grade datacenters in Africa (in Cape Town and Johannesburg, South Africa), becoming the first global provider to deliver its cloud services, Microsoft Azure, from datacenters located on the continent. By providing African firms with advanced technologies such as artificial intelligence (AI) and big data analytics, these datacenters will create new opportunities, help accelerate global investment, and improve access to online services across Africa.

In 2015, when the United Nations (UN) General Assembly adopted the 2030 Agenda for Sustainable Development, it was recognized that partnerships will play a crucial role in mobilizing and sharing knowledge, expertise, technologies, and financial resources. Microsoft understands the importance of partnerships and utilizes them to contribute to the UN Sustainable Development Goals (SDGs)[1] through innovation, investment, and the power of digital technology. This white paper will provide a sense of the many ways in which we have sought to partner with African governments, organizations, and businesses to ensure that progress is made toward achieving the SDGs.

Source: Microsoft, 4Afrika Initiative. https://www.microsoft.com/africa/4afrika/about-us.aspx

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[1] Microsoft white paper: Microsoft and the United Nations Sustainable Development Goals. https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4JVmT

Youngest Continent in the World

+12M
youths added to the labor force every year[1]

By 2050
two in every five children will be born in Africa[2]

+230M
jobs in Africa will require digital skills by 2030 resulting in almost 650M training opportunities[3]

Mobile First Continent[4]

+475M
people will be mobile internet users by 2025 (45% of population)

27%
connections by 2025 will be on 4G, with 3% on 5G

+$184B
mobile industry contribution to economy by 2024

Connected Africa

+$100B
will be spent on key ICT infrastructure by 2030 to achieve universal broadband access[5]

$2.5T
consumer spending by 2030 from $1.4 trillion in 2015[6]

+120M
people have active mobile money accounts[7]

Projections for age of population, mobile-phone connectivity, and e-commerce for Africa.

Many of the programs that are discussed in this document are based on what we define as human-centered connectivity.[2] This reflects Microsoft's approach to addressing the digital divide through a combination of access, by ensuring the availability of affordable connectivity and devices; readiness, by building digital literacy and skills; and applications, by enabling individuals to receive the benefits of basic human services such as education, healthcare, and economic development. This white paper will reflect these themes.

In the course of this paper, we hope to convey a clear sense of how Microsoft approaches its work and many partnerships across Africa. We also hope to learn new ideas for deepening these partnerships, learn where further innovations can be made, and learn how to better leverage our investments in Africa to achieve inclusive developmental impact.

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[2] Microsoft white paper: Closing the Digital Divide, A Human-Centered Approach to Connectivity.
https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RWLCVo

Section 1:
E-commerce infrastructure for member states

There are more than 400 million internet users in Africa, the second-largest internet-user population on the planet, after China.[3] This figure is projected to grow to 611 million internet users—35 percent of the population—by 2023.[4] It is estimated that there are more than 280 million online shoppers in Africa,[5] and that number inevitably will increase as mobile connectivity increases.

This trend toward e-commerce has been accelerated by the coronavirus pandemic. Over 30 percent of consumers surveyed in Kenya and Nigeria said that they are shopping online more frequently amid the pandemic.[6] In South Africa, 64 percent of consumers made their first online grocery purchase, and 53 percent bought goods from an online pharmacy for the first time, in 2020.[7] Yet even so, e-commerce sales still represent just 1 percent of all sales in Africa, compared to almost a quarter in China.[8]

Opportunity

Much more needs to be done in this space to encourage e-commerce to take off on the continent. This includes ensuring that robust regulations are in place to protect consumers shopping online. Infrastructure developments are also needed, including digital transformation through cloud adoption, expanding internet connectivity, and developing efficient logistics networks. Access to secure and easy-to-use technological solutions is also critical to ensure that African enterprises have the tools to grow and build their e-commerce stores.

Microsoft's contributions

- In July 2021, Network International, the leading enabler of digital commerce in the Middle East and Africa (MEA) region, offered its N-Genius Online platform through trusted, secure, Microsoft Azure Cloud Services. This will provide e-commerce companies across the region with access to advanced digital-payments services.[9] Network International serves more than 200 financial institutions and 80,000 merchants in more than 50 countries, providing secure, hassle-free digital payments in the region.

3 McKinsey & Company. "How e-commerce supports African business growth," January 17, 2019. https://www.mckinsey.com/featured-insights/middle-east-and-africa/how-ecommerce-supports-african-business-growth

4 Cisco. *Cisco Annual Internet Report (2018–2023) White Paper*, March 9, 2020. https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html

5 Statista. "E-commerce in Africa - statistics & facts," January 5, 2021. https://www.statista.com/topics/7288/e-commerce-in-africa

6 Standard Chartered. "Making it easier for businesses in Africa to join the B2B e-commerce bandwagon," January, 15 2021. https://www.sc.com/en/feature/making-it-easier-for-businesses-in-africa-to-join-the-b2b-e-commerce-bandwagon

7 Ibid.

8 Ibid.

9 Microsoft News Center. "Regional digital payments leader Network International joins forces with Microsoft to strengthen e-commerce proposition," July 1, 2021. Available at: https://news.microsoft.com/en-xm/2021/07/01/regional-digital-payments-leader-network-international-joins-forces-with-microsoft-to-strengthen-e-commerce-proposition

- Through its 4Afrika Initiative launched in 2013, Microsoft invests in high-impact strategic partnerships across Africa. One of these investments is in the Nigerian startup SpacePointe, which helps small and medium-sized enterprises (SMEs) build affordable online marketplaces and e-commerce strategies.[10]

"Access to secure and easy-to-use technological solutions is ... critical to ensure that African enterprises have the tools to grow and build their e-commerce stores."

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[10] Microsoft 4Afrika. "Wakanda is closer than you think: Africa's real life innovative tech stories."
https://www.microsoft.com/africa/4afrika/wakanda.aspx

Section 2:
Payment systems infrastructure

Since 2010, there has been a sharp acceleration in the payment infrastructure space in Africa. Mobile-based digital transactions have soared, with the monthly value of mobile money payments increasing 25 times between 2010 and 2018.[11] Africa's payment services are experiencing this rapid growth due to the concerted efforts of mobile money operators, banks, and fintech companies, especially their efforts to implement real-time payment systems.

Opportunity

Continued collaboration between pan-African institutions, governments, banks, mobile money operators, fintech companies, and technology providers will be crucial for creating a robust payment systems ecosystem in Africa. A strong and harmonized regulatory regime, especially regarding consumer protection, privacy, and cybersecurity, will be important in building consumer confidence and trust.

Microsoft's contributions

- Microsoft 4Afrika partnered with Flutterwave, a Nigeria-based payment technology company founded in 2016, to enable Africans to build global businesses that can make and accept any payment from anywhere in the world. This is done by aggregating payment services from multiple gateways and placing them on one platform.[12]

- In Kenya, Microsoft 4Afrika partnered with Popote Payments, a startup that enables businesses to make and manage their payments digitally while taking advantage of the system's other benefits, such as approval workflow and automated accounting.[13]

- In June 2021, Microsoft and Standard Bank of South Africa announced a new partnership that aims to accelerate the bank's digital transformation and further drive growth on the continent. This partnership is the latest step in a 30-year relationship, and it will enable Standard Bank to migrate workloads, applications, and platforms to Microsoft Azure. Microsoft and Standard Bank will also form an African Digital Foundry through which both will cocreate unique technology solutions to meet the financial needs of Africa's consumers. The companies hope to reach 100 million customers in Africa in the next five years.[14]

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[11] Mavadiya, Madhvi. "There is more to digital payments in Africa than M-Pesa," *Finextra*, June 25, 2020.
https://www.finextra.com/the-long-read/44/there-is-more-to-digital-payments-in-africa-than-m-pesa

[12] Microsoft 4Afrika. "Enhancing start-ups' access to technology and finance."
https://www.microsoft.com/africa/4afrika/enhacing-start-ups.aspx

[13] Ibid.

[14] Microsoft News Center. "Standard Bank Partners with Microsoft to Boost Agility, Resilience and Innovation and Drive Africa's Growth," June 15, 2021. https://news.microsoft.com/en-xm/2021/06/15/standard-bank-partners-with-microsoft-to-boost-agility-resilience-and-innovation-and-drive-africas-growth

- Standard Bank was able to use Microsoft Azure to help it roll out a pioneering digital payment solution to 2 million customers within two weeks. Moving to Azure allowed Standard Bank to reduce the burden on its IT teams and has resulted in fewer outages, which will allow the bank to provide more resilient and flexible services to its customers.[15]

- Microsoft Azure Blockchain has also played a key role in helping Interswitch, a Nigerian digital payments company, expand its services. Interswitch connects banks and customers in 20 African countries, including The Gambia, Kenya, and Uganda. It was able to use Azure Blockchain Workbench to set up its blockchain-based Supply Chain Financing service. This service helps to connect those banks with nontraditional businesses and customers, increasing the availability of banking services to them.[16]

"Continued collaboration between pan-African institutions, governments, banks, mobile money operators, fintech companies, and technology providers will be crucial for creating a robust payment systems ecosystem in Africa."

[15] Microsoft Customer Stories. "Leading South African bank advances financial inclusion with Azure-based payments platform," September 22, 2020.
https://customers.microsoft.com/en-GB/story/845094-standard-bank-of-south-africa-banking-capital-markets-azure-en-south-africa

[16] Microsoft Customer Stories. "Digital payments company answers questions about using Azure Blockchain Workbench to help build a more prosperous Africa," September 21, 2018.
https://customers.microsoft.com/en-us/story/interswitch-banking-capital-markets-azure-blockchain-workbench

Section 3:
Digital trade infrastructure, platforms, and services

When the coronavirus pandemic forced African economies into lockdown, many retailers who relied on walk-in customers had to rethink their business models and find ways of selling their products online, either through third-party platforms or their own offerings. Africa's rail and road infrastructure drives up the cost of moving goods to more than three times higher than that in developed countries.[17] In fact, transport costs can represent as much as 75 percent of retail prices.[18] Industries like logistics, healthcare, financial services, and mobility remain highly fragmented, with hundreds or thousands of semiformal suppliers.[19] Most business transactions remain informal, making data on demand, supply, prices, and cash flows hard to keep track of.[20]

Opportunity

Digital platforms can reduce this fragmentation by aggregating suppliers and improving access to buyers, which in turn can encourage competition, transparency, and better-quality services. By collecting valuable data on cash flows, inventory, and prices, companies can optimize supply chains, enabling small businesses to scale efficiently and deliver better value to their customers. This is the process of "digital formalization," which will be a crucial growth tool for Africa's economies in the near and long term.

Microsoft's contributions

- Microsoft Azure Cloud Services are used by businesses across Africa to build their e-commerce platforms and services. The rapid growth of cloud-based solutions in Africa demonstrates the equalizing effects of the cloud, enabling even small firms in remote areas of Africa to access the same powerful services available to leading firms in developed economies, and to bring innovative new offerings to all segments of African society.

- In 2021, leading cosmetics and fragrance group Signature Cosmetics understood the impact the coronavirus pandemic and subsequent lockdown would have on its network of more than 170 stores across Botswana, Namibia, and South Africa. With Microsoft technology, the group was able to fast-track its e-commerce strategy, ensuring business continuity by offering its services online.[21]

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[17] Knight Frank. *Logistics Africa*, 2016.
      https://www.tralac.org/images/docs/10347/logistics-africa-2016-knight-frank.pdf

[18] Ibid.

[19] Ribica, Selma. "Digital Platforms Provide The Infrastructure Africa's Businesses Need To Survive And Thrive," *Forbes*, August 10, 2020.
      https://www.forbes.com/sites/forbesfinancecouncil/2020/08/10/digital-platforms-provide-the-infrastructure-africas-businesses-need-to-survive-and-thrive/?sh=6c5f1b33407a

[20] Ibid.

[21] Microsoft Customer Stories. "Signature Cosmetics - First South African Dynamics 365 e-Commerce Deployment," March 16, 2021.
      https://customers.microsoft.com/en-us/story/1338080791227449991-signature-cosmetics-retailers-dynamics-en-south-africa

- In 2019, Microsoft 4Afrika launched a partnership with Sparkle, a Nigerian startup offering retailers, SMEs, and individuals access to banking, inventory management, invoicing, and tax calculation and remittance.[22] The collaboration with Microsoft 4Afrika, and the MySkills4Afrika volunteering program, helped the company fast-track the development of their platform by leveraging Microsoft technology and expertise.

"The process of 'digital formalization' … will be a crucial growth tool for Africa's economies in the near and long term."

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[22] Microsoft 4Afrika. "Enhancing start-ups' access to technology and finance."
https://www.microsoft.com/africa/4afrika/enhacing-start-ups.aspx

Section 4:
Data and data infrastructure and process innovations and services

Data-driven solutions and the use of innovative technologies such as AI will play an important role in Africa's efforts to achieve the SDGs. Increasingly, private-sector and public-sector partnerships are coming together to use data and AI to solve some of the challenges that Africa faces related to agriculture, health, language barriers, conservation, and humanitarian crises.

Opportunity

Use of innovative technologies, including AI, Internet of Things (IoT) devices, and drones, can be applied to tackle problems that are challenging to solve with manpower and traditional methods alone. In order to fully unlock this potential, it will be important to ensure that people in Africa have access both to these technological tools and to the training to gain the skills to use them.

The freedom to transfer data across borders is crucial to enable this digital transformation. Most innovative cloud services today are powered by the analysis of vast amounts of data, often from millions of devices located in many different countries. Firms across all sectors of the economy transfer data across borders every day, not just to support cutting-edge innovation but also for routine business functions. Firms in Africa likewise need the freedom to transfer and analyze data across borders. It is therefore essential to permit and not restrict the cross-border transfer of digital data.

Solar-powered irrigation in Kenya.

Source: Microsoft 4Afrika. https://www.microsoft.com/africa/4afrika/SunCulture.aspx

Microsoft's contributions

- In 2020, Microsoft began working with the Nigeria Incentive-based Risk Sharing System for Agricultural Lending (NIRSAL) to help Nigerian farmers become more productive, reduce costs, practice sustainable agriculture, and achieve better agricultural outcomes[23] through Microsoft Azure FarmBeats.[24]

- In Kenya, Microsoft partners with SunCulture, which develops irrigation and farming technology solutions to help smallholder farmers in Africa maximize yields and increase earnings. Ninety-six percent of Africa's smallholder farmers rely on rain instead of irrigation for farming. However, Africa's rainfall has declined more than 100 mm annually since the 1970s, requiring farmers to be extremely precise with when and how they farm. SunCulture combines intelligent hardware, IoT, big data, and neural networks to help farmers practice precision agriculture.[25]

"Increasingly, private-sector and public-sector partnerships are coming together to use data and AI to solve some of the challenges that Africa faces related to agriculture, health, language barriers, conservation, and humanitarian crises."

- Microsoft AI for Earth[26] aims to put AI technology into the hands of the world's leading ecologists and conservation technologists, and organizations around the world that are working to protect our planet.[27] For example, Ketty Adoch, a geographical information systems specialist with a Kampala-based consulting firm, reinforces conservation efforts in Uganda by applying machine learning tools to analyze aerial imagery of the landscape of Murchison Falls National Park and Lake Albert.[28]

- The World Mosquito Program uses Microsoft AI tools available through the Microsoft AI for Earth initiative to model population areas and determine the best release sites for disease-fighting mosquitos to stop the spread of deadly dengue fever.[29]

- Based on lessons learned from the Microsoft AI for Earth initiative, Microsoft built the Planetary Computer,[30] a platform to provide access to trillions of data points collected by people and by machines in space, in the sky, in and on the ground, and in the water.

[23] Microsoft News Center. "Data-driven agriculture can solve the challenge of food security in Africa," November 2, 2020. https://news.microsoft.com/en-xm/2020/11/02/data-driven-agriculture-can-solve-the-challenge-of-food-security-in-africa

[24] Microsoft Research. "FarmBeats: AI, Edge & IoT for Agriculture." https://www.microsoft.com/en-us/research/project/farmbeats-iot-agriculture

[25] Microsoft AI. "SunCulture." https://www.microsoft.com/en-us/ai/ai-for-earth-SunCulture

[26] Microsoft AI. "AI for Earth." https://www.microsoft.com/en-us/ai/ai-for-earth

[27] Official Microsoft Blog. "A healthy society requires a healthy planet," April, 15 2020. https://blogs.microsoft.com/blog/2020/04/15/a-healthy-society-requires-a-healthy-planet

[28] Microsoft. "AI for Earth Grantee Profile: Ketty Adoch, Detecting landcover changes in Uganda." https://ai4edatasetspublicassets.blob.core.windows.net/grantee-profiles/Ketty%20Adoch_Africa_Ag_AI4E%20Grantee%20Profile.pdf

[29] Microsoft AI. "World Mosquito Program." https://www.microsoft.com/en-us/ai/ai-for-earth-world-mosquito-program

[30] Microsoft Planetary Computer. "A Planetary Computer for a Sustainable Future." https://planetarycomputer.microsoft.com

Data is shared by partners from around the world, including our partners in Africa.[31] This platform provides scientists, conservation organizations, and businesses access to data that allow insights needed to plan for a sustainable future.

- Microsoft AI for Cultural Heritage[32] leverages AI to empower people and organizations dedicated to the preservation and enrichment of cultural heritage. Our projects include a collaboration with the Nigerian government to help protect Nigeria's rich cultural heritage by deploying AI tools to preserve and revive the country's three major indigenous languages: Hausa, Igbo, and Yoruba.[33]

- Microsoft AI for Humanitarian Action aims to harness the power of AI to focus on four priorities—helping the world recover from disasters, addressing the needs of women and children, protecting refugees and displaced people, and promoting respect for human rights. The program works with selected non-governmental organizations (NGOs), universities, and humanitarian organizations through financial grants, technology investments, and partnerships that combine our AI and data science expertise with their domain knowledge. The program has invested in 57 projects in more than 19 countries, helping organizations harness the power of AI to better enable humanitarian response.[34]

- Through our grant program, AI for Accessibility,[35] Microsoft is working to harness the power of AI and innovation to amplify human capability for people with disabilities—all over the world. Projects include Seeing AI,[36] a free app that narrates the world around users, designed for the blind and low-vision community, and Microsoft Translator,[37] which helps improve the accuracy of real-time captions for people with hearing loss or deafness. In Kenya, inABLE[38] received a Microsoft AI for Accessibility grant to revolutionize how blind students take exams.

- Microsoft is partnering with the Alliance for a Green Revolution in Africa (AGRA) to cocreate technology solutions in agriculture. The collaboration supports AGRA's digital transformation as it works to improve food security for 30 million farming households across 11 countries in Africa.[39]

31 Microsoft AI. "AI for Earth partners."
    https://www.microsoft.com/en-us/ai/ai-for-earth-partners?activetab=pivot_1:primaryr3

32 Microsoft AI. "AI for Cultural Heritage." https://www.microsoft.com/en-us/ai/ai-for-cultural-heritage

33 Microsoft News Center. "Microsoft collaborates with the Nigerian government to accelerate digital transformation in the country," May 3, 2021.
    https://news.microsoft.com/en-xm/2021/05/03/microsoft-collaborates-with-the-nigerian-government-to-accelerate-digital-transformation-in-the-country

34 Microsoft AI. "AI for Humanitarian Action." https://www.microsoft.com/en-us/ai/ai-for-humanitarian-action

35 Microsoft AI. "AI for Accessibility." https://www.microsoft.com/en-us/ai/ai-for-accessibility

36 Microsoft AI. "Seeing AI in new languages." https://www.microsoft.com/en-us/ai/seeing-ai

37 Microsoft AI Blog. "AI technology helps students who are deaf learn," April 5, 2018.
    https://blogs.microsoft.com/ai/ai-powered-captioning

38 Microsoft AI. "Reimagining the Future of Accessible Education with AI," February 18, 2021.
    https://blogs.microsoft.com/accessibility/ai4edugrants21

39 Microsoft News Center. "Microsoft reaffirms its commitment to the Alliance for a Green Revolution in Africa to support digital transformation in agriculture," September 22, 2020.
    https://news.microsoft.com/en-xm/2020/09/22/microsoft-reaffirms-its-commitment-to-the-alliance-for-a-green-revolution-in-africa-to-support-digital-transformation-in-agriculture
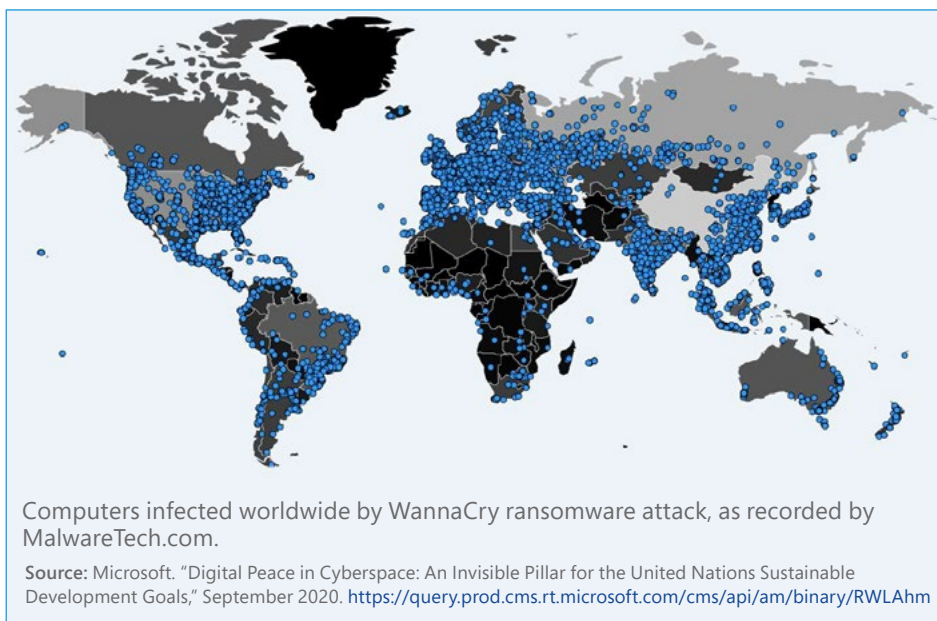
Section 5:
Cybersecurity and information security infrastructure and technologies

Cyberattacks on critical infrastructures are becoming frequent, with the estimated cost of cybercrime in Africa reaching $3.5 billion in 2017.[40] Everything connected to an information network—banks, governments, energy grids, telecommunications networks, military systems—is vulnerable to cyberattacks.

Opportunity

African governments and businesses need access to state-of-the-art cybersecurity tools to combat these attacks. A coordinated effort between both the public and private sectors at the international level is required to combat cyberthreats—which are increasing in sophistication and impact. This is critical to ensure that digital transformation and data-driven innovations in Africa develop in a way that protects citizens from the harm of cybercrimes.

Computers infected worldwide by WannaCry ransomware attack, as recorded by MalwareTech.com.

Source: Microsoft. "Digital Peace in Cyberspace: An Invisible Pillar for the United Nations Sustainable Development Goals," September 2020. https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RWLAhm

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[40] Organisation for Economic Co-operation and Development (OECD). "Overview: Priorities to make digitalisation work for all in Africa," OECD iLibrary.
https://www.oecd-ilibrary.org/sites/7b66a37e-en/index.html?itemId=/content/component/7b66a37e-en

Microsoft's contributions

- Microsoft was one of the first signatories to, and is one of the most prominent supporters of, the Paris Call for Trust and Security in Cyberspace and its nine principles to promote responsible behavior by all actors online.[41] The Call has 1,210 signatories, with 79 states, including Burkina Faso, Central African Republic, Democratic Republic of the Congo, Gabon, Guinea, Mauritania, Mauritius, Morocco, Senegal, and Tunisia.

- In May 2020, Microsoft President Brad Smith joined more than 40 international leaders in calling on the world's governments to take immediate and decisive action to prevent and stop cyberattacks that target the healthcare professionals and institutions that are providing critical care in response to the coronavirus pandemic.[42]

- Microsoft is one of the founding signatories and a lead supporter of the Cybersecurity Tech Accord, the largest industry commitment to cybersecurity principles, which includes more than 150 signatory companies from across the tech industry and around the world. The coalition works collaboratively to be the industry's voice on peace and security online and pursues initiatives that improve the cybersecurity ecosystem. This includes advancing security best practices by industry and partnering with governments and civil-society groups to promote expectations for responsible behavior by states and other actors.[43] Pan-African support for the Cybersecurity Tech Accord would promote regional integration and elevate the security of data and networks across the continent.

- Microsoft partners with the Global Forum on Cyber Expertise (GFCE) to increase cybercapacity-building efforts in Africa through a program focusing on unifying existing cybercapacity-building efforts. Microsoft was a founding member of the GFCE, which was established in 2015 and which has helped countries across Africa, including The Gambia and Sierra Leone, with cybercapacity-building efforts, as well as with the development of national strategies and policies.[44]

- Microsoft worked in partnership with Mastercard and the Hewlett Foundation, along with other key partners, to establish and support the CyberPeace Institute (CPI), an independent NGO based in Geneva and launched in 2019. The CPI has a unique mandate to address the harms caused by escalating conflict in cyberspace through direct assistance and advocacy work, as well as by promoting accountability for responsible behavior in cyberspace. Amid the coronavirus pandemic, the CPI launched its operational capacities, focusing on the unique vulnerabilities of hospitals and healthcare groups and highlighting the impact of increasing attacks against them.[45]

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[41] Microsoft On the Issues. "An important step toward peace and security in the digital world," November 12, 2018. https://blogs.microsoft.com/on-the-issues/2018/11/12/an-important-step-toward-peace-and-security-in-the-digital-world

[42] "Call by global leaders: work together now to stop cyberattacks on the healthcare sector," *Humanitarian Law & Policy Blog*, May 26, 2020. https://blogs.icrc.org/law-and-policy/2020/05/26/call-global-leaders-stop-cyberattacks-healthcare

[43] Microsoft On the Issues. "34 companies stand up for cybersecurity with a tech accord," April 17, 2018. https://blogs.microsoft.com/on-the-issues/2018/04/17/34-companies-stand-up-for-cybersecurity-with-a-tech-accord

[44] GFCE News. "GFCE and Microsoft announce an investment partnership in Cybersecurity Capacity Building in Africa," November 13, 2020. https://thegfce.org/gfce-and-microsoft-announce-an-investment-partnership-in-cybersecurity-capacity-building-in-africa

[45] Microsoft News. "CyberPeace Institute to support victims harmed by escalating conflicts in cyberspace," September 26, 2019. https://news.microsoft.com/de-ch/2019/09/26/cyberpeace-institute-to-support-victims-harmed-by-escalating-conflicts-in-cyberspace

- Microsoft is a contributor and supporter of the International Telecommunication Union (ITU) National Cybersecurity Strategy Guide, which provides guidance to governments in creating a comprehensive national plan for cybersecurity. We have been a key partner in developing an updated version of the guide.[46]

- Microsoft provided support to the Internet Governance Forum Dynamic Coalition on Internet Standards, Security and Safety to help global implementation of cybersecurity standards to advance the resiliency of the online environment and IoT devices.[47]

- Microsoft has provided support to the Alliance of Democracies Foundation to develop the Global Alliance of Democracy Resilience to strengthen democratic processes and institutions around the world.[48] Microsoft's Defending Democracy Program also regularly cohosts virtual programs with the Alliance that focus on important issues such as the threat of disinformation to democracy and the protection of the electoral process from cyberattacks.[49]

"A coordinated effort between both the public and private sectors at the international level is required to combat cyberthreats—which are increasing in sophistication and impact."

[46] International Telecommunication Union. *A Guide to Developing a National Cybersecurity Strategy: Strategic Engagement in Cybersecurity*, 2018. https://www.itu.int/myitu/-/media/Publications/2018-Publications/BDT-2018/Guide-to-developing-a-national-cybersecurity-strategy---Strategic-engagement-in-cybersecurity.pdf

[47] Internet Governance Forum (IGF). Dynamic Coalition on Internet Standards, Security and Safety (DC-ISSS), *Making the Internet more secure and safer*. https://www.intgovforum.org/multilingual/content/dynamic-coalition-on-internet-standards-security-and-safety-dc-isss

[48] Alliance of Democracies. *#DefendDemocracy Virtual Series*. https://www.allianceofdemocracies.org/initiatives/the-campaign/defenddemocracy-virtual-series

[49] Microsoft On the Issues. "Defending Democracy Program." https://news.microsoft.com/on-the-issues/topic/defending-democracy-program

Section 6:
Identity infrastructure

At the core of the SDGs is the goal of inclusion. SDG 16, target 9 (SDG 16.9), specifically calls for delivering a legal identity for all by 2030. According to the World Bank, a staggering 1 billion people today lack any official proof of identity, including one in two women.[50] Without a legal identity, it is almost impossible for citizens to claim fundamental rights and essential services such as healthcare, social protection, and education. A lack of legal documentation not only strips access to critical services, but it also puts those trapped in the "identity gap" at risk of larger issues, including displacement and trafficking.

From an economic development perspective, a national identification system allows governments to hold records of vital population events and statistics needed for policy planning and implementation. Tracking and recording critical data such as birth rates, death rates, and marriage statistics enables policymakers to plan for the future of their countries. It is also important to know who precisely is being left out of development programs in order to enable better targeting of intended beneficiaries. Providing each person with a legal identity is crucial to achieving this aim.

Opportunity

Building inclusive and trusted digital identification systems requires governments to take proactive measures to implement effective systems while also protecting individuals' personal data.[51] This includes adopting privacy and data protection laws in line with international best practices, like the European Union's General Data Protection Regulation (GDPR).

Microsoft's contributions

- As a member of the Technical Advisory Council for the ID2020 Alliance—a global public-private partnership dedicated to aiding the 1.1 billion people around the world who lack any legal form of identity—we are working to create safe, secure, and ethical digital identification systems for the future.[52]

- In 2017, Microsoft collaborated with Accenture and Avanade on a blockchain-based identity prototype on Microsoft Azure. Microsoft continues to build on this work by collaborating on an open-source, self-sovereign, blockchain-based identity system that allows people, products, apps, and services to interoperate across blockchains, cloud providers, and organizations.[53]

50   World Bank ID4D. "ID4D Data: Global Identification Challenge by the Numbers."
     https://id4d.worldbank.org/global-dataset
51   Desai, Vyjayanti; Neumann, James; Satola, David. "Good digital ID needs great data protection," World Bank,
     January 28, 2021.
     https://blogs.worldbank.org/digital-development/good-digital-id-needs-great-data-protection
52   ID2020. https://id2020.org
53   Official Microsoft Blog. "Partnering for a path to digital identity," January 22, 2018.
     https://blogs.microsoft.com/blog/2018/01/22/partnering-for-a-path-to-digital-identity

Section 7:
E-government infrastructure and services

Africa is in a unique position to implement e-government services, enabling governments to save money, reduce corruption, and improve the provision of government services. Some countries have already made great strides.

Opportunity

Technology has a transformational power to improve governance and increase efficiency in the delivery of government services. In Africa, e-government services need to be accessible via smartphones, as most Africans access the internet via mobile broadband.

Microsoft's contributions

- Microsoft is working with the Egyptian Ministry of Finance's E-Tax[54] to employ AI and business intelligence techniques in the tax system and drive digital transformation of the Egyptian Tax Authority. This includes electronic invoices and electronic invoice service providers, as well as smart business reports in the area of tax and tax fraud.

- Other examples include: supporting Nigeria's Kaduna State Government to build a web portal for Environmental Impact Assessment submissions and payments;[55] assisting Ghana's National IT Agency in developing a Smart Workplace platform designed to improve collaboration, enhance security, and speed up service outcomes;[56] and working with Nigeria's national public health institute to step up the country's response to the coronavirus pandemic.[57]

- Microsoft AccountGuard is a freely available service providing identity protection offerings to help ensure that only authorized people can sign in to an organization's systems. The program also makes it more difficult for hackers to impersonate legitimate staff. Originally created for political campaigns, the service has been expanded to election officials, political parties, think tanks, and human rights organizations. It is currently active in 32 countries, protecting more than 2.4 million accounts around the world.[58]

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[54] Microsoft News Center. "Egypt's E-Tax, Microsoft partner to use AI in tax solutions," April 29, 2021.
https://news.microsoft.com/en-xm/2021/04/29/egypts-e-tax-microsoft-partner-to-use-ai-in-tax-solutions

[55] Microsoft Customer Stories. "Kaduna State Government gives business processes a boost in North West Nigeria," May 24, 2021.
https://customers.microsoft.com/en-us/story/1374575439813656023-kaduna-state-government-azure-sql-database-en-nigeria

[56] Microsoft Customer Stories. "Ghana's National IT Agency ushers in a digitally enabled future," December 10, 2020.
https://customers.microsoft.com/en-us/story/857951-nita-government-microsoft-en-ghana

[57] Microsoft Customer Stories. "Nigeria's national public health institute drives swift pandemic response with Microsoft Azure," November 6, 2020.
https://customers.microsoft.com/en-us/story/852253-nigeria-centre-for-disease-control-government-azure-en-nigeria

[58] Neutze, Jan. "Expanding AccountGuard protections for high-risk customers in 31 democracies," Microsoft On the Issues, March 9, 2021.
https://blogs.microsoft.com/on-the-issues/2021/03/09/accountguard-expansion-high-risk-defending-democracy

- Through our Microsoft Learn online repository, we seek to empower government transformation by providing officials access to learning modules and training on Microsoft products and technologies more broadly.[59] This includes Microsoft's AI Business School, which contains a learning path specifically designed for government officials.[60]

> *"Technology has a transformational power to improve governance and increase efficiency in the delivery of government services."*

[59] Microsoft Learn. https://docs.microsoft.com/en-us/learn

[60] Microsoft Learn. "AI business school for government." https://docs.microsoft.com/en-us/learn/paths/ai-business-school-government/?WT.mc_id=sitertzn_homepage_mslearn-card-aibusinessschool

Section 8:
Collaborations and partnerships to build capacity

Digital technologies and data-driven innovations have the potential to transform African societies and economies by creating quality jobs and driving inclusive and sustainable economic growth across multiple sectors. One of the most important factors that will drive digital transformation in the continent is Africa's young and increasingly educated population. Africa has the highest labor force growth rate in the world—every year between now and 2030, an additional 29 million young people will become 16 years old, looking for jobs and educational opportunities.[61]

Opportunity

In order for the countries in Africa to harness the full potential of digital transformation, they will need to expand education and provide professional skills training, especially on how to use new digital technologies. It will be particularly important for governments to work with the private sector, technical and vocational education training institutes, engineers, and international organizations to provide new learning opportunities.

Source: Microsoft Stories. "Digital skills for 25 million people."
https://news.microsoft.com/announcement/digital-skills-for-25-million-people/

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[61] African Union Commission/Organisation for Economic Co-operation and Development. Africa's Development Dynamics 2019: Achieving Productive Transformation, 2019.
https://dx.doi.org/10.1787/c1cd7de0-en

Microsoft's contributions

- In anticipation of the increased demand for digital technology skills around the world, Microsoft launched a Global Skills Initiative[62] in June 2020 aimed at bringing digital skills to 25 million people worldwide by the end of the year.[63] Nine months later, Microsoft helped more than 30 million people, including around 1.5 million people in Africa.[64] As of June 30, 2021, we have helped 45 million people gain these critical digital skills in an economy impacted by the coronavirus pandemic.

- Specifically for young people in Africa and the Middle East, Microsoft has partnered with the United Nations Educational, Scientific and Cultural Organization (UNESCO) to create a Global Skills Academy.[65] The partnership aims to create opportunities for digital upskilling and enable free access to employability-oriented training materials.

- Microsoft Learn for Students and Educators,[66] one of the digital curricula provided by the Global Skills Academy, will be a key part of bridging the skills gap. It offers students engaging, entry-level courses and builds up to programs that develop professional skills for free.

- Microsoft has also established the Microsoft 4Afrika Academy, which seeks to help Africans develop world-class skills that benefit their communities and countries and the continent at large. The Academy aims to enable African youth to start businesses and secure jobs, particularly in the technology sector, through the MySkills4Afrika and Microsoft Virtual Academy 4Afrika curricula.[67]

- In March 2021, Microsoft partnered with Tech4Dev, a nonprofit social enterprise, to establish the Women Techsters initiative, designed for girls and women between ages 16 and 40 in 54 African countries. The initiative aims to bridge the digital and technology divide and ensure equal access to opportunities across the continent.[68]

- Microsoft also partners with the Egyptian Government on the Tawar w Ghayar platform, which provides young people with digital-skills training courses and trains ministries how to create livelihood opportunities.[69]

[62] Microsoft Stories. "Microsoft launches next stage of skills initiative after helping 30 million people." https://news.microsoft.com/skills

[63] Official Microsoft Blog. "Microsoft launches initiative to help 25 million people worldwide acquire the digital skills needed in a COVID-19 economy," June 30, 2020. https://blogs.microsoft.com/blog/2020/06/30/microsoft-launches-initiative-to-help-25-million-people-worldwide-acquire-the-digital-skills-needed-in-a-covid-19-economy

[64] Official Microsoft Blog. "Building a more inclusive skills-based economy: The next steps for our global skills initiative," March 30, 2021. https://blogs.microsoft.com/blog/2021/03/30/building-a-more-inclusive-skills-based-economy-the-next-steps-for-our-global-skills-initiative

[65] Microsoft News Center. "New Global Skills Academy to boost employability," July 29, 2020. https://news.microsoft.com/en-xm/2020/07/29/microsoft-and-unesco-team-up-to-boost-employability-in-the-middle-east-and-africa

[66] Microsoft Docs. "Microsoft Learn for Students: Build tech skills for the future." https://docs.microsoft.com/en-us/learn/roles/student

[67] Microsoft 4Afrika. "Microsoft 4Afrika Academy." https://www.microsoft.com/africa/4afrika/academy

[68] Microsoft News Center. "Microsoft and Tech4Dev partner on Women Techsters Initiative for girls and women to acquire digital skills across the continent," March 9, 2021. https://news.microsoft.com/en-xm/2021/03/09/microsoft-and-tech4dev-partner-on-women-techsters-initiative-for-girls-and-women-acquire-digital-skills-across-the-continent

[69] Tawar w Ghayar. "Build your Digital Skills with Tawar w Ghayar." https://www.tawarwghayar.com

Section 9:
Collaborations on digital transformations and leadership for smart policy

Many emerging technologies are empowering the security and stability of African nations. Drones, robots, and "smart cities" are proliferating across the continent. Digitization is improving government revenue collection and curbing corruption,[70] and drones are delivering life-saving medical supplies.[71]

The coronavirus pandemic will likely effect an acceleration in the spread of emerging technology. As Africa recovers from the pandemic, harnessing the power of emerging technologies will help increase transparency, foster social and economic inclusion, and improve government efficiency.

Opportunity

Sound digital policies and a stable, harmonized regulatory environment are critical to enabling African people and businesses to realize the full potential of innovative technologies. Freedom to transfer data across borders, the moratorium on customs duties, regulatory harmonization, and cybersecurity are all critical elements of digital policies that foster trustworthy, inclusive, and equitable digital transformation leading to economic growth. There is an opportunity for stakeholders, including governments, businesses, and civil society, to coalesce on joint policy positions on the topics that are most pertinent for the African people, and reap the full benefits of the region's digital revolution.

Microsoft's contributions

- In August 2021, Microsoft entered a partnership with the ITU to accelerate Africa's digital transformation through connectivity. Our collaboration seeks to foster meaningful digital connectivity and access with a focus on youth and women in Africa.[72]

- In May 2021, Microsoft announced it was partnering with the Nigerian Government to accelerate the country's digital economy. Microsoft committed to: helping increase internet penetration in Nigeria; upskilling 5 million Nigerians over the next three years; furthering the fight against corruption by supporting the design and implementation of cloud-based tools; and helping to preserve Nigeria's cultural heritage through a new partnership with the National Institute of Cultural Orientation.[73]

- Our Microsoft 4Afrika initiative invests in startups, SMEs, governments, and youth on the African continent.[74] Working with these groups, the initiative's focus is to deliver affordable access to the internet, develop skilled workforces, and invest in

70 Allen, Nathaniel. "The promises and perils of Africa's digital revolution," The Brookings Institute, March 11, 2021. https://www.brookings.edu/techstream/the-promises-and-perils-of-africas-digital-revolution

71 Ibid.

72 International Telecommunication Union. "Our common work with selected Partners." https://www.itu.int/en/ITU-D/MembersPartners/Pages/Partners/Our-common-work-with-selected-Partners.aspx?pi=6999&nb=1

73 Microsoft News Center. "Microsoft collaborates with the Nigerian government to accelerate digital transformation in the country," May 3, 2021. https://news.microsoft.com/en-xm/2021/05/03/microsoft-collaborates-with-the-nigerian-government-to-accelerate-digital-transformation-in-the-country

74 Microsoft 4Afrika. https://www.microsoft.com/africa/4afrika/about-us.aspx

local technology solutions. For example, our partnership with M-KOPA has enabled the energy startup to become the largest provider of solar home systems globally, connecting more than 750,000 homes and ultimately delivering affordable clean energy to more than 3.75 million people.[75]

• Through our membership in the World Economic Forum G20 Global Smart Cities Alliance, Microsoft is working toward making smart cities more inclusive and transparent by helping to create accessibility and privacy policies that will benefit citizens.[76]

	Impact Period/ Timing	Social implications	Economic implications	Political implications	Security implications
Internet of Things (IoTw)	Immediate - medium term	Privacy		Sensitive data migration overseas	Cybersecurity Online fraud & scams
Digital Platforms	Immediate- medium term		Business disruption [Technological] unemployment	Sensitive data migration overseas	Cybersecurity Online fraud & scams Online fraud & scams
Cloud computing	Immediate - medium term		Business disruption [Technological] unemployment	Sensitive data migration overseas	
Distributed ledger/ blockchain technology (DLT)	Immediate - medium term		[Technological] unemployment		
3D Printing	Immediate - medium term		Business disruption [Technological] unemployment		Weapons proliferation Cyber-sabotage Terrorism
Big Data/ Data analytics	Immediate - medium term	Privacy	[Technological] unemployment	Sensitive data migration overseas	
Drones	Medium-term		Disruption of traditional logistics businesses Monopolies [Technological] unemployment	Dependence on one or two sources for necessities.	Espionage Terrorism Trafficking Smuggling
AI & Robotics	Medium-term	Income inequality Artificial stupidity Addiction (gaming) [Technological]	[Technological] unemployment	Bias (racism, xenophobia) Instability	Cybersecurity Artificial stupidity

Potential Implications of the Fourth Industrial Revolution

Source: Microsoft. Enabling A Digital Nigeria: A Position Paper of Microsoft's Vision for Digital Transformation and A Digital Economy that Works for Everyone, 2020.
https://info.microsoft.com/rs/157-GQE-382/images/EN-CNTNT-Whitepaper-SRGCM3460

[75] Microsoft 4Afrika. "M-KOPA - Lighting up homes through the cloud." https://www.microsoft.com/africa/4afrika/mkopa.aspx
[76] G20 Global Smart Cities Alliance. https://globalsmartcitiesalliance.org/global

Section 10:
Open data governance

The International Open Data Charter defines open data as "digital data that is made available with the technical and legal characteristics necessary for it to be freely used, reused, and redistributed by anyone, anytime, anywhere."[77] Governments around the world are increasingly promoting open data initiatives to improve the quality of public services and increase transparency and accountability over government decision-making. Open datasets can also bolster economic growth by encouraging the creation of new business models and improving productivity and efficiency.

Opportunity

The open data movement in Africa has evolved substantially, with a large number of open data portals and initiatives implemented over the last decade. However, there remains a significant opportunity to use open data initiatives to support citizen engagement with governments, expand the use of open data in policymaking, and increase transparency, accountability, data reuse, and technological innovation. The freedom to transfer data across borders is a key regulatory enabler of open data.

Microsoft's contributions

- In April 2020, Microsoft launched the Open Data Campaign to help organizations of all sizes realize the benefits of data and the new technologies it powers.[78] We set out the principles that guide how we approach sharing data, and we also committed to developing 20 new collaborations built around shared data by 2022. The collaborations aim to address some of the world's most pressing challenges in the areas of sustainability, health, and equity and inclusion. For example, an open data project called Zamba Cloud is helping animal conservation efforts in Africa. By using Microsoft Azure to automatically identify animals in videos, Zamba Cloud makes it easier, more affordable, and faster for researchers and conservationists to study camera trap footage.[79]

Source: Strathmore University. *Mapping Policies and Structures for Kenya's Preparedness for Digital Agriculture.*

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[77] International Open Data Charter. "Principles." https://opendatacharter.net/principles//

[78] Microsoft On the Issues. "Closing the data divide: the need for open data," April 21, 2020. https://blogs.microsoft.com/on-the-issues/2020/04/21/open-data-campaign-divide

[79] Microsoft AI. "Zamba Cloud." https://www.microsoft.com/en-us/ai/ai-for-earth-zamba-cloud

- In April 2021, Microsoft reported on the Open Data Campaign one year into the journey and detailed the progress made with the first nine collaborations.[80] This included the Purdue Food and Agricultural Vulnerability Index's online dashboard built on top of Microsoft Azure that estimates the share of agricultural production at risk from pandemic-related illnesses among the farming workforce. Although initially built to identify the vulnerability of agricultural supplies due to the coronavirus pandemic, the dashboard identifies potential pandemic hot spots, which frequently are in underserved communities, and can be used to decide where to deploy healthcare resources. This collaboration demonstrates that when making data available for one purpose, we uncover benefits not initially envisioned.

- Microsoft partnered with The Awareness Company,[81] a tech startup that champions data-driven storytelling, to build the first integrated Africa-specific COVID-19 dashboard[82]—developed for the United Nations Economic Commission for Africa.

"There remains a significant opportunity to use open data initiatives to support citizen engagement with governments, expand the use of open data in policymaking, and increase transparency, accountability, data reuse, and technological innovation."

80 Microsoft. Open Data Campaign: Year one in review, April 2021.
    https://news.microsoft.com/wp-content/uploads/prod/sites/560/2021/04/Microsoft-Open-Data-Campaign-Report_PDF_FINAL-1.pdf

81 Microsoft 4Afrika. "Using data to tell the stories of Africa."
    https://www.microsoft.com/africa/4afrika/africastories.aspx

82 Africa UN Knowledge Hub for COVID-19, UNECA. https://knowledge.uneca.org/covid19/countrydata

26

Section 11:
Internet governance

The UN defines internet governance as "the development and application by governments, the private sector, and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet."[83] Multistakeholder governance (where governments, businesses, civil society, and the technical community participate in policy discussions on equal footing) underpins many aspects of today's internet and enables tremendous progress to be made in bridging the global digital divide.

The UN's Internet Governance Forum (IGF) is the primary forum for multistakeholder internet governance discussions, covering a range of issues including connectivity, inclusion, trust, and security. Microsoft is a strong supporter of the IGF, participating in its annual meetings and intersessional work and helping to fund it through donations to the IGF Trust Fund.

Opportunity

There are many national and regional IGFs enabling local discussions between governments and stakeholders, including Africa IGF,[84] East Africa IGF,[85] North Africa IGF,[86] Southern Africa IGF,[87] West Africa IGF,[88] and the national IGFs in 30 African countries. African governments should continue to work with other stakeholders in the internet governance community to develop policy and regulatory frameworks that fuel internet innovation and sustainable economic development in support of the UN SDGs.

Microsoft's contributions

- Over the course of 2021, Microsoft has collaborated with the IGF Secretariat on a capacity-building workshop series in the areas of digital transformation and cybersecurity for developing countries.[89] The workshops are driven by the call in the UN Decade of Action for stakeholders to partner on achieving the SDGs, especially the themes covered in SDG 9 and SDG 16.[90]

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[83] United Nations Department of Economic and Social Affairs. "Internet Governance." https://publicadministration.un.org/en/internetgovernance

[84] African Internet Governance Forum. https://afigf.org

[85] Internet Governance Forum. East African IGF. http://www.intgovforum.org/multilingual/content/east-african-igf-0

[86] IGF North Africa. http://www.naigf.org

[87] Southern Africa Internet Governance Forum. https://www.saigf.org

[88] West Africa Internet Governance Forum. https://www.waigf.org

[89] Internet Governance Forum. "'Our Digital Future' Addressing Digital Transformation and Cybersecurity Capacity development workshop series focused on developing countries." https://www.intgovforum.org/multilingual/content/our-digital-future

[90] United Nations. "Decade of Action." https://www.un.org/sustainabledevelopment/decade-of-action

- Microsoft is closely involved in two IGF policy networks that will present reports to the annual IGF meeting in December 2021—as cochair of the Policy Network on Environment[91] and as a member of the Policy Network on Meaningful Access—collaborating with representatives from the African Union and Ethiopia.[92]

- In May 2019, Microsoft joined four other leading technology companies in signing the Christchurch Call and committing to take nine steps to address the abuse of technology and prevent its use to spread terrorist and violent extremist content.[93] This commitment expands on the Global Internet Forum to Counter Terrorism and builds on Microsoft's other initiatives with government and civil society to prevent the dissemination of extremist content.

"African governments should continue to work with other stakeholders in the internet governance community to develop policy and regulatory frameworks that fuel internet innovation and sustainable economic development in support of the UN SDGs."

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[91] Internet Governance Forum. "Policy Network on Environment (PNE)."
https://www.intgovforum.org/multilingual/content/policy-network-on-environment-pne

[92] Internet Governance Forum. "Policy Network on Meaningful Access (PNMA)."
https://www.intgovforum.org/multilingual/content/policy-network-on-meaningful-access-pnma

[93] Microsoft On the Issues. "The Christchurch Call and steps to tackle terrorist and violent extremist content,"
May 15, 2019.
https://blogs.microsoft.com/on-the-issues/2019/05/15/the-christchurch-call-and-steps-to-tackle-terrorist-and-violent-extremist-content

Digital equity for underserved communities

Interview with Bryan Kariuki,
Board Member, Mawingu Networks

What has been the biggest surprise in your partnership with Microsoft?

As an internet service provider working with rural communities in Kenya, the largest issue we face is one of inequality, both in terms of access to economic opportunities and access to public participation and services. It is critically important that we get everyone in Kenya access to the internet, and our partnership with Microsoft has enabled us to explore different technologies and scale our networks across the country. Using the tools available to us across the Microsoft portfolio, we can provide last-mile access to the most underserved communities at an affordable price point. In addition, we have been able to collaborate to focus our efforts on marginalized communities like women and girls, providing not just connectivity, but digital equity.

"Companies are having to think more creatively about what true sustainability means …."

In the Sustainable Development Goals, Goal 17 calls for revitalized partnerships to achieve the SDGs; is the private sector fulfilling its potential as a contributor to SDGs?

The private sector is critically important to sustainable development, with partnership being an essential component of this work. In recent years we have seen a shift toward increased collaboration between public and private partners and a strong focus on sustainable and scalable business models. Because of the resources available from organizations like Microsoft and the private sector's focus on expediency and innovation, we have access to collaboration and tools that we otherwise would not. We are finding new ways, every day, that the internet can be made more valuable, and we are working with Microsoft to move from a philanthropic model to a commercially viable approach to last-mile connectivity.

In the 2030 Agenda for Sustainable Development, "financial resources, technology development, and transfer, and capacity building" are listed as three means of implementation for the SDGs. Where is the private sector falling short?

A key role of the private sector when looking at implementation of the SDGs is to enable local partners who have strong community ties and an understanding of local needs and the local landscape. Without a core focus on capacity building to enable technology development and use, as well as to catalyze financial resources, growth will not be truly sustainable. By placing a strong focus on collaboration and partnership, not only can we achieve results connecting the unconnected, but also we can think more holistically about internet access and digital equity. Using local partners and working with the public sector enables private-sector partners to create tools that have tangible value and promote inclusion globally.

How should companies think about what truly counts as "sustainable" when they report on the SDGs?

Companies are having to think more creatively about what true sustainability means, and also about how to embed sustainability into their practices. In a world where consumers are increasingly demanding greater responsibility, Microsoft's mission of empowering every person and organization on the planet to do more remains critical. In partnership both Microsoft and Mawingu recognize that, to live that mission, ubiquitous access both to internet and to energy is critical. In addition, as a company, we know that tools created to promote digital inclusion are key, allowing connectivity to provide value to everyone globally.
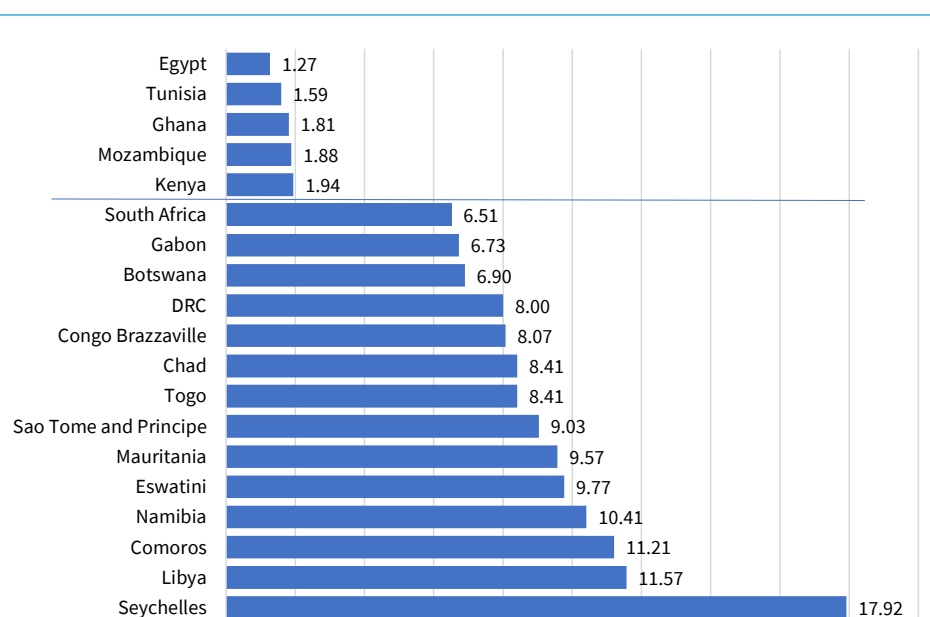
"Without a core focus on capacity building to enable technology development and use, as well as to catalyze financial resources, growth will not be truly sustainable."

Section 12:
Broadband infrastructure and connectivity

Despite significant progress made over the last decade to develop information and communications technology (ICT) infrastructure, internet accessibility and usability in Africa is lower relative to other parts of the world. Nearly 300 million Africans live more than 50 km away from fiber or cable broadband.[94] Furthermore, the Alliance for Affordable Internet reports that of the 48 African countries it tracks, only 14 meet its standard for "affordable internet" (designated as 1 GB of mobile prepaid broadband costing 2 percent or less than the average monthly income).[95]

In 2019, the African Union mapped out a strategy to digitally connect every individual, business, and government in Africa by 2030.[96] The goal is to bring high-speed connectivity to everyone on the continent, including those who make up the last mile, and lay the foundations for a vibrant digital economy. Connecting the unconnected requires rolling out innovative and alternative solutions such as Wi-Fi, satellites, and hotspots to reach the nearly 100 million people that live in remote areas currently out of reach of traditional mobile networks.[97]

Country	Value
Egypt	1.27
Tunisia	1.59
Ghana	1.81
Mozambique	1.88
Kenya	1.94
South Africa	6.51
Gabon	6.73
Botswana	6.90
DRC	8.00
Congo Brazzaville	8.07
Chad	8.41
Togo	8.41
Sao Tome and Principe	9.03
Mauritania	9.57
Eswatini	9.77
Namibia	10.41
Comoros	11.21
Libya	11.57
Seychelles	17.92

Data costs per 1GB in Africa.

Source: Research ICT Africa. RIA Mobile Pricing Index. Q4 2019. Paving the way towards digitalising agriculture in South Africa. https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4Aznl

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94 OECD/ACET. Quality Infrastructure in 21st Century Africa: Prioritising, Accelerating and Scaling up in the Context of PIDA (2021-30), 2020. https://www.oecd.org/dev/Africa-Quality-infrastructure-21st-century.pdf

95 Alliance for Affordable Internet. Africa Regional Snapshot: Affordability Report 2020. https://1e8q3q16vyc81g8l 3h3md6q5f5e-wpengine.netdna-ssl.com/wp-content/uploads/2021/04/3522_RegionalReport_Africa.pdf

96 Broadband Commission Working Group on Broadband for All (prepared by the African Union, World Bank Group, UNESCO, et al). Connecting Africa Through Broadband: A strategy for doubling connectivity by 2021 and reaching universal access by 2030, October 2019. https://broadbandcommission.org/Documents/working-groups/DigitalMoonshotforAfrica_Report.pdf

97 Ibid.

Opportunity

Continued investment in developing ICT infrastructure across the continent, including its reach to rural communities and those in lower income groups, will be an important pillar for establishing Africa's growing data-driven economy. A crucial starting point is to take a technology-agnostic approach that would lower cost without sacrificing utility. The technology investments needed to achieve connectivity must incorporate the most cost-efficient technologies and consider alternative approaches when necessary.

Microsoft's contributions

- Microsoft believes it is essential to take a human-centric approach to ensure that connectivity is robust, ubiquitous, evolving, and affordable, with a particular focus on the unserved and the underserved. In 2017, Microsoft launched the Airband Initiative[98] to eliminate the broadband gap in rural areas. Through the Airband Initiative, we partner with internet and energy access providers, telecom equipment makers, nonprofits, and local entrepreneurs to advance digital equity—access to affordable internet, affordable devices, and digital skills—as a platform for empowerment and digital transformation across the world. By July 2022, Microsoft Airband partners are projected to extend internet connectivity to at least 40 million unserved people.[99]

- In August 2020, Microsoft Airband launched a public-private partnership with the United States Agency for International Development (USAID) to bring internet access to more women around the world, expanding women's economic opportunities and enabling digital development services. Projects are being deployed with six participating Airband partners across the globe, including Mawingu and M-KOPA in Kenya.[100]

- In Ghana, as part of the Airband Initiative, Microsoft partnered with government officials to ensure strong regulations were in place so that TV white spaces and other technologies could be used to extend networks quickly in unserved, predominantly rural areas. Regulations in Ghana now permit affordable broadband access to over 800,000 previously underserved people living in the rural eastern part of the country.[101]

- In Kenya, Microsoft Airband leveraged TV white spaces to bring internet access to the city of Nanyuki, a market town nearly 200 km from Nairobi. The technology reduced average household spend on internet access by nearly 15 percent. Access to the internet has also enabled students at local schools to improve their scores on the Kenya National Exam.[102]

98 Microsoft Airband. https://www.microsoft.com/en-us/corporate-responsibility/airband

99 Microsoft On the Issues. "The path to prosperity through access to high-speed internet," October 7, 2019. https://blogs.microsoft.com/on-the-issues/2019/10/07/the-path-to-prosperity-through-access-to-high-speed-internet/

100 United States Agency for International Development. USAID/Microsoft Airband Initiative Factsheet, June 3, 2021. https://www.usaid.gov/digital-development/usaid-microsoft-airband-initiative

101 Microsoft On the Issues. "The path to prosperity through access to high-speed internet," October 7, 2019. https://blogs.microsoft.com/on-the-issues/2019/10/07/the-path-to-prosperity-through-access-to-high-speed-internet

102 Microsoft 4Afrika. "Mawingu: Connecting the Unconnected." https://www.microsoft.com/africa/4afrika/mawingu.aspx

- **Microsoft 4Afrika ran TV white spaces pilots in other countries across Africa**, including Botswana, Namibia, South Africa, and Tanzania. Namibia is home to the largest TV white spaces pilot, connecting 28 schools and 24,000 students. In Botswana, three hospitals and five clinics are bringing specialized telemedicine services to more than 3,000 patients. Many of these patients are women receiving access to maternal care for the first time.[103]

"The technology investments needed to achieve connectivity must incorporate the most cost-efficient technologies and consider alternative approaches when necessary."

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[103] Microsoft 4Afrika. "Mawingu: Connecting the Unconnected."
https://www.microsoft.com/africa/4afrika/mawingu.aspx

Section 13:
Sustainable cost structure for affordability and access for software and cloud services (public and private), including licensing and fees

African business leaders already recognize the benefits of cloud computing, including improved speed, reliability, and performance, all at a lower cost than using traditional onsite datacenters. What is especially useful about cloud computing is that organizations do not need to own computing infrastructure or datacenters. Instead, they can rent access to storage and applications from a cloud service provider, allowing them access to sophisticated capabilities on demand. Cloud computing also allows businesses to leverage these digital tools on platforms that are secured by state-of-the-art cybersecurity measures, ensuring that the data processed is protected against increasingly sophisticated cyberthreats.

Opportunity

The coronavirus pandemic highlights the importance of flexibility and remote working solutions to sustained business operations. Cloud computing enables the tools needed for these solutions, as well as supports the proliferation of other digital and data-driven services, including e-learning services and digital healthcare. Ensuring citizens and businesses have access to affordable cloud computing resources will be an important driver for continued digital transformation in Africa.

Microsoft's contributions

- In the fiscal year 2021, Microsoft Philanthropies[104] provided $2.5 billion in technology grants and discounts to some 295,000 nonprofits—45,000 more than last year. Of that total, Microsoft provided over $2 billion exclusively in cloud grants and discounts to over 225,000 nonprofits.

- Firms who adopted Microsoft cloud services have benefited from a decrease in IT and administrative costs. In 2020, Microsoft worked with the Office of the Auditor General-Kenya, an independent organization responsible for auditing the performance of the Kenyan Government, to move its on-premises infrastructure, networking, and storage to Microsoft Azure. This led to a reduction in IT administration costs of 22 percent, while reaching up to 99.99 percent application uptime. Before using the cloud, monthly uptime was only around 60 percent.[105]

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[104] Microsoft. "Corporate Social Responsibility." https://www.microsoft.com/en-us/corporate-responsibility

[105] Microsoft Customer Stories. "Cloud reduces IT spend by 22 percent, boosts secure data access for a Kenyan audit office," May 11, 2020.
https://customers.microsoft.com/en-gb/story/815220-oag-government-azure-office365-kenya

Section 14:
Collaborations and partnerships on digital learning infrastructure, platforms, and services for member states

The coronavirus pandemic has highlighted the need for, and increased the proliferation of, digital learning infrastructure in Africa. As elsewhere, lockdowns in Africa have led to school closures and missed educational time. Given the relatively low internet penetration rate, children on the continent have been hit particularly hard. While many governments in Africa launched educational broadcasts via television or radio, or online, only 34 percent of households have access to the internet and around 89 percent of learners do not have access to a computer at home.[106] As a result, hundreds of millions of children across Africa have missed months of learning.[107] The pandemic highlights how the digital divide is a major obstacle to learning continuity and reinforces the importance of transforming education systems across the continent through digital learning infrastructure.

Opportunity

Collaborations and partnerships will be key in developing and deploying solutions to ensure that Africa's children do not fall further behind and that its teachers are properly trained and equipped to deliver remote lessons to students. African governments should build on the increased interest in leveraging technology to strengthen digital education systems, and seize the opportunity to scale up digital learning across the continent.

Microsoft's contributions:

- The Learning Passport partnership between Microsoft and UNICEF is a digital platform that facilitates learning opportunities for children and young people affected by conflict and natural disasters. The partnership has also helped ensure continuity of education during the coronavirus pandemic.[108] It is currently available in 10 countries, including Egypt, Puntland-Somalia, and Zimbabwe.

- Microsoft is a founding member of the UNESCO Global Education Coalition for the pandemic response. The coalition seeks to facilitate inclusive learning opportunities for children and youth during this period of sudden and unprecedented educational disruption. The coalition has prioritized Africa due to the large percentage of its population who lack access to home computers. Its work spans 66 projects across

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106 UNESCO. "Global Education Coalition explores the digital learning turn in Africa," May 26, 2021.
https://en.unesco.org/news/global-education-coalition-explores-digital-learning-turn-africa

107 UNICEF Press Release. "Two thirds of the world's school-age children have no internet access at home, new UNICEF-ITU report says," November 30, 2020.
https://www.unicef.org/press-releases/two-thirds-worlds-school-age-children-have-no-internet-access-home-new-unicef-itu

108 Microsoft Stories. "UNICEF and Microsoft launch global learning platform to help address COVID-19 education crisis," April 19, 2020.
https://news.microsoft.com/2020/04/19/unicef-and-microsoft-launch-global-learning-platform-to-help-address-covid-19-education-crisis

39 African countries,[109] and its programs not only aim to increase access to online education across the continent, but also to train new teachers and give them the skills needed to carry out remote teaching.

- Microsoft partnered with the African Development Bank to launch the digital training platform Coding for Employment.[110] The platform launched in 2019 and aims to reach 50 million people in Africa. Coding for Employment is a crucial part of the African Development Bank's strategic agenda to create 25 million jobs by 2025, and to equip 50 million African youth with competitive skills.

- On August 2, 2021, Microsoft committed to partnering with Kenya and other African governments to transform education across the continent for millions of students. As part of its effort, Microsoft will be working with the Global Partnership for Education (GPE), the largest global fund that is solely dedicated to transforming education in low-income countries. Microsoft supports GPE beneficiary countries by offering Office 365 A1 for Education for free to education systems, with an estimated value of several million dollars per year.[111]

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[109] United Nations Educational, Scientific and Cultural Organization. "Recovery, resilience and reimagining education in Africa: the Global Education Coalition in action," 2021.
https://unesdoc.unesco.org/ark:/48223/pf0000377514.locale=en

[110] Microsoft News Center. "African Development Bank launches digital tool to help African youth learn to code," December 10, 2019.
https://news.microsoft.com/en-xm/2019/12/10/african-development-bank-launches-digital-tool-to-help-african-youth-learn-to-code

[111] Microsoft News Center. "Microsoft To Partner with Kenya and Governments Across Africa to Transform Education for Millions of Students," August 2, 2021.
https://news.microsoft.com/en-xm/2021/08/02/microsoft-to-partner-with-kenya-and-governments-across-africa-to-transform-education-for-millions-of-students

Section 15:
Collaborations and engagements with Microsoft research and labs across the continent

Data-driven research and development is being used to improve productivity and efficiency across a number of sectors in Africa. Research into using emerging technologies, such as drones, sensors on IoT devices, and AI-powered data analytics tools, in agriculture, presents opportunities to develop new agricultural techniques that increase productivity and efficiency while improving sustainability.[112]

The coronavirus pandemic has highlighted the important role that health research plays in protecting public health. Our learnings from research undertaken during the pandemic will be instrumental in helping governments respond to widespread pandemics in the future. Research-driven solutions will be the key to solving other problems faced by the African continent, such as climate change and humanitarian crises, including poverty and displaced communities.

Opportunity

Solving some of the most challenging health and development issues is crucial for an inclusive and prosperous Africa. To succeed, governments need to create conditions that are conducive to scientific and technological innovation, including through collaborations and engagements with businesses. Scientific knowledge is a critical driver for human health and well-being, economic development, and environmental sustainability. The pandemic has presented an excellent opportunity for governments to increase their research capacity to drive advancements in sectors important to the continent, such as fintech, agritech, and off-grid energy.

Microsoft's contributions

- In May 2019, Microsoft launched the Africa Development Center (ADC), the first-ever Microsoft engineering offices in Africa, with two initial sites in Kenya and Nigeria.[113] The ADC serves as a premier center of engineering for Microsoft, where world-class African talent can create innovative solutions fueled by AI and machine learning to benefit their communities in areas including healthcare, agriculture, and finance. A key ADC initiative is the Microsoft Africa Research Institute, which brings together researchers, engineers, designers, and the community to drive productivity in the areas of work, health, and society.[114]

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[112] UN Africa Renewal. "Using Artificial Intelligence to transform agriculture in Africa," March 26, 2021. https://www.un.org/africarenewal/news/using-artificial-intelligence-transform-agriculture-africa

[113] Microsoft News Center. "Furthering our investment in Africa: Microsoft opens first Africa Development Centre in Kenya and Nigeria," May 13, 2019. https://news.microsoft.com/en-xm/features/furthering-our-investment-in-africa-microsoft-opens-first-africa-development-centre-in-kenya-and-nigeria

[114] Microsoft News Center. "Microsoft Africa Research Institute to be co-located with the Africa Development Centre in Nairobi," July 30, 2020. https://news.microsoft.com/en-xm/2020/07/30/microsoft-africa-research-institute-to-be-co-located-with-the-africa-development-centre-in-nairobi

Source: Microsoft News Center. "Microsoft Africa Research Institute to be co-located with the Africa Development Centre in Nairobi," July 30, 2020. https://news.microsoft.com/en-xm/2020/07/30/microsoft-africa-research-institute-to-be-co-located-with-the-africa-development-centre-in-nairobi/

- In 2020, Microsoft mobilized the AI for Health program to support those focused on the front lines of COVID-19 research.[115] We have awarded more than 150 grants to COVID-19 research projects around the world, and we have given grantees and partners shared access to Microsoft AI technology. These resources have accelerated COVID-19 research progress, allowing what used to take months to happen in days.

- The Microsoft Advanced Technology Lab Cairo (ATL Cairo) officially started in February 2007 with a focus on cutting-edge software engineering and data science projects, including natural language processing and speech processing. ATL Cairo has promoted an internship program to offer students from the entire region an opportunity to work with our engineers and researchers to gain hands-on experience with state-of-the art technologies.[116]

"Governments need to create conditions that are conducive to scientific and technological innovation, including through collaborations and engagements with businesses."

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[115] Microsoft On the Issues. "An update on our AI for Health program," November 9, 2020. https://blogs.microsoft.com/on-the-issues/2020/11/09/ai-for-health-covid-19-update

[116] Microsoft Research. "Advanced Technology Lab Cairo." https://www.microsoft.com/en-us/research/group/advanced-technology-lab-cairo-2

Conclusion

Digital technologies offer enormous benefits for citizens, businesses, and governments across Africa. Fostering digital transformation will require multistakeholder collaboration between the public sector, the private sector, and civil-society communities across the region. These collaborations promise to deliver policies and regulations that will accelerate Africa's digital trajectory, such as the freedom to transfer data across borders, regulatory harmonization, and mutual recognition.

Our objective with this paper is to illustrate to the Africa Group of Ambassadors in Geneva how Microsoft is harnessing its vast array of technologies, innovations, and resources to accelerate the process of economic and social development on the continent. Our efforts range from supporting the largest companies in Africa and empowering governments seeking to provide online services, to connecting students beyond the proverbial last mile who are looking to obtain the next level of learning. Microsoft wants to drive partnerships that will lead to lasting success and progress.

We appreciate this opportunity to present Microsoft's contributions and sincerely welcome continued dialogue.

Cynthia Wasonga, Software Engineer, Microsoft Corporation.

Source: Microsoft News Center. "Furthering our investment in Africa: Microsoft opens first Africa Development Centre in Kenya and Nigeria," May 13, 2019.
https://news.microsoft.com/en-xm/features/furthering-our-investment-in-africa-microsoft-opens-first-africa-development-centre-in-kenya-and-nigeria/

Microsoft