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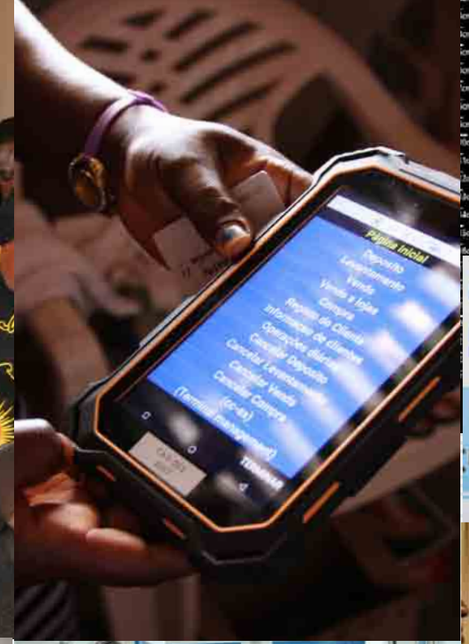
Africa:
Innovating a New Future

TICAD YOKOHAMA JAPAN 2019



Special Feature: **Africa**

Innovating a New Future

Japan has been actively supporting development in Africa, highlighted by hosting the ongoing Tokyo International Conference on African Development (TICAD) series since 1993. Africa has enjoyed steady economic growth since 2000, and JICA aims to further drive this progress by promoting innovative solutions that look beyond existing systems and conventions. With a collaborative mindset, JICA is drawing on Japan's scientific and technological might to help drive Africa's future socioeconomic development.

What is Innovation?

"Innovation" can be defined as finding new ways of applying resources, labor, or means of production to create new value. In developing countries, this might mean exploring unconventional solutions to social problems by applying new techniques to old ways of thinking and acting, and by applying ICT and other new technologies to create fresh solutions.

Innovation is about…

- **Producing new products/services**
- **Finding new markets**
- **Introducing new production methods**
- **Acquiring new sources of raw materials or semi-manufactured goods**
- **Achieving new organizational structures (forming or breaking up monopolies)**

Innovation was first conceptualized by the Austrian economist Joseph Schumpeter. According to Schumpeter (1911), any innovation can be placed into one of the above categories.

In 2015, the United Nations adopted the 17 Sustainable Development Goals (SDGs) in an effort to tackle the world's problems by 2030. Although aid projects in developing countries are traditionally the domain of governments, it is keenly expected that NGOs and the private sector will actively participate in realizing the SDGs. Hopes are high that this public-private collaboration will generate innovative solutions to help transform societies.

Against such a background, new businesses in Africa are beginning to make innovative use of Information and Communications Technology (ICT). A salient example is M-Pesa in Kenya. M-Pesa is an electronic money transfer service that enables people to send and receive money—even when they lack the income to open a bank account—as long as they have an ID and mobile phone. This innovative service has attracted worldwide attention, and is considered a revolutionary way to empower vast numbers of people to conduct financial transactions. M-Pesa was introduced in 2007, and currently handles annual volume of currency transactions equivalent to nearly 50% of Kenya's GDP.

Meanwhile in Rwanda, an innovative blood transport service using drones appeared in 2016. Medical supplies that previously took hours to be delivered from the capital city to regional medical centers by land can now be delivered by a drone within a matter of minutes.

JICA Senior Advisor for ICT and Innovation Tomoyuki Naito provides insight into why such innovations are appearing in Africa.

"The scarcity of regulations and systems in developing countries has given an edge to innovations that use digital technology. Mobile phones and broadband internet have come to be widely available in developed countries since 2000, and subsequently have spread globally. Now, even in Africa, digital technology is becoming an important part of everyday life. In Kenya, it was proving time-consuming and costly to expand the landline telephone system; in the meantime, private enterprises developed the 'M-Pesa' service, which operates wirelessly. In Rwanda, deliveries by drone were possible because the government prioritized problem-solving, and their aviation regulations were considerably more lenient than those of developed countries."

The scope for new business in Africa has expanded following these successes, and now companies and investors all over the world are looking to Africa for opportunities. This has resulted in a leapfrog effect, where solutions to hard-to-solve social problems were found and development has been accelerated by using ICT to bypass the lengthy traditional steps of development.

"A major role is being played by the youth—the so-called 'Digital Natives.' They are communicating with the rest of the world, sharing ideas, and starting businesses not geographically limited to their own countries, but also within Africa, Asia or anywhere else. The number of 'Tech Hubs,' where startups and other new businesses can develop, has increased by approximately 50 percent to over 400 between 2016 and 2018. In Rwanda, which is committed to becoming an ICT-oriented country, JICA is helping to create new businesses by supporting projects such as the incubator (facility) 'kLab,' which is fostering and supporting new digital businesses."

Instead of just using new technology, innovation may create new value by integrating existing, proven solutions and ideas. JICA promotes the use of ultrasound echo machines (see p.10) in Sudan, and projects using solar-powered pumps in Senegal to just this effect. In addition, JICA is working to foster the human resources necessary to produce innovative solutions in the future.

JICA continues to cooperate in these fields on many levels, and with the same "leave no one behind" commitment as outlined in the SDGs.

Resource Person
Tomoyuki Naito

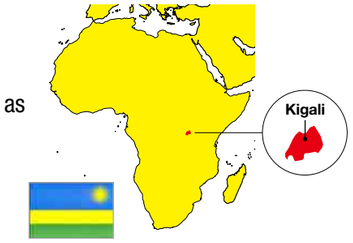
JICA Senior Advisor for ICT and Innovation. Previous positions include JICA Director of Transportation and ICT, and Program Manager for the World Bank. Currently a member of the World Economic Forum's "Internet for All" global steering committee, and a member of the Ministry of Internal Affairs and Communications' Global Strategy Working Group.

Printed circuit board (p.2-3, 8-9) by VLADGRIN via Shutterstock.com

Innovation to Change the Future

Hatching the Golden Eggs of Rwanda's Future

Rwanda is a country transforming and being reborn as an ICT-enabled nation. Emerging ICT entrepreneurs are expected to help develop the country and Africa as a whole, and a project is currently underway to make this aspiration a reality.



Republic of Rwanda

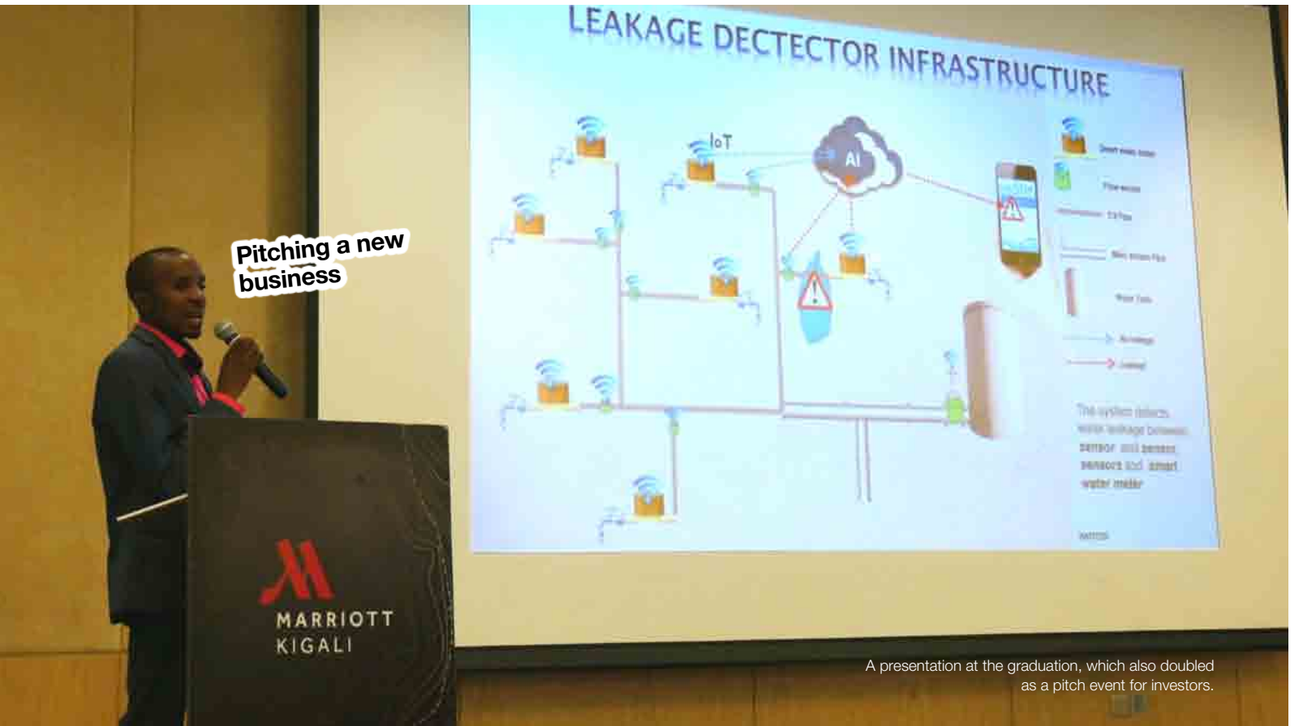
Name: Republic of Rwanda
Capital: Kigali
Currency: Rwandan franc
Population: 12.2 million (2017 World Bank)
Languages: Kinyarwanda, English, French, Swahili

ICT Entrepreneurs Leading Africa into the Future

In December 2018, eight teams of Rwandan entrepreneurs, ranging in age from 19 to mid-30s, gave enthusiastic presentations regarding new ICT businesses in the banquet hall of a luxury hotel in Kigali, the capital city of Rwanda. This was the graduation ceremony for the 250Startups program (see p.5), which is a part of the project started by JICA in November 2017 to strengthen the country's ICT sector and innovation ecosystem, especially for startups. Their message was warmly received by an audience of over 200 people, comprised of investors and others from the business community, as well as government personnel, including the Permanent Secretary of the Rwandan Ministry of ICT & Innovation.

These startup businesses were founded with the aim of utilizing ICT to solve the social challenges facing the nation. The businesses present included a distribution service app for directly linking producers with consumers, an app for detecting and identifying the location of leaks in water service pipes, and a paperless system for sharing information among agricultural cooperatives. Members of the audience participated in a lively Q&A session, asking questions such as "who is your target market?" and "how did you come up with the idea for this business?"

200 people attended the graduation from both within and outside Rwanda. Entrepreneurs and investors were also seen deep in discussion outside the venue.

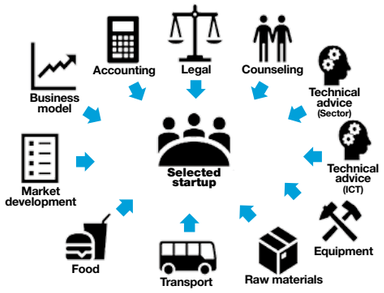


A presentation at the graduation, which also doubled as a pitch event for investors.

Diplomas were presented by Mr. Takayuki Miyashita, Ambassador of Japan to the Republic of Rwanda. In January 2019, five of the eight companies visited Japan and three visited Kenya for discussions with investors.

What is "250Startups"?

250Startups is a program that provides an environment in which entrepreneurs can concentrate on growing their businesses by offering them expertise in matters related to law, finance/accounting, business planning, marketing, equipment and materials (see concept diagram on the right). While the program does not provide financial support, it does provide entrepreneurs with the opportunity to meet potential investors at international conferences and other events. In addition to being the international calling code for Rwanda, 250 signifies the minimum number of outstanding startups the project aims to foster by 2025/26.



Company Name:
Hatch Plus

Developed an automated incubator, which can carry out monitoring of eggs and remote control operations using a smartphone and other devices. Company president Imani Bora (24) also works as a lecturer at IPRC Tumba. "Rwanda is reliant on imports for 80% of its chicken and eggs, so prices are high. When I became aware of this problem, I wondered if there was something that I could do about it, and so I developed this system."

Company Name:
AKWA

Developed a system for water supply companies whereby small sensors are installed in water service pipes, so that when a leak is detected the location is identified and an app notification is sent to a smartphone. "The amount of water used can also be monitored, so the system is compatible with electronic billing," says co-founder Kenneth Mwebesa.

Twenty-eight startup companies applied to join the program in March 2018, from which eight were selected as the first batch to receive six-month-long support from JICA experts in a process called incubation (fostering of new businesses). The program offered them core skills such as management, legal knowledge, finance/accounting, and marketing.

Imani Bora, one of the selected entrepreneurs, developed an app for remotely controlling a chicken egg incubator in order to improve the supply of chickens in Rwanda, and help address the country's current reliance on imports. His presentation attracted much attention.

"In this program I learned various skills for making my business sustainable, such as how to create a budget and business plan. I also came to see the importance of talking directly with the farmers who are my clients, and customizing products to match their needs."

"This project is not about us creating 250 companies, but rather about creating a place within the country with a framework for efficiently fostering business," explains Atsushi Yamanaka, the JICA expert overseeing the project. "We also wanted the graduation to be a chance to find collaborators from Rwanda and overseas. I was watching the audience listening to the presentations, and I'm sure many thought 'this will really make a good business,'" he added.

It is important for the Rwandan government, and the related agencies and private enterprises promoting ICT, to create a support framework for startup companies that is not fully reliant on JICA. Furthermore, we see this developing not just in Rwanda, but also taking root in other countries throughout Africa.

Rwanda's Resolve to become an ICT-oriented Country

The 1994 civil war in Rwanda had a major impact on the economy. But now, 25 years down the track, the country is growing so quickly it has become known as the "miracle of Africa." The roots of this spectacular recovery can be found in the ICT industry.

At the end of the 1990s, in the midst of an information technology (IT) bubble that was enveloping the world, the UN and developed countries provided support to developing countries to make the most of ICT. Rwanda saw ICT as an important key to develop the country, and committed to formulating and implementing four 5-year ICT strategic plans for the period between 2001 and 2020.

However, during the first period in the 2000s, the IT bubble burst and the support of the international community came to a standstill; consequently, many developing countries

Toward becoming the leading ICT country in Africa

The number of high-rise buildings in the heart of Kigali is increasing year by year.
The streets are clean with not even a piece of garbage, and the area is popular among visitors and international businessmen alike due to its high level of safety.

had to suspend ICT-driven development. “Rwanda, however, was different and stayed the course,” explains Mr. Yamanaka.

“Rwanda, a geographically small country, had always been poor in natural resources; agricultural production was limited, and it had a strong desire to use ICT as one of the keys to develop the country. Without relying on the international community and using only its own funds, the country is one of only a handful that persevered in installing a fiber optic network and continuing with digital development using its own resources. As a result, Rwanda established itself in Africa as an ICT-oriented country.

It was during this time that Japan extended a helping hand. Japan had suspended ODA since the outbreak of the internal conflict, but in 2005, JICA reopened their Office in Rwanda, and from 2007 they started to provide assistance to develop the curriculum for the Integrated Polytechnic Regional College of Tumba (IPRC Tumba), an institution that trains ICT technicians and practitioners.

Mr. Yamanaka has worked as an expert in the country since 2010 and has been active in providing support for the development of the Rwandan ICT strategy, as well as in the training of personnel. He provided support for the development of the private-sector federation ICT Chamber, and the kLab and Fab Lab incubators that support the fostering of young entrepreneurs. Mr. Yamanaka also acted as a coordinator for the ABE Initiative* in which young people are brought to Japan to get their master's degrees at a Japanese university, or to participate in an internship program.

Sharing the Lessons from Japan in Rwanda

Among the young people currently active in the Rwandan ICT industry, many have studied in Japan under the ABE Initiative.

At Kobe Institute of Computing (KIC), which accepts many Rwandan exchange students, the “Program for Fostering Young ICT Personnel Centered in Kigali” grassroots technical assistance program is being run in cooperation with Kobe City. Students are taught using the Tankyu method advocated by KIC President Toshiki Sumitani. With the Tankyu method, students investigate the needs of society and then independently draw up and implement solutions to meet such needs.

“Although I thought about staying and working in Japan, the desire to return to my country and share the skills that I had learned in Japan and do something to contribute to my country proved stronger,” says Yves Cyuzuzo, who teaches the Tankyu method while working at the software development company WiredIn in Kigali.

“The desire to do something for their country is strong among Rwandans,” Mr. Yamanaka adds. “There are many who returned to Rwanda after the end of the civil war, and I often hear them say things like ‘We’re creating the future of our country. Never again will we allow a tragedy such as genocide to happen. Rwanda is going to change!’ They have such strong feelings, they set high goals and act on them.”

Geographically, Rwanda is located almost at the center of the African continent, and many people speak both English and French. This is why Mr. Yamanaka expects ICT innovation culture to spread throughout the rest of Africa in the future.

“Many challenges remain throughout the African continent, and there are many fields where development through the use of ICT is necessary. All the more reason, therefore, for them to come to Rwanda to obtain the latest information and make connections. That’s why we are working hard to make Rwanda the center of innovation in Africa.”

*The ABE Initiative (the African Business Education Initiative for Youth) is a program that accepts outstanding young Africans with work experience as international students, and offers them opportunities to study at master’s degree courses and experience internships at Japanese companies.

ICT Innovation Ecosystem Strengthening Project Specialist
Atsushi Yamanaka

“In August of this year, the seventh Tokyo International Conference on African Development (TICAD7) will be held in Yokohama. There, in addition to introducing the knowledge obtained through Rwanda’s ICT innovation, we will endeavor to strengthen relationships between Japan and Rwanda on the private-sector level, so keep an eye out for it.”

Telecom House

A Place of Dreams for Startups

Located in the heart of Kigali, Telecom House is home to ICT-related organizations and facilities, such as kLab, Fab Lab, the ICT Chamber, the Rwanda Information Society Authority (RISA), and the JICA project office, and serves as the central hub of the Rwandan ICT industry.

■ kLab

Established in 2012, the “K” in the name comes from the first letter of the word “knowledge.” This innovation center, which supports the fostering of young entrepreneurs, etc., has already started more than 250 businesses. It is also used as a place where entrepreneurs can exchange information and hold meetings or workshops.

A free space for learning about IT

Many young people use this place for collecting information and learning, as they can use the internet at no cost just by registering.

The countless number of business cards stuck to the wall helps facilitate sharing of contact details and strengthens relationships among people in business.

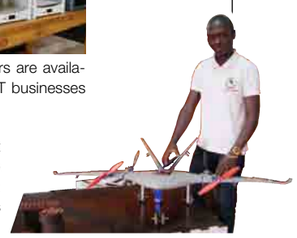
■ Fab Lab

Fab Lab was established in 2016 and takes the first three letters of its name from the word “fabrication.” Now found throughout the world, the original concept for Fab Lab came from the ‘spaces for creation’ advocated by Neil Gershenfeld (a Massachusetts Institute of Technology professor). With 3D printers, NC (numerical control) machines, laser cutters, and other machine tools, almost anything can be made.

A creative space to form ideas

Tools such as 3D printers and laser cutters are available. Prototypes of devices required for ICT businesses can also be easily made.

A young man who created a model aircraft using the machine tools at Fab Lab. The aircraft is said to have a range of 4 km, and he is planning to demonstrate the plane’s performance at upcoming contests.



The Youth Behind Rwanda's ICT Sector

Young people in their late twenties and early thirties are distinguishing themselves as entrepreneurs and lynchpins in Rwanda's ICT industry. Using the experience gained in Japan through JICA's programs, these people are working hard to solve problems in their country.

Contactless Cards for Bus Fares

Christa Munezero (27)

Belongs to AC group, the developer of the "Tap&Go" smart card system (contactless ic card). The system is installed in all of the buses of the three companies operating in Kigali City, and is used by roughly 300,000 people every day. The company is rolling out a similar service in Cameroon, and plans to continue expanding throughout Africa.

"It used to be inconvenient because it took time for the bus conductor to calculate people's change, but now people are happy because of Tap&Go. Bus companies are also reporting a 30 percent increase in sales. While I was studying in Japan, I learned about the importance of making plans, holding meetings, and filing reports, and all these skills have now become very useful."

Bus fares can be paid by tapping a contactless smart card against an orange terminal next to the driver.

An App to Find the Ideal Delivery Company

Yves Cyuzuzo (30) & Charles Mutabazi (30)

After completing their overseas studies in Japan, Yves and Charles joined WiredIn, an offshore software development* business established in 2014 by Japanese company Rexvirt Communications. Approximately 10 staff members work at WiredIn's Kigali office, developing software for customers in Japan, Europe, and Rwanda. In December 2018, WiredIn released Ohereza, a mobile app that allows users to hire delivery services. Users enter information about their package and its destination, and choose delivery companies based on price and reviews. If a deal is made, then a courier will arrive to pick up the package.

*Entails contracting out the development of web systems, mobile apps, and other types of software to foreign companies or subsidiaries.

The app allows users to see shipping prices and check if their package has been delivered. Payments are made with mobile money.

Building an Online Shopping Platform

Richard Rusa (30)

DMM.HeHe: formed in 2017 when Japanese ICT company DMM.com Group acquired HeHe Labs, a Rwandan ICT startup founded in 2010. DMM.HeHe built and operates an online shopping platform that sells food, farm produce, and other daily necessities. They are also involved in nurturing local high school and university students to become ICT entrepreneurs and engineers.

"'HeHe' is Kinyarwanda for 'where,'" says Richard Rusa, Head of Technology at DMM.HeHe. "It signifies that we want to answer the questions 'Where can I get it?' and 'Where can I find it?'"

I'm studying in Japan!

Introducing two budding ICT entrepreneurs studying under the ABE Initiative.

Materne Ntihemuka

Shibaura Institute of Technology Graduate School of Engineering and Science

"In Rwanda, I was developing systems for banks. I think that Japan is the most industrialized and innovative country in the developed world. In Japan I'm learning to be diligent, studying as hard as I can. I specialize in research about detecting crop diseases with IoT (Internet of Things), and my paper has been featured in two international academic journals. I would like to start my own business one day, and use new ideas and technologies to make the world a better place."

Professor's Comment

Masahiro Inoue, Vice President and Professor, Department of Electronic Information Systems, College of Systems Engineering and Science

Materne researches IoT. His research covers the agricultural applications of systems combining hardware such as networks and sensors, and software such as AI and machine learning. His paper has twice been featured by international journals. I look forward to seeing his IoT and AI-based contributions and innovations being used to help achieve some of the SDGs.

Ibrahim Tumukunde

Miyagi University Graduate School of Project Design

"I've felt a bond with Japan since my time learning karate in high school. I'm now studying information design at university and am able to make connections with Japanese companies and researchers by doing internships and attending academic conferences. Talking with them, I felt that they have a deep interest in the African market. My biggest goal is to use the knowledge and skills I've gained to help develop my home country. At the moment I'm coming up with ideas for a post-graduation project in which Japanese and Rwandan companies can cooperate."

Tumukunde (back row, third from left) and his group from Miyagi University were presented the Special Jury Award at the Challenge Japan IoT Awards 2016 for their presentation at the Business Model Discovery & Presentation Tohoku Conference.

Professor's Comment

Hiroki Suguri, Professor Graduate School of Project Design

Ibrahim's research involves using AI to perform deep text analysis. In his paper, he analyzes opinions about the Rwandan government on social media. I look forward to seeing his future achievements.

Cooperating with Japan to Solve Social Challenges with ICT

Paula Ingabire, Rwandan Minister of ICT and Innovation

"The Government of Japan, JICA, and Japanese technology companies have been instrumental in supporting and shaping development of the ICT Sector in Rwanda. This partnership started 10 years ago through capacity building and B2B matching to establish the kLab. Through all this, the Japanese community has been committed to our vision of becoming a technology / innovation hub of the continent, and we are extremely grateful for their support and dedication to make our vision a reality. I look forward to deepening and furthering our cooperation with Japan towards co-creating sustainable technology solutions tackling various challenges in our society. With a growing youthful population, we are committed to joining forces with Japan to help our businesses grow and scale to the rest of the continent and globally."

Appointed Minister of ICT and Innovation in October 2018. Minister Ingabire has worked with JICA expert Atsushi Yamanaka to develop ICT sector since her time at the Rwanda Development Board.

Changing Lives through Innovation

Ultrasonic Scanners are Changing Health Services

A Japanese company is endeavoring to promote the use of ultrasonic scanners that can be used by any trained medical professional to help ensure pregnant mothers have a safe delivery. Using their experience in project-based training for their devices in Sudan, Lequio Power Technology Corp. is now working to create a new paradigm in health systems for developing countries.

The Republic of the Sudan

Name: The Republic of the Sudan
Capital: Khartoum
Currency: Sudanese pound
Population: 40.53 million (2017, World Bank)
Languages: Arabic, English, Sudanese Arabic

Traube's stethoscope by Altosvic via Shutterstock.com

Before

Until now, a Traube's stethoscope was generally used to carry out prenatal tests. This was greatly dependent on the experience and intuition of medical staff as diagnosis was made on the basis of listening to heart sounds.

After

The ultrasound scanner used in the Sudan program. As it is powered via USB, it simply needs to connect to a computer. Ultrasound devices in Japan have many functions and are expensive, ranging in price from JPY 5 million; but as the scanner has only simple functions, unit price ranges from JPY 200,000 to JPY 300,000.

Midwives can better understand the condition of pregnant women and their unborn children by learning how to use ultrasonography. Furthermore, ultrasound can be used not only in prenatal examinations but also for diagnosing other diseases of the liver, pancreas, and kidneys in both men and women.

Ultrasound Examination by Midwives Saves the Lives of Pregnant Women

In Sudan, the mortality rate for pregnant women and newborns is much higher than the average for the rest of the world. It is a country with extremely few doctors, with one for every several tens of thousands of people, and even in terms of just medical examinations, there are not enough doctors to meet demand. Wanting to address this situation, Tetsu Kawamura, president and CEO of Japanese company Lequio Power Technology, created a low-cost ultrasonic scanner for use in developing countries that only has basic functions, and can be easily used with appropriate training. Ultrasound examinations are used to monitor the state of health of pregnant women and their unborn children. In Japan this is standard practice, but in Sudan it is rare, meaning that it has been difficult to detect abnormalities during pregnancy. Joining JICA's Partnership program with the private sector, Mr. Kawamura carried out a trial of the ultrasonic scanners they developed in Sudan between November 2015 and May 2018.

Seeing the ultrasound image on a computer screen makes it possible to easily check conditions such as the unborn child's heart movement, the position of the placenta, and the amount of amniotic fluid. More than 80% of midwives in Sudan are now able to make a diagnosis using the scanner.

45 midwives participated in the trial. Learning diagnostic ultrasound techniques gave them the ability to carry out more accurate examinations.

"Dr. Car" (Mobile Clinic) Project

Mr. Kawamura first visited Sudan in 2012, when he joined a mobile clinic traveling around rural areas where there were no doctors. This experience led him to see the need for ultrasonography in prenatal examinations.

The aim of the trial was to have midwives learn how to operate ultrasonic scanners so that pregnant women can safely give birth, even if they live in areas where there are no doctors. Midwives, who have traditionally used palpation and a unique instrument called a Traube's stethoscope to carry out examinations, were surprised to see the form of an unborn child displayed on a computer screen during training, and were eager to improve their level of skill.

"Ultrasound images are a powerful tool to use when explaining the condition of the unborn child to mothers, and in many cases we see that women can relax and look forward to the birth," says Mr. Kawamura.

During the trial, diagnostic ultrasound was carried out for a total of 5,572 women by 45 midwives, with suspected abnormalities detected in 1,408 cases. Additionally, pregnant women who were at risk from natural birth were able to be referred to well-equipped hospitals where it would be possible, if necessary, to carry out a caesarian section.

"As acknowledged by the Sudanese government, training midwives in the use of the ultrasound device has greatly helped in reducing the maternal and neonatal mortality rates."

Although the use of diagnostic ultrasound by midwives has yet to be legalized, on receiving the results of this trial carried out under temporary approval, the government is now preparing legislation for official approval.

Ultrasound's Cloud-based Service Future

Mr. Kawamura is presently engaged in using the knowledge and experience gained in Sudan to spread the use of ultrasound to 50 other countries. One of his goals is to develop a cloud-based Ultrasound Training Support Service that can be provided free of charge.

"For example, a doctor with little experience in a settlement somewhere in rural Africa can carry out an examination using ultrasound, and then upload the images and any questions to the cloud. With this system, doctors with a high level of expertise in ultrasonography can look at the scans and send back advice. This is the kind of cloud-based medical training platform that I'm aiming to develop—an infrastructure that can be freely used by participants."

By learning from the many examples of conditions that are shared as a database, it will be possible to improve the capabilities of doctors working even in remote areas. A project scheduled to start this year aims to see the popularization of this system, and JICA has agreed to also work together on this next step.

Furthermore, the use of cloud services will not be limited to developing countries; it is expected to be introduced among the more health-conscious generation in newly industrializing economies and developed countries, and in households carrying out home-based care. It will also be possible for people to receive cloud-based training so that they can use ultrasonography to examine themselves, and to have access to databases so that they can compare their own images with examples of various conditions. The long-term plan is to use the fees generated to create a financially sustainable business.

"We want to use the profits obtained to increase production of ultrasound scanners, and reduce the cost so that we can provide affordable products to developing countries. In time, cloud services will most likely come to include AI-based education and status observation," elaborates Kawamura enthusiastically. With JICA's help, he is seeking to use information and communications technology (ICT) to bring new changes to the future of medicine.

Mr. Tetsu Kawamura
President of Lequio Power Technology Corp.

Joined Sumitomo Bakelite Co., Ltd in 1997. Worked as an engineer in the development of high-performance resins for electrical/electronic components. Joined Dream Incubator, Inc. in 2005 as a management consultant involved in the formulation of technology-related business strategies. Founded Lequio Power Technology Corp. in 2011 and was selected to participate in "J-Startup," a startup support program sponsored by the Ministry of Economy, Trade and Industry in 2018.

Fostering People Capable of Sparking Innovation

The Future of Science and Technology Starts Here

Education and research are essential in fostering human resources capable of generating new technology and ideas. Here we introduce two universities that are attracting exceptional students from throughout the continent, and equipping them with advanced knowledge and skills in science and technology.

Focus on Science, Technology and Innovation

Capacity Building for Africans in Africa is the core concept behind the Pan-African University (PAU), which was established by the African Union Commission (AUC) in 2008. Africa was split into five regions, each with a designated field, a host country, a host university, and supporting partner countries. PAU is working toward raising the level of university research in the continent as a whole, and fostering outstanding personnel.

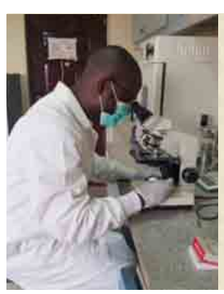
In 2012, the PAU Institute for Basic Sciences, Technology and Innovation (PAUSTI) was established in Kenya's Jomo Kenyatta University of Agriculture and Technology (JKUAT) as PAU's foothold in the east. Japan is among PAUSTI's supporting partners. "Specialists from Japan were dispatched to provide support, mainly to the faculties of science, engineering, and agriculture. They have formed teams with the main members of each faculty to train personnel who are well-versed in science, technology, and innovation (STI)," recounts Mai Toda of JICA's HR Development Department, who oversees the project.

The most popular courses at PAUSTI among the approximately 500 international students, currently drawn from 40 countries throughout Africa, are robotics and agricultural research. There are students doing research into creating robots for sowing seeds in fields; and some are eager to spread knowledge to farmers about tomato cultivation techniques that require less water. "We want them to get to meet students from other countries at PAUSTI and form networks that in the future will transcend borders," notes Toda expectantly.

Assembling a computer-controlled self-propelled device as part of group work. This type of practical training is extremely popular.

Research being carried out in the field of medicine. Here we see students dissecting a small experimental animal in a laboratory.

Growing tomato seedlings as part of an experiment for developing tomato cultivation techniques that require less water.



Mohammed Tawheed Abdul Khan
From Nigeria

I specialize in molecular biology and biotechnology, and am researching the interaction between microbes and plants. PAUSTI is home to some of the best minds in Africa, and one of its strengths is that researchers from numerous countries can carry out cross-border joint research. After completing my doctorate degree, I will return to the National Biotechnology Development Agency, my former place of work, and use what I have learned at PAUSTI.
(PhD Graduate of PAUSTI, June 2018)

A significant amont of equipment has been provided by JICA for research purposes.

The name of the university at the entrance is written in Arabic, Japanese, and English.

The E-JUST graduation ceremony. Knowledge and technology will be spread throughout Africa from here.

Meshach Howey Ochen
From Kenya

In Kenya, researchers are striving to produce biodiesel from non-edible plants. Using this biodiesel, research is underway to develop engines with better environmental performance. E-JUST is the hub of engineering universities in the African region; and its collaborations with Japanese universities, and having the possibility to receive training in Japan make the university extremely attractive to students.
(PhD Graduate of E-JUST, January 2019)

A University that Adopts Japanese-style Education

Another university with which Japan cooperates in the field of STI is the Egypt-Japan University of Science and Technology (E-JUST), which was newly established in 2010.

In Egypt there is Cairo University, which is a huge university with 260,000 students and a teaching faculty of about 10,000. In fact, it is so big that there are 30 students per teacher. Consequently, classes are primarily lectures, allowing little time for staff to engage in research. E-JUST was established because there were strong calls from within Egypt to introduce the Japanese style of engineering education where faculty teach in detail to a small number of students, the lectures are accompanied by practice, and experiments are carried out.

To date, the university has produced 94 masters of engineering and 132 doctors of engineering. The research level is rapidly increasing, with the school now holding the top ranking in Egypt in terms of the number of research papers published by each staff member. E-JUST now also has a number of supporting universities in Japan, with which they have both teacher and student exchanges. Undergraduate faculties were established in addition to the graduate school two years ago, and more international students are being accepted.

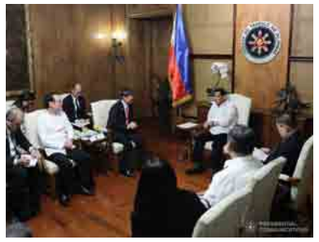
"The international students attending E-JUST include teaching staff from universities in surrounding countries. They come to further their research, and because they want to learn how to carry out better research in their own countries. Some of them also go to study short-term at the Japanese universities that support E-JUST, and carry out joint research. This creates an even stronger bond between Japan and Africa in terms of university education," remarks Toda.

She continues, "In this way, people who have studied at such universities can return and spread throughout the continent, bringing innovation that is suited to the unique needs of each area—well, that's the future that we envision."

Trends

Philippines

JICA President Kitaoka Visits the Philippines



JICA President Shinichi Kitaoka, center left, holds talks with Philippine President Rodrigo Duterte.

In April, JICA President Shinichi Kitaoka went to the Philippines to meet with government dignitaries and visit ODA project sites in Manila and Davao. He first had a meeting with President Duterte, marking their third meeting since the Philippine President's election in 2016. Since that year, JICA has committed over 400 billion yen of assistance in a wide range of sectors, including railway transportation, disaster management, and human development. Additionally, JICA, together with the Government of Japan, has been supporting the peace process and development in Mindanao since the 2000s. During the meeting, Dr. Kitaoka and President Duterte discussed the significance of a free and open Indo-Pacific, and the importance of establishing peaceful relations to maintain the international order. Dr. Kitaoka next held a meeting with Bangsamoro's Minister of Education Mohagher Iqbal, a key figure in the Mindanao peace process. Dr. Kitaoka reconfirmed JICA's commitment to the people of the Bangsamoro Region, and to the ongoing cooperation for helping deliver a peace dividend to each and every individual.

Dr. Kitaoka visited construction sites of the Davao City Bypass supported by JICA's loan assistance, and historic sites of the Japanese community's long-standing contribution to the socioeconomic development of the region. He also visited the Mindanao Kokusai Daigaku (Mindanao International College), a tertiary institution of the Philippine Nikkei Jin Kai (society of Japanese descendants) in Davao City. Then in Metro Manila, Dr. Kitaoka visited flood control project sites and observed the early warning system of the Pasig and Marikina Rivers, where he emphasized the importance of drawing on the experiences of Japan to help create a resilient Philippine society that can sustain high-quality growth. Mr. Kitaoka also visited the Mindanao Kokusai Daigaku (Mindanao International College), a tertiary institution of the Philippine Nikkei Jin Kai (society of Japanese descendants) in Davao City. Lastly, he went to the Research Institute for Tropical Medicine (RITM), which was established in 1981 through a grant-in-aid from Japan, to observe collaborative work being done on human rabies prevention.

Palau

JICA Assistance for Palau's Airport Upgrade

Signing ceremony. The project is Palau's first-ever major public-private partnership for infrastructure development.

Tourism is a core industry in Palau, representing nearly 75 percent of GDP, approximately 80 percent of foreign currency income, and about 40 percent of total employment. However, due to a steady rise in the number of tourists since the turn of the century, the country's sole international airport terminal has been working beyond its capacity. In peak season, the terminal suffers from long queues at immigration and check-in counters, making expansion of airport facilities a pressing matter.

JICA has signed a loan agreement in April, for the Renovation, Expansion and Management of Palau International Airport Project, which will be carried out by the Palau International Airport Corporation (a special-purpose company established by the government of the Republic of Palau) and the Japan Airport Management Partners Company Limited (JAMP). JAMP is joint venture of Sojitz Corporation, which brings extensive experience and provides access to a strong aviation industry network, the Japan Airport Terminal Co., Ltd., a specialist in airport operations, and the Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development. The project goals— reducing congestion at the passenger terminal, upgrading commercial facilities, and improving terminal convenience—will be achieved through the expansion, renovation, operation and maintenance of passenger terminal facilities.

The government of the Republic of Palau considers the expansion of its airport system to accommodate future demand a strategic priority in the Palau 2020 National Master Development Plan. The project is Palau's first-ever major public-private partnership for infrastructure development, and is expected to serve as a model for other projects. The year 2019 marks the 25th anniversary of the establishment of diplomatic relations between Japan and Palau, and this project symbolizes the partnership between the two countries.

Nigeria

Nigeria to Strengthen Diagnostic Capacity with Biosafety Level-3 Laboratories

Signing ceremony held in Abuja on April 9.

In Africa, where infectious diseases are an ever-present threat, JICA has been supporting the improvement of laboratory capacities and infrastructure for their detection and diagnosis. Nigeria will be one of the countries supported by JICA to establish a diagnostic and research facility for the rapid and accurate detection of infectious diseases. On April 9, 2019, JICA signed a grant agreement with the government of the Federal Republic of Nigeria to provide grant-in-aid of up to 1.58 billion yen for the Project for Strengthening the Diagnostic Capacity of the Nigeria Centre for Disease Control (NCDC). The objective of the project is to improve infectious disease surveillance, which will significantly contribute toward the establishment of an integrated and resilient public health system in Nigeria.

In this project, a laboratory facility will be constructed in Abuja, on the grounds of the National Reference Laboratory, which belongs to the NCDC. The new facility will include three biosafety level-3 (BSL-3) laboratories, three BSL-2 laboratories, and biobanks. Laboratories with a higher level of biosafety enable the handling of microbes that are more hazardous to humans, such as avian influenza, Lassa fever, Ebola virus disease, measles, and yellow fever. The project will enable the NCDC to conduct vital examinations and research, and is scheduled to be completed within 40 months. JICA will be closely involved in early-stage implementation, provision of constant technical guidance for facility operation and maintenance of equipment, and oversee the management system for hazardous waste treatment. By expanding the scope and technical capacities of the NCDC, Nigeria will be able to better support their neighboring countries in West Africa with its improved response time and ability to detect infectious pathogens, which will prove vital in times of public health emergency.

Voices from the Field

Helping Plan a Better Future for Nigeria

Sadiq Gulma first came across JICA in Kenya while studying for his master's degree at the Pan African University, where JICA had established an Innovations Lab as part of a grant aid project. In 2014, after graduation, he was fortunate enough to be invited to join the Africa-ai-Japan Project as a research engineer. After returning to work for the government in his native country, Nigeria, he came across another attractive opportunity, this time to join JICA as a consultant working in the fields of WASH (Water, Sanitation, Hygiene) and environment. His experience in Kenya proved valuable for his application, and he has been working for JICA since 2016.

In the early stages of his work, he was primarily engaged in managing and implementing the WASH and solid waste management program in Nigeria's capital Abuja, as well as conducting ex-post evaluations of JICA's rural WASH grant aid projects in low-income communities. His work has increasingly focused on urban environments, most notably formulating a cooperation project for the review and improvement of the Integrated Abuja Urban Development Master Plan administered by the Federal Capital Development Authority. As the only city with a master plan, Abuja is experiencing rapid unsustainable urbanization, yet the master plan has never undergone a holistic review, and is long overdue for an update that reflects present-day urban dynamics. Working as a part of this Master Plan's project team has been immensely satisfying for Gulma. "JICA's support for Abuja couldn't have come at a better time, exactly 40 years since the creation of the city, and I am delighted to be part of the development of such a beautiful city."

Gulma is motivated by the importance of the work JICA is doing, pointing to the organization's grant aid project for the provision of solar power to the Federal Capital Territory (FCT) Water Board as a prime case. JICA's provision of solar panels to replace diesel generators has not only overcome the problem of erratic water supply, but has also led the Board to have Nigeria's largest solar energy power generating facility. This has prompted a paradigm shift in the perception of large-scale power generation in the country, and has set a trend in power generation in Nigeria.

JICA's work is recognized by many Nigerians as highly impactful and beneficial. Gulma's hope for future JICA projects lies in innovative collaborations with all stakeholders, including the private sector, local NGOs, and start-ups. He expects that these will produce new forms of cooperation and provide the participatory collaboration needed to create sustainable cities.

Mr. Gulma (bottom right) makes visiting a low income area in Katsina State to meet the beneficiaries of JICA's grant aid project.

Sadiq Gulma
Consultant, JICA Nigeria Office

A Transition to Innovation will Transform Africa

Charles Murigande

Deputy Vice Chancellor for Institutional Advancement of the University of Rwanda

For Africa to bridge the development gap it has to move away from being a consumer of products, services, and ideas of the developed world, and fully embrace innovation in all sectors, especially in science, technology, social affairs, politics and economy. The countries of East Asia that rapidly grew their economies and successfully bridged the development gap with Western countries were able to do so because of innovation in governance, management, production processes and service delivery. That is the journey that Africa has embarked on, and thanks to the emergence of new technologies of information and communication, it is travelling at a much greater speed than these Asian tigers.

African countries, including my own Rwanda, are leapfrogging the development ladder, and the examples highlighted in this issue are just a small selection of the exciting developments taking place. Rwanda consciously made the choice to drive its development through knowledge and technology, including massively investing in modern IT infrastructure such as dense fiber optic and 4G network deployment throughout the country. Conscious of the fact that innovation is driven by well-trained people, Rwanda has created and attracted top training institutions in science, technology and management from around the world, and they are setting the foundation of knowledge for future success. Rwanda has also worked with its development partners, especially JICA, to create innovation/incubation hubs, and these will serve as launch pads for stimulating and commercializing innovations.

JICA has been at the forefront of supporting innovation in Africa by training future innovators and creating a conducive environment for them to thrive. Some excellent examples of JICA's contribution have been highlighted in the preceding articles, but I have especially high hopes for the ABE Initiative*. This initiative will provide young bright Africans access to excellent training in top Japanese universities, and internships in top Japanese companies, and enable them to experience the whole process of creating innovation at university, and transforming it into a commercialized product or a service. These ABE graduates are expected—and have actually started—to play a big role in pushing Africa's innovation forward and in linking Africa to Japan.

Innovation drives creation of wealth and sustains the development and competitiveness of a nation; there is no doubt that Japan has a lot to share with or teach Africa, and JICA, as the Japanese Government's instrument for sharing its development's experience with other nations, is expected to continue to play a major role in this endeavor. The rapid expansion of connectivity gives me great hope in accelerating the transformation of Africa, provided, however, that we ensure that all Africans get access to electricity, without which they will not be able to enjoy the full benefits of the digital/technological revolution taking place in Africa.

Profile:
Charles Murigande holds a PhD in Mathematics from the University of Namur in Belgium, and has extensive international work experience. He has served the Government of Rwanda as Ambassador to Japan, and as Minister in various portfolios including Education, Cabinet Affairs, Foreign Affairs and Cooperation, and Transport and Communication. Currently he is Deputy Vice Chancellor for Institutional Advancement of the University of Rwanda.

* African Business Education Initiative for Youth

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Nibancho Center Bldg.
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Tokyo 102-8012, Japan

Tel: +81-3-5226-6660
Fax: +81-3-5226-6396
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Young people doing research and development at Fab Lab in Rwanda. He is making a model plane. ©Tatsuya Mitsuishi

The Japan International Cooperation Agency (JICA) is one of the world's largest bilateral development organizations, operating in some 150 countries to help some of the globe's most vulnerable people.