Africa's digital solutions to tackle COVID-19

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European Investment Bank

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European Investment Bank
The European Investment Bank is the financing arm of the European Union. The Bank works on economic development and cohesion in all countries of the European Union. It will provide up to €6.7 billion in the coming months to fight the coronavirus pandemic outside the European Union. This financing will strengthen healthcare, help the private sector and sustain jobs in many countries around the world.

European Commission
The European Commission is the executive branch of the European Union. It is responsible for proposing legislation, implementing decisions, upholding treaties and managing the day-to-day business of the Union. It has created a "Team Europe" response to support countries outside Europe during the pandemic.

UNDP
The United Nations Development Programme works in about 170 countries and territories, fighting poverty and reducing inequalities. The programme also supports development, disaster-risk reduction and climate change. It is also helping countries meet the UN Sustainable Development Goals. In all of its activities, it encourages the protection of human rights and the empowerment of women, minorities and the poorest and most vulnerable people.

BearingPoint
BearingPoint is an independent management and technology consultancy with European roots and a global reach. The company advises private companies, international institutions and public administrations. Its consulting network supports clients in more than 75 countries including more than 25 African countries.

Disclaimer

This study was conducted from May to June 2020 by BearingPoint under the supervision of the European Investment Bank and with the collaboration of the United Nations Development Programme. This paper's results come mainly from interviews and questionnaires conducted in many African countries[1]. Interviews and questionnaires analysed current digital solutions and reviewed new ideas.

For further information on the EIB's activities, please consult our website, www.eib.org. You can also contact our InfoDesk, info@eib.org.

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[1] See list of countries in Annex 3.

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Foreword

Many African countries have been severely hurt by the coronavirus pandemic. Fragile and less-developed countries in particular do not have the financial power to withstand the economic troubles caused by this crisis. Many countries also depend heavily on commodity exports.

Health systems and the local manufacturers of basic medical equipment are often extremely weak. There is widespread concern that the crisis could lead to social unrest and security problems, particularly in countries where there is conflict or where a large part of the population is living on a day-to-day income.

In Africa, COVID-19 is disrupting millions of lives. Poor people and small and informal businesses are having particular difficulties getting by. Even with containment measures such as lockdowns and quarantines, the pace of this disruption is likely to accelerate in the months ahead. No country is exempt. In addition to the social turmoil, the crisis's economic impact may cause a major displacement of people.

There is an urgent need to secure supplies of essential products, contain the spread of the virus, support health systems, stabilise financial systems and help businesses survive. In the short to medium term, Africa will have to invest heavily in sustainable growth to reverse the economic damage and increase the resilience of societies and businesses.

The pandemic has put more attention on the world's digital divide. The internet is a vital communications tool that can help communities deal with the crisis. The technology sector is helping many industries adapt to this new situation and reduce the risks. But an estimated 3.6 billion people are not connected to the internet across the world, including 900 million in Africa. Only 27% of women in Africa have access to the internet and only 15% of them can afford to use it. People who do not have access to the internet cannot receive timely information about the crisis. They also can't get educated about preventative measures or benefit from telemedicine.

As we seek to limit the spread of the virus with lockdowns and other safety measures, and try to keep businesses open, the limitations of the technological infrastructure and the lack of investment become more apparent. In Africa, large companies that support local economies – like banks, the mining industry or agriculture – need to ensure that workers have internet access. Businesses also need sufficient capacity to run virtual private networks that enable secure teleworking, and they need to be protected from cyberattacks at a time of high confusion.

This paper is intended to contribute to the European Union's response to the coronavirus. This joint EU response includes a special initiative called "Team Europe." This new team is helping partner countries outside the European Union fight the pandemic and prepare for the future. This paper will enhance communication among public agencies like the European Investment Bank, other members of Team Europe and the communities that need our help. The paper also seeks to evaluate solutions, encourage the development of new ideas and identify investments that will make life better for everyone.

Ambroise Fayolle
Vice-President, European Investment Bank

A statement from the United Nations Development Programme

The COVID-19 pandemic is the defining global health crisis of our time, and the greatest challenge since World War II. COVID-19 – with its triple threat to health, education, and livelihoods – is undermining human development globally. In Africa, the pandemic threatens to erase many development gains made in the past few decades.

Even before COVID-19 hit, Africa was battling several crises, from food shortages to violent extremism. Yet Africa also has some of the best-performing economies and several countries on the continent have become world leaders in technological innovation. Mobile payment services, for example, were pioneered in Africa. The high rate of mobile phone use in some areas helps spur innovations that are then adapted to each country's problems. As these same countries race to slow the spread of the disease, digital tools and technologies are playing a crucial role. Through our work with the governments, we are seeing creative solutions such as robots that can detect the spread of the virus in Rwanda, a mobile app that helps market vendors in Uganda, and an open system for contracts that improves transparency in Kenya.

This paper is timely and important. It outlines the digital solutions being used right now in response to COVID-19 across the continent. In addition, it lists the investment required to improve digital technology and digital infrastructure. The document reviews many technologies, such as basic conferencing software that allows teleworking over a mobile device or computer and social media platforms that allow people to communicate with each other and enable governments to educate the public. There are also more advanced offerings, such as the delivery of medical products using drones and digital platforms that help small businesses stay open.

One of the main findings in this study is that we need smarter and more cost-effective investment. This will allow us to improve technologies at a faster rate nationally and regionally. The UN Economic Commission for Africa estimates that the pandemic could cause African economies to contract by 2.6% in 2020. This will make it harder for local governments to finance and support new technology. This paper will help Africa understand how much it will cost to develop more digital solutions. As African countries continue to adapt to the pandemic and prepare for the recovery, there are many ways we can help them invest in a better future.

The United Nations Development Programme connects countries to the knowledge and resources they need to build better lives. We are helping countries build communities that are stronger and greener. We are helping decision-makers look beyond the recovery and toward 2030, so they can make choices that handle complexity and uncertainty. In the new world after COVID-19, we are convinced that advanced technologies will be even more important and fulfil Africa's goal to help everyone in society.

Ahunna Eziakonwa
Assistant Administrator and Regional Director for Africa

Executive summary

At the end of December 2019, China reported several cases of acute respiratory syndrome. A new coronavirus responsible for this syndrome, called severe acute respiratory syndrome coronavirus 2, or SARS-CoV-2, was identified. The disease is called COVID-19. After a pandemic was declared, African countries quickly started working to reduce the spread of the virus. Today, the continent still faces the risk of a massive increase in sick patients and the need to find alternatives to a general lockdown.

The European Union's plan to fight the pandemic includes a new initiative called Team Europe that is helping partner countries outside the European Union to recover from the crisis. Team Europe combines aid from the European Union, its member states and financial institutions such as the European Investment Bank Group. As of June 2020, almost €**36 billion** had been mobilised for this initiative. The EIB Group has pledged €6.7 billion for Team Europe. The Bank's aid will support urgent healthcare needs and help many parts of the public and private sectors.

Throughout the world, the public and private sectors have developed digital services and digital infrastructure to improve healthcare services and boost the economy. The use of more digital technology to help societies is a top priority for the European Union. Digital services are likely to be a key feature in a joint strategy to be endorsed at the summit meeting of the European Union and the African Union in October 2020.

Several African and European companies have indicated their strong willingness to use their expertise and technology to find alternatives to the quarantine of people and to help fight the crisis. Some of the new digital technology being used right now across Africa can be implemented quickly and has proven useful in the fight against the pandemic in several countries.

To better understand the digital solutions that can help Africa and to estimate the investment required, the European Investment Bank organised a broad-based survey in many African countries, with the help of the United Nations Development Programme and the consulting firm BearingPoint.

The goal was to highlight technological solutions that can manage the pandemic and provide an estimate of the costs. This assessment included two main phases: 1) identify solutions already helping Africa and Europe, and 2) identify the digital solutions African countries need.

These solutions were classified according to five priorities. Based on the classification system, and after reviewing more than 100 digital solutions in Europe and Africa, interviews were carried out and questionnaires were completed involving 50 people from 30 African countries. The people involved are in charge of coordinating digital investments related to the COVID-19 outbreak.

Based on the results, we created three categories: category 1, countries with a low ability to deploy digital solutions; category 2, countries with an intermediate ability to take advantage of digital solutions; and category 3, countries that have already accomplished three or four priorities identified in this paper.

The total investment required to carry out these digital solutions across the African continent, not including costs related to telecom infrastructure, training, or law improvement, has been estimated at €680 million – €190 million for category 1, €140 million for category 2, and €350 million for category 3.

African countries have faced many different crises in the past, especially health-related emergencies such as Ebola. This new crisis is another burden that could hurt the positive trend African economies have experienced over the last 10 years. The digital economy has given countries the ability to accelerate part of the services offered to people. This is part of the so-called digital leapfrog. The coronavirus has required certain countries to quickly implement new digital tools to help communicate with the public, to strengthen healthcare and to monitor the evolution of the pandemic. This shows that in an emergency, African countries have the ability to launch impactful digital projects.

However, based on the interviews, most African countries have reached their limits of financing and lack the ability to go the extra mile to complete the digital transformations required to fight COVID-19 and future crises. The amount of investment and technical assistance still needed is not huge compared to other development programmes and financing initiatives, so efforts should be made to fill this gap. These efforts would go a long way toward increasing the resilience of African countries. This is what the Bank intends to provide for the digital economy.

To meet its commitment to Team Europe, the Bank will work with the public and private sectors to increase financing for healthcare services and businesses. This will include support for regional trade and highly vulnerable sectors. Fast-track financing will be available for countries where the EIB already operates. The Bank aims to attract private sector investment. In the spirit of the Team Europe approach, this initiative has been designed so that EIB financing can be matched by support from international and European development finance partners.

Introduction

Africa has been less affected than Europe by the coronavirus crisis, but the number of cases is increasing as the pandemic progresses across the continent. Measures must be taken so that it does not get worse. Many African families depend on the informal economy[2] and will have to find means of subsistence to continue to live closer to normalcy.

Restrictive containment measures have to be accompanied by economic and social solutions, such as a safety net for people in isolation who cannot work. However, the real concern is reaching people quickly with assistance, but without exposing them to the virus. In predominantly informal economies, most families seek a new source of income every day. Total lockdown in the absence of a daily safety net and the means to relay direct aid would cause a complete economic halt and an increase in poverty. Distributing cash would break the lockdown, putting families at risk. Supply chains also cannot be guaranteed under total lockdown.

The World Health Organization is encouraging people to use digital payment services when possible, saying that the use of cash could be a risk factor in the spread of the coronavirus. Mobile financial services, which have grown across the continent, are allowing governments and startups to perform a significant volume of digital transactions. However, there are huge disparities across the continent in mobile financial services. Countries such as Kenya rely heavily on these technologies for any kind of transaction, while many other countries rarely use this service. Mobile services can be expanded rapidly across the continent with the right financing. Startups that are focused on financial inclusion receive the majority of venture capital funding in Africa.

Among the measures that can support Africa, some can serve fundamental needs and secure minimum services, while some can help prepare the continent for the future and make countries more capable of tackling other health or social crises. Based on several readings[3] and discussions, the European Investment Bank identified five priorities to address a crisis such as the COVID-19 pandemic in Africa and to suggest digital solutions. Those priorities address the three main objectives of Team Europe -- responding to the immediate needs, strengthening healthcare and other essential programmes, and reducing the social and economic effects of the crisis.

[2] "The International Labour Organization estimates that more than 66% of total employment in Sub-Saharan African is in the informal sector." "Understanding the informal economy in African cities: Recent evidence from Greater Kampala," by Angus Morgan Kathage, March 14, 2018, blogs.worldbank.org/team/angus-morgan-kathage.

[3] Readings including "Tackling COVID-19 in Africa, An unfolding health and economic crisis that demands bold action" by Kartik Jayaram, Acha Leke, Amandla Ooko-Ombaka, and Ying Sunny Sun.

Priorities	Digital solutions
1 – Information, risk communication and geolocation of cases	
A. Coordinate government actions	1.1. Set up and operation of the state capacity
B. Anticipate pandemic evolution	1.2. Digital tracking and monitoring
C. Inform the population	1.3. Proactive communication
2 – Health systems responses	
D. Cure the infected	2.1. Contain the epidemic: preventative measures, diagnostics, testing, isolation
E. Increase capacity to fight the pandemic	2.2. Prepare the healthcare ecosystem: infrastructure, drugs and medical equipment
D. Strengthen health systems	2.3. Prepare the healthcare ecosystem: workforce
3 – Supply basic necessities and manage the continuity of essential services	
F. Support the vulnerable population	3.1. Secure the food supply: supply priority products, pricing, tracking and monitoring
E. Increase capacity to fight the pandemic	3.2. Maintain access to essential services: health and education, telecommunications, utilities
4 – Protection of vulnerable populations	
G. Know what to do	4.1. Protect jobs: retraining for crisis needs
F. Support the poorest	4.2. Support most vulnerable populations: social safety-net mechanisms and distribution
5 – Anticipate the impact on society and the economy	
G. Know what to do	5.1. Economy: scenario analysis, impact on economy and public finance
H. Increase resilience	5.2. Short-term stimulus package: financial stability, help firms survive, especially small companies and informal economy
H. Increase resilience	5.3. Preparation for recovery: preparation for "next normal"

All priorities require substantial financial mobilisation and coordination. Some may prove challenging because of physical distancing rules, population movement and the evolution of the pandemic. But digital solutions can still significantly help countries fight the pandemic.

When addressing digital technology in Africa, it is important to consider the challenges, such as access to electricity, internet connectivity, infrastructure, policies and regulations, and the ability of people to use the digital solutions.

Despite these challenges, the digital economy has grown significantly in Africa, with incubators, startups, and IT activities spreading across the continent. Using technology and experience, Africans have created many digital solutions to provide immediate help for the pandemic. Many countries across the continent are using digital technology and developing highly innovative solutions. They have established laws and regulatory frameworks and continue to develop digital skills to offer new solutions. Africa has another key advantage: mobile banking.[4] The massive use of mobile banking for direct payments is an important solution. Ventures such as M-BIRR, which offer mobile money transfers, allow Ethiopians to send and receive money safely and instantly by phone.

[4] An example from Togo around basic universal income implementation leveraging on digital here by the innovation team: https://podcasts.apple.com/my/podcast/covid-cash-transfer-programme-in-togo-that-gives-more/id1508950038?i=1000477961786

However, there are strong disparities among countries. This study describes the current state of digitalisation, the needs in many areas and the challenges African countries are facing in deploying the solutions.

Many of these needs can generally be met without heavy investment. Filling the gaps and providing rapid responses to fight COVID-19 are technically and financially feasible for the international community, and these responses will make the continent's societies and economies more resilient. This work should be done in accordance with data protection and privacy laws and should be subject to good cybersecurity to avoid any misuse of data. This will ensure that investments meet the international community's values and standards.

The European Union is working in various ways and using different programmes to fill these gaps. It is focusing on these areas:

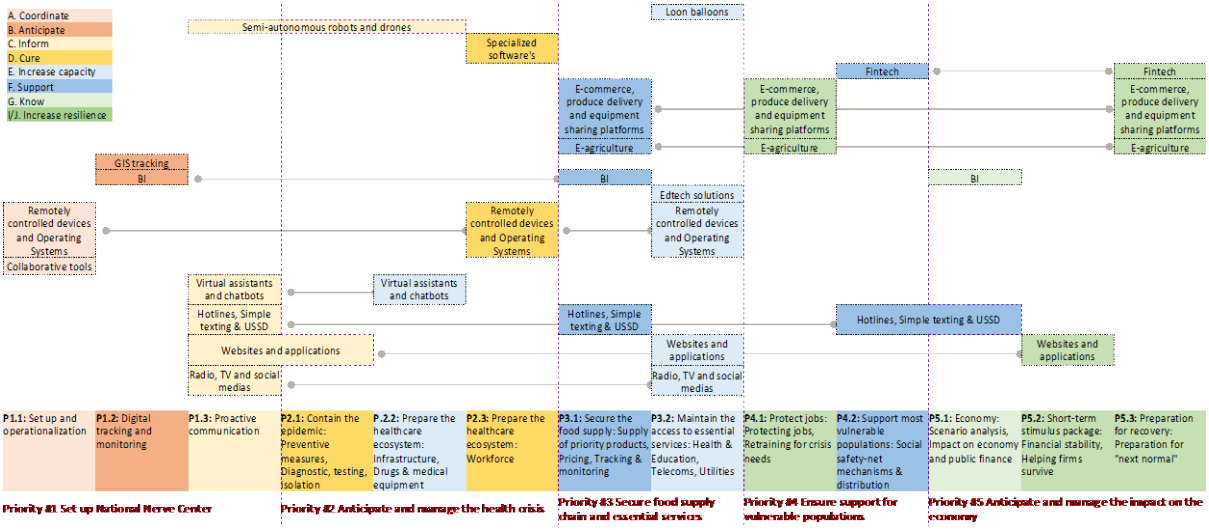
- **Responding to the immediate health crisis** and humanitarian needs. This includes supporting the World Health Organization and the United Nations.
- **Strengthening healthcare, water and sanitation**, and increasing partner countries' ability to deal with the pandemic.
- **Reducing the social and economic consequences**, including giving more support to the private sector, especially small businesses, and encouraging government reforms to reduce poverty.

The European Union is a major contributor to the international aid system. It is promoting a coordinated, multilateral response to the pandemic by joining forces with the United Nations, international financial institutions, and members of the G7 and G20.

Analysis and findings

Digital solutions offered right now

According to the interviews and questionnaires received, many digital solutions for the pandemic address the urgent priorities identified here. A wide range of solutions and technologies have been identified and studied in this paper. Around 100 solutions are already being implemented[5] or tested in African countries. Some solutions are technologically very simple, while others are truly innovative. All provide thoughtful examples of the way to support the fight against the pandemic.



Digital technologies used in relation to the priorities (see in Annex 1 for a full-page table).

Priority 1 – Information, risk communication and geolocation of cases

The first priorities to address in a health crisis such as the COVID-19 pandemic are the country's ability to keep the private and public sectors running, to monitor the spread of the pandemic and to ensure good communication with people about the risks.

Collaborative tools

Tools enabling people to collaborate on projects are widely used across Africa and allow countries to keep operating public services such as ministerial councils, crisis units and surveillance teams.

It seems that the surge in bandwidth use due to the crisis did not break the internet in Africa. As in the rest of the world, network operators and content providers successfully maintained internet services and used the data capacity efficiently. Data capacity was very often increased to avoid major congestion. This internet access resilience is partly related to competition among data networks, especially in urban areas, which allowed traffic peaks to be managed, eliminating service interruptions.

5 As of June 2020.

The coronavirus crisis made it even clearer that providing advanced broadband connections involves a number of challenges. It also put the huge digital divide across the continent into stark relief. Advanced broadband is required for a good experience with videoconferences and other online services. Since the informal economy is widespread in sub-Saharan countries, most people do not work in offices. Teleworking is usually the reserve of managers at service companies or people working for the government, multi-national companies or international organisations.

Contact-tracing apps

Many applications based on geographic information technologies are used to track and monitor the pandemic. These apps often use geolocation data from telecom companies and help identify the contacts of people who have tested positive, and can locate neighbourhoods where the virus is spreading.

Many African startups have developed this type of solution for local needs. **FabLab,** an innovation hub in **Kenya,** has developed an application called **Msafari,**[6] which can track people on public transport. **Morocco** launched a COVID-19 tracking application called **Wiqaytna**[7] in June. The application is downloaded onto mobile phones and uses GPS and Bluetooth technology. Once a case is found, the application crosschecks the person's movements over the last 14 days. Users who have been in contact with someone who has tested positive are notified with a text message. The application has been download more than 1 million times.

Case study on **Msafari, Kenya**

On 23 March 2020, Kenya launched an application for contact-tracing. Public service vehicle operators and passengers are required to provide information that helps trace the movements of people who have contracted the coronavirus. All public drivers or operators are required to enroll using their vehicle registration numbers and collect details of every passenger. The application is expected to trace all the contacts made by an infected person inside public vehicles. An estimated 50% of the Kenyan population uses public transport daily. The application is also intended to enforce a rule on the maximum number of passengers allowed on matatus (minibuses) and buses.

In **Tunisia**, **Enova Robotics** has developed the **PGuard robot**[8], which has been circulating in Tunis since the end of March in a pilot phase. Equipped with speakers and a camera, all remotely controlled, the robot can broadcast safety instructions, check the validity of exit authorisations, and ensure compliance with the lockdown. Such measures can slow the spread of the virus.

Phone apps may help fight the pandemic, but they also raise privacy and data protection concerns. Digital measures used for the pandemic must comply with data protection and privacy legislation or be in line with locally approved practices. The European Commission has recommended a common EU approach on contact-tracing apps, designed to warn people if they have been in contact with an infected person. The apps should not be obligatory and their use should end once the pandemic is over.

6 "We can get it done here": Africa's tech scene tackles virus", Rosebank Killerney Gazette, by Fran Blandy and AFP Africa bureaus, Nairobi (AFP) | 19 May 2020 3:05.

7 Explained through questionnaire answered by Moroccan Digital Agency (https://www.wiqaytna.ma/).

8 https://enovarobotics.eu/.

Large communication tools

Due to the lack of infrastructure, communication is often a challenge in Africa, especially in rural areas and in poor or isolated communities. Communication is even harder under physical-distancing rules. Structured communication campaigns were established quickly in some countries using television, radio, and social networks. Websites, COVID dashboards[9] and government applications have been set up to provide reliable information to people in real time, and to fight fake news. Countries such as Guinea-Bissau[10] and Kenya[11] have created websites to help educate people about the pandemic and combat false information.

In Libya, an emergency telecom hotline managed by the World Food Programme allows humanitarian workers to communicate with communities that need help. It is also trying to ascertain how men and women access and use information differently, to help ensure that the needs of all people can be met.

In several countries, the World Health Organization has set up an artificial intelligence chatbot to provide information. Called WHO HEALTH Alert, the chatbot is available in more than 10 languages. Since February, the WHO has reached out to dozens of governments to help provide accurate information to the public through the WhatsApp service.[12] There have also been country-led offerings in Egypt (including a version for the deaf), Congo and Zimbabwe.[13]

German development agency **GIZ and the European Commission**'s development department, known as DEVCO, are providing up to €30 million in financing for hackathons. One of these initiatives is called SmartDevelopmentHack, launched by the German Ministry for Economic Cooperation and Development. The hackathon is calling for digital solutions to fight the coronavirus in low- and middle-income countries. It is sponsored by the German development ministry, the EU Commission, EU countries, technology companies and other organisations, and is a global hackathon launched ahead of the German presidency of the EU Council. The German software company **SAP** and the survey company **Qualtrics** have worked together to help governments collect real-time data from the public and healthcare workers. This data can be quickly analysed to help respond to the crisis.

Receiving reliable health and safety information is complicated in most regions of Africa without a smartphone or other mobile device and access to the internet. Women experience a particularly substantial cost barrier to getting smartphones, so there is a risk that they will not know how to protect themselves or their families. Some countries use robots to communicate with the public and make sure physical-distancing rules are followed.

Ivory Coast is using drones to spread messages in rural areas. These drones[14] were developed by three local companies, Côte d'Ivoire Drone, WeFly Agri and Investiv, and are also used to sanitise large areas.

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9 Example in Angola.

10 https://airtable.com/shr2xNxlgBXK5oWDb/tblwPhDJfiisTMNg6/viwRoWh6lu99wyzz7/rec65Dm5ijydDlsnA.

11 https://airtable.com/shr2xNxlgBXK5oWDb/tblwPhDJfiisTMNg6/viwRoWh6lu99wyzz7/recWftuJQmCKepel5.

12 See solution 9 in Annex 2.

13 https://airtable.com/shrGXLJECotnZa1Ou/tblwPhDJfiisTMNg6/viwRoWh6lu99wyzz7?blocks=bipVDslkfppjON6Dh.

14 See solution 15 in Annex 2.

Priority 2 – Health system responses

The health crisis also can be managed with digital technologies that improve prevention and diagnostics. It's also important to improve the healthcare infrastructure and the workforce.

Self-assessment applications

Many websites have been launched to share virus prevention advice. In **Togo**, the startup **Teachmepad**[15] has launched a website in local languages that provides prevention information. This initiative is being offered in other languages in different African countries. It may also provide information through phone messages.

To reduce pressure on care centres and healthcare workers, it is important for people to try to self-diagnose. **Wellvis**[16], a healthcare application, is offering a tool that helps people diagnose themselves and contact medical emergency workers in 15 African countries. Such services are particularly useful in countries with a weak healthcare system that cannot serve large numbers of patients. Mbaza is a COVID-19 chatbot used in Rwanda. The solution provides access to valuable COVID-19 information in plain language on any phone at any time and enables feedback connecting people to the authorities. It allows citizens to raise concerns and to provide governments with information on the local situation. The solution was highlighted during #SmartDevelopmentHack organised by the European Commission, together with the German Federal Ministry for Economic Cooperation and Development (BMZ).

Self-assessment solutions – unstructured supplementary service data

The government of **Sierra Leone**[17]**,** in partnership with local startups, launched a self-assessment solution based on this technology in April. An existing unstructured supplementary service data (USSD) government platform was extended to enable citizens to conduct a self-assessment of their symptoms and get updates on Sierra Leone's COVID-19 situation. An additional SMS mobile application that offers users the same functionalities was also developed for smartphone users. **USSD technology** is a low-cost service that helps reach people who have no internet coverage and no access to smartphones.

USSD solutions are the best way to reach both men and women, as there is a significant gender gap for smartphones. Women in low and middle-income countries are 20% less likely to own a smartphone than men. The ability of people to obtain an initial diagnosis not only reassures the population but also helps predict the spread of the virus.

Drones and robots

In April, as the coronavirus was circulating in **Ghana,** an American startup, **Zipline**[18], started using drones to collect test samples from health facilities in rural areas, and deliver them to medical laboratories in the country's two largest cities, Accra and Kumasi. Zipline drones were already being used in **Ghana and Rwanda** for blood transfer between healthcare facilities. This technology performs 600 deliveries per day in Ghana and covers more than 500 hospitals. The company has a contract with

[15] See solution 12 in Annex 2.
[16] See solution 13 in Annex 2.
[17] "Sierra Leone goes live with SMS and USSD COVID-19 self-assessment mobile services", Directorate of Sciences Technology, and Innovation.
[18] See solution 16 in Annex 2.

Ghana to make those 600 deliveries a day for four years at a cost of about $12.5 million. Drones are covering an area that serves nearly 22 million people.

Rwanda, in partnership with the United Nations Development Programme (UNDP), uses four **humanoid robots** in coronavirus treatment centres to minimise physical contact. These robots can screen 50 to 150 people per minute. The robots can deliver food and medication to patient rooms and monitor patient status. These robots protect health workers' lives by minimising physical contact and can speed up service delivery.

Healthcare software

Health Management Information Systems and other data collection systems exist for multiple purposes such as routine health facility data, staffing, equipment, infrastructure, population estimates, disease outbreaks, survey/audit data, patient satisfaction surveys, longitudinal patient records, etc. In a pandemic situation, a digitalised healthcare ecosystem may facilitate the pandemic response by enhancing surveillance and control activities (e.g. for rapid case reporting), and by facilitating the exchange of information (such as efficient documentation and sharing of patient records). The spread of the COVID-19 pandemic has highlighted the importance of health data exchange and interoperability, and has exposed their limited penetration across health organisations. Data visualisation systems (such as GIS) have proven useful to ensuring that programme staff and health workers have a better understanding of the context (geospatial data, administrative and health facilities) and the pandemic (epidemiological overview maps – geospatial and over time). By providing this data in an easy-to-grasp format, health workers and officials are more likely to take this into account for decision making, logistical planning, etc.

Several healthcare software developers have adapted their offers during the pandemic, focusing on COVID-19 monitoring. SAP has launched a **healthcare application** that can be set up in less than a month that helps health ministries to monitor a patient's situation, equipment, and medicine stocks, and provides a real-time dashboard with combined data. The Ministry of Health in Morocco has already implemented this application.

The **mHERO**[19] solution – initially developed in 2014 for the fight against Ebola and used in Uganda, Guinea, Liberia, Mali and Sierra Leone – has enabled many countries that have adopted it to continue their fight against pandemic situations. mHERO is a two-way mobile phone-based communication system that connects ministries of health and health workers. Communication can reach the healthcare workforce in rural areas with no internet coverage by using simple talk-and-text phones. While the platform is built on free technologies, countries are only responsible for the cost of sending texts through mobile network operator and employees' time for using and maintaining the system.

Enabel, the Belgian development agency, and other partners have worked to roll out DHIS2 for health data (District Health Information Software is an open source, web-based health management information system platform). DHIS2 has recently released a digital data package for COVID-19 detection, reporting and surveillance[20].

[19] See solution 18 in Annex 2.
[20] https://www.dhis2.org/covid-19.

Priority 3 – Supply basic necessities and manage the continuity of essential services

The third priority is securing access to the food supply chain and essential services.

E-commerce purchase and delivery platforms

Digital commerce has proven it can meet people's needs during the pandemic. In fact, as physical distancing is imposed many online platforms are being used to purchase and deliver products. This means that digital commerce – as a contact-reduced way of providing products and services – can allow for food security and economic resilience even when shops are closed or movement is restricted due to lockdown measures. **Jumia**, the African e-commerce leader, has strengthened its offerings and supply chain facilities to meet the increase in demand. Jumia has also included products from informal workers, especially women, to help them save and restructure their jobs. The United Nations Development Programme (UNDP), **in partnership with Jumia Uganda**[21]**,** has launched an online platform to enable small and medium-sized businesses to connect with consumers in order to meet new requirements while restrictions on movement are in force. Jumia Food is offering an online ordering platform via an app and a website. The services include a last-mile distribution network, a diverse set of payment methods, quality assurance, training for vendors and growth marketing. The United Nations agency has provided mobile phones, airtime and data services for the vendors.

The European Commission's development department is working on different projects for online commerce to address the COVID-19 crisis, some with local solutions [22]and some being carried out with the UN Capital Development Fund in **Sierra Leone**, for example.

The crisis has accelerated the development of online commerce in Africa. Online platforms are adapting and offering essential products to meet people's needs. Hypermarkets and local producers are also getting involved.

Education technologies

The lockdown has caused school buildings to close. To adapt, many countries are using online teaching, social media, TV, radio and other digital education offerings.

Shule Direct is an online learning platform for students and teachers in secondary schools in Tanzania. This platform is serving over 2 million students and 23 637 teachers. Telecommunications companies are offering free access to the platform during COVID-19 crisis.

Eneza Education[23] currently serves around 380 000 people a month. It offers a subscription service for educational content to children in primary and secondary schools via SMS or USSD, with a daily, weekly, or monthly subscription in Kenya, Ghana and Ivory Coast.

Elsewhere, **KaiOs**[24], a low-cost solution for simple text-and-talk phones, has launched an application named "Life" that enables students to learn, take quizzes, complete assignments, and prepare for national exams, all on a KaiOs-enabled device.

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21 See solution 19 in Annex 2.
22 Digital Agriculture Africa: https://toolkit-digitalisierung.de/en/smartdevelopmenthack/winners/.
23 See solution 21 in Annex 2.
24 See solution 3 in Annex 2.

In Uganda, Enabel has helped the mobile phone operator MTN set up special ICT training programmes based on open source software. The platform ensures continuity of technical and vocational education and training. Of all regions, sub-Saharan Africa has the highest rates of education exclusion. Over 20% of children between the ages of about 6 and 11 are out of school, followed by 30% of young people between the ages of about 12 and 14.

Government monitoring dashboards

Supplying medicines and basic necessities nationwide remains a major challenge for all countries. If countries can track supply in real time, they can adjust to shortfalls.

Djibouti is currently relying on **BI Dashboards**[25] to monitor stocks of medical supplies and critical imports. Using two dashboards, the government receives requests for COVID-19 supplies from all health facilities countrywide in real time through a simplified request form that is accessible by smartphone or computer. It also helps the Ministry of Trade streamline the supply chain and ensure the stability of resale prices and therefore the availability of key food items at affordable prices.

The European Commission's development department is providing €7 million in financing for countries in the Intergovernmental Authority on Development region. This financing will help these countries establish surveillance and monitoring systems for COVID-19 data in line with European standards for data protection and privacy. The systems will be compatible with national and continental systems, such as those established by the African Centres for Disease Control and Prevention. The German development agency GIZ and the Digital for Development Hub are the leading partners for this project.

Priority 4 – Protection of vulnerable populations

People operating in the informal economy are the hardest hit by the crisis and are more vulnerable to the lockdown. We need to ensure support for these vulnerable populations.

SafeBoda[26]**,** an e-commerce platform in **Uganda,** has partnered with the UNDP to launch an initiative that will provide 800 market vendors with access to the SafeBoda app. They can use the app to sell their produce while creating and maintaining the livelihoods of the 18 000 SafeBoda riders whose income has been affected by the ban on public transport. The application will enable about 50 000 customers to be reached daily with food and goods delivery.

Famoco[27] has developed the SCOPE platform for the **World Food Programme** to organise, assist and monitor food and non-food distribution to poor communities and other people who need help. This technology is based on the distribution of e-vouchers through a secure digital platform and the use of a professional terminal by any shopkeeper partnering with the programme.

In general, African governments have had the daunting task of finding solutions to help the poorest people. The contribution of digital has made it possible to facilitate the implementation of this assistance and ensure that it is the right citizens who benefit.

The pandemic has had severe consequences in sectors where a majority of women are employed. Most women across the continent do not have savings accounts. Social protection and food security –

[25] See solution 4 in Annex 2.
[26] See solution 20 in Annex 2.
[27] See solution 2 in Annex 2.

among other key issues – should be a focus in the gender equality responses to COVID-19, including support for technologies such as biometric identification and mobile financial services.

Priority 5 – Anticipate the impact on society and the economy

Anticipating and managing the impact on the economy has been a challenge for governments during the pandemic.

The **UNDP Accelerator Lab, in Kenya**[28]**,** has compiled a systems map covering the relationships between the effects and responses to the COVID-19 pandemic. The UNDP Accelerator Lab began by casting its net wide to see how the response to COVID-19 was evolving. It drew on stories and data from social media. The factors considered included people, institutions, trends, events, norms, beliefs, laws and policies:

- **Increasing local production in the long term** could encourage inclusive growth and help in the fight against climate change if transport to other parts of the world is reduced.
- **Transparency and accountability**: To increase the public's voice and participation in the process of accountability, governments should publish the procurement details of their entire medical infrastructure, develop open contracting platforms, and follow other forms of accountability for public operations.
- **Access to the formal justice system**: The crisis could encourage different arms of government to rethink their approach to technology and to see how it can be used to provide a more engaging experience for everyone involved.

Much of the digital transformation Africa is experiencing because of the COVID-19 pandemic will increase the continent's economic resilience via a higher level of digital knowledge, better productivity and stronger inclusion.

[28] See solution 6 in Annex 2.

Assessment of the digital needs in Africa and the ability of countries to deploy solutions

In our in-depth study, we reviewed digital technologies already being used in African countries and those that still need to be developed. One of the main findings from these interviews is that many digital initiatives have already been implemented across a large number of African countries, but a lot more could be done to improve the ability of the continent to fight COVID-19 and handle related problems, while also preparing to fight other crises in the future. Investments in digital technologies that provide immediate solutions to the pandemic will also build medium-term and long-term economic resilience.

> "**A voluntary task force has been setup by some Gambians to coordinate digital initiatives and fight COVID-19**." - Alagie Fadera, Directorate of Development Planning, Ministry of Finance and Economic Affairs (Gambia)

First of all, the majority of the surveyed countries have set up a specific organisation or task forces to combat the COVID-19 pandemic. For more than half of them, this unit is not focused only on the coordination of digital initiatives, but also on all actions taken to deal with the pandemic. These specific organisations are sometimes led by prime ministers, and most often comprise several institutions and ministries, such as the ministries in charge of the digital economy, health, information and communication technology, security or telecommunications. The telecommunications regulatory authorities and the country's mobile phone operators may also be members of these task forces. Sometimes they are voluntary initiatives by the public.

However, few countries have adopted a specific law or official decision to regulate the deployment of digital solutions for COVID-19. For many of them, the deployment of digital solutions is already covered by existing regulations.

Among the sub-priorities identified, two are almost always addressed by the countries studied: the communication of official information to populations via e-government platforms or mobile phone applications (Priority 1) and continued access to essential services, especially education (Priority 3):

- **Communication of official information to populations via e-government platforms or mobile phone applications**

  The coordination of official communications to the public is considered the first priority in responding to the pandemic. Multiple solutions have emerged. They range from the simple communication of information through an official government or health ministry website to the implementation of mobile applications, and sometimes chatbot solutions, SMS platforms or specific call centres. These solutions communicate information about the pandemic in the country, security measures and government directives, but also information on fighting fake news. Many countries have implemented more than one solution.

- **Continued access to essential services**

  Essential services, such as education, access to energy, water sanitation or security, are also priorities, according to the different statements and concerns from all African countries.

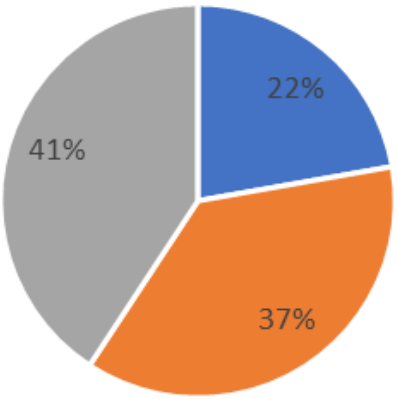
Improving distance education is also a high priority in African countries, and digital solutions in this field have multiplied, using mobile applications, Skype, and the broadcasting of courses on national radio or television.

Some priorities are often addressed by African countries, but in a second phase: the analysis of geographic data to understand the spread of the pandemic and the movements of people (Priority 1), the control of the epidemic through methods such as self-diagnosis and better patient care (Priority 2), and improvements in information systems and equipment in healthcare (Priority 2).

In general, a large number of solutions are developed around the USSD channel, particularly for people who don't have a smartphone and who are often the most isolated. This solution also improves inclusion.

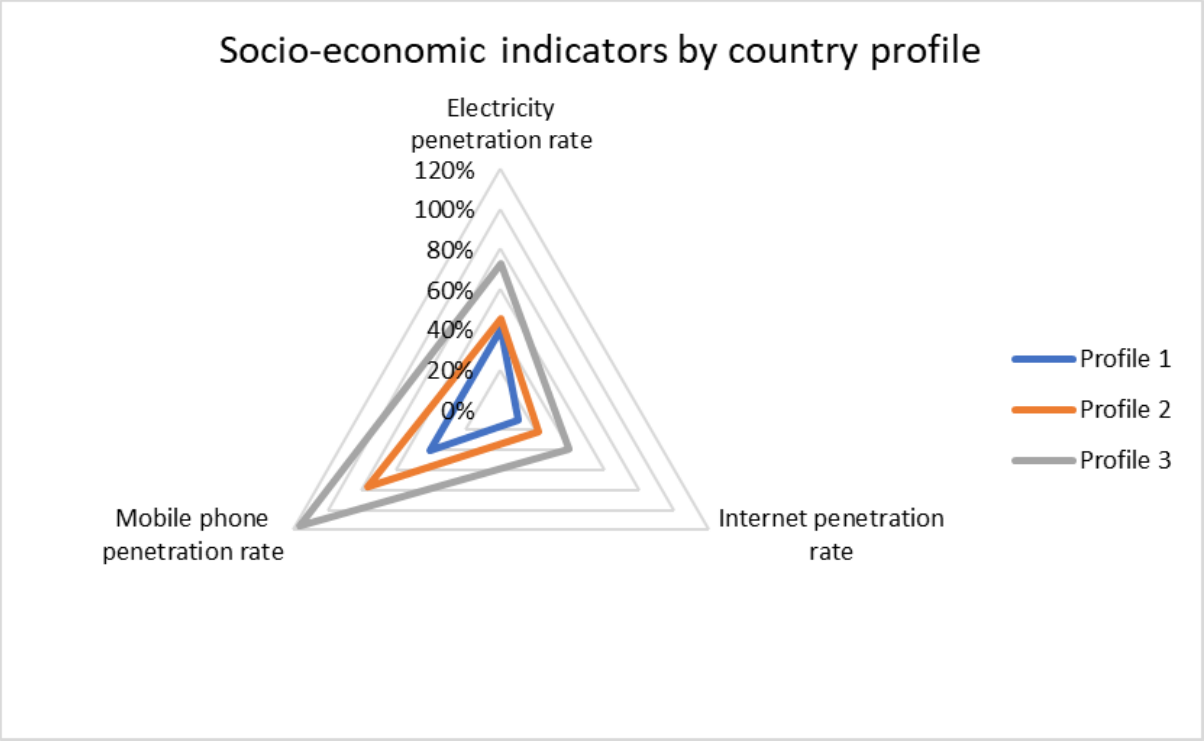
The study highlighted three categories for African countries based their digital progress and their ability to use these solutions. Category 1, for example, adopted digital technologies in a slow and limited manner, while category 3 used digital technologies in a timely way to address a vast array of problems related to the pandemic. According to the interviews, the speed of adoption depends on the ability to develop technology, local coordination, the spread of the pandemic and access to loans or other financing.

% of countries interviewed by category



- Country category 1 – Countries with a low capacity to deploy digital solutions, having responded to very few or no priorities mentioned
- Country category 2 – Countries with an intermediate capacity to deploy digital solutions, which have had the capacity to address 2 to 3 priorities
- Country category 3 – Countries that have already covered 3 to 4 priorities with their deployed digital solutions and whose need is to implement a global digital transformation plan and increase economic resilience

It is noteworthy that there is a certain link between the implementation of digital solutions and the condition of society and the economy in the country. For instance, the average human development index (HDI) of countries in category 1 is about 0.47, with an average of 40 in terms of ranking in Africa. This is 0.58 and 26 for countries in category 2, and 0.59 and 16 for countries in category 3. There is a direct link between the amount of development in an African country and the ability to take advantage of new digital technologies to fight the pandemic.



Source - World Bank Development Indicators

Category 1 - Countries with a low ability to take advantage of new digital technologies, having accomplished few or no priorities mentioned in this paper.

This first category is for countries experiencing significant difficulties in taking advantage of new digital technologies. These countries are using only one solution that helps maintain access to education and enables online courses for students, or the country may not have deployed any digital solutions. A few countries in this category are experiencing difficulties getting started with a solution or persuading people to use them. A lack of electricity and internet are major challenges identified in the interviews, in remote areas and in cities. In some areas, few people have electricity or internet. The second significant issue is the lack of internet servers, data centres and electricity supporting the digital technology already in place or in development. Another difficulty – in Ethiopia, Liberia and Democratic Republic of Congo – is the lack of a digital identification system, which is a huge constraint for countries trying to develop a digital strategy. Countries in this first category have a big problem accessing electricity (less than 40% of population), and mobile phone use is less than 45%, while internet access is less than 20%.

These countries, with an underdeveloped digital economy, usually also have the lowest ability to fight the pandemic with economic power or strong healthcare systems. They are experiencing major challenges dealing with the pandemic and they could be helped quickly by digital technologies. These countries generally have a strong need for digital solutions to accomplish the first three priorities, in particular to enable:

- Tracking of the epidemic and analysis of the most affected areas
- Remote working in key government departments and the provision of equipment to employees
- Improvement of patient care
- Better communication with the public and education about physical distancing for countries that have not deployed digital technologies to meet these needs

Countries have often identified or even started to develop local digital solutions that meet these objectives. However, those countries do not have the capacity to roll out those technologies across their territory due to a lack of funding and infrastructure and low levels of digital knowledge. Moreover, as these countries have very low internet access rates, they need simple solutions often relying on the USSD channel in order to reach a larger share of the population easily.

In addition to the challenges already mentioned, people are generally not familiar with common digital tools, or do not have access to the equipment to use these tools. In addition, these countries do not always have the local capacity to deploy digital solutions throughout the territory and need support from technical partners. Often they have not even been able to find the right technical partners. Angola, for example, is finding it difficult to develop digital solutions, according to its national director for technological innovation. The country was yet to implement any solutions for the coronavirus crisis.

Category 2 - Countries with an intermediate capacity to deploy digital solutions, but with the ability to accomplish two or three priorities.

Countries in this category usually have at least 40% electricity access, 45% mobile phone penetration and 20% internet users.

In addition to the priorities already covered by the first country category, these countries have identified or deployed digital solutions covering broader needs. Concerning the first priority, some of these countries have deployed equipment and tools to facilitate the remote working of several government administrations and tracking applications to anticipate the evolution of the epidemic and identify risk areas. They have also deployed solutions to address priorities relating to the anticipation and the management of the health crisis, including mobile applications or USSD interfaces offering self-diagnosis services and providing a list of doctors and health centres in the country, or the possibility to ask questions and seek medical advice.

As a result, these countries are now focusing primarily on the enhancement of the healthcare system (in particular by developing a centralised information system) and the creation of online health services over the long term. After using digital solutions to provide an immediate answer to the pandemic – informing the public, limiting the spread of the virus or making more efficient use of healthcare resources – countries in this category can also work on building economic resilience. For instance, they also need to implement online commerce and online payment solutions, making it possible to secure the food supply chain, as well as adding tools to monitor medical supply distribution channels.

Countries in this category generally have a sufficient mobile penetration rate, above 80%, which does not represent a major obstacle to the deployment of digital solutions. However, these are often “feature phones,” as the proportion of the population owning a smartphone remains low, and the average internet user rate within countries in this category is only 20%. In addition, these countries generally have a broad vision of the local IT solutions market and have the local capacity to deploy digital solutions across the country easily. For the largest part of this catagory, there is sufficient local capacity in terms of information technology resources to deploy digital solutions.

Category 3 - Countries that have already accomplished three or four priorities with their digital solutions, but that still need to implement a digital transformation plan and increase economic resilience.

The third category involves countries that have implemented a large number of digital initiatives that address most of the priorities identified in this report to fight the pandemic. These investments are countering the spread of the pandemic in a major way. These innovative solutions have enabled remote working for public entities, tracking solutions for the pandemic, effective communication with the population, and improvement of healthcare services. These countries are going even further by using online commerce and online payments to secure the food supply or protect jobs, or solutions to support the poorest people. For example, Mauritania has set up systems to monitor food and medical supply stocks and their distribution, and Morocco has set up an online portal enabling companies to declare employees who can no longer work fulltime.

These countries primarily need to anticipate and manage the pandemic's impact on the economy in the long term, implement solutions to increase economic resilience, and offer sustainable digital solutions that can transform society.

"**We've done a lot, we are happy. At least our innovators and our community were able to address the challenges**." - Angelos Munezero, Ministry of Information Technology and Communications, Rwanda

These countries have demonstrated a strong ability to deploy digital solutions throughout the territory, with a global outlook on the local IT solutions market. Their rates of internet users are disparate and may be very limited, but the population has a high level of digital knowledge and the high rate of mobile phones and smartphones use help these countries provide effective digital solutions for the crisis.

To sum up, the rollout of those solutions is restrained by various challenges in different countries. The absence of a digital identity system in some countries is an obstacle to identification, monitoring and outreach to poor populations. The limited testing for COVID-19 and access to the internet hinders the deployment of tracking solutions, and the low rate of mobile payment users also limits the possible solutions. However, many solutions already developed or created during the pandemic have addressed some of the crisis's challenges.

They won't help all the challenges in Africa, but technological solutions can help countries battle the coronavirus, while digitalising economies and making them stronger.

Investment requirements

Outside the European Union, the Bank signs agreements with countries to offer development finance and other aid. Africa will require a significant level of sustainable investments to help the economy and society recover from the coronavirus crisis.

A wide range of the digital solutions listed in this study require financing to reach their full potential across the continent. The solutions would help manage the crisis, assist medical staff, control the spread of the virus, support the poorest people and help the government educate the public and fight fake news. Each African country is addressing the crisis differently and implementing different measures. The investments have to be adapted according to the level of the pandemic: identification of the crisis, start of the crisis, middle of the crisis, end of lockdown measures, return to something approaching normal life.

To estimate each country's financing needs, three main factors were considered: solutions that have been implemented; solutions that have been identified and budgeted; and investments that still need to be budgeted. For the third factor, regional benchmarks were used to estimate investment requirements. For countries that did not respond to the interviews or questionnaires, investment requirements were estimated based on regional benchmarks with similar criteria.

For each of the sub-priorities defined by the Bank, we identified a digital solution that is deployable and whose benefits go beyond the COVID-19 pandemic. For each solution, we estimated the costs in each African country according to local factors.

All the factors include fixed and variable costs. Fixed costs aren't connected to the number of people served, such as websites and online commerce, which require one solution per country. Variable costs can change with the number of people served, and could include the number of devices offered to students, the number of devices offered to healthcare staff, and the distribution points. Examples of the factors include:

- Devices with access to educational content for students: This involves the number of students enrolled in secondary and tertiary education in rural areas who can benefit from an initiative.
- Solutions to identify and reach vulnerable populations: This involves the number of people below the poverty line who can benefit from a service.
- Devices used by healthcare workers for patient monitoring: This involves the number of healthcare workers involved in COVID-19 work who can benefit from an initiative.
- USSD self-diagnostics: This involves the percentage of the population that uses mobile phones and can benefit from such USSD services.
- Drone deliveries. This involves the size of areas covered by drone deliveries in a country

The calculations explained above were applied to data from the World Health Organization and the World Bank. The data used for estimates include factors such as population, land areas, poverty numbers, poverty income levels of $1.90 a day, school enrolment, medical doctors, nurses and midwives, cellular subscriptions and people using the Internet.

The following estimates do not take into account technical assistance or regulatory reforms needed to address data protection, governance, ethics and privacy issues. The total investment required to carry out these digital solutions across the African continent has been estimated at €680 million over the next 12 months.

The estimates are based on input from 27 African countries. The feedback was collected using interviews and questionnaires.

The estimates only cover the cost of acquiring and deploying digital solutions.

Category	Countries	Estimates
1	Countries with a low ability to deploy digital solutions. They have accomplished very few or no priorities listed in this paper.	***€190 million***
2	Countries with an intermediate capacity to deploy digital solutions. They have accomplished two or three of the priorities.	***€140 million***
3	Countries that have accomplished three or four digital priorities, but they still need to implement a digital transformation plan and increase economic resilience.	***€350 million***
	Total 12 months investment requirements across the African continent	***€680 million***

Going forward

Most African countries are already using many digital technologies to fight the new coronavirus. However, these solutions are not enough, according to most people interviewed. What solutions deserve extra investment to help fight the pandemic, while improving social and economic resilience? This answer can vary widely depending on the country and the state of digital technology there.

For **category 1 countries**, the goal is to find affordable solutions for immediate and basic needs, while making a big difference in people's lives. Here is what these countries need:

- Simple websites to educate the public and combat fake news;
- Collaboration tools that help people work. These tools can improve everyday work outside of a pandemic;
- Affordable and easy-to-implement technologies (USSD or SMS-type) that help with:
    - Self-diagnosis or services to ask a question and get medical advice;
    - Securing the supply of consumer goods and other necessities;
    - Messaging-type solutions to identify and assist communities that need extra help.
- Acquisition of terminals at low prices with integrated applications for e-learning, for example, in countries where many people don't have smartphones.

For **category 2 countries**, the objective is to improve and develop healthcare systems through medium- and long-term programmes that streamline the medical chain, from patient care to treatment, and including the supply of medical equipment.

Online and mobile services in healthcare, agriculture, business and education offer big steps forward for societies and economies. Many of these technologies can be developed locally and do not require much investment.

For **category 3 countries**, the first aim is to build a long-term healthcare system by setting up a centralised and connected information system, making it possible to treat patients effectively and gather information to make quick decisions. These are slightly more expensive solutions.
Investment for this type of country is needed in two areas:

- Recover from the pandemic by collecting better data to manage the end of the crisis and the economic revival;
- Offer more digital services, such as online administrative services and online education.

In general, the investments can address several priorities at the same time and provide long-term help for society and the economy, going far beyond the pandemic.

In the end, the best way to help countries adopt digital solutions might be to maximise the investment possibilities and offer advice on rolling out solutions locally. The key is to find solutions that do the best job of addressing the pandemic while helping society and the economy recover, improving the outlook for future crises, and keeping investments at the minimum level required to meet countries' needs. The European Investment Bank will keep working with Team Europe, the United Nations and other organisations, while encouraging the development of new ideas and new investments that make life better for everyone.

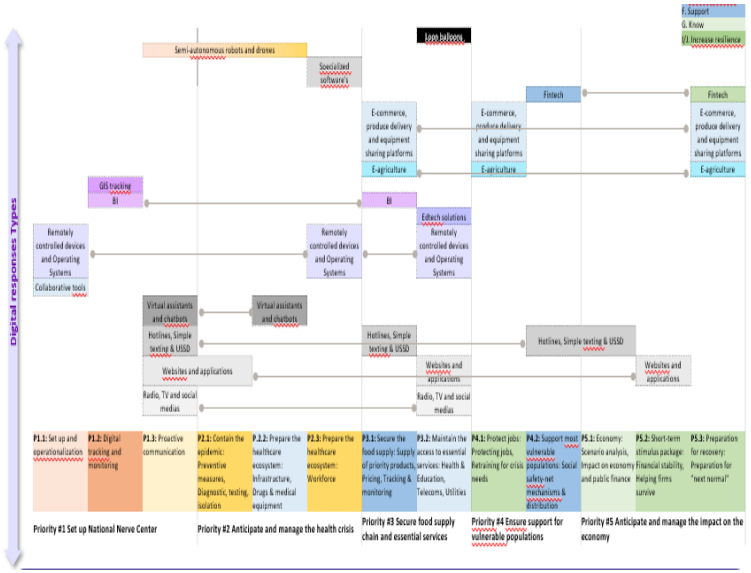
Annexes

Annex 1: Description of solutions

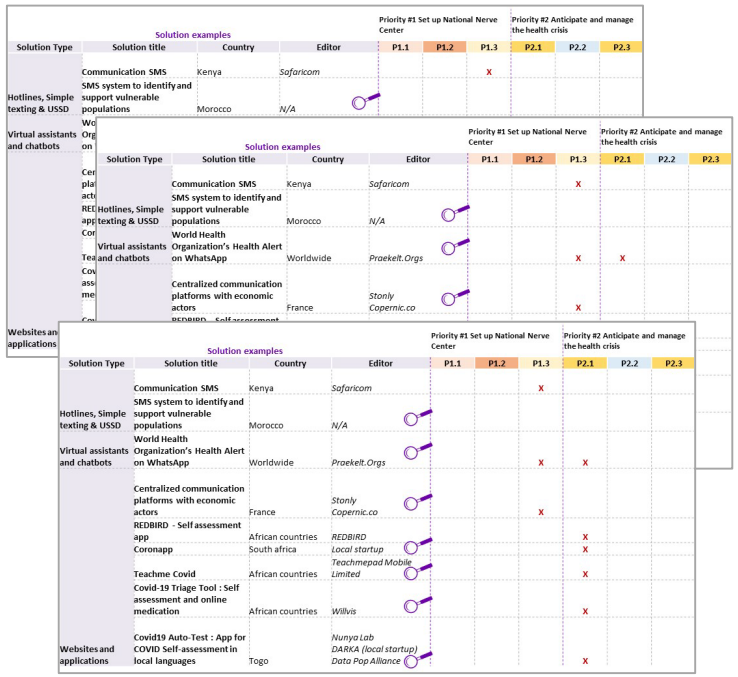
Adopted approach

Based on documentation and information resources shared by the EIB, BearingPoint internal resources and public external resources:

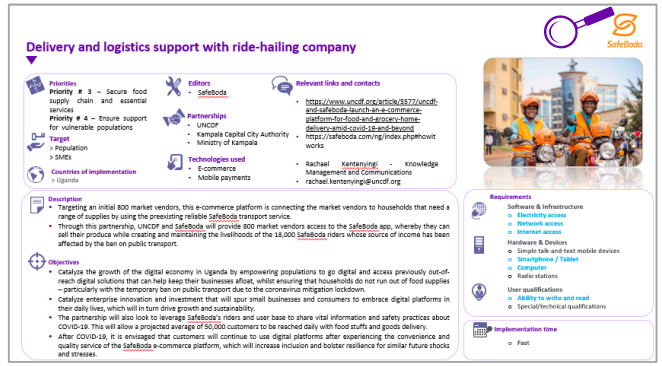
1- A large panel of digital initiatives and specific solutions that are already deployed in many countries all over the world have been identified. The macro-matrix of the most common solutions types being adopted is shown below.

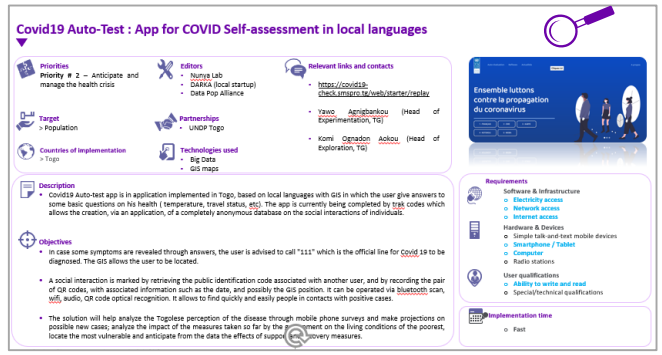


2- A shortlist of about 42 successful examples of specific digital solutions or country case studies that respond to the five urgent priorities, particularly in African countries.

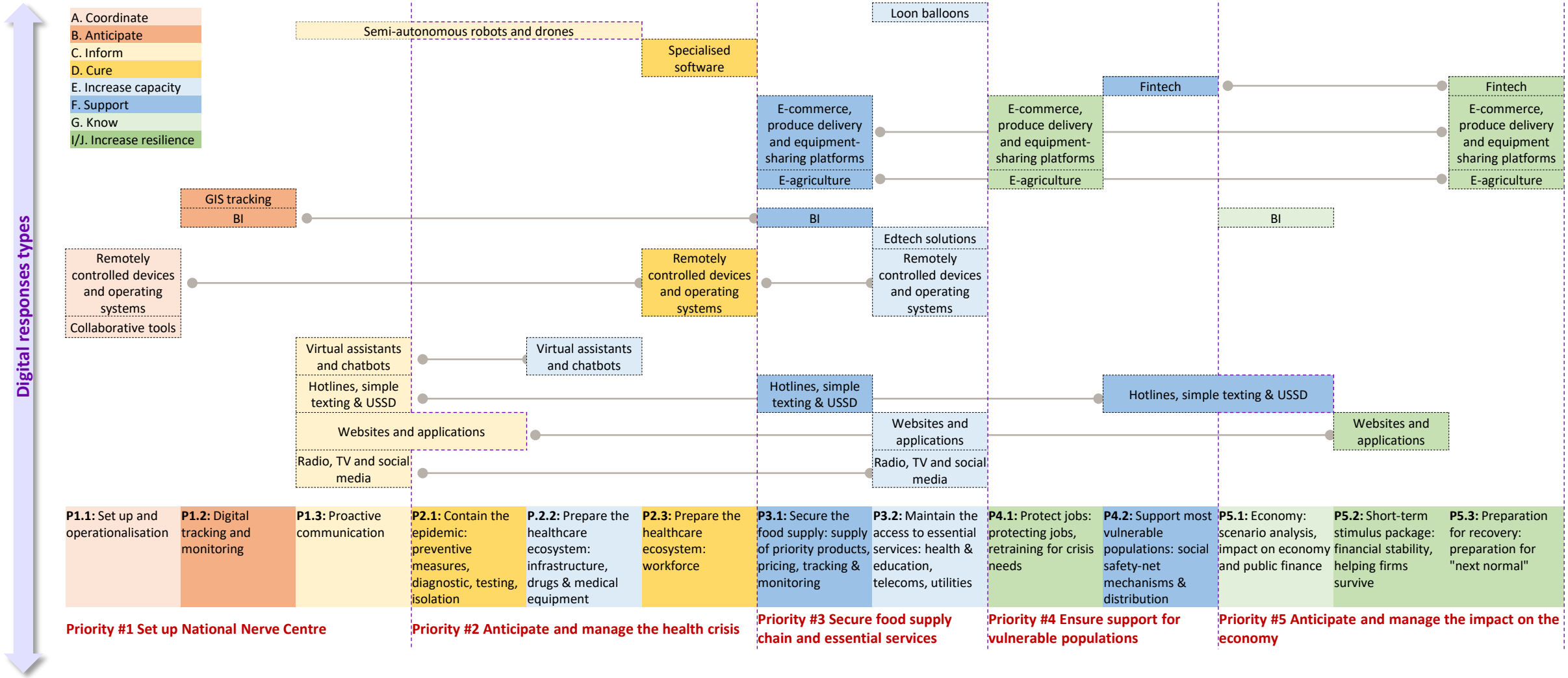


3- A broader outline of specific digital solutions and country case studies.





Countries all over the world are devising various digital solutions that respond to the five urgent priorities to help contain the spread of COVID-19



Many innovative solutions have already been adopted in African countries as a quick response to the challenges of the pandemic. Among more than 200 specific solutions identified, we have shortlisted about 45 digital solutions and country case studies, specifically focusing on about 20 of them.

Digital solution and case study examples (1/5)

Solution examples				Priority #1 Set up National Nerve Centre			Priority #2 Anticipate and manage the health crisis			Priority #3 Secure food supply chain and essential services		Priority #4 Ensure support for vulnerable populations		Priority #5 Anticipate and manage the impact on the economy		
Solution type	**Solution title**	**Country**	**Software developer**	**P1.1**	**P1.2**	**P1.3**	**P2.1**	**P2.2**	**P2.3**	**P3.1**	**P3.2**	**P4.1**	**P4.2**	**P5.1**	**P5.2**	**P5.3**
Collaborative tools	**Dingtalk**	Worldwide	*Dingtalk*	X							X					
	Lark	Worldwide	*Lark*	X							X					
	Hangouts Meet	Worldwide	*Hangouts Meet*	X							X					
	Teams	Worldwide	*MS Teams*	X							X					
	Skype	Worldwide	*Skype*	X							X					
	WeChat Work	Worldwide	*WeChat Work*	X							X					
	Zoom	Worldwide	*Zoom*	X							X					
Remotely controlled devices and operating systems	**Famoco Mobile Devices**	Worldwide	*Famoco*	X												
	KaiOS – Software that gives smartphone capabilities to inexpensive mobile phones	Worldwide	*KaiOs*			X					X					
BI	**Medical Supplies BI Dashboard**	Djibouti	*PowerBI*		X			X			X					
	Critical food imports BI Dashboard	Djibouti	*PowerBI*		X					X						
	COVID behaviour map	Kenya	*Dataminr*											X		

Specific focus

Digital solution and case study examples (2/5)

Solution examples				Priority #1 Set up National Nerve Centre			Priority #2 Anticipate and manage the health crisis			Priority #3 Secure food supply chain and essential services		Priority #4 Ensure support for vulnerable populations		Priority #5 Anticipate and manage the impact on the economy		
Solution type	**Solution title**	**Country**	**Software developer**	**P1.1**	**P1.2**	**P1.3**	**P2.1**	**P2.2**	**P2.3**	**P3.1**	**P3.2**	**P4.1**	**P4.2**	**P5.1**	**P5.2**	**P5.3**
GIS tracking	**Covimoov**	France	*Geo4cast*		X											
	TELIA COVID-19 MOBILITY ANALYSIS	Europe	*Telia*		X											
	TraceTogether	Worldwide	*GovTech*		X											
Hotlines, simple texting & USSD	**Communication SMS**	Worldwide	*Telecom actors*			X										
	SMS system to identify and support vulnerable populations	Worldwide, Eg : *Morocco* *Mauritius*	*N/A*										X			
Virtual assistants and chatbots	**World Health Organization's Health Alert on WhatsApp**	Worldwide	*Praekelt.Orgs*			X	X									
Websites and applications	**Centralised communication platforms with economic actors**	Worldwide, e.g. *France*	*France Focus:* *Stonly* *Copernic.co*			X									X	
	REDBIRD - Self assessment app	African countries	*REDBIRD*				X									
	Coronapp	South Africa	*Local startup*				X									
	Teachme Covid	African countries	*Teachmepad Mobile Limited*				X									
	COVID-19 Triage Tool: self assessment and online medication	African countries	*Willvis*				X				X					
	COVID-19 Auto-Test: app for COVID self-assessment in local languages	Togo	*Nunya Lab* *DARKA (local startup)* *Data Pop Alliance*				X									

Digital solution and case study examples (3/5)

Solution examples				Priority #1 Set up National Nerve Centre			Priority #2 Anticipate and manage the health crisis			Priority #3 Secure food supply chain and essential services		Priority #4 Ensure support for vulnerable populations		Priority #5 Anticipate and manage the impact on the economy		
Solution type	**Solution title**	**Country**	**Software developer**	**P1.1**	**P1.2**	**P1.3**	**P2.1**	**P2.2**	**P2.3**	**P3.1**	**P3.2**	**P4.1**	**P4.2**	**P5.1**	**P5.2**	**P5.3**
Semi-autonomous robots and drones	**Local drone for sanitising public space and spreading messages**	Ivory Coast	*Saved by tech: Côte d'ivoire Drone We Fly Agri Investiv*			X	X	X								
	Hybrix drones by Quaternium	Spain	*Quaternium*			X	X	X								
	Zipline Drones for medical delivery	Worldwide, e.g. *Rwanda Ghana*	*Zipline*				X	X								
	Temperature scanning helmets	Worldwide	*Kuang-chi technology*				X									
Specialised software	**DHIS2 COVID-19 tracker: healthcare software**	Worldwide	*Health Information Systems Program (HISP) the University of Oslo (UiO).*		X											
	mHero for COVID-19: an integrated digital health platform for health worker communication and coordination	African countries	*mHERO*			X			X							

Digital solution and case study examples (4/5)

Solution examples				Priority #1 Set up National Nerve Centre			Priority #2 Anticipate and manage the health crisis			Priority #3 Secure food supply chain and essential services		Priority #4 Ensure support for vulnerable populations		Priority #5 Anticipate and manage the impact on the economy		
Solution type	**Solution title**	**Country**	**Software developer**	**P1.1**	**P1.2**	**P1.3**	**P2.1**	**P2.2**	**P2.3**	**P3.1**	**P3.2**	**P4.1**	**P4.2**	**P5.1**	**P5.2**	**P5.3**
E-agriculture	**Mergdata - Helping rural farmers connect**	Kenya & 13 other countries	*FarmerLine*							X		X				X
	Farmafrica - Helping rural farmers connect	African countries	*Farmafrica*							X		X				X
	Apollo Agriculture - Helping rural farmers connect	Kenya	*Apollo Agriculture*							X		X				X
E-commerce, produce delivery and equipment-sharing platforms	**Jumia: using e-commerce to link market vendors with consumers online**	African countries, e.g. *Uganda Focus*	*Jumia*							X		X				X
	Safe Boda - Delivery and logistics support with ride-hailing company	Uganda	*SafeBoda*							X		X				X
	Freshinabox - Vegetable sales and delivery	Zimbabwe	*Freshinabox*							X		X				X
	The Market Garden - Vegetable sales and delivery	Uganda	*The Institute for Social Transformation*							X		X				X

Digital solution and case study examples (5/5)

Solution examples				Priority #1 Set up National Nerve Centre			Priority #2 Anticipate and manage the health crisis			Priority #3 Secure food supply chain and essential services		Priority #4 Ensure support for vulnerable populations		Priority #5 Anticipate and manage the impact on the economy		
Solution type	**Solution title**	**Country**	**Software developer**	**P1.1**	**P1.2**	**P1.3**	**P2.1**	**P2.2**	**P2.3**	**P3.1**	**P3.2**	**P4.1**	**P4.2**	**P5.1**	**P5.2**	**P5.3**
Edtech solutions	**Cell-Ed – Learner-centred, skills-based learning platform with offline options**	Worldwide	*Cell-ED*								X					
	Eneza Education - Revision and learning materials for basic feature phones	Worldwide	*Eneza Education*								X					
	Funzi – Mobile learning service that supports teaching and training for large groups	Worldwide	*Funzi*								X					
	Ubongo - Uses entertainment, mass media, and the connectivity of mobile devices to deliver localised learning to African families at low cost and scale	African countries	*Ubongo*								X					
	Kolibri - offline app for universal education	Worldwide	*Kolibri*								X					
Loon balloons	**High-altitude balloons to supply internet to remote communities**	Worldwide , e.g. *Kenya focus*	*Loon (Google)*								X					

Annex 2: Digital solutions case studies

#	Title
1	Uganda: enable virtual government business continuity through collaborative tools
2	Famoco: remotely controlled Android devices
3	KaiOs: software that gives smartphone capabilities to inexpensive mobile phones and helps open portals to learning opportunities
4	Djibouti: dashboard to monitor the stock of key medical supplies
5	Djibouti: commodities dashboard to monitor supply of critical food imports
6	Kenya: COVID behaviour map, leveraging opportunities forged in the COVID-19 crisis to deliver long-term change
7	Telia: COVID-19 mobility analysis
8	Morocco: SMS system to identify and support vulnerable populations
9	Worldwide World Health Organization's Health Alert on WhatsApp
10	France: centralised communication platforms with economic actors
11	South Africa: Coronapp , a reliable information source and self-assessment tool
12	Multi-form and multi-language awareness-raising platform to tackle COVID-19
13	Many African countries: COVID-19 triage tool for self-assessment and online medication
14	Togo: COVID-19 auto-test - COVID self-assessment in local languages application
15	Ivory Coast: drones to sanitise public spaces, spread information and take temperature
16	Rwanda and Ghana: drones for medical deliveries to rural communities
17	Worldwide: DHIS2 COVID-19 tracker, healthcare software
18	mHero, an integrated digital health platform for health worker communication and coordination
19	Uganda: Jumia using e-commerce to connect informal vendors and consumers
20	Uganda: SafeBoda, delivery and logistics support with ride-hailing company
21	Eneza Education, revision and learning materials for basic feature phones
22	Ubongo, entertainment, mass media, and the connectivity of mobile devices to deliver localised learning
23	Kenya: high-altitude balloons to supply internet to remote communities

Uganda: enable virtual government business continuity through collaborative tools

Priorities
P1.1: Set up and operationalisation

Target
> Government employees

Countries of implementation
> Uganda

Software developers
- Zoom

Partnerships
- UNDP Uganda

Technology Type
- Collaborative tools

Relevant links and contacts
- https://www.ug.undp.org/content/uganda/en/home/presscenter/pressreleases/2019/covid-19--undp-supports-uganda-government-business-continuity-th.html

Description

- UNDP has provided a collaboration tool, Zoom, and an assortment of ICT gadgets to enable virtual government business continuity as the novel coronavirus disease (COVID-19) affects routine operations in several ministries, departments and agencies as well as the Executive, Legislature and Judiciary.
- By early April, over 81 government institutions including 40 districts had key officials registered and enabled to remotely video-conference in supporting government business continuity. Notable examples include the Office of the Prime Minister, the Office of the President, Ministry of Local Government, and Ministry of ICT and National Guidance.

Objectives

- Enable the Government to maintain its core functions, and to plan, coordinate, communicate and finance its response to COVID-19 in a robust manner.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Famoco: remotely controlled Android devices

Priorities
P1.1: Set up and operationalisation
P2.3: Prepare the healthcare ecosystem: workforce
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Economic actors
> Population

Countries of implementation
> Worldwide

Software developers
- Famoco

Partnerships
- N/A

Technology Type
- Remotely controlled devices and operating systems

Relevant links and contacts
- https://www.famoco.com/

Description

Business applications on secure Android devices, remotely manageable in one SaaS platform.

Objectives

Famoco offers many devices and applications types to ensure:

- Contactless payment.
- Transport ticket validation.
- QR code payment.
- Inventory management.
- Goods tracking.
- Biometric customer enrollment.
- ID verification.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

KaiOs: software that gives smartphone capabilities to inexpensive mobile phones and helps open portals to learning opportunities

Priorities
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Population

Countries of implementation
> Worldwide

Software developers
- KaiOs

Partnerships
- N/A

Technology Type
- Remotely controlled devices and operating systems

Relevant links and contacts
- KaiOS – Software that gives smartphone capabilities to inexpensive mobile phones and helps open portals to learning opportunities. https://www.kaiostech.com/life-the-kaios-in-house-app-that-bridges-the-gap-to-educational-resources-is-now-live-in-africa/

Description

Open up new possibilities for individuals, organisations, and societies by bringing mobile connectivity to people without internet in emerging markets, as well as providing those in established markets with an alternative to smartphones.

Objectives

- Through different applications, KaiOS users have access to reliable and practical information about the coronavirus disease and prevention measures.
- Application that equips first-time internet users with tools and resources in digital skills, health, education, and other essential topics now includes coronavirus-related information from UNICEF and the WHO. It also gives users access to the WHO's WhatsApp chatbot, which answers questions in real-time.
- Application that allows students to learn, take quizzes, complete assignments, and prepare for national exams, all on a KaiOS-enabled device.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Djibouti: dashboard to monitor the stock of key medical supplies

Power BI

Priorities

P1.2: Digital tracking and monitoring
P.2.2: Prepare the healthcare ecosystem: infrastructure, drugs & medical equipment
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target

> Government
> Healthcare personal

Countries of implementation

> Djibouti

Software developers

- Powerbi

Partnerships

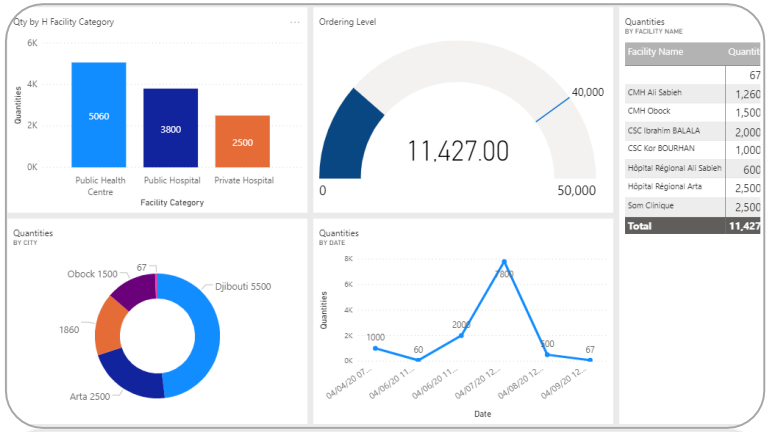
- UNDP Djibouti
- Ministry of Health
- Central Medical Store
- Intergovernmental Authority on Development, IGAD

Technology Type

- BI

Relevant links and contacts

- https://app.powerbi.com/
- Gael Ollivier (Legal Specialist, TD)



Description

- Real-time COVID-19 dashboard to visualise and monitor the stock levels of the key medical supplies and equipment related to COVID-19, and notably PPE, at a country level for the Ministry of Health and at a regional level for IGAD.

Objectives

- Receive requests for COVID-19 supplies from all health facilities countrywide in real-time through a simplified request form that is accessible by smartphone or PC.
- Monitor and approve the quantities to be delivered and notify the dispatcher and requester.
- Track the stock levels, assess trends and enable informed decision making on re-ordering levels for any specific item.
- Track stock levels in each IGAD country and facilitate coordination and swaps among countries to respond to most urgent and priority needs.
- The real-time COVID-19 dashboard of health products is fully automated and visible to authorised users 24/7.

Requirements

Software & infrastructure

- Electricity access
- Network access
- Internet access

Hardware & devices

- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications

- Ability to read and write
- Special/technical qualifications

Djibouti: commodities dashboard to monitor supply of critical food imports

Power BI

Priorities
P1.2: Digital tracking and monitoring
P3.1: Secure the food supply: supply of priority products, pricing, tracking & monitoring

Target
> Government

Countries of implementation
> Djibouti

Software developers
- Powerbi

Partnerships
- UNDP Djibouti
- Ministry of Trade

Technology Type
- BI

Relevant links and contacts
- https://app.powerbi.com/
- Gael Ollivier (Legal Specialist, TD)

Description
- Real-time COVID-19 commodities dashboard to visualise and monitor the stock levels of the critical food imports during the COVID-19 lockdown to meet national food consumption needs.

Objectives
- This data is used by the Ministry of Trade to closely monitor market prices and support informed policy decisions.
- It helps the Ministry of Trade to streamline the supply chain and ensure stability of resale prices and therefore availability of key food items at affordable prices for the population.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Kenya: COVID behaviour map, leveraging opportunities forged in the COVID-19 crisis to deliver long-term change

Dataminr

Priorities
P5.1: Economy: scenario analysis, impact on economy and public finance

Target
> Government

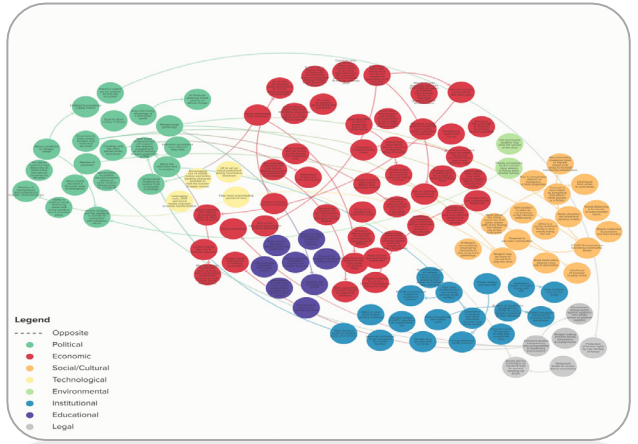
Countries of implementation
> Kenya

Software developers
- Dataminr

Partnerships
- UNDP Accelerator Lab in Kenya

Technology Type
- BI

Relevant links and contacts
- https://www.ke.undp.org/content/kenya/en/home/blog/2020/leveraging-opportunities-forged-in-the-covid-19-crisis-to-delive.html
- Victor Apollo, Head of Solutions Mapping



Description
The UNDP Accelerator Lab in Kenya compiled a systems map showing the interrelations between effects of and responses to the COVID-19 pandemic. Methodologically, UNDP Accelerator Lab began by casting its net wide to illuminate forces that impact how the response to COVID-19 was evolving by drawing on data and stories from social media, including Twitter analytics and trending hashtags, and tapping into the work of Dataminr and media outlets. The factors considered included people, trends, events, norms, beliefs, phenomena, institutions, laws and policies, focusing on those that led to both negative and positive systemic behaviours and grouping these within defined political, economic, social, technological, educational, legal, and institutional spheres.

Objectives
Innovations born of necessity during the pandemic situation have the potential to strengthen socio-economic infrastructure for the future. Below are a few examples of what could be considered as potential arising from the systems mapping exercise.

- **Transparency and accountability**: equal focus could be placed on developing open contracting platforms; helping government to publish the procurement details of all its medical infrastructure and new forms of social accountability to increase public voice and participation in the process of accountability.
- **Upscaling local production in the long-term**: this would not only be a tool for inclusive growth, but also a weapon in the fight against climate change if intercontinental transport is reduced.
- **Access to formal justice system**: the crisis could act as a tipping point to encourage the judiciary and other arms of government to rethink their approach to technology and to see how it can be used to provide a more engaging and inclusive experience for their stakeholders.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Telia: COVID-19 mobility analysis

Priorities
P1.2: Digital tracking and monitoring

Target
> Government

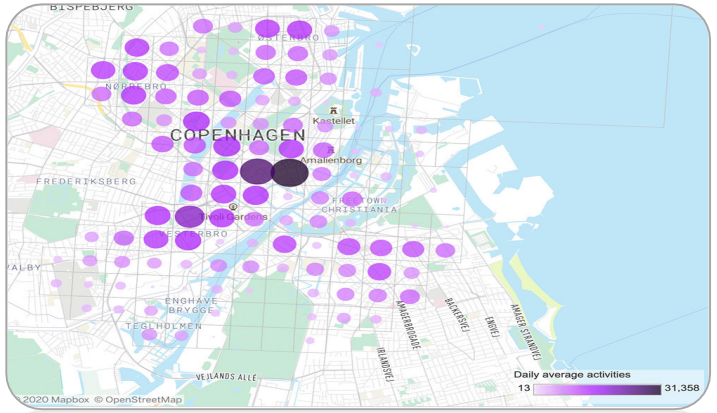
Countries of implementation
> Europe

Software developers
- Telia

Partnerships
- N/A

Technology Type
- GIS Tracking

Relevant links and contacts
- https://www.ug.undp.org/content/uganda/en/home/presscenter/pressreleases/2019/covid-19--undp-supports-uganda-government-business-continuity-th.html



Description

As national authorities around the world take on the COVID-19 pandemic, they face the universal challenge of trying to make the best possible public health decisions - based on evidence and data. One measure taken everywhere is to stay in the area where you live and travel restrictions have been put in place to different extents. To be able to stay on top of how these restrictions are working out, national authorities across the Nordics and Estonia have been seeking up-to-date data about people's travel patterns.

Objectives

A commercial service analysing anonymised and aggregated mobile network data which provides a way to understand grouped movement behaviour in society, such as travel patterns.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Morocco: SMS system to identify and support vulnerable populations

Priorities
P4.2: Support most vulnerable populations: social safety-net mechanisms & distribution

Target
> Government
> Population

Countries of implementation
> Morocco

Software developers
- TBD

Partnerships
- Moroccan government
- Moroccan telecom companies
- Banks and money transfer companies

Technology Type
- Hotlines, simple texting & USSD

Relevant links and contacts
- https://ledesk.ma/2020/03/30/exclusif-voici-comment-laide-de-subsistance-aux-menages-sera-distribuee/

Description

- Identification and distribution of financial aid for vulnerable populations and informal workers, via a simple SMS system.

Objectives

- Identify vulnerable populations eligible for financial aid by sending their affiliation numbers via SMS.
- Communicate via SMS with vulnerable populations to inform them about withdrawal points near there locations, taking social distancing into consideration.

Requirements

Software & Infrastructure
- Electricity access
- **Network access**
- Internet access

Hardware & devices
- **Simple talk-and-text mobile devices**
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- **Ability to read and write**
- Special/technical qualifications

Worldwide World Health Organization's Health Alert on WhatsApp

Priorities
P1.3: Proactive communication
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation

Countries of implementation (*examples*)
- South Africa
- New Zealand
- Australia
- Mozambique
- Uganda
- Ethiopia
- Bangladesh
- Madagascar
- Timor-Leste

Software developers
- Praekelt.Orgs

Partnerships
- World Health Organization
- WhatsApp
- Facebook

Technology Type
- Virtual assistants and chatbots

Relevant links and contacts
- https://www.praekelt.org/onboarding-form
- https://www.praekelt.org/
- https://www.whatsapp.com/coronavirus/who

Target
> Population

Description
- WHO has launched a dedicated messaging services in 11 languages in partnership with WhatsApp and Facebook to keep people safe from coronavirus. This easy-to-use messaging service has the potential to reach 2 billion people and enables WHO to get information directly into the hands of the people that need it. This solution can be adapted to countries' local contexts.

Objectives
- WhatsApp-based helpline to support users on queries/concerns and direct them to accurate information sources.
- Automated responses provide answers to the most frequently asked questions.
- Machine learning and natural language understanding enable automatic triage to help manage conversations at scale.
- Serving government decision-makers by providing the latest numbers and situation reports.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

France: centralised communication platforms with economic actors

Priorities
P1.3: Proactive communication
P5.2: Short-term stimulus package: financial stability, helping firms survive

Target
> Economic actors

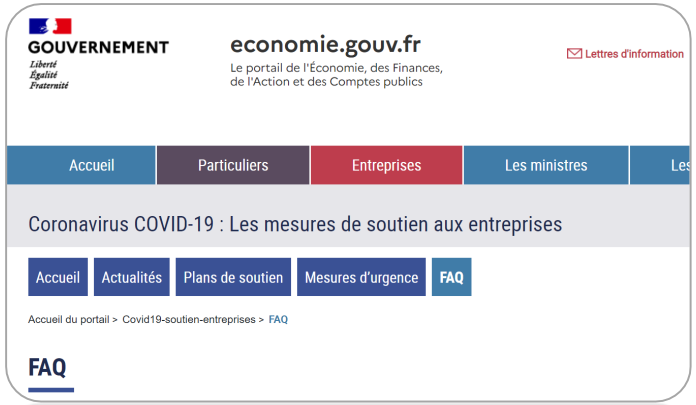
Countries of implementation
> France

Software developers
- Stonly
- Copernic.com

Partnerships
- French Ministry of Finance & Economy

Technology Type
- Websites and application

Relevant links and contacts
- https://info-entreprises-covid19.economie.gouv.fr/kb/fr/financement-8233



Description
- The French Ministry of Finance and Economy, in partnership with Stonly and Copernic startups, has launched an online support and communication tool for economic actors.

Objectives
- Centralised and reliable communication about governmental initiatives to support economic actors.
- Open forum for questions.
- Online financial assessment tool.
- Access to financial support and aids.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

South Africa: Coronapp , a reliable information source and self-assessment tool

Priorities
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation

Software developers
- Local startup

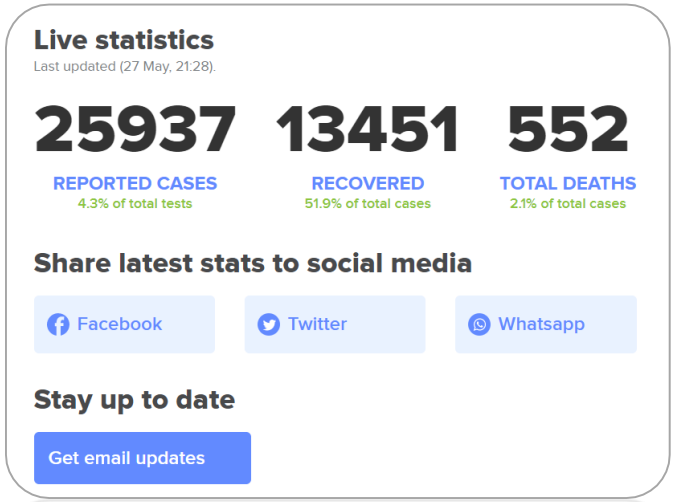
Relevant links and contacts
- https://www.coronapp.co.za/https://www.coronapp.co.za/

Target
> Population

Partnerships
- N/A

Countries of implementation
> South Africa

Technology Type
- Websites and applications



Description

- Coronapp is a centralised repository for relevant and accurate information regarding the COVID-19 virus in South Africa. Its purpose is to make reliable information highly accessible to South Africans to help people and prevent panic. The information published is collected from government and health authorities.

Objectives

- Provide reliable and verified access to information and statistics about regional and national COVID-19 evolution.
- Provide quick self assessment and link with emergency services and WhatsApp support.

Requirements

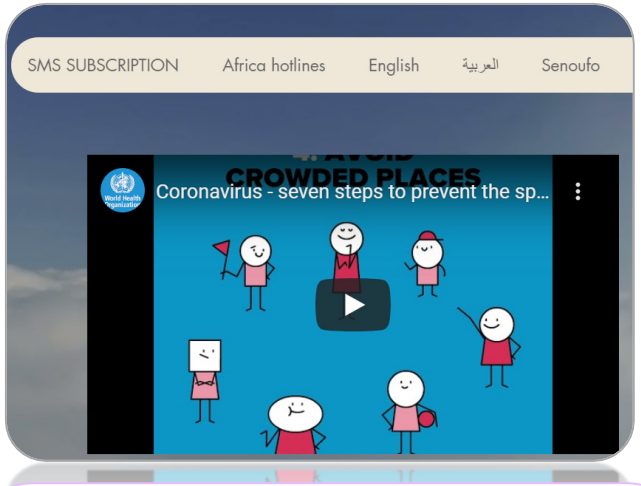
Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Multi-form and multi-language awareness-raising platform to tackle COVID-19

TEACHMECOVID
DISCOVER THE COVID-19 TRANSITION IN AFRICAN LANGUAGES



Priorities
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation

Target
> Population

Countries of implementation
> Cameroon & other African countries

Software developers
- Teachmepad Mobile Limited

Partnerships
- UNDP

Technology Type
- Websites and applications

Relevant links and contacts
- https://www.teachmecovid.com/

Description
- Multi-form & multi-language awareness-raising platform to tackle COVID-19.

Objectives
- Provide information about useful emergency numbers in different African countries.
- Provide information about the health situation in countries in local languages via SMS.
- Free access to prevention audio and video sports in more than nine local languages.

Requirements

Software & infrastructure
- **Electricity access**
- **Network access**
- **Internet access**

Hardware & devices
- Simple talk-and-text mobile devices
- **Smartphone/tablet**
- **Computer**
- TV/radio stations

User qualifications
- **Ability to read and write**
- Special/technical qualifications

Many African countries: COVID-19 triage tool for self-assessment and online medication

Priorities
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Population
> Healthcare personal

Countries of implementation
> 16 African countries*

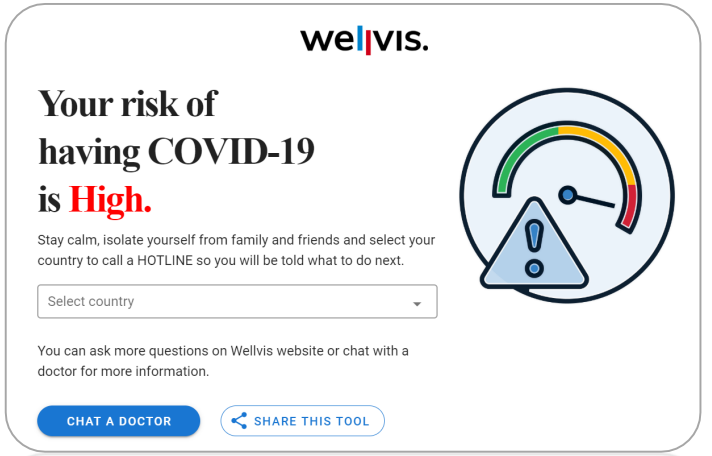
Software developers
- Wellvis

Partnerships
- N/A

Technology Type
- Websites and applications

Relevant links and contacts
- http://covid19.wellvis.org/

** Nigeria, Benin, Burkina Faso, Cameroon, Cape Verde, Ivory Coast, Ghana, Guinea, Guinea-Bissau, Kenya, Mali, Senegal, Sierra Leone, Togo, Gambia*



Description
- Wellvis app is an application that allows users to self-assess their coronavirus risk category based on their symptoms and exposure history in a free way. The application also allows digital healthcare appointments that can be payed online.

Objectives
- Assess how many individuals in a geographical location are at high, medium, and low risk levels of contracting COVID-19.
- Provide data for contact tracing of individuals who present a high risk.
- Provide support for planned testing of individuals in an identified high-risk location.
- Provide the required safety education and reassurance.
- Connect users to doctors for virtual private chat.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Togo: COVID-19 auto-test - COVID self-assessment in local languages application

Priorities
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation

Target
> Population

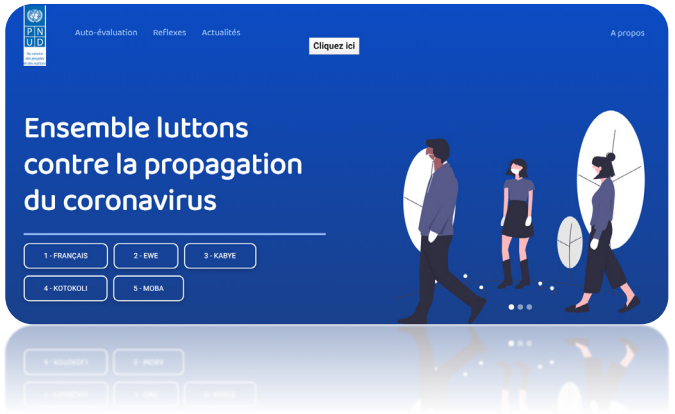
Countries of implementation
> Togo

Software developers
- Nunya Lab
- DARKA (local startup)
- Data Pop Alliance

Partnerships
- UNDP Togo

Technology Type
- Websites and applications

Relevant links and contacts
- https://covid19-check.smspro.tg/web/starter/replay
- Yawo Agnigbankou (Head of Experimentation, TG)
- Komi Ognadon Aokou (Head of Exploration, TG)



Description
- COVID-19 auto-test app is in application implemented in Togo, based on local languages with GIS in which users give answers to some basic questions on their health (temperature, travel status, etc.). The app is currently being completed with tracking codes which allows the creation, via an application, of a completely anonymous database on the social interactions of individuals.

Objectives
- In the event symptoms are revealed through answers, the user is advised to call "111“, which is the official line for COVID-19 to be diagnosed. The GIS allows the user to be located.
- A social interaction is marked by retrieving the public identification code associated with another user, and by recording the pair of QR codes, with associated information such as the date, and possibly the GIS position. It can be operated via Bluetooth scan, WiFi, audio or QR code optical recognition. It makes it possible to find people in contact with positive cases quickly and easily .
- The solution will help analyse the Togolese perception of the disease through mobile phone surveys and make projections on possible new cases; analyse the impact of the measures taken so far by the government on the living conditions of the poorest; locate the most vulnerable; and anticipate from the data the effects of support and recovery measures.

Requirements

Software & infrastructure
- **Electricity access**
- **Network access**
- **Internet access**

Hardware & devices
- Simple talk-and-text mobile devices
- **Smartphone/tablet**
- **Computer**
- TV/radio stations

User qualifications
- **Ability to read and write**
- Special/technical qualifications

Ivory Coast: drones to sanitise public spaces, spread information and take temperature

Côte d'Ivoire Drone
We Fly Agri
Investiv

Priorities
P1.3: Proactive communication
P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation
P.2.2: Prepare the healthcare ecosystem: infrastructure, drugs & medical equipment

Target
> Government
> Population

Countries of implementation
> Ivory Coast

Software developers
- Côte d'Ivoire Drone
- We Fly Agri
- Investiv

Partnerships
- N/A

Technology Type
- Semi-autonomous robots and drones

Relevant links and contacts
- https://afrique.le360.ma/cote-divoire/societe/2020/04/10/30155-cote-divoire-coronavirus-des-drones-concus-par-un-marocain-mobilises-contre-le-covid-19
- Marouane Jebbar – "Côte d'ivoire Drone" - CEO

Description
- "Saved by tech" is an Ivoirian foundation led by three leading local companies specialised in drone design. It has developed three types of drone for specific uses to tackle COVID-19.

Objectives
- Spread pre-recorded or live messages from the sky on how to prevent coronavirus infection in rural aeras.
- Measure temperature using a thermic camera.
- Transport about 30 litres of liquid solution to sanitise public spaces.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Rwanda and Ghana: drones for medical deliveries to rural communities

Priorities

P2.1: Contain the epidemic: preventive measures, diagnostic, testing, isolation

P.2.2: Prepare the healthcare ecosystem: infrastructure, drugs & medical equipment

Target

> Population

> Healthcare personal

Countries of implementation

> Rwanda

> Ghana

Software developers

- Zipline

Partnerships

- Local governments

Technology Type

- Semi-autonomous robots and drones

Relevant links and contacts

- https://flyzipline.com/covid-19/
- https://www.voanews.com/covid-19-pandemic/ghana-drones-help-combat-covid-19
- GlobalHealth@flyzipline.com

Description

- Already used for supplying blood to a network of 21 remotely located transfusion clinics in Rwanda and carrying more than 35% of Rwanda's blood supply, Zipline high speed drones are being used to tackle the COVID-19 pandemic by delivering vital packages to clinics and hospitals over up to 85 km in Ghana and Rwanda, in about one-third the time it would take by car.

Objectives

- Reduce unnecessary hospital visits and lower the risk of exposure for non-infected patients by extending the reach of the healthcare system to areas closer to their home.
- Deliver medical supplies to hospitals, clinics, healthcare workers or directly to patients.
- Carry samples from suspected coronavirus patients to labs in Ghana's and Rwanda's big cities, allowing the government to more quickly monitor the spread of COVID-19.

Requirements

Software & infrastructure

- Electricity access
- Network access
- Internet access

Hardware & devices

- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications

- Ability to read and write
- Special/technical qualifications

Worldwide: DHIS2 COVID-19 tracker, healthcare software

Priorities
P1.2: Digital tracking and monitoring

Target
> Government
> Healthcare personal

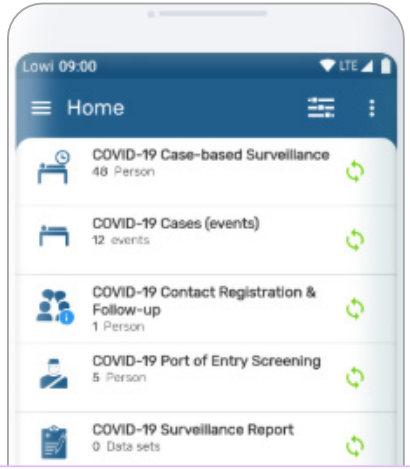
Countries of implementation
> Operational in 21 countries all over the world
> In development in 26 countries

Software developers
- Health Information Systems Program (HISP)
- University of Oslo (UiO).

Partnerships
- UNDP
- World Health Organization (WHO)
- Ministry of Health

Technology Type
- Specialised software

Relevant links and contacts
- https://www.dhis2.org/development
- covid@dhis2.org.



Description
- District Health Information 2 is the world's largest HMIS platform, in use by 67 low and middle-income countries. 2.3 billion people live in countries where DHIS2 is used. DHIS2 has released a digital data package offering five main functionalities, to accelerate case detection, situation reporting, active surveillance and response for COVID-19:
  - COVID-19 case-based surveillance [tracker].
  - Contact registration & follow-up programme [tracker].
  - Ports of Entry screening & follow-up programme [tracker].
  - COVID-19 surveillance event programme [event].
  - COVID-19 aggregate surveillance [aggregate].
- Most solutions work-offline, enabling improved reach in locations with poor connectivity.

Objectives
- Improve information use in countries.
- Simplify support if there are standard solutions.
- Reporting on key indicators.
- Avoid reinventing the wheel in each country.
- Integrate disease programmes into (often) Health Management Information-run systems.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

mHero, an integrated digital health platform for health worker communication and coordination

Priorities
P1.3: Proactive communication
P2.3: Prepare the healthcare ecosystem: workforce

Target
> Healthcare personal

Countries of implementation
> Sierra Leonne
> Liberia
> Uganda
> Mali
> Guinea

Software developers
- mHero

Partnerships
- IntraHealth International
- UNICEF
- USAID

Technology Type
- Specialised software

Relevant links and contacts
- https://www.mhero.org/faq#smart
- https://www.mhero.org/sites/mhero/files/mherobrochureenglish2018.pdf

Description
- mHero is a system that connects health workers to health officials, to each other, and to critical information that can save lives, using the basic mobile phones that most health workers already have. The platform facilitates two-way communication using SMS messages to get critical information to frontline health workers in real time. Initially launched to address the Ebola crisis in 2014 by a consortium led by IntraHealth International and UNICEF, mHero offers ministries of health and health workers a trusted channel of communication on a broad range of health services, including primary care, maternal and child health, family planning, HIV, malaria, nutrition and disease surveillance.

Objectives
- Coordinate health promotion strategies and public health emergency responses.
- Train health workers on infection prevention and control and risk communication.
- Test health worker knowledge of COVID-19 responses through mini-quizzes.
- Report suspected COVID-19 cases and other high-priority diseases.
- Relay unanticipated stock outs of essential commodities such as sterile gloves, masks, and respirators.
- Reveal local health and safety concerns, including mental health and physical risks.

Requirements

Software & infrastructure
- **Electricity access**
- **Network access**
- **Internet access**

Hardware & devices
- **Simple talk-and-text mobile devices**
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- **Ability to read and write**
- Special/technical qualifications

Uganda: Jumia using e-commerce to connect informal vendors and consumers

Priorities

P3.1: Secure the food supply: supply of priority products, pricing, tracking & monitoring

P4.1: Protect jobs: protecting jobs, retraining for crisis needs

P5.3: Preparation for recovery: preparation for "next normal"

Target

> Population

> SMEs

Countries of implementation

> Uganda

Software developers

- Jumia

Partnerships

- UNDP Uganda

Technology Type

- E-commerce, produce delivery and equipment sharing platforms

Relevant links and contacts

- https://group.jumia.com/covid-19-undp-jumia-uganda-partner-to-link-market-vendors-with-consumers-online/
- Michael Mubangizi, Communications Analyst, UNDP Uganda Email: michael.mubangizi@undp.org,
- Tel: 0772147564

Description

- The UNDP in partnership with Jumia Uganda, have launched an online platform – to enable small and medium enterprises to connect with consumers to sustain livelihoods in view of restrictions on movement, stay at home measures and social distancing guidelines which were instituted as part of the measures to curtail further transmission of the novel coronavirus (COVID-19) pandemic. Jumia Food will avail of its dedicated ordering platform via app and website that includes a last-mile distribution network, diverse set of payment methods, quality assurance, facilitation of training for the vendors, and growth marketing.
- UNDP will provide smartphones, airtime, and data to be used by the market vendors.

Objectives

- Provide the informal sector and SMEs solutions to keep running and reaching customers during the COVID-19 crisis.
- Connect rural farmers with the urban market, keeping the supply chain for agricultural produce active and providing employment and mitigate the effects of the COVID-19 on the economy.
- Reduce congestion in the markets and traffic jams around these markets and hence not only reducing the risk around spreading the virus, but also increasing convenience of shopping
- For the initial six months, the innovation will benefit vendors in five markets: Nakasero, Nakawa, Wandegeya, Bugolobi, and Kalerwe, all in Kampala city.

Requirements

Software & infrastructure

- Electricity access
- Network access
- Internet access

Hardware & devices

- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications

- Ability to read and write
- Special/technical qualifications

Uganda: SafeBoda, delivery and logistics support with ride-hailing company

Priorities

P3.1: Secure the food supply: supply of priority products, pricing, tracking & monitoring

P4.1: Protect jobs: protecting jobs, retraining for crisis needs

P5.3: Preparation for recovery: preparation for "next normal"

Target

> Population

> SMEs

Countries of implementation

> Uganda

Software developers

- SafeBoda

Partnerships

- UNCDF
- Kampala Capital City Authority
- Ministry of Kampala

Technology Type

- E-commerce, produce delivery and equipment sharing platforms

Relevant links and contacts

- https://www.uncdf.org/article/5577/uncdf-and-safeboda-launch-an-e-commerce-platform-for-food-and-grocery-home-delivery-amid-covid-19-and-beyond
- https://safeboda.com/ng/index.php#howitworks
- Rachael Kentenyingi - Knowledge Management and Communications
- rachael.kentenyingi@uncdf.org

Description

- Targeting an initial 800 market vendors, this e-commerce platform is connecting the market vendors to households that need a range of supplies by using the preexisting reliable SafeBoda transport service.
- Through this partnership, UNCDF and SafeBoda will provide 800 market vendors access to the SafeBoda app, whereby they can sell their produce while creating and maintaining the livelihoods of the 18 000 SafeBoda riders whose source of income has been affected by the ban on public transport.

Objectives

- Catalyse the growth of the digital economy in Uganda by empowering populations to go digital and access previously out-of-reach digital solutions that can help keep their businesses afloat, whilst ensuring that households do not run out of food supplies – particularly with the temporary ban on public transport due to the coronavirus mitigation lockdown.
- Catalyse enterprise innovation and investment that will spur small businesses and consumers to embrace digital platforms in their daily lives, which will in turn drive growth and sustainability.
- The partnership will also look to leverage SafeBoda's riders and user base to share vital information and safety practices about COVID-19. This will enable a projected average of 50 000 customers to be reached daily with food and goods delivery.
- After COVID-19, it is envisaged that customers will continue to use digital platforms after experiencing the convenience and quality service of the SafeBoda e-commerce platform, which will increase inclusion and bolster resilience for similar future shocks and stresses.

Requirements

Software & infrastructure

- **Electricity access**
- **Network access**
- **Internet access**

Hardware & devices

- Simple talk-and-text mobile devices
- **Smartphone/tablet**
- **Computer**
- TV/radio stations

User qualifications

- **Ability to read and write**
- Special/technical qualifications

Eneza Education, revision and learning materials for basic feature phones

Priorities
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Population (students)

Countries of implementation
> Kenya
> Ghana
> Ivory Coast

Software developers
- Eneza education

Partnerships
- UNESCO
- Local telecom compagnies

Technology Type
- Edtech

Relevant links and contacts
- https://en.unesco.org/covid19/educationresponse/nationalresponses#AFRICA
- https://enezaeducation.com/

Description

- Learning solution for basic phones via USSD & texting messages, for students from 6 to 18 years old with dedicated content.

Objectives

- Ensure free and large access to education for students in lockdown situations through basic phones.
- Ensure access to education for students in rural areas with difficult access to schools, even without the lockdown situation.

Requirements

Software & infrastructure
- Electricity access
- **Network access**
- Internet access

Hardware & devices
- **Simple talk-and-text mobile devices**
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- **Ability to read and write**
- Special/technical qualifications

Ubongo, entertainment, mass media, and the connectivity of mobile devices to deliver localised learning

ubongo

Priorities
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Population (students)

Countries of implementation
> Several African countries: Ghana, Kenya, Malawi, Nigeria, Rwanda, South Africa, Tanzania, Uganda and Zambia.

Software developers
- Ubango

Partnerships
- UNESCO
- Other

Technology Type
- Edtech

Relevant links and contacts
- https://en.unesco.org/covid19/educationresponse/nationalresponses#AFRICA
- https://www.ubongo.org/

Description

- As Africa's leading edutainment company, Ubongo creates fun, localised and multi-platform educational media that reaches millions of families through accessible technologies.

Objectives

- Improve school readiness and learning outcomes for kids, and promote social and behavioral change for kids, caregivers and educators.
- Ensure free and large-scale access to education for students in lockdown situations through basic phones.
- Ensure access to education for students in rural areas with difficult access to schools, even without the lockdown situation.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Kenya: high-altitude balloons to supply internet to remote communities

Alphabet

Priorities
P3.2: Maintain access to essential services: health & education, telecoms, utilities

Target
> Population

Countries of implementation
> Kenya

Software developers
- Alphabet Inc

Partnerships
- Telkom Kenya
- Government of Kenya

Technology Type
- Loon balloons

Relevant links and contacts
- https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/insights/telkom-kenya
- https://www.worldbank.org/en/topic/edutech/brief/how-countries-are-using-edtech-to-support-remote-learning-during-the-covid-19-pandemic

Description

- Balloons – floating cell sites equipped to offer 4G connectivity to about 25 million Kenyans who lack coverage. Because each internet-enabled balloon covers a large area – roughly 30 times greater than a ground-based system – Loon can provide service to traditionally hard-to-reach or underserved regions. Loon's balloons work by beaming internet connectivity from ground stations to a balloon 20 km overhead. The signal is then sent across multiple balloons, creating a network of floating cell sites that deliver connectivity directly to a user's phone handset, router, or dongle.

Objectives

- Ensure access to internet in rural areas.
- Ensure education continuity for students during lockdown.
- Enable the connection of remote health clinics to the country's national referral hospitals, other medical facilities, and emergency services.

Requirements

Software & infrastructure
- Electricity access
- Network access
- Internet access

Hardware & devices
- Simple talk-and-text mobile devices
- Smartphone/tablet
- Computer
- TV/radio stations

User qualifications
- Ability to read and write
- Special/technical qualifications

Annex 3: Countries surveyed

Country	Questionnaire	Interview conducted
Angola		x
Benin	x	
Central African Republic	x	
Chad		x
Comoros	x	
Republic of Congo	x	x
Djibouti	x	
Equatorial Guinea		x
Eswatini	x	
Ethiopia	x	x
Gambia	x	x
Guinea	x	
Kenya	x	
Lesotho		x
Liberia		x
Mali	x	
Mauritania	x	
Mauritius		x
Morocco	x	
Mozambique		x
Niger	x	x
Nigeria		x
Rwanda		x
Senegal	x	x
Sierra Leone		x
South Africa	x	
South Sudan		x
Togo		x
Tunisia	x	
Uganda		x
Zimbabwe	x	

Annex 4: Acknowledgements

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- François Abandza – Congo-Brazzaville – Managing Director of Technological Innovation, Ministry of Scientific Research and Technological Innovation
- Abdou Ambarka – Benin – ICT Head, Sèmè City
- Mohamed Assoweh – Djibouti – General Director, Djibouti Telecom
- Claude Borna – Benin – General Director of Sèmè City and initiator of the Task Force INNOV COVID-19
- Abdallah Diallo – Senegal – Smart Territory Manager, State IT Agency
- Melanio Ebendeng Oyana – Equatorial Guinea – General Director, National Center for Informatisation of Public Administration in Equatorial Guinea (CNIAPGE)
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- André Gandala – Chad – Director of Communication, Ministry of the Post and New Information Technologies
- Jone Heitor – Angola – National Director for the Development of Technological Innovation and University Professor, Ministry of Higher Education, Technology and Innovation
- Dr Behailu Kassaye – Ethiopia
- Rouffahi Koabo – Niger – General Director, CIPMEN (Centre Incubateur des Petites et Moyennes Entreprises du Niger – Niger Small and Medium Enterprises Incubator Centre)
- Rym Jarou – Tunisia – CEO of "Smart Tunisia", Ministry of ICT and Digital Transformation
- HE Cina Lawson – Togo – Minister of Posts, Digital Economy and Technological Innovation
- Aminetou Bowba MBareck – Mauritania – President, Réseau des Jeunes Scientifiques Mauritaniens (Mauritanian Young Scientists Network)
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- Angelos Munezero – Rwanda – Director General of Innovation and Business Development Department, Ministry of ICT and Innovation
- Chamsoudine Mzaouiyani – Comoros – General Director, ANADEN (Agence Nationale de Développement du Numérique - National Digital Development Agency)
- Bonga Ndlangamandla – Eswatini – Executive Director, eGovernment Unit within the Prime Minister's Office
- Eric NDoumba – Congo-Brazzaville – Adviser to the Minister of Posts, Telecommunications and New Technologies
- Amadou Nyang – Gambia – Ministry of Information Communication Infrastructure
- Ronald Osumba – Kenya – CEO, iGov Africa
- Cassandre Pignon – Senegal - West Africa Regional Director, IDinsight
- Guy Rozenblum – Guinea – General Director, SkyVision Guinea

- Mohamed Lemine Salihi – Mauritania – General Direction of Information and Communication Technologies, Ministry of Higher Education and Scientific Research, Information and Communication Technologies (MESRSTIC)
- Mouhamed Tidiane Seck – Senegal – Coordinator, Technical Committee DANNCOVID19
- David Moinina Sengeh – Sierra Leone – Chief Innovation Officer, Directorate of Science, Technology, and Innovation
- Eyob Tesfaye – Ethiopia – Program Director Financial Inclusion, UN Capital Development Fund Ethiopia
- Tuminsang Thabela – Zimbabwe – Ministry of Primary and Secondary Education, Head of Ministry and Permanent Secretary for Primary and Secondary Education

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