Session 1A

Toolkit for MSMEs – digital technologies for sustainability

In the Ministerial Declaration from May 2022, the G7 countries declared their commitment to solving environmental challenges through digitalisation. They agreed to bring together experts and stakeholders to develop a toolkit that identifies the potential of digitalisation and policy measures to help micro, small and medium-sized enterprises (MSMEs) to reduce their environmental footprint. In order to develop this toolkit, the German Federal Ministry for Digital and Transport commissioned PricewaterhouseCoopers (PwC) to compile input, best practices, insights, data and stakeholder demands. In the session, the representatives of PwC presented the toolkit and discussed it with the participants.

The speakers stated that MSMEs play a vital part in achieving decarbonisation goals, since they make up 99% of all businesses in the G7 and are responsible for approximately 13% of global energy consumption. But many of them don't have the digital solutions and tools to reduce their footprint. The toolkit helps them to do so by providing best practice approaches and suggestions for policy measures that e. g. enhancing transparency and creating incentives to increase energy and resource efficiency. It also gives them advice on promoting energy- and resource-efficient production, use, reuse and the disposal of hardware and software – including new digital technologies.

The main target group of the toolkit are the G7 administrations. It provides them with information to create the right conditions for MSMEs to optimise their environmental footprint in seven categories: Climate Neutrality, Resource Consumption, Energy Efficiency Through Digital Tech, Energy Efficiency of Digital Tech, Renewable Energy, Circular Economy and Innovation Promotion.

For the toolkit, a list of 112 measures was compiled by collecting input from the G7 and the EU, and 11 fields of action were highlighted. The fields consist of a wide array of policy measures throughout the G7 and are each structured into three implementation mechanisms, which reflect the policy options: Information, Financial and Regulation. In the session, the speakers introduced three of the fields of action and one best practice example each.

The participants very much welcomed the development of the toolkit and agreed that MSMEs need governmental support. But they also emphasized that they themselves have a key role to play in the development and deployment of sustainable digital technologies and solutions, and that they can learn from each other and drive change and innovation among themselves.

The speakers concluded that there is an increasing awareness among MSMEs regarding digitalisation and sustainability as well as a wide range of available practical solutions, but that most MSMEs don't have access to that knowledge. The toolkit aims to close this gap. The session suggested for all G7 administrations to use the toolkit, implement suitable solutions and bring about change on a national and international level.

Session 1B

Software and digital platforms – necessity for sustainability by design?

With the increasing use of things like video streaming and mobile networks, energy consumption for IT is rising worldwide, and with it CO2 emissions. On the other hand, digital solutions for the sharing economy or the circular economy can reduce the amount of waste or decrease consumption.

The panellists agreed that sustainability must be viewed as an existential requirement. Digital platforms are key drivers for sustainable change and sustainability needs to be a cornerstone of modern software development. Sustainability in the context of digitalisation can be understood in two dimensions: sustainable digitalisation and sustainability by digitalisation. Sustainable digitalisation addresses the negative impact of digitalisation on the climate and attempts to mitigate it. Sustainability by digitalisation seeks to create more sustainability through innovation and intelligent solutions.

For industry, the pursuit of greater sustainability can offer just as great an economic advantage. A few examples of this were given, and included optimising the supply routes of construction materials or the energy consumption of digital infrastructure. In these cases, savings in the environmental impact of CO2 also mean monetary savings, as less energy is consumed.

Some companies that do not receive a direct benefit from increased sustainability were also presented. These companies, which increase sustainability without necessarily making a profit, should be supported. The panel recommended a combination of regulation and financial incentives to expedite the implementation of sustainability practices in the market.

The panellists agreed that industry and policymakers should be called to action. They also agreed that acting in a more sustainable way should be as easy as possible for consumers. Several requirements need to be met in order to accelerate the sustainability of platforms and software. Recommendations of the G7 youth representatives present in the session were:

- Empower consumers through detailed, honest and accessible information
- Support transparency and avoid greenwashing
- Increase diversity and work with a broad range of stakeholders
- Take a more holistic approach to sustainable IT and think outside the Western Hemisphere
- Establish an inclusive structure to support youth and sustainable development projects

Furthermore, it was argued that youth is not only an important user group, but also an important and crucial partner to work with.

Session 1C

The role of data centres: integral part of sustainable and climate neutral digitalisation?

The starting point of the discussions was the acknowledgement that data centres are critical infrastructures and integral components of achieving sustainability goals.

The panel stressed that the technology for reducing energy usage is available and should be implemented in all data centres, since all efforts are needed to reach sustainability goals. Frameworks and declarations like the Code of Conduct for Energy Efficiency, the Climate Neutral Data Centre Pact or Amazon's Climate Pledge are voluntary tools that address the increased energy consumption in data centres. These frameworks recommend measures and best practices that can be adopted flexibly by different actors across the data centre sector and create commitment towards achieving common goals.

Data centres contribute to European sustainability policies in two ways. Firstly, digital services are important to help industries reduce their use of energy and power through data-based optimisation. Secondly, it is at the same time essential for data infrastructure to adapt to climate change. All panellists agreed that the twin transition toward a digitalised and climate neutral society depends on digital infrastructures so both processes should be regarded as interlinked. At the same time, there is a need to achieve greater transparency in the use of energy by data centres. Claims need to be backed by data and transparent indicators for environmental criteria.

For data centres to become more climate neutral themselves, they need to be more efficient. This is further incentivised by increasing energy prices. The panel stressed the importance of building data centres in a sustainable way, one intervention being the reuse of old buildings thus saving resources and energy spending during construction.

To increase efficiency further, energy storage is the main challenge since solar and wind energy are not permanently accessible. Investing more heavily in research about and development of storage solutions is therefore a prerequisite. Other solutions include utilising waste heat generated by data centres to warm private and industry buildings. The main challenge here is access to the customers, since district heating systems are mostly not equipped to use waste heat. Currently, the vast majority of waste heat remains unused.

At the same time, the panel stressed that customers, rather than data centres, are responsible for the bulk of power use. Moving data services to cloud solutions is thus an essential element of reducing energy use, since data centres are more efficient than office solutions. All the panellists agreed that cloud computing can help cut carbon emissions and should be encouraged by policy.

Another sustainability issue addressed in the panel was water usage effectiveness. The panellists agreed that sustainability goals also need political support. They called for accelerated expansion of renewable energy sources and digital infrastructure.

Session 1D

Mobile networks – ensuring sustainability in a mobile world

This session focused on the mobile sector and discussed how both hardware and network providers can contribute to a more sustainable process of digitisation.

A holistic view of the mobile sector reveals that most emissions are generated outside of the network companies themselves. They are either generated during the supply chain for network infrastructure hardware or by the end consumers, the latter being the largest factor at 80-90%. The panel thus stressed that in order to reduce emissions in the mobile sector, companies need to look beyond themselves and take the whole lifecycle of products into account. This requires collaboration between all stakeholders involved.

For consumption to become more sustainable, hardware design and recycling play a key role. In Germany, 250 million old cell phones lie in drawers. Consumers should return their phones so they can be recycled and rare earths within them can be reused. Leasing schemes or projects with local stakeholders can further encourage them to do so.

However, mobile companies themselves can also reduce their carbon footprint. Both companies present on the panel – Ericsson and Vodafone – have developed their own climate goals. One key challenge to achieving these goals is the fact that upgrading mobile networks to new generations has in the past always lead to higher energy consumption, which currently corresponds to about 25 billion dollars in energy costs. With the ongoing shift to 5G, this energy curve can be broken. Hardware modernisation is a chance to not just add, but replace old antennas with more efficient ones while still increasing network traffic. In a trial in London, this led to a reduction in energy consumption of around 50%. At the same time, the operation of a mobile network can be further optimised with smart software solutions, such as putting hardware into sleep mode when traffic is lower.

Mobile network masts can also be made more sustainable. New masts can be constructed with renewable materials, namely wood. Furthermore, there is a large untapped potential for decentralised energy production. Solar panels or wind turbines on or around radio masts can provide a significant amount of local energy .

Finally, the enabling heavers for a sustainable future through digitisation in the mobile sector were discussed. Examples included driverless trucks with up to 90% lower carbon emissions and automated container tracking in ports or smart factories. All these applications need fast and reliable mobile networks to function.

Session 2A

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The participants very much welcomed the toolkit and the inclusion of their perspectives as stakeholders. They emphasized the importance of making MSMEs that are digital frontrunners more visible so they can inspire others. They also highlighted that the G7 need to work together to achieve their goals and that it is their responsibility to raise awareness, promote transparency and provide support and incentives for MSMEs.

The speakers concluded that there is an increasing awareness among MSMEs regarding digitalisation and sustainability as well as a wide range of available practical solutions, but that most MSMEs don't have access to that knowledge. The toolkit aims to close this gap. The session suggested for all G7 administrations to use the toolkit, implement suitable solutions and bring about change on a national and international level.

Session 2B

Sustainable hardware – life-cycle management of resources and components

The sustainable usage of hardware was the focus of the discussion. The participants agreed that more sustainable hardware has huge potential.

Around 80% of the carbon footprint of ICT is determined by the manufacturing of hardware, particularly in the area of end-user devices. In order to make hardware more sustainable, we have to look at which components have the highest impacts. Bringing the manufacturing industry together with renewable energy can accelerate the reduction of impact.

According to the panel, the main focus must be ensuring long term-use of electronic devices. Hence, the life-cycle management of ICT hardware must be made more sustainable. This would have a large impact on the carbon footprint, as it would lead to less raw material being mined and generally less resources being needed, meaning that long transport routes can also be avoided.

One solution is to recycle the products and reuse the materials and components of new devices. Recycling has to be addressed by consumers as well as by the industry. In order for parts and materials to be reacquired, consumers have to be incentivised to return their old devices. This can be done through, for example, offering customers the possibility of exchanging their old devices for a reduction in price of a new one. Manufactures must also allow for easy recycling of their devices through sustainable design.

However, the panel pointed out that using electronic devices for a much longer time would have an even larger impact on waste reduction and raw material use. Generally speaking, more than half of all discarded devices are still functioning. To enable consumers to use their hardware for longer, devices must be constructed in a way that allows for easy repair.

Best practices were shared concerning the production of IT hardware in an environmentally friendly manner. An example of this was packaging, which can be made out of recycled or sustainable materials. Other examples included the use of standardised parts as well as more efficient production chains.

The panel discussed regulation that is already underway. Two of the initiatives discussed by the panel are:

- The EU has been preparing legislation concerning the longevity of products. Since an estimated 80% of the life-cycle impact of products is already defined at the designing stage, the EU proposed a new Ecodesign for Sustainable Products Regulation on 30 March 2022.
- A new digital passport for each product is being developed by the EU as well. A scannable data carrier with a unique identifier that can be linked to data about production, the material, the longevity and the possibility to repair the product ensures that all of this information is available to consumers.

Session 2C

Digital solutions for sustainability – how corporations implement holistic perspectives

Digitisation and sustainability must be reflected upon from a holistic perspective. On the one hand, the use of digital technologies and solutions makes it possible to save enormous resources across sectors. On the other hand, digitisation consumes energy through network operation and the use of devices. The panel looked at how corporations use digital innovation to address sustainability goals.

One challenge for companies to become carbon free is energy storage. Its cost and the intermittency of solar and wind energy make it difficult to become carbon free on an hourly basis.
One solution is investing heavily in building renewable capacities, such as funding research in more stable sources like geothermal energy or storing renewable energy to provide clean backup solutions. Another tool corporations explore is optimisation for energy efficacy: for example Google developed a procedure to shift flexible tasks around grids in order to better use the carbon free hours of the day. Digital innovation is at the heart of such efforts – for example optimising cooling data centres by using AI.

Another perspective is how digital technologies can enable more sustainable solutions, products or services. Using the public rail service Deutsche Bahn as an example, data analysis can help to resolve conflicts in traffic and to increase the flow and punctuality of train services. Automation and optimisation based on digital solutions furthermore allow for greater energy efficiency. Optimising for trainload can cut energy usage, since 40% of running costs are spent on air conditioning and heating. Automated inspection and maintenance as well as digital twins are other measures to improve performance.

However, when it comes to a number of companies that are trying to achieve sustainability goals, the panel identified gaps between knowing and doing. Measuring carbon footprint across all scopes is imperative to designing a holistic approach, but it is just one step in the journey. Structured data across all scopes should be integrated and analysed in order to assess the potential of optimisation. The panel therefore stressed that sharing data across organisational and technical systems is a key enabler for sustainability. Acting on such knowledge is a third step in the process. The panel encouraged other companies to use available public funding to digitalise for sustainability.

All panellists emphasised the role of the legislator and called for policy regulations to be formulated with sustainability goals in mind.

Session 2D

Fixed line networks – can they really contribute to sustainability?

This session focused on whether and how fixed line networks can contribute to sustainability.

On a general note, the panellists agreed that change measures – such as those needed for a green shift – have to be put in place using clear goals, since this makes it easier to implement change. To implement the change of a more sustainable digital future, digital infrastructure is a central anchor point.

When looking at fixed line connectivity, about half of energy consumption takes place at the customers. Another significant part is generated by the content providers. The network operators, while also producing greenhouse gas emissions themselves, need to collaborate with those stakeholders in order to bring emissions down across the value chain.

There are three main factors that can help cable networks make digitisation more sustainable. The first factor is the shift from copper to fibre. Data transfers via fibre need around half the energy of copper cables while at the same time increasing speed. Therefore, the shift to fibre already underway to increase broadband connectivity is expected to lead to emission reductions. Furthermore, the production of fibre cables needs fewer raw materials like copper, the mining of which has a significant impact on the environment.

The second factor is the transformation of mobile traffic into fixed traffic. Mobile connectivity needs about 20 times the energy compared to fixed fibre lines to transmit the same amount of data. Therefore, offloading data transfers from mobile to Wi-Fi, whenever possible, can significantly reduce energy consumption across the network. However, fixed line connections require additional hardware on the consumer side, such as routers. Consumers must therefore act as well by, for example, turning devices off when they are not needed.

The third and final factor discussed was the use of synergies in network architecture. One example is the possibility of piggybacking onto construction projects, which are already opening up the ground when rolling out new cables or using existing ducts. Both can help reduce the environmental impact from construction needed to grow

fixed line networks. Another example is open access of the infrastructure itself. When market architectures incentivise competition of networks, companies build the same cables on top of each other. Open access of network infrastructure can help avoid the unnecessary use of resources.