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Information Paper

Digitalisation and Sustainable Digitalisation Strategies in Europe and its implementation in Germany at a glance

Abstract

The paper is supposed to give an overview about European and national (the example of Germany) strategies in digitalisation in general (Part I) and trends as well as strategies in sustainable digitalisation, following the “Green Deal” program of the European Commission (Part II). The paper is not to be understood as a scientific article but as an incomplete compilation of existing documents (as a glance). It should serve as an “Intellectual Output” of the project partner EIAB in the running Erasmus + project “SmartSoc project (Education for Future ICT Experts Based on Smart Society Needs)” The described publications should primarily support the case study work in the project.

The paper shows that there are existing quite far developed digital strategies on the European and national level (Germany). It is obvious that Germany is not a “frontrunner” in this context. Concerning the merge of digital transformation and sustainability (ecologically and social) the actors seem to be on an ambitious way. They have detected the urgency to bring together the two approaches but there is a lot to do in the future.

To develop business strategies Start Up companies also in the ICT branch have to note more and more these aspects in their considerations and strategies. This is not only important to reach corporate success today but also to meet the necessities of the today’s global challenges as such.

Part I Digitalisation Strategies

1. The European Digitalisation strategy

Following the European Commission “Shaping Europe’s digital future, there are 4 pillars to be considered:

1. Technology which works for the people
Development, deployment and uptake of technology makes a real difference to people’s daily lives. A strong and competitive economy that masters and shapes technology in a way that respects European values is necessary.
2. A fair and competitive digital economy
A frictionless single market, where companies of all sizes and in any sector can compete on equal terms, and can develop, market and use digital technologies, products and services at a scale that boosts their productivity and global competitiveness, and consumers can be confident that their rights are respected.

3. An open and democratic digital society

A trustworthy environment in which citizens are empowered in how they act and interact, and of the data they provide both online and offline. A European way to digital transformation which enhances our democratic values, respects our fundamental rights, and contributes to a sustainable, climate-neutral and resource-efficient economy.

4. Europe as a global digital player

The EU is committed to setting global standards for emerging technologies and will remain the most open region for trade and investment in the world, provided that anyone who comes to do business here accepts and respects our rules.

<https://ec.europa.eu/digital-single-market/en/content/european-digital-strategy>.

The actions to be taken are

- Artificial intelligence
- European data strategy
- European industrial strategy
- High Performing Computing (HPC)
- Digital Markets Act
- Digital Services Act
- Cybersecurity
- Digital Skills
- Connectivity

https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age_en (24.2.2021)

A position paper from the European IT interest group Bitcom gives further information about the expected strategy in Europe and with this the implementation in the member states.

Towards European Leadership on Innovation - Recommendations for the next Digital Single Market

<https://www.bitkom.org/EN/List-and-detailpages/Publications/Towards-European-Leadership-on-Innovation-Recommendations-for-the-next-Digital-Single-Market> (24.2.2021)

II. Digital Strategy of the German Federal Government

In order to develop the digital change in Germany and to prepare the country for the digital change the best the Federal Government has developed a package of actions and strategies for implementation. This is supposed to improve life quality of all citizens, to unfold economic and ecologic potentials and to safeguard the social cohesion.

The strategy embraces five fields of action: digital skills, infrastructure and equipment, innovation and digital transformation, society in digital change and the modern state. The fields of action bring to life the many advantages offered by digital change so that people experience them first hand. The implementation strategy offers specific solutions for every challenge, along with implementation plans. It will be regularly updated and the achievement of its goals will be measured and reviewed.

1. Digital skills

The German government wants everybody to be able to make use of the opportunities afforded by digitalisation. They are to play an active and self-reliant part in shaping digital change and are to be enabled to deal responsibly with the risks involved. To this end more services are to be made available across the boards and the education system is to be

geared even more to digital technology in everyday life, to the digital working and economic world and to the digital knowledge society.

The federal government's "Digital Pakt Schule" (Digital Compact for Schools) for instance is ensuring that fast internet connections are installed at some 43,000 schools in Germany along with an effective digital learning infrastructure.

2. Infrastructure and equipment

Effective infrastructure is the lifeblood of our society, particularly digital networks. Without them the people, private companies and public authorities will not be able to use the advantages of digital change – and they are needed in urban and in rural areas. The aim is for everyone to have a connection – everywhere at all times. The special importance and the vulnerability of digital infrastructure call for security and special protection.

It is our goal to see all of Germany served by the new high-speed net by 2025. Germany is to become the leading market for 5G applications.

3. Innovation and digital transformation

The force to shape change and create something new is a precondition for underpinning sustainable prosperity and social cohesion in Germany, Europe and the world in the long-term. The German government aims to ensure that technology and innovations are in line with the legal framework and the values of Germany and Europe. We want to become better at taking excellent technical research and using it to make and market excellent technological products in Germany and in Europe, and to set international standards with these.

The Artificial Intelligence (AI) Strategy is to bring research and development, and application of AI in Germany, to a leading level worldwide. In the health sector, for instance, AI can help diagnose diseases earlier as well as developing new treatment options.

4. Society in digital transformation

Digitalisation needs values. People must be at the heart of all of the government's considerations and projects – even in the digital era. Whether people are open to digitalisation, or have concerns and fears, or whether they have to date been entirely indifferent to the digital world: digital transformation is to improve the lives of the people. The government aims to bring the country together and move it forward, safely and securely.

Positive progress can only be made if digital transformation is strongly anchored in society, if it is embraced by all sections of society and if the opportunities it offers are open equally to all sections. These are the framework conditions the government aims to put in place, at national European and global levels.

5. Modern state

Authorities should make people and company's lives easier not more complicated. That is why the German government wants to make dialogue with the authorities and requests for services simple and secure for everyone. To this end, by the end of 2022, all of the services offered by authorities will be offered online.

Parents, for instance, will be sent the birth certificate for their new babies without having to make an application, and child allowance will likewise be paid automatically. Naturally, digital

access to the authorities will be barrier-free, so that more people with disabilities can also be reached in this way.

<https://www.bundesregierung.de/breg-en/news/the-digital-strategy-of-the-german-government-1550216> (5.2.2021)

III. Digital Strategy in the State Hesse, Germany (Homeland of EIAB)

1st example

Digitisation puts companies and national economies under great pressure to change, but it is also an indispensable tool in the search for solutions to social challenges such as the energy turnaround and climate protection. Hessen recognises this development as a challenge for political action – and as an opportunity.

The aim of the Digital Hesse Strategy is to exploit the potentials of digitisation with a view to enhancing the quality of life and furthering the sustainable development of the State of Hessen. At the same time, digitisation provides an opportunity to decouple resource consumption and economic development. Digitisation is not an end in itself – it must be to the advantage of society.

The Digital Hessen Strategy was drawn up in close consultation with 500 representatives from industry and trade, the service sector, research facilities and associations. It addresses not only the classical areas of political action, where the State can exercise direct influence, but also the areas of technology and applications, where the State of Hessen acts by providing incentives and support.

IV. Digital Strategy in the State Berlin (Capital)

2nd example

1. Health care

Biotechnology and pharmaceuticals (regenerative therapies, glycobotechnology, diagnostics and bio-analytics, companion diagnostics), medical technology (medical imaging, e-Health, bipolarised medical technology), innovative patient care and rehabilitation (telemedicine, IT-based optimisation processes, developing innovative forms of patient care), IT-supported prevention, health promotion and health tourism.

2. Power engineering

Solar energy (manufacturing of PV modules, supply industry and certification, grid integration and energy storage applications, power plants and integration into buildings), turbo machinery and power plant engineering (gas turbines, compressor units, aircraft engines/ jet turbines, combustion engineering, modelling of power plants, power plant components, maintenance, repair and overhaul), energy efficiency technologies (heat supply and distribution, energy-efficient buildings, building envelope, industrial processes, public space), wind energy (construction, operational management, maintenance, material science, production and assembly engineering, measurement and control technology, measuring and test methods, offshore material science), bio-energy (energy crops/short rotation coppice, biogenic residual waste, fermented technology, biochar, HTC bio fuels), energy networks and storage/e-mobility (integration of renewable energies in energy networks incl. direct storage

connection, separate networks, intelligent control rooms, multi-sector grid management, ICT for smart grids, application of mobile energy storage and charging infrastructure (e-Mobility))

3. Transport, mobility and logistics

Automotive (e-mobility, drive technology and alternative fuels, Car2X & automated driving, efficient production and innovative materials, traffic and vehicle safety), logistics (transloading centers (GVZ), inter-modal freight service, area development surrounding airports, logistics-based value-added services), aerospace (flight engines, very small space satellites, unmanned aerial vehicles (UAV), testing & simulation), railway (Shift2Rail (EU Joint Undertaking), energy efficient railway systems, innovative control and safety systems, efficient use of railway infrastructure, innovative IT-based solutions to increase attractiveness of railway), traffic telematics (multi-modal mobility, car IT, navigation, location bases services and digital maps, control systems for providers, fleet management)

4. ICT

Digital infrastructure (telecommunication, broadband, wireless, data centres), digital business solutions (mobile applications, web services, industry-specific solutions), software development technologies & usability, internet services (digital commerce, social media, platforms), internet of things and industry 4.0, open IT, open data, geo-information, cloud computing, software as a service, IT security and security with IT

5. Media and creative industry

Presentation and networking platforms (incl. Berlin Web Week, Berlin Fashion Week, Berlin Art Week), games and edutainment, cross-innovation (incl. competitions focussed on innovation topics, matchmaking between start ups and investors as well as old and digital economy), innovation labs/incubators, crowd funding/crowd investing)

6. Optics

Communication and sensors (photonic systems integration (on-chip and hybrid), development of high-rate dynamic communication systems, fiber optic sensor technology, innovative material-processing (micro/ macro, 3D laser printing)), laser technology (development of novel direct-diode-laser systems), lighting technology (addressability of light in outdoor lighting, individualization of light in indoor lighting, technological lighting systems (SSL systems, MIR and semiconductor)), optical analytics (visual process metrology, multidimensional spectroscopy, applications in biomedicine, optical sensors and fiber optics), biomedical and ophthalmic optics (molecular imaging, disposable diagnostics, ophthalmic optics/ optometry), micro systems technology (wide-bandgap semiconductors, power electronics and sensors, micro-opto-electro-mechanical systems (MOEMS))

7. Production and automation technology

Data safety, human-machine-interfaces, working world industry 4.0 and upgrading of facilities

8. Clean Technologies

Sustainable water management (water procurement and water treatment, water use, use of rainwater, waste water management), circular economy, material and resource efficiency (collection and transport, treatment, energy recovery of waste, consultancy, waste and material flow management

VI. Example of Digitalisation Strategy on the local level (City of Darmstadt, Germany)

Darmstadt is a town about 30 km south of Frankfurt. It has about 160000 inhabitants. It is called “City of Science”. It has several universities and various scientific companies (e.g. Merck) and institutions (e.g. European Space Agency). As sustainable city Darmstadt is at the top of the German Smart City Ranking (No. 4)

The Vision of Digitalization:

SmartCity is a visionary future project with a certain exemplary character. The vision helps to give in a concise way a sustainable idea what the aim of the SmartCity Darmstadt will be. The implementation of the vision will include the various actors in town, coming from municipality, economy, science and civil society. Darmstadt is supposed to be a unique innovation laboratory.

Around this vision five core objectives are built:

1. valuable to us
2. participative
3. forward looking
4. sustainable
5. secure

Three lighthouse themes have been chosen:

1. Mobility and environment
2. Digital Services & Society
3. Economy and Technology

The fields of action reflect all themes of daily urban life:

1. Mobility
2. Energy
3. Environment
4. Administration
5. Education
6. Culture
7. Healthcare
8. Society
9. Security & Disaster protection
10. IT Infrastructure
11. Data platform
12. Industry 4.0
13. commerce & Tourism
14. Cyber security

Part II Sustainable Digitalisation Strategies

I. Europe is ready for a digital green deal

The COVID-19 crisis has boosted digitalisation of many aspects of our daily life throughout Europe: from smart working to distance education and the use of digital platforms for food delivery. Digital tools and data are playing an important role in the health response to COVID-19, from tracing the virus with contact tracing apps to the use of data to identify outbreaks and assess the impact on jobs and the environment.

The more digitalisation goes on, the more we must give it a direction. The moment for doing that is NOW!

On 15th December 2020 the EU Commission presented its Digital Service Act – a kind of a new constitution for digitalisation in Europe. New regulation for platforms, digital contents and data are part of it.

Data is the raw material of the digital economy and an intelligent use of data is of great public interest. To regain democratic control, strong rules will be needed such as stricter antitrust rules that link data privacy and competition, governance models such as "data trusts", and fostering the development of decentralized and privacy-enhancing technologies.

But, we need not only such a new constitution for the internet, we also need new specifications for the basic equipment of all infrastructures and devices that make the access to all digital data possible.

Data centres, digital infrastructure and devices require enormous amounts of resources and energy. As the number of devices is growing consumption is growing as well. If we don't act now, the estimated energy consumption will cause us to significantly backslide on environment and climate goals.

Therefore we should promote a "digital green deal" because it is about using digital technologies to attain both social and environmental sustainability.

Taking over European leadership in this sense, creates a new chance – especially now, that the tech cold war between the US and China risks creating a global technology-industry split. Make EU a frontrunner and establish sustainable digitalisation as a European trademark beyond the consumer-driven Silicon Valley approach and authoritarian models of digitalisation.

That is the vision we have worked for during the six months of the German Council Presidency. There are many issues to tackle, here are three examples:

The environmental data of all EU member states, compiled in a Green Deal data space, could make it easier to implement the EU's ambitious environmental policies. It could also facilitate using digital technologies as a driver for innovation and for the ecological transformation, which lies ahead of us.

Secondly, a "digital product passport" would create transparency along global value chains around the social and ecological rucksack of a product and enable consumers, citizens as well as companies to take environmental action. Public IT tenders should also include ethical

digital standards to preserve people's digital rights, data sovereignty, openness and interoperability, leveraging EU common data infrastructures such as GaiaX.

Thirdly, digital technologies should be environmentally sustainable. This will require rules to reduce the energy consumption of data centres and increase their energy efficiency. Provisions to extend the operating life of digital hardware are also needed, in particular for Smartphones and other smart devices. This applies equally to production, design and use.

The European Commission, like us, sees a need for action at the interface between the environment and digitalisation. With the European Green Deal and its digital strategy, the Commission has made proposals that the German Council Presidency is pushing now. At the end of this month EU member states will pass council conclusions for a green digitalisation and for an action plan to significantly reduce the amount of disposed ICT products by 2025, climate neutral data centres by 2030 and a digital product passport to provide more information on a product's components, reuse, repair and recycling possibilities. The Commission will develop pilot projects on that starting with car batteries.

It is time for Europe to put forward a model of European technological sovereignty: a new digital humanism, a technological revolution for people and the ecological transition. For us, this includes setting worldwide standards for sustainable and democratic digitalisation in all its variety – that will benefit both people and the environment and become a new hallmark of Europe. This op-ed by Minister Svenja Schulze and Francesca Bria was published in the Italian newspaper *Il sole 24 Ore* and in LinkedIn on December 15 2020. <https://www.bmu.de/en/topics/europe-international-sustainability-digitalisation/europe-and-environment/europe-is-ready-for-a-digital-green-deal/>

II. Digitalisation and “Going Green” – How green IT is changing Sustainable Digital Transformation

Green IT specifically describes a strategy with which an organisation strives to align its information and communications technology with sustainability goals. The government ministries (and thus also the BMU) have committed to the following three goals:

- Energy efficient data centres
- Sustainable procurement of hardware
- Blue Angel eco-label certification

The BMU is implementing several measures to achieve these goals:

- We are addressing environmental protection and aspects of resource efficiency in and via information and communication technology (ICT).
- On behalf of the CIO Council, we are leading the Green IT project group in which the ministries are jointly refining their Green IT strategy.
- To implement the corresponding measures for the IT of the federal government, we set up a Green IT Office (Green IT Initiative Office).
- We are also in close contact with German Environment Agency advisory unit for sustainable information and communication technology (Green IT).

III. Environmental aspects of the digital transformation of industry and society

Over the past few years, due to rapid technological advances our understanding of Green IT is moving towards sustainable digitalisation. In conventional ICT just the computer, server and telephones had to be taken into account. Today, however, we are presented with the challenge of addressing environmental issues in a world in which cars, refrigerators, watches, industrial robots, weather satellites, energy meters and whales are connected. The discourse in the environmental sector is also increasingly being determined by buzz words like digital currencies, online trading, industry 4.0, smart cities, e-Agriculture, block chain, artificial intelligence (AI) and disruptive business models. Digitalisation will further accelerate the expansion of the green tech sector.

<https://www.bmu.de/en/topics/europe-international-sustainability-digitalisation/digitalisation-and-the-environment/sustainable-digital-transformation/> (18.2.2021)

IV. Opportunities and Risks of digitalisation

1. Three mega trends

The mega trends of our time are digitalisation, globalisation and climate change. They are changing the lives of all people. We are confronted with the question of what we want to achieve with new technologies and how we can secure peace on economic, social and ecological fronts. And do so not only in Germany, but also in Europe and throughout the world. Digitalisation is raising "old" questions in new ways – questions about ownership and distribution, and about the concentration of economic and political power. Issues of participation and access are taking on a new significance as well.

Digitalisation has considerable impacts on the environment and nature. If those impacts continue unabated, they will exacerbate our planet's ecological and social crises, by sweeping us past the planetary boundaries all the faster. This is because they entail ever-increasing consumption of energy, resources and goods, along with more and more transport.

2. We need a trend reversal

This is why we need a major turnaround in digitalisation. a turnaround that can bring prosperity into harmony with justice and environmental protection. Digitalisation, if sustainable oriented, can drive all kinds of opportunities.

- It can interconnect renewable energy sources and support the energy transition.
- It can link bicycles, buses, cars and trains both inside and outside of cities.
- It can help us fertilise our crops precisely and thereby also protect biodiversity.
- It can provide transparency in supply chains and for consumers.
- It can help bring about a true circular economy.
- It will help us better evaluate the sustainability of financial investments.

3. Incentives and rules for all of Europe

To make use of digital opportunities for our environment, we need good examples, incentives and rules – ideally, throughout all Europe. A way towards a social, ecological, economically strong and democratic Europe that both promotes digital innovations and protects its citizens is necessary.

4. Get the Environment into those Algorithms!

We want to combine things digital with things environmental, and give every algorithm a good dose of environmental action. In developing a digital agenda for environmental protection, climate action and nature conservation, we are working on a compass for digitalisation in Germany and Europe. We want to create a smart regulatory framework that will define objectives for digitalisation and point it in the right direction. It is a framework that will enable digitalisation to be a driver for sustainability and serve the Sustainable Development Goals of the UN's 2030 Agenda. Our strategy can benefit the environment and, by promoting innovation, provide new impetus for industry. During the German EU Council Presidency in the second half of 2020, we plan to refine our agenda in cooperation with our European neighbours.

Smart combinations with digitalisation: 10 theses can be found in the document Get the Environment into those Algorithms!

<https://www.bmu.de/en/topics/europe-international-sustainability-digitalisation/digitalisation-and-the-environment/opportunities-and-risks-of-digitalisation/#c42897> (18.2.2021)

V. Digital Sustainability deficits

- **Ecology**
 - Power Consumption through ICT, Internet and Data Centres
 - Smart phones: Consumption and use
 - E Waste
- **Economy**
 - Recycling
 - Smart phones: Manufacturers, Suppliers and Working conditions
 - Planned obsolescence (shortened service life)
 - Digitalisation of the World of Work
- **Politics**
 - Network Expansion
 - Preservation of Democracy; Education
- **Society**
 - Social problem situations through Extraction of raw material
 - Psychological obsolescence; Rebound effects
 - Consumption opportunities; E-Commerce; Freight transport

VI. Germany's New Climate-Friendly Digital Agenda Puts Sustainability and Digitalisation in Front and Centre

Written by [Marisa Pettit](#), 13-03-2020,

The interconnected issues of digitalisation and sustainable development are reaching a wider audience - finally! Last week, Germany's Environment Minister Svenja Schulze set forth the country's latest digital agenda - calling for more sustainability in the digital economy and a push for much-needed action for more "digital for good".

Globally, our use of digital technologies now causes more CO2 emissions and has a bigger impact on global warming than [the entire aviation industry](#). Will digitalisation end up being another motor for the climate crisis? Or can digital tools - when used properly - support the development of a more sustainable world? RESET has been exploring the relationship between [the digital transition and sustainability](#) for a long time, and we've watched with interest as awareness has also been growing among the wider public in recent years - including among policy makers and advisors. Take last year, for example. In April 2019, the German Advisory Council on Global Change (WBGU) presented its flagship report [Towards our Common Digital Future](#), and the 2019 Re:publica - Europe's huge annual digital society conference - placed the issue of sustainability front and centre like never before - RESET took to the stage heading up a panel on how [sustainable tech innovations can protect forests and rivers](#), and Germany's Federal Minister of the Environment, Svenja Schulze, presented a green paper outlining an upcoming digital policy agenda for the environment. The final version of that digital policy agenda, worked on over three weeks with a group of hundreds of experts, was presented in Berlin just last week.

There are many government programmes and agendas that deal with digitalisation. But mostly they look at the topic from an economic perspective - how can digitalisation be used as a driver for development, or as a motor for more economic growth? The 2020 [digital agenda](#), however, takes things in a distinctly different, and more sustainable, direction. *"The digital agenda is one of the first official government programmes or ministry initiatives in Europe - perhaps even worldwide - that consistently places the protection of people and nature at the centre of digital policy. The German Environment Ministry is addressing digitalisation as one of the central drivers of energy and resource consumption, but at the same time also as a design opportunity with historic potential to develop solutions for the challenges of the socio-ecological transformation,"* explained Dr Stephan Ramesohl, Co-Head of the Digital Transformation Research Unit at the [Wuppertal Institute for Climate, Environment and Energy](#), who worked on the agenda.

Germany's new digital agenda sets out over 70 individual measures that the country aims to use to steer digitalisation in a direction that is both socially- and environmentally-friendly, and also to drive digital innovations for the good of the climate.

- One key measure is the idea of developing a "digital product passport" for more transparency about the environmental impacts of different products. This would provide information about where the raw materials come from, the working conditions it was produced under, how much CO2 was generated in the process and information about how to recycle it.
- The agenda also calls for the lifespan of [smartphones and other electronics](#) to be drastically lengthened, with manufacturers told to provide spare parts and software updates and make it easier for customers to replace elements that often wear out, like screens and batteries.

- Online retailers are encouraged to offer increased transparency about the products they sell by supplying customers with clear sustainability information.
- Online streaming services should adjust their default settings to be more eco-friendly and less energy-intensive, by, for example, reducing the resolution of their videos and not always setting them to play automatically.
- And data centres - the “invisible” carbon-producing power houses that so many of our digital devices rely on - will receive energy-efficiency certificates for achieving cuts in their power consumption or for re-using [surplus heat](#).
- And last but not least, a “Digital Innovation Hub for Climate” will be set up, a space for founders, middle-sized companies and big corporations to come together and work on digital climate innovations together.

Currently, all of these measures are voluntary commitments, relying on everyone involved to take the initiative and change their ways for the good of the planet, rather than a set of laws or binding requirements. This means that companies only have to comply with the changes if they want to - there's no obligation. *“Ultimately, of course, we will need to get to a point where these kind of measures (...) become a systematic and mandatory requirement for all stakeholders. But until we get to that point, we have to take intermediate steps along the way - in the form of voluntary commitments, for example”* explains Dr. Ramesohl.

One thing is for sure: the coming decade will be crucial for ensuring that digitalisation becomes a force for environmental protection rather than yet another ecological burden. And this digital agenda is evidence that one of Europe's most powerful countries is finally devoting more attention to these two major challenges and how they interconnect and overlap. But because digitalisation is developing and changing so fast, there are no ready-made solutions. As Dr Ramesohl says, it is a question of innovation. *“How can we combine social interests, public welfare and the protection of nature and the environment with the potentials and business opportunities provided by digital solutions? (...) We have to develop new solutions, negotiate them and possibly revise them over and over in discussion with others. Making this kind of policy is new, and the digital agenda provides a starting point for this process.”*

Europe-wide sustainability laws - like the [upcoming ban on single-use plastics](#) - often come into force through individual member states stepping up to take the initiative, encouraging other countries to follow suit and then the rest of Europe follows. Hopefully the new German digital agenda will kickstart a conversation throughout Europe about what we understand by digitalisation for sustainable development - and more importantly, how we hope to take action to make that sustainable digital future a reality.

<https://en.reset.org/blog/germany%E2%80%99s-new-climate-friendly-digital-agenda-puts-sustainability-and-digitalisation-front-and> (22.2.2021)-

VII. Further Literature

1. **See also a Position Paper “Digitalisation and Sustainability” of Deutscher Bundestag**
<https://www.bundestag.de/en/committees/bodies/sustainability> (23.2.2021)
2. **See also study In German language on digitalisation and Sustainability from WWF**
<https://www.wwf.de/aktiv-werden/bildungsarbeit-lehrerservice/digitalisierung-und-nachhaltigkeit> (24.2.2021)
3. **See also European Digital SME Alliance, Sustainable Digitalisation: Strengthening Europe’s Digital Sovereignty**
<https://www.digitalsme.eu/what-is-sustainable-digitalisation/> (24.2.2021)
4. **See also a discussion Paper of EPC “Towards a green, competitive and resilient EU economy: How can digitalisation help?”**
<https://www.epc.eu/en/publications/Towards-a-green-competitive-and-resilient-EU-economy-How-can-digital-35bfc4> (25.2.2021)
5. **See also “Sustainable Digitalisation. Guidelines for a Digitalization we need for the future we want”**
<https://www.2030agenda.de/de/publication/sustainable-digitalization>
www.sustainable-digitalization.net (25.2.2021)
6. **See also Friedrich Ebert Foundation. Shaping Digitalisation in Germany. More innovation needed**
<https://www.google.com/search?client=firefox-b-d&q=digitalisation+and+sustainability+fes>
 (25.2.2021)

Digression: Corporate Digital Responsibility (CDR)

More and more, accelerated from the ongoing digitalisation transformation in Multinational Enterprises (MNE) as well as in Small and Medium Sized Enterprises (SME), the question of managerial responsibility for corporate digital activities has to be raised. It is a field of research which starts to get into the focus of extended the general approach of Corporate Social Responsibility. Two definitions of Corporate Digital Responsibility:

First definition: CDG describes the part of Corporate Social Responsibility (CSR) that concerns the impact of digital transformation on the environment, society and the economy. Digital Responsibility must be integrated into business processes, and services and promoted along the value chain. Fairness, participation, trust, autonomy, transparency and sustainability must all be taken into account as they are important aspects of Digital Responsibility

<https://econsense.de/publikationen/>

Another definition; CDR can also be defined as the set of shared values and norms guiding an organization's operations with respect to four main processes related to digital technology and data. These processes are the creation of technology and data capture, operation and decision making, inspection and impact assessment, and refinement of technology and data. Lobschat, L et al, *Corporate Digital Responsibility, Journal of Business Research* 2019, pp. 875-888
<https://publikationen.bibliothek.kit.edu/1000104768> (19.2.2021)