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Key take aways
and recommendations

May 19-20 2021

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

Ecologically-Sustainable Digitalization in an International Context

Digitalization and increased appreciation of the need to move towards a more sustainable development within our planetary boundaries are the two main drivers of the comprehensive transformations which economies and societies worldwide will undergo in the decades ahead and are, in part, already undergoing. Each driver needs to make use of the dynamics triggered by the other. However, too often, challenges and opportunities linked to digitalization and sustainable development are discussed within separate communities or in national forums that neglect the globalized context (including the United Nations' 2030 Agenda) in which they occur.

The aim of this conference was to complement ongoing discourses on the interlinkages between digitalization and the ecological dimension of sustainable development from an international perspective. To this end, the event brought together experts and scientists, entrepreneurs, civil society representatives and policy makers from both communities and from across the world for an exchange of views and practical experiences on the following questions:

// What concrete measures are needed to ensure the ecological sustainability of digitalization?

// How can digitalization enable and support the transformation towards more sustainable development?

// How can we learn from each other and cooperate on an international and bilateral level in order to create favorable framework conditions and promote promising initiatives for sustainable digitalization?

About this document

In the following, we summarize the key findings, recommendations and results of the green.net.working conference hosted by Oeko Institut and GIZ GmbH on May 19-20, 2021.

This document has been written based on talks and inputs by conference speakers as well as on comments and contributions by conference participants. It does not necessarily represent the position of GIZ GmbH or Oeko Institut.

What now? A summary of ideas derived from two days of green.net.working

During the two days of the virtual conference approx. 200 participants and 40 speakers exchanged ideas and brought together expertise and experience from diverse backgrounds to discuss the interconnection of digitalization and ecological sustainability in an international context, possible next steps and long-term perspectives.

The following summarizes the main take aways from the green.net.working conference on what to focus on in future:

Digitalization is not temporary – we urgently need to shape it actively

Digitization has not yet helped to make our lives more sustainable. It has increased inequalities, has widened the gap between rich and poor, and has increased global CO2 emissions many times over. But digitization has become an integral part of our lives - and without harnessing its potential, we will not be able to achieve the climate goals and the SDGs.

For this reason, it is all the more important to actively shape the digitization in an ecologically sustainable way and to make use of its potential thoughtfully, sensibly and for the benefit of all.

We need to know what we are dealing with – and therefore must both collect reliable figures, data and analyses as well as broaden and deepen our knowledge and understanding

› We need reliable and current figures on the impact of relevant technologies, such as blockchain or machine learning, and we need analyses focusing on the impact of ICT in specific sectors, e.g. agriculture, mobility, energy, e-commerce, etc as well as on different countries and regions.

› Impact analyses must not only or mainly focus on how digitalization can contribute to emission reduction in middle income countries, but also in least developed countries.

› Digital competences and capabilities need to be built up comprehensively to better understand the potentials and challenges of digitalization for an ecologically sustainable development, to be able to draw the right conclusions, and help guide and shape digitization in an ecologically sustainable way.

› We cannot afford to wait - we urgently must act, according to the best of our knowledge.

Diverse perspectives and dialogue are key - who to involve

› A wide variety of initiatives, organizations and stakeholders address both sustainability and digitization. Nevertheless we need to deepen and intensify the dialogue, include diverse perspectives and bring together those who do not normally sit at the same table: experts from academia, industry/private sector, scientists, entrepreneurs, civil society actors and policymakers, consultancy, those from the field of digitalization and those from the field of sustainability, from different countries and regions.

› Decision making needs to involve the needs of stakeholders who should or could benefit from digital applications and whose data is collected and used as well as those who are not represented in conventional datasets.

› Multi-Actor partnerships need to be strengthened and regular international exchange needs to be set up.

› Tech can help tech: awareness of sustainability among private actors pursuing data-driven business needs to be raised.

From a macro- and medium-level to long-term perspective - what we should not lose sight of

Overall digital technologies need to be connected with the human system. How can this be realized? How can we solve normative challenges triggered by digital opportunities and ensure that the resulting normative principles are woven into technological systems? What is ethically and morally justifiable when boundaries between humans and machines are getting more and more blurred?

Agenda Day 1 – May 19

10:00 h	Virtual doors open
10:10 h	Welcoming Address
	// Dr. Elke Siehl Head of Department GloBe, GIZ
	// Jan Peter Schemmel CEO, Oeko-Institut
10:30 h	Opening Address
	// Jochen Flasbarth State Secretary of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
10:40 h	Speed exchange among all participants: Main challenges, opportunities and potential blind spots of sustainable digitalization
11:00 h	Digitalization and sustainable development – Interconnections of two megatrends and political priorities for shaping our common digital future
	Keynote Address **// Prof. Dr. Dirk Messner** President of the German Environment Agency (UBA)
12:00 h	Break to network
	Discussion Forums: How to green digitalization - Integrated approaches over the lifecycle of ICT
12:30 h	›› Forum 1: Responsible raw materials supply and production of ICT
	// Thea Kleinmagd Circular material chains innovator, Fairphone
	// Prof. Dr. Marie-Rose Bashwira Associate Professor, Université Catholique de Bukavu, Scientific Coordinator Research Centre on Gender and Development Bukavu
	// Alejandro Gonzalez International coordinator Good Electronics Network, SOMO
	// Dr. Davide Polverini Policy officer, European Commission
	// Dr. Philip Schütte Federal Institute for Geosciences and Natural Resources

12:30 h	›› Forum 2: Greening the internet backbone
	// Encik Shamsul Bahar bin Mohd Nor CEO, Malaysian Green Technology And Climate Change Centre
	// Rabih Bashroush Global Head, IT Infrastructure Advisory, Uptime Institute
	// Paolo Bertoldi Senior Expert, European Commission, Joint Research Centre JRC
12:30 h	›› Forum 3: Towards environmentally sound management of e-waste
	// Dr. Deepali Sinha Khetriwal Managing Director, Sofies India
	// Elisabeth Smith Executive Director, StEP
	// Dr. Sampson Atiemo Director, Mountain Research Institute
	// Dr. Tadesse Amera Director, PAN-Ethiopia
1:45 h	Panel Discussion: How to Ensure a Green Digital Recovery
	// Dr. Vivien Foster Chief Economist for the Infrastructure Vice-Presidency, World Bank
	// Dr. Marc Schattenmann Head of Directorate IT, Digitalisation, Innovation and Research, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
	// Dr. Axel Klaphake Director of Division, Economic and Social Development, Digitalisation GIZ GmbH
2:30 h	Concluding Remarks Day 1
	// Vera Scholz Director of Division Climate Change, Environment and Infrastructure, GIZ GmbH
	// Jan Peter Schemmel CEO, Oeko-Institut

Digitalization and Sustainable Development – Interconnections of Two Megatrends and Political Priorities for Shaping our Common Digital Future

Prof. Dr. Dirk Messner

President of the German Environment Agency (UBA)

Main conclusions and findings of the session

> The digital and AI community have not 'arrived' in the sustainability age yet and the sustainability community not in the digital age.

> We cannot govern what we don't understand and hence ministries need to acquire more expertise in the field of digitalization and sustainability.

> So far, digitalization tends to speed up and catalyze unsustainable developments. To change that, we need to actively intervene. We need to shape digitalization and use the digital technologies in a targeted way for sustainable development.

> But if we manage digitalization well, it can help to protect the environment and play an important role in achieving the SDGs.

> Digitalization is the strongest driver of digitalization.

> Increased transnational interconnectedness enabled by digital communication helps global cooperation as precondition for sustainable development.

> We must ask ourselves: How to combine technological systems with normative challenges? How far should we go given the increasingly blurring boundaries between humans and machines?

Most relevant challenges

> Most of the developments towards a digital society are taking place in the OECD countries and China. The risk of deepening the divides between better off and poorer countries is high.

> Without guard railing, digitalization reinforces the environmental and climate crisis.

> Steeply increasing energy and resources demand of digitalization.

> Raw materials for IT-equipment often are extracted in conditions that are not compatible with social and environmental goals.

> Digital technologies often fuel unsustainable production and consumption trends.

Most promising approaches to overcome challenges and make use of opportunities

> For digitalization to support an ecologically sustainable development we need to first establish ambitious environmental targets and policies and get the prices right. This creates the incentives for digitalization to move into the right direction.

> Increase awareness, information, and transparency as basis for sustainable consumption, e.g. through energy labels for datacenters, a digital product passport or through algorithms and filters identifying environmentally friendly products.

> Use digital technologies to improve our understanding of the working of ecosystems and human impact on these as basis for setting priorities and implementing appropriate measures in favor of sustainable development.

> Application of digital technologies for more efficient and sustainable management e.g. in the areas of traffic and energy (through application of machine-learning methods), circular economy oriented production (digital product passport providing crucial information for increased repairs and recycling), or agriculture (use of satellite- and geo-data for reduced use of pesticides).

> Improve the mutual understanding within the digital and the sustainability community of logic, dynamics and functioning of digitalization and sustainable development in a global context.

Responsible Raw Materials Supply and Production of ICT

Thea Kleinmagd, Circular material chains innovator, Fairphone
Prof. Dr. Marie-Rose Bashwira, Associate Professor, Université Catholique Bukavu, Scientific Coordinator Research Centre Gender and Development Bukavu
Alejandro Gonzalez, International coordinator Good Electronics Network, SOMO
Dr. Davide Polverini, Policy officer, European Commission
Dr. Philip Schütte, Federal Institute for Geosciences and Natural Resources

Main conclusions and findings of the session

› We need to get the economics and prices right in the sector. It is important to focus limited political capital on the structural problems, such as low product lifetimes, poor repairability, poor working conditions, chemical management in the supply chain etc. For instance, only about 20% of the overall smartphones are reused of recycled.

› Despite several international initiatives and policies, mining of raw materials and production of ICT devices continues to lead to severe environmental problems and human right abuses.

› COVID-19 has worsened existing injustices in the ICT supply chain and has exposed structural inequalities.

› It needs to be analyzed if EU Regulations (e.g. EU Conflict Mineral Regulation or Ecodesign Directive) are leading to any improvement on the ground in mining and ICT production.

› While digitalization is dependent on a broad range of minerals and metals as raw material input (primary sourcing or recycling; e.g. for a smartphone more than 60 different minerals and metals are required), each of them makes up only few cents of the value of the final device.

› Some minerals (tin, tantalum, tungsten and gold – 3TG) used for information and communications technologies are financing conflicts in high risk areas (e.g. DR Congo).

› Not only mining and its social and ecological risks must be considered, but the whole supply chain too, e.g., carbon emissions by metal refiners or red flags on smuggling risks in commodity trading centers.

Most relevant challenges

› Agreement on common international legislation and standards for mining and for eco-design – coordination is complicated.

› Not clear how different standards for the responsible mineral supply chain complement each other and what are the existing gaps.

› Covid-19 is a major challenge to small-scale miners.

› Women are particularly vulnerable in small scale mining.

› Solving mining issues in the DR Congo requires to take a broad approach and include security issues in the Great Lakes Region.

› Existing linear production & consumption patterns (make-take-waste): Circular Economy where products & materials are kept in the loop for as long as possible is still a utopia.

› The business model of big IT companies relies on selling more products and maximizing profits. If the shareholder value is only linked to increasing individual profits, sustainability issues of the collective/ society will always take the backseat.

Most promising approaches to overcome challenges and make use of opportunities

› Internalize the environmental and social costs of raw material extraction & ICT production considering that companies move to places with low environmental and social standards to save costs.

› Replicating experiences from the EU product policy, such as implementing minimum ecodesign standards for improved durability, repairability, energy efficiency etc., in other parts of the world to transform the markets.

› Further economic incentives to change the business model: from products with early obsolescence to longevity, so that less raw material extraction is needed.

› Engage and work on the ground for creating improvements in social & environmental standards and don't only regulate (e.g. a de-facto embargo of certain regions would be the worst for small-scale miners on the ground).

› More ambitious consumer protection instruments, such as longer warranties for products for increased durability to reduce overall extraction of raw materials.

› Make consumers more aware and provide more information on the challenges of the ICT supply chain.

› Consider upstream and downstream actors starting with the miner to the customer.

Greening the Internet Backbone

Encik Shamsul Bahar bin Mohd Nor, CEO, Malaysian Green Technology and Climate Change Centre
Rabih Bashroush, Global Head, IT Infrastructure Advisory, Uptime Institute
Paolo Bertoldi, Senior Expert, European Commission, Joint Research Centre

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Main conclusions and findings of the session

› The energy demand of data centres will continue to rise sharply in the future.

› The increase in electronic waste from old IT equipment is also worrying, especially in countries with inadequate disposal infrastructure. More needs to be done in the area of circular economy for electronics.

› The data situation on digital infrastructures is poor. There is an urgent need for more transparency about the energy demand, but also the efficiency and environmental impact of digital infrastructures.

› A blind spot so far is still the efficiency of software. Here, methods and key figures must be developed so that not only the hardware but also the applications executed on it become more efficient.

Most relevant challenges

› Lack of transparency concerning the energy consumption and efficiency of data centres and electronic communication networks

› Rising energy demand of digital infrastructures

› Circular economy for electronics

Most promising approaches to overcome challenges and make use of opportunities

› Mandatory introduction of data collection and monitoring of energy use of digital infrastructures. This could be achieved by a central register for data centres and networks, nation-wide, EU-wide, or globally.

› Through voluntary self-regulation, innovative providers can already show the way to more sustainability. This could trigger a competition for the most environmentally friendly digital services among digital service providers.

› Backing up voluntary self-declarations with binding minimum requirements (particularly in the areas of share of renewable energies, energy efficiency and maximum energy consumption).

› Where no self-regulation is issued or it is insufficient, government regulation must set the framework to trigger sustainable digitalization. These might be eco-design requirements, energy labelling, reporting obligations (central register), inclusion in carbon reduction targets, minimum recycling, component re-use and heat recovery rates.

› Development of economic framework conditions (e.g. carbon tax, sustainable finance taxonomy) and business models that elaborate efficiency advantages.

Discussion Forum 3
Towards Environmentally Sound Management of E-Waste

Dr. Deepali Sinha Khetriwal, Managing Director, Sofies India
Elisabeth Smith, Executive Director, StEP
Dr. Sampson Atiemo, Director, Mountain Research Institute
Dr. Tadesse Amera, Director, PAN-Ethiopia

Main conclusions and findings of the session

› Environmentally sound management (ESM) of e-waste recycling is now and increasingly so an issue of concern in countries in the Global South.

› ESM of e-waste is not a profitable business model in itself due to the negative value of multiple waste fractions. Hence, it needs additional funding and interventions in the short, middle and long-term. Without government interventions (e.g. tax, standards, effective conformity assessment schemes etc.) recycling markets fail at the expense of the health of people and the environment.

› Extended Producer Responsibility (EPR) is a promising approach to tackle financing of sustainable e-waste management, especially where systems are already in place (e.g. Europe). Yet, in the very countries of residence of the panelists (Ethiopia, Ghana and India), there is relevant legislation to address e-waste (EPR) in place, too, however the implementation of these regulations is very complicated.

› Governments and state actors need to commit themselves to implement and enforce national market regulations to hold economic actors accountable e.g. through the setting of targets. Legislation is needed that kickstarts the sector's infrastructure and sets up financing mechanisms simultaneously.

› International cooperation to tackle the underlying system and advance 'design for environment' approaches in the ICT industry is vital.

Most relevant challenges

› Business model of recycling: Sustainable recycling is not profitable per se due to negative value fractions.

› Externalization of environmental and social cost in the recovery and collection process.

› Lack of legislation and implementation of existing legislation.

› Funding shortages for ESM: Suitable recycling of hazardous fractions need financing (realized by EPR schemes in the long run or other instruments, such as private compensation in the short run).

› Difficulties in international shipments, e.g. from a Country like Ghana to ESM in Europe, due to lack of capacities for notification procedures of the Basel Convention in the Global South. Some fractions that cannot be recycled properly on site need to be shipped.

Most promising approaches to overcome challenges and make use of opportunities

› Some form of market regulation: e.g. introduction of a price intervention such as an eco-levy, tax or similar.

› Introducing policy of extended producer responsibility (EPR) and/or streamlining EPR to improve its implementation.

› Compensation by manufacturers for ESM of e-waste.

› Enable and strengthen ESM of e-waste with local (informal) recycling sectors and partnerships between informal/formal recyclers. Access to finance supported by capacity building.

› Design for environment: look at the whole lifecycle of products, e.g. avoidance of hazardous substances in products to avoid pollution problems at the end of the value chain or "design for recycling" (no composite materials that are difficult to recycle).

› Multi-Actor Approaches (no actor can solve the problem alone) work in international alliances (e.g. with PREVENT Waste Alliance or StEP Initiative) to further implement the Basel convention.

› The Global South needs higher funding for e-waste management. The link to green digital recovery funds should to be explored more at this crucial point in time, also strengthening the connection in the public's mind between the e-waste topic and the advancement of digitalization.

How to Ensure a Green Digital Recovery

Dr. Vivien Foster, Chief Economist for the Infrastructure Vice-Presidency, World Bank
Dr. Marc Schattenmann, Head of Directorate IT, Digitalisation, Innovation and Research, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
Dr. Axel Klaphake, Director of Division, Economic and Social Development, Digitalisation GIZ GmbH

Main conclusions and findings of the session

> Innovation cycles and technological changes happen so quickly, we cannot afford to wait and see until we know more about the impacts and effects of digitalization. We must act now, based on what we know today. We thereby have to focus on the full potential of digitalization.

> We have to work together on promising approaches, with an open mind, and further learn as we go. We should consider ourselves as pioneers.

> Economic incentives for a green recovery will not be enough - There needs to be regulation and guidance.

> Openness for innovation is greatest where traditional and proven instruments are not available. Example: On the African continent many promising approaches of leapfrogging are experienced.

Most relevant challenges

> Worldwide we are still facing a great digital divide – both regarding connectivity (infrastructure) but also usage of and ability to use digital technologies and data.

> Experience in how to use digitalization for broad economic develop-ment let alone for a more sustainable development is still scarce. Hence, while we know much about criteria and elements for a green recovery, there is little to build on for a digital green recovery.

> Using data for achieving a rapid green digital recovery is a double-edged sword – there is a positive side (e.g. effectiveness, evidence-based decision making) and a dark side (e.g. abuse of personal data, violation of data privacy).

> Ensuring that the recovery from the COVID-19 crisis is not only green, but also resilient, inclusive, gender sensitive and redressing inequalities. Digitalization must contribute to and be considered as an integral component in all these aspects.

> In discussions on the recovery stakeholders of ecological sustainabi-lity in most cases do not have a seat at the table with stakeholders of economic development and digitalization.

Most promising approaches to overcome challenges and make use of opportunities

> Setting targets for public recovery spending on fighting climate change and on digitalization as being the case in the EU's Recovery and Resilience Facility helps to ensure funds go where they should go.

> An own multi-stakeholder-based digital agenda and strategy strengthens and emphasizes the environment ministries' position to participate in government discussions and decision making on digitalization.

> Investment in the physical aspect of connectivity and in collection of data to help ensure inclusi-vity of all people.

> The World Development Report 2021 introduces the idea of a social contract for data, as an enabler of safer collaboration to get more value out of data than we do at the moment: Different data-creating and data-using parties need to collaborate, and have a way to do so safely. At the same time, the opportunities that data create should be accessible to all people in all countries, and not just confined to a few.

Agenda Day 2 – May 20

10:15 h	Virtual doors open
10:30 h	Welcoming
	Reflections on Day 1
	// Philip Thigo
	Senior Director, Thunderbird School of Global Management
	// Ambreen Waheed
	Founder, RBI-Responsible Behavior Institute
	// Marc-Oliver Pahl
	Secretary General, German Council for Sustainable Development
11:00 h	How to leverage the potentials of digitalization as an enabler for ecologically sustainable development
	// Luis Neves
	CEO, Global Enabling Sustainability Initiative (GeSI)
	// Dr. Heike Henn
	Head of Directorate Climate and energy; sustainable urban development; environment; Commissioner for climate policy and climate financing, German Federal Ministry for Economic Cooperation and Development (BMZ)
	// Amel Saidane
	President, TunisianStartups
	CEO and Co-Founder, BetaCube
	// Dr. Ariel Liebman
	Director, Monash Energy Institute & Program Leader, RACE for Networks
12:00 h	Break to network
	Discussion Forums: Sectoral perspectives on the potentials of digitalization as an enabler for sustainable development
12:15 h	›› Forum 1: Digital catalyzers for the energy transition
	// Aurélie Beauvais
	Deputy CEO and Policy Director, SolarPower Europe
	// Carlos Alexandre Principe Pires
	Director, Brasilian Energy Development Department, Ministry of Mines and Energy
	// Jaafar Saied
	CEO, Lightency

12:15 h	›› Forum 2: The potential of digitalization as a gamechanger for sustainable mobility
	// Elba Fuster
	Technical Expert, Digitalisation and Smart Cities, UNDP Global Centre for Technology, Innovation and Sustainable Development
	// Martin Röhrleef
	Innovation Manager, ÜSTRA Hannoversche Verkehrsbetriebe AG; Managing Director, Taxibus; Partner, digital mobilities consultants
	// Suzanne Hoadley
	Senior Manager, Traffic Efficiency Coordinator, Polis
12:15 h	›› Forum 3: Harnessing digitalization for sustainable supply chains
	// Nadia Hewett
	Project Lead, Blockchain and Distributed Ledger Technology, World Economic Forum
	// Almut van Casteren
	Managing Director, eProd Solutions Ltd
	// Pascal Ripplinger
	Consultant, INATrace, GIZ GmbH
1:30 h	Panel Discussion: Sustainability, data governance and data-driven business models in an international context
	// Malte Beyer-Katzenberger
	Policy Officer, European Commission, DG Justice and Consumers
	// Suha Mohamed
	Head of Strategy, Aapti Institute
	// Ghazaleh Kohestanian
	CEO, re2you
2:15 h	Concluding Remarks: Where do we go from here?
	// Vera Scholz
	Director of Division Climate Change, Environment and Infrastructure, GIZ GmbH
	// Jan Peter Schemmel
	CEO, Oeko-Institut

How to leverage the potentials of digitalization as an enabler for ecologically sustainable development

Luis Neves, CEO, Global Enabling Sustainability Initiative (GeSI)
Dr. Heike Henn, Head of Directorate Climate and energy; sustainable urban development; environment; Commissioner for climate policy and climate financing, German Federal Ministry for Economic Cooperation and Development (BMZ)
Amel Saidane, President, TunisianStartups; CEO and Co-Founder, BetaCube
Dr. Ariel Liebman, Director, Monash Energy Institute & Program Leader, RACE for Networks

Main conclusions and findings of the session

› Digital technologies can help abate more emissions than they cause, inter alia by reducing the need for physical infrastructure.

› Countries need to understand the potential of digital technologies for achieving climate goals.

› We need ambitious climate policies, targets, and regulation to create the market for sustainability oriented digital applications thus triggering that digitalization realizes its enabling potential for emission reductions.

› Digital applications can't and won't drive the sustainability transformation unguided – it is us, and what we use them for.

› Working together with entrepreneurs and the Start-Up-community will mobilize the necessary innovative strength.

› The carbon footprint of the ICT sector will likely continue to be dominated by applications like video streaming, social media, etc. and ICT applications addressing climate change are unlikely to be a major contributor to the sector's own carbon footprint.

Most relevant challenges

› Insufficient (investment in) digital infrastructure in many places.

› Insufficient private investment capital for sustainability oriented digital business models and respective start-ups particularly in emerging economies.

› Innovation cycles are expected to be speeding up and becoming even more complex: This makes it difficult to ensure that low- and middle-income countries participate in the benefits thereof. Further, it makes it difficult to predict the impact of digital technologies on future emissions.

› Digital technologies and their development are still dominated and owned by only a few.

› Most times inclusion of and benefits for the poor and vulnerable are still not considered in digital solutions thus deepening inequalities.

Most promising approaches to overcome challenges and make use of opportunities

› Work at different levels at the same time: (i) ambitious climate policies and targets, (ii) get the prices right (e.g. CO2-pricing) but also the sectoral market and regulatory systems to support the transition, and (iii) work with stakeholders and start-ups on specific digital sustainability solutions including on the necessary specific regulatory framework conditions

› Increase access of start-ups in low- / middle-income countries to (i) impact-investment / sources of sustainable finance (e.g. promoting existing venture capitalists to work on new models by fund-matching), (ii) markets and (iii) (open) data and APIs for digital applications.

› Bring environment and digitalization ministers together at the climate COPs to discuss how to use and steer digitalization in a direction that ensures a zero-emission pathway

› Strengthen digital capacities and access of the global south to own technologies and to found local tech companies

Discussion Forum 1
Digital Catalyzers for the Energy Transition

Aurélie Beauvais, Deputy CEO and Policy Director, SolarPower Europe
Carlos Alexandre Principe Pires, Director, Brasilian Energy Development Department, Ministry of Mines and Energy
Jaafar Saied, CEO, Lightency

Main conclusions and findings of the session

› We are in the middle of a great transformational phase of the energy sector globally with digitalization as a main facilitator of that transformation

› The shift from a unidirectional to a decentralized approach offers great opportunities for a sustainable development in the energy sector but can not be realized without further digitalization.

› Great need for providing regulatory sandboxes allowing for a "test & fail" approach.

› Make greater use of the global knowledge around digitalization for the energy transition.

Most relevant challenges

› Smart Energy, Smart grids etc. are not yet part of national standards for e.g. information privacy, data handling and ICT in most countries.

› Connecting the various flexibility solutions in the power sector (e.g. balancing of renewable based energy production, reduction of grid congestion, provision of flexibility services, connection of sectors and appliances).

› Data access, while ensuring cybersecurity.

› Lack of deeper understanding of digital approaches by energy system regulators.

› Material use and CO2 footprint of data centers.

› Yet restricted role of prosumers due to regulatory hurdles and a lack of business models: prosumers could play an important role and be part of the energy value chain by e.g. decentralized pricing mechanisms that rely on supply and demand and respective payments solutions (e.g. blockchain).

› Restricted financial means of consumers.

› Lack of digital skills of energy sector workforce, especially network operators in e.g. design of software, its handling and implementation.

› Lack of digital tools applications on demand side that support the reduction of energy consumption.

› Split responsibilities for digitalization within and between federal, local or municipalities level.

Most promising approaches to overcome challenges and make use of opportunities

› Standardization (e.g. of information privacy, data handling, ICT/Information and Communication Technology) fundamental for reaping benefits throughout the system. Identify and roll-out of "best-practice" standardization.

› Blockchain as a possible solution for payment procedures (micropayment, smart contracts, P2P (peer-to-peer) Trading); 5G connectivity to enhance fast and efficient exchange of data and communication between the connected actors; robotics as a solution for efficient and digitally equipped production lines; Digital energy management systems (including AI/machine learning supported controls and maintenance) and smart apps for consumers.

› Allow for regulatory real-life laboratories and enable pilot projects for learning by doing.

› Development and strengthening of digital skills within energy sector professional training curricula and workforce.

The Potential of Digitalization as a Gamechanger for Sustainable Mobility

Elba Fuster, Technical Expert, Digitalisation and Smart Cities, UNDP Global Centre for Technology, Innovation and Sustainable Development
Martin Röhrleef, Innovation Manager, ÜSTRA Hannoversche Verkehrsbetriebe AG; Managing Director, Taxibus; Partner, digital mobilities consultants
Suzanne Hoadley, Senior Manager, Traffic Efficiency Coordinator, Polis

Main conclusions and findings of the session

› Digitalization efforts in the mobility sector need to take linkages between mobility, urban development and policy-making into account.

› Mobility data are relevant for service delivery and service improvement, both in the informal sector and in the public (formal) sector.

› Digital tools can support sustainable mobility systems, but the fundamental aspects of sustainable mobility planning should always be the basis for these approaches. Data and digitalization should always have a purpose.

› Digital tools can and will not be the sole problem-solver. They only can supplement sustainability oriented adequate policy frameworks, urban planning and financing schemes.

Most relevant challenges

› Digitalization entails certain risks: It can increase inequalities (accessibility & affordability issues).

› Ensuring privacy-sensitive (respecting personal data) and inclusive policy (through the involvement of local companies).

› Data culture, i.e. the safe and natural handling of data-based projects and their integration into processes, is often stronger in larger cities than in smaller cities.

› Lack of active mobility data and too much focus on vehicle-bound data.

› Data siloes due to many different agencies (municipalities, transport operators etc.) and little data sharing between them.

› Sustainability oriented digital solutions need to consider the complexity of actors and stakeholders in the sector, the need for well guided processes and the creation of synergies between these actors.

› Sharing models for people with complex trip patterns / trip chaining need to be improved.

› Avoiding potential negative collaterals of digital approaches (e.g. increased selling of old cars to other regions of the world or concerning waste management/ raw material supply).

Most promising approaches to overcome challenges and make use of opportunities

› Design and use digital approaches to help reduce trips, and thus reduce the need for further vehicles, raw materials etc.

› Collecting data & mapping formal and informal transport and mobility patterns can help significantly to improve services improve sustainable urban and transport planning, safety of individuals (e.g. harassment), and road safety (through accident mapping).

› Analysis of data of e-vehicle fleets can help to understand their functioning and efficiency, improving electric vehicle adoption.

› Digital approaches have a great potential to improve usability of public transport, e.g. by simplified ticket purchases / ride charging.

› Digitalization offers relevant potential for new services & business models, e.g. sharing models and driverless mobility for better rural-urban connection, higher frequency of services (24/7 mobility network), first-and-last-mile solutions.

› The development and roll-out of new data collection and data sharing models should be strongly supported.

› Setting up partnerships (e.g. between public transportation and car-sharing companies).

› Support public authorities in understanding what they should be doing today and what to leave to the market.

Discussion Forum 3
Harnessing Digitalization for Sustainable Supply Chains

Nadia Hewett, Project Lead, Blockchain and Distributed Ledger Technology, World Economic Forum
Almut van Casteren, Managing Director, eProd Solutions Ltd
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Main conclusions and findings of the session

› Various external drivers increase pressure on businesses with regards to sustainable supply chains, e.g. increasing consumer demands, growing importance of corporate due diligence and other regulation.

› A lot of data is generated but most of it is currently "locked up", i.e. not shared and made available to improve supply chains and drive sustainability, in general. If, for example, real-time data, which in parts is already being collected, is made available, it can significantly increase our knowledge base (e.g. weather data for agricultural supply chains).

› Blockchain can help in tracking and tracing products and raw materials, thereby increasing transparency for consumers, trust and control along the value chain, efficiency gains (e.g. optimization of processes for producers).

› Digital technologies such as mobile apps and data banks can increase market access (again through trust and control of product quality) and improve access to finance (as it provides documentation and allows for payments).

› Digital technologies can empower, e.g. when providing better access to markets and disabling middlemen that "overcharge".

Most relevant challenges

› Many environmental impacts occur in supply chains, e.g. when mining or collecting raw materials.

› Existing data must be made available and actively used for the purpose of sustainability.

› Digital technologies are not a "silver bullet" to solve the problem of unsustainable supply chains --> conditions on the ground have to change.

› Blockchain: it can protect data from being manipulated but it cannot influence the quality of data that goes in.

› Availability of hardware, limited digital literacy and bandwidth.

Most promising approaches to overcome challenges and make use of opportunities

› Capacity building e.g. in the field of digital literacy and use of digital technologies.

› More collaboration among relevant stakeholders is needed (e.g. in the fields of environment, digitalization, human rights).

› Monetisation of data --> if data was an economic good, everyone who provides data would benefit economically, including in the Global South.

› Smart regulation regarding aspects like privacy or data ownership.

Sustainability, data governance and data-driven business models in an international context

Malte Beyer-Katzenberger, Policy Officer, European Commission, DG Justice and Consumers
Suha Mohamed, Head of Strategy, Aapti Institute
Ghazaleh Kohestanian, CEO, re2you

Main conclusions and findings of the session

› Data is not only an economic resource, but also a resource of political agency, specifically regarding sustainability issues. Hence, providing practical, trustworthy options will enable consumers to decide to whom to provide what kind of data. This would help democratize the power over data.

› Data should be more open. Public data should be available to others and it should be possible to use the wealth of private data for society and to reuse data more easily to harness its potential for sustainable development. Thereby professional handling is essential to ensure data safety.

› The European approach to data governance is promising, especially its focus on the important role of data intermediaries (such as data trustees) and its aim to work against monopolistic data markets.

› Policy-level discussions on data governance need to move beyond questions of ownership and control, and rather recognize the enormous collective benefits of data collection to society. It is important to distinguish between individual data and large data sets. Data is already being shared today to enable analyses and applications that improve sustainable development in areas ranging from health, to pollution control or public transport planning.

› The role of communities, especially when it comes to the handling of non-personal data (NPD) is important – lessons from the Indian model should be closely examined.

› What data governance to follow depends among other things on whether the government itself has good and enough data. It is important to assess the level of trust people place in the government and those who collect, hold, and use data. Hence, data rights may vary.

Most relevant challenges

› Monopolistic market structures pose a risk for sustainable development by hindering competition. Also, less actors being able to use the data leads to a suboptimal outcome for society as a whole.

› Thinking about privacy is giving consumers a headache. A more attractive business model is one that is seductive – the less the consumer needs to think, the better the product is.

› Tech professionals too often do not reflect on their civic identity and responsibility when programming algorithms.

› Individual data sovereignty: private people unable to follow / grasp data privacy laws.

› Data ownership is a complex issue: discussions need to explore the rights and control that individuals, groups, and organizations (public and private) have over data and should encompass a societal as well as individual point of view.

Most promising approaches to overcome challenges and make use of opportunities

› Stronger market regulation. In this regard, the European approach seems very promising. With regard to collective data governance, the Indian model should be examined further.

› Providing trustworthy and easy to use options for data altruism, as in the EU approach under the Digital Governance Act. It allows individuals and companies to give consent sharing the data they generate for the common good, voluntarily and free of charge.

› Establish individual data sovereignty through the smart use of data intermediaries that provide individuals with the ability to exercise their right to privacy and ownership by managing consent to access their data.

› In some instances, the ability to extract the monetary value inherent in their own self-curated personal data could also lead to a fairer distribution of the economic benefits of digitalization. However, the ethical and political consequences of creating opportunities to trade in personal or non-personal data must be carefully considered on a case-by-case basis.

› White labelling of software products should be further discussed.

› Tech can change tech: design software that does not feature lock in mechanisms.

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Find more information on speakers on www.green-net-working.net

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Virtual Conference on Ecologically-Sustainable
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