The EU's approach to digital transformation, the ambitious Data Strategy and the EU's assets in its pursuit for digital sovereignty

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'But Europe must now lead the way on digital – or it will have to follow the way of others, who are setting these standards for us.'

In her recent State of the Union Address EU Commission President von der Leyen set the tone for *'Europe's Digital Decade'*. In order to make this a successful decade the Union cannot rely solely on its regulatory power but it has to make the right choices and investments to become a tech superpower. The EU sees itself better prepared for the 2nd wave of digital transformation driven by AI, industrial IoT and Big Data, and all efforts are directed towards the creation of a supportive framework for a real data economy.

1. The EU's technological dependency and calls for technological and digital sovereignty

The year 2020 will be remembered as the year when the entire world was hit by the COVID-19 pandemic, and given the EU's growing discourse about technological and digital sovereignty, it might also be remembered as the year when the European Union started laying the foundations for its strategic sovereignty. The strategic rivalry between the United States and China is undermining international cooperation, digital technology has become a critical battleground in geopolitical struggles, the U.S. and China try to establish their global technological and industrial dominance, and all this sets the frame for the EU's struggle for technological and digital sovereignty. The EU's reliance on the U.S. (at least until today) far exceeds European digital dependence on China, and Andrés Ortega Klein remarks that *'from a digital sovereignty perspective, the US is the biggest problem, [and] China has become the biggest fear'*.[1]

The EU has always believed that it's collective economic seize and capacity guarantee its economic independence (sovereignty), and unlike other superpowers it has never tried to translate economic interests into geopolitical interests. Neither has the EU ever had a broad discussion on the overall issue of technological sovereignty. All that changed considerably with the new EU Commission (approved in November 2019), and its new President von der Leyen announced that her Commission would be a geopolitical one, and she added that *'we have to work hard for our technological sovereignty'*[2].

The beginning of 2020 saw the outbreak of COVID-19, and the pandemic has uncovered the vulnerability of Europe's supply chains and the EU's technological dependency. This dependency poses a serious threat to the competitiveness of European industry, and ultimately also to the prosperity of the European societies.

In her first State of the Union Address[3] Commission President von der Leyen reiterated that *'Europe must now lead the way on digital'*, and by doing so it will have to focus on three areas – data, technology (in particular AI), and infrastructure. President von der Leyen concluded that *'none of this is an end in itself - it is about Europe's digital sovereignty, on a small and large scale'*.

From the EU's perspective, technological and/or digital sovereignty comprise interests but also values, and the dependency has serious implications from a governance perspective too. Because of the increasing dependence on non-European private sector companies - which to a large extent act as de-facto regulators and with no reference to European values - the EU has lost its influence over the governance. One of the current dilemmas of the EU is the disconnect between

[1] See Andrés Ortega Klein in Carla Hobbs[ed.] 'Europe's Digital Sovereignty: from rulemaker to superpower in the age of US-China rivalry' 30 July 2020

[2] See Ursula von der Leyen. 'The von der Leyen Commission: for a Union that strives for more' 10 September 2019

[3] See Ursula von der Leyen. 'State of the Union Address by President von der Leyen at the European Parliament Plenary' 16 September 2020

regulatory and data sovereignty.

Looking for an answer to how to achieve a true technological sovereignty without isolating oneself, the EU seems to have found an answer – creating ambitious own alternatives.

2. The Digital Single Market Strategy initiated by the Juncker Commission

Having neglected the need to add a digital component to the EU's Single Market, the announcement (in May 2015) of the ambitious *Digital Single Market Strategy*[4] by the Juncker Commission reflected the understanding that the EU would have to embrace the digital revolution and open up digital opportunities for people and businesses. The EU institutions struggled to close the gap between the rapid digital transformation and the necessary EU policy responses, and they found it difficult to draft and implement a future-oriented approach to digital policy. Halfway through the mandate of the Juncker Commission (2014-2019) the efforts became more assertive and produced impressive results, whereby the adoption of the *General Data Protection Regulation* (entered into force in May 2018) is in so far the most prominent one as it has been echoed by legislation in many other legal systems. Anu Bradford, a Professor of Law and International Organization at Columbia Law School, argues in her book[5] that despite *'strong headwinds'* countervailing Europe's regulatory standard setting, *'there is reason to think that the Brussels Effect will prevail'*.

The GDPR and further more modest 'success' stories encouraged the new EU Commission to adopt a more assertive and determined approach to digital policy, which culminated in the presentation of its first key document - *Shaping Europe's digital future*[6].

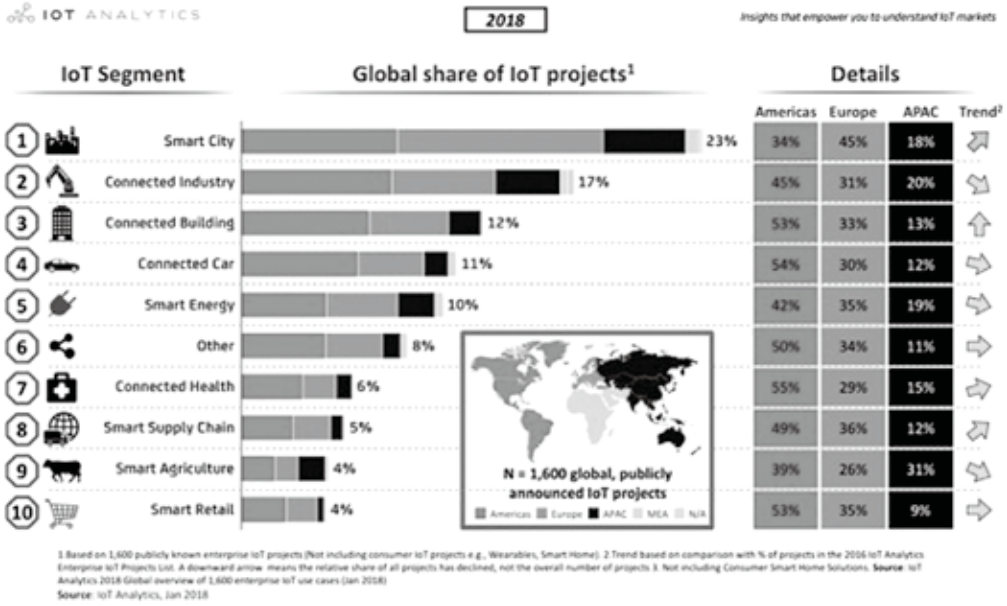
3. Europe's potential and advantages in the second wave of digital transformation

Having been rather slow in its response during the first waves of digital transformation, there is no reason for the EU to stick its head into the sand because digital technology is developing rapidly, and the evolution of technology is already paving the way for a new transformation in the digital environment. Many experts refer to the Internet of Things (IoT) as *'the next industrial revolution'*, and the EU Commission is convinced that this transformation will create new opportunities for Europe to regain its role in the global competition for digital solutions. In fact, this sign has already been seen in the global share of IoT projects in 2018 (Figure 1). The forecasts for the number of connected objects are breath taking: according to an IHS Markit

[4] See Juncker Commission. 'A Digital Single Market Strategy for Europe', 6 May 2015

[5] See Anu Bradford. *'The Brussels Effect: How the European Union Rules the World'* Oxford University Press, 2020

[6] See European Commission. 'Shaping Europe's digital future', 19 February 2020



Source: IOT ANALYTICS

Figure 1 The Top 10 IoT Segments in 2018

forecast there will be 125 billion devices connected in 2030, and according to ARM (big semiconductor firm now part of Softbank[7]), there will be one trillion connected devices in 2035[8]. Complex processes will be increasingly automated, and there will be a need to keep both data and AI as close as possible to 'the things'. The alternative to centralised IoT systems will be the implementation of intelligent solutions closer to 'the things' ('at the edge'), whereby a fully decentralized system with 'embedded AI' in each of the connected objects is currently no real alternative because of the costs.

With regard to the EU's potential, it first has to be noted that the general purpose cloud computing (Infrastructure as a Service [IaaS]) is in the hands of U.S. and/or Chinese digital giants, and it isn't the aim to substitute them with European actors.

The EU sees the trend 'from cloud to edge' as a paradigm shift, and given the fact that the edge is more 'application oriented', the EU will have to concentrate on its strengths which are industrial applications, sensors (where Bosch and some others are rather strong), and cyber physical systems (CPS) (Figure 2). The ultimate driver for the EU is to grasp this opportunity to regain competences and market shares for EU actors. Europe has to reinforce its place between the U.S. and China, and doing so, it has to maintain and strengthen its own identity. For the latter to be successful the EU needs to aim at technological autonomy (up to a certain extent) at least in sectors where Europe is leading (as for example automotive). For Europe to continue leading in the automotive sector it needs to master the value chain and in particular the digital part of it. A broad approach is needed and there are already a lot of encouraging developments:

- microelectronics, photonics, IoT, software and systems, data analytics, 5G and beyond,
- operating systems and platforms,
- large-scale piloting and partnerships.

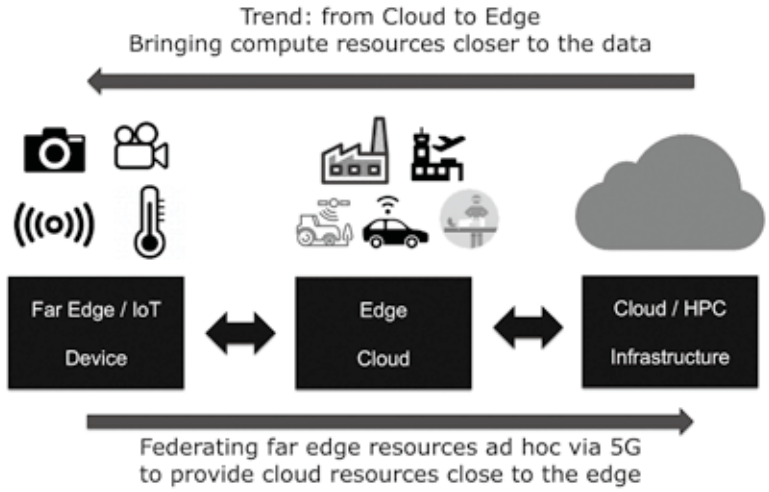
The edge/cloud model requires a certain degree of automation and fast thinking already at the local level, and this will have consequences for the functioning and organization of the digital economy. A positive outcome will be an increase in competition and new investments, and in more general terms it might lead to a more balanced and sustainable architecture of the digital world where each and every one has sovereignty over its data.

4. The European Data Strategy – a combination of policy measures and funding

In her State of the Union Address von der Leyen talks about *'Europe's Digital Decade'*, and whilst *'Europe has been too slow'* on personalized data, this *'cannot happen with industrial data'* because *'Europe is in the lead'*. With regard to its digital strategy the EU Commission will, for the foreseeable future, concentrate on the B2B domain, and because of the emergence of the IoT and the edge/cloud infrastructure it will also have to work on the new approach to industrial policy.

[7] Softbank announced it is selling Arm to US semicondactor firm NVIDIA for up to $40 billion on 18 September 2020.

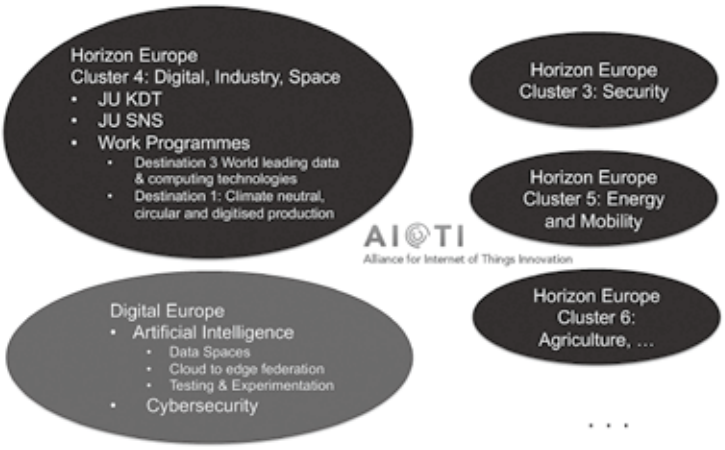
[8] See Daniel Gros[et al.]. 'Global Trends to 2035: Economy and Society' (Report for the European Parliament), November 2018



Source: European Commission, CNECT.DDG1.E.4, Internet of Things, *Max Lemke*
Figure 2 The Trend "from cloud to Edge"

When the EU Commission presented its digital vision in February 2020, it presented a package consisting of three documents[9], and according to Commission VP Vestager *'Europe's second chance at becoming a world leader on tech'*[10].

The new *Data Strategy*[11] reflects the Commission's first ever attempt to anticipate future market developments, it provides a strategic outlook and the framework for future activities of the Commission, and it is less of a technological state of the art description. The strategic priorities for Europe are threefold, and they form the overall framework: *compliant* (human-centric, inclusive, and democratic, instead of 'just safe'), *prosperous* (being competitive without subordinating everything to economic considerations), and *resilient* (digital-green twin).



Source: European Commission, CNECT.DDG1.E.4, Internet of Things, *Max Lemke*
Figure 3 EU's Program and Relevant Areas

The strategy includes the vision of an overarching common European data space as well as the creation of a number of domain- or mission specific data spaces. The EU institutions will try to create a supportive regulatory and legal framework for the development of these data spaces, which includes the right standards for data sharing and data interoperability, as well as the technical tools and infrastructures necessary to use and exchange data, as well as appropriate governance mechanisms. With regard to the future single European data space, EU law will prevail and all data-driven products and services will be fully compliant with the EU's data regulations.

Guided by the overall objective and ambition to build a single market for data, common data spaces and a data economy, the 'Data Strategy' proposes the creation of a series of large pools of data ('data spaces') in strategic sectors. The necessary infrastructure, technical tools and appropriate governance mechanisms will facilitate access and usage of the data in these common European data spaces. These data spaces require a horizontal framework as well as sectoral legislation for data access and use, and the key to bring all that together in a useful manner is interoperability for which a respective mechanism will have to be put in place. Equally important are the full compliance with data protection rules and the highest cyber-security standards possible. The governance aspects of data space management are still unknown, and the 'Data Strategy' mentions that the Commission will propose a legislative framework for the governance of common European data spaces already in Q4 2020. Nine common European data spaces are proposed, and some of them are cross-sectoral (the 'Green Deal data space', the 'Skills data space', the 'Public Administration data space'), and others more sector-specific (manufacturing, mobility, health, finance, energy and agriculture).

In order to further advance its digital sovereignty the Commission aims at creating a federated cloud infrastructure, which operates under rules and protocols that embed strict data protection and governance requirements. The respective inspiration will come from the Franco-German GAIA-X initiative, which, instead of representing a single player competing with the U.S. tech giants, will be a federated data infrastructure, open to small and large companies. In addition to that, the Commission aims at creating an EU (self-) regulatory cloud rulebook (Q2 2022), and a European cloud services marketplace (Q4 2022).

The EU's 'Data Strategy' is based on policy measures and funding, and the latter includes an ambitious investment programme called *High Impact project on European data spaces* to finance next-generation infrastructure and services for data processing by means of cloud computing in data centers and highly distributed and smart data processing at the edge. A lot of the respective funding in the next period 2021-2027 will be implemented through the programmes *Horizon Europe and Digital Europe* (Figure 3).

[9] 'Communication: Shaping Europe's Digital Future'; 'Communication: A European Strategy for Data'; 'White Paper on AI'

[10] See Melissa Heikkilä. 'Vestager touts AI-powered vision for Europe's tech future' POLITICO, 17 February 2020

[11] See European Commission.'A European strategy for data'; 19 February 2020

(1) The European Cloud build on the Franco-German GAIA-X initiative

The EU's Data Strategy does make a reference to the Franco-German GAIA-X initiative (*'In this context, the Commission will foster synergies between the work on European cloud federation and Member States' initiatives such as Gaia-X'*), and even if the Commission has initially been a bit hesitant towards the project, Commission President von der Leyen gave a clear signal in her State of the Union Address: *'And it is why we will build a European cloud as part of NextGenerationEU - based on GaiaX'*.

In a bit more than a year the Franco-German GAIA-X project has managed to develop a broader European focus, and at the moment there are around 500 participants from more than 300 companies (a lot of them SMEs).

Key emphasis of the project is on the user requirements, and users are asked to provide use cases which are then evaluated (until now there are 42 use cases from eight different domains). The evaluations have shown that 80% of the requirements are the same across the use cases and in the various domains, and since there are already existing solutions in place in some domains, GAIA-X will not reinvent the wheel but the idea is to build on any existing solutions from any of the domains. The eight domains (energy, health, Industry 4.0/SME, mobility, public sector, smart living, finance agriculture) correspond to a large extent with the data spaces proposed in the EU's 'Data Strategy', and since GAIA-X isn't an end in itself the project wants to contribute to achieving these common European data spaces. In line with the EU 'Data Strategy' GAIA-X does offer ontologies for interoperability and API within and across sector specific data spaces.

GAIA-X allows the emergence of Advanced Smart Systems such as AI, Analytics or Big Data and fosters innovation in the GAIA-X ecosystem. In order to facilitate value creation based on digital services and mechanisms, an architecture in the form of an underlying framework common to all domains is still necessary.

(2) Digital identity and electronic trust services

A particularly important aspect for the development of the Single European data space will be the area of digital verification, comprising both electronic trust services (eTS) as well as digital identify (eID). *'Trust in the online world also means helping consumers take greater control of and responsibility for their own data and identity.'*[12] On July 24, 2020, the EU Commission launched a public consultation (closed October 2) to collect feedback on drivers and barriers to the development and uptake of eID and trust services in Europe and on the impacts of the options for delivering an EU digital identity. The eIDAS Regulation[13] sets the standards and criteria for simple electronic signature, advanced electronic signature, qualified electronic signature, qualified certificates and online trust services, and it fully recognizes digital means of verification that are considered to be equivalent to physical presence. The above mentioned review of the eIDAS Regulation might lead to broadening its scope to potentially include other means of verification (e.g. fingerprint scan) and create a new system for certification of digital ID.

5. Regulatory power alone is not enough

In her book *'The Brussels effect – How the European Union rules the World'* Columbia Law School Professor Anu Bradford challenges the prevalent view that the EU is a declining world power, and she argues that despite many challenges the EU remains an influential superpower because of its ability to (unilaterally) promulgate regulations that shape the global business environment and elevate standards worldwide. The EU has become the world's leading digital regulatory power, but the actual question is whether it's enough to write the rules of the game instead of playing it, or with the words of Guntram Wolff (Director of the Brussels-based economic think tank BRUEGEL): *'Europe may be the world's AI referee, but referees don't win'*[14].

The way the EU is exporting its rules and standards to the rest of the world is also evolving. While under the *General Data Protection Regulation* the EU mainly introduced extraterritorial rules for non-EU companies active on the European market (regardless of where they're headquartered), the new approach proposed under the 'Data

[12] See European Commission. 'Shaping Europe's digital future', 19 February 2020

[13] See Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market, 23 July 2014

[14] See Guntram Wolff. 'Europe may be the world's AI referee, but referees don't win' POLITICO, 17 February 2020

Strategy' and in particular the creation of a European cloud federation (based on GAIA-X) goes beyond simple law. Member States' telecommunications ministers are expected to sign (October 15[15]) a Joint Declaration on *'Building the next generation cloud for businesses and the public sector in the EU'*, which in *'defining a common approach on federating cloud capacities'* highlights *'common conditions of participation in European cloud federation through a set of norms (such as technical standards, codes of conduct and certifications, including those foreseen in EU legislation). Cloud providers participating in European cloud federation should guarantee European standards in terms of security, data protection, consumer protection, data portability and energy efficiency and contribute to European digital sovereignty, while meeting diverse cloud user needs and ensuring competitiveness.'*

6. Mixed responses from the tech community in Brussels

Considering the many legislative proposals in the pipeline[16] the EU must now decide how restrictive it will be when it comes to protecting European values on the one hand, and supporting European innovation and companies on the other.

Non-EU tech companies (in particular those from the U.S.) are concerned about the increasing European rhetoric about sovereignty, and they ask themselves whether this is simply protectionism and the intention to establish a 'digital fortress Europe'. On the other hand, the impact of Europe's search for digital sovereignty cannot just simply be ignored, and the concerned companies will have to comply with EU rules or lose a major market. For the majority of them the smartest choice seems to be an early engagement with the EU and an effort to help shape the emerging legislation.

The Washington-headquartered *Center for Data Innovation* submitted a 42-pages response[17] to the EU Commission's consultation on the 'Data Strategy' in which it states that *'the EU data strategy shoots at the wrong targets'* and calls upon the EU to *'work with its partners—including allied countries in areas where mutual engagement is beneficial, as well as the private sector'.*

The Washington-based Information Technology Industry Council (ITI) emphasized in its first response[18] that *'for Europe to fully realise its tech leadership potential, it should take a collaborative approach to regulation and avoid prescriptive policies that could stifle innovation in emerging areas like AI'.*

China's controversial tech giant Huawei responded[19] rather positively pointing out that *'Huawei research operations in Europe can positively contribute to the implementation of key EU policy goals'* and added that the company *'will play an active role in ensuring that this positive agenda at an EU level is fully implemented'.*

Europe's most influential digital tech association *DigitalEurope* (which has a number of U.S. companies as members) also submitted a comprehensive response[20] with the main emphasis on voluntary (and no mandatory) data sharing, contractual arrangements as the preferred option, a market-friendly governance framework for the data spaces, tailored solutions for the different portability needs (B2C, B2B), standardization efforts based on existing international standards, and new cloud initiatives should not lead to limitations on cloud service offerings.

7. Conclusions

The coming decade will see a shift towards decentralised environments, and the catalyst for this new development is industrial data. The ongoing exponential growth of data volumes will soon see the current centralised cloud model reach its limits. The EU's vision to create decentralised cloud-ecosystems, which privilege data ownership, monetisation and sustainability and thus help achieve data sovereignty, have the potential to bring value to the EU economies and make them greener.

[15] See Council of the European Union.'Informal meeting of telecommunications ministers, 15 October 2020'

[16] See European Commission. '2020 Commission Work Programme'; last updated on May 27 2020

[17] See Center for Data Innovation. 'Response to the European Commission's Consultation on the European Strategy for Data'; 31 May 2020

[18] See Information Technology Industry Council. 'ITI Responds to Proposed EU Tech Policy Agenda'; 19 February 2020

[19] See Huawei. 'Huawei research operations in Europe can support key EU objectives, says Huawei EU Chief Rep'; 19 February 2020

[20] See DigitalEurope. 'DIGITALEUROPE's response to the EU Data strategy consultation'; 11 June 2020