

DECEMBER 2017

INTERNATIONAL DEVELOPMENT AND THE DIGITAL AGE

DISCUSSION PAPER

Development Policy Forum (DPF)



This publication is part of Friends of Europe's Development Policy Forum, which brings together a number of crucial development actors including the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Agence Française de Développement (AFD), the Japan International Cooperation Agency (JICA), the European Investment Bank (EIB), the United Nations and the World Bank to contribute to the global and European conversation on development. In this discussion paper, international tech and development experts set out how to use new technologies to achieve the Sustainable Development Goals and generate digital dividends for the developing world.

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Publisher: Geert Cami

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TABLE OF CONTENTS

FOREWORD	8
PART 1 - HARNESSING THE DIGITAL REVOLUTION	11
Connecting one and all to the digital revolution <i>José Luis Irigoyen</i>	12
There's more to digital development than exporting tech <i>Paolo Ciccarelli</i>	16
Using big data to fill the development gap <i>Jorge Moreira da Silva</i>	20
A plea for regulatory policy 4.0 <i>Dirk Aßmann, Sonja Kurz, Max Büge</i>	23
PART 2 - BUILDING INNOVATIVE TOOLS	27
Digital lives need digital financing <i>Tillman Bruett</i>	29
New, better and more affordable digital financial services needed to bridge the digital gap <i>Alvaro Martin</i>	32
Case study: Drone deliveries saving lives in Rwanda	36
Agripreneurs may at last free Africa from hunger <i>Chiji Ojukwu, Edson Mpyisi, Mariam Yinusa</i>	38

How can developing countries follow the path of Japan in ICT supported sustainable agriculture? <i>Masao Shino</i>	43
The convergence of the energy and digital transitions <i>Rima Le Coguic</i>	46
PART 3 - LEAVING NO ONE BEHIND	51
Paving a digital highway to the SDGs <i>Jüri Seilenthal</i>	52
Girls and women cannot be left behind in the digital revolution <i>Lindsey Nefesh-Clarke</i>	55
Technology can support the building of gender inclusive cities <i>Kalpana Viswanath</i>	61
Digital inclusion policies must focus on young people <i>Dana Schurmans</i>	65
Case study : ICT and education	68
PART 4 - RECOMMENDATIONS	70

FOREWORD



LET'S MAKE THE DIGITAL REVOLUTION WORK FOR DEVELOPMENT

We live digital lives. From the minute we wake up to the moment we go to sleep, digital technology is with us, helping us to connect, drive, read, pay and to inform ourselves in thousands of ways.

The digital revolution is also transforming the traditional growth and development trajectory across the world. It is helping to implement the Agenda 2030 for Sustainable Development and to connect people, businesses and nations as they search for innovative solutions for speeding up development.

As underlined by Agenda 2030, "the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies".

Access to digital technologies and the Internet is empowering the world's poor and disadvantaged people, creating jobs, allowing more women to participate in the labour market, allowing the quick and efficient transfer of money, and providing millions of people with access to health and educational facilities.

However, challenges remain. We have to make sure that no one is left behind. While some in the world are reaping the benefits of an interconnected world, many are lagging behind.

Making the internet universally accessible and affordable should therefore be an urgent priority. In addition, in many parts of the world, there are also extreme gender inequalities in access to digital technologies.

So how can the digital revolution be made to work better and faster for development?

This discussion paper brings together contributions from an array of experts who look at the many ways in which digital technologies are helping to speed up development across the world. Their views and recommendations on harnessing the digital revolution, building innovative tools for development and making sure that no one is left behind in this digital revolution provide valuable information on just how new technologies can be used to build a better world.

This publication complements the Friends of Europe Policy Insight debate on 'Making the digital revolution work better, faster for development', held on 7 November 2017.

Happy reading!

Shada Islam

Director for Europe and Geopolitics at Friends of Europe



JICA's Initiatives

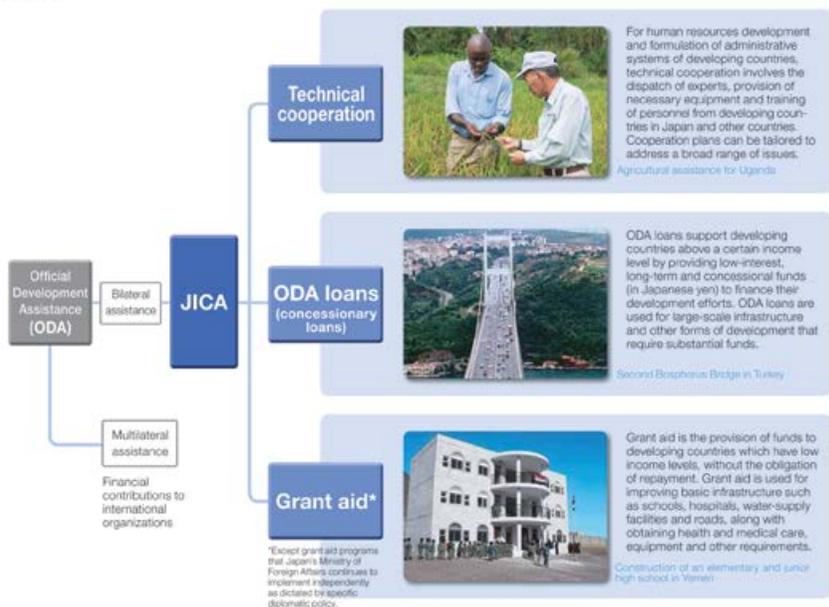
A Bridge Linking Japan with Developing Countries

JICA assists and supports developing countries as the executing agency of Japanese ODA. In accordance with its vision of "Inclusive and Dynamic Development," JICA supports the resolution of issues of developing countries by using the most suitable tools of various assistance methods and a combined regional-, country- and issue-oriented approach.

ODA and JICA

Since joining the Colombo Plan in 1954, Japan has been providing financial and technical assistance to developing countries through ODA, aiming to contribute to the peace and development of the international community and thereby help ensure Japan's own security and prosperity.

JICA is in charge of administering all ODA such as technical cooperation, ODA loans and grant aid in an integrated manner, except contributions to international organizations. JICA, the world's largest bilateral aid agency, works in over 150 countries and regions and has some 100 overseas offices.



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PART 1

HARNESSING THE DIGITAL REVOLUTION



CONNECTING ONE AND ALL TO THE DIGITAL REVOLUTION

12

THERE'S MORE TO DIGITAL DEVELOPMENT THAN EXPORTING TECH

16

USING BIG DATA TO FILL THE DEVELOPMENT GAP

20

A PLEA FOR REGULATORY POLICY 4.0

23

Connecting one and all to the digital revolution



Artificial intelligence and automation risk the creation of a new class of digital poor

José Luis Irigoyen, Senior Director for Transport and ICT at the World Bank Group

The World Bank Group has long promoted digital solutions to development problems, and never more so than now, as traditional development paths are being disrupted globally by digital technology. While digitisation brings both risks and opportunities, innovative technology is vital to achieving the Sustainable Development Goals (SDGs) as well as the Bank's twin goals of eliminating extreme poverty and boosting shared prosperity.

We know that digital technology is having an impact. Markets are becoming more efficient and participation is increasing across economies,

which are transitioning to the digital space thanks to advances in cloud computing, big data analytics, artificial intelligence and machine learning. Connectivity is increasing, with the number of connected devices comprising the Internet of Things estimated to double to over 20 billion by 2020. This is leading to an exponential growth in data – around 90% of data today was created over the past two years. The World Bank is promoting data-driven development to harness this potential, such as in more affordable public transportation and disaster risk management.

Digital technologies are creating economic opportunities. Suppliers and buyers in the global economy can now interact directly regardless of their size or location. For example, Chinese companies selling on Alibaba typically reach around 100 export destinations, more than twice the average of their offline competitors. The value of businesses trading on global e-commerce sites such as Alibaba could top \$6 trillion over the next five years.

While the population's access to bank accounts and services in many developing countries remains very low, a significant expansion of mobile money services could provide every citizen with a digital bank account. In Somalia, for instance, while only 15% of the adult population uses banking services such as Hawala, around 72% use mobile money. Where mobile money or online banking has been used, it has shown to promote self-employment opportunities. Ensuring universal access to digital financial services is thus a definite option for countries to leapfrog into the digital economy.

In addition to boosting trade, technology improves governance, anti-corruption measures and transparency. Governments in developing countries are using data and technology for fiscal management, enhanced accountability, people management, procurement and the delivery of public services. For example, the World Bank has worked with Moldova to provide easy, around-the-clock access to government documents and around 80 public services, resulting in greater transparency and efficiency.

“Globally, four billion people do not have access to broadband”

Yet the real significance of digital development for the SDGs is likely to lie in helping to achieve many of the targets. Target 3.8, for instance, on achieving universal health coverage, 5.B on promoting women's empowerment, 10.C on reducing the transmission costs of migrant remittances, or 16.9 on providing a legal identity for all. It is the enabling function of digital technologies that make them so valuable.

The World Bank's 2016 World Development Report on Digital Dividends identified three broad ways in which ICTs, and especially the internet, facilitate and could indeed be transformational for broader development.

First, by promoting the inclusion of disadvantaged groups within society such as by facilitating the provision of a digital identity to all or by allowing disabled persons to work from home. Second, by boosting efficiency, such as through reducing transaction costs using e-commerce. Third, by using ICT to promote innovation, such as the development of mobile money and ride-sharing platforms. The delivery of these “digital dividends” is dependent on complementary skills, leadership, institutions and policies/regulations – highlighting that the digital phenomenon is cross-cutting and could impact most aspects of the economy and society.



It is clear, however, that the digital revolution has not touched everyone. The lack of reliable and affordable connectivity infrastructure remains a critical challenge. Broadband internet is still in its infancy in sub-Saharan Africa, where internet users represented only 22% of the population in 2016, compared to 44% worldwide. Globally, four billion people do not have access to broadband. The longer those countries and their citizens remain excluded from the online world, the greater their missed development opportunities.

Furthermore, the digital revolution presents societies with a whole new set of challenges ranging from the disruptive effects of technologies such as automated jobs and employability, to digital exclusion and inequality, cybersecurity, data privacy and regulatory issues. Technology, artificial intelligence and automation are already replacing some low- and mid-skill jobs, risking the creation of a new class of digital poor who will find it hard to catch up with the rest of society unless new interventions and policies are introduced.

Disruptive technologies will confront societies with impacts for which they are mostly unprepared. At the same time as digital skills become vital, a whole generation in some developing countries will have difficulty participating in the economy. It is thus essential to create the right “analogue” foundations for digital solutions to be effective, such as better access to education to empower people with digital skills, health to enable them to work effectively and infrastructure to connect them. These foundations also include adequate

regulations so companies can leverage digital technologies to compete and innovate, as well as accountable institutions so governments can respond to citizens’ needs.

The World Bank supports its client countries in developing their communications infrastructure and digital platforms, leveraging private sector resources to strengthen the foundations of the digital economy. Earlier this year, the World Bank in collaboration with the International Finance Corporation launched the Digital Infrastructure Initiative (DII), which will conduct 50 country diagnostic studies to identify gaps and investment needs in broadband communications infrastructure. Last year, we also launched the Digital Development Partnership (DDP), a platform open to both the public and private sectors to share knowledge and expertise on broadband, digital platforms and cyber security.

The Bank is also working with DG CONNECT – the European Commission Directorate-General for Communications Networks, Content and Technology – through the Connected Communities Initiative (CCI), a digital inclusion programme that has already helped secure funds to extend affordable internet access in underserved areas of Croatia, The Netherlands, Portugal, Slovenia and Spain.

We are incorporating the digital transformation into all aspects of our work with the goal to shift the development paradigm, helping to secure and share the gains of the digital revolution, while anticipating and managing the potential downsides. ●

There's more to **digital development** than exporting tech



No SDG target focuses specifically on digital progress

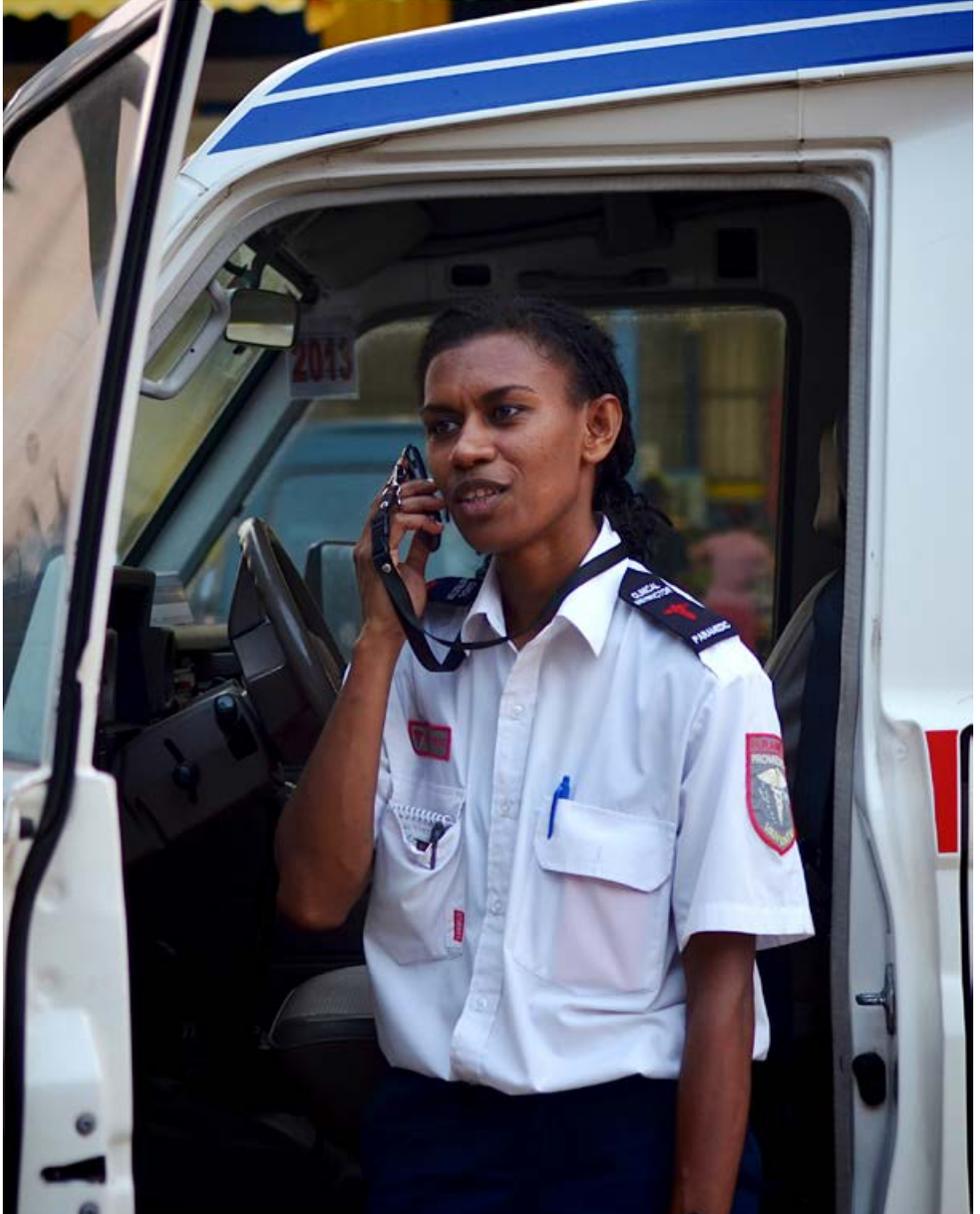
Paolo Ciccarelli, Head of Unit for Cities, Local Authorities, Digitalisation and Infrastructures at the European Commission Directorate-General for International Cooperation and Development (DEVCO)

The international development agenda's focus on digitisation is not new, though it has gained new momentum with both challenges and opportunities at a pivotal moment.

Digital technologies' potential for greater economic achievement has been recognised and discussed in a variety of international fora for over twenty years, with the benefits of closing the global digital gap observed as early as 1995 at the G7 Conference on Information Society. The World Economic

Forum then launched a Global Digital Initiative in 2000 tasked with transforming this rift into an opportunity for growth by spreading ICT access, skills and resources.

Today, the worldwide digital economy is evolving rapidly in line with the fourth industrial revolution and the developing world's positive response to mobile phone technology. Indeed, most Internet access in developing countries is achieved using mobile phones, and the sector is continually expanding despite prevailing



challenges of low connection speeds, high subscription costs and poor rural coverage. Mobile coverage in Africa, for instance, grew from 12% in 2005 to 76% in 2015. This is the opportune moment to further strengthen support for digitisation policy.

Numerous global challenges also call for public intervention, including the enduring digital divide. Indeed, though global Internet access has doubled over the last ten years from 20.6% in 2007 to 47.1%, the digital divide has gained complexity, with gender, rural-urban and other geographical dimensions affecting the uneven distribution of development gains within and between countries, particularly penalising least developed countries (LDCs).

ICT was already given attention in targets related to the Millennium Development Goals (MDGs), and the post-2015 discussion has reinforced the view that digital technologies are considered “enablers of sustainable development”, given the remarkable developments in the capabilities and reach of ICT within developing countries. Digital elements are thus incorporated into several targets of the United Nations Sustainable Development Goals (SDGs), but no target focuses specifically on digital progress.

The European Union considers digitisation an accelerator and enabler of many, perhaps all, of the SDGs. With the New European Consensus on Development and the Staff Working Document on “Digital4Development” (D4D), the EU has acquired a strategic framework through which digital technology

may enhance the effectiveness and efficiency of its development policy, thus supporting partner countries in achieving the SDGs.

The new D4D approach aims at mainstreaming digital technologies and services across four priority areas: connectivity, digital literacy and skills, digital entrepreneurship and job creation, and digital as an enabler for sustainable development. The implementation of the D4D approach has already catalysed an indicative EU contribution of close to €160m for projects in 2017.

The funding currently available for digitisation in EU development policy originates from programmes under the European Development Fund and the General Budget – the Development Cooperation Instrument, Horizon 2020, and so on. Given the attractiveness of investments in digital, the engagement of private sector funds should provide even greater sustainability of projects in the longer term. The new European External Investment Plan, through its innovative financing mechanisms such as the new European Fund for Sustainable Development, is expected to leverage more than €44bn in investments by 2020.

Digital technologies can be a real game changer in the EU’s development policies, but their production must not be seen as an end in itself. It is more crucial to exploit their full potential as enablers for an inclusive sustainable development by mainstreaming digitisation across focal sectors and controlling the misapplication of digital technologies.

“The Arab Spring shows how ICT can be used for harmful purposes, to monitor and control the communications of citizens”

Otherwise, digital proliferation could further widen inequalities and undermine development progress. The experiences of the Arab Spring in the MENA region, for example, show how ICT can be used for harmful purposes to monitor, censor and control the communications of citizens, jeopardising civil and human rights.

Health and education are two key sectors for which digital technologies could bring a wide range of benefits to a large part of the population. E-health applications make it possible for doctors to reach rural patients in remote areas, as well as improve data sharing between medical units. Similarly, e-teaching and e-learning provide new and more flexible learning opportunities resulting in greater inclusion and an improved quality of education for all. Previous initiatives in these sectors have shown, however, that technology will not achieve goals by itself, and deeper analysis must therefore be carried out to ensure projects realise their full potential.

For digital technology to be an accelerator and enabler of sustainable development, other conditions also need to be met; these include national ownership and political will, engagement by multiple stakeholders, public-private partnerships and resource blending, coordination to avoid duplications of efforts, and full consideration of the unequal distribution of digital dividends between and within countries.

What matters for the EU's approach is that the integration of digital technologies is fully grounded in an analysis of local contexts and a deep understanding of who is going to be affected and how, tailoring strategies to local needs and situations. That is why the EU is currently working with the Estonian e-Governance Academy as well as through the European Union's network of delegations across the world to produce an analysis of African countries' preparedness for e-governance systems. This combination of digital expertise and in-country knowledge means we have good reason to be optimistic about this ambitious agenda. 

Using **big data** to fill the development gap



Financing for development is being steered blindly

Jorge Moreira da Silva, Director of the OECD Development Cooperation Directorate

When the SDGs were adopted in 2015, the UN General Assembly called for a data revolution, focusing the world's attention on the reality that policymaking is largely based on incomplete data. Without better quality data, financing for development is being steered blindly, as we will have little basis for determining the effectiveness of finance to support the SDGs.

There is not yet any data for two-thirds of the 232 SDG indicators, and 88 indicators have neither an agreed methodology nor data for measuring them. Even when data is available, it is often insufficiently disaggregated, making

it difficult for policymakers to track or compare different communities. We cannot expect to deliver on the 2030 Agenda promise of “leaving no one behind” with such gaps in basic data.

This year's OECD Development Cooperation Report reviewed the statistical capacity of 131 low- and middle- income countries, and found that only 37 countries have statistical laws up to UN standards. Less than a third of the countries surveyed even have systems capable of fully registering births or deaths, so demographic data must be estimated.



Too often, governments in developing countries lack the resources to develop sound statistical systems. The aid committed by donors for building statistical systems in developing countries has stagnated over the past three years at 0.3% of total official development assistance. Only five OECD Development Assistance Committee (DAC) members accounted for 78% of this aid.

Fortunately, we have better tools than ever at our disposal, and the so-called “data revolution” makes it easier, faster and cheaper to produce and analyse data from a wide range of sources.

We must not miss this opportunity to harness the data revolution and advances in technology. A number of developing countries are already using technology in innovative ways to capture data with positive results. For example, Ethiopia, South Africa, Sri Lanka and Uganda have improved the efficiency and accuracy of census and survey data collection using tablets or other handheld devices. In Brazil, the UN and Facebook used anonymised big data to fight the Zika health crisis.

Yet without a comprehensive plan that addresses the digital divide at the same time as

“Without a plan that addresses the digital divide, technology will deepen inequalities”

applying innovation, technology advances will deepen inequalities, with rich countries moving to “Industry 4.0” while poorer countries are left behind. There are still 3.9 billion people without reliable access to the Internet. In Uganda, for instance, reliable Internet services are not yet a reality in rural areas, where 90% of the population live. This leaves radio as the main line of communication. In response, the UN Pulse Lab Kampala, supported by the Belgian Government, is using digital technology to transform radio broadcasts and call-in shows into a source of big data, allowing better first-hand reporting from rural Ugandans on issues like infectious disease outbreak.

Governments must be better equipped to manage this new data. Innovations for data collection cannot replace official statistics; they must complement efforts to build up national statistical systems in order to complete the data ecosystem.

We need to translate the ever-accelerating progress in data into tangible support for results on the ground, especially in least developed countries (LDCs). If current levels of ODA spent on statistics were increased by an annual \$200m, the funding gap would be filled to meet the minimum cost of producing data for the SDGs in developing countries.

But it’s not only about financing. There are six essential steps for strengthening data for development. The first is to make statistical laws, regulations and standards fit for evolving data needs. The quantity and quality of financing for data for development must next be increased. We then boost statistical capacity and data literacy in developing countries through new approaches, followed by the promotion of national ownership and coordinating support for statistics at the national-government level. Country-led data can subsequently be used to monitor progress towards the SDGs. This, in turn, will allow us to produce and utilise better development finance data.

Now more than ever we need to tell the full story of how development aid touches lives and supports a more secure, stable and prosperous world. Complete data from developing countries has the ability to amplify human stories beyond the borders of fragile states. The future of development cooperation depends on hard evidence about its impact with increased and better-targeted investments. As we move towards a results-orientated paradigm on sustainable development, big data has the potential to complete the picture. ●

A plea for **regulatory policy** 4.0



Regulatory areas are becoming obsolete as traditional industrial sectors are overlapping

Dirk Abmann, Director-General of the Sectoral Department, **Sonja Kurz**, Head of the Competence Centre for Economic Policy and Private Sector Development and **Max Büge**, Advisor on Economic Policy and Digital Transformation at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Two minutes and forty seconds. That's how long you will probably take to read this article. During that time, Chinese e-commerce giant Alibaba will send out 22,000 parcels, 85,000 financial transactions will be processed by the now-global Kenyan mobile money service M-Pesa, more than 100 million WhatsApp messages will be sent all over the world and around 49,000 cyber attacks will occur, while the Internet as a whole will acquire 1,600 new users.

The fourth industrial revolution is in full swing, blurring the boundaries between physical,

digital and increasingly also biological processes. An unknown number of sensors, 3D printers, machines and robots are constantly capturing digital data and using them for production processes. This comes with lightning-fast progress and the ever-broader interconnectedness of big data, cloud computing, blockchain, artificial intelligence, the Internet of Things, bio- and nanotechnology and so on.

Like every industrial revolution, the fourth entails a deep-reaching structural transformation. Klaus



Schwab, founder and Executive Chairman of the World Economic Forum, has observed that the question for all industries is no longer whether disruption is coming but rather when and how it will affect each organisation.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Germany's international development agency, is conducting a large number of projects concerned with promoting start-ups, digital finance or digital literacy. One example is the 'MakeIT in Africa' project promoting selected tech start-ups in Kenya and Nigeria. Based on this and other projects, GIZ spent several months analysing requirements related to digital change in collaboration with universities, think tanks, regulators and enterprises – both start-ups and multinationals.

From our analysis it is clear that we need to deepen international dialogue and step up

cooperation on a new regulatory policy. The finely calibrated system laying down the 'rules of the game', in the words of economic historian Douglass C. North, cannot keep pace with the speed at which that game is changing. In consequence, ministries, regulators and other authorities across the globe need a regulatory policy 4.0.

A complementary regulatory revolution will need to recognise entirely new issues and realities, such as gauging the market power of a company when its size is no longer measured by turnover but by its data, clicks and number of users. We will need to decide what policies are needed to encourage innovation and allow newcomers to access markets in the age of digital platforms. Regulation-making will need to be handled in a flexible and innovative manner so as to keep pace with technological progress. E-commerce rules will need to be agreed for

the countries of today, such as India, which is now one of the world's ten biggest e-commerce markets. And, not least, regulatory policy must foster the inclusiveness and societal benefits of the digital transformation, possibly with increased understanding and recognition for virtual currencies.

Most basically, we lack any multi-stakeholder dialogues on regulatory policy 4.0. Industrialised and developing countries could do more to exchange their lessons learned and best practices related to the digital transformation. The first G20 Digital Ministers' meeting in Düsseldorf last April could serve as a model for future international exchanges bringing together ministries, authorities, technology experts, academics, civil society and the private sector.

Above all, we should not forget that emerging economies can contribute hugely to such a dialogue with their own success stories; the key word being leapfrogging, the adoption of state-of-the-art technologies without immediately prior technologies.

Policy and strategic advisory services also need redesigning. The development community must devise new and better instruments and approaches to advise partner countries in designing their policies and strategies. This calls for the involvement of cutting-edge technology and service providers.

We can also draw upon ongoing discussions such as the EU's antitrust case against Google, the new framework conditions for autonomous driving, or debates in the US concerning fake

news and the role of social media. Against this backdrop, our regulatory areas – industrial, social or competition policy – are becoming obsolete as traditional industrial sectors are overlapping.

Decision-makers in industry, politics and civil society require enough tailored training to make informed decisions without having to become full-blown digital experts. 'Enough with the buzzwords,' said one participant during a GIZ discussion on needs. Authorities and regulators instead need specific, high-level technical training, for example on the application of the law, on competition economics, cyber security, network regulation and industrial analysis.

New and innovative knowledge products are essential to introducing an effective regulatory policy 4.0. We need to fill the dearth of comparative country and case studies, peer reviews, policy impact models, statistics and new indices on the digital transformation. Civil society has a role to play here with universities, think tanks and NGOs providing key knowledge bases.

Europe can play a central role with the launch of an international dialogue on regulatory policy 4.0. Many partner countries are observing with great interest how Europe and its member states are handling the digital transformation. Europe's approach, which steers a middle course between US laissez-faire capitalism and the Chinese model, makes the EU an attractive dialogue partner for many emerging economies and developing countries. ●



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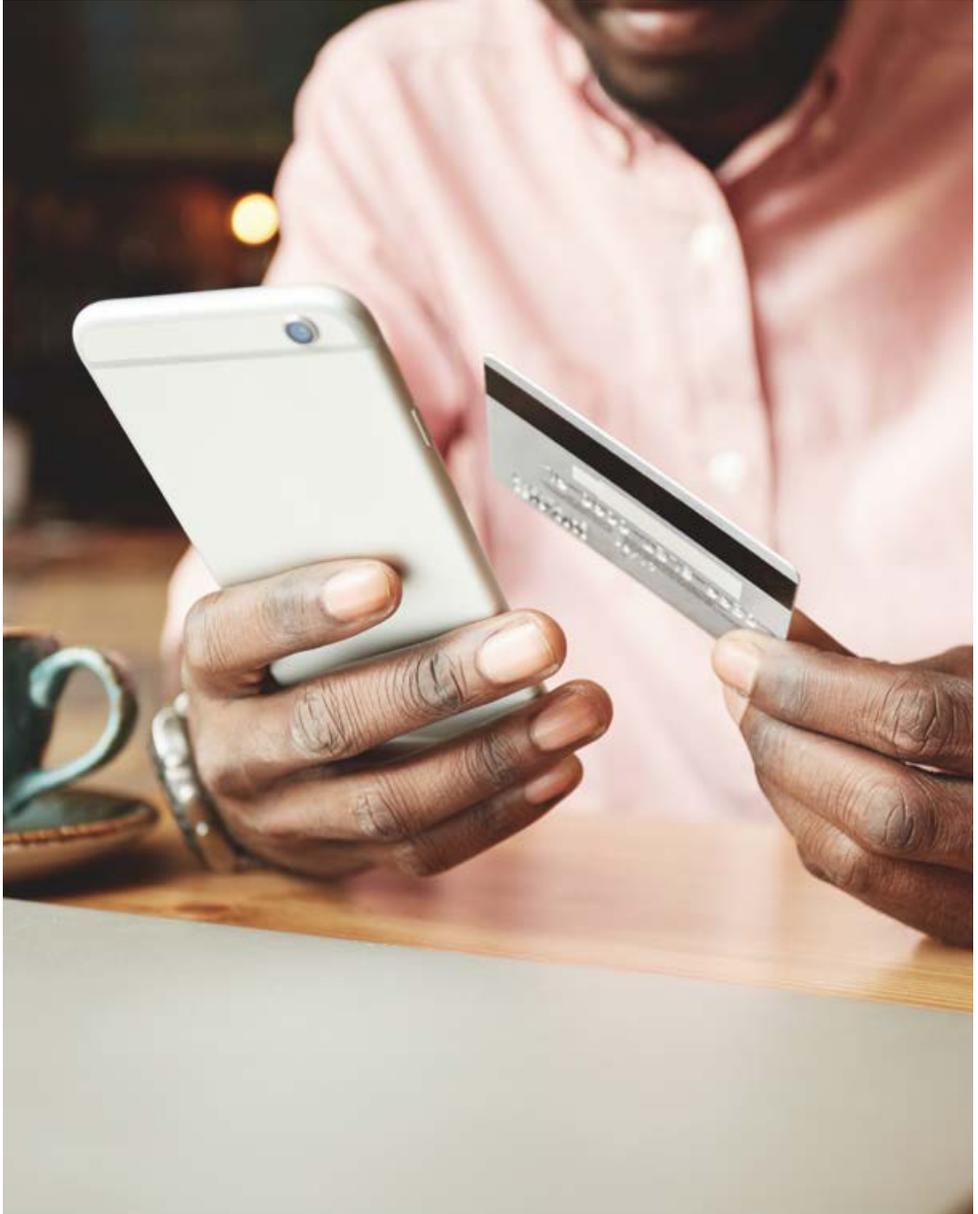
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PART 2

BUILDING INNOVATIVE TOOLS



DIGITAL LIVES NEED DIGITAL FINANCING	29
NEW, BETTER AND MORE AFFORDABLE DIGITAL FINANCIAL SERVICES NEEDED TO BRIDGE THE DIGITAL GAP	32
CASE STUDY: DRONE DELIVERIES SAVING LIVES IN RWANDA	36
AGRIPRENEURS MAY AT LAST FREE AFRICA FROM HUNGER	38
HOW CAN DEVELOPING COUNTRIES FOLLOW THE PATH OF JAPAN IN ICT SUPPORTED SUSTAINABLE AGRICULTURE?	43
THE CONVERGENCE OF THE ENERGY AND DIGITAL TRANSITIONS	46



Digital lives need digital financing



If WhatsApp and Facebook decide to charge their users, buying a smartphone will become the price of entry

Tillman Bruett, Manager of the United Nations Capital Development Fund (UNCDF) initiative Mobile Money for the Poor (MM4P)

Mobile connectivity is bringing rapid advances to even the least developed of countries. While working on digital finance in the Pacific region nearly a decade ago, I saw countries progress from 10% mobile coverage to near 100% in only a few years. Even in some of the most remote villages, you can now find a mobile phone in every home.

Though mobile network operators, banks, microfinance institutions and other stakeholders are all continuously investing in digital solutions, customer growth, revenue and capital

expenditures are in decline due to competition and market saturation. Banks are now going digital and down-market, but they are limited by their own cost structures, which studies show make most small-value accounts unprofitable.

New “fintechs”, loosely defined as companies offering financial services digitally, are discovering new market opportunities. But it is only natural that they focus on profitable services for middle-income countries before going to mass market – if they do so at all.

For these reasons, it is still vital for development agencies to test the water before the private sector dives into the mass market. At UNCDF, the programmes I have the honour to create and manage were designed to ensure people who most need digital finance are not left behind. The project has covered 15 countries, from the Solomon Islands to Sierra Leone.

The first challenge in such endeavours is extending reliable network coverage beyond urban centres. We have experimented with risk sharing and other incentives to help private sector entities overcome their loss aversion and test the limits of their own business models, especially in rural areas.

In Uganda, we agreed to offset losses for telecom company MTN related to setting up new base stations allowing coffee growers to receive digital payments. We also supported “booster teams” to kick-start the enrolment and training of both agents and clients in rural areas to offset entry costs in regions perceived as low-potential. Revenues from new rural subscribers exceeded expectations to such a degree that our guarantee was never claimed. Since then, MTN has revamped its financial model to reflect rural potential and is increasing investment in rural infrastructure.

A second challenge concerns broadening access to phones, particularly smartphones. If companies like WhatsApp and Facebook decide to follow WeChat in offering a payment solution, buying a smartphone will become the price of entry. Consider four developing

countries in two very different situations. There are more mobile phones than people in Nepal, while only 20% of Ethiopians own a phone; and there is a phone – usually a smartphone – for every person in Myanmar, while the 25% of Malawians with a phone have to rely on basic-feature handsets.

Phone access matters. It is the primary reason, for example, why women are far less likely to have digital accounts. At UNCDF, we have supported small companies offering pay-as-you-go models for phones, allowing customers to invest in a phone in small instalments matching their cash flow. Development agencies may also consider outright subsidies to get smartphones into markets faster, reversing the growing digital divide.

Smartphones are pivotal, as revealed by a third challenge of user experience. Without a smartphone, digital transactions are time-consuming and require multiple steps, often resulting in errors. Smartphones allow people to intuitively interact with technology in their own language and with helpful images. They also offer the opportunity to bundle a range of services into a single application. Some projects UNCDF currently supports provide basic insurance through airtime purchases in Papua New Guinea, and create a savings and payment plan for education in Uganda.

We need to develop solutions that suit the needs of low-income families. Services bundling information, planning and payment tools are needed to address the real challenges these

***“There are more mobile phones than people in Nepal,
while only 20% of Ethiopians own a phone”***

families face, such as paying for healthcare, life insurance and education. A death or illness in a family often sees children – particularly girls – pulled out of school, which is a significant contributor to multi-generational poverty. Imagine the difference if we could help millions of families to avoid such poverty traps.

Another challenge is meeting customers where they live and work. An effective way to reach low-income clients is through institutions they already know. In Uganda and Nepal, tea growers’ financial lives are intertwined with those of the company – or companies – selling them agricultural inputs and buying their crops. These companies know their customers and are well placed to offer options that help them plan, save during the harvest season and borrow during the planting season.

Despite all this, cash will not disappear quickly. Over 90% of transactions in Kenya are still in cash, not to mention 80% in Germany. This brings us to a fifth and final challenge of building nationwide “cash in - cash out” networks. These must be broad and liquid enough that people can trust they will get cash when they need it at a reasonable cost. One option is to think big, such as supporting national cash distribution networks, perhaps through a combination of public and private efforts. Another is to think small, drawing on the so-called sharing economy and encouraging individuals to act as human ATMs for a reasonable fee.

We have never before had so many private sector allies and options. Together we can provide families with the tools they need to achieve their own sustainable development goals. ●

New, better and more affordable digital **financial services** needed to bridge the digital gap



Cloud computing is also increasingly fuelling artificial intelligence and machine learning algorithms

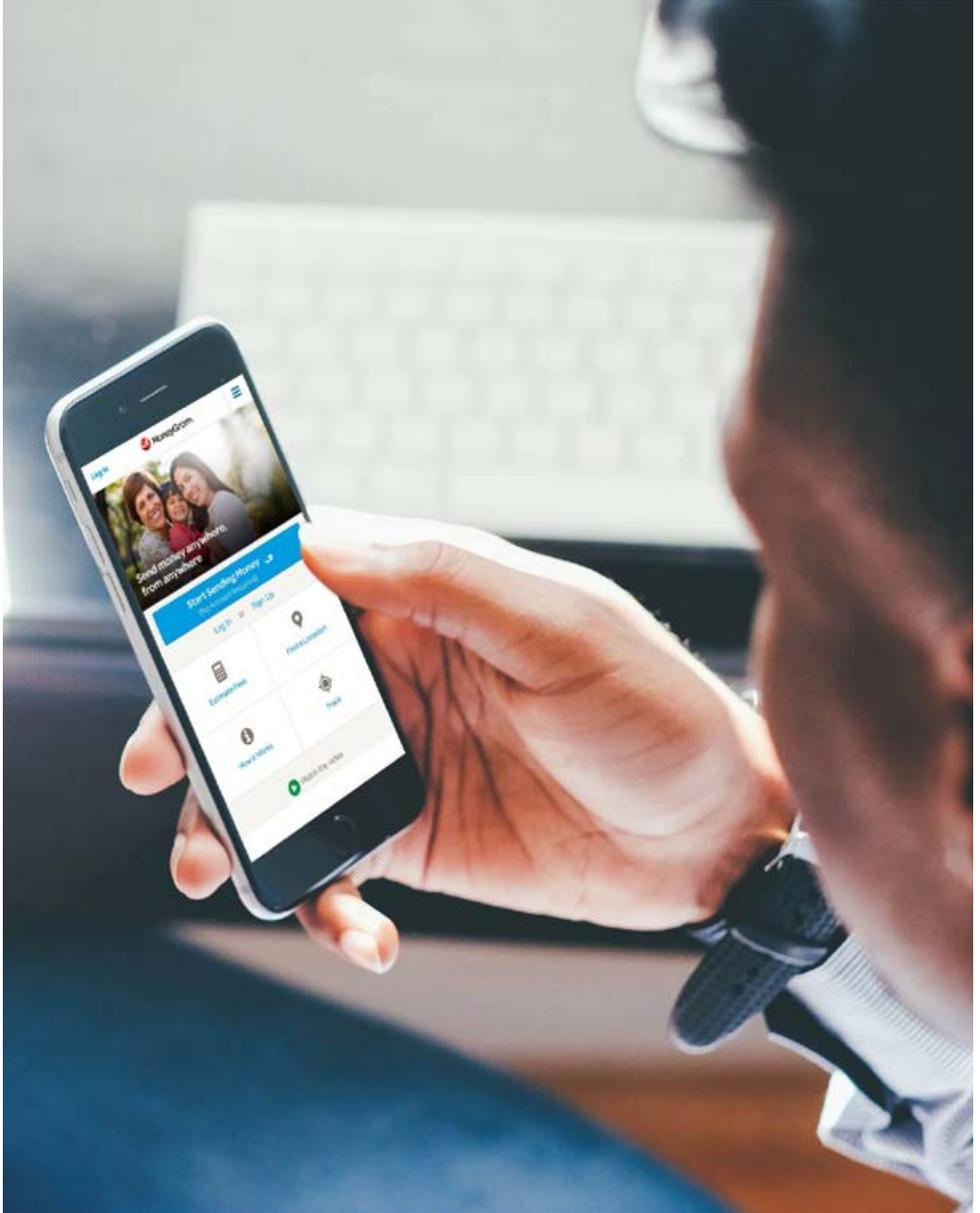
Alvaro Martin, Head Economist for Digital Regulation at BBVA Research

The scale, depth and speed of the digital transformation in the economic sector is astounding in almost any activity. Arguably, industries that rely most heavily on information flows and have less regulatory barriers to entry experience the challenge, or opportunity, of digitalisation at earlier stages. Nevertheless, eventually all sectors will be impacted by the irruption of digital technologies.

Empirical observation shows that certain technologies follow exponential growth patterns or an exponential cost reduction in

their adoption. Consequently, the diffusion of these technologies is accelerated and often reaches a critical mass of individuals over relatively short periods of time. For instance, the fast deployment of cellular networks and the widespread adoption of mobile phones have made it possible for almost five billion people to be connected in barely two decades, according to the latest figures by the GSM Association.

The potential of mobile technologies to reduce poverty and inequality has been extensively discussed. Their application within broader



“In the trade-off between greater control on risks and more competition and efficiency, consumer protection must be preserved in all cases”

financial inclusion strategies is a particular case that raised high expectations following the success of a Kenyan M-Pesa, a mobile-phone based money transfer service. The use of mobile technology to make payments, access credit or manage savings is a reality across the globe today.

While many users still have access to so-called feature phones with basic capabilities, the adoption of smartphones and Internet connections is on the rise with 3.8 billion Internet subscribers globally. The combined power of mobile devices and Internet connectivity has already been transformational for the early adopters - usually the wealthiest, youngest and most educated - by providing them with access to a whole range of online services, from video streaming to mobile banking. Fortunately, evidence shows that the gap generated by cell phones and Internet access in developing countries is narrower in terms of timing than in the adoption of other technologies.

The quality and reliability of online services, as well as the overall user experience, have

improved dramatically since the surge of another exponential technology: cloud computing. The cloud offers distributed computing power and storage capabilities, available on demand. In terms of scalability, flexibility and cost, it is currently the preferred technology to deploy new digital services, and its variable cost structure makes the launch of innovative ventures easier, as it also reduces upfront investment.

Cloud computing is the underlying technology in data-driven organisations in which the available datasets can be exploited through big data analytics to make smart decisions. These analyses provide better insights on complex phenomena, such as inequality or financial decision-making, and allow for a better understanding of the policy and business issues to be addressed.

Cloud computing is also increasingly fuelling artificial intelligence and machine learning algorithms that bring a new range of opportunities, including automated advisory, natural language interfaces, optimal asset allocation or fraud detection, to mention

just a few. Although machine learning is not completely risk-free - the ethical, legal and economic impacts of automation are still being assessed - it has the potential to lower the cost of serving the bottom of the pyramid, expanding the supply of advanced advisory services and increasing equality.

As explained, cloud computing is the cornerstone for much of the digital innovation to come, and will have an impact in expanding the adoption of affordable, high-quality digital services for all. Many industries are already making good use of these capabilities, but only recently are they being applied to financial services. The reasons for this include an intrinsic high level of complexity of legacy systems, as banking has historically been one of the largest investors in ICT, but also the constraints imposed by the existing regulations.

Broadly speaking, the regulatory framework applicable for the use of cloud computing in financial services often requires some sort of data location, which is against the distributed nature of cloud infrastructures and services. This restriction can be imposed by privacy laws preventing cross-border personal data flows, but also by financial authorities willing to keep oversight of financial data stored in

their own jurisdiction. Financial supervisors also ask for a tight control of the operational risks associated with any outsourcing agreement, as it is the case with external cloud service providers. This is a fair concern for the sake of financial stability, but supervisory practices are sometimes unfit for the specificities of cloud outsourcing. In the most extreme cases, regulation completely forbids the use of public clouds - those accessible by any third party - by financial institutions.

If policymakers want to unleash the potential of digital technologies and bring new, better and more affordable financial services for all, they should embrace cloud computing and avoid imposing excessive burdens to those willing to innovate. In the trade-off between greater control on risks and more competition and efficiency, consumer protection must be preserved in all cases, especially when protecting the most vulnerable individuals or communities.

On the other hand, financial stability and integrity objectives should not be forgotten, but there are numerous risk-based approaches to regulation for financial inclusion, such as e-money and basic deposit accounts, that pave the way for a rapid adoption of cloud technologies. ●

CASE STUDY

DRONE DELIVERIES SAVING LIVES IN RWANDA

A man wearing a pink shirt and sunglasses is operating a red drone in a workshop. The drone is mounted on a stand and has a white container attached to it. The man is pointing towards the drone. The background shows a workshop with various tools and equipment.

Healthcare services usually require major infrastructure like hospitals, laboratories and cold storage facilities. In both developed and lesser-developed countries access to healthcare is hampered by limited or poor infrastructure. In rural or remote areas, medical teams – if they can be deployed – need diagnostic and testing services to be able to offer appropriate treatment. Motorbikes and trucks carrying urgent medical supplies are prevented from reaching their destinations by impassable roads, difficult terrain and adverse weather conditions. Access to basic supplies such as blood for transfusions could prevent millions of deaths each year, including those of more than 2.9 million children under five, and 150,000 deaths related to pregnancy.

Drone technology has the potential to revolutionise health supply distribution, saving lives through



the fast delivery of blood, medication and vaccines. In late 2016, Zipline, the world's first drone delivery system, was launched in Rwanda using 15 custom-built drones to transport blood products from central distribution centres to hospitals. Healthcare workers send a text message requesting blood. Staff at a centre packs the delivery together with a paper parachute. When the drone reaches its destination, the package can be dropped from the air, meaning that no runway is needed, and the drone can immediately return to the distribution centre ready for its next flight.

Navigating with GPS receivers, the drones can cover up to 150km and deliver 1.5kg within 15 to 30 minutes. This fast turnaround period eliminates the need for on-board cold storage or insulation, thereby addressing one of the key barriers to health supply transportation.

The Zipline drones are also able to withstand wind speeds of up to 50kph, making them more versatile and efficient than similar systems using 'multicopter' designs.

This pilot project was made possible by multi-million dollar donations. These investments allow the Rwandan government to pay the same price per drone delivery as it uses for a motorbike. If Zipline's service is successful then it also could be used for vaccines or other drugs, and the company has hopes for international expansion. But although the Rwandan government was prepared to take the leap and permit the drones to use airspace, this innovation may not take off in other countries where governments have banned or introduced large fees or heavy licensing requirements for commercial drone services. ●

Agripreneurs may at last free Africa from hunger



It is a matter of urgency that the younger generation be attracted to agricultural work

Chiji Ojukwu, Director of the Agriculture and Agro-Industries Department, **Edson Mpyisi**, Agricultural Economist and **Mariam Yinusa**, Financial Economist at the African Development Bank (AfDB)

Africa's agricultural sector is replete with paradoxes. The majority of the continent's 1.2 billion inhabitants live in rural areas where farming contributes up to 65% of livelihoods. Yet despite owning more than 60% of the world's remaining arable land, Africa is still largely dependent on food imports, which reached \$35bn in 2015 and could reach \$110bn by 2025.

Tragic episodes of famine recur frequently to remind us of Africa's untapped potential for food

self-sufficiency. A host of challenges bridle the sector such as low productivity stemming from predominantly rain-fed subsistence farming techniques, restrictive land tenure systems and poor access to finance. Moreover, the little that is produced is often lost due to poor storage, processing and transportation infrastructure.

As the world's youngest continent, Africa is home to nearly 420 million people between the ages of 15 and 35. But at the same time, youth



unemployment rates are worryingly high with only 3 million new formal jobs on offer for the 12 million young people entering the workforce each year.

Many of the disenchanted unemployed resort to dangerous alternative livelihoods. In 2017 alone, more than 2,000 young Africans lost their lives attempting to cross the Mediterranean Sea in search of a better future in Europe, and terrorist groups have taken advantage of this situation to entice vulnerable youth into their ranks.

Creating decent employment opportunities for the next generation of Africans is clearly of critical importance both on the continent and elsewhere. It has become a matter of urgency that the younger generation be attracted to work in the agricultural sector.

Making farming “cool” has become an important priority for many African governments, development institutions and the private sector. During the Borlaug Dialogue earlier this month, Akinwumi Adesina, President of the African Development Bank (AfDB) and winner of the 2017 World Food Prize, dedicated his cash prize of \$250,000 to support young African entrepreneurs in agriculture – agripreneurs.

Bringing young people into agriculture is perhaps the elusive key to attaining food security and launching commodity-based agro-industrialisation in Africa. But in today's fast-paced digital world, many young people find traditional agriculture so unattractive it is generally an option of last resort. Drastic paradigm shifts are needed to unlock the

entrepreneurial opportunities that lie along entire agricultural value chains from farm to fork.

Thanks to a revolution started by the International Institute for Tropical Agriculture (IITA) while launching the IITA Youth Agripreneurs (IYA) Programme in 2012, Africa's youth is turning to technology for new and smart agricultural practices to seize opportunities, thereby triggering the much-needed modernisation of the sector. Mechanisation, ICT and mobile phones are quickly replacing the long back-breaking hours under the sun with hoes and cutlasses. In fact, young African agripreneurs are leapfrogging into very novel and innovative ICT solutions to age-old agricultural bottlenecks.

The rapid spread of mobile technology in Africa has made it the platform of choice for digital transformation. The GSM Association, the global representative body of mobile phone operators, estimates there are 557 million unique subscribers in Africa, a number likely to rise to 725 million by 2020. Across Africa, mobile phones are spurring innovative ideas and boosting incomes. The agricultural sector is no exception. Farmers now use them to check market prices before selling to middlemen, and market traders can accept payments using mobile money.

Many new agri-apps are developed and deployed by young Africans themselves. Rita Kimani is the co-founder and CEO of FarmDrive, an enterprise that works to better the livelihoods of smallholder farmers in Africa using new data-driven technology to improve access to financial capital. The app connects unbanked

smallholder farmers to credit while helping financial institutions cost-effectively increase their agricultural loan portfolios. Other young agripreneurs are rolling out similar technologies in Botswana, Rwanda and Senegal and reaching hundreds of thousands of farmers with their services.

Similarly, in Ghana, young agripreneur Peter Awin founded CowTribe in 2014. CowTribe is a mobile technology platform that tracks movements of cattle herds and enables veterinarians to better deliver services to herdsmen using mobile phones. About 80% of poor families in Africa depend on livestock as a key source of livelihoods, yet 30% of livestock are lost each year due to disease outbreaks, accounting for about \$4bn in agricultural losses, mostly from poor farmers.

Rebecca Nakubogo is another digital agripreneur who heads the Ugandan Youth in Agribusiness association which created and manages a web-based market selling fruits and vegetables harvested in their 500-acre farm. Selling and delivering directly to customers means better price discovery and flexibility to quickly adapt to customer demand.

These are but a few examples of how young agripreneurs are digitally transforming Africa's agriculture. There is no doubt that the agripreneur revolution is underway, but there is still more work to be done to ensure more youth agribusinesses succeed.

***“Drastic paradigm shifts
are needed to unlock
entrepreneurial opportunities”***

Low levels of technological uptake, limited access to land and finance for the youth and low internet and mobile penetration rates remain challenges that must be remedied. Institutions such as the AfDB, IITA, Technical Centre for Agricultural and Rural Cooperation, Nestle and MasterCard Foundation are partnering in various countries on initiatives to change the local youth's perception of agriculture and support them in building exciting and profitable agribusinesses.

Initiatives such as the Technologies for Africa's Agricultural Transformation (TAAT), an innovation-based response to the recognised need for scaling up proven technologies, the ENABLE Youth Program, which trains and supports young agripreneurs to set up their business, and Agrihack, which allows technologically-minded young people to pitch ideas, are working in the right direction to boost productivity and make Africa self-sufficient in key commodities. ●



How can developing countries follow the path of Japan in ICT supported sustainable agriculture?



The best example of utilising ICT is the improvement in productivity in the vegetable cultivation factory

Masao Shino, Deputy Director for Transportation and ICT at the Japan International Cooperation Agency (JICA)

According to estimates from the United Nations Conference on Trade and Development (UNCTAD), the annual amount of money required to achieve the Sustainable Development Goals (SDGs) is US\$3.09tr; however, developing countries only fulfilled US\$1.04tr of this amount. Moreover, the total official development assistance provided by developed countries in 2014 was about US\$14bn. In order to use these limited funds effectively, Information and Communication Technology (ICT) is expected to

provide further innovative approaches, including improving the efficiency and resiliency of the agricultural sector.

The second SDG states: “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”. The applications of ICT to agriculture are diverse: from farmers accessing agricultural information through mobile phones to remote sensing using satellite image pictures, and so on.

Many of us are familiar with the general aspects of agriculture: farmers grow crops based on their accumulated experience and intuition, and share knowledge within their communities. The climate affects the quality, amount and price of crops. Farmers also require a variety of agricultural information on elements such as production techniques, weather conditions and market prices. In developing countries, agriculture provides many employment opportunities, even with increased industrialisation. For example, the World Bank data shows agriculture is still responsible for one-third of GDP and three-quarters of total employment in Sub-Saharan Africa.

The features of ICT on the other hand are its ability to digitise and convert data that can be easily stored, visualised and exchanged over geographical distances. Thanks to ICT, information can be presented in a prompt, affordable and precise manner.

But what happens if the benefits of ICT are applied to agriculture? Visualising the experiences and intuitions related to the cultivation of crops and sharing them even from remote areas becomes possible, which in turn leads to improved quality of crops, reduced workload, improvement in efficiency and increased productivity. A database of agricultural information and a facility cultivation system such as a “vegetable cultivation factory” could be created as a concrete measure.

ICT also contributes to supplying agricultural information on ways to increase yield, to access markets and to adapt to weather conditions.

All of these have the potential to improve productivity and increase farmers' income. Mobile phones in particular have been a convenient tool to share agricultural information.

There are, however, some prerequisites for promoting ICT within the agricultural industry. First, the ICT infrastructure must be established. Fortunately, the widespread use of mobile phones and the communication coverage through networks that can access cloud services are making ICT more available for everyone. Second, from a cost point of view, it needs to be affordable to users: whether it is a service that can be used not only on a smartphone but also on feature phones or whether Capital Expenditure (CAPEX) or Operating Expense (OPEX) costs need to be paid is something to consider. Third, it is necessary to take into consideration the unique features of the area, such as customs, adaptability to crops and barriers to utilising ICT. If these prerequisites are met, efforts should be made to encourage users to enjoy the merits of taking full advantage of ICT and promote the transition from traditional methods to newer ones.

Looking at agriculture in Japan, the best example of utilising ICT is the improvement in productivity in the vegetable cultivation factory. This is an environment with semi-controlled lighting, temperature and nutrients necessary for the growth of vegetables based on hydroponic cultivation. ICT is used in the factory to control these necessary parameters. The benefits include stable and high-speed production (depending on the variety, crops can be harvested in half the time compared to log production), as well

as advanced use of land. The disadvantages are that the production cost is high (both CAPEX and OPEX), the unit price per crop is about double the log production and, at the present time, there are few applicable varieties (leaf lettuce and other leaf vegetables only).

Japan International Cooperation Agency (JICA) conducted a cloud-based facility cultivation project with Japanese companies in Turkey and Vietnam. JICA also worked on a project investigating control technology in hydroponic cultivation of small and medium enterprises. Moreover, in Bangladesh, JICA conducted cultivation support projects using the web system and mobile phones, with the Telecentre as the operation base for farmers at the bottom of the wealth pyramid.

Furthermore, JICA has been continuously providing assistance to Rwanda, an African ICT hub country since 2010. In Rwanda, 'Ecosystem', which organises people, goods and money by fusing JICA and worldwide support from industry, government and academia to create innovation, is organically occurring. In order to further strengthen this innovation ecosystem, JICA and the Rwandan government will jointly start a new project in the latter half of 2017. The project aims to strengthen the country's innovation ecosystem through the implementation of pilot projects to solve Rwanda's social issues with the help of ICT. In this context, a pilot project using ICT for agricultural development is being planned.

“The application of ICT to agriculture may help achieve the second SDG”

The application of ICT to agriculture may help achieve the second SDG. It is clear from the example of Japan's efforts that the characteristics of ICT, such as data conversion, accumulation, visualisation and exchange over geographical distances offer the possibility of bringing about improvements in agricultural productivity and increasing farmers' income.

Although the latest technology is not necessarily a solution, since ICT has a rapid transition period, it is essential to create a mechanism (open access) that widely accepts proposals. JICA currently provides a mechanism for accepting proposals from private companies and commercialising them. Similar approaches are also being implemented by the Department for International Development (DFID) and the United States Agency for International Development (USAID). In addition to this, development assistance agencies are expected to make efforts to fulfil the prerequisites for ICT utilisation by providing public funds, such as Universal Fund and highly concessional loans, which provide communication networks not only for urban areas, but also in rural areas to distribute ICT devices directly to farmers. ●

The convergence of the **energy** and **digital** transitions

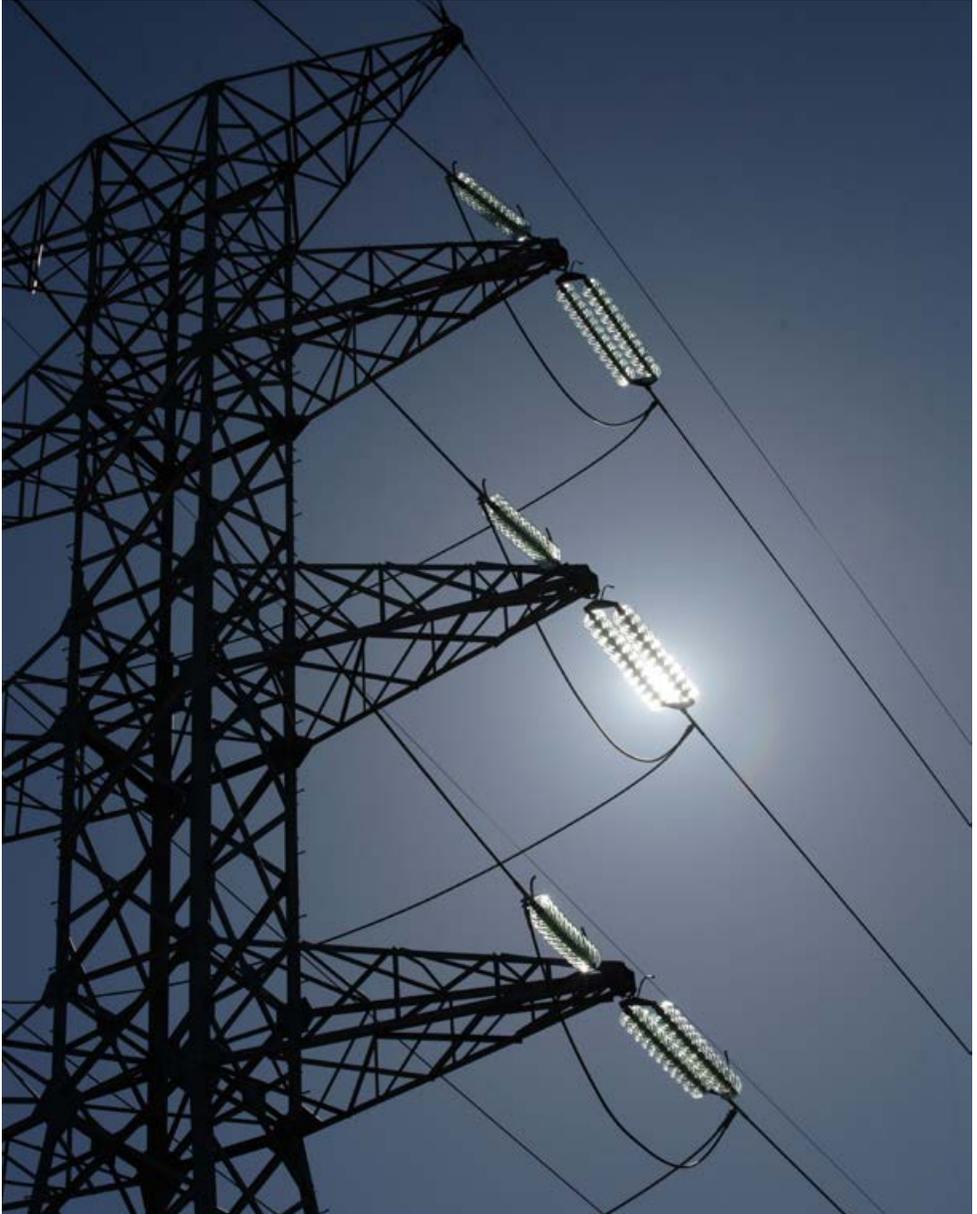


The Internet now accounts for 10% of the world's electricity consumption

Rima Le Coguic, Director for Energy and Digital Transitions at the Agence Française de Développement (AFD)

The energy and digital transitions are at the heart of ongoing transformations in our society and ways of life. These two transitions have a common characteristic in that they affect all sectors of the economy and all trades. Yet their guiding trajectories differ. The energy transition is the path that humanity must pursue actively and voluntarily to limit climate change while allowing access to energy services for all. The digital transition is more of a massive technological revolution transforming our societies almost with a pace of its own.

The energy transition paths leading to a decarbonised and environmentally and socially sustainable model have yet to be defined. But the need to limit global warming to 2 degrees Celsius requires profound changes in the way humans consume, produce, work, and so on. Digital technologies provide the energy sector with innovative tools and solutions to control our consumption, better integrate intermittent energies with smart equipment such as smart grids, optimise the use of resources, reduce losses, and find new and less expensive



solutions to extend access to energy for all – such as the “pay as you go” model.

Yet digital is nonetheless a consumer of energy resources and metals with a significant ecological footprint. The Internet now accounts for around 10% of the world’s electricity consumption, growing at 7% per year. This figure includes data centres (30%), user equipment (30%) and networks (40%). The rapid development of technologies such as IoT (internet of objects), artificial intelligence and big data will further increase the overall electricity consumption of the digital sector. Digital CO₂ emissions are estimated to be at 2-5% of total emissions, which is by no means insignificant considering the aviation sector accounts for 2% and has a much slower growth rate.

These two essential transitions also require consumption of metals, such as silver, cobalt, copper, indium, gallium, germanium, lithium and tantalum, calling into question their long-term sustainability further still. The production of digital equipment uses certain rare metals with low recyclability and limited accessible reserves, some of which are also needed for the production of renewable energy equipment, such as wind turbines and solar panels.

Yet the convergence of these two transitions offers an opportunity that may prove essential for their sustainability. New technologies already provide energy transition solutions. Whether in control systems, such as SCADA, earth observation, data analysis and processing for renewable energy forecasts, or smart metering to facilitate the interaction between energy

producers and consumers, these solutions help optimise grid operation and energy consumption. Conversely, new and more energy-efficient technologies are reducing the carbon footprint of digital services.

To ensure the convergence of digital and energy transitions, solutions and models must be conceived according to four axes.

The first is to decarbonise the digital sector through the triptych of renewable energy, energy efficiency and demand management. The energy efficiency of equipment and digital uses will have to be improved wherever possible and the energy consumption patterns of digital services modified. In parallel, substituting non-renewable resources for renewable alternatives will have to be extended; Facebook, Apple and Google have accordingly committed to a target of 100% renewable energy consumption.

Secondly, solutions must also be developed for the efficient use of resources in both sectors. A circular economy model should be envisaged from the inception, with the aim of continual reuse of materials and resources. The sharing economy will enhance resource efficiency deeper still, as illustrated by new solutions of shared mobility, like Uber and others. Digital technologies open new opportunities in the development of resources and services sharing platforms.

Thirdly, a profound shift in consumption patterns and lifestyles drives both transitions in tandem. Dematerialisation makes it possible to satisfy people’s needs via remote solutions such as

e-commerce, teleworking, digital sharing and consultation platforms.

Finally, the “greening” of technological innovations, while systematically mainstreaming sustainability and efficiency criteria is necessary. The introduction of carbon indicators to digital products and services incentivises responsible patterns.

Moreover, the new modes of communication offered by the digital world are powerful leverage to raise awareness and promote changes in practice.

The convergence can be even faster in developing countries. It is likely that innovative solutions will come both from the North and the South, so developing countries should seize opportunities to transform models and conceive their own development pathways, incorporating energy and digital transitions.

More than two billion people still do not have access to modern energy services, including 600 million in sub-Saharan Africa. Centralised energy systems and on-grid solutions, such as existing networks in Europe and in other developed countries, are no longer considered as the only viable models for countries without existing energy coverage. Decentralised models such as individual solar home systems are more and more often the fastest and most economical solution for uncovered rural areas.

The same applies to the digital transition. Internet connectivity in Africa remains low at 18% compared to the global average of 54%,

***“Neither the energy transition
nor the digital will be made
without the other”***

and complete territorial coverage would still leave 35% of the population untouched by telecom networks.

Just as it was possible for African countries to move directly to mobile phone solutions without experiencing the fixed telephone and to introduce mobile banking, a digital leapfrog introducing digital modern solutions in all sectors is possible. Developing countries can achieve this by ensuring a triple inclusion: social (e-identities facilitate the distribution of social assistance, e-Health, e-learning), financial (mobile money), and territorial (e-agriculture, smart cities).

Neither the energy transition nor the digital one can happen without each other. The challenge is to harmonise these two trajectories and ensure convergence between both transitions through awareness of the challenges they share.

The new shared vision must be based on values around sustainable social models centred both on human wellbeing and the preservation of the natural environment. ●

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AND THERE

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PART 3

LEAVING NO ONE BEHIND



PAVING A DIGITAL HIGHWAY TO THE SDGS 52

GIRLS AND WOMEN CANNOT BE LEFT BEHIND IN THE DIGITAL REVOLUTION 55

TECHNOLOGY CAN SUPPORT THE BUILDING OF GENDER INCLUSIVE CITIES 61

DIGITAL INCLUSION POLICIES MUST FOCUS ON YOUNG PEOPLE 65

CASE STUDY : ICT AND EDUCATION 68

Paving a digital highway to the **SDGs**



Access to information enhances participation and thereby legitimacy

Jüri Seienthal, Director-General for Development Cooperation and Humanitarian Affairs of the Ministry of Foreign Affairs of Estonia

Digitisation is an overarching priority for the Estonian Presidency of the European Council. Throughout the latter half of 2017, our goal has been to convince the EU and its member states that there is much to be gained from mainstreaming digital thinking across policy sectors.

We definitely know what we are talking about when it comes to the digital agenda. Estonia has been moving towards reliable and transparent digital governance since the early 2000s, and it is quite difficult now to imagine how we did things before going digital.

Our country's sustainable development has benefited hugely from having a digital mindset. Everybody in Estonia can achieve a great deal using digital tools, from completing tax declarations in under ten minutes to voting in government elections online.

Looking at the broader development landscape, digitisation is a goal in and of itself as well as a tool with which to achieve the Sustainable Development Goals by 2030. Indeed, the success of various SDGs could benefit from a digital component.



For example, we could make progress in providing universal healthcare to more people (SDG 3) by using e-health solutions. Through bilateral development cooperation, Estonia is already contributing to an e-health system in Moldova that allows patients in remote areas to consult with relevant doctors online before making a long journey to hospital.

It can also contribute to more accountable and inclusive societies, and through this takes us a step closer to the achievement of SDG 16: peace, justice and strong institutions. Access to information enhances participation, and in fact

creates conditions for meaningful participation and thereby legitimacy.

One of the benefits of digital solutions is that they do not discriminate against users. Your computer or your smartphone does not care about your age, gender, nationality or disability. In that sense, digitisation can be a powerful tool for empowering those who today are economically, politically and socially vulnerable.

This should all start with the creation of secure digital identities, which is a precondition for numerous e-governance services and achieves

“Your computer does not discriminate against your age, gender, nationality or disability”

SDG target 16.9 – to provide a legal identity for all, including birth registration. An electronic civil registry based on this secure identity could also facilitate the compilation of electoral lists and could help determine the number of people in need for certain basic services.

A digital ID paired with a valid signature could also be used in legal procedures, facilitating trade and in future also regulating migration. Of course, these measures have to be matched with investments in cyber security to ensure a sufficient amount of protection of data.

Digital solutions also help to collect more resources for sustainable development by contributing to more efficient and transparent tax systems. The e-traces left behind by every online activity are also a powerful anti-corruption tool, if balanced with privacy measures. At every turn, economic efficiency comes from the time saved.

For these services to be effective, there have to be accessible connections. Yet the challenge is to improve connectivity and services at the same time, not to treat connectivity as a prerequisite for starting to develop services. The uneven spread of connectivity is an issue but not a crucial one. The World Bank’s

2016 development report shows that many more people have the option for an internet connection than actually use one. The same applies here in Europe.

An interesting factor of digitisation is that it is taking place all over the world as we speak. New technologies are being used in developing as well as developed countries and that these technologies offer new possibilities to tackle issues related to sustainable development. Digitisation is not exclusive to developed states and thus offers an opportunity for new kinds of mutually beneficial partnerships. Cooperation in the field of digitisation is not a one-way street. There is the high possibility that problems we are struggling with in Europe have already been solved somewhere else in the world. We should use all opportunities to learn best practices of each other. EU development cooperation policy should increasingly use the tools of digitisation so we are not the ones left behind.

Everything digital is Beta all the time. Services go online before they are 100% ready and will be improved in real time based on feedback from users. We as policymakers have to provide space for learning from mistakes in our planning if we are to create ever-better services. ●

Girls and women cannot be left behind in the digital revolution



Empowering girls and women is potentially worth trillions

Lindsey Nefesh-Clarke, Founder & Managing Director of W4 (Women's WorldWide Web) and European Young Leader (EYL40)

It was in a cemetery in the Philippines that I was first struck by the power of Information and Communication Technologies (ICTs) and their ability to accelerate girls' and women's empowerment.

In 2008, I was managing a programme to enable underprivileged girls to attend school and college. Many of these children and their families were squatting in a cemetery, literally living among the tombstones. They lacked access to electricity, running water, and sanitation.

When we set up an IT vocational training centre, we located it right next to the cemetery because we knew that providing girls and young women

with IT skills, ranging from digital literacy to more advanced skills, was an effective way to help them obtain safe, formal employment and protect themselves from dangers such as human trafficking.

And now, against all odds, young women who were born in the cemetery are flourishing in employment, including in the Philippines' growing IT-BPM sector. What a remarkable and uplifting example of breaking the intergenerational cycle of poverty.

Again and again, around the world, I have seen how ICTs can open up all manner of resources and opportunities to change - and even save -



the lives of girls and women through: innovative e- and mobile learning tools; financial technology for women's financial inclusion; agriculture 2.0 to promote sustainable agriculture and help communities adapt to climate change; e- and m-health services and digital applications to combat gender violence and support women survivors of violence; e-marketplaces for female artisans and entrepreneurs; apps and platforms to amplify women's voices and political participation; and, of course, employment opportunities in the ICT sector.

There is no doubt that ICTs can catalyse progress for girls and women everywhere; and, by extension, for wider socio-economic progress, as underscored by SDG 5(b). But, as we navigate the vertiginous shifts of the 4th Industrial Revolution (4IR), we face an urgent challenge: countless girls and women are being excluded from the digital transformation. And this digital gender divide is growing.

Over half of the world's population still has no access to the Internet. That's approximately 3.9 billion people, mostly in developing countries - the majority of them are girls and women. Research estimates that women's chances of benefitting from the advantages of ICTs are one-third less than men's. The digital gender gap remains largest (at 31%) in the world's least developed countries. In Africa, only 12% of women are online.

Women are alarmingly underrepresented across the entire IT ecosystem, especially in more technical positions and leadership positions.

Globally, women hold only 24% of all digital sector jobs, and in developing contexts men are 2.7 times more likely to work in the digital sector. Only 6% of the CEOs of top 100 tech companies are women; an estimated 90% of electronic goods are created by men.

Moreover, this digital gender divide exists against the backdrop of glaring economic inequality. At our current pace of progress, it will take another 170 years to reach economic gender parity. In the global context of a supply-demand mismatch in digital skills, and as digital literacy becomes the 'new literacy', an essential prerequisite for employment, we must step up efforts to ensure girls' and women's empowerment through digital inclusion and equality.

Empowering girls and women is, in turn, potentially worth trillions. McKinsey's "Power of Parity" report estimates that narrowing the global gender gap in labour force participation could add US\$12 trillion in global annual GDP by 2025. Narrowing the gender gap in the ICT sector alone would open up a market of US\$50-70 billion.

Achieving gender equality in ICTs is essential, both as an end in itself and as a key driver of wider socioeconomic progress. It is crucial if we are to tackle the global pandemic of violence against women, which remains the most widespread human rights violation - unsurprisingly, statistics show that the more economically empowered a woman is, the less vulnerable she is to violence.

Tech and innovation increasingly shape the societies we live in and the values we live by, and women must be equal participants in this transformation. Digital equality is central in the push to achieve our 2030 vision and address the multiple challenges facing us globally.

So, what is holding girls and women back? Extensive studies have identified obvious obstacles which include: deficient infrastructure; lack of affordable access; inadequate education and skills (owing in part to outdated school curricula); biases and stereotypes; and a paucity of content that's relevant to girls' and women's specific needs.

Other barriers include offline gender disparities, such as economic inequality, discrimination, and the fact that girls and women disproportionately bear the burden of unpaid work and care. And there's the urgent issue of safety and protecting girls' and women's online rights.

These obstacles are depriving countless girls and women of their rights and the opportunity to fulfil their potential. And yet, strikingly, women's exclusion from the digital revolution is, according to many reports, primarily owing to policy failure. The Web Foundation's 2016 Women's Rights Online Digital Gender Gap audit laments the fact that "many national ICT strategies or broadband plans include, at most, a rhetorical commitment to gender equity."

Beyond the rhetoric, we do have a sheer abundance of real solutions, action plans and roadmaps. Examples include: the

recommendations of the UN's Broadband Commission for Sustainable Development and of the Web Foundation and the Alliance For Affordable Internet (A4AI); the #eSkills4girls initiative launched under Germany's G20 presidency; the recent UNHRC's gender digital divide recommendations; the G20 Digital Economy ministerial decree roadmap; and the proposals of the UN-IT partnership "Equals", a global, cross-sector coalition to bridge the gender digital divide.

What we urgently need is more collective action and greater investments - on the part of governments, companies, educators, and civil society. We need to invest in equal, affordable access to ICTs, in digital skills education, in modernising schools and curricula, and in increasing public access to ICT facilities and training.

Equally, gender-responsive policy is critical. Gender needs to be integrated in ICT-related strategies, policies, plans and budgets, with clear gender-equality targets. Governments need to invest more in generating gender-disaggregated data to track progress. Of the 14 indicators of progress associated with the primary gender equity goal SDG5, most countries are measuring just three.

The ICT sector must also do more to ensure a culture of equality and diversity. With greater collaborative effort, we can overcome biases and barriers, such as dissuasive stereotypes, and create relevant products, content and services that take into account the specific needs of girls and women.

Clearly, SDG5(b) can be a game-changer for girls and women, but also for entire communities and societies. The global digital transformation holds the promise of a safer, brighter, fairer world. But only if we ensure that the digital revolution is a development revolution for all. We cannot afford to leave girls and women behind. ◉

“Digital equality is central in the push to achieve our 2030 vision and address the multiple challenges facing us globally”





Technology can support the building of **gender inclusive cities**



Using technology tools can provide quick access, privacy as well as trigger responses

Kalpana Viswanath, Co-founder and CEO of Safetipin, India

Safety of women and gender inclusion in cities has become an important concern around the world. Data shows that women are at risk of sexual harassment and violence in many, if not all, cities around the world, especially after dark. This prevents women and girls from participating in city life without fear and threat of violence.

A study by Hollaback and Cornell University in 2014 interviewed over 16,000 women and reported that over 50% of the women in Europe and 75% of the women in the United States

had faced their first incident of harassment before the age of 17. Over 81% of the women interviewed had experienced some form of sexual harassment. Other studies conducted in Delhi, Dar es Salaam and Rosario revealed that women had experienced some form of sexual violence in a city setting.

In 2003, more than half of the world's inhabitants became city dwellers. The Sustainable Development Goals that the United Nations formulated in 2016 now have a stand-alone goal on inclusive urbanisation and human

settlements, with a specific target on gender inclusion: “universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities”. It is now being increasingly recognised that cities are spaces where people should have the right to access public spaces and that public spaces are a public good. This is supported by the targets of SDG5 which focuses on the elimination of “all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation.” The New Urban Agenda adopted at Habitat III in Quito, Ecuador in October 2016 provides key principles for inclusive urbanisation, with an emphasis on gender inclusion.

The fear of violence in public spaces affects the everyday lives of women as it restricts their movement and freedom to exert their right as citizens and inhabitants of the city – freedom to move, study, work, and leisure. However, creating safety involves much more than just responding to violence: it is important to create the conditions by which women are able to move about safely and without fear of violence or assault. Research has shown that many factors play a role in determining women’s access to the city, including urban design and planning, community involvement, improved policing, usage of space, and so forth.

Over the years, there have been many initiatives aimed at making women feel safer and making cities and public spaces in particular more inclusive. Today, technology and the digital

space is an important one, both in terms of finding solutions as well as reaching out to and connecting larger numbers of people, especially the young. Some interesting initiatives include online mapping of sexual harassment and unsafe spaces such as HarassMap in Egypt. Others are apps that seek to map the safety of public spaces. Safetipin, developed in India, is one example of an app which has converted a safety audit tool into a digital platform. It is interesting that many of these innovations have arisen in developing countries, and that they are now being used in many parts of the world. As we know, gender-based violence is not only a concern for developing countries.

Mobile applications could be part of the solution. As mobile apps allow women to instantly access the most current data, it is thus a tool that helps women to determine the safety of the area they are in. Using technology, tools can provide quick access, privacy as well as trigger responses. For example, after some incidents of violence in taxicabs, some countries have ordered drivers to install panic buttons inside the vehicles for women to use. There are also many apps that include panic buttons and allow women to reach out to people or the police in a dangerous situation.

But we know that the digital gender gap is still there, reaching 12% in 2016. This gender divide is higher in rural areas and also has an age dimension: among 15-24- year-olds, the gender gap is 2.9% in low- and middle-income countries. It grows among the 25-74-year-olds across all countries, but is higher for low- and middle-income countries (7.7%) compared to



high-income countries (3.5%). When looking at the 75+ age group, the gender gap becomes significantly larger, with an average gap of 45.8% across all countries.

It is obvious that there are several factors that play a role in the gender divide, and we need to have policies that can address these in a proactive manner. In an ever-increasingly connected world, the digital divide will affect people's ability to access information and opportunities. Governments need to ensure that ICT policies aim to increase access for disadvantaged groups. The private sector, a major player in the digital revolution, also needs to formulate policies and practices that address this divide and find ways to reach the

more underserved populations. We need to continuously collect gender disaggregated data to understand the problem in order to find solutions. More technology has to be directed towards addressing problems that women face, both online and offline.

The gender digital gap is at its lowest among the youth. Therefore, technology is a very effective way to reach young women as well as young men in the effort of building gender inclusive cities and boosting women's empowerment. Equitable access has to be part of the agenda, not only for governments but also for the private sector, as it largely owns and determines the agendas of the tech world. ●



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Digital **inclusion** policies must focus on **young people**



Prejudice is a global security threat

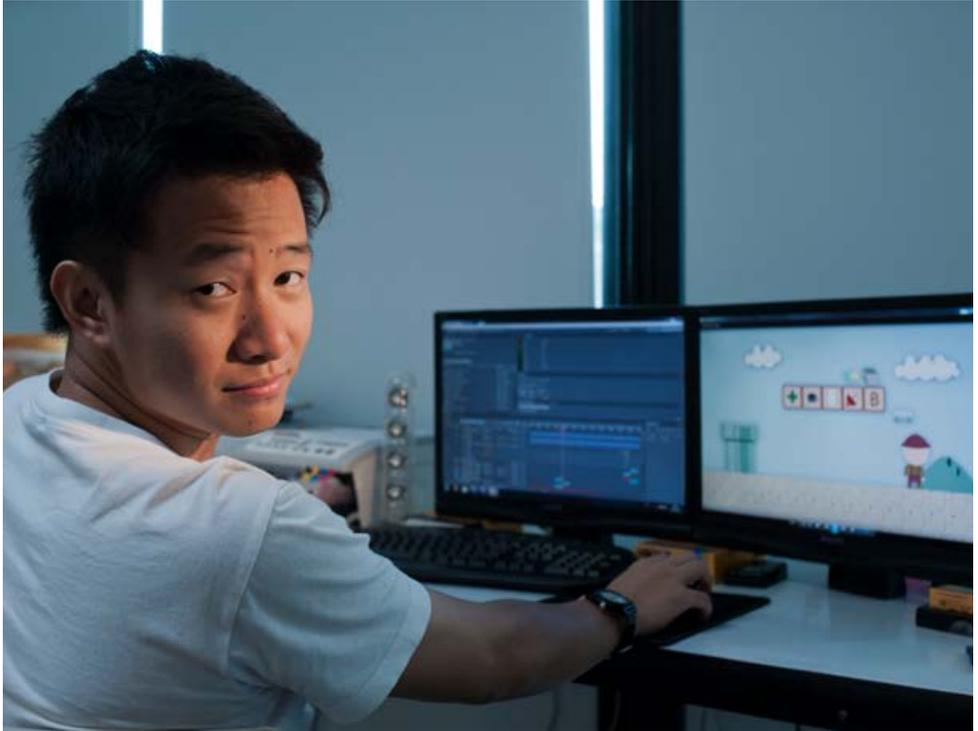
Dana Schurmans, Digital Inclusion Expert at the ACP Young Professional Network (ACP YPN)

Young people from the EU and from African, Caribbean and Pacific countries (ACP) are undeniable drivers of development and social change. They are essential contributors to the international development agenda, including the continuing progress of the Cotonou Agreement first signed between these regions in 2000.

Neglecting the evolving social and digital realities affecting young lives will undermine the achievement of the Sustainable Development Goals (SDGs), making it near impossible to eradicate poverty, reduce vulnerabilities and address inequalities. Such neglect will also

leave individuals and groups forgotten at the edge of the digital society. Our duty is to do our utmost to reduce those inequalities that hinder social cohesion.

Currently writing a doctoral thesis on digital inclusion policies for marginalised Brussels inhabitants between the ages of 16 and 25, I find no shortage of examples of inequalities mirroring the digital age. Brussels, as many other metropolises, is characterised by a significant percentage of people living at the margins of today's knowledge society. Almost 30% of the population in Brussels have an income below



the poverty risk threshold. In 2015, around one boy out of six and one girl out of seven left school without a higher secondary education certificate. The significant issues resulting from poverty and the shortcomings of the education system are indicators of the pressing problem in quality access to the Internet at home as well as the lack of digital literacy skills for a large proportion of the Brussels population.

Even though my work focuses mainly on social inclusion and welfare policies within a 'developed' context, I am certain that insights

acquired about the underlying causes and consequences of exclusion can be instructive regardless of distance across time and space.

Young people from disadvantaged communities face a significantly higher risk than their peers of being digitally excluded. We know that an individual's online activity is not only influenced by their socio-demographic profile – age, gender, income and education – but also by differences in access, attitude, social support, and the possession and self-assessment of skills. These differences result in a spectrum

of digital profiles ranging from wholly 'digital in' to 'digital out'. This draws our attention simultaneously to the potential of ICT for inclusion through integration into the job market or the obtaining of a degree, and to the dangers of reinforcing social stratification among the younger generations.

Based on my experience as a digital inclusion expert for the ACP Young Professional Network (ACP YPN), I am convinced that digital technologies are important tools for connecting people, sharing knowledge and empowering the marginalised. By exchanging with local leaders and investigating the development of innovative digital projects, I am persuaded that we need to exchange best practices on digital inclusion for disadvantaged youth communities across borders.

One example of such projects I have come across is the "Solar Powered Digital Libraries" project that introduced tablets to Haitian schools located in remote and rural areas and lacking, or having extremely limited number of, books, educational resources and no access to the Internet. Between 2014 and 2015, within the framework of the project, over 70 Haitian teachers were trained in using tablets as educational tools in their classrooms, allowing them to expand the educational opportunities of hundreds of Haitian children. This is a very encouraging example of the empowering effect of tablets in education.

I am, however, aware that the more governments encourage and invest in digital solutions for development, the more we risk leaving those

with the weakest digital profiles behind. ICT4D policies offer new perspectives for development aid, including for young generations. But policymakers should acknowledge with greater force the new challenges related to digital exclusion. True success will mean empowering the younger generation to act as a central actor in achieving the SDGs through ICT.

To enable young people from developing countries to seize digital opportunities, I see two actions that Europe and ACP must undertake.

The first is to enact a digital inclusion action plan for disadvantaged youth communities in the developing world. This initiative should continually invest in digital infrastructure, education and meaningful digital environments and services. It should also integrate youth perspectives in the planning and implementation stages of national, regional and international ICT policies and strategies.

Second, policymakers must harness the full potential of new technologies by investing more in research and innovation. Current efforts lack insight on meaningful digital inclusion for poor and marginalised people and communities, including for young generations.

Capitalising on social and digital resources is an absolute requirement if we want to achieve development through digital. The EU together with ACP countries must be at the forefront on this subject. ●

CASE STUDY

ICT AND EDUCATION



Education is paramount to improvement in people's lives and sustainable development. Investments in education are thought to be the most efficient to achieve long-term economic and social development. This importance has been recognized in the Agenda 2030, where SDG 4 sets out a very ambitious goal of ensuring that "all girls and boys complete free, equitable and quality primary and secondary education".

While important progress has been made in the last few decades, education for all remains an elusive goal. In 2014, only 40 percent of children in the Least Developed Countries participated in primary education. Worldwide, more than 260 million children are out of school. Education is still a huge challenge for most of the developing countries. This is particularly true in Sub-Saharan Africa, where lack of basic infrastructure and extremely low economic development prevent the achievement of SDG 4.



Information and Communications Technologies (ICTs) are a powerful enabler of education and can be a way to circumvent these issues. The use of ICT potentially allows anyone, anywhere, to have access to a world-class education. ICTs can have an impact on almost every aspect of education: they can provide schools with up-to-date courses in local languages; enable remote teachers training; and allow for a personalised monitoring of pupils.

In 2010, eLimu, an innovative start-up founded in Nairobi, decided to rethink education. Realising that textbooks were often inefficient, boring and obsolete, eLimu's founders, Nivi Sharma and Marie Githinji, decided to put revision material on an android tablet, along with multimedia content. eLimu's app, KCPE Revision – named after the KCPE, Kenya Certificate of Primary Education – provides Kenyan children with cheap, stimulating educational material. It offers students the possibility of taking tests, getting their scores instantly and directs them exactly to what they need to learn. The start-up also has

developed the “Hadithi! Hadithi!” app, aimed at children in the first two years of primary school, giving them access to the latest pedagogy and technology, such as interactive stories written by local teachers. eLimu is also providing teachers across the country training courses to help them tap into the full potential of ICT for education. In conjunction with technologies such as solar panel and tablets specifically designed for African schools, innovative solutions can help change education in Africa, for children but also for uneducated adults, especially women.

eLimu success story was made possible because of a voluntary political choice: in 2016, Kenya's government started to distribute tablets in schools around the country. But Kenya is still an exception in Africa. While they are becoming cheaper and cheaper, digital solutions still represent an important cost that disenfranchised African family can rarely afford by themselves. ICTs also require basic infrastructure such as a consistent access to electricity and reliable internet connections to reach their full potential. ●

PART 4

RECOMMENDATIONS



These recommendations draw on the viewpoints and ideas presented by the authors of the articles in this discussion paper and the Development Policy Forum debate “Making the digital revolution work better, faster for development” held in November 2017.

STEP UP INTERNATIONAL COOPERATION

To bring the digital revolution to everyone, there must be greater cooperation and dialogue. A multi-stakeholder dialogue involving all actors - international donors and developing countries, but also international companies and civil societies from around the world - must be ensured to discuss lessons learned and exchange best practices. The private sector must also be included so that they can share their vast knowledge and experience in the ICT sector. The engagement of multiple stakeholders and public-private partnerships are already at the heart of the EU's new Consensus on Development.

IMPROVE AND BUILD NEW, INNOVATIVE TOOLS TO FACE NEW REALITIES

The digital revolution is a game changer in international development, but also in global economic and social structures. International and national laws and regulations can keep pace with these evolutions. New realities call for new tools and new regulations to harness the potential of the digital revolution and help the private sector navigate a changing world.

In developing countries, data is often lacking or insufficiently disaggregated, making it hard for policymakers to implement the SDGs effectively as they cannot base good development policies on incomplete data. Data collection could be improved by increasing funding for statistical systems, assisting developing countries in building efficient statistical laws and boosting data and statistics literacy.

FOCUS ON SOLVING PRACTICAL PROBLEMS

To reap the benefits of digitisation, the first step must be to find digital applications that make an immediate difference to people's lives. With ICTs, people can get better healthcare, better education and transfer money quickly and efficiently. But people are also naturally technophobes, and avoid having to learn new ways of doing things. That's why it's important that they see the immediate benefits of technology. Digital solutions must be highly relevant to people: by focusing on solving real problems, we can ensure that populations support the implementation of ICT solutions. In the same way, nationwide digital government systems are cheaper and more efficient than traditional governance, but people must be ready to use them.

BRIDGE THE DIGITAL INFRASTRUCTURE GAP

Digitisation has great potential to boost development in poorer countries, and bring jobs and opportunities to millions of disadvantaged people. But this will not happen automatically. In fact, without proper implementation digital technologies could even increase inequalities. While developed countries are moving ahead with the 4th Industrial Revolution, there are still 3.9 billion people without reliable access to the Internet around the globe. Despite hopes pinned on digitisation, countries still need a basic level of infrastructure to make it a success. Ensuring that developing countries receive the proper funding and assistance to complete their economic and social development is therefore essential.

CREATE MORE INCLUSIVE SOCIETIES

The digital age holds the promise of a better, fairer world. But it won't be able to fulfill this promise without the inclusion of marginalised groups. To really reap the benefits of the digital revolution, all members of society should be able to engage with and shape technology and innovation. Women and girls must be included through investments in equal access to ICTs and developing gender-responsive digital policies. The ICT sector must be encouraged to create a more open and diverse culture. A focus on youth is also essential, encouraging digital literacy especially among young jobseekers. Digital skills are now essential, and all efforts must be made to sure that disenfranchised groups are not left behind.

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