

HOW TO SPEND IT:

A digital investment
plan for Europe

#AStrongerDigitalEurope

DIGITALEUROPE





FOREWORD

Digital technologies have proved themselves to be essential for society and citizens during the COVID-19 crisis. As we retreated back into our homes and away from offices, schools, restaurants and large gatherings, digital solutions kept us in touch with what mattered. They are no longer simply “nice to have”.

Many citizens, businesses and public sector institutions have made a huge “digital leap” in the last few months. We have seen years’ worth of digital transformation in a few short months. Yet despite the gradual opening we are now seeing, the economic situation remains dire – the worst recession in decades, possibly centuries.

The investment decisions of today will shape Europe for the next five years, and speed is of essence. For example, before the crisis we knew that 52 per cent of the workforce needed to be reskilled over the next five years due to digitalisation. Now it looks like this must happen in the next 12 months, as millions have been made unemployed or have been placed on government furlough schemes.

The unprecedented common €750 billion stimulus package and 2021-2027 budget present a historic opportunity for Europe. There is a strong consensus that investment in digital technologies must be one of the pillars of the recovery.

Announced in President von der Leyen’s State of the Union speech and endorsed by European leaders, 20 per cent of the new recovery and resilience funding must be spent on digital investments.



Hilary Mine
President,
DIGITALEUROPE

What we must do is therefore clear. We must invest in digital to:

- **Make sure we have the data and infrastructure to prevent, track and treat COVID-19 or other diseases in the future**
- **Develop our industry into one that is competitive, resilient, green, innovative and secure**
- **Accelerate the digital transformation of our public services**
- **Decrease our energy consumption**
- **Promote inclusion and create good, well-paying jobs in sectors that have a viable future**
- **Make sure that everyone has the skills to get a good job and participate in an increasingly digitised society, regardless of their background**
- **Connect rural areas into a digital inclusive society**
- **Protect critical digital infrastructure from cyberthreats**

The question now is not *if*, but *how*.

In this paper we aim to point decision-makers both in Brussels and in the Member States in the right direction. We want to inspire as well as put forward visionary ideas for pan-European projects and Member State investments.

In the pages that follow, you will see the types of projects that have the potential to take Europe forward and help it reinvent itself.

As a continent, we are now weakened by the COVID-19 crisis, but if we invest wisely we will emerge as a stronger digital Europe than before.



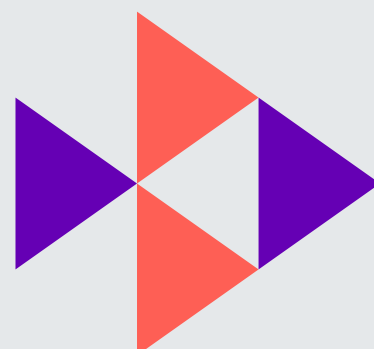
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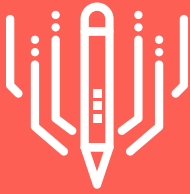


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Earlier this year we outlined **five broad areas** for digital investment in our COVID-19 Recovery Plan:



Digital education,
skills and inclusion



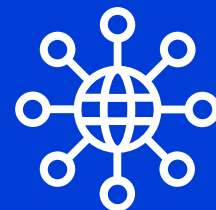
Digital healthcare



Digitalising SMEs and
scale-ups



Digital transformation,
innovation and
the Green Deal



Connectivity and
infrastructure

EXECUTIVE SUMMARY

Building on this, *How to spend it: A digital investment plan for Europe* is divided into two parts.

In the first part, we outline the ten investment ideas under each of these cross-cutting headings in more detail.

▶▶ Digital education, skills and inclusion

1. A European digital upskilling and reskilling programme
2. Bringing schools into the digital age
3. Using artificial intelligence to predict the jobs of the future

▶▶ Digital healthcare

4. Modernising and securing the EU's health systems
5. Harnessing health data to benefit patients and speed up research

▶▶ Digitalising SMEs and scale-ups

6. Boosting SME growth and cross-border trade through a Europe-wide e-Administration Portal
7. Unlocking open public data to empower scale-ups

▶▶ Digital transformation, innovation and the Green Deal

8. A digital 'Renovation Wave' and a modernised construction sector

▶▶ Connectivity and infrastructure

9. Bridging the urban-rural digital divide
10. Boosting growth of traditional sectors through 5G connectivity

In the second part, we outline concrete **case studies** from our members of digital projects at national level that could be scaled up and help achieve these aims.

These concrete case studies are intended to complement and illustrate the guidance provided by the Commission to Member States on priority digital flagship areas.



Our manifesto for a stronger digital Europe: 18 months on

Back in 2019, we released a set of 22 success indicators that Europe should aim to achieve by 2025. All of the investment ideas in this guide will help Europe reach these goals. In some cases, we have updated the KPIs, or added new ones, to take into account the changing circumstances.

By 2025,

50%

of SMEs should be using big data analytics. At the moment, only 12 per cent do so¹.

By 2025,

30%

of SMEs should trade across more than one European border. At the moment, only 8,4 per cent do so².

By 2025,

80%

of schoolteachers should feel ready to use digital technologies. At the moment only 40 per cent do³.

By 2025, **one in three Member States should offer cross-border access to**

ELECTRONIC HEALTH RECORDS.

Today, it is not possible to access your medical records if you cross a border.

By 2025,

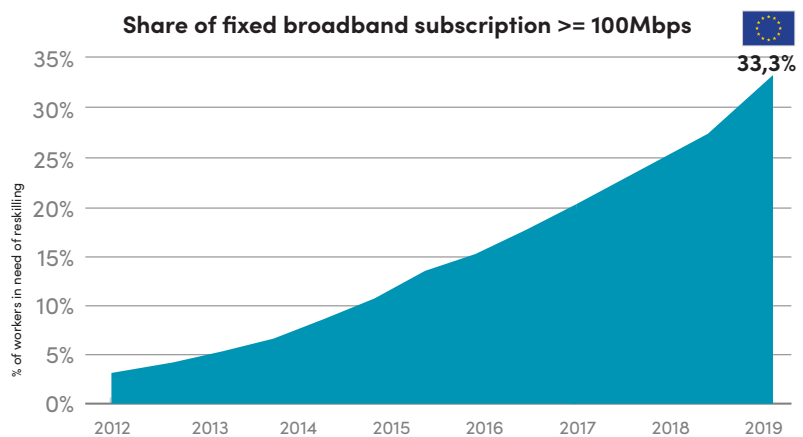
90%

of people who are without formal education should be regular internet users. At the moment 67,8 per cent of people with low or no education use the internet less than once a week⁴.

By 2025,

70%

of European households should have a broadband connection with 100 Mbps or more. Today, only one out of three does⁵.



¹ European Commission, [Digital Economy and Society Index Report – Integration of Digital Technology](#), 2020

² Eurostat, [Selling online Cross-border](#), 2018

³ OECD, TALIS results: [Teachers and School Leaders as Lifelong Learners](#), 2018

⁴ Eurostat, [Individuals who are regular internet users \(at least once a week\)](#), 2019

⁵ Eurostat, [Share of fixed broadband subscriptions](#), 2019

By 2025, **enterprises in Europe should be providing ICT training to**

70%

of their employees. Today, only 23,9 per cent of all European enterprise do so⁶.

By 2025, all **Member States should have updated their**

NATIONAL BROADBAND PLANS

to adapt to the needs of 5G and in line with EU's connectivity objectives. Today, only 17 Member States have already assigned spectrum in the 5G pioneer bands⁷.

By 2025,

10%

of **Research and Innovation spending** should be targeted at ICT technologies. Currently, only 6,9 per cent is⁸.

By 2025,

75%

of **EU citizens should be using eGovernment services,** compared to the current 56 per cent⁹.

By 2025,

6%

of **working women should be ICT specialists.** Currently only 1.4 per cent of women in the EU are employed as ICT specialists¹⁰.

By 2025, **every European household should have access to**

4G

Today, one household out of ten in rural areas still does not have this basic connectivity right¹¹.

By 2025, Member States and companies across **Europe should have completed retraining for 20% of the workforce,** leaving only 32% of workers in need of reskilling.

52%

of workers need some form of reskilling¹².

By 2025, Member States, universities and business should be

TRAINING SPECIALISTS

for the most in-demand jobs, including: data analysis scientists; AI and machine learning specialists; big data specialists; and digital transformation managers.

⁶ Eurostat, **Enterprise provided training to their personnel to develop/upgrade their ICT skills**, 2019

⁷ European Commission, **Digital Economy and Society Index Report – Connectivity**, 2020

⁸ Join Research Centre, **PREDICT Report – ICT sector analysis**, 2020

⁹ Eurostat, **Individuals who used the internet for interaction with public authorities**, 2020

¹⁰ Eurostat, **ICT specialists, by Gender**, 2017

¹¹ Eurostat, **Rural 4G mobile broadband coverage**, 2017

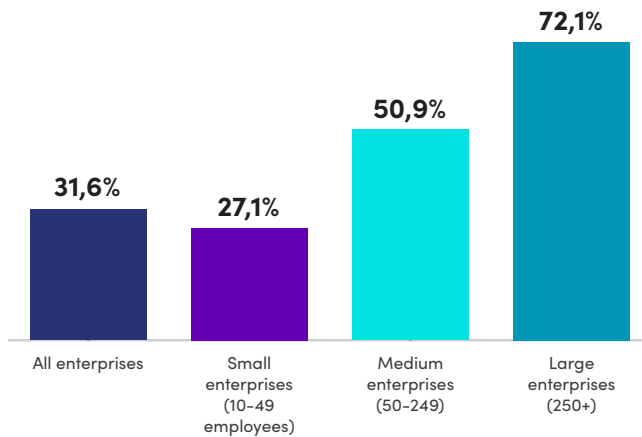
¹² World Economic Forum, **The Future of Jobs Report**, 2018

By 2025, **all large European enterprises should have a clear**

CYBERSECURITY STRATEGY

Efforts need to be made for Small and Medium-Sized Enterprises to implement cybersecurity strategies by an additional 20 per cent. In 2015, only 31,6 per cent had formally defined their ICT security policy. On this matter there is a great variance with 72,1 per cent of large enterprises having done so against only 27,1 per cent of small ones¹³.

% of enterprises with a formally defined ICT security policy



By 2025,

15%

of all the material used in the economy should be recovered and re-used.

Today it is only the case for 11,7 per cent¹⁷.

By 2025,

5G

connections should cover at least 200 million users¹⁸.

By 2025, fewer than

10%

of internet users should be deterred from online purchases due to safety concerns. In 2015, 19 per cent of internet users were discouraged from online purchases because of security concerns¹⁴.

By 2025, **Europe should strive to invert the increasing gap of cybersecurity professionals that it requires.** As of now, the gap is expected to rise to

350.000

by 2022¹⁵.

By 2025, Europe should have **saved**

26 billion tonnes

of CO₂ emissions by digitising resource-intensive sectors.

According to estimates, 15,8 billion tonnes can be saved from the electricity sector, 9,9 billion tonnes from the logistics sector, and 540 million tonnes from the automotive sector alone¹⁶.

¹³ Eurostat, **Enterprises with a formally defined ICT security policy**, 2015

¹⁴ Eurostat, **Security concerns kept individual from ordering or buying online**, 2015

¹⁵ Frost & Sullivan, **2017 Global Information Security Workforce Study**, 2017

¹⁶ World Economic Forum, **How can digital enable the transition to a more sustainable world?**, 2016

¹⁷ Eurostat, **Circular material use rate**, 2016

¹⁸ CSS Insight, **1 Billion Users of 5G by 2023, with More Than Half in China**, 2018

By 2025, **European countries should be spending**

3% OF THEIR GDP

on Research & Innovation – Japan already meets that target with 3,3 per cent spending, and in the US it is 2,8 per cent. The EU average is 2 per cent¹⁹.

By 2025,

30%

of European manufacturing industries should leverage big data analytics. At the moment just 10,8 per cent do so²⁰.

By 2025,

35%

of internet users should order goods or services across EU borders – last time it was recorded that figure was a paltry 18 per cent²¹.

By 2025, **Europe should be home to**

25%

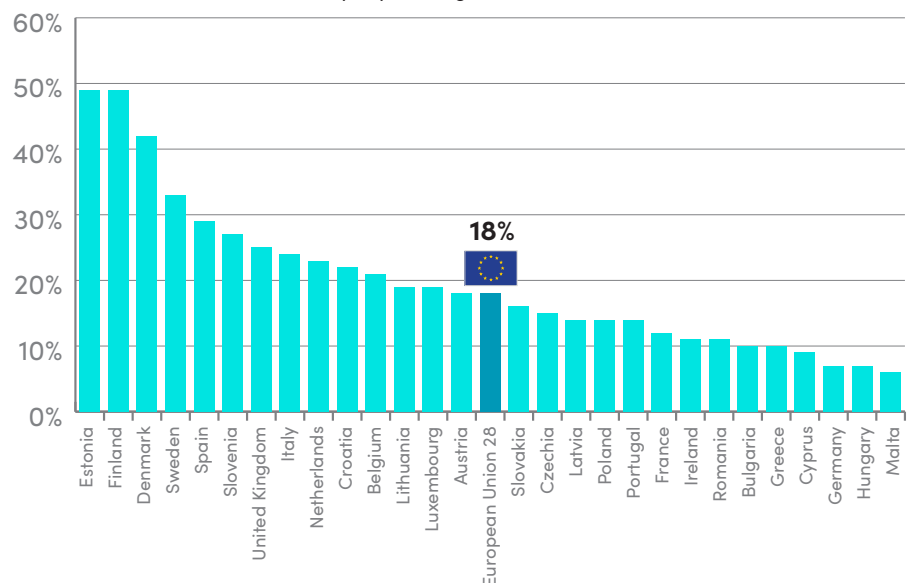
of the world's unicorns. In 2017 we were home to just 11,6 per cent (and nearly half of them are based in the UK), far behind the US and China²³.

By 2025,

60%

of EU citizens should use health and care services provided online, following the example of Estonia and Finland where almost 50 per cent of citizens take advantage of such services online. In 2018 for the EU, this figure was a meagre 18 per cent²².

% of people using health services online



¹⁹ UNESCO, **Research and development expenditure**, 2015

²⁰ Eurostat, **Enterprises analysis big data from any source, by Economic sectors**, 2018

²¹ Eurostat, **Individuals ordering good or services online, from sellers from other EU countries**, 2014

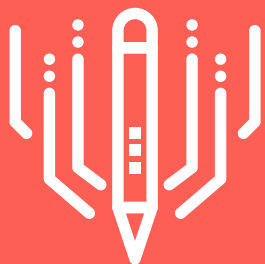
²² Eurostat, **Individual using health and care services provided online**, 2018

²³ CB Insights, **The complete list of Unicorn Companies**, 2018





TEN INVESTMENT IDEAS FOR EUROPE'S DIGITAL RECOVERY



Digital education,
skills and inclusion

According to European Commission figures, **42 per cent** of European adults do not have basic digital skills. In addition, **52 per cent** of the workforce need reskilling due to changes in the job market. At the same time, there are hundreds of thousands of unfilled vacancies for ICT professionals in Europe.

As highlighted in the **European Skills Agenda** and the **Digital Education Action Plan**, Member States and the relevant local authorities should prioritise digital skills.

1. A European digital upskilling and reskilling programme

COVID-19 has intensified the need for reskilling the European workforce. Workers in a range of sectors – such as tourism, manufacturing and healthcare – have seen their jobs radically change in the past few years, and this has accelerated during the pandemic.

All Europeans must be able to see themselves as a part of the future job market and digitalisation should leave no one behind. Beyond employability, basic digital skills are also essential to empower citizens to take advantage of e-government services and participate fully in modern democracies.

Learning new skills has the double positive effect of supporting people in their employability and allowing our businesses to gain skilled workers, so that both can take advantage of the opportunities afforded by digitalisation.

Member States need to invest heavily in this area in the coming months and years to ensure that those made unemployed by COVID-19 can bounce back into the labour market.

Several initiatives are already in place, such as the **Digital Skills and Jobs Coalitions**, but they are often underfunded and understaffed. We propose to invest heavily in national coalitions, gathering all initiatives under one hat in each Member State.

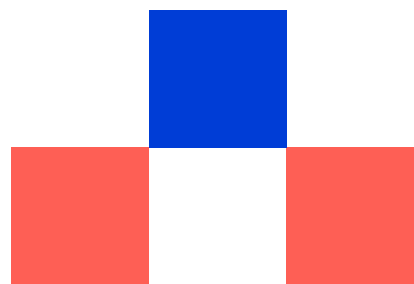
We also propose to add demands to the coalitions to professionalise management and institutionalise at board level the collaboration between the EU, governments, the private sector, unions and education providers, and collaborate directly with the “Digital Hubs” being set up in each region.

Another idea is to introduce vouchers and loans to promote adult vocational training, aimed at employees and/or employers to contribute to qualified training programmes. The priorities of such trainings should be digital upskilling, a tailoring to the labour market’s needs in each sector and region with proven methodologies that would ensure maximum effectiveness.

Part of the solution will also be to identify, scale up and replicate existing public-private partnerships among all stakeholders. In “**Part II – Case studies**”, we offer some examples. Member States should dedicate funding to these sector-specific digital upskilling programmes. Europe’s support – for example, through the newly proposed **European Digital Education Hub** – will be essential to provide harmonised guidance to national and regional authorities and promote the same pace of digital upskilling throughout Europe.

By 2025, **90 per cent of people who are without formal education should be regular internet users.** At the moment **67.8 per cent of people with low or no education use the internet less than once a week.**

By 2025, **Members States and companies across Europe should have completed retraining of 20 per cent of the workforce, leaving only 32 per cent of workers in need of reskilling.** Currently an estimated **52 per cent of workers need some form of reskilling.**



2. Bringing schools into the digital age

By 2025, 80 per cent of schoolteachers should feel ready to use digital technologies – at the moment only 40 per cent do.

By 2025, 6 per cent of working women should be ICT specialists – currently only 1.4 per cent of women in the EU are employed as ICT specialists.

The use of digital tools and online video platforms in education have enabled pupils and teachers to stay connected around the world during the COVID-19 lockdown. For the foreseeable future, we are likely to see hybrid teaching methods, mixing in-person and remote learning.

However, the COVID-19 crisis is also exposing gaps and areas where improvements are still needed. In schools that were ill-equipped for lockdowns, children have gone many months without proper education.

Online teaching is now essential to our education systems, and knowledge of coding, cybersecurity and privacy are vital skills for our children and their future careers. We recommend a major investment in the digital upskilling of teachers with online teaching methods and to ensure that they can deliver digital skills training. We should also modernise school curricula to include digital upskilling, the basics of programming and teacher training and guidance.

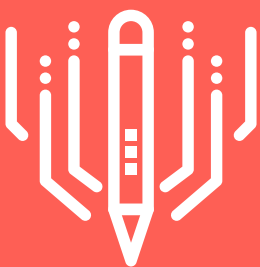
This is crucial to ensure that educational systems meet the needs of society and labour markets, and address digital skills shortages as well as lack of technology uptake.

Retraining school teachers is particularly important, when **less than 40 per cent** of them feel ready to use digital technologies. We must empower them not only to carry on their work during lockdowns, but also to inspire their students in integrating technology in their everyday life and become innovators themselves.

In addition, we should invest in secure technologies to accelerate digital uptake, as well as in modern equipment and high-quality connectivity. Indeed, connecting our schools to high-quality secure broadband and creating the right digital infrastructure will allow teachers to use expanded educational materials, access e-learning, and collaborate from different locations.

These opportunities will also benefit people living in remote rural areas, allowing them to access the best teaching available regardless of their location. It would also allow for the sharing of competences and skills across the EU. Teaching is no longer limited by borders and this could open up a new world of collaboration between educators in different member states.

To this end, collaboration is vital. The private sector, national and local authorities, training and education providers, and NGOs must work together to develop ad-hoc distance learning modules and toolkits for teachers. The digital industry is already helping design forward-looking courses and trainings, as detailed in **case studies in Part II**.



3. Using artificial intelligence to predict the jobs of the future

Good policymaking requires a solid base of evidence and well-developed predictions to inform and guide policy decisions and implementation. Foresight can help improve education and training systems, solve current educational challenges, offer projections of the future trends in employment and analyse the current and future population's skills base.

To begin with, this means mapping out vital skills needs at different levels and for different roles. This mapping should be conducted on a regional basis, to ensure a useful level of detail. Based on this wealth of evidence, we can then define what technology investments and large-scale training facilities are needed to provide those skills across a number of sectors, in both cities and rural areas.

We therefore recommend that the Commission coordinates an AI-powered skills forecasting project covering all Member States. This would look at potential job disruption and the future job markets and be based on methodologies already in place. The method and algorithms can be adapted to each country and sector to take into account different circumstances.

DIGITALEUROPE member **AGORIA**, the Belgian association, have already launched such a project at national level. Their analysis of the Belgian job market predicts that equipping people with the right skills can lead to 268,000 vacancies being filled by 2030.

The project, called **"Be The Change"**, is assessing the impact of digitalisation both in terms of the number of emerging and disappearing jobs and of the evolving skillsets people need to navigate an evolving labour market. The algorithmic model behind the analysis allows to predict the impact of policy and social measures on the shape of Belgian labour market.

More than 80 companies have already signed up to the "Be The Change" charter, pledging to adapt the management of their human resources to the challenges of tomorrow's labour market.

In addition to the study and the pledge, "Be The Change" offers the DigiSkills Passport, a tool providing every individual with insights on the digital skills and the training pathway linked to their unique needs and ambitions.

By 2025, Member States, universities and business should be training specialists for the most in-demand jobs, including: data analysis scientists; AI and machine learning specialists; big data specialists; and digital transformation managers.

By 2025, enterprises in Europe should be providing ICT training to 70 per cent of their employees. Today, only 23.9 per cent of all European enterprises do so.





Digital healthcare

Digital connectivity and tools have been instrumental in providing and expanding vital healthcare during the COVID-19 health crisis. Now is the time to build on and accelerate the digitisation we have started during the pandemic. This will ensure the resilience and preparedness of our healthcare systems for this and future crises, but it will equally address pre-existing challenges and create new opportunities.

The COVID-19 pandemic has exposed the lack of investment in and adoption of digital health solutions in Europe, leaving the potential of health data untapped and making health systems and organisations more vulnerable to crises.

4. Modernising and securing the EU's health systems

It is key for the EU to invest in digital tools and equipment to modernise and secure its health systems. Spending on software, databases and ICT services in healthcare **has been modest** for far too long compared to other sectors. This must change quickly if we want to achieve long-term sustainability, security, accessibility, and resilience in our health systems.

Digitalising hospitals – for instance, by moving to a digital documentation system and integrating data into it – is crucial to enable a systemic approach to mitigate cross-border health threats to the Union. This must go hand in hand with a digital skill programme targeted at healthcare professionals and with appropriate investments in digital equipment for medical facilities. **Up to 70 per cent** of health professionals report not using digital solutions due to gaps in knowledge and skills in data analytics.

The future viability of our health systems will also need digital-savvy doctors, nurses and clinical staff in general.

Strengthening telehealth is also vital to ensure that everyone – especially those in rural areas, vulnerable groups, and the elderly – can benefit from continuity of care, even in times of pandemics and lockdowns.

New technologies – such as AI – will also play an important role in improving diagnostics and treatment. New excellence centres across the EU should partner with healthcare actors to test AI solutions in real operational environments.

By 2025, 60 per cent of EU citizens should use health and care services provided online, following the example of Estonia and Finland where almost 50 per cent of citizens take advantage of such services online. In 2018 for the EU, this figure was a meagre 18 per cent.



5. Harnessing health data to benefit patients and speed up research

By 2025, one in three Member States should offer cross-border access to electronic health records. Today, it is not possible to access your medical records if you cross a border.

Health systems now produce as much as **30 per cent** of the world's stored data. Unfortunately, much of it is paper-based and remains siloed in hospitals and other specific organisations. It is also exposed to data breaches and ransomware attacks with a significant privacy impact on patients and financial impact on our hospitals. As well as a bold legal framework supported by Member States, investment is needed to digitise, connect and secure these disparate data systems.

Investment will also be needed for a pan-European health data infrastructure. Electronic health records are at the core of a patient-centred, interoperable, trust-based Common European Health Data Space that will propel the EU towards new predictive and preventative models of care.

Harnessing health data will also benefit researchers from the public and private sectors, who need quick and safe access to this data to develop treatments and vaccines, as the COVID-19 pandemic has highlighted.

The digital technology for moving to a paperless environment is there, but adoption of electronic health records stands at just **3 per cent** in Europe. Similarly, investment in secure software applications in healthcare is insufficient and trails that of many other sectors.







Digitalising SMEs and scale-ups

As the backbone of the European economy and one of the hardest-hit sectors by the COVID-19 crisis, small and medium-sized enterprises (SMEs) need specific support. The digitisation of SMEs can enable them to move their activities online and maintain operations in case of future lockdowns. As in previous crises, those companies that could adapt their business swiftly with the help of secure digital technologies are the most likely to survive. Streamlining processes and moving away from paper can also save costs and help businesses to expand.

6. Boosting SME growth and cross-border trade through a Europe-wide e-Administration Portal

Excessive paperwork is a huge problem for smaller and medium-sized companies. Manually entering receipts into the accounts system, filling out invoices and reporting to authorities are arduous and time-consuming tasks and stop smaller businesses from being more productive.

Only 8.4 per cent of the European SMEs trade across one European border, which shows that the Single Market is still underdeveloped. The majority of administrative tasks in the logistics sector are still done on paper. This is because national administrations are not equipped for digital transactions and the different systems that do exist are not interoperable.

Europe already has a standard for electronic invoice. The next logical step is to launch a project for a wholly digital economy for business data. This would allow real-time information about cashflow and could automatise reporting to authorities and creditors.

We propose a Europe-wide e-administration portal to ensure that smaller businesses can take advantage of new technologies and free up resources to drive their businesses forward.

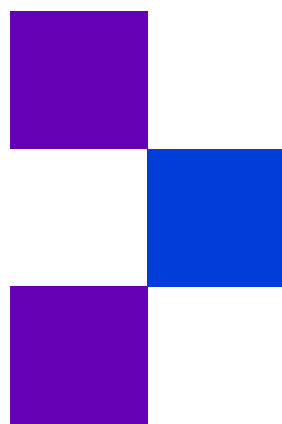
This can be done by defining a standard for electronic receipts and by investing into structures for conveying structural economic information. This information forms a basis for automated collection of taxes and dramatically reduces the administrative burden both on the public sector and on companies. Datasets gathered from electronic receipts are also very valuable and could form the basis for new kinds of economic services.

A similar initiative is already being piloted in the Nordic Countries under the **Nordic Smart Government (NSG)** project. Upgrading this to cover the whole continent would strengthen the European Single Market and help companies gain millions in productivity.

Standardised structured financial information and the relevant sharing infrastructure will especially help cross-border trade and operations of SME companies. According to the NSG evaluation, two million Nordic SMEs could save €500 million by 2025, by switching to completely digitalised business information and administration.

By 2025, 75 per cent of EU citizens should be using eGovernment services, compared to the current 56 per cent.

By 2025, 30 per cent of SMEs should trade across more than one European border – at the moment only 8.4 per cent do so.



7. Unlocking open public data to empower scale-ups

By 2025, 50 per cent of SMEs should be using big data analytics. At the moment, only 12 per cent do so.

By 2025, Europe should be home to 25 per cent of the world's unicorns. In 2017 we were home to just 11.6 per cent (and nearly half of them are based in the UK), far behind the US and China.

Open public data has huge potential to transform sectors across our whole economy: from energy production and consumption, to transport and mobility, to water and waste management, to agriculture.

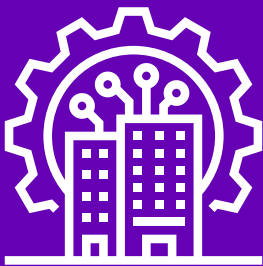
Today it is primarily larger companies that have the resources to most benefit from data. Harnessing data can be a gamechanger for smaller companies looking to grow quickly and be the next European unicorns. Areas as diverse as transport, farming and retail could see **15.7 per cent** growth if they use open data.

Back in 2003, the European Union made its first strides towards releasing the potential of the huge quantities of data held by public institutions; this became in 2013 the Open Data Directive, complemented today with the EU Data Portal, a great resource acting as a repository for all this information.

Furthermore, over **one million Europeans** are already employed in generating, providing, aggregating, re-using, and enriching open data. This could rise to two million within five years – and only covers those directly employed.

But we've barely scratched the surface of what releasing public data can achieve. Much of it is still trapped in siloes across different institutions, sometimes unreadable or in the wrong formats. To make European data spaces a reality, we first need data that is rightly labelled, annotated, and interoperable – meaning that it is easily comprehensible to all researchers and companies from across Europe, no matter their size.

EU funds from national recovery and resilience funds, as well as the Digital Europe programme, could be spent on giving public authorities the resources they need to make their data usable and secure at EU level. This will boost scalability and growth for hundreds of thousands of SMEs and scale-ups.



Open data for smarter, greener cities

Use of data and data-driven technologies offers a powerful solution to manage essential resources such as energy and water: that's why all urban planning should be "smart", i.e., leverage data to make traditional networks, infrastructure and services more efficient. In 2050, two-thirds of the world population will live in towns, consuming over 70 per cent of energy and emitting roughly the same proportion of greenhouse gases. As city populations grow, demand for services but also pressure on resources will increase.





Digital transformation, innovation, and the Green Deal

Digital has enormous enabling potential to facilitate the EU's transition to a low carbon circular economy. According to a recent study, digital technologies have the potential to enable a 20 per cent reduction of global CO₂ emissions by 2030, in particular in traditional sectors like energy, transport, construction, agriculture and manufacturing. That is ten times more than we produce as a sector.

Policymakers should mainstream digital in public investments, such as in cities and infrastructure, to support innovation and the transition to a more productive and sustainable economy. For instance, investments from public authorities in transport and urban planning should also be "smart" – i.e. digitalised.

One way to encourage industry-wide change would be a public-private partnership aimed at establishing a "digital lighthouse factory" in every traditional industry sector, from cement production to electronics manufacturing. Such a real-life, entirely digitised production site would not only demonstrate the potential of existing, commercially available technologies; it should also serve as vocational training centres and as research sites for academic and private partners, in particular start-ups, to learn and replicate innovative production methods.

8. A digital "Renovation Wave" and a modernised construction sector

One particular sector that will greatly benefit from digital investments is the construction sector, as acknowledged by the Commission in its "Renovation Wave", which aims to upgrade Europe's buildings with digital energy-saving solutions.

On average, people spend 80 per cent of their lives inside a building. Construction is an essential sector, yet it requires substantial spending to fabricate, maintain and renovate buildings. Digital technologies such as the Internet of Things (IoT) and AI will radically change the way we monitor and manage our building stock.

The construction sector is also a pillar of the EU economy. It provides 18 million direct jobs and contributes to about 9 per cent of the EU's GDP. Yet buildings generate about 40 per cent of the EU's energy consumption and 36 per cent of its greenhouse gas emissions.

Around three quarters of greenhouse gases emitted by buildings are caused by their heating and cooling systems. The main reason for this large carbon footprint is that the energy performance of our buildings remains far too low.

Newer buildings must be constructed according to minimum requirements, but older buildings still represent the majority of the building stock. There is therefore huge potential to reduce emissions, create comfortable and healthy living spaces, and improve citizens' quality of life by digitally upgrading the existing stock of buildings.

Through a network of sensors, smart meters, edge computing and energy management systems, management of heating, cooling and ventilation systems can be optimised to ensure maximum efficiency. Similar projects have seen reductions of energy needs of over 15 per cent, as well as improving quality of life for citizens (see, for example, Panasonic's "Future Living Berlin" and Schneider Electric's smart warehouse).

The public sector must lead by example. Many Member States have not yet presented their long-term renovation strategies under the revised Energy Performance of Buildings Directive. While required budgets will be large, there is great potential for the mobilisation of private investments.

By 2025, Europe should have saved 26 billion tonnes of CO₂ emissions by digitalising resource-intensive sectors. According to estimates, 15.8 billion tonnes can be saved from the electricity sector, 9.9 billion tonnes from the logistics sector, and 540 million tonnes from the automotive sector alone.

By 2025, 15 per cent of all the material used in the economy should be recovered and re-used. Today it is only the case for 11.7 per cent.

The Recovery Fund will be instrumental in allocating extra spending to retrofit older, publicly-owned buildings such as social housing, schools, hospitals and town halls. Digital public-private partnerships should be a key pillar in such renovation strategies.

Beyond the environmental benefits, these investments will create jobs for a wide range of skilled workers, from architects, designers, installers, construction workers to data engineers and other technicians, both in cities and rural areas.

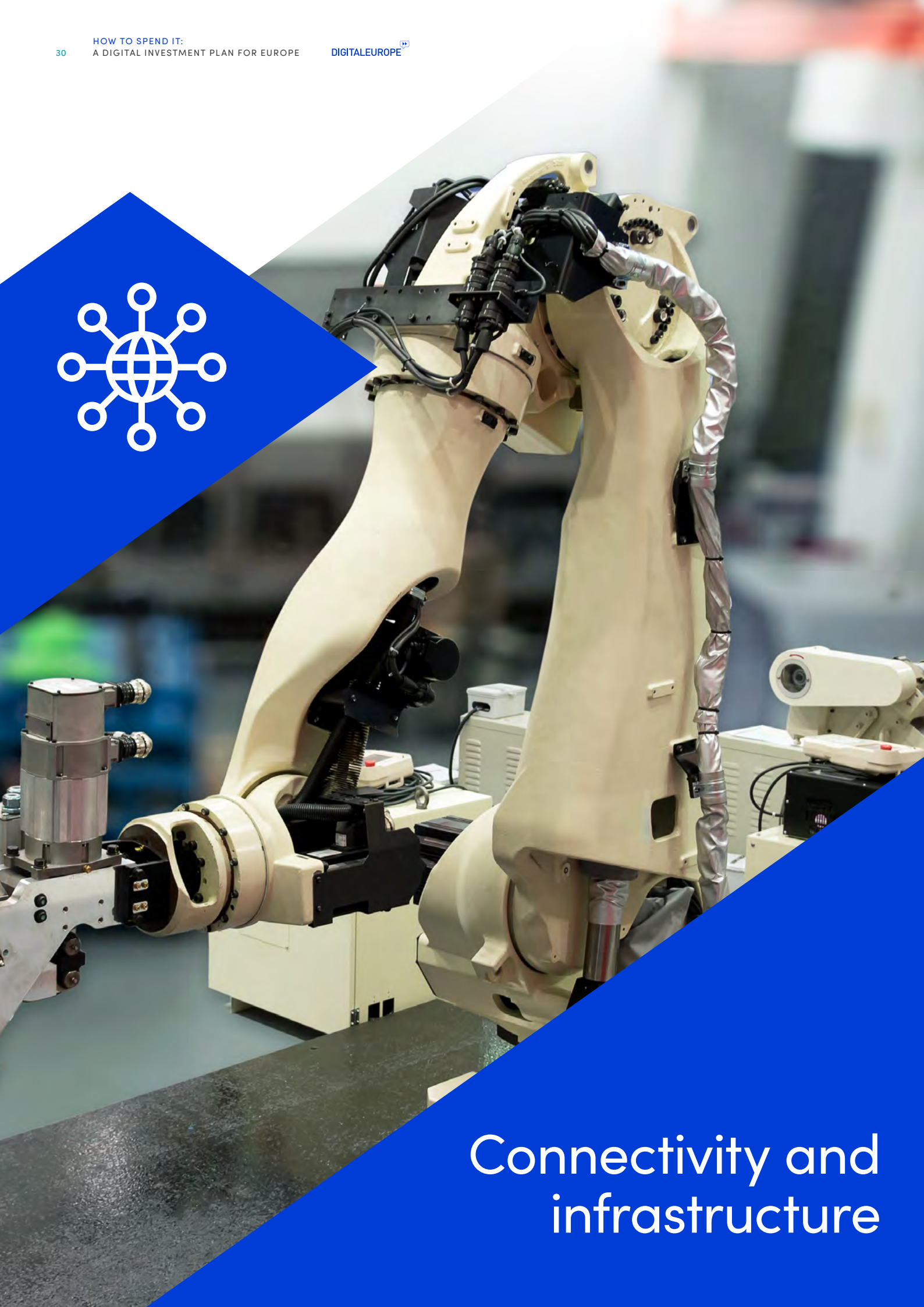
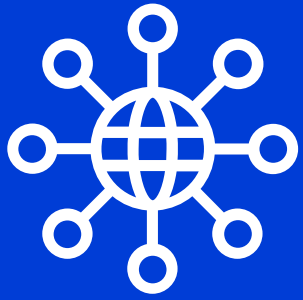
Digitally upgrading buildings will also save money for national and local authorities in the long-term thanks to lower energy bills. **Studies** also suggest that public investments in “deep renovations” of this kind could trigger three to four times as much investment from the private sector.

Why stop at renovation?

Construction is the least digitised sector in the EU, and we are lagging behind North America in the adoption of digital building techniques. When constructing new buildings, investments should be made in Building Information Modelling (BIM) and digital building twins (i.e., a real-time digital representation of a building or infrastructure). For instance, DIGITALEUROPE member Siemens is successfully using BIM to first develop a building virtually, with physical construction only beginning after all expectations and specifications are met.







Connectivity and infrastructure

Given the unprecedented transition to mass home working, living and leisure, the quality of connectivity will be more critical than ever. Connectivity will also enable strategic digital technologies like AI and IoT and will allow European companies to grow so that they can come out of the crisis stronger.

We need to ensure Europe has the right overall connectivity mix (submarine networks, fibre, 5G) capable of delivering what is required in terms of coverage, capacity, speed, latency, reliability, redundancy, and security to enable a modern and inclusive society to function properly, increase its potential in terms of value creation and competitiveness, also in challenging times of crisis.

9. Bridging the urban–rural digital divide

All countries continue to have a significant urban–rural digital divide, mainly due to the higher cost and risk associated with network deployment in less dense areas. As pointed out by Commission President Ursula von der Leyen in her **State of the Union** speech, 40 per cent of people in rural areas still do not have access to fast broadband connections.

The crisis has shown that bridging this digital divide is a societal imperative, essential for the socio-economic empowerment of citizens and businesses residing outside of the large metropolitan areas.

The EU and Member States need to increase funding for available and affordable high-quality network infrastructure, such as fibre and 5G, in areas where the market conditions are such that private investments will not be able to deliver such networks on their own. Most countries today already have some level of public funds available for broadband deployment projects in rural areas, but these funding levels remain significantly lower than those for other key infrastructures such as roads.

This distribution of resources should be rebalanced.

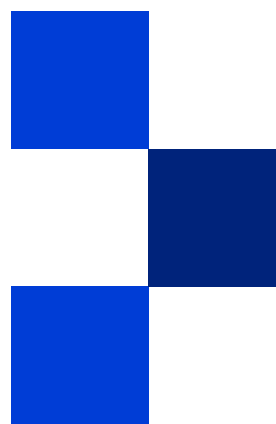
As remote access to corporate or public sector networks requires new cybersecurity solutions, all investments should include appropriate security measures integrated across all cloud, endpoint, and traditional network environments.

The COVID-19 crisis has demonstrated that the increase of remote work – both in the private and the public sector – has made our society more vulnerable to cyber attacks.

This exposed the need for significant investments in security of institutions like hospitals, at the frontline of the pandemic and frequent victims of such attacks. Addressing this underinvestment in critical functions of our societies must be a top priority for the EU and the Member States.

By 2025, 70 per cent of European households should have a broadband connection with 100 Mbps or more. Today, only one out of three does.

By 2025, all large European enterprises should have a clear cybersecurity strategy, with an additional 20 per cent of SMEs implementing cybersecurity strategies compared with today.



10. Boosting growth in traditional sectors through 5G connectivity

By 2025, 5G connections should cover at least 200 million users.

High-speed 5G connectivity will be critical to enable smart factories, where wireless communications and industrial IoT are transforming manufacturing through hybrid cyber-physical systems.

In a smart factory, almost every asset is connected: this allows a more efficient production system through a range of advantages, from machinery monitoring for predictive maintenance and remote-control to real-time supply chain visibility. 5G is particularly suitable to this environment due to its low latency, high reliability for remote control of processes, and high bandwidth enabling high-volume data traffic for surveillance and monitoring of machinery.

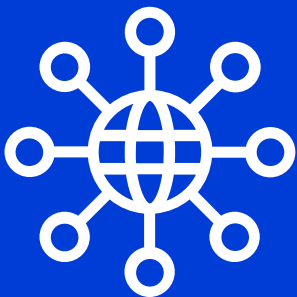
There are also social and environmental benefits to be considered, such as increased security and safety thanks to remote control and a reduction in energy and material consumption.

A study by DIGITALEUROPE members Ericsson and Qualcomm has estimated that an investment of €12 billion in accelerating the 5G uptake for smart production would add €70 billion to the EU GDP.

Smart manufacturing is just one area where digital technologies can have a positive impact. Another example is in agriculture, where the same study found that by transforming the sector through digital technologies and 5G connectivity, we could increase EU GDP by €45 billion.

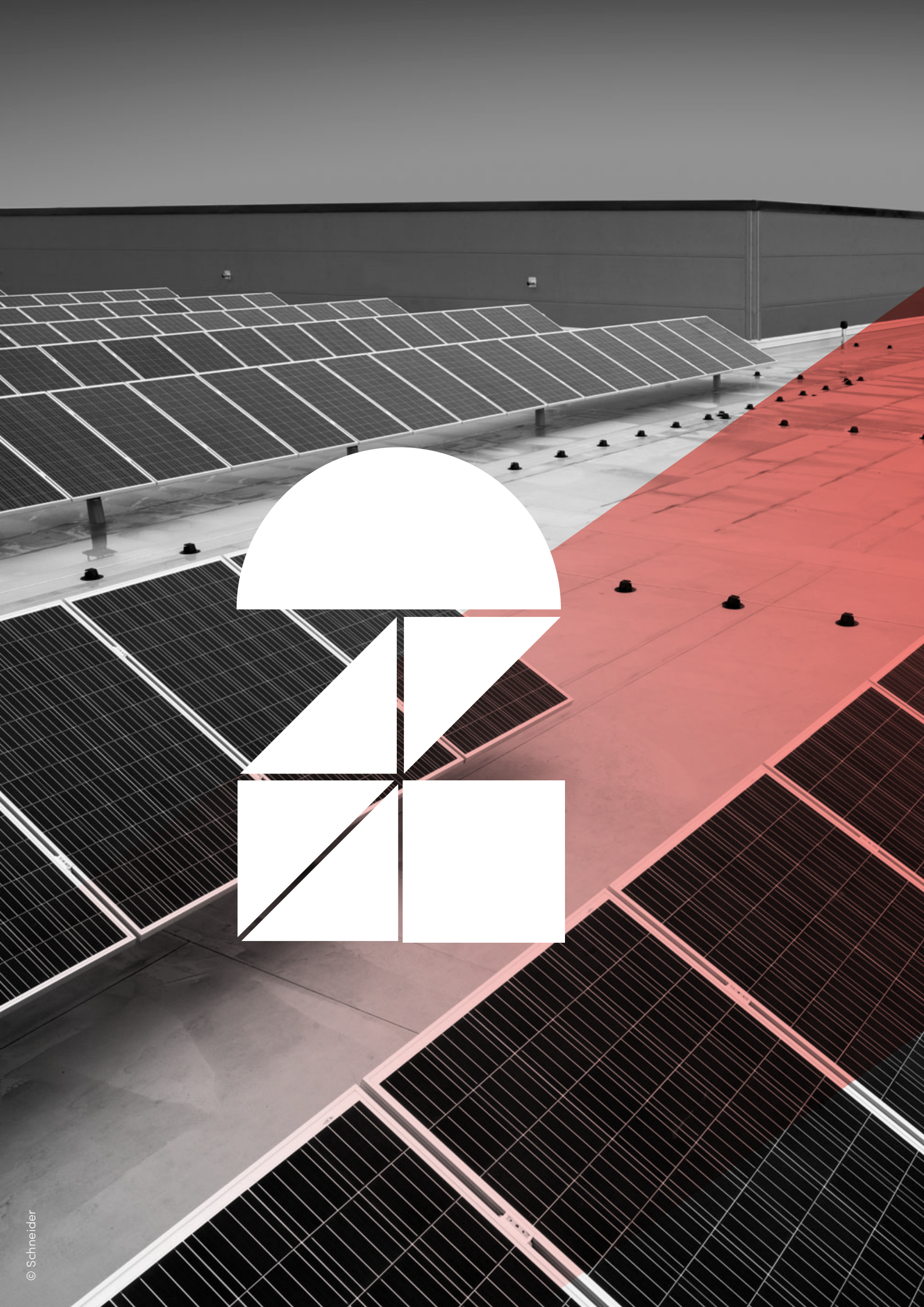
Establishing sensor networks for crops and livestock, for instance, will greatly improve pest detection and moisture level monitoring. Bringing a higher degree of connectivity into the field will also allow untethered surveillance drones and more efficient autonomous agriculture machinery. This has important consequences for the sector's environmental footprint, as it will reduce carbon emissions as well as waste and product use through greater efficiency and less land use.

A more digital and connected agriculture sector will also help support rural and remote areas, boosting local industries including fishing, tourism and farming, and helping rural producers market their products beyond their immediate surroundings by using e-commerce platforms.



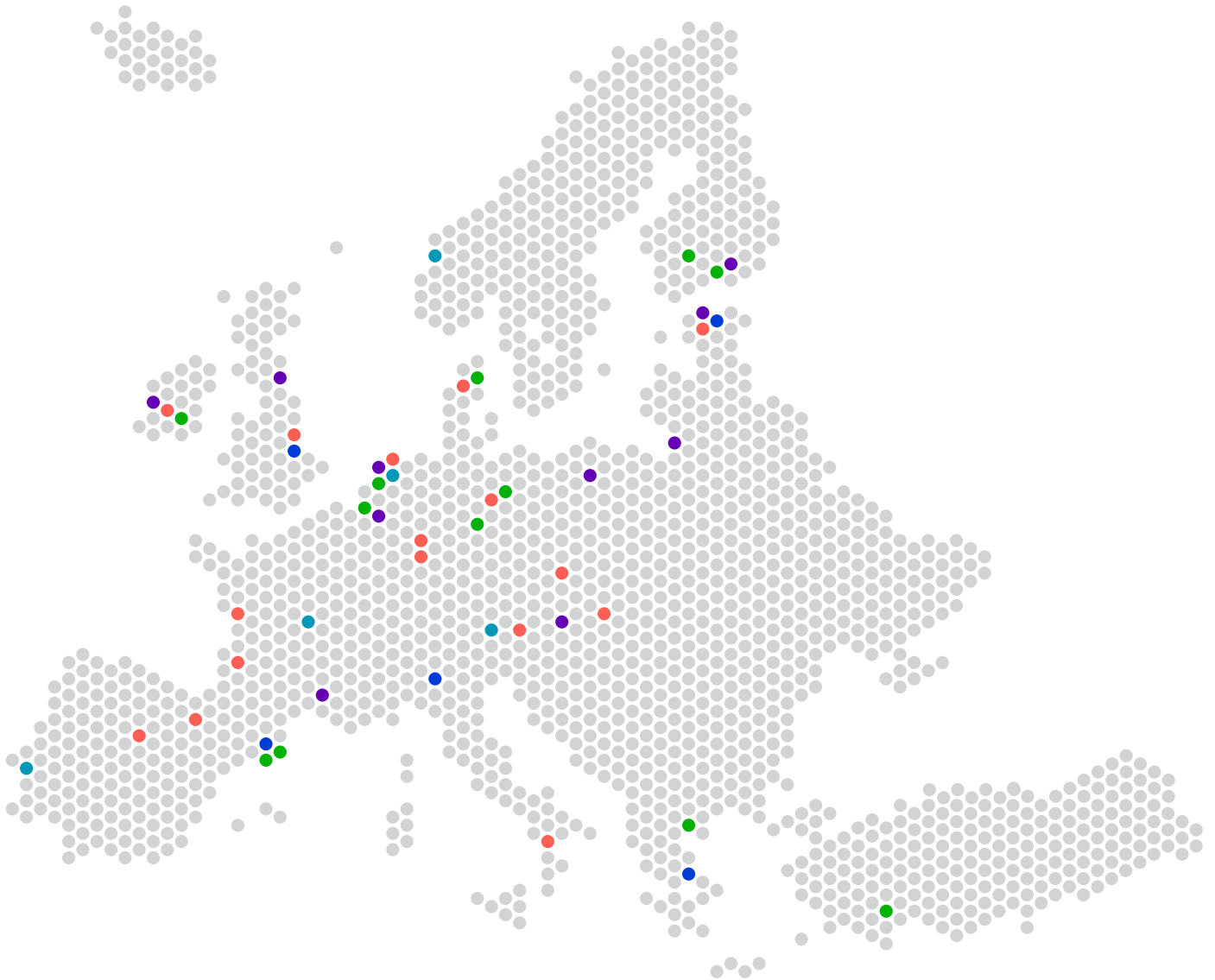
There are also social and environmental benefits to be considered, such as increased security and safety thanks to remote control and a reduction in energy and material consumption.





CASE STUDIES







Digital education, skills and inclusion



Learning digital skills to re-enter the workforce

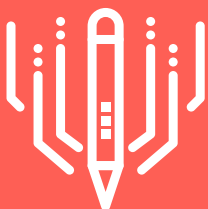
The People2Work programme provides SAP training in both digital and soft skills to job seekers, unemployed or underemployed people, looking to re-enter the workforce.

This funded programme provides job seekers with certified skills in SAP software, opening up new opportunities for them to find skilled work (i.e. consultant, end-users such as accountants, HR professionals). It also helps to boost digital skills in the labour market and European industry to find talent and grow the business in Europe.

The programme has a proven impact on jobs and growth. In Germany, for example, it has created measurable social impact since its start over 20 years ago, with 80 per cent placement rates. In 2019, 21,000 students were trained, and 14,000 students received SAP software certification. People2Work is particularly useful as it includes the tracking of participants' success rate in employment records.

The programme has a high potential for scalability: it has been so far rolled out in Germany, Denmark, and France, with plans to expand to Spain and Greece. The ambition is to scale it across the European Union and to the wider Europe, Middle East and Africa region.

DIGITALEUROPE member - **SAP**



Creating new opportunities for engineers in connected and electrified driving

European industry and especially the automotive sector face disruptive changes in the next decade. On the one hand, new business opportunities are arising through digital services and expanding electrification and automation technologies. On the other hand, traditional parts of the business are declining or are undergoing a major transformation.

This shift opens up possibilities of new career profiles building on digital skills. Re-training programmes, such as the one Bosch is implementing, will allow companies to prepare for this transition and to help the workforce secure high-quality, well-paid jobs.

To counter the recent decline in diesel business, Bosch has launched a pilot programme called "Mission to move", which focuses on the "shift to software" as its re-training target. Since 2018, the programme has already successfully

re-qualified and transferred over 170 associates to new positions in the areas of electrification and connected solutions.

The programme has a unique flexible approach of combining theory from e-Universities with practical exercises that prepare the candidates for specific positions. It is organised in different modules, allowing a flexible timing and learning pathway depending on the existing qualifications and the needs of the new position.

All these characteristics make it easy to scale and suitable to smaller suppliers too, as well as providing a well-grounded educational model for other manufacturers. Future plans include expanding the programme to other areas, such as data science, data engineering and AI.

DIGITALEUROPE member - **Bosch**





Reskilling young job seekers in crisis-hit regions

Since the beginning of the COVID-19 crisis in Spain, approximately 900,000 people have lost their jobs, including about 550,000 temporary workers. Spain's official unemployment figure rose to 3.5 million.

As part of a reaction to the crisis, **Amazon Web Services (AWS)** is working with technology cluster IDiA in the Aragon region to provide digital skills training for young (under 30) unemployed people to increase their employment opportunities in the ICT sector.

Through ad-hoc intensive virtual Instructor-Led Training provided in Spanish, students develop highly sought-after cloud computing skills paired with industry-led certification. Furthermore, with all training activities being provided remotely, the course was able to be rolled out rapidly, even during the lockdown.

Participants in the programme will have the chance to access Aragonese tech companies in the IDiA cluster who require ICT professionals. The Aragonese Employment Agency funds the programme.

DIGITALEUROPE member - **Amazon**

Excellence in e-learning with the digital transformation of universities



Keeping pace with technology is critical for any higher education establishment wanting to attract students and achieve academic success. Integrated solutions with computers and tablets for faculty and staff, projectors, digital whiteboards, classroom audio solutions, digital signage and professional AV equipment can help reach new standards in terms of teaching, learning and the overall student experience. This is particularly important to provide high-quality remote education.

With new COVID-related restrictions, universities are looking to create a connected learning environment to meet the needs of remote students. Clearly, students need more than a recording of a lecture: the whole approach we have to teaching needs to change, including new ways for professors to interact with students and new opportunities to track their learning progress.

The implementation of a so-called “lecture capture system”, alongside video conferencing and audio-visual solutions, creates a flexible teaching space that radically improves the learning experience. Such a solution has already been designed for and deployed at the Otto Beisheim School of Management in Germany and in more than 50 leading universities all over Europe. Panasonic is supporting this roll-out through proof of concepts studies.

EU funding targeted at modernising equipment and digitising teaching systems would greatly benefit universities and schools across Europe. This will result in a shift towards new, innovative learning models and to more inclusive education systems, open to students from abroad and remote areas alike.

DIGITALEUROPE MEMBER - **Panasonic**





Spain's "Connected Schools" programme

Spain's "Connected Schools" programme ("Escuelas Conectadas") aims to bring ultrafast connectivity to more than 6.5 million students and more than 16,500 schools, enabling those schools to offer new and improved teaching materials and methods. The programme was established prior to the COVID-19 pandemic, and it has become all the more relevant as we move towards hybrid learning models in the effort to ensure resiliency and readiness in the face of future crises.

The Spanish "Connected Schools" programme is also an excellent example of how European countries can make best use of EU funds for regional and economic development.

The 330 million euro programme is in fact co-financed through the European Regional Development Fund (ERDF) and would be an excellent candidate for a project under the Recovery and Resilience Facility.

EU-managed funds, such as the Connecting Europe Facility Digital, have great potential in improving schools' connectivity and digital infrastructure: for example, the WiFi4EU initiative could be expanded to cover in-school connectivity. This, combined with good use of decentralised development funds, will enable Member States to fully bring their education systems into the digital era.

DIGITALEUROPE member - **Cisco**



Rolling out cloud computing skills across Europe

AWS re/Start is a full-time, classroom-based skills development and job training programme that prepares individuals for entry-level cloud positions. AWS re/Start works with non-profit, philanthropic, and government organizations to deliver a learning experience that provides a pathway to earning AWS Certification, and supports participants as they launch their cloud careers.

The program's mission is to build local talent by providing AWS Cloud skills development to individuals who are unemployed or underemployed—and otherwise might not have access to this path.

AWS re/Start prepares learners for entry-level cloud roles, such as cloud operations, site reliability, infrastructure support, and technical adjacent business support functions. Each cohort of learners, supported by professional mentors and accredited trainers, completes a 12-week training featuring real-world scenario-based learning, hands-on labs, and coursework.

AWS re/Start also provides learners with resume and interview coaching to prepare for employer meetings and interviews to launch an entry-level cloud career, and it connects alumni with potential employers.

The AWS re/Start project is helping to close the ICT skills gap, equipping young people and job seekers with extremely valuable and sought-after cloud skills, and helping them enter one of the fastest-growing parts of the tech sector.

Training content for the AWS re/Start program is curated by AWS in collaboration with local organisations. re/Start has been running **in London** (co-funded with European Social Fund and Power Up), **in Paris** and **in Amsterdam**.

DIGITALEUROPE member - **Amazon**





Ensuring graduates have the ICT skills that employers need

Many of DIGITALEUROPE members offer a range of skills-related courses which dovetail with government-funded or supported curricula. However, given the pace of digital change, bridging the gap between academia and industry is vital to equip students leaving university with skillsets that are immediately usable in the labour market.

The Red Hat Academy is an academic programme providing an open source curriculum at no costs for students. University ICT professors deliver these market-related courses which have a high component of lab exercises (between 30 and 40 per cent of the content).

The courses can either be set up in the classroom or accessed remotely via a cloud environment.

This is extremely relevant in light of COVID-19 restrictions, where more and more ICT classes are delivered virtually by professors, which often requires accessing labs via cloud. Upgrading universities' digital infrastructure goes hand in hand with modernising curricula, and regional funds for education will play a big role in that.

DIGITALEUROPE member - **Red Hat**



Supporting women reinvent their careers in the digital sector



Companies are increasingly understanding the value of hiring women and having a multi-generational and gender balanced workforce which better reflects a diverse customer base.

At the same time, there are still significant barriers for experienced, qualified, and skilled women to join or re-join the digital sector after a career break. Up to 70 per cent of female ICT workers can take a career break when their families are young. By not supporting these women retrain and adapt to new workplaces, Europe is missing out on an extraordinary opportunity to increase inclusivity and alleviate ICT skills shortages.

Over the last four years, DIGITALEUROPE member Technology Ireland has implemented a range of initiatives to support women return to work, in partnership with Skillnet Ireland. Each project is tailored to a specific segment of women, taking into account their background and competences, but they share the overall goal: helping women with past work experience and graduate or postgraduate qualifications enter or re-enter the sector. This enables companies to fill open roles with a diverse and unique set of competencies, improve the generational and gender profile of their workforce, and drive innovation through a new set of perspectives.

Average participants are in their forties and have been out of the workplace for some time (typically around eight years, but it can be up to 23 years). That means that while they do not possess up-to-date digital skills, they bring a suite of strong competencies and knowledge that, through coaching, mentoring and digital skills training, they can rapidly adapt to a new workplace.

All programmes are sponsored by companies in the digital industry, who are actively involved throughout all implementation stages, from selection, to

programme delivery, to work placements – which often lead them to hire them the alumni.

“Women ReBOOT” is a programme for women with ICT skills, experience and qualifications, who have taken a career break and are now trying to re-enter the sector. The initiative equips participants with an understanding of the evolution of job roles, business models and sectoral trends, so that they can successfully adapt their existing experience and knowledge to new workplace contexts. To date, over 150 women have been supported to re-enter the digital sector and continue successful careers. The project is sponsored by over 40 leading tech and financial services companies throughout Ireland.

“Women TechStart” retrains women from different backgrounds who have a range of professional skills, qualifications and experience, and who want to retrain for the tech and digital sectors. Its programmes focus on intensive technical skills training for a number of in-demand roles and have been joined by 69 participants so far. The initiative is supported by Dell, VMware and McAfee.

Finally, “Women TechLEARN” aims to help women kick-start their digital career by offering beginner digital learning programmes. So far, 50 women have taken part in its online training and coaching, in association with the tech skills platform Pluralsight.

These projects are helping shift standard recruitment practices towards a new hiring environment open to women and people from diverse backgrounds. They also have an extraordinary employment rate, with 97 per cent of “Women ReBOOT” and “Women TechStart” alumni being hired within six months after the programme.

DIGITALEUROPE member
- **Technology Ireland**

Digital healthcare



Improving the continuity of care by digitising patient information

In Austria, the roll out for the nationwide Electronic Health Record (ELGA) started five years ago, in 2015. Today, work is already underway on the implementation of valuable extensions, such as the eVaccination pass or care networks as part of ELGA.

As a modern and secure infrastructure, ELGA is available to all citizens and all those who receive care in the Austrian health care system. It facilitates access to health data for patients and authorized ELGA health service providers - attending physicians, hospitals, nursing homes or pharmacies.

An important goal of ELGA is especially the support of medical, nursing and therapeutic treatment and care through a better flow of information, especially when several health care institutions or professional groups work together along a treatment chain.

ELGA is working with different models of opt-out, leading to a general coverage of 97 per cent of the insured population as enrolled ELGA users.

DIGITALEUROPE member
- **Siemens Healthineers**

Why stop at health records?

Our Austrian member [Internet Offensive](#) proposes to go beyond electronic health records by implementing a “Digital Healthcare Platform”. The aim is to help citizens organise every aspect of their healthcare online. Such a platform will bring citizens and healthcare providers together in a secure manner, be easily accessible by smartphone, and improve user experience through the healthcare system with predefined “health pathways”, for example for the birth of a child.



Accessing healthcare from the comfort of your own home

In COVID times, easing the burden on hospitals has been a central public policy objective. Patients were discouraged from coming to hospitals except in urgent circumstances. 'Telehealth' technologies have helped provide care in the meantime, either through consultations with medical professionals or by monitoring ongoing health conditions.

Remote patient monitoring is enabling patients to monitor their own condition with support from healthcare personnel. The monitoring is done by measuring vital signs (like oxygen saturation, blood pressure, body weight, glucose etc.) and answering questionnaires relevant to the patient's condition. Measurements and

questions can trigger alarms that are followed up by healthcare personnel. It is documented that participating patients are more involved in their own care, they exercise more, use less welfare services and have reduced the number of hospital admissions.

In a report on telehealth, staff spend 75 per cent less time on patient monitoring and the number of inpatient days for women with pregnancy complications has been reduced by 44 per cent.

DIGITALEUROPE member
- **Siemens Healthineers**



COVID-19 patient data sharing between hospitals

To fight the COVID-19 pandemic, the Netherlands has developed an online portal allowing Dutch hospitals to share patient information seamlessly. The project was the result of a cooperation between the Erasmus Medical Center in Rotterdam, the Jeroen Bosch Hospital ('s-Hertogenbosch) and the Dutch Ministry of Health.

During a pandemic, being able to share patient data between hospitals in real time is essential to optimising the use of healthcare resources. It can assist, for instance, in transferring infected patients between hospitals to avoid local overload in intensive care units.

The portal is available to all Dutch hospitals. Since its launch in March 2020, 95 per cent of them have connected to the portal to digitally exchange COVID-19 patient data.

DIGITALEUROPE member - **Philips**





Decongesting hospitals by telemonitoring COVID-19 patients

In countries like France, the COVID-19 crisis and the subsequent lockdown period raised two major challenges for healthcare and governmental institutions. First, there was an urgent need to maintain containment measures, in order to decongest hospitals and let them focus on high-risk patients, while allowing remote detection of serious cases. Second, data had to be collected in order to monitor the spread of the virus and detect outbreaks.

In March 2020, French digital health start-up *Nouvéal* and *AP-HP* – the Paris area’s university hospital – co-developed *Covidom*, a digital solution addressing both of those needs. It consists in a telemonitoring app for patients that have contracted the virus (or are suspected to) but do not require hospitalisation. During a first consultation, the doctor creates the patient’s profile and provides key medical and administrative data. Then, the patient is asked to answer a simple

questionnaire on a daily basis, from a web portal or a smartphone. In case of acute symptoms, an automatic alert is sent to a general practitioner (GP) or an emergency room (ER) team, who will get in touch with the patient to provide adequate solutions and follow-up care.

As a result, patients presenting light symptoms can be monitored efficiently, without overcrowding hospitals and GPs.

In April 2020, thanks to the joint support of *Janssen* (pharmaceutical companies of DIGITALEUROPE member *Johnson & Johnson*), *Novo Nordisk*, *La Poste*, and *Malakoff Humanis*, the solution was made available free of charge to all of metropolitan France’s hospitals, private GPs and nurses. To date, more than 23,000 healthcare professionals and 110,000 patients have been using the application.

DIGITALEUROPE member
- *Janssen* (pharmaceutical companies of **Johnson & Johnson**)





Providing each citizen with personalized, digital guidance on COVID-19

How to provide each citizen with adequate guidance regarding their personal COVID-19 situation without overwhelming hospitals? Another digital solution was developed since the beginning of lockdown by Pasteur Institute and AP-HP through the website maladiecoronavirus.fr, with the financial support of Johnson & Johnson and other leading industry partners.

This website allows anyone who suspects they may have been exposed to COVID-19 to conduct a self-assessment in just a few clicks and benefit from personalised recommendations adapted to their state of health. This is possible through an algorithm that was approved and supported by the French Ministry of Health.

The website was released as early as 16 March, and has gathered more than 10 million visitors to date. Statistical studies conducted in the Paris area show that it managed to reduce the number of calls to the French ER hotline by a factor of 8.

With more than 5.5 million questionnaires completed, the website also forms one of the biggest pool of structured epidemiological data in the world, covering all phases of the pandemic. Using this information, researchers were able to validate anosmia (the loss of the sense of smell) as one of the disease's symptoms, and to create a number of predictive models. It also helped detect several clusters within the French territory. The data is currently being used in research studies at the Pasteur Institute, which already led to four international scientific publications.

The platform is still active today, helping monitor the virus progression after the end of lockdowns and anticipating future outbreaks.

DIGITALEUROPE member
- Janssen (pharmaceutical companies of [Johnson & Johnson](https://www.jnj.com))





Hospitals' digital maturity improves clinical outcomes and patient care

Portugal's Cascais hospital, managed in a private-public partnership by Lusíadas, is one of only six hospitals in Europe to have achieved Stage 7 validation by Healthcare Information and Management Systems Society (HIMSS) for advancing health and wellness through information and technology.

Lusíadas worked with local vendors who built a unique solution based on feedback by the Cascais clinical staff. The hospital created new roles to act as champions in introducing technology to staff and building digital skills internally: Chief Medical Information Officer, Chief Nurse Information Officer, and Chief Pharmacy Information Officer.

The Cascais hospital has a strong tradition of clinical leadership, and reaching the highest level of digital maturity in infrastructure, analytics, coordination of care and clinical documentation has further improved clinical outcomes and patient care.

The journey started with the transformation of the pharmacy framework and introduction of barcode enablement for all drugs and medical devices. This simplified drug administration to patients saving nurses two hours per shift, prevented over 5,000 near-misses, and improved patient satisfaction (NPS - Net Promoter Score) from 37 to 69.

Today, the Cascais hospital is a totally paperless hospital, using electronic health records and clinical algorithms based on historical data and best practices to triage patients, automate clinical order sets, and fast-track procedures. For example, the electronic fast-track programme for a broken hip has reduced door-to-surgery time for patients by more than 50 per cent, decreased their in-hospital mortality rate from 8 per cent to 0.2 per cent, and reduced the length of their stay in hospital.

Due to its track record, the Cascais hospital has been asked to mentor Global Digital Exemplar hospitals in the UK.

DIGITALEUROPE member
- **UnitedHealth Group** (Lusíadas)





Digitising SMEs and scale-ups



An interoperable system for SMEs to exchange paperless logistics information

In the European logistics sector, many large companies have already digitised their internal processes, but many SMEs have yet to do so. Around 99 per cent of cross-border transport operations in the EU still involve paper documents. Many SMEs stick to paper as national authorities still do not accept electronic versions, in addition to the lack of universally agreed rules and the technical means for SMEs to exchange information electronically. Given that SMEs form the backbone of the European economy, this puts us at a tremendous competitive disadvantage.

In 2019, public and industry partners in the Baltic-Nordic region committed to the digitalisation of cross-border road freight transportation, aiming to accelerate the move from paper to the e-version of cross-border road consignment note. This project will enable businesses to optimise processes and integrate activities into a common network of information systems.

While the initiative aims to stimulate the digital economy and accelerate the creation of a Digital Single Market in the Baltic-Nordic region, it has great potential to be scaled at the pan-European level.

An interoperable European-wide system for the exchange of electronic freight transportation information would use existing building blocks – blockchain, eDelivery and electronic IDentification, Authentication and trust Services (eIDAS) – from the Connecting Europe Facility. Additional financial grants would help SMEs implement the system and retrain staff to acquire the technical know-how.

Digitisation will enable businesses to manage their information and supply chain more effectively, optimise their processes, improve the data quality and reduce the risk of recurring errors. It could create savings worth **€20-27 billion** by 2040 thanks to the reduction in administrative costs.

In the COVID-19 context, paperless logistics operations also ensure more safety and physical distancing. For public authorities, it will reduce time spent manually checking freight papers and help combat offences related to tax avoidance and transport safety.

Moving to electronic logistics information will also reduce CO₂ emissions by **1.3 million tonnes** by 2040. With an average of one to five copies of each document per shipment, about two to eight billion sheets of paper would be saved – the equivalent of between 180,000 and 900,000 trees annually.

DIGITALEUROPE members
- **INFOBALT** (Lithuania), **ITL** (Estonia) and **KIGEIT** (Poland).



Digital signing services for SMEs

Not all business processes are sufficiently digitised today, even if the technology has already been available for a long time. And those SMEs that are less digitised are being hit harder by the COVID-19 crisis.

The use of digital signatures has become even more vital in a COVID-19 scenario when in-person signing is not always practicable. Digital signatures are a trustworthy and safe method to ensure physical distancing and avoid transactions being delayed or cancelled due to lockdowns.

The Zetes digital signing platform facilitates a signed agreement between merchant and consumer, maintaining each parties' rights. The consumer can sign from home at any moment. This platform identifies the consumer remotely in a unique and unambiguous way, in line with the eIDAS EU910/14 Regulation.

This leaves no doubt as to the identity of the signer or the legal validity of the signature placed. The platform also ensures the authenticity and integrity of the content.

Digital signing platforms allow SMEs not only to benefit from digital transformation, but also offer a perfect springboard for cross-border trade. EU funding will be vital in providing direct financial support for SMEs that adopt such a signing platform.

This service also has the potential to be complemented by the adoption of a notified digital identity with a link to a cloud-based signing certificate available for every citizen of an EU Member State. The latter would improve the confidence and ease of digital transactions online and support the growing importance of mobile devices.

DIGITALEUROPE member
- **Panasonic** (Zetes)





Supporting women-owned SMEs scale their businesses through the power of technology, access to capital and networking

Since 2010, the Dell Women's Entrepreneur Network (DWEN) has empowered female entrepreneurs to grow their businesses through the expansion of their personal networks, power of technology and access to capital.

DWEN provides women-owned SMEs with the opportunity to partner with a technology advisor who helps them determine which IT solutions best suit their business needs, for example, whether they should choose a local data centre or rather a cloud solution. The network also gives members access to financing experts from Dell Financial Services, who can recommend financing solutions for purchasing IT equipment, including rewards and tailored discounts, enabling SMEs to afford new technologies.

With COVID-19, many SMEs needed to establish remote working practices and improve their online presence while navigating cash flow problems. The digital transition proved particularly difficult for smaller businesses that lacked in-house expertise in areas ranging from online payments to security and data breaches. To help SMEs navigate this transition, DWEN connected members with business information and support, providing tailored resources on how to access funding opportunities and finance technology needs.

DWEN has local chapters in France, Ireland, the Netherlands and the UK. The ambition is to scale it across the EMEA region.

DIGITALEUROPE member:
- **Dell Technologies**



Helping SMEs shift to data-driven business models

The European Commission estimates that the value of the EU data market will increase to €1,054 billion by 2025. Yet, across Europe, only 8 per cent of SMEs are using big data analytics.

According to Sitra's 2019 report, almost half (46 per cent) of Finnish SMEs are hesitant about the opportunities afforded to them by the data economy. In addition, many of these smaller companies are lacking in-house expertise.

Through **Sitra**, the Finnish Innovation Fund, 22 Finnish SMEs from a range of different industries are now being supported in their shift to new business models using data.

Sitra's IHAN business programme will help SMEs develop new products and services and identify the skills they will need. As part of the programme, data specialists from across Finland offer their advice and ideas.

The programme's ambition is to develop an effective model through best practices and lessons learned that can be then scaled and rolled out country-wide and in other European Member States.

DIGITALEUROPE member company
- **Technology Industries Finland**

Preparing SMEs for Industry 4.0

In cooperation with IFKA, DIGITALEUROPE member IVSZ launched “Ipar 4.0”, a free program providing hands-on experience and knowledge to productive micro- and SMEs to learn about Industry 4.0 technologies and their applicability, and thus increase their competitiveness and digital uptake.

The initiative has been possible through the EU’s Economic Development and Innovation Operational Programme (EDIOP) and covers so-called “convergence regions”, or regions with a GDP pro-capita of less than 75 per cent of the EU-25 average.

Over 60 per cent of Hungarian SMEs are family businesses and have very simple management models: only 13 to 15 per cent of these companies has a business strategy at all. 70 per cent of small business owners are around 55 years old, and often lack familiarity and know-how of digital tools. Clearly, this poses a risk to their opportunities of digitally transforming.

To understand their challenges in technology and management uptake, IVSZ conducted self assessments and mentor-assisted surveys that highlighted lack of financial resources and access to technology, lengthy bureaucracy, difficulty to attract the right talents, even scepticism that such an investment would be worth it.

On the other hand, solution providers reported often encountering a lack of digital competences, management capabilities, and user practice as main obstacles in their trading with SMEs.

The gap between these assessment shows that solutions should take into account all factors, rather than just technology obstacles. Investing in skills, coaching and mentoring programmes, and supporting SMEs owners to adopt a strategic and pragmatic mindset are all crucial steps.

The project therefore integrated a variety of services in its SME support, from technology workshops and demonstrations to business planning and production practices. Thanks to this hands-on approach and the professional mentor support, the SMEs started their transformation journey. Participants in the project reported increased productivity, more efficient communication with clients and suppliers, and increased use of AI and automation tools in production plans.

To date, over 2,600 SMEs were reached and 131 completed a digitalisation roadmap. The plan for the next two years is to implement a searchable public digitalisation solution cadastre for SMEs.

DIGITALEUROPE member - **IVSZ**



Digital transformation, innovation and the Green Deal



Buildings

A smart warehouse that produces 40 per cent less CO₂ emissions than its peers

DIGITALEUROPE member Schneider Electric helped build this ultra-modern warehouse for Lidl in Finland. It integrates their EcoStruxure™ Microgrid and EcoStruxure Building Operation solution that runs fully on clean energy. This leads to 40 per cent less CO₂ emissions, 30 per cent less energy consumption and a 50 per cent reduction in energy costs.

Light sensors will automatically dim the lights to a suitable level in daylight, and motion sensors control the outdoor, office and warehouse lighting so that they will dim down the lights during the night and only switch them on when someone is on the premises. This saves 45 per cent of energy compared to a standard lighting system.

The heat recovered from refrigeration systems is used for the building's energy needs, and is also supplied to Järvenpää's residents, heating water for approximately 40 private homes, producing about 700 MWh/y of heat.

The warehouse produces energy primarily with its own solar panels, and energy is stored for later use whenever possible, which makes the entity as self-sufficient as possible in terms of electrical energy. The electricity consumption in the warehouse center was designed to be flexible, with the main purpose of cutting down the amount of electricity used.

However, the warehouse can also feed its excess electricity back to the network thanks to its batteries and reserve power machinery. In this way, the center is able to operate on the reserve and balancing electricity market of Fingrid – the company responsible for Finland's main grid – helping balance the consumption and production of Finland's power systems.

All of this is digitally managed. Through cloud-based analytics and intelligent management system, the facility's managers can optimise energy resources by using real-time data and predictive learning algorithms. Through the software, Lidl's team can monitor and manage the power and heat, energy storage as well as the heating and cooling system. For real-time energy optimisation, the system also takes into account the utilisation rate, price, consumption of electricity, and weather in Finland.

DIGITALEUROPE member
- **Schneider Electric**



Smart cities

Using big data to create smart coastal cities



Many coastal cities rely on tourism, which has been one of the sectors hardest-hit by the COVID-19 crisis. They are also the most affected by rising sea levels.

DIGITALEUROPE member Dell Technologies joined forces with four European waterfront cities to realise the H2020 CUTLER (Coastal Urban development through the Lenses of Resiliency) project,²⁴ which developed a platform enabling policymakers to use data analytics to improve scenario and urban planning in coastal cities.

By pushing an evidence-driven approach, cities are able to make informed decisions that will reduce water-wastage and pollution, improve residents' lives, create jobs and protect urban areas from the effects of climate change. Through a network of sensors, a wealth of data is generated daily on things like the weather, flood risks, hazard maps, visitor numbers, economic impact, visitor surveys, and traffic.

These insights help cities implement, monitor, evaluate and revise urban planning strategies that integrate climate adaptation measures, addressing challenges such as climate change and population growth that require smarter solutions in the city of tomorrow.

For instance, Cork has used these new insights to enhance the city's potential as a tourist destination, assessing costs of new investments against potential benefits. Through sentiment analysis, the city is also able to gather citizens' opinions and predict the number of visitors and revenue for new projects.

The objective of CUTLER is to build a platform and gather enough use cases that can be replicated by cities in all EU countries with coastal regions. The CUTLER platform can be easily customised to meet the specific requirements of different cities around Europe.

DIGITALEUROPE member
- **Dell Technologies**



²⁴ The CUTLER project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 770469.



A new smart quarter with intelligent energy management

Working with building management company GSW, Panasonic has contributed to the development of “Future Living Berlin®”.

The digital and smart energy management system which is currently being tested at “Future Living Berlin®” optimises the on-site production, use and storage of electricity. Tenants could therefore benefit from reduced energy consumption, and thus lower energy bills.

This is possible because the highly digitalised energy management system is connected to heat pumps, 600 solar panels and energy storage equipment, allowing a 15 per cent reduction in energy consumption and contributing to very low carbon emissions throughout the year.

DIGITALEUROPE member - **Panasonic**



Open source collaboration across Europe to drive smarter cities

FIWARE is a curated framework of open source platform components that together help accelerate the development of smart solutions. It is renowned for its ability and speed to address urgent challenges and the needs of society, companies and public administrations.

The need for ready-to-use solutions, based on open source and open standards principles – to help automate data sharing – grows rapidly as the COVID-19 pandemic unfolds across the globe. With that in mind, FIWARE have approached their community to present off-the-shelf technology solutions to help in the fight against the pandemic.

Prior to the pandemic, FIWARE and various DIGITALEUROPE members have been engaged in the delivery of smart city solutions around the world. Underpinned by a fast and secure telecommunications infrastructure and taking advantage of IoT and machine-to-machine communications, smart cities have the potential to deliver benefits in a number of areas.

DIGITALEUROPE member - **Red Hat**



Transport and logistics Enhanced connectivity and operational efficiency at major travel hubs

As one of the first sites in Belgium and one of the first airports in Europe, Brussels Airport Company is building a 5G-ready network in collaboration with Nokia and Citymesh to speed up the airport's operational efficiency and enable further technology innovations.

A private 5G-ready network offers a more efficient, more reliable and faster connectivity than current solutions across the airport grounds. Thanks to the higher capacity of 5G and to Nokia's Digital Automation Cloud platform, the airport will be able to deploy additional technologies and innovative solutions, such as IoT, automated vehicles, mobile safety systems or track and trace technology.

Nokia and Lufthansa Technik, a leading provider of technical aircraft services, have deployed a 5G industrial-grade private wireless network to accelerate a project that enables the remote inspection of engine parts for Lufthansa's civil aviation customers. The Lufthansa Technik's "Virtual Table Inspection", combined with the hyper-fast 5G private wireless network, will remove the need for Lufthansa customers to travel and physically attend servicing by providing remote real-time high-definition video access to the engine overhaul site. This new approach improves operational efficiency, productivity and service.

DIGITALEUROPE member - **Nokia**





Turning Rotterdam into the smartest port in the world

Rotterdam is Europe's biggest and busiest port, creating direct and indirect employment for some 385,000 people in businesses throughout the Netherlands. To maintain its global competitiveness, it aims to be the world's smartest and most sustainable port by introducing technology that makes shipping safer, more efficient, and more environmentally friendly.

One of the biggest challenges Rotterdam faces is growth. There is no more physical room to expand, and at the same time, the port has a target to decrease its environmental footprint by up to 95 per cent in 2050.

The only way to achieve the dual goals of growth and sustainability was to streamline the port's operations. So it embarked on a digitisation journey to become the "smartest" port in the world.

By introducing IoT sensors which gather mission-critical data – for example, about water and weather conditions – analysed through a software, the port is now able to optimise route planning and berthing of the ships, which increases fuel efficiency, saves money, reduces carbon emissions, and improves air quality.

DIGITALEUROPE member - **Cisco**





Creating a Mediterranean connected transport corridor

The Barcelona-Perpignan cross-border 5G corridor, 5GMed, will test use cases for connected and automated mobility, including road and rail, on the basis of 5G network infrastructure between France and Spain. This EU-funded project brings together different stakeholders (mobile network operators, road and rail operators, as well as innovative SMEs and research centres) to develop a sustainable 5G deployment model for future mobility.

Its ambition is to become the lighthouse project for 5G deployment in cross-border scenarios (including for railways) that can be replicated across Europe and trigger further investments through the Connecting Europe Facility programme. 5GMed will, in particular, demonstrate the multi-application and multi-stakeholder potential of 5G infrastructure for joint projects in the field of road and rail, which will greatly improve connectivity for road users and train passengers.

The infrastructure will support remote driving pilots, advanced traffic management, applications and business service continuity in railway, and follow-me infotainment both in main road and railway scenarios.

Demonstrations will be carried out in three small scale testing facilities in order to replicate real conditions. Based on the outcomes of the tests, a final integration and validation will be carried out in the cross-border area between Figueres and Perpignan, a strategic region in the Trans-European Transport Network since it sustains 55 per cent of road traffic and 65 per cent of rail traffic between the Iberian peninsula and the rest of Europe.

DIGITALEUROPE member - **AMETIC**





Energy efficiency

Using data analytics for predictive maintenance and wind farm engineering

The Danish renewable energy company Ørsted develops, builds, and operates offshore wind farms that provide clean power to more than 11 million people, roughly a quarter of the world's offshore wind power market.

To reach its goals, Ørsted relies on a digital strategy that includes advanced analytics and artificial intelligence, working with Microsoft technology. Ørsted transforms data from its 1,500 offshore wind turbines into insights for predictive maintenance that saves time and resources.

Each turbine is equipped with thousands of sensors, and each second, minute, and hour, they produce vast quantities of data which Ørsted analyses to optimize operations and maintenance. Using data, Ørsted is able to increase turbine availability by early detection and repair of faults, and to avoid unneeded and costly maintenance – all contributing to the low cost of offshore wind power.

Modern, cloud-based tools also help the over 6,000 Ørsted employees work and collaborate more efficiently. The computations to design wind turbine foundations used to take weeks. With computing in the cloud, results can be obtained within a day.

The data analytics provided by this collaboration between Microsoft and Ørsted are also helping the company shift away from fossil fuels and toward renewable energy. Ørsted divested its upstream oil and gas business in 2017 and has reduced its coal consumption by 82 per cent in the last decade. By 2025, Ørsted will have increased its offshore wind capacity to 15 gigawatts – enough to power more than 30 million people. Also by 2025, Ørsted will have reduced its carbon emissions by 99 per cent.

DIGITALEUROPE member - **Microsoft**



Decentralised energy trading infrastructure for private households



Current European electricity grids face two major challenges: an increasing amount of volatile and decentralised power generation and potentially higher electricity loads, for example due to an increasing use of electricity in the transport and cooling and heating sectors. A smart electricity supply and demand management becomes key to maintain stability in the grid and an adequate and secure power supply under all circumstances.

The team behind the “Economy of Things” strategic advanced engineering project at Bosch Research is working on the vision of a data-preserving energy trade between households.

From a technical standpoint, digital solutions can already optimise energy consumption in a single household.

Smart home appliances allow private households to monitor and optimise their electrical loads: for example, by setting the washing machine to run only when it is most economical – i.e. when the system is generating excess power – or the refrigerator to regulate its own energy consumption based on its contents. This would flatten peak electricity demand and contribute to grid stability.

This effect can be enhanced by linking private households by a common

marketplace, where they are able to trade the power they don't need with others in the neighbourhood. This can considerably reduce the stress on energy grids, in addition to providing households with an extra source of income.

But how could we manage this data exchange? This project proposes to establish a decentralised digital marketplace, based on secure multi-party computation and digital ledger technology. These technologies ensure data privacy through cryptography, and prevent information asymmetry by providing a transparent, verifiable and consensus-based transaction history. In this way, platform operators and private households could trade their load shifting capacity and consumption prediction in a fair and sustainable manner.

The trading would be also managed by “digital energy agents”, i.e. highly automated self-learning software. The agent software would be able to make predictions about how much energy the household will need and when. It could then use this information combined with the actual capabilities to target optimum economy for the household, balancing the interests of the private consumer with grid stability.

DIGITALEUROPE member - **Bosch**





Re-using waste heat from mobile base stations and data centres

Approximately 90 per cent of the energy used to power technology infrastructure – such as mobile base stations and data centres – ends up as waste heat. By implementing liquid-cooling solutions and connecting the heat thus generated to a wider grid, we could repurpose power currently wasted to contribute to the population's energy needs.

At the same time, getting rid of air-cooling systems would greatly improve the energy efficiency of technology infrastructure, contributing to fewer carbon emissions and a lower environmental impact.

Such a system has been implemented in Finland by Nokia and Elisa, a leading communication service provider. Mobile base stations are usually cooled by air-conditioning systems, which use a great amount of energy and end up generating heat which cannot be re-used.

By switching to liquid-cooling systems – 50 per cent smaller, 30 per cent lighter, much less noisy than air fans and easier to maintain – Elisa was able to reduce its CO₂ emissions by approximately 80 per cent, while at the same time achieving significant savings and longer component life.

Using a similar approach, Nokia achieved a 20 per cent improvement in energy efficiency and 90 per cent reduction in CO₂ emissions in its Tampere Data Centre, which contains 13,000 square feet of hardware with an output of 4 megawatts of energy.

Heat produced by the data centre is cooled down through water, which is then routed back to the city's grid line for district heating, usually at a temperature of 23-24 degrees Celsius. While not warm enough to heat up entire buildings on its own, nonetheless, this water needs less energy to be raised to the required temperature by the heating system pumps and can thus be more easily distributed to public facilities.

DIGITALEUROPE member - **Nokia**





Connectivity and infrastructure



Bridging the rural digital connectivity gap with national broadband plans

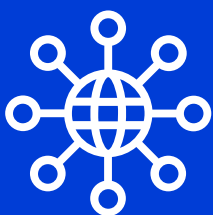
Unequal access to broadband translates into inequality of opportunity. People in rural areas that lack broadband face higher unemployment rates and encounter fewer job and economic opportunities. Children from these communities might end up falling behind their peers in schools. Of course, this is not just a rural issue – broadband deserts exist within urban areas as well, where costs can be unaffordable and availability non-existent.

The Italian National Broadband Plan presents a good example of how policy and public funding can be tailored to different markets and existing coverage situations, in different parts of the country.

The Italian government has earmarked around €6 billion between 2014 and 2020 to this end. Part of the funding is through direct grants, while the rest mixes public and private funding, including through various kinds of preferential finance conditions.

Through geographic segmentation analysis, the government identified 7,300 cities where the market has failed to provide sufficient connectivity, which represent half of the country's population. These are areas where no private investment is planned, and therefore the state can step in with public funds and grants without falling foul of state aid rules.

DIGITALEUROPE member - **Cisco**



5G-based fixed wireless access in suburban and rural areas

With Fixed Wireless Access (FWA) based on 5G, it is possible to offer high-speed broadband connectivity for consumers and business in areas not reached by full-fibre networks. FWA could also support implementation of other 5G uses, such as telehealth and remote patient monitoring.

As well as reducing the digital divide, better connectivity could help slow or reverse the population decline in rural areas, thus contributing to maintaining these communities. It also offers opportunities for local businesses to access wider markets for their products via e-commerce, supporting rural sustainability.

5G connectivity in rural areas will also enable remote working and help create a better work-life balance – something that has become all the more important during the COVID-19 pandemic.

From a sustainability point of view, having the possibility to work from home to a larger extent means reduced journeys and thus reduced environmental impact.

Public subsidies have an important role to play in making mobile networks suitable for 5G rural coverage. This includes encouraging partnerships between governments and the mobile industry to deliver consistent 5G mobile coverage, for example through shared deployment models, including connecting remote premises, rural industry and rural transport routes. At the European level, 5G FWA should be eligible for targeted funding aimed at fostering superfast and ultrafast broadband provision.

DIGITALEUROPE member – [Ericsson](#)





Voucher scheme to bring gigabit broadband to rural areas

The UK government is **rolling out** gigabit-capable broadband connections, which offer the fastest and most reliable speeds available, to homes and businesses in rural areas, thus helping close connectivity gaps and foster growth. Rural premises with broadband speeds of less than 100Mbps can use vouchers worth £1,500 per home and up to £3,500 for each SME to support the cost of installing new fast and reliable connections.

The investment has been a crucial boost for SMEs like the Bauhaus Hotel and Kitchen in Aberdeen. Links to online booking systems and Wi-Fi availability

throughout the hotel are business-crucial for a busy city centre hotel with high occupancy. Previous download speeds of less than 100 Mbps meant that the hotel's connectivity was being spread far too sparsely around over 40 users with multiple devices.

With the grant, the hotel was able to install full-fibre broadband connection using a gigabit voucher to offset the installation cost. This delivered synchronous download and upload speeds of 200 Mbps for less than they were paying before.

DIGITALEUROPE member - **techUK**



Creating a 5G hub in Southern Europe

5G Barcelona is a public-private initiative that works towards transforming the metropolitan area of Barcelona into an open, urban, citizen-oriented laboratory for adopting 5G technologies and applications in a real environment. The project hopes to turn the city of Barcelona into a European digital innovation hub and a 5G leader in Southern Europe. This initiative is promoted by the Generalitat de Catalunya, Barcelona City Hall, Mobile World Capital Barcelona, i2CAT, CTTC, Atos and the UPC.

The idea is to facilitate access to the IoT, paving the way for a new generation of services such as driverless and connected vehicles, drones, 4.0 industry and access to e-health services, all while improving user experience.

The rollout of 5G will bring about a technological transformation in services and infrastructures, reduce the digital divide and generate opportunities for new generations.

Neutrality is an essential part of 5G Barcelona. This means that the initiative is not exclusively linked to any institution or private company.

DIGITALEUROPE member - **Ametic**

A digitally connected and modernised public administration

SYZEFXIS II is Greece's flagship project to modernise the State's digital infrastructure by creating a country-wide telecommunications network, which will enable provision of upgraded electronic communications services such as telephony, internet, video, etc. at a reduced cost. It is at the core of the plan to establish a Public Sector Network for e-Government.

The project's purpose is to provide an upgraded digital telecommunications infrastructure to all General Government entities. The goal is to connect 34,000 state-owned buildings through a modern and more cost effective network all over Greece over a period of three years.

SYZEFXIS II will enable the creation of a broadband environment for all public bodies and the lifting of the digital exclusion that exists today.

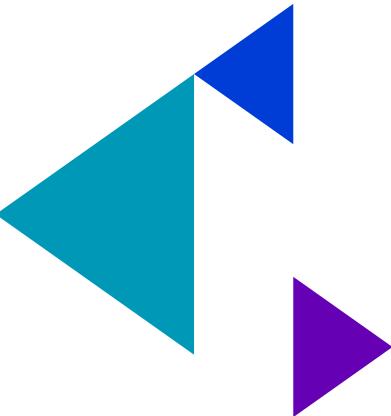
By providing upgraded electronic services to the institutions and modernising the Greek public administration, it will reduce bureaucracy, improve cooperation and interoperability in the public services, and foster a digital culture in the executives of the Greek public sector.

The project will also provide upgraded services to citizens through automated and user-friendly transaction information and processing systems, thus reducing the digital divide in line with the national and European digital strategy.

DIGITALEUROPE member - **SEPE**



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DIGITALEUROPE represents the voice of digitally transforming industries in Europe.
We stand for a regulatory environment that enables businesses to grow and citizens to prosper from the use of digital technologies.

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