



Brussels, 2.5.2017
SWD(2017) 157 final

COMMISSION STAFF WORKING DOCUMENT

**Digital4Development: mainstreaming digital technologies and services into EU
Development Policy**

CONTENTS

Executive summary	3
1. Introduction	5
2. Digitalisation in a global context	6
2.1. D4D and the international donor community	6
2.2. D4D in the European Union	7
2.3. D4D in the EU Member States	7
3. Lessons learnt	8
4. Current limitations to D4D uptake, new challenges and opportunities	11
4.1. Information and communication revolution affected by persistence of divides	11
4.2. The challenge of affordable broadband subscriptions	11
4.3. Free flow of data and protecting the right to information and freedom of speech: a necessity and a challenge	12
4.4. Cybercrime, cybersecurity and privacy	12
4.5. ICT companies' social responsibility	13
4.6. The opportunities	14
5. The EU response: Digital4Development	15
5.1. The new vision and its underlying principles	15
5.2. Main priority areas and possible types of actions and measures	16
6. Financial resources	23
7. Implementation of Digital4Development	24
8. Conclusions	24
Annex 1	25
Annex 2	26

EXECUTIVE SUMMARY

As follow up to the conclusions of the Foreign Affairs Council (Development formation) of 28 November 2016 on 'mainstreaming digital solutions and technologies in EU development policy'¹, the objective of this Staff Working Document (SWD) is to outline the Commission's approach to mainstreaming digital technologies into EU development policy. The need to further mainstream digitalisation in EU interventions for sustainable development and economic growth has been strongly highlighted in the Commission Communication concerning a proposal for a new European Consensus on Development².

Digital technologies (alias information and communication technologies - ICT) and services are proven enablers of sustainable development and inclusive growth. They can be key to improving lives even in the poorest countries, in particular by empowering women and girls, enhancing democratic governance and transparency, and boosting productivity and job creation. Nevertheless, connectivity and affordability remain a problem both across and within regions, since there are large variations between high and lower income countries and between cities and rural areas.

In 2015, the United Nations General Assembly approved the 2030 Agenda for Sustainable Development, which highlights the importance of information and communication technologies. Reference to ICT can be found explicitly as a target under Sustainable Development Goal 9 "*Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*"³, while ICT is also referenced in the targets related to climate change, gender equality and women empowerment, private sector development, education and health. While the 2030 Agenda sets out a comprehensive vision of what needs to be achieved to eradicate poverty and promote sustainable development, EU development policy is a critical part of the overall EU response to that Agenda.

Worldwide, the adoption of the Sustainable Development Goals (SDGs) was followed by a large number of initiatives, including the follow-up conference to the World Summit on Information Society (WSIS+10) in December 2015 and the World Bank's 2016 World Development Report⁴ focussing on digital dividends, all stressing the gains of using digital solutions for development.

Internally, the EU is promoting a vision of access to affordable broadband connectivity, with equally trained men and women accessing and creating relevant content and services that are beneficial for themselves and their societies and potentially globally competitive, enabled by

¹ Council of the European Union, 14682/16, 28 November 2016

² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions; Proposal for 'a new European Consensus on Development Our World, our Dignity, our Future', COM(2016) 740 final, 22.11.2016

³ Sustainable Development Goal 9: '*Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*'; target: 9.5 '*Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending*' and target 9c: '*Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020*'
<http://www.un.org/sustainabledevelopment/infrastructure-industrialization>

⁴ World Bank, 2016, World Development Report 2016: Digital Dividends. Washington, DC: World Bank. doi:10.1596/978-1-4648-0671-1. License: Creative Commons Attribution CC BY 3.0 IGO

an open, free and secure Internet. Additionally, several individual EU Member States have adopted strategies to integrate digital aspects into their development policies and actions.

The Digital Single Market for Europe⁵ (DSM) strategy adopted in May 2015 recognises the significant impact that digitalisation has on growth and job creation within the European economy. There is great scope for further translating the key principles of the DSM to a wider EU development policy by promoting digital economies in the rest of the world and in particular in developing countries.

For the last two decades the EU has been active in the promotion of digital technologies and services in partner countries, but has lacked an appropriate framework for mainstreaming digital technologies, contributing to the achievement of the SDGs and ensuring an effective delivery. As indicated in the Commission's proposal for a new European Consensus on Development⁶, "Digital4Development" - as a solid, comprehensive and targeted approach, should enable EU development policy interventions to have a greater transformative potential.

Based on existing policies and partnerships involving the public and private sectors the Commission is mainstreaming digital technologies across four main priority areas:

- i. promote access to affordable and secure broadband connectivity and to digital infrastructure, including the necessary regulatory reforms;
- ii. promote digital literacy and skills;
- iii. foster digital entrepreneurship and job creation; and
- iv. promote the use of digital technologies as an enabler for sustainable development.

Commission services consider that in the context of the Digital for Development framework, financial support should not be primarily born by public development assistance funds. Indeed, digitalisation is an important investment opportunity and working together with European and international financial institutions and the private sector blending would therefore constitute an important tool to leverage financial resources.

Finally, while digitalisation is considered of global interest and the added value of mainstreaming digital aspects applies to the entire range of development policy and action, it will not be possible to implement these measures in all partner countries at once, and not at the same pace. Consequently, the Commission is putting the immediate focus mainly in Africa, since the digital divide there is the greatest, and in particular in those African countries that are more ready building on the interests and consensus of the local partners, as well as in the first priority countries identified under the European Agenda on Migration.

⁵ COM(2015) 192 final, 6/05/2015

⁶ COM(2016) 740 final, 22/11/2016

1. INTRODUCTION

The exponential spread and scale-up of digital technologies and services has profound global implications, creating opportunities for sustainable development and inclusive growth, but at the same time new threats and challenges. Digitalisation has an important role to play in a wide range of areas including gender, good governance, transparency and accountability, the fight against corruption, job creation and private sector development, access to micro-finance, improving access to public services - notably energy, protecting the environment and addressing climate change, providing humanitarian aid, promoting education, health or agriculture. As such, digital solutions can help combat poverty, contribute to better targeting and the linking of humanitarian and development activities, and help to manage migration and address shortcomings in a number of EU partner countries where eIdentification and civil registries, digital entrepreneurship and Small and Medium Enterprises (SME's), eServices, eGovernment, mobile financing or blockchain secured transactions can reduce inequalities and increase prosperity.

Digitalisation acts as an accelerator and enabler of many, perhaps all of the SDGs. The 2030 Agenda for Sustainable Development sets specific targets in this respect. For example, there are various benefits of digital technologies and services within health (SDG3): e-health applications quickly transmit data between medical units and also provide the opportunity for rural patients to benefit from remote diagnosis; in education (SDG4): e-teaching and e-learning provide for flexibility and the opportunity to access teaching material provided by leading education institutes; regarding gender equality (SDG5): new communication channels enhance women's participation in the work force and everyday life and provide access to education, finance and social networks; for jobs and growth (SDG8): the generation of new online services contributes to job creation; in environment and climate change: (SDGs 13, 14 and 15), digital technologies provide global data on weather, water flows, forest reserves oceans, seas and climate; in peace, justice and strong institutions (SDG 16): digital technologies can enable registration of children at birth, promote access to public information and improve transparency of public institutions and thus improve access, inclusiveness and citizen's trust in authorities.

The Digital4Development approach aims to promote information and communication technologies in developing countries as powerful enablers of growth, and to better mainstream digital solutions in development. It is consistent with other relevant EU policies⁷, is guided by international frameworks, such as the UN's 2030 Agenda for Sustainable Development⁸ and its Addis Ababa Action Agenda for financing development (AAAA)⁹. It will promote access to affordable broadband connectivity and provide training equally for men and women. It will also contribute to reducing the digital divide and facilitate access to Internet to youth, women, as well as to the least developed populations or communities having no access to digital technologies today. It will allow remote education, particularly for female population.

⁷ These include notably the proposed new European Consensus on Development, the European Neighbourhood Policy, and the European Agenda on Migration and the Valletta Action Plan, the Global Strategy for the EU's Foreign and Security Policy, the EU Action Plan on Human Rights and Democracy, the existing legally binding association agreements with the different North African countries (except Libya) and the ACP countries and the Digital Single Market for Europe strategy

⁸ UN, 2030 Agenda for Sustainable Development, 2015

⁹ UN, Addis Ababa Action Agenda, 2015

Based on existing policies and partnerships involving the public and private sectors, Digital4Development defines four inter-related priorities for action, that align opportunities for digital technology innovation with the Union's broader development goals.

2. DIGITALISATION IN A GLOBAL CONTEXT

2.1. D4D and the international donor community¹⁰

In recent years, digitalisation became a prominent topic in international donors' development agendas and the international community has gradually recognised the opportunities and benefits that digitalisation brings to developing countries. This was mainly due to the large increase of mobile services across the planet and the number of mobile users surpassing the number of people having access to electric energy, sanitation or clean water. Furthermore, it was largely recognised that digital innovation could bring new solutions to local problems.

Most donors have developed digitalisation strategic frameworks and are implementing diversified digital technologies project portfolios. Donors' support towards the digital sector has gradually shifted from financing infrastructure to providing assistance for digital policy and regulatory frameworks and digital capacity building. Most donors generally combine a two-pronged approach for promoting digital technologies that is based on targeted interventions for the digital sector (e.g. financing broadband infrastructure, support to Information Technology-based industries), and mainstreaming of digitalisation in priority sectors.

In 2015, the United Nations General Assembly approved the 2030 Agenda for Sustainable Development¹¹, which highlights the importance of information and communication technologies. Universal and affordable Internet connectivity in least developed countries (LDCs) is explicitly mentioned in SDG 9, while SDG 5 advocates for the enhanced use for ICT to empower women. Following the adoption of the 2030 Agenda for Sustainable Development in September 2015, the UN General Assembly also agreed¹² on a framework for facilitating, from a digital technology perspective, the achievements of the Sustainable Development Goals (SDGs)¹³, including goals related to ending poverty, quality education, clean energy and climate, zero hunger, economic growth.

Subsequently, a large number of initiatives focusing on the gains of using digital solutions for development were undertaken worldwide (e.g. follow-up conference to the World Summit on Information Society (WSIS+10) in December 2015, the World Bank's 2016 World Development Report).

In the spring of 2016, the US Department of State launched the "Global Connect Initiative, a multi-stakeholder group pledging to connect 1.5 billion people to the Internet by 2020, as already agreed in the 2014 International Telecommunications Union Connect 2020 agenda.

¹⁰ The Commission is closely involved in development dialogue with or within international organisations and informal groupings such as the Group of Seven (G7) and the Group of Twenty (G20) as well as with non EU countries, traditional donors and emerging economies

¹¹ UN, 2030 Agenda for Sustainable Development, 2015

¹² Outcome Document of the High Level Meeting of the UN General Assembly on the Overall Review of the Implementation of World Summit for Information Society WSIS Outcomes, <http://workspace.unpan.org/sites/Internet/Documents/UNPAN95707.pdf>

¹³ The EU is fully committed to be a frontrunner in implementing the 2030 Agenda and the SDGs

The United Nations Broadband Commission for Sustainable Development has continued its advocacy for global broadband connectivity and use of digital services and published to this end a comprehensive report¹⁴ in the margins of the 2016 United Nations General Assembly. At the same time, digital for development began to be addressed by the World Economic Forum's "Internet for all" Initiative.

Digital for Development issues continue to be on the agenda of G7 and G20 with backing from all their Members, recognising the importance of digitalisation for global development. For example, since issues concerning the spread of digital technology are increasingly affecting economic growth, this topic received special attention under the German Presidency of the G20. On 6-7 April 2017, at the first time ever G20 Digital Ministers meeting organised (in preparation for the G20 summit on 5-6 July 2017) under the banner "Digitalisation: Policies for a Digital Future", a roadmap was agreed for joint policies for a digital future.

2.2. D4D in the European Union

Digital economy stands at the centre of the EU priorities for growth and jobs.

In 2014, in its Communication 'A Stronger Role of the Private Sector in Achieving Inclusive and Sustainable Growth in Developing Countries'¹⁵, the Commission highlighted the importance of digital technologies "*as a tool for achieving financial inclusion of the poor, especially in Africa where they are already dramatically changing the financial landscape*".

In the context of the European Digital Single Market (DSM) strategy¹⁶, adopted in May 2015, the Commission underlines the significant impact of digitalisation on growth and job creation within the economy. It will also have a significant contribution for delivering the Sustainable Development Goals. The review of the Digital Single Market strategy, currently underway, will raise the profile of its international dimension.

The importance of Digital for Development has also been mentioned in the 2016 Commission Communication proposing a new European Consensus on Development¹⁷.

In November 2016, the Foreign Affairs Council (Development formation)¹⁸ underlined the significant contribution of digital technologies in all socio-economic and environmental dimensions and insisted on the importance of using ICT as an enabler for sustainable development, inclusive growth and inclusive societies.

2.3. D4D in the EU Member States

A number of EU Member States have recognised the potential of Digital for Development both in terms of achieving the Sustainable Development Goals and connecting markets and industry in a win-win situation. Belgium, Estonia, France, Germany, United Kingdom,

¹⁴ See also <http://www.broadbandcommission.org/Documents/reports/bb-annualreport2016.pdf>

¹⁵ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'A Stronger Role of the Private Sector in Achieving Inclusive and Sustainable Growth in Developing Countries', COM(2014)263, 13.5.2014

¹⁶ COM(2015)192 final. "A Digital Single Market Strategy for Europe"

¹⁷ COM(2016) 740 final of 22/11/2016.

¹⁸ Council conclusions, Foreign Affairs/Development Council, 28 November 2016, Council of the European Union, 14682/16

Finland, the Netherlands and Sweden have published, or are in the process of publishing, Digital for Development strategies.

Among the common characteristics of Member States' strategies, it is worth highlighting the introduction of digital into development cooperation, the use of national digital know-how, technology and industry for development purposes, the support to local innovation, start-ups and infrastructure deployment, as well as on the use of digital as cross-sectorial enabler (governance, education, culture, agriculture, health, etc.).

Nevertheless, as it is the case with other international donors, approaches to mainstreaming digitalisation vary amongst the different EU Member States. For example, in the British and Swedish development cooperation, digitalisation is a cross-cutting issue increasingly integrated in the programmes and aid delivery systems. In contrast, Germany follows a two-fold approach where digitalisation is both gradually mainstreamed into priority sector programmes and also targeted as a stand-alone sector with specific interventions. France, which is also adopting a two-fold approach, has a strong focus on promoting digitalisation in the education and health sectors.

3. LESSONS LEARNT

For the last two decades the European Union has been active in the promotion of digital technologies for development. Over the last ten years, approximately EUR 350 million has been devoted to digital initiatives in EU partner countries, while more than EUR 110 million are allocated for on-going digital projects¹⁹. Yet much remains to be done.

Up until now EU support on digital technologies and services in development cooperation has focussed on financing digital components of projects in other focal sectors. Although, to date, an evaluation of the digital sector itself has not been carried out, two digital technology projects (Satellite-enhanced Tele-medicine and eHealth for Sub-Saharan Africa and Seychelles Submarine Cable), implemented through the EU-Africa Infrastructure Trust Fund blending mechanism²⁰, have been positively assessed by the Mid-Term Evaluation of the EU-Africa Infrastructure Trust Fund (June 2012)²¹. The evaluation has shown that the first project improved the attractiveness of remote locations by lowering the risk of disease and increasing access to skilled health care, while the second contributed indirectly to poverty reduction by providing affordable broadband telecommunication infrastructure.

In some projects implementation was facilitated and the outcomes enhanced when it was possible to benefit from similar projects carried-out in Europe (such as NRENs²², connecting European research and education institutions). In addition, the importance of adopting tailor made management approaches, taking into account local contexts and the geographical, cultural and/or organisational specificities of countries and their different stages of NREN

¹⁹ Approximately 31% of these funds are allocated in the European Neighbourhood (funded mainly by the European Neighbourhood Instrument), 19% in Africa (funded mainly by the Development Cooperation Instrument), 43% in Asia (funded mainly by the Development Cooperation Instrument) and 7% in Latin America (funded mainly by the Development Cooperation Instrument)

²⁰ Created in 2007 by the European Commission and European Union Member States, the EU-Africa Infrastructure Trust Fund (EU-AITF) was the first EU “blending instrument” with the objective of promoting infrastructure projects in Sub-Saharan Africa with a regional impact. EU-AITF donor contributions stem from the European Development Fund (EDF) budget and from several European Union Member States

²¹ <http://www.eu-africa-infrastructure-tf.net/infocentre/publications/mid-term-evaluation.htm>

²² National Research and Education Networks

development, has been demonstrated in all digital technologies and services projects. Finally, granting derogations regarding the rules of origin proved beneficial in order to overcome monopoly or quasi-monopoly environments, which are common in Africa.

The EU has supported a series of infrastructure networks projects, aiming at connecting European research and education institutions with peer institutions in partner countries. Examples in this area include the GÉANT project²³ (initially a Pan-European initiative to interconnect national research & education networks) for the management of networking projects serving Europe, the Eastern Partnership countries (E@PConnect²⁴), the Mediterranean (EUMEDCONNECT²⁵), Africa (AfricaConnect²⁶), Central Asia (CAREN2²⁷), Latin America (RedClara²⁸) and the Caribbean (C@ribnet²⁹). Although initially these actions started off as infrastructure networks, today they have evolved into research collaboration platforms and have the potential to expand cooperation in the digital domain even further.

The EU is contributing to global efforts to promote creativity and cultural diversity in the digital environment. The EU, all its Member States and many developing countries are among over 140 Parties to the UNESCO 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions. During current negotiations on guidelines to implement the Convention in the digital environment, the EU has emphasised in the conclusions of the Foreign Affairs Council (Development formation) of 28 November 2016 on 'mainstreaming digital solutions and technologies in EU development policy'³⁰ that digital technologies play a strategic role in the development and growth of the cultural and creative industries and, as such, should be used to protect and promote cultural diversity. The EU has led by example through projects such as 'Creative Tracks', a dynamic online platform connecting young entrepreneurs in cultural and creative sectors in the EU and developing countries³¹.

The EU has also supported projects focusing on policy harmonisation, with the main objective to support regulatory reforms and to create the appropriate frameworks with independent national regulators, to develop market liberalisation and subsequently encourage private sector investment. Examples in this area include Support for Harmonisation of ICT Policies in Sub-Saharan Africa (HIPSSA³²) and EMERG³³ in the Southern Mediterranean.

In the African, Caribbean and Pacific (ACP) group of countries, examples of digital technologies projects implemented by blending mechanisms include the already mentioned Seychelles East African Submarine Cable System³⁴ (EUR 4 million EU contribution) and the

²³ see <https://www.geant.net/Pages/default.aspx>

²⁴ financed under the Regulation (EU) No 232/2014 of the European Parliament and of the Council of 11 March 2014 establishing a European Neighbourhood Instrument, OJ L 77, 15.03.2014, p. 27

²⁵ see supra European Neighbourhood Instrument

²⁶ financed under the Regulation (EC) No 1905/2006 of the European Parliament and of the Council of 18 December 2006 establishing a financing instrument for development cooperation, OJ L 378, 27.12.2006, p. 41

²⁷ financed under the Commission Implementing Decision on the Annual Action Programme 2013 part 1 in favour of Central Asia to be financed from the general budget of the European Union, C(2013) 5672 final of 29.8.2013

²⁸ see <https://www.redclara.net/index.php/en/>

²⁹ see <http://portal.caribnet.org/ckln/>

³⁰ Council of the European Union, 14682/16, 28 November 2016

³¹ www.creativetracks.org, co-funded by the European Union (Creative Europe programme)

³² <http://www.itu.int/en/ITU-D/Projects/ITU-EC-ACP/HIPSSA/Pages/default.aspx>

³³ Euro-Mediterranean Regulators Group; see <http://www.emergonline.org/about-emerg>

³⁴ see <http://www.eu-africa-infrastructure-tf.net/activities/grants/seychelles-east-africa-submarine-cable.htm>

Satellite enhanced Telemedicine and eHealth for sub-Saharan Africa³⁵ (EUR 4 million of EU contribution) as well as the African Internet Exchange System³⁶ (AXIS) project (EUR 5.1 million EU contribution) and EASSy³⁷ (EUR 2.6 million EU contribution) projects. These projects have been funded through the EU-Africa Infrastructure Trust Fund³⁸.

Specific projects implemented in Central & Latin America include the support to the Information Society in Mercosur³⁹ (EUR 7 million from 2008 to 2013), the Alliance for the Information Society⁴⁰ (@LIS and @LIS2) for the consolidation of RedClara (EUR 85 million from 2004 to 2013) as well as the new regional broadband interconnectivity (EUR 8 million) and the interconnection in Latin America (EUR 25 million), to enhance the interconnection between GÉANT and RedClara.

In Asia, the EU supports the Trans-Eurasia Information Network / Asi@Connect⁴¹, aiming at the interconnection of researchers in 18 countries in Asia with counterparts in Europe via links to GÉANT, as well as the Central Asia Research and Education Network (CAREN⁴²) which concerns over 500,000 researchers, academics and students across Central Asia. In addition, there are various cooperation platforms for research with India and the EU-India co-operation on digitalisation-related standardisation, policy and legislation.

Complementary actions in the area of cyber resilience include a number of projects focusing on the fight against cybercrime in accession and neighbourhood countries such as iPROCEEDS (EUR 5 million) and Cyber@EaP II and III (EUR 1.5 million) as well as a number of global actions: Global Action on Cybercrime: GLACY and GLACY+⁴³ (EUR 12 million). These are joint projects of the European Union (under the Instrument Contributing to Peace and Stability⁴⁴) and the Council of Europe, in partnership with a number of EU Member States and the European Cybercrime Centre at Europol. In addition, in the field of cybersecurity and the protection of critical information infrastructure, building on the experience of the pilot programme ENCYSEC⁴⁵ (EUR 1.5 million), which ran between 2014 and 2016 in the Former Yugoslav Republic of Macedonia, Kosovo and Moldova, a larger initiative (EUR 11 million) is to be launched in 2017 focussing on enhancing the cyber strategic, organisational and incidence response capacities of selected third countries, particularly in Africa and Asia.

³⁵ see <http://www.eu-africa-infrastructure-tf.net/activities/grants/satellite-emedicine-for-africa.htm>

³⁶ see https://ec.europa.eu/europeaid/axis-african-internet-exchange-system_en

³⁷ see <http://www.eu-africa-infrastructure-tf.net/activities/grants/eassy.htm>

³⁸ see https://ec.europa.eu/europeaid/regions/africa/eu-africa-infrastructure-trust-fund-eu-aif_en

³⁹ financed under the Regulation (EC) No 1905/2006 of the European Parliament and of the Council establishing a financing instrument for development cooperation, OJ L 378, 27 December 2006

⁴⁰ see https://ec.europa.eu/europeaid/regions/latin-america/lis-ii-alliance-information-society_en

⁴¹ see https://ec.europa.eu/europeaid/regions/asia/tein-3_en

⁴² financed under the Commission Implementing Decision on the Annual Action Programme 2013 part 1 in favour of Central Asia to be financed from the general budget of the European Union, C(2013) 5672 final of 29.8.2013

⁴³ see <http://www.coe.int/en/web/cybercrime/glacyplus>

⁴⁴ Regulation (EU) No 230/2014 of the European Parliament and of the Council of 11 March 2014 establishing an instrument contributing to stability and peace, OJ L 77, 15.3.2014, p.1

⁴⁵ see https://ec.europa.eu/europeaid/sites/devco/files/c-2016-4773-annex-3_en.pdf

4. CURRENT LIMITATIONS TO D4D UPTAKE, NEW CHALLENGES AND OPPORTUNITIES

4.1. Information and communication revolution affected by persistence of divides

Digital technologies developed over the last decades have been adopted at an unprecedented rate in all parts of the world, including in developing countries. There are now more households in developing countries that own a mobile phone compared to having access to electricity or clean water (on average 8 out of 10 households). Mobile broadband is predominately the technology chosen to cover large territories, where low population density makes fix broadband harder to deploy and sustain economically. Mobile-broadband networks (3G and 4G) reach 84% of the global population but only 67% of the global rural population. 4G networks have spread quickly since 2013 and reach almost 4 billion people today (53% of the global population)⁴⁶, enhancing the quality of Internet use. In particular, the African continent has since 2006 leaped from twelve mobile subscriptions per 100 inhabitants to 80. For example, it took 60 years for electricity to be rolled-out in Kenya compared to just a few years for the introduction of mobile phones and the Internet.

4.2. The challenge of affordable broadband subscriptions

The number of Internet users globally has tripled in the last decade, moving from 1 billion in 2005 to 3.2 billion in 2015. Despite a global decrease of the price of broadband subscriptions, broadband subscriptions remain unaffordable to many in the developing countries. According to 2016 International Telecommunications Union (ITU) findings⁴⁷, a monthly fixed broadband package costs 1.7% of average income in developed countries, compared with 31% of average income in developing countries, and 64% of average income in Africa. The situation is particularly difficult for LDCs and Small Island Developing States.

Moreover, there are also digital divides within a given country: rural-urban, as well as the gender digital divide, are among the most visible. In Africa, urban areas have more than twice the number of digital users (23%) than the rural ones (10%). Women (11%) are less likely to use the Internet than men (18%).

Additional barriers to Internet access are due to lack of technical literacy and digital skills and locally relevant content – including lack of content available in the local language. Integrated statistics around basic digital skills do not exist. The indicator of ownership of a personal computer (PC) or smartphone cannot always give clear overview on the level of digital competence in a certain country. Around 50% of the online content still is only in English.

Digital entrepreneurial ecosystems face difficulties to develop and grow due to low public support, regulatory barriers, lack of digital and entrepreneurial skills, as well as language constraints. Fiscal incentives and targeted government support have proven to be efficient policies in growing local innovation ecosystems. The private sector remains at the centre of these developments, following widespread liberalisation of telecom markets.

⁴⁶ International Telecommunications Union, Press Release: ITU releases 2016 ICT figures, <http://www.itu.int/en/mediacentre/pages/2016-PR30.aspx>

⁴⁷ International Telecommunications Union, "The State of Broadband 2016: Broadband Catalyzing sustainable development", September 2016, ISBN: 978-92-61-21761-7 (paper version) 978-92-61-21771-6 (electronic version) 978-92-61-22111-9 (eBook version).

4.3. Free flow of data and protecting the right to information and freedom of speech: a necessity and a challenge

Free flow of data is the building block of the digital economy and innovation. It can support connectivity between sectors and industries, lower costs, stimulate research and innovation and unleash the potential of new economic models. Data technologies and services are essential factors of progress in the new era of digitalisation because they can be used for the collection, processing or storage of data (e.g. cloud computing, big data) for a scalable, development-oriented digital infrastructure. For example, the African Data Intensive Research Cloud could provide a platform to enable African researchers across many disciplines to access large data sets and tools for data analysis. Such an open digital research environment for universities and research organisations in Africa could give rise to the development of new products and services locally. The African Data Intensive Research Cloud will be an African counterpart to the European Open Science Cloud⁴⁸.

Ensuring net neutrality and full access to the open Internet is an additional policy challenge. Giving access to only a limited set of Internet content, applications or services would not only severely limit the possibilities that Internet offers as an engine of innovation that promotes digital entrepreneurship and the use of digitalisation in other sectors but would also hamper its use as a tool to promote freedom of speech and access to information. The rapid technological developments are far ahead of the judicial and democratic oversight and safeguards. As a result, technological systems may be misused for censorship, surveillance, unauthorised access to devices, jamming, interception, tracing and tracking. The EU has recognised these threats by adopting the *EU Human Rights Guidelines on Freedom of Expression Online and Offline* in 2014⁴⁹. The *Council conclusions on the Action Plan on Human Rights and Democracy 2015-2019*⁵⁰ further set out specific actions to be taken by the EU in order to promote freedom of opinion and expression, privacy, data protection, and limit surveillance of communications.

4.4. Cybercrime, cybersecurity and privacy

While the digital evolution has brought great potential for sustainable socioeconomic development and governance accountability globally, our growing dependence on ICT has also allowed the emergence of new vulnerabilities and threats to cyberspace. Cybercrime, such as attacks against information systems, online child sexual exploitation and non-cash payment fraud, affects the security and rights of individuals and businesses; it strengthens transnational criminal organisations, including those active in trafficking of drugs, firearms and in human beings, and enables terrorist organisations for propaganda, recruitment, training and financing purposes. In addition, cyber-attacks can seriously compromise the functioning of critical infrastructure upon which societies rely, putting therefore at risk the resilience of states. At the same time, many countries have only recently started to understand the challenges that could jeopardise their efforts from reaping of the benefits of increased access to the Internet for delivery of services like banking, health care or education. Governments

⁴⁸ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'European Cloud Initiative - Building a competitive data and knowledge economy in Europe', COM(2016) 178 final of 19.4.2016

⁴⁹ Foreign Affairs Council, 12 May 2014, EU Human Rights Guidelines on Freedom of Expression Online and Offline, Council of the European Union, 9647/14

⁵⁰ Council conclusions on the Action Plan on Human Rights and Democracy 2015 – 2019, Foreign Affairs Council, 20 July 2015, Council of the European Union, 10897/15

need to put in place legal, policy, organisational and technical frameworks for enhancing their digital resilience.

The Council conclusions on Cyber Diplomacy adopted on 11 February 2015⁵¹ recognise that cyberspace issues present both significant opportunities as well as continuously evolving challenges and highlight the link between development and cyber capacity building. The provision of basic digital infrastructure in third countries, the support to building up their capabilities to investigate and prosecute borderless cybercrime on the basis of the Budapest Convention on Cybercrime, as well as their ability to adequately prevent and respond to cyberattacks and accidental failures, are basic tenets of the EU's 2013 Cybersecurity Strategy and can also contribute to the progressive realisation of the 2030 Agenda for Sustainable Development (SDG 9a on resilient infrastructure, SDG 16.4 on combatting all forms of organised crime and SDG 16.6 on effective, accountable and transparent institutions).

Due to the cross-sectorial nature of digitalisation, promoting cybersecurity⁵² as a transversal issue is essential in development cooperation, namely through incorporation of cybercrime components in criminal justice sector reform programmes as well as integration of cyber resilience elements in projects dealing with critical infrastructures (ex. ICT, transport, energy) and digital/e-government initiatives. Regarding cybersecurity capacity building, there is a need to leverage existing networks and good practices, work towards creating local 'expert' hubs, as well as to engage with international partners and organisations, the private sector and civil society. This multi-stakeholder approach needs to be tailored towards supporting the adoption and implementation of holistic cyber frameworks at strategic, organisational, and technical levels that can enhance the resilience of countries in the face of counter cyber threats⁵³.

To minimise such risks personal data should be processed in a manner that ensures security and confidentiality of the personal data, including for preventing unauthorised access to or use of personal data and the equipment used for their processing. Effective prevention of unauthorised access to electronic communications networks and malicious code distribution is conducive to cybersecurity and data protection and can lead to reduced damages to computer and electronic communication systems.

4.5. ICT companies' social responsibility

ICT companies are key to delivering digital solutions and technologies in EU development policy. Private companies play a significant role in social activities. Nevertheless, the absence of safeguards to prevent these private actors from imposing excessive restrictions on fundamental rights and freedoms (e.g. assessing the legality of content, developing surveillance systems) represents a real challenge for many countries. Therefore, the Commission will pay adequate attention to actively promote and ensure the implementation of the provisions of the *'ICT Sector Guide on Implementing the UN Guiding Principles on*

⁵¹ Council conclusions on Cyber Diplomacy as adopted by the General Affairs Council on 10 February 2015, Brussels, 11 February 2015, 6122/15

⁵² see also European Commission and the High Representative of the Union for Foreign Affairs and security policy joint Communication to the European Parliament and the Council on 'Joint Framework on countering hybrid threats: a European Union response', JOIN(2016)18 final, 6.4.2016

⁵³ see also European Commission and the High Representative of the Union for Foreign Affairs and security policy Joint Communication to the European Parliament and the Council Joint Framework on countering hybrid threats a European Union response, JOIN(2016) 18 final, 6.4.2016

Business and Human Rights' (2013), which obliges companies to perform context specific human rights impact assessments before engagement.

4.6. The opportunities

- *Productivity, sustainable growth and job creation*

The access to mobile networks and the Internet have spurred productivity and growth and created jobs. Several studies in the development literature have attempted, through rough extrapolations, to quantify the number of jobs created through digitalisation, looking at both the people directly employed in the sector and at those that have indirectly benefited from the uptake of digital technologies and services. Whereas more skilled people can enter the formal labour market, many find micro-entrepreneurial opportunities, especially within the extensive network of phone card distribution system, internet cafés, and mobile phone sales and repairs services. In 2015 in Africa, according to a 2016 GSMA study⁵⁴, mobile technologies and services generated 6.7% of GDP in Africa, while the mobile ecosystem supported 3.8 million jobs.

Technological hubs are emerging and growing across the developing world spurring digital innovation and locally relevant content in a wide range of sectors like health, trade, culture and agriculture, notably in Kenya, South Africa, Ghana, India, Colombia and Peru.

- *Women's empowerment*

Digitalisation is potentially a powerful tool for social transformation and gender equality. Development practitioners have often championed the investment in women's empowerment as the most direct and effective way to promote economic growth, peace and prosperity. One of the ways digital technologies and services enables empowerment is by providing accurate information – a critical enabler of good decision-making. Digitalisation can play a crucial role in breaking up gender segregation patterns through amplifying women's voices, facilitating the delivery of services and information to women with mobility constraints or limited access to public places.

- *The development of digital governance*

Governments have started employing eGovernment solutions at a wider scale. Services are upgraded from simple governmental information websites towards integrated services that allow interaction with citizens, like filing documents online or paying taxes. When the fundamentals are in place (e.g. functioning paper-based data collection and archiving system, appropriate legal framework), digital identification systems are proven to be an efficient way to provide better access to both public and private services. Open public data have increased transparency and innovation. eGovernment has contributed to the accountability of institutions and public servants by giving users the possibility to report absenteeism and fraud, and has in general improved public finance management.

⁵⁴ See Report authored by GSMA Intelligence: *'The Mobile Economy Africa 2016'*, <http://www.gsma.com/mobileeconomy/africa/>; GSM Association (commonly referred to as 'the GSMA') is a trade body representing the interests of mobile operators worldwide

5. THE EU RESPONSE: DIGITAL4DEVELOPMENT

The role of digital technologies and services in EU development policy was first recognised in a Commission Communication in 2001⁵⁵ stating their relevance as enablers of socio-economic progress. In 2011, the Agenda for Change⁵⁶ stated that EU development policy should also support the use of digital technologies to promote a 'green economy' that can generate growth, create jobs and help reduce poverty.

Mainstreaming digital technologies should help better ensure that EU development policy can help partner countries to tackle challenges and to seize the opportunities digitalisation can offer in a globalised environment. It can contribute to providing access to affordable broadband connectivity for all, creating relevant content and globally competitive services enabled by an open and free Internet and protecting human rights, including privacy. In addition, cooperation between developing countries and the EU in the area of digitalisation can lead to a 'win-win' situation. "Made-in-Europe" solutions can help address the needs of developing countries and in parallel promote EU policies and standards, as well as create opportunities for European companies to extend their presence in new markets. Policy approximation between the EU and Africa in particular will also contribute to developing business relationships in the fast growing markets of the developing world, based on co-development and co-innovation. Reinforcing the cooperation between the EU and partner countries on mutually beneficial terms can help to boost the emergence of joint projects, facilitate the access to venture capital, and create jobs.

For that purpose, **"Digital4Development"** is a framework for mainstreaming digital technologies into development policy, contributing to the achievement of the Sustainable Development Goals and ensuring effective delivery based on existing policies, funding instruments and partnerships involving the public and private sectors. Digital4Development should be guided by a vision that maximises the uptake of digitalisation as a strong driver for economic growth in partner countries and reduces the digital divide by providing access for all, with particular emphasis on women, youth and vulnerable groups, and on their education.

Digital for Development is an opportunity to address EU development policy priorities, e.g. Job creation (and linking with the proposed External Investment Plan⁵⁷), Gender equality⁵⁸ (e-Gender), Good Governance and Rule of Law (e-Governance), Migration (e-Governance), Sustainable Energy and Climate Change (e-Energy and e-Climate Change).

5.1. The new vision and its underlying principles

On the basis of the Commission proposal for a new European Consensus on Development, Digital4Development defines four inter-related priorities for action that align the opportunities for digital technology innovation with the Union's development policy objectives.

⁵⁵ 'Information and Communication Technologies in Development. The role of ICTs in EC development policy', COM(2001) 770 final, 14.12.2001

⁵⁶ 'Increasing the impact of EU Development Policy: an Agenda for Change', COM(2011) 637 final, 13.10.2011

⁵⁷ See Commission's proposal for a Regulation of the European Parliament and of the Council on the European Fund for Sustainable Development (EFSD), COM(2016)586, 14.9.2016

⁵⁸ Commission Staff Working Document 'Strategic engagement for gender equality 2016-2019', SWD(2015) 278 final, 3.12.2015

In line with Council conclusions⁵⁹ on a rights-based approach, encompassing all rights and the Commission proposal for a new European Consensus on Development, interventions in the context of Digital4Development will follow a rights-based approach, which includes, inter alia, a context-specific assessment of the human rights situation, supporting the efforts of partner countries to fulfil their human rights obligations.

While digitalisation is considered as a global interest, it will **not be possible to implement these measures in all developing countries at once**, and not at the same pace. Consequently, at the level of implementation it is **proposed to have the immediate focus mainly in Africa**, since the digital divide there is the greatest, and in particular in those African countries that are more ready, building on the interests and consensus of the local partners, as well as in the first priority countries identified under the European Agenda on Migration.

5.2. Main priority areas and possible types of actions and measures

Priority Area 1: Access to open, affordable and secure broadband connectivity and digital infrastructure including the necessary regulatory framework

Connectivity is the foundation of the digital economy and digital inclusion. Basic mobile services for voice (GSM) have expanded with great speed in the last 10 years, while Internet connectivity lags behind. The digital world is evolving towards services that need broadband connectivity without which a vast majority of global users will not be able to enjoy the benefits of the Internet. Broadband connectivity requires fixed and mobile access networks as well as connection of these networks to the internet backbone.

Factors hampering connectivity

The main causes hampering connectivity relate to the underdeveloped terrestrial networks (in particular cross-border connections to land-locked countries), absence of enabling public policies and of an appropriate regulatory framework, high taxation of digital products and services, low market competition, lack of an energy grid, low population density in rural areas, high risk for investments, inefficient spectrum management and high prices of international connectivity. There are persistent digital divides across gender, geography, age, and income within each country. In addition, some of the perceived benefits of the Internet are being neutralised by new risks.

Threats to cybersecurity are undermining confidence in the Internet and increasing the costs to businesses and governments, resulting in economic losses as well as higher security spending. While these costs and losses are to date primarily affecting developed countries, they will increasingly affect the developing world in the coming years. In this respect, digital finance is bringing large numbers of people into the financial system for the first time.

Proposed response to foster access to connectivity and to digital applications

Since international connectivity remains an issue for the Land Locked Developing Countries and for Small Island Developing States, supporting the installation of submarine cables, cross-border fibre connections and Internet Exchange Points (IXPs), in particular with the use of blending mechanisms, can reduce prices for international connectivity. Moreover, with lack of fixed networks and vast territories to cover, mobile networks are the preferred option for the

⁵⁹ Council conclusions, 19 May 2014, Council of the European Union, 9987/14

majority of developing countries. Especially in low-income and low-security countries, mobile connectivity and training for vulnerable groups, such as single mothers, sick/old people, young people who have to travel a lot for joining school daily, would dramatically increase their sense of security.

Mobile broadband Internet needs allocation of radio spectrum and efficient spectrum management in order to avoid interferences and to verify that the obligations taken by the operators under the licencing regimes are met. Innovative spectrum sharing approaches such as the use of TV White Spaces offer economic solutions for rural communities to extend the reach of Wi-Fi hot spots without expensive mobile infrastructure.

Cybersecurity has become an increasing challenge in developing countries as its cost to the economy undermines the digital dividends, while their weak networks are often used for cyber-attacks. In particular there is a need for increased consumer education and consumer protection, including promoting financial literacy and preventing fraud, dispute resolution mechanisms and data privacy in the area of financial services.

The adoption and use of digital technologies and services call for the appropriate policy and regulatory reforms and clear neutrality rules, creating the appropriate framework (e.g. net-neutrality rules independent regulatory authorities, state aide schemes for rural or low population density areas, etc.) for sound competition for the private sector.

It is also vital that policy-makers and government officials understand the foundations of these technologies and the principles that must be maintained to preserve the Internet as a tool for innovation, communication and the respect of rights. Capacity-building measures specifically addressed at them will be beneficial in this context.

Priority Area 2: Digital literacy and digital skills

Digital literacy and digital skills are key enablers to mitigate inequalities and build strong digital economies. If applied together with the right skills, digital tools can improve access to information. For example, farmers can use mobile technologies to improve their crop yields, obtain information on crop disease and spread and get a fair price for their produce. Health workers in remote areas can use mobile communication and information for maternity related care. When access to data is difficult, such as in disaster situations, tracking mobile data can assist (during the 2014–2016 Ebola outbreak in West Africa relief organisations were able to map data to track the spread of disease outbreak using reports coming through apps designed specifically for this purpose). Moreover, digital technologies can also support preparedness to disasters by providing early warning of natural disasters for example to the affected population. Citizens can use digital technology to get better information about government policies leading to improved transparency and institutional accountability. Education professionals can use digital learning platforms⁶⁰ to get access to quality material and best practices in education.

Skill shortages and affordability issues

The absence of digital literacy is a barrier to Internet usage, while a labour force with low digital skills will impede economic development. Although there are currently no

⁶⁰ The EU's School Education Gateway (<http://www.schooleducationgateway.eu/en/pub/index.htm>) is being used by a number of educators from across developing regions as well as the EU

comprehensible global statistics on digital literacy and skills to understand the phenomenon in detail and its impact on the economic and social progress in the developing countries, all major studies and surveys in the developing countries related to Internet use identify digital literacy as one of the priority issues to be addressed.

Proposed response to reap digital benefits for all

The reform of the education and training systems in the developing countries and the introduction of digital skills (including coding and digital entrepreneurship) at a range of levels from primary school up to tertiary education is particularly important for ensuring a digital literacy that corresponds to the needs of the digital age. To that end, mainstreaming digital literacy and skills into the "Human development" priority and the Erasmus+ programme⁶¹ can have a significant impact.

Public-Private Partnerships are providing support to address the lack of digital skills in the human workforce. To this end, it also seems timely and necessary to promote financial incentives for people to obtain digital skills such as tax breaks and digital skills vouchers. On digital financial literacy, the banking sector could reinforce its activities in order to promote the usage of mobile banking, while software companies could mobilise their resources to teach coding to young generations.

Promoting digital security awareness, tools and training could also help mitigate potential negative impacts on privacy and human rights.

Priority Area 3: Digital for growth, entrepreneurship and job creation

Digital innovation has proven its potential to offer solutions to local problems. Technological trends, such as mobile and social solutions, cloud computing and data analytics, including the analysis of research data as part of the African Data Intensive Research Cloud, offer a range of opportunities for new business services in the knowledge economy and drastically facilitate the entry into the market of innovative SMEs. Digital solutions can significantly contribute to a more transparent and rules-based business and investment climate, including by facilitating company registration, fiscal and administrative procedures.

The Commission⁶² recognises the key role that digital technologies can play in improving the business landscape in Europe. Moreover, growing body of reports and studies⁶³ suggest that this is equally valid for developing countries since digital technologies and services provide an opportunity for partner countries to achieve sustainable growth and to create decent jobs. Digital entrepreneurship can strongly contribute to reduce poverty and create prosperity and livelihoods in developing countries and digital entrepreneurs can reap the benefits of the

⁶¹ Regulation(EU) No 1288/2013 of the European Parliament and of the Council of 11 December 2013 establishing 'Erasmus+': the Union programme for education, training, youth and sport' and repealing Decisions No 1719/2006/EC, No 1720/2006/EC and No 1298/2008/EC, OJEU L 347/50, 20.12.2013

⁶² see also http://europa.eu/rapid/press-release_MEMO-14-323_en.htm regarding Europe 2020 strategy for growth and jobs, and its flagships – i) the Digital Agenda for Europe, ii) the Single Market Act, iii) the Industrial policy for the globalisation era, and iv) the Entrepreneurship 2020 Action Plan

⁶³ for example: Markle Foundation, Global Digital Opportunities: National Strategies of "ICT for Development", 12 (2003); "eTransform Africa: The Transformational Use of ICTs in Africa", publication edited by Enock Yonazi, Tim Kelly, Naomi Halewood and Colin Blackman (2012); OECD Innovation for Development (2012) UNCTAD Information Economy Report 2015; " How Information and Communications Technology Can Achieve The Sustainable Development Goals" Earth Institute at Columbia University and Ericsson, in collaboration with ITU and GSMA

global market. Young people can develop their capacity to build start-ups and innovative community initiatives by using digital technologies as a support. Digitalisation can also create opportunities in sectors such as cultural and creative industries which employ proportionately greater numbers of young people and women.

Digital hubs and scalable digital services and products are emerging in developing countries. In addition to creating growth and jobs they serve as a way to address local problems using digital means. Digital entrepreneurship is driven by so called "*frugal innovation*", meaning design of products and services that are affordable and durable, without having a focus on sophistication.

Bottlenecks to successful digital entrepreneurship

Analyses show that businesses - and SMEs in particular - often struggle with digital developments, barriers to cross-border trade, regulatory and administrative burdens and insufficient access to finance.

Proposed response to boost digital entrepreneurship and job creation

Removing intermediaries, matching employers with their future employees, providing online education, adapting the educational material, giving people their first physical address and their first bank account are just a few of the areas addressed by digital entrepreneurs. In order to build innovation ecosystems, a number of measures are necessary.

A key condition for success is creating an enabling business climate for entrepreneurs. Legal predictability, positive fiscal policies providing incentives, better technical, creative and entrepreneurial education in schools and universities, government support to hubs, shared spaces and deployment of public accessible small-scale workshops offering digital fabrication constitute some of the essential elements for stimulating digital entrepreneurship.

Furthermore, interconnection of the main actors of start-ups ecosystems plays an important role for the development of local ecosystems that can support their start-ups to grow. Reinforcing cooperation between the EU and partner countries on mutual beneficial terms can help to build bridges between the start-ups ecosystems in the EU and the ones in partner countries and therefore boost the emergence of joint projects, facilitate the access to venture capital and increase talent, creativity and financing opportunities. This could be further eased by a pilot project supporting digital entrepreneurs, including incubators, accelerators and other types of ecosystem builders fostering digital innovation in a number of developing countries.

Affordable broadband skills and literacy as well as digital entrepreneurship could also be directly or indirectly addressed in the implementation of the proposed European External Investment Plan. The European digital industry, active in developing countries, can be an effective partner.

Priority Area 4: Digital technologies as an enabler

Digital technologies and services are profoundly changing the way people interact by enhancing the effectiveness of development activities, offering new solutions across all sectors of the society, the economy and the environment. In the case of human rights and governance, social media is an impressive accountability tool in uncovering abuse and human rights breaches. eGovernment increases transparency of public institutions and involves the

citizens in the decision making process, while eID can improve access to public services. Accordingly, the use of digital technologies can significantly contribute in achieving the objectives for sustainable development, including helping reduce and/or manage migration flows.

Proposed framework response for the use of digital technologies in all sectors

i. Digital 4 Gender Equality

The enabling power of digital tools and platforms can facilitate advocacy and organisation of women's groups. Digital technologies and services can be effectively used in developing countries for strengthening women's empowerment. This can be achieved by disseminating information and documenting abuses, mobilising support for vulnerable categories, building knowledge and amplifying the pressure for change. New web-based applications enable Internet users to easily publish content and control data, as well as create digital communities – shifting the power dynamics between information creators, owners and users.

Addressing the gender digital divide can have a fundamental impact in promoting gender equality on multiple levels. Improving digital skills and literacy presents a unique opportunity for increasing the inclusion in the labour market of women and girls, contributing to their financial empowerment and independence, ensuring a better work-life balance and enabling them to act as drivers of development for local communities and economies.

ii. Digital 4 Climate Change, Environment and Sustainable Energy

Long-term and high quality climate data provides the basis to understand, assess, predict climate variability, and is necessary for the development of climate applications and services to respond to climate change. Digitalisation can help developing countries in the support of political decision-making on climatic change issues and consequently to assist them in the critical stage of developing adaptation strategies. Furthermore, climate data can allow subsistence farmers to use of this information for the improvement of their crop yields and better adapt to risks. Finally, digitalisation of climate change data enables the scientific understanding of climate processes and variability and the application of this knowledge to forecast impending disasters and issue warnings, allowing for preparation and quick response.

Furthermore, long-term and high quality ocean data provide the basis to understand, assess, protect and sustainably exploit the ocean and predict the state of the ocean, climate changes, weather, resilience etc. Digitalisation can help developing countries to manage and protect for example aquaculture and other maritime activities.

In relation to the environment, digital tools and platforms can play a significant part in providing key data on the environment, to assist decision-making, assess the effectiveness of existing policies and legislation on the environment as well as ensure public access to information on the state of the environment.

Regarding sustainable energy, digital technologies could facilitate especially access to the electricity market by use of mobile applications, the management of electricity consumption and the establishment of "smart cities". However, energy consumption by digital devices, data centres and the digital infrastructure will need to be factored into overall energy consumption exploiting all possibilities for energy savings and greater efficiencies.

iii. Digital 4 Secure Identity for All

The lack of identity documents is an impediment for people to exercise their basic democratic and human rights.

Improvement in the quality of identity documents by introducing enhanced security features, production methods and personalisation techniques has made the latest generation of biometric identification documents more difficult to forge. This has resulted in a shift from document fraud to identity fraud, since breeder documents appear much easier to forge. In some developing countries it is both cheap and easy to acquire "genuine" false birth certificates.

Proper and secure identification is a precondition for people to be citizens in their countries, allowing the exercise of citizen's rights, such as the right to vote, access to justice and health systems and facilitating both the access to basic services, such as education or social assistance and the fulfilment of duties, like paying taxes, also facilitating cross border movements.

Digital technologies can help improve the integrity and effectiveness of civil registration systems. SDG's Target 16.9 aims at providing by year 2030 legal identities for all.

Digital identification schemes, which include databases with biometric features, can consolidate the link between the identification document and the identity of its holder. These databases make it impossible for an individual to obtain more than one declared identity in a given country (and therefore more than one passport or travel documents). They can also help third country nationals to prove their identity and can help EU Member States' authorities confirm the identity of undocumented irregular migrants. The key role of such databases is to enable national identity management, a functioning, transparent and complete civil registry and the issuing of identity documents and secure travel documents. Complete civil registries significantly contribute to transparent and reliable elections and other democratic procedures. However, for the civil register system to be effective, other factors have a strong impact on its integrity and completeness (e.g. political will, quality of the administration act, security situation, level of technological skills, etc.). Digital identification can also prove an important tool to promote the effectiveness and efficiency of humanitarian assistance. Biometric registration for example could allow for both governments and providers of humanitarian assistance to accurately identify and quantify the number of people in need of assistance after disasters.

Digitalisation should not be introduced in a vacuum, but as part of a set of structural measures to support civil registers. In order to improve the integrity, effectiveness, and completeness of the civil registration there is a need to tackle the reasons why individuals do not register, the technical failures of the system and corruption in implementation. The geo-political context of the country, in particular in cases where populations live in conflict-afflicted areas where there is little or no presence of the state, is another important factor to be considered. A data protection legal framework needs to be in place and enforced.

The establishment of systems of personal identifiers, including biometrics, should be based on a consolidated civil registration system, and start at the birth of each individual, followed by other significant events immediately after their occurrence, rather than being established as separate systems when people reach a certain age. The establishment of a continuous civil registration system implies the existence of trained staff and well-kept material infrastructure.

An efficient and reliable civil register can only exist if there is sustained political will and financial commitment for the maintenance of the system.

In relation to digital identification, the EU is already contributing to providing legal identities in developing countries by supporting civil registration systems with enhanced biometric features. For example, under the EU Trust Fund for Africa, the EU is helping consolidate the civil register files of Mali and Senegal and establish the legal framework and environment (e.g. laws for personal data protection, equipping also local authorities with computers and software for civil registration databases, digitalisation of civil registers and supporting biometric registration campaigns). These are extremely beneficial projects for the populations, as they promote social and democratic inclusion. These measures also support the governments' efforts to enhance cooperation on legal migration with the EU and can contribute addressing trafficking in human beings, including child trafficking, in main countries of origin, such as Nigeria.

iv. Digital 4 Capacity Building

Support is essential to assist Governments in partner countries, being key facilitators of cross-cutting use of digital technologies and services, in their effort to mainstream digital technologies into their sector plans and programmes. Partner countries' ownership in this regard is a crucial element for sustainable results.

v. Digital 4 Sustainable Agriculture

Digital technologies can contribute to resolving market asymmetries by connecting producers to consumers and by enabling a better distribution of perishable products (for example, in Honduras SMS with prices received by the farmers have increased their income by 12.5%; thanks to the use of a mobile phone, while farmers in Pakistan lose 21-35% less postharvest perishable products). The Technical Centre for Agricultural and Rural Cooperation (CTA) has initiated reflections on the use of digital technologies in agriculture development, which can usefully inform, notably in relation to food prices.

vi. Digital 4 Education and Human Development

Digitalisation can be a powerful tool to improve access and equity in education, delivery of quality learning and teaching, teachers' professional development, as well as education management, governance and administration. By using existing tools, and by putting in place the right enabling factors, educational and vocational training institutions can be supported in integrating and effectively deploying digital learning technologies and educators can improve their digital and pedagogical competences. Another example is distance learning which has a long and successful history in developed countries. As the availability of digital services tend to reach first the urban, better off and educated groups, it is important to ensure that the urban poor, rural population and people from disadvantaged groups can fully benefit from digitalisation. Internet users would need to master not just the basic literacy skills, but also language skills and other technical, creative, structural and strategic skills in order to fully benefit from internet access. EU higher education programmes have supported e-platforms, e-learning and virtual mobility.

vii. Digital 4 Health

Mobile phone-based (mHealth) and eHealth tools have been introduced particularly in low-income countries⁶⁴ to improve the quality of epidemiological surveillance, health promotion, the management of health services and the training of health workers, all with the aim to strengthen health systems in order to achieve universal health coverage as defined by the UN Agenda 2030. The systematic application of e-Health is currently being implemented in programmes funded by the EU⁶⁵ to strengthen health information systems, and health management information systems.

The particular advantage of m-Health has been demonstrated in inaccessible geographical areas, in disease outbreaks (such as the 2014-2016 Ebola outbreak in West Africa), in the capacity building of health workers in remote areas and in raising awareness on healthy behaviour issues in the population at large (e.g. awareness raising concerning nutrition), and education on substance abuse (e.g. tobacco use). The rapidly increasing use of mobile phones by populations in low income countries provides a unique opportunity to "leap frog" developmental steps for a sustainable health systems development.

6. FINANCIAL RESOURCES

The measures proposed in support of Digital4Development will not have a dedicated budget or funding instrument; they would however be supported by the existing programmes in the context of the 2014-2020 Multiannual Financial Framework (e.g. Development Cooperation Instrument /DCI⁶⁶, Horizon 2020⁶⁷, Erasmus+⁶⁸, etc.) or under the European Development Fund⁶⁹ (e.g. National and/or Regional Indicative Programmes). In addition, at the implementing level, blending should be utilised to mobilise market mechanisms to leverage financial resources in order to finance Digital4Development.

Digital technologies could also be addressed in the implementation of the proposed European External Investment Plan, in which the private sector is expected to play a key role. To this end, the Commission could envisage opening a specific window in the new European Fund for Sustainable Development (EFSD) once the proposed Regulation is adopted⁷⁰. The coordination with the other pillars of the European External Investment Plan (EIP) would be

⁶⁴ "ICT in the developing world", Study, IP/G/STOA/FWC/2013-001/LOT4/C3, December 2015, European Parliamentary Research Service, PE 563.482

⁶⁵ For example the 'Satellite enhanced Telemedicine' and 'eHealth for sub-Saharan Africa' (EUR 4 million of EU contribution)

⁶⁶ Regulation (EU) No 233/2014 of the European Parliament and of the Council of 11 March 2014 establishing a financing instrument for development cooperation for the period 2014-2020, OJEU L 77, 15.3.2014

⁶⁷ Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC, OJEU L 347, 20.12.2013

⁶⁸ Regulation (EU) No 1288/2013 of the European Parliament and of the Council of 11 December 2013 establishing 'Erasmus+': the Union programme for education, training, youth and sport' and repealing Decisions No 1719/2006/EC, No 1720/2006/EC and No 1298/2008/EC, OJEU L 347/50, 20.12.2013

⁶⁹ Internal Agreement between the Representatives of the Governments of the Member States of the European Union, meeting within the Council, on the financing of European Union aid under the multiannual financial framework for the period 2014 to 2020, in accordance with the ACP-EU Partnership Agreement, and on the allocation of financial assistance for the Overseas Countries and Territories to which Part Four of the Treaty on the Functioning of the European Union applies, OJEU L 210, 6.8.2013.

⁷⁰ See Commission's proposal, COM(2016)586final - Commission's proposal is currently discussed within the European Parliament, with the view of the initiation of the 'trilogue' procedure involving the Commission, the European Parliament and the Council and eventually the final adoption.

ensured through the strategic guidance provided by the Strategic Board to be established by the EFSD Regulation.

7. IMPLEMENTATION OF DIGITAL4DEVELOPMENT

In support to Digital4Development, the Commission services present a series of indicative actions that could be launched during the 2017-2020 period to serve as a catalyst to enhance efforts and resources in the field of digitalisation. These actions will be decided in conformity with the rules and procedures regarding programming and implementation of the relevant financial instruments, while taking into account the degree of readiness for implementation in the short or medium term. In that respect, Annex 1 presents number of actions that are currently at the identification or formulation phase, and could be launched in the course of 2017.

During the 2018-2020 period, EU support could mainly take the form of pilot activities (presented in Annex 2), and may concern in priority the following areas: Digital4Gender equality, Digital4Climate Change and Sustainable Energy, Digital4Entrepreneurship and Digital4Governance. Additional actions could be carried out, providing specific technical assistance to partner countries for the reinforcement of the policy and regulatory frameworks and practical guidance to introduce digital technologies in strategic sectors.

For the successful implementation of Digital4Development and of the relevant actions, the Commission services consider important to ensure, from the beginning, systematic involvement of EU Member States, partner countries, civil society, academia and first and foremost the digital private sector. To this end, the Commission services will seize the opportunities of major events (e.g. European Development Days, etc.) to bring digitalisation among the prominent topics for discussion and to exchange views on the Digital4Development framework with all relevant stakeholders.

In addition, Commission services are planning to create a specific Digital4Development section in its online platform "capacity4dev", to disseminate information to development experts and facilitate the exchange of best practices.

8. CONCLUSIONS

Commission services are committed to reinforcing the support for the development of digital technologies and services in the context of the EU international cooperation and development policy. This will be achieved through a well-coordinated and targeted set of measures, using already existing or planned delivery instruments and tools. Digital technologies and services are to be considered as a tool to achieve the objectives within the focal areas and cross-cutting themes of the EU development policy. The Digital4Development approach will not be implemented in isolation, but as part and parcel of overall development strategies and the policy dialogue with partner countries.

The European Union and its Member States, private stakeholders and civil society are investing important resources in developing countries on topics related to Digital4Development. Delivering on the measures proposed under Digital4Development will be better achieved through a coordinated commitment between the Commission, financial institutions and other donors.

Short term (2017) indicative type of actions

(This is an indicative list – all actions to be agreed in conformity with existing rules and procedures regarding programming and implementation of the relevant financial instruments)

Title	Countries	Indicative cost (EUR million)	Indicative EU contribution (EUR million)	Possible financing instruments
Multinational Trans-Saharan Backbone (TSB) Optical Fiber Project (TSB)	Algeria, Niger, Nigeria and Chad	80.50	30.00	BUDGET (PANAF/DCI)
Central Africa Backbone-Central African Republic Terrestrial fibre ICT backbone project	Cameroon, Congo-B, DRC, Gabon, Equatorial Guinea, Chad and CAR	35.00	17.50	EDF NIP/RIP (AfIF)
Cyber Resilience for Development: Protection of critical digital infrastructure and networks	Global facility with priority countries mainly in Africa and Asia	11.00	11.00	BUDGET Instrument contributing to Stability and Peace (IcSP)
Accessing the Digital Dividend in Africa	Africa	10.50	10.00	BUDGET (PANAF/DCI)
Appui budgétaire à la stratégie numérique du Territoire de Wallis et Futuna	OCT ⁷¹	19.60	19.60	EDF
Strengthening the Regulatory capacity in the field of Telecommunications	Israel	1.50	1.50	BUDGET
Support to financial inclusion	ACP ⁷²	57.00	25.00	EDF (Intra-ACP)
Private sector programmes	Jordan	45.70	45.70	BUDGET

⁷¹ Overseas Countries and Territories

⁷² Africa, Caribbean and Pacific group of countries

Medium term (2018-2020) indicative type of measures

(This is an indicative list – all measures to be agreed in conformity with the rules and procedures regarding programming and implementation of the relevant financial instruments)

Domain	Region	Description
Digital Infrastructure	Global	To promote by use of blending mechanisms investments for digital infrastructure projects, such as interconnections with terrestrial fibre cables, point-to-point fixed links, linking especially remote regions or land-locked countries to submarine cables and access networks in TV White Space, etc.
Recommendations to National Administrations on digital	Africa	To support the formulation of recommendations to National Administrations in Africa for the finalisation of digital policies.
Enhancement of the digital enabling environment	Africa	To promote and stimulate the ICT industry and services in Africa at regional level, while strengthening cyber security, eGovernance and establishing a harmonised ICT policy and regulatory framework to further strengthen regional integration.
Digital Skills and Literacy in National Education Systems	Global	To support partner countries to draft digital skills and literacy strategies and to adapt curricula to integrate digital skills and literacy into their educational system (including training of teachers).
Support a pilot programme for digital entrepreneurs	Africa	To support digital entrepreneurs, including incubators, accelerators and other types of ecosystem builders fostering digital innovation
Increase financial inclusion	Global	Deepen financial inclusion, building on open inclusive and responsive digital financial services for the benefit of the poor people and entrepreneurs
Use of mobile applications in electricity market	Africa	To support innovative business models involving mobile applications to sell and buy electricity particularly in remote areas in order to provide access to sustainable energy for poor people.
Linking telecom towers with sustainable electricity generation / consumption	Africa	To support the linking of telecom towers with sustainable electricity generation or consumption through the ElectriFI initiative, creating partnerships with the private sector and financial institutions to set up sustainable business models benefitting the remote rural communities.
Projects for civil register and digital identification	Africa	To support the use of ICT to foster the elaboration of comprehensive civil registers and digital identification in African countries.
Elaboration of manuals for mainstreaming of	Global	To prepare manuals enhancing the role and providing guidance for introducing strong digital components into

Domain	Region	Description
digital technologies		programmes and projects in various focal sectors (such as health, agriculture, education etc.) to be used by national/regional stakeholders during preparation of their actions.
Pilot project to support women empowerment	Africa	To support and facilitate women empowerment through the creation of women's digital communities.
Pilot project on digitalisation of climate data	Africa	To support the inventory of available climate data archived in paper and ensure that data are digitised and well conserved.
Pilot project on use of digital technologies in agriculture (eAgriculture)	Africa	To secure and frequently and timely analyse food prices data, including for early warning systems related to food security and support to policy making.
Pilot project on e-health/m-health	Africa	Use of e-health/m-health in health systems with a particular focus on disease surveillance.
Pilot project on deployment of eGovernance systems	Africa	To support the deployment of eGovernance systems with a focus on elections, company registration, customs and taxation.