AmCham EU
SPEAKING FOR AMERICAN BUSINESS IN EUROPE

Our position

Twin transition: the role of digital technologies in enabling sustainable transformation

AmCham EU speaks for American companies committed to Europe on trade, investment and competitiveness issues. It aims to ensure a growth-orientated business and investment climate in Europe. AmCham EU facilitates the resolution of transatlantic issues that impact business and plays a role in creating better understanding of EU and US positions on business matters. Aggregate US investment in Europe totalled more than €3.7 trillion in 2022, directly supports more than 4.9 million jobs in Europe, and generates billions of euros annually in income, trade and research and development.

American Chamber of Commerce to the European Union
Speaking for American business in Europe

Avenue des Arts/Kunstlaan 56, 1000 Brussels, Belgium • **T** +32 2 513 68 92
info@amchameu.eu • amchameu.eu • European Transparency Register: 5265780509-97

Executive summary

The EU has proposed a new European growth model underpinned by sustainability, digitalisation and resilience. However, without rapid scaling, development, and deployment of digital solutions, the EU will not be able to meet its ambitious goals of green transformation. In the ICT for Green section, this paper takes a closer look at examples from the five economic sectors where digital solutions have helped to reduce emissions and accelerate the green transition. On the other hand, in the Greening ICT section, this paper addresses the energy consumption, emissions and e-waste from digital solutions themselves, which will be key for digital transition to become a true driver for the Green Deal.

Introduction

The climate science is clear – global carbon emissions must be drastically reduced in the next decade to avoid the worst impacts of climate change. Transitioning to a greener economy will be the defining challenge of our time, which is why we applaud the EU for its ambition to pave the way for the green transition and achieve climate-neutrality by 2050. AmCham EU brings together American companies committed to Europe and Europe's green transition, thus stand committed to help the EU's sustainability efforts.

In its communication from 2022, the European Commission proposed a new European growth model which needs to be underpinned by 'a green, digital and resilient economy.'[1] The document also underscores the importance of a fair and inclusive transformation that will allow each European citizen and business to benefit from the twin green and digital transitions. AmCham EU is supportive of these objectives and strongly believe that the EU cannot meet its urgent goals of green transformation without the rapid scaling, development, and deployment of digital solutions.

In recent years, the European continent has faced many challenges that called into question its ability to reach its sustainability objectives. We applaud the EU's resolution in maintaining and accelerating the Union's green transition even when faced with these unforeseen obstacles. Digital technologies helped keep the world's economies afloat during the COVID-19 crisis, accelerating digital transformation that resulted in savings and efficiencies. These technologies have a similar potential to alleviate the severity of the energy crisis by increasing the speed and scale of the much-needed energy transition. We welcome the recognition of such potential in the EU Action Plan for Digitalising the Energy System (DESAP) that explicitly recognises that 'with digital tools, public authorities can [...] better map, monitor, and address energy poverty, while the energy sector can better optimise its operations and prioritise the use of renewables'[2].

Last year's Strategic Foresight Report identified 'stepping up green and digital diplomacy' as one of the key EU levers.[3] We strongly support such an approach both in a global and transatlantic context.

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[1] European Commission, 'Towards a green, digital and resilient economy: our European Growth Model', 2 March 2022, viewed in May 2023, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0083

[2] European Commission, 'Digitalising the energy system - EU action plan', 18 October 2022, viewed in May 2023, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0552&qid=1666369684560

[3] European Commission, '2022 Strategic Foresight Report', 21 June 2022, viewed in May 2023, https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight/2022-strategic-foresight-report_en

We welcome strengthening of the EU-US cooperation on green and digital issues through the Trade and Technology Council and hope it can lead to a quicker decarbonisation of both economies. It is important that the EU and the US continue to work together and avoid new trade tensions in order to facilitate a stronger and more resilient energy sector. The DESAP advocates for leveraging the transatlantic relationship to promote a policy framework which empowers both energy markets and consumers through digitalization. Again, the AmCham EU member companies strongly support the European Commission in reaching these objectives.

ICT for Green

The European Commission's Joint Research Centre's (JRC) study 'Towards a green & digital future' underscores that 'successfully managing the green and digital 'twin' transitions is the cornerstone for delivering a sustainable, fair, and competitive future.'[4] One of the reasons why digital is instrumental in making this vision a reality is because it can help break the link between economic growth and the depletion of resources, which lies at the core of the successful green transition. A 2019 study by Global e-Sustainability Initiative (GeSI) shows that decisive action from the industry and policymakers could lead to ICT-enabled emissions reductions equivalent to 9% of total world emissions.[5] The combination of green and digital solutions can eliminate the historical trade-off between economic growth and sustainability objectives, leading to synergies and serving as a source of innovation.

Quantifying the benefits of digital solutions for green in a systematic way is instrumental to provide confidence in such solutions and ensuring their broad uptake by consumers, enterprises and public sector. In this context, we welcome the creation of the European Green Digital Coalition, which counts many AmCham EU companies among its members, and the coalition's efforts to create an accurate methodology to calculate net environmental impacts of green digital solutions.[6] Only consistent and comparable metrics can help ensure accountability and result in large-scale emissions reduction.

At the core of every digital solution lies its ability to provide better data and insights into the organisation's operations that can be further improved by innovative technologies. Digital's role in the green transformation is no different. The above-mentioned JRC study describes data and data analysis as 'the backbone of the green and digital transitions.' However, sharing large volumes of data can also carry heightened risks, which is why data privacy and security are crucial components. Digital solutions that enable sustainable innovation must be underpinned by appropriate standards and protocols to ensure transparency in how data is handled and protected, and provide a holistic baseline for cybersecurity.

During its current mandate, the European Commission updated the EU ESG reporting rules by adopting several pieces of legislation, including the Corporate Sustainability Reporting Directive (CSRD), which aims to improve transparency and ensure comparability of sustainability data. Compliance with and accuracy of implementing these new rules can be significantly facilitated by

[4] European Commission, Joint Research Centre, Muench, S., Stoermer, E., Jensen, K.et al., *Towards a green & digital future – Key requirements for successful twin transitions in the European Union*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/977331

[5] GeSI, 'Digital with Purpose: Delivering a SMARTer2030', September 2019, viewed in May 2023, https://gesi.org/research/download/36

[6] European Green Digital Coalition, 'European Green Digital Coalition, viewed In May 2023, https://www.greendigitalcoalition.eu/

digital solutions, including through improved collection, organisation, sharing and analysis of data. More accurate reporting will not only help measure progress and incentivise further action but also increase trust and confidence in climate-related disclosures.

The above-mentioned study by GeSI lists four different mechanisms by which digital technologies enable and accelerate sustainability impact. Firstly, technology connects by bringing individuals and teams together to engage with social and environmental impact topics. Secondly, digital technology enables analysis, measurement, tracking, assessment, and prediction of social and environmental impacts. Thirdly, analysis can be deployed to enable optimisation, improve resource efficiency, and reduce resource use. Fourthly, digital technology can be deployed to reconfigure business models, value chains and ecosystems for social and environmental impact. These impact functions can be applied to all sectors of the economy and all types of organisations looking to amplify their sustainability strategy through the use of data.[7]

Having listed mechanisms by which digital technologies enable and accelerate sustainability, AmCham EU members would like to showcase five examples from different economic sectors where digital solutions have helped to save emissions and accelerate the green transition.

Agriculture

The agricultural sector is increasingly using technology powered by data and AI to reduce its water consumption and overall environmental footprint while continuing to feed the population nutritiously and more sustainably. For instance, farmers can work with digital decision support tools (tactical and strategic) associated with sensors directly in the plots and satellite images. Tactical tools can establish a real-time diagnosis of the state and performance of a farm to allow optimisation of interventions on the plot with better allocation of resources and reduction of displacements. Strategic tools can help performing simulations to rethink the production system in the long term and reduce emissions and/or store carbon. The use of new robotised tools has also both indirect (reduction in the use of phytosanitary products) and direct impacts on decarbonation (substitution of thermal-powered machines by automated and electric tools, limitation of the number of interventions). Overall, agriculture-related data will be key to transform the sector into a sustainable food production model that can meet the need of society while respecting plenary boundaries.

Buildings and construction

Digital technologies are driving sustainability in the buildings and construction sector across each stage of the value chain. For instance, technology can enable building design to focus more on sustainability, with digital twins being used to enable more sustainable designs, demand forecasting tools to reduce resource needs and digital tools to ensure more efficient collaboration between design teams. In the building phase, digital tools improve project and resource management and material tracking – avoiding unnecessary waste and delays. Finally, buildings can be managed more sustainably through the use of digital technology, with monitoring and automation systems to use resources more smartly and enable predictive maintenance.

Smart energy management also adds value in the integration of onsite renewable power with storage facilities or cooling and heating systems, the dynamic charging of electric vehicles in warehouses and,

[7] GeSI, 'Digital with Purpose: Delivering a SMARTer2030', September 2019, viewed in May 2023, https://gesi.org/research/download/36

the calibration of room temperature. Technologies like AI and blockchain can be used to enable building management systems to adjust heat and power consumption based on renewable energy supply and engaging them to help with load balancing. The solution allows high-volume consumers – like building owners, companies, real estate firms, shopping malls and supermarkets – to opt to use less or make their own ventilation, cooling and freezing facilities available to the grid when supply is low. AI is used to understand consumption behaviour and blockchain supports transparency and trust across the whole cycle. By leveraging buildings' flexibility, the local energy provider can avoid relying on fossil-fuelled reserve power plants to meet the demand and thereby avoids the plants' associated greenhouse gas emissions.[8]

Circular economy

The EU's transition to a circular economy can also be significantly advanced by leveraging the potential of digital technologies. In particular, so-called digital identification technologies can help track items from source to end of life, delivering more transparent, efficient and sustainable supply chains and allowing consumers to access information about product sustainability. The EU Digital Product passport, part of the Eco-design for Sustainable Product Initiative, is a great example of how digital technology can help tracking the life story of a product, enabling services related to its reparability, remanufacturing, and recycling, contributing to create a circular economy in the EU.

Moreover, technologies enabled by the cloud (AI, ML, IoT) can be a game-changer in providing the tools to step up research and put in place solutions to address wider environmental challenges. As acknowledged by the European Commission[9], digital twins and simulation technologies optimise production, test products and processes and detect possible harmful effects. Machine learning is today an enabler of circularity for industry (design new materials, predictive maintenance to increase product lifespan, real-time analysis of waste streams, digital thread of resilient supply chains etc), while computational chemistry provides insights into the behaviours of various chemicals, materials and products and help identify and eliminate harmful substances. IoT can help provide consumers with more affordable, reliable and cleaner energy options.

Energy-intensive industries

Across many energy-intensive manufacturing and processing industries, digital technologies are being used before, during and after production to drive positive sustainability outcomes. Before manufacturing takes place, high performance compute is often deployed in the research and development of new sustainable materials, like lower carbon steel. Virtual prototyping and simulation can be used to imagine new production scenarios and more efficient methods. Digital tools are used in the supply chain to identify and tackle sustainability hot spots in the sources of raw materials. During production, smart solutions that leverage machine learning, IoT and robotics can monitor the manufacturing environment and automate processes for maximum efficiency. Digital tools can also be deployed to track goods downstream, to enable a circular value chain maximising reuse, recycling, and repair to minimise waste.

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[8] P. Spring, 'Transforming the Energy Consumption Model for Buildings', in *IBM Newsroom.* 22 December 2022, viewed in May 2023, https://newsroom.ibm.com/Transforming-the-Energy-Consumption-Model-for-Buildings

[9] European Commission, Directorate-General for Research and Innovation, Müller, J., Enabling Technologies for Industry 5.0 – Results of a workshop with Europe's technology leaders, Publications Office, 2020, https://data.europa.eu/doi/10.2777/082634

Transport

In the transport sector, the digital transition has a major role to play in decarbonising mobility. Thanks to real time vehicle data, it is now possible to develop solutions to ease the adoption of zero emission vehicles by giving them information on the battery electric or fuel cell electric vehicle's real range but also on charging infrastructure available to best optimise their journey.

Across the world, public sector bodies are starting to implement intelligent transport systems that use real-time data to tackle emissions by optimising traffic flow and reducing congestion. Digital platforms provide access to ridesharing and carpooling and Mobility as a Service (MaaS) platforms provide users with seamless access to multiple modes of transportation, including public transit and bike sharing. Delivery companies use digital technology to not only optimise their delivery routes, but to improve packing efficiency, which reduces the number of trucks on the road.

The International Energy Agency (IEA) estimates that in 2050 half the reductions of emissions will come from technologies that are currently at the demonstration or prototype phase such as advanced batteries, hydrogen electrolysers or direct air capture and storage.[10] The EU's investment in such technologies will be instrumental to accelerating their adoption and subsequent environmental benefits.

Greening ICT

Digital solutions can only help decarbonise the economy if the emissions associated with deploying such technologies are significantly lower than the emissions they help to abate. That means that the digital equipment, data centres, and telecommunication networks that underpin the delivery of digital technologies must have as little impact on the environment as possible. These considerations are top-of-mind for AmCham EU members both as providers and users of digital technologies, which is why AmCham EU applauds the European Green Deal's ambitions on the circularity of digital technologies as well as its objective to ensure that all EU data centres are climate-neutral, energy-efficient, and resource-efficient by 2030.

The past decade has seen a sharp increase in a demand for digital services, with the pandemic further accelerating the adoption of digital technologies. Despite this significant growth, the energy demand associated with the data centres and telecommunication networks saw only a modest increase with each accounting for approximately 1-1.5% of global electricity use.[11] For example, Groupe Speciale Mobile Association (GSMA) members reported that their network data traffic increased by 31% in 2021 while total electricity use by operators rose by 5%.[12]

The reason behind these moderate increases lies in the efficiency improvements such as reductions in energy intensity of fixed-line and mobile networks as well as material efficiency improvements of data centre IT hardware and cooling. Additionally, moving away from smaller inefficient data centres has also helped reduce energy consumption. Recent research shows that shifting away from on-

[10] IEA, 'Data Centres and Data Transmission Networks,' September 2022, viewed in May 2023, https://www.iea.org/reports/data-centres-and-data-transmission-networks

[11] Ibid.

[12] GSMA, 'Mobile Net Zero', 18 May 2022, viewed in May 2023, https://www.gsma.com/betterfuture/wp-content/uploads/2022/05/Moble-Net-Zero-State-of-the-Industry-on-Climate-Action-2022.pdf

premise enterprise data centres toward large scale cloud infrastructure in Europe could result in energy usage reduction of nearly 80%.[13]

Similarly to the energy demand, the increase in emissions associated with digital services only moderately increased as a result of more energy-efficient infrastructure, renewable energy procurement of the ICT sector and broader efforts to decarbonise electricity grids.[14] Apart from the emissions stemming from energy use, the sector also strives to tackle life cycle emissions. ICT companies are leading the way in terms of purchasing renewable energy and are responsible for half of all corporate power purchase agreements.[15]

The next section reflects on the current climate and environmental footprint of digitalisation using the examples of data centres and digital devices. Moreover, it looks at the role of EU policies in supporting the efforts of these sectors to become more sustainable.

Data centres

The current trend of moderate increases in energy use of data centres and telecommunication networks is likely to continue over the next few years. It is difficult to predict whether it will remain valid beyond that timeframe, but if past data is any indication, the energy-efficiency gains are likely to be underestimated and energy use overestimated.[16] The final outcome will depend on a myriad of factors including further energy-efficiency gains in IT equipment, and in case of data centres the pace of moving workloads away from inefficient on-premise facilities.[17]

Besides leading the way on sustainable corporate power procurement and decarbonising electricity use by matching electricity demand to carbon-free supply, data centre operators in Europe can provide waste heat to district heating system operators (when conditions such as off taker demand and technical feasibility allow it).

The European Commission's actions outlined in the DESAP such as the EU Code of Conduct for the sustainability of telecommunications networks and an environmental labelling scheme for data centres that are to be completed by the end of 2025. We strongly advocate for the above frameworks to be harmonised, easy to implement and leveraging existing internationally agreed standards.

[13] S&P Global, Morgan, K, 'Improving datacenter efficiency in Europe: The role of PUE.' *Market Intelligence*, 15 June 2022, viewed in May 2023, https://cispe.cloud/website_cispe/wp-content/uploads/2022/12/451-Improving-datacenter-efficiency-FINAL

[14] CERRE, Banet, C., Pollitt, M., Covatariu, A., Duma, D., *Data Centres and the Grid – Greening ICT in Europe,* 13 October 2022, viewed in May 2023, https://cerre.eu/publications/data-centres-and-the-energy-grid/

[15] IEA, 'Data Centres and Data Transmission Networks,' September 2022, viewed in May 2023, https://www.iea.org/reports/data-centres-and-data-transmission-networks

[16] E. Masanet, A. Shehabi, N.Lei, S. Smith and J. Koomey, 'Recalibrating global data center energy-use estimates.' *Science,* vol 367, 2020, viewed in May 2023, https://ailab-ua.github.io/courses/resources/ScienceDataCenterEnergy.pdf

[17] S&P Global, Morgan, K, 'Improving datacenter efficiency in Europe: The role of PUE.' *Market Intelligence*, 15 June 2022, viewed in May 2023, https://cispe.cloud/website_cispe/wp-content/uploads/2022/12/451-Improving-datacenter-efficiency-FINAL

As the European Commission continues to work on guidance to Member States on cloud computing procurement, AmCham EU believes they should reflect the importance of energy-efficient data centres, which will be essential for the sustainable use of edge and cloud computing technologies.

Devices

Although important, focusing solely on tackling emissions stemming from the use of data centres and networks will not be enough to meet Europe's ambitious climate objectives. A recent study conducted by the French environmental agency (ADEME) and the French telecom regulator (Arcep) on the digital environmental footprint in France found that devices account for 79% of the digital carbon footprint, compared to around 16% for data centres and 5% for networks.[18]

For the past two decades, the EU has been building a robust legislative framework aimed at addressing sustainability of digital devices, including the RoHS Directive that restricts the use of certain hazardous substances in electrical and electronic equipment (EEE), the Waste Electrical and Electronic Equipment (WEEE) Directive, the Batteries Directive or the Ecodesign Regulation (Lot 3, 5, 9, X…). These laws are regularly revised and adapted. Over the past few years, the EU has also introduced a number of new legislative proposals aimed at significantly reducing emissions associated with devices, including: Ecodesign for Sustainable Products Regulation (ESPR), EU Digital Product Passport (under ESPR), Critical Raw Materials Act, or the Right to Repair legislative proposal.

It is of paramount importance that the growing body of legislation in this space is bringing about significant climate benefits as well creating a set of clear, coherent and consistent rules for companies.

Recommendations

- **Twin transition**: Transitioning to a greener economy will be the defining challenge of our time, which is why we applaud the EU for its ambition to pave the way for the green transition and achieve climate-neutrality by 2050. The EU cannot meet its urgent goals of green transformation without digital solutions, which is why investment and enabling policy environment are key for the rapid scaling, development, and deployment such solutions.
- **Transatlantic cooperation**: We welcome strengthening of the EU-US cooperation on green and digital issues through the Trade and Technology Council and hope it can lead to a quicker decarbonisation of both economies. It is important that the EU and the US continue to work together and avoid new trade tensions in order to facilitate a stronger and more resilient energy sector.
- **Metrics**: Quantifying the benefits of digital solutions for green in a systematic way is instrumental to provide confidence in such solutions and ensuring their broad uptake by consumers, enterprises and public sector. We welcome the creation of the European Green Digital Coalition and the coalition's efforts to create an accurate methodology to calculate net environmental impacts of green digital solutions.
- **Data centres & telecoms networks**: The EU Code of Conduct for the sustainability of telecommunications networks and an environmental labelling scheme for data centres that

[18] ADEME-Arcep,'Assessment of the digital environmental footprint in France in 2020, 2030 and 2050', March 2023, viewed in May 2023, https://en.arcep.fr/uploads/tx_gspublication/press-kit-study-Ademe-Arcep-lot3_march2023.pdf

are to be completed by the end of 2025 should be harmonised, easy to implement and leveraging existing internationally agreed standards. Similarly, EU's guidance to Member States on cloud computing procurement, should reflect the importance of energy-efficient data centres, which will be essential for the sustainable use of edge and cloud computing technologies.

- **Devices**: For the past two decades, the EU has been building a robust legislative framework aimed at addressing sustainability of digital devices. We call upon the EU to ensure that the growing body of legislation in this space is bringing about significant climate benefits as well creating a set of clear, coherent, and consistent rules for companies.

Conclusion

Digital technologies play a vital role in the EU economy and energy security. The EU should ensure that measures addressing the ICT sector's energy consumption do not undermine the critical role of digital technologies in reducing carbon emissions and helping the EU achieve its energy and climate objectives. When looking at the twin transition, it is essential to ensure synergy between the green transition and digitalisation which is the essence of the green digital transformation, leading to societal, environmental and economic benefits. This link between the digital and green transitions will help create new business models and jobs, as well as improve people's health and quality of life.