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A European strategy for data

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1. Introduction

Over the last few years, digital technologies have transformed the economy and society, affecting all sectors of activity and the daily lives of all Europeans. Data is at the centre of this transformation and more is to come. Data-driven innovation will bring enormous benefits for citizens, for example through improved personalised medicine, new mobility and through its contribution to the European Green Deal. In a society where individuals will generate ever-increasing amounts of data, the way in which the data are collected and used must place the interests of the individual first, in accordance with European values, fundamental rights and rules. Citizens will trust and embrace data-driven innovations only if they are confident that any personal data sharing in the EU will be subject to full compliance with the EU's strict data protection rules. At the same time, the increasing volume of non-personal industrial data and public data in Europe, combined with technological change in how the data is stored and processed, will constitute a potential source of growth and innovation that should be tapped.

Citizens should be empowered to make better decisions based on insights gleaned from non-personal data. And that data should be available to all – whether public or private, big or small, start-up or giant. This will help society to get the most out of innovation and competition and ensure that everyone benefits from a digital dividend. This digital Europe should reflect the best of Europe - open, fair, diverse, democratic, and confident.

The EU can **become a leading role model for a society empowered by data to make better decisions – in business and the public sector**. To fulfil this ambition, the EU can build on a strong legal framework – in terms of data protection, fundamental rights, safety and cyber-security – and its internal market with competitive companies of all sizes and varied industrial base. If the EU is to acquire a leading role in the data economy, it has to act now and tackle, in a concerted manner, issues ranging from connectivity to processing and storage of data, computing power and cybersecurity. Moreover, it will have to improve its governance structures for handling data and to increase its pools of quality data available for use and re-use.

Ultimately, Europe aims to capture the benefits of better use of data, including greater productivity and competitive markets, but also improvements in health and well-being, environment, transparent governance and convenient public services. The measures laid out in this paper contribute to a comprehensive approach to the data economy that aim to increase the use of, and demand for, data and data-enabled products and services throughout the Single Market.

This Communication outlines a strategy for policy measures and investments to enable the data economy for the coming five years. This data strategy is presented at the same time as the Commission's Communication on "Shaping Europe's digital future" and a White Paper on

artificial intelligence that indicates how the Commission will support and promote the development and uptake of artificial intelligence across the EU.

On the basis of this strategy, the Commission launches a comprehensive consultation on the specific measures that could be taken to keep the EU at the forefront of the data-agile economy, while respecting and promoting the fundamental values that are the foundation of European societies.

2. What is at stake?

Growing data volumes and technological change

The volume of data produced in the world is growing rapidly, from 33 zettabytes in 2018 to an expected 175 zettabytes in 2025[1]. Each new wave of data represents major opportunities for the EU to become a world leader in this area. Furthermore, the way in which data is stored and processed will change dramatically over the coming 5 years. Today 80% of the processing and analysis of data takes place in data centres and centralised computing facilities, and 20% in smart connected objects, such as cars, home appliances or manufacturing robots, and in computing facilities close to the user ('edge computing'). By 2025 these proportions are likely to be inverted[2]. Aside from the economic and sustainability advantages that this development presents, it opens up additional opportunities for businesses to develop tools for data producers to increase control over their own data.

The importance of data for the economy and society

Data will reshape the way we produce, consume and live. Benefits will be felt in every single aspect of our lives, ranging from more conscious energy consumption and product, material and food traceability, to healthier lives and better health-care.

> *Personalised medicine will better respond to the patients' needs by enabling doctors to take data-enabled decisions. This will make it possible to tailor the right therapeutic strategy to the needs of the right person at the right time, and/or to determine the predisposition to disease and/or to deliver timely and targeted prevention.*

Data is the lifeblood of economic development: it is the basis for many new products and services, driving productivity and resource efficiency gains across all sectors of the economy, allowing for more personalised products and services and enabling better policy making and upgrading government services. It is an essential resource for start-ups and small and medium-sized enterprises (SMEs) in developing products and services. The availability of data is essential for training artificial intelligence systems, with products and services rapidly

[1] IDC, 2018.
[2] Gartner, 2017.

moving from pattern recognition and insight generation to more sophisticated forecasting techniques and, thus, better decisions.

Data will also fuel the wide implementation of transformative practices such as the use of digital twins in manufacturing.

> *Digital twins create a virtual replica of a physical product, process or system. The replica can for example predict when a machine will fail, based on data analysis, which allows to increase productivity through predictive maintenance.*

Moreover, making more data available and improving the way in which data is used is essential for tackling societal, climate and environment-related challenges, contributing to healthier, more prosperous and more sustainable societies. It will for example lead to better policies to achieve the objectives of the European Green Deal. At the same time, the current environmental footprint of the ICT sector is estimated to be between 5 to 9% of the world's total electricity use and more than 2% of all emissions, a large part of which is due to data centres, cloud services and connectivity. The EU's digital strategy 'Shaping Europe's digital future' proposes green transformation measures for the ICT sector.

The EU has everything to play for in the data economy of the future

Currently, a small number of Big Tech firms hold a large part of the world's data. This could reduce the incentives for data-driven businesses to emerge, grow and innovate in the EU today, but numerous opportunities lie ahead. A large part of the data of the future will come from industrial and professional applications, areas of public interest or internet-of-things applications in everyday life, areas where the EU is strong. Opportunities will also arise from technological change, with new perspectives for European business in areas such as cloud at the edge, from digital solutions for safety critical applications, and also from quantum computing. These trends indicate that the winners of today will not necessarily be the winners of tomorrow. But the sources of competitiveness for the next decades in the data economy are determined now. This is why the EU should act now .

The EU has the potential to be successful in the data-agile economy. It has the technology, the know-how and a highly skilled workforce. However, competitors such as China and the US are already innovating quickly and projecting their concepts of data access and use across the globe. In the US, the organisation of the data space is left to the private sector, with considerable concentration effects. China has a combination of government surveillance with a strong control of Big Tech companies over massive amounts of data without sufficient safeguards for individuals.

In order to release Europe's potential we have to find our European way, balancing the flow and wide use of data, while preserving high privacy, security, safety and ethical standards.

What has been done so far?

The Commission has already taken a number of steps since 2014. With the General Data Protection Regulation (GDPR)[3], the EU created a solid framework for digital trust. The upcoming review of the GDPR may provide further useful elements in this regard. Other initiatives that have fostered the development ofthe data economy are the Regulation on the free flow of non-personal data (FFD)[4], the Cybersecurity Act (CSA)[5,] and the Open Data Directive[6]. The Commission had also engaged in digital diplomacy recognising 13 countries as providing adequate level of protection for personal data.

Sector-specific legislation on data access has also been adopted in some fields to address identified market failures, such as automotive[7], payment service providers[8], smart metering information[9], electricity network data[10], or intelligent transport systems[11]. The Digital Content Directive[12] contributed to empowering individuals by introducing contractual rights when digital services are supplied to consumers who provide access to their data.

3. The vision

The Commission's vision stems from European values and fundamental rights and the conviction that the human being is and should remain at the centre. The Commission is convinced that businesses and the public sector in the EU can be empowered through the use of data to make better decisions. It is all the more compelling to seize the opportunity presented by data for social and economic good, as data – unlike most economic resources – can be replicated at close to zero cost and its use by one person or organisation does not prevent the simultaneous use by another person or organisation. That potential should be put to work to address the needs of individuals and thus create value for the economy and society. To release this potential, there is a need to ensure better access to data and its responsible usage.

The EU should create an attractive policy environment so that, by 2030, the EU's share of the data economy – data stored, processed and put to valuable use in Europe - at least corresponds to its economic weight, not by *fiat* but by choice. The aim is to create a single European data space – a genuine single market for data, open to data from across the world – where personal as well as non-personal data, including sensitive business data, are secure and businesses also

[3] Regulation (EU) 2016/679.
[4] Regulation (EU) 2018/1807.
[5] Regulation (EU) 2019/881.
[6] Directive (EU) 2019/1024.
[7] Regulation 715/2007 as amended by Regulation 595/2009.
[8] Payment Service Directive Directive 2015/2366.
[9] Directive 2019/944 for electricity, Directive 2009/73/EC for gas meters.
[10] Commission Regulation (EU) 2017/1485, Commission Regulation (EU) 2015/703.
[11] Directive 2010/40/EU.
[12] Directive (EU) 2019/770.

have easy access to an almost infinite amount of high-quality industrial data, boosting growth and creating value, while minimising the human carbon and environmental footprint. It should be a space where EU law can be enforced effectively, and where all data-driven products and services comply with the relevant norms of the EU's single market. To this end, the EU should combine fit-for-purpose legislation and governance to ensure availability of data, with investments in standards, tools and infrastructures as well as competences for handling data. This favourable context, promoting incentives and choice, will lead to more data being stored and processed in the EU.

The European data space will give businesses in the EU the possibility to build on the scale of the Single market. Common European rules and efficient enforcement mechanisms should ensure that:

- data can flow within the EU and across sectors;
- European rules and values, in particular personal data protection, consumer protection legislation and competition law, are fully respected;
- the rules for access to and use of data are fair, practical and clear, and there are clear and trustworthy data governance mechanisms in place;there is an open, but assertive approach to international data flows, based on European values.

The steps listed here to enable access to data need to be complemented with a broader industrial strategy for the data-agile economy. Data spaces should foster an ecosystem (of companies, civil society and individuals) creating new products and services based on more accessible data. Public policy can increase demand for data-enabled offerings, both by increasing the public sector's own ability to employ data for decision-making and public services and by updating regulation and sectoral policies to reflect the opportunities provided by data and ensure that they do not maintain disincentives for productive data use.

The functioning of the European data space will depend on the capacity of the EU to invest in next-generation technologies and infrastructures as well as in digital competences like data literacy. This in turn will increase Europe's technological sovereignty in key enabling technologies and infrastructures for the data economy. The infrastructures should support the creation of European data pools enabling Big Data analytics and machine learning, in a manner compliant with data protection legislation and competition law, allowing the emergence of data-driven ecosystems. These pools may be organised in a centralised or a distributed way[13]. The organisations contributing data would get a return in the form of increased access to data of other contributors, analytical results from the data pool, services such as predictive maintenance services, or licence fees.

[13] In the latter case the data are not moved to a central place in order to analyse them together with other data assets. The analytical tools come to the data, not the other way around. This makes it easier to keep the data secure and to ensure control over who accesses what data for what purposes.

While data is essential for all sectors of the economy and society, each domain has its own specificities and not all sectors are moving at the same speed. Therefore, cross-sectoral actions towards a European data space need to be accompanied by the development of sectoral data spaces in strategic areas such as manufacturing, agriculture, health, and mobility.

4. The problems

Several issues are holding the EU back from realising its potential in the data economy.

Fragmentation between Member States is a major risk for the vision of a common European data space and for the further development of a genuine single market for data. A number of Member States have started with adaptations of their legal framework, such as on use of privately-held data by government authorities[14], data processing for scientific research purposes[15], or adaptations to competition law[16]. Others are only starting to explore how to handle the issues at stake. The emerging differences underline the importance of common action in order to leverage the scale of the internal market. Progress will need to be made together on the following issues:

Availability of data: The value of data lies in its use and re-use. Currently there is not enough data available for innovative re-use, including for the development of artificial intelligence. The issues can be grouped according to who is the data holder and who is the data user, but also depend on the nature of data involved (i.e. personal data, non-personal data, or mixed data-sets combining the two[17]). Several of the issues concern the availability of data for the public good.

> ***Data for the public good****: Data is created by society and can serve to combat emergencies, such as floods and wildfires, to ensure that people can live longer and healthier lives, to improve public services, and to tackle environmental degradation and climate change, and, where necessary and proportionate, to ensure more efficient fight against crime. Data generated by the public sector as well as the value created should be available for the common good by ensuring, including through preferential access, that these data are used by researchers, other public institutions, SMEs or start-ups. Data from the private sector can also make a significant contribution as*

[14] For example the French 'LOI n° 2016-1321 du 7 octobre 2016 pour une République numérique', allowing the public sector to access certain (private sector) data of general interest or the Finnish Forest Act obliging forest owners to share information related to the management of the forest with the public sector.
[15] For example the Finnish law on secondary use of health and social data, creating a data permit authority.
[16] Discussions on adapting the competition rules to make them better equipped for the data economy are for example ongoing in Germany. See also the report for the Commission on 'Competition policy for the digital era'.
[17] For adding legal certainty, the European Commission issued practical guidance for businesses on how to process mixed datasets in May 2019; see COM(2019)250 https://ec.europa.eu/digital-single-market/en/news/practical-guidance-businesses-how-process-mixed-datasets

public goods. The use of aggregated and anonymised social media data can for example be an effective way of complementing the reports of general practitioners in case of an epidemic.

- *Use of public sector information by business (government-to-business – G2B – data sharing).* Opening up government-held information is a long-standing EU policy[18]. This data has been produced with public money and should therefore benefit society. The recently revised Open Data Directive[19] as well as other sector-specific legislation ensures that the public sector makes more of the data it produces easily available for use[20], in particular by SMEs but also for civil society, and the scientific community, in the framework of independent public policy evaluations. However, governments can do more. High-value datasets are often not available under the same conditions across the EU to the detriment of the use of the data by SMEs that cannot afford this fragmentation. At the same time, sensitive data (e.g. health data) in public databases is often not made available for research purposes, in the absence of capacity or mechanisms that allow specific research actions to be taken in a manner compliant with personal data protection rules.

- *Sharing and use of privately-held data by other companies (business-to-business – B2B – data-sharing).* In spite of the economic potential, data sharing between companies has not taken off at sufficient scale. This is due to a lack of economic incentives (including the fear of losing a competitive edge), lack of trust between economic operators that the data will be used in line with contractual agreements, imbalances in negotiating power, the fear of misappropriation of the data by third parties, and a lack of legal clarity on who can do what with the data (for example for co-created data, in particular IoT data).

- *Use of privately-held data by government authorities (business-to-government – B2G – data sharing).* There is currently not enough private sector data available for use by the public sector to improve evidence-driven policy-making[21] and public services such as mobility management or enhancing the scope and timeliness of official statistics[22], and hence their relevance in the context of new societal developments. The recommendations of an Expert Group[23] created by the Commission, include the creation of national structures for B2G data sharing, the development of appropriate incentives to create a

[18] Since the adoption of Directive 2003/98/EC on the re-use of public sector information.
[19] Directive (EU) 2019/1024, repealing Directive 2003/98/EC as revised by Directive 2013/37/EU.
[20] The European open data portal contains examples of a range of companies from across the EU that have benefited from open data, and some of them would not exist without the data availability. https://www.europeandataportal.eu/en/using-data/use-cases.
[21] For example in new areas such as platform work.
[22] The scope of the work on B2G does not include the use of data for law enforcement purposes. Any action in this area should comply with data protection and privacy legislation.
[23] see here: https://ec.europa.eu/digital-single-market/news-redirect/666643.

data-sharing culture, and the suggestion to explore an EU regulatory framework to govern the public sector's re-use for the public interest of privately-held data..

- *Sharing of data between public authorities* is equally important. It can make a considerable contribution to improving policy making and public services, but also to reduce the administrative burden on companies operating in the Single Market ('once only' principle).

Imbalances in market power: Beside the high concentration in the provision of cloud services and data infrastructures, there are also market imbalances in relation to access to and use of data, for example when it comes to access to data by SMEs. A case in point comes from large online platforms, where a small number of players may accumulate large amounts of data, gathering important insights and competitive advantages from the richness and variety of the data they hold. This can affect, in turn, the contestability of markets in specific cases – not only the market for such platform services, but also the various specific markets for goods and services served by the platform, in particular if the platform is itself active on such related markets. The high degree of market power resulting from the 'data advantage' can enable large players to set the rules on the platform and unilaterally impose conditions for access and use of data or, indeed, allow leveraging of such 'power advantage' when developing new services and expanding towards new markets. Imbalances may also arise in other situations, such as with regard to access to co-generated IoT data from industrial and consumer devices.

Data interoperability and quality: Data interoperability and quality, as well as their structure, authenticity and integrity are key for the exploitation of the data value, especially in the context of AI deployment. Data producers and users have identified significant interoperability issues which impede the combination of data from different sources within sectors, and even more so between sectors. The application of standard and shared compatible formats and protocols for gathering and processing data from different sources in a coherent and interoperable manner across sectors and vertical markets should be encouraged through the rolling plan for ICT standardisation[24] and (as regards public services) a strengthened European Interoperability Framework.[25]

Data governance: There have been calls to further reinforce the governance of data use in society and the economy.[26] For these data spaces to become operational, organisational approaches and structures (both public and private) are needed that enable data-driven innovation on the basis of the existing legal framework.

[24] https://ec.europa.eu/digital-single-market/en/news/rolling-plan-ict-standardisation.
[25] https://ec.europa.eu/isa2/eif_en; see: COM(2017)134 final.
[26]E.g. in a recent series of workshops undertaken by the Commission on the concept of 'common European data spaces' https://ec.europa.eu/digital-single-market/en/news/report-european-commissions-workshops-common-european-data-spaces.

Data infrastructures and technologies: The digital transformation of the EU economy depends on the availability and uptake of secure, energy-efficient, affordable and high-quality data processing capacities, such as those offered by cloud infrastructures and services, both in data centres and at the edge. In this perspective, the EU needs to reduce its technological dependencies in these strategic infrastructures, at the centre of the data economy.

However problems persist on both the supply and demand side of cloud.

On the supply side:

- EU-based cloud providers have only a small share of the cloud market, which makes the EU highly dependent on external providers, vulnerable to external data threats and subject to a loss of investment potential for the European digital industry in the data processing market;
- Service providers operating in the EU may also be subject to legislation of third countries, which presents the risk that data of EU citizens and businesses are accessed by third country jurisdictions that are in contradiction with the EU's data protection framework. In particular, concerns have been voiced about several Chinese laws related to cybersecurity and national intelligence.
- While third country legislations like the U.S. CLOUD Act are based on public policy reasons such as law enforcement access to data for criminal investigations, the application of foreign jurisdictions' legislation raises legitimate concerns for European businesses, citizens and public authorities over legal uncertainty and compliance with applicable EU law, such as data protection rules. The EU is acting to mitigate such concerns through mutually beneficial international cooperation, such as the proposed EU-U.S. Agreement to facilitate cross border access to electronic evidence, alleviating the risk of conflict of laws and establishing clear safeguards for the data of EU citizens and companies. The EU is also working at the multilateral level, including in the context of the Council of Europe, to develop common rules on access to electronic evidence, based on a high level of protection of fundamental and procedural rights.
- There is uncertainty about compliance of cloud service providers with important EU rules and standards, for example on data protection.
- Micro-enterprises and SMEs suffer economic detriment because of contract-related problems, e.g. non-conformity with the contract or unfair contract terms.[27]

On the demand side:

- There is a low cloud uptake in Europe (1 company in 4, only 1 in 5 for SMEs[28]). Significant divergences in cloud uptake exist between Member States (from below 10% to up to 65% of businesses using cloud);

[27] Study on the economic detriment from unfair and unbalanced cloud computing contract terms.

[28] https://ec.europa.eu/eurostat/statistics-explained/index.php/Cloud_computing_-_statistics_on_the_use_by_enterprises.

- Specifically, cloud uptake in the European public sector is low. This may lead to less efficient digital public services, not only because of the clear potential to cut IT costs by cloud adoption, but also because governments need the scalability of cloud computing to deploy technologies like Artificial Intelligence.
- There is frequently insufficient visibility on the market of smaller, often European, providers of innovative cloud services.
- European businesses often experience problems with multi-cloud interoperability, in particular data portability.

Empowering individuals to exercise their rights: Individuals value the high level of protection granted by the GDPR and ePrivacy legislation. However, they suffer from the absence of technical tools and standards that make the exercise of their rights simple and not overly burdensome. The potential of Article 20 of the GDPR to enable novel data flows and foster competition is recognised in reports for the Commission and Member State governments[29], not limited to the EU[30]. Yet, as a result of its design to enable switching of service providers rather than enabling data reuse in digital ecosystems the right has practical limitations.

Since increasingly large amounts of data are generated by consumers when they use IoT devices and digital services, consumers may be faced with risks of discrimination, unfair practices and 'lock-in' effects. Considerations of consumer and innovation empowerment underlie the provisions on data access and reuse of the Payment Services Directive

In response to this, there are calls to give individuals the tools and means to decide at a granular level what is done with their data (by the MyData movement and others)[31]. This promises significant benefits to individuals, including to their health and wellness, better personal finances, reduced environmental footprint, hassle-free access to public and private services and greater oversight and transparency over their personal data. Those tools and means include consent management tools, personal information management apps, including fully decentralised solutions building on blockchain, as well as personal data cooperatives or trusts acting as novel neutral intermediaries in the personal data economy[32]. Currently such tools are still in their infancy, although they have significant potential and need a supportive environment.

Skills and data literacy: Currently, big data and analytics are top of the list of critical skills shortages. In 2017, there were approximately 496 000 unfilled positions in the area of big data

[29] Cf. e.g. Cremer/deMontjoye/Schweitzer, Competition policy for the digital era; Furman, Unlocking digital competition, report for the UK government; German Datenethikkommission.
[30] See introduction of a new Consumer Data Right in Australia, https://www.accc.gov.au/focus-areas/consumer-data-right-cdr-0 and the consultation in on data portability in Singapore.
[31] https://mydata.org/; https://www.decodeproject.eu/; https://solid.mit.edu/, https://radicalxchange.org/
[32] See report of German Datenethikkommission, p. 133 and Staff Working Document, p. 8.

and analytics in the EU27[33]. Moreover, general data literacy in the workforce and across the population is relatively low and participation gaps exist (for example by elderly people). If it is not addressed, the shortage in data experts and the lack of data literacy will affect the EU's capacity to master the challenges of the data economy and society.

Cybersecurity: In the area of cybersecurity Europe has developed an already comprehensive framework to support Member States, businesses and citizens to tackle cybersecurity threats and attacks, and Europe will continue to develop and improve its mechanisms to protect its data and the services building on it. The safe and widespread use of data-fuelled products and services will also depend on the highest cybersecurity standards. The EU Cybersecurity Certification Framework and the EU Agency for Cybersecurity (ENISA)[34] are expected to play an important role towards that endeavour.

However, the new data paradigm where less data will be stored in data centres, and more data will be spread in a pervasive way closer to the user 'at the edge', brings new challenges for cybersecurity. It will be essential to preserve data security when data are being exchanged. Ensuring the continuity of access controls (i.e. how security attributes of data are managed and respected) across data value chains will be a key, but demanding, pre-requisite to foster data sharing and ensure trust among the different actors of European data ecosystems.

*New decentralised digital technologies such as **blockchain** offer a further possibility for both individuals and companies to manage data flows and usage, based on individual free choice and self-determination. Such technologies will make dynamic data portability in real time possible for individuals and companies, along with various compensation models.*

5. The strategy

This European data strategy serves to realise the vision for a genuine single market for data and tackles the problems identified through policy measures and funding, building on what has already been achieved in the last few years.

Each of the new legislative measures will be prepared and assessed in full compliance with the Better Regulation principles.

The actions are based on four pillars:

[33] IDC 2019.
[34] Regulation (EU) 2019/881 – European Cybersecurity Act.

A. A cross-sectoral governance framework for data access and use

Cross-sectoral (or horizontal) measures for data access and use should create the necessary over-arching framework for the data-agile economy, thereby avoiding harmful fragmentation of the internal market through inconsistent actions between sectors and between the Member States. Such measures should nonetheless take into account the specificities of individual sectors and of the Member States.

The Commission's approach to regulation is to create frameworks that shape the context, allowing lively, dynamic and vivid ecosystems to develop. Because it is difficult to fully comprehend all elements of this transformation towards a data-agile economy, the Commission deliberately abstains from overly detailed, heavy-handed *ex ante* regulation, and will prefer an agile approach to governance that favours experimentation (such as regulatory sandboxes), iteration, and differentiation.

In line with this principle, a first priority for operationalising the vision is to put in place an **enabling legislative framework for the governance of common European data spaces (Q4 2020)**. Such governance structures should support decisions on what data can be used in which situations, facilitate cross-border data use, and prioritise interoperability requirements and standards within and across sectors, while taking into account the need for sectoral authorities to specify sectoral requirements. The framework will reinforce the necessary structures in the Member States and at EU level to facilitate the use of data for innovative business ideas, both at sector- or domain-specific level and from a cross-sector perspective. It will build on recent initiatives in the Member States[35] and in individual sectors to address one or more of the following issues:

- strengthen the governance mechanisms at EU level and in the Member States relevant for cross-sector data use and for data use in the common sectoral data spaces, involving both private and public players. This could include a mechanism to prioritise standardisation activities[36] and to work towards a more harmonised description and overview of datasets, data objects and identifiers to foster data interoperability (i.e. their usability at a technical level[37]) between sectors and, where relevant, within sectors[38]. This can be done in line with the principles on Findability, Accessibility, Interoperability and Reusability (FAIR) of data taking into account the developments and decisions of sector-specific authorities;

[35] Finnish Health and Social Data Permit Authority (https://www.findata.fi/en/), French Health Data Hub (https://www.health-data-hub.fr/), German Forschungsdatenzentrum (https://www.forschungsdatenzentrum.de/en).
[36] The idea is not to create a body that develops new standards, but rather to be able to prioritise between existing and future standards to be developed.
[37] See also the FAIR data principles: https://www.force11.org/group/fairgroup/fairprinciples.
[38] For instance, the 2017 Tallinn Ministerial Declaration on e-Government calls on governments to "increase the findability, quality and technical accessibility of data in key base registers."

- facilitate decisions on which data can be used, how and by whom for scientific research purposes in a manner compliant with the GDPR. This is particularly relevant for publicly-held databases with sensitive data not covered by the Open Data Directive;
- make it easier for individuals to allow the use of the data they generate for the public good, if they wish to do so ('data altruism'), in compliance with the GDPR.

Secondly, the Commission will work on making more high-quality public sector data available for re-use, in particular in view of its potential for SMEs. In order to open up key public sector reference data sets for innovation, it shall start the procedure for the adoption of an **Implementing act on high-value data sets (Q1 2021)** under the Open Data Directive, making these data sets available across the EU for free, in machine-readable format and through standardised Application Programming Interfaces (APIs). The Commission will look into mechanisms to take into account the particular needs of SMEs. It will also assist the Member States to ensure a timely and accurate transposition of the new rules of the Open Data Directive by 17 July 2021.

Third, the Commission will **explore the need for legislative action on issues that affect relations between actors in the data-agile economy** to provide incentives for horizontal data sharing across sectors (complementing data sharing within sectors as described in the appendix)). One or more of the following issues could be taken forward in a **Data Act (2021**):
- Foster business-to-government data sharing for the public interest also in the light of the recommendations included in the report of the Expert Group on Business-to-Government Data Sharing).
- support business-to-business data sharing, in particular addressing issues related to usage rights for co-generated data (such as IoT data in industrial settings), typically laid down in private contracts. The Commission will also seek to identify and address any undue existing hurdles hindering data sharing and to clarify rules for the responsible use of data (such as legal liability). The general principle shall be to facilitate voluntary data sharing.
- only where specific circumstances so dictate[39], access to data should be made compulsory, where appropriate under fair, transparent, reasonable, proportionate and/or non-discriminatory conditions[40].
- evaluating the IPR framework with a view to further enhance data access and use (including a possible revision of the Database Directive[41] and a possible clarification of the application of the Trade Secrets Protection Directive[42] as an enabling framework).

[39] A data access right should only be sector-specific and only given if a market failure in this sector is identified/can be foreseen, which competition law cannot solve. The scope of a data access right should take into account legitimate interests of the data holder and needs to respect the legal framework.
[40] Variations of this principle apply in particular with respect to certain motor vehicle repair and maintenance information to be made accessible under Regulation 715/2007 as well as for information resulting from testing of chemicals on vertebrate animals under Regulation 1907/2006 (REACH).
[41] Directive 96/9/EC.

Furthermore, the Commission will assess what measures are necessary to establish data pools for data analysis and machine learning.

The Commission will provide more guidance to stakeholders on the compliance of data sharing and pooling arrangements with EU competition law by means of an update of the Horizontal Co-operation Guidelines[43]. The Commission is also prepared to provide additional individual project-related guidance on the compatibility with EU competition rules, if needed. In the exercise of its merger control powers, the Commission will look closely at the possible effects on competition of large-scale data accumulation through acquisitions and at the utility of data-access or data-sharing remedies to resolve any concerns.

In its ongoing review of a number of State Aid guidelines, the Commission will examine the relationship between public support to undertakings (e.g. for digital transformation) and the minimisation of competition distortions through data-sharing requirements for beneficiaries.

The review of the current self-regulatory approach for cloud provider switching[44] could lead to further action, depending on the progress made by market players.

The Commission will also consider jurisdictional issues related to data. These issues create uncertainty for businesses which may face conflicting rules. The EU should not compromise on its principles: all companies which sell goods or provide services related to the data-agile economy in the EU must respect EU legislation and this should not be compromised by jurisdictional claims from outside the EU.

The Commission will consider measures that facilitate the use of data in products and services and increase demand for data-enabled services. Sectoral reviews should identify regulatory and non-regulatory obstacles to the use of data and data-enabled offerings. Increased availability and standardisation of data should also facilitate real-time and cross-border compliance, leading to reductions in administrative burdens and barriers to the Single Market. Furthermore, governments can also foster demand through increased use of data-analytics and automated services in public services and decision making.

The accumulation of vast amounts of data by Big Tech companies, the role of data in creating or reinforcing imbalances in bargaining power and the way these companies use and share the data across sectors is being analysed by the Observatory of the Online Platforms Economy. The issue will not be addressed as part of the Data Act, but under the broader fact-finding around the high degree of market power of certain platforms and also in the context of the Commission's work on the Digital Services Act package. On the basis of this fact-finding, the Commission will consider how best to address more systemic issues related to platforms and data, including by *ex ante* regulation if appropriate, to ensure that markets stay open and fair.

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[42] Directive (EU) 2016/943.
[43] 2011/C 11/01.
[44] https://swipo.eu/ The approach is based on the Free flow of data regulation, Regulation (EU) 2018/1807.

Leading by example

The Commission will strive for excellence in the way it organises its own data, uses the data for better policy making, and makes the data it produces and funds available to others, including through the EU Open Data Portal[45].

The EU will continue to make data resulting from its research and deployment programmes available in line with the principle 'as open as possible, as closed as necessary', and will continue to facilitate discovery, sharing of, access to and reuse of data and services by researchers through the European Open Science Cloud (EOSC)[46].

The EU will also contribute data and infrastructure from the Copernicus earth observation programme to underpinning the European data spaces where relevant. At the same time, enhancing the Copernicus ecosystem through the application of European digital technological solutions will offer new innovation opportunities to the data spaces constituency, both public and private.

The EU will seek to make increased use of data and data analytics in its internal processes and as an input to Commission decision-making and reviews of existing policy

Key actions

- Propose a legislative framework for the governance of common European data spaces, Q4 2020
- Adopt an implementing act on high-value data-sets, Q1 2021
- Propose, as appropriate, a Data Act, 2021
- Analysis of the importance of data in the digital economy (e.g. through the Observatory of the Online Platform Economy), and review of the existing policy framework in the context of the Digital Services Act package (Q4 2020).

B. Enablers: Investments in data and strengthening Europe's capabilities and infrastructures for hosting, processing and using data, interoperability

Europe's data strategy relies on a thriving ecosystem of private actors to create economic and societal value from data. Start-ups and scale-ups will play a key role in developing and growing disruptive new business models that fully take advantage of the data revolution. Europe should offer an environment that supports data-driven innovation and stimulates demand for products and services that rely on data as an important factor of production.

[45] https://data.europa.eu/euodp/en/data/.

[46] https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud. See also COM (2016) 178 final and SWD(2018)83.

Making rapid progress on data-driven innovation in strategic areas requires investments, both from the private and public sectors. The Commission will use its convening power as well as EU funding programmes to strengthen Europe's technological sovereignty for the data-agile economy. This will be done through standard setting, tool development, best practices collection on how to deal with personal data (especially around pseudonymization) as well as build-out of next-generation infrastructures for data processing. Where relevant, the investments will be co-ordinated with relevant authorities in Member States and paired, in line with state aid rules, with national and regional funding and with investments through the structural and investment funds.

In the period 2021-2027, **the Commission will invest in a High Impact Project on European data spaces and federated cloud infrastructures**..

The project will fund infrastructures, data-sharing tools, architectures and governance mechanisms for thriving data-sharing and Artificial Intelligence ecosystems. It will be based on the European federation (i.e. interconnection) of energy-efficient and trustworthy edge and cloud infrastructures (Infrastructure-as-a-Service, Platform-as-a-Service and Software-as-a-Service services). It will address the specific needs of industries in the EU, including hybrid cloud deployment models that allow data processing at the edge with no latency (cloud-to-edge). This project will involve and benefit the European ecosystem of data-intensive companies, and will support European companies and the public sector in their digital transformation.

For this project to be credible as a pan-European initiative, it needs an adequate level of investment. The Member States and industry are expected to co-invest with the Commission in the project, which could arrive at a total funding in the order of €4-6 billion, of which the Commission could aim at financing €2 billion, drawing upon different spending programmes, subject to an agreement on the next Multiannual Financial Framework.

This Project needs to be seen in the context of a **wider set of strategic EU investments in new technologies** that the Commission will present in March 2020 **as part of its industrial strategy**. They concern in particular funding for edge computing, high-performance computing/quantum computing, cyber-security, low-power processors and 6G networks. These investments are essential for the EU's data infrastructure of the future, to equip Europe with the right infrastructures, computing power, encryption capacity and cybersecurity tools to process data.

High Impact Project: developing common European data spaces and interconnecting cloud infrastructures

Concretely, the Commission intends to fund the **establishment of EU-wide common, interoperable data spaces** in strategic sectors. Such spaces aim at overcoming legal and technical barriers to data sharing across organisations, by combining the necessary tools and infrastructures and addressing issues of trust, for example by way of common rules developed

for the space. The spaces will include: (i) the deployment of data-sharing tools and platforms; (ii) the creation of data governance frameworks; (iii) improving the availability, quality and interoperability of data – both in domain-specific settings and across sectors. Funding will also support authorities in the Member States in making high value data sets available for re-use in the different common data spaces.

The support for data spaces will also cover data processing and computing capacities that comply with essential requirements in terms of environmental performance, security, data protection, interoperability and scalability.

With focus on the areas where EU level support has clear added value, investments may also cover the interconnection of existing computing capacities at national[47] and European level, including High Performace Computing capacities[48], and will -where needed- bring together the capacity of data processing resources. The aim is to help common data and world class cloud infrastructures for the public good to emerge, enabling secure data storage and processing for the public sector and research institutions. Similar positive effects are expected from the interconnection with the European Open Science Cloud (EOSC) and the Data and Information Access Services (DIAS) cloud-based platform that provides access to services based on the Copernicus earth observation data.

The private sector, including notably SMEs, also needs data and cloud infrastructures and services that provide the essential features of security, sustainability, interoperability and scalability. This is essential for European businesses to benefit from a complete value chain of data generation, processing, access and re-use[49]. The investment track will bring together private actors with public support to develop common platforms offering access to a large diversity of cloud services for secure data storage and sharing as well as applications ranging from artificial intelligence to simulation, modelling, digital twins and high performance computing (HPC) resources. The platform will cover all the layers of data and computing infrastructure and services and will seize the opportunities offered by latest developments such as edge computing, the deployment of 5G and the uptake of Internet of Things across industrial sectors. It will also help develop a dynamic ecosystem for a data- and cloud-based supply industry in Europe across the value chain.

The cloud federation component of the High Impact Project will foster the gradual rebalancing between centralised data infrastructure in the cloud and highly distributed and smart data processing at the edge. Such a project should therefore interconnect emerging edge computing capacities from the start. Over time, the project should furthermore enable access to top-end high-performance computers and its integration with mainstream data processing

[47] Such as the French "Cloud de Confiance" initiative or the Polish Common State IT Infrastructure Programme (WIIP)
[48] Notably the capacities supported under the EuroHPC initiative.
[49] For example as expressed by the industry support to the German Gaia-X project.

services. This will provide a seamless computing continuum to maximize the growth and exploitation of common European data spaces for public, industrial and scientific applications.

In this context, the Commission will foster synergies between the work on European cloud federation and Member States' initiatives such as Gaia-X[50]. This is necessary to avoid multiplication of fragmented cloud federation and data-sharing initiatives, as the success of such an initiative would depend on pan-European participation and capacity to scale. For this reason, the Commission will facilitate **Memoranda of Understanding with Member States by Q3 2020**, starting with those having existing cloud federation and data-sharing initiatives.

Enabling access to competitive, secure and fair European cloud services

In order to protect the rights and interests of EU companies and citizens, the Commission, with the support of the relevant authorities of the Member States, will pay particular attention to the adherence of cloud service providers operating on the EU market to EU rules (e.g. General Data Protection Regulation, Free Flow of non-personal Data Regulation and the Cybersecurity Act) and, where relevant, their envisaged implementation through self- and co-regulatory mechanisms and technological means to increase trust, such as security by design and automated compliance. Currently, no comprehensive overview of these EU rules and self-/co-regulatory schemes is available for cloud providers and users. In this context, the Commission will bring together **by Q2 2022** a coherent framework around the different applicable rules (including self-regulation) for cloud services, in the form of a '**cloud rulebook'.** In a first instance, the cloud rulebook will offer **a compendium of existing cloud codes of conduct and certification** on security, energy efficiency, quality of service, data protection and data portability. In the area of energy efficiency earlier action will be considered.

In coherence with the cloud rulebook, the Commission will facilitate the development of **common European standards and requirements for the public procurement of data processing services**. This will enable the EU's public sector at European, national, regional and local level to also become a driver of new EU data processing capacities, rather than just a beneficiary of such European infrastructures[51].

To fully leverage this potential, additional work should be done to connect demand-side organisations in the private and public sector to the new and innovative offering of tailored data processing services, specifically at Platform-as-a-Service and Software-as-a-Service

[50] An initiative to stimulate cloud federation from the German perspective, presented by the German government on 29 October 2019. The purpose of the project is to cater for European standards and reference architectures to create EU-based 'virtual hyperscale providers'.

[51] Examples of similar public procurement programmes in this area can be drawn from third countries, e.g. the American 'FedRAMP' government procurement program. It provides a standardised approach to security assessment, authorisation, and continuous monitoring for cloud products and services across federal agencies.

levels. The set-up of a **cloud services marketplace** for EU users from the private and public sector will be facilitated by the Commission **by Q4 2022**. The marketplace will put potential users (in particular the public sector and SMEs) in the position to select cloud processing, software and platform service offerings that comply with a number of requirements in areas like data protection, security, data portability, energy efficiency and market practice. Participation in the marketplace for service providers will be made conditional on the use of transparent and fair contract conditions, which the current market does not always provide, specifically to micro-enterprises and SME users[52]. The marketplace can facilitate public sector procurement of alternative solutions, and take-up by the public sector can support the marketplace due to its significant aggregate demand.

While a number of Member States are already developing similar marketplace initiatives at national level, the advantage of an EU-level cloud services marketplace is two-fold: first, it can resolve the current problem of market asymmetry between hyperscale global actors that often offer integrated solutions containing applications also provided by smaller (EU) players. Second, it can generate clarity about the compliance of cloud services with relevant rules. This will ensure a better match between the EU offer and demand stemming notably from public administrations, services of general public interest and SMEs.

Support progress on data technologies

The Horizon Europe programme will continue to support technologies that are crucial for the next stages of the data economy, such as privacy preserving technologies and technologies underpinning industrial and personal data spaces. Several Horizon Europe candidate partnerships, such as the partnership for Artificial intelligence, data and robotics and the European Open Science Cloud partnership, that are in preparation can help steer the investments in this area.

Key actions

- Invest **in a High Impact project on European data spaces**, encompassing data sharing architectures (including standards for data sharing, best practices, tools) and governance mechanisms, as well as the European federation of energy-efficient and trustworthy cloud infrastructures and related services, with a view to facilitating combined investments of €4-6 billion, of which the Commission could aim at investing €2 billion. First implementation phase foreseen for 2022;
- Sign Memoranda of Understanding with Member States on cloud federation, Q3 2020;

[52] See: 'Study on the economic detriment to SMEs arising from unfair and unbalanced cloud computing contracts', https://ec.europa.eu/info/sites/info/files/dg_just_cloud_computing_final_report_web_final.pdf.

- Launch a European cloud services marketplace, integrating the full stack of cloud service offering, Q4 2022;

- Create an EU (self-)regulatory cloud rulebook, Q2 2022.

C. Competences: Empowering individuals, investing in skills and in SMEs

Empowering individuals with respect to their data

Individuals should be further supported in enforcing their rights with regard to the use of the data they generate. They can be empowered to be in control of their data through tools and means to decide at a granular level about what is done with their data ('personal data spaces'). This could be supported by enhancing the portability right for individuals under Article 20 of the GDPR, giving them more control over who can access and use machine-generated data, for example through stricter requirements on interfaces for real-time data access and making machine-readable formats compulsory for data from certain products and services, e.g. data coming from smart home appliances or wearables. In addition, rules for providers of personal data apps or novel data intermediaries such as providers of personal data spaces could be considered, guaranteeing their role as a neutral broker[53]. These issues can be further explored in the context of the Data Act mentioned above. The Digital Europe programme will also support the development and roll-out of 'personal data spaces'.

Investments in skills and general data literacy

The funding dedicated to skills under the Digital Europe programme will contribute to narrowing the gap in terms of big data and analytics capacities. The programme will make funding available to expand the digital talent pool with in the order of 250 000 people who will be able to deploy the latest technologies in businesses throughout the EU. Given the importance of data in the digital economy, many of these are likely to be related to data.

Overall, by 2025, the EU and the Member States should have halved the current gap of 1 million digital specialists, including by putting a focus on increasing the participation of women.

The idea of a network of data stewards from across data-intensive organisations (both businesses and the public sector), put forward by the expert group on Business-to-Government data sharing, will be further explored.

In terms of general data literacy, the Reinforced Skills agenda will set out a pathway showing how EU and Member State action can increase the proportion of the EU population with basic digital skills, from the current 57% to 65% by 2025.

[53] Secure and universally usable digital identities are also crucial to enabling individuals' access to and control over their data.

Big data and learning analytics offer new opportunities to capture, analyse and use data to improve education and training. The updated **Digital Education Action Plan** will reinforce better access to and use of data as one of its key priorities, in order to make education and training institutions fit for the digital age and equip them with the capabilities needed for making better decisions and improving skills and competences.

Dedicated capacity building for SMEs

The forthcoming European SME strategy will define measures to build capacity for SMEs and start-ups. Data is an important asset in this context, since starting or scaling a company based on data is not very capital intensive. SMEs and start-ups often require legal and regulatory advice to fully capture the many opportunities ahead from data-based business models.

The Horizon Europe and Digital Europe programmes as well as the structural and investment funds will create opportunities for SMEs in the data economy, to have better access to data and to develop new services and applications based on data, inter alia through incubation schemes.

Key action

- Explore enhancing the portability right for individuals under Article 20 of the GDPR giving them more control over who can access and use machine-generated data (possibly as part of the Data Act in 2021).

D. Common European data spaces in strategic sectors and domains of public interest

In complement to the horizontal framework, as well as to the funding and the actions on skills and empowerment of individuals under A, B and C[54], the Commission will promote the development of common European data spaces in strategic economic sectors and domains of public interest. These sectors or domains are those where the use of data will have systemic impact on the entire ecosystem, but also on citizens.

This should lead to the availability of large pools of data in these sectors and domains, combined with the technical tools and infrastructures necessary to use and exchange data, as well as appropriate governance mechanisms. While not having a one-size-fits-all approach, common governance concepts and models can be replicated in the different sectors.

The horizontal framework will – where appropriate – be complemented by sectoral legislation for data access and use, and mechanisms for ensuring interoperability. Differences between the sectors will depend on the maturity of the discussions on and problems identified with data availability in the sector. A further relevant factor is the degree of public interest and involvement in a given sector, which may be higher in areas such as health and lower in areas such as manufacturing. The potential cross-sector use of data between sectors also needs to be

[54] The list of sectoral data spaces is not exhaustive and can be extended.

taken into account. The data spaces will be developed in full compliance with data protection rules and according to the highest available cyber-security standards.

Data spaces need to be complemented by policies that stimulate the use of data and demand for services enriched with data. Work on sectoral data spaces will be complemented by sectoral measures across the data value chain.

Building on the ongoing experience with the research community with the European Open Science Cloud, the Commission will also support the establishment of the following nine common European data spaces:

- **A Common European industrial (manufacturing) data space,** to support the competitiveness and performance of the EU's industry, allowing to capture the potential value of use of non-personal data in manufacturing (estimated at € 1,5 trillion by 2027).
- **A Common European Green Deal data space,** to use the major potential of data in support of the Green Deal priority actions on climate change, circular economy, zero-pollution, biodiversity, deforestation and compliance assurance. The "GreenData4All" and 'Destination Earth' (digital twin of the Earth) initiatives will cover concrete actions.
- **A Common European mobility data space,** to position Europe at the forefront of the development of an intelligent transport system, including connected cars as well as other modes of transport. Such data space will facilitate access, pooling and sharing of data from existing and future transport and mobility databases.
- **A Common European health data space,** which is essential for advances in preventing, detecting and curing diseases as well as for informed, evidence-based decisions to improve the accessibility, effectiveness and sustainability of the healthcare systems.
- **A Common European financial data space,** to stimulate, through enhanced data sharing, innovation, market transparency, sustainable finance, as well as access to finance for European businesses and a more integrated market.
- **A Common European energy data space,** to promote a stronger availability and cross-sector sharing of data, in a customer-centric, secure and trustworthy manner, as this would facilitate innovative solutions and support the decarbonisation of the energy system.
- **A Common European agriculture data space,** to enhance the sustainability performance and competitiveness of the agricultural sector through the processing and analysis of production and other data, allowing for precise and tailored application of production approaches at farm level.
- **Common European data spaces for public administration,** to improve transparency and accountability of public spending and spending quality, fighting corruption, both

at EU and national level, and to address law enforcement needs and support the effective application of EU law and enable innovative 'gov tech', 'reg tech' and 'legal tech' applications supporting practitioners as well as other services of public interest

- **A Common European skills data space**, to reduce the skills mismatches between the education and training system on the one hand and the labour market needs on the other.

The annex presents in more detail each of the sector- and domain-specific common European data spaces, with background on the sector-specific policies and legislation underpinning the creation of such spaces in the different sectors and domains, and proposing sector-specific actions that are tangible, sizable, focused on data, and accompanied by a clear and realistic timeline.

The Commission may consider launching, in a sequential way, additional common European data spaces in other sectors.

6. An open, but proactive international approach

The vision of a common European data space implies an open, but assertive approach to international data flows, based on European values. Today's European companies operate in a connected environment that goes beyond the EU's borders, so that international data flows are indispensable for their competitiveness. Building upon the strength of the Single Market's regulatory environment, the EU has a strong interest in leading and supporting international cooperation with regard to data, shaping global standards and creating an environment in which economic and technological development can thrive, in full compliance with EU law.

At the same time, European companies operating in some third countries are increasingly faced with unjustified barriers and digital restrictions. The EU will continue to address these unjustified obstacles to data flows in bilateral discussions and international fora – including the World Trade Organisation – while promoting and protecting European data processing rules and standards, in full compliance with EU legislation. The Commission will be particularly vigilant to protect and assert the rights, obligations and interests of Europeans and companies, in particular as regards data protection, security and fair and trustworthy market practices. The Commission is convinced that international cooperation must be based on an approach that promotes the EU's fundamental values, including protection of privacy. The EU must ensure, therefore, that any access to EU citizen's personal data and European commercially sensitive data is in compliance with its values and legislative framework. In that context, transfers and sharing of data between trusted countries should be promoted. As regards personal data, international transfers are done via adequacy decisions and other existing transfer tools which guarantee that the protection travels with the data no matter where the data is. Additionally, and without prejudice to the EU's framework for the protection of personal data, free and safe flow of data should be ensured with third countries,

subject to exceptions and restrictions for public security, public order and other legitimate public policy objectives of the European Union, in line with international obligations. This would allow the EU to have an open but assertive international data approach based on its values and strategic interests.

The Commission will continue to improve its capacity to analyse the EU's strategic interest with regard to further facilitating international data flows. To this end, the Commission will **create a European analytical framework for measuring data flows** (Q4 2021). This should be a durable framework that provides the tools to conduct a continuous analysis of data flows and the economic development of the EU's data processing sector, including a robust methodology, economic valuation and data flows collection mechanisms. It will serve to better understand patterns of data flows and centres of gravity, both within the EU and between the EU and the rest of the world, and can be a basis for adequate policy responses by the Commission, if necessary. It should also help to drive adequate investments to overcome possible infrastructure gaps preventing data flows. The Commission will therefore seek in due course cooperation with relevant financial and international organisations on the data flow measurement framework (e.g. EIB, EBRD, OECD, IMF).

The EU should take advantage of its effective data regulatory and policy framework to attract the storage and processing of data from other countries and regions, and to increase the high-value-added innovation that arises from these data spaces. Companies from around the world will be welcome to avail of the European data space, subject to compliance with applicable standards, including those developed relative to data sharing. The The Connecting Europe Facility (CEF 2) programme as well as t the new external instruments, the Neighbourhood, Development and International Cooperation Instrument and the Instrument for Pre-accession Assistance, will support the connectivity of third countries with Europe, which will in turn increase the attractivness of data interchange between the EU and the relevant partner countries.

In parallel, the EU will also actively promote its standards and its values with its partners around the world[55]. It will work in multilateral fora to fight abuses such as the disproportionate access of governments to data, for example access to personal data that is not in line with the EU's data protection rules. In order to promote the European model around the world, the EU will work with trusted partners sharing the same standards and values, to support others who wish to give their citizens greater control over their data, in line with values they share with Europe. For instance, the EU will support Africa in creating an African data economy for the benefit of its citizens and businesses.

[55] Following examples such as the adoption of rules modelled on the GDPR by Brazil and Kenya.

Key action

Create a framework to measure data flows and estimate their economic value within Europe, as well as between Europe and the rest of the world, Q4 2021.

7. Conclusion

This Communication puts forward a European data strategy whose ambition is to enable the EU to become the most attractive, most secure and most dynamic data-agile economy in the world – empowering Europe with data to improve decisions and better the lives of all of its citizens. It enumerates a number of policy measures and investments needed to achieve this goal.

The stakes are high, since the EU's technological future depends on whether it manages to harness its strengths and seize the opportunities offered by the ever-increasing production and use of data. A European way for handling data will ensure that more data becomes available for addressing societal challenges and for use in the economy, while respecting and promoting our European shared values.

In order to secure its digital future, the EU has to seize its window of opportunity in the data economy.

APPENDIX to the Communication 'A European strategy for data'

Common European data spaces in in strategic sectors and domains of public interest

The Communication 'A European strategy for data' announces the creation of sector- and domain-specific data spaces.

This document gives additional background on the sector-specific policies and legislation underpinning the creation of such spaces in the different sectors and domains.

1. Common European **industrial (manufacturing) data space**

Europe has a strong industrial base, and manufacturing in particular is an area where the generation of and use of data can make a significant difference to the performance and competitiveness of European industry. A 2018 study estimated the potential value of use of non-personal data in manufacturing at € 1,5 trillion by 2027[56].

In order to unleash this potential, the Commission will:

- Address issues related to the usage rights on co-generated industrial data (IoT data created in industrial settings), as part of a wider Data Act (Q4 2021).
- Gather key players from the manufacturing sector to agree – in a manner compliant with competition rules as well as principles of fair contracts – the conditions under which they would be ready to share their data and how to further boost data generation, notably via smart connected products (Q2 2020 onwards). Where data generated by individuals are concerned, their interests should be fully taken into account in such a process and compliance with data protection rules must be ensured.

2. Common European **Green Deal data space**

Europe's Green Deal has set out the ambitious goal for Europe to become the world's first climate-neutral continent by 2050. The Commission's Communication clearly underlines the importance of data for achieving this goal. A European green data space can exploit the major potential of data in support of the Green Deal priority actions on climate change, circular economy, zero-pollution, biodiversity, deforestation and compliance assurance.

In this context the Commission will:

- Initiate a 'GreenData4All' initiative. This consists in evaluating and possibly reviewing the Directive establishing an Infrastructure for Spatial Information in the EU (INSPIRE), together with the Access to Environment Information Directive (Q4 2021 or Q1 2022). It will modernise the regime in line with technological and innovation opportunities, making it easier for EU public authorities, businesses and citizens to support the transition to a greener and carbon-neutral economy, and reducing administrative burden.

[56] Deloitte 2018.

- Roll out re-usable data-services on a large scale to assist in collecting, sharing, processing and analysing large volumes of data relevant for assuring compliance with environmental legislation and rules related to the priority actions set in the Green Deal.(Q4 2021)

- Establish a common European data space for smart circular applications making available the most relevant data for enabling circular value creation along supply chains. A particular focus will be concentrated at the outset on the sectors targeted by the Circular Economy Action Plan, such as the built environment, packaging, textiles, electronics, ICT and plastics. Digital 'product passports' will be developed, that will provide information on a product's origin, durability, composition, reuse, repair and dismantling possibilities, and end-of-life handling. Development of architecture and governance (2020), sectoral data strategies (2021), adoption of a sustainable product policy with product passport (2021) and resource mapping and waste shipments tracking (2021).

- Initiate a pilot for early implementation of the data strategy in the context of the 'zero pollution ambition' to harvest the potential of an already data-rich policy domain with data on chemicals, air, water and soil emission, hazardous substances in consumer products, etc. which is underexploited and where early results can benefit consumers and the Planet directly (Q4 2021).

- Launch the 'Destination Earth' initiative

> *The 'Destination Earth' initiative will bring together European scientific and industrial excellence to develop a very high precision digital model of the Earth. This ground-breaking initiative will offer a digital modelling platform to visualize, monitor and forecast natural and human activity on the planet in support of sustainable development thus supporting Europe's efforts for a better environment as set out in the Green Deal. The digital twin of the Earth will be constructed progressively, starting in 2021.*

3. Common European **mobility data space**

Transport and mobility are at the forefront of the debate on data sharing, an area where the EU has many assets. This concerns the automotive sector, where connected cars critically depend on data, as well as other transport modes. Digitisation and data in all modes of transport and in logistics will be an essential component of further work on the 'European Transport System' and in particular in the upcoming '**Smart and Sustainable Transport Strategy**' (Q4 2020). This will include actions in all transport sectors as well as for cross-modal data sharing logistics and passengers ecosystems.

Automotive

Today, modern vehicles generate around 25 gigabytes of data every hour and autonomous cars will generate terabytes of data that can be used for innovative mobility-related services and for repair and maintenance services. Innovation in this area requires that car data are shared, in a secure and well-framed way, in line with competition rules amongst many different economic players. The access to in-vehicle data is regulated since 2007 in the EU

vehicle approval legislation[57] to ensure fair access to certain car data by independent repairers. This legislation is now being updated to take into account the increasing use of connectivity (3G-4G, so-called remote diagnostics)[58], that the rights and interests of the car-owners generating the data are respected and compliance with data protection rules is ensured.

The full transport system

Passenger transport activity is projected to grow by 35% during 2015-2050. Freight traffic for inland modes is expected to grow faster than for passenger at 53% by 2050[59]. Digitalisation and data play an increasing role in supporting transport sustainability. Several legislative frameworks already contain data-sharing obligations, which establishes a list of datasets (including datasets concerning public transport). Moreover, the Digital Transport and Logistics Forum is working on a concept of 'federated platforms' to define what needs to be done at the EU level to facilitate data-sharing/re-use by connecting different public and private platforms. Furthermore, networks of national access points to make data available exist in the Member States where the data are made available with a view to serving road safety, traffic and multi-modal travel information services, with data generated by the public and the private sector. Wide availability and use of data in public transport systems has the potential to make them more efficient, green and customer friendly. Data use to improve transport systems is also a central feature of smart cities.

The Commission will:

- Review the current EU type approval legislation for motor vehicles (currently focused on wireless data sharing for repair and maintenance), to open it up to more car data based services (Q1 2021). The review will *inter alia* look at how data is made accessible by the car manufacturer, what procedures are necessary to obtain it in full compliance with data protection rules and the role and rights of the car owner.
- Review the Directive on harmonised river information services[60] and the Directive on Intelligent Transport Systems[61], including its delegated regulations to further contribute to data availability, reuse and interoperability (both in 2021) and establish a stronger coordination mechanism to federate the National Access Points established under the ITS Directive through a EU wide CEF Programme Support Action (2020).
- Amend the proposal for a Regulation on the Single European Sky[62] to include new provisions on data availability and market access of data service providers in order to promote the digitalisation and automation of air traffic management (2020). This will improve safety, efficiency and capacity in air traffic.

[57] Regulation (EC) 715/2007.
[58] As required by Article 61 of Regulation (EU) 2018/858.
[59] In-depth analysis in support of Commission Communication COM(2018) 773 'A Clean Planet for all: A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'.
[60] Directive 2005/44/EC.
[61] Directive 2010/40/EU.
[62] COM(2013) 410 final.

- Review the regulatory framework for interoperable data-sharing in rail transport in 2022.
- Establish common data sets as foreseen in the Regulation on Maritime Single Window[63] and, subject to its final adoption, in the Regulation on electronic freight transport information regulations[64] (the first such act to be adopted by Q3 2021 and Q4 2022 respectively) to facilitate digital exchange and data reuse between businesses and administration.

4. Common European **health data space**

The current regulatory and research models rely on access to health data, including individual level data from patients. Strengthening and extending the use and re-use of health data is critical for innovation in the healthcare sector. It also helps healthcare authorities to take evidence-based decisions to improve the accessibility, effectiveness and sustainability of the healthcare systems. It also contributes to the competitiveness of the EU's industry. Better access to health data can significantly support the work of regulatory bodies in the healthcare system, the assessment of medical products and demonstration of their safety and efficacy.

Citizens have the right in particular to access and control their personal health data and to request their portability, but implementation of this right is fragmented. Working towards making sure that every citizen has secure access to their Electronic Health Record (EHR) and can ensure the portability of his/her data – within and across borders – will improve access to and quality of care, cost effectiveness of care delivery and contribute to the modernisation of health systems.

Citizens also need to be reassured that, once they have given consent for their data to be shared, the healthcare systems uses such data in an ethical manner and ensure that the given consent can be withdrawn at any time.

Health is an area where the EU can benefit from the data revolution, increasing the quality of healthcare, while decreasing costs. Progress will often depend on the willingness of Member States and healthcare providers to join forces and find ways to use and combine data, in a manner compliant with the GDPR, under which health data merit specific protection. While the GDPR has created a level playing field for the use of health personal data, fragmentation remains within and between Member States and the governance models for accessing data are diverse. The landscape of digital health services remains fragmented, especially when provided cross-border.

The Commission will:

- Develop sector-specific legislative or non-legislative measures for the European health data space, complementing the horizontal framework of the common data space. Take measures to strengthen citizens' access to health data and portability of these data and

[63] Regulation (EU) 2019/1239.
[64] The negotiations with the co-legislators are concluded, adoption is foreseen mid-2020.

tackle barriers to cross-border provision of digital health services and products. Facilitate the establishment, in accordance with Article 40 of the GDPR, of a Code of Conduct for processing of personal data in health sector. These actions will build upon an ongoing mapping of the use of personal health data in Member States and the results of the Joint Action in the context of the Health programme (2020-2023)[65].

- Deploy the data infrastructures, tools and computing capacity for the European health data space, more specifically support the development of national electronic health records (EHRs) and interoperability of health data through the application of the Electronic Health Record Exchange Format. Scale up cross-border exchange of health data; link and use, through secure, federated repositories, specific kinds of health information, such as EHRs, genomic information (for at least 10 million people by 2025), and digital health images, in compliance with the GDPR. Enable the exchange of electronic patient summaries and ePrescriptions between 22 Member States participating in the eHealth Digital Service Infrastructure (eHDSI) by 2022; start cross-border electronic exchanges through eHDSI of medical images, laboratory results and discharge reports and enhance the virtual consultation model and registries of European Reference Networks; support big data projects promoted by the network of regulators. These actions will support prevention, diagnosis and treatment (in particular for cancer, rare diseases and common and complex diseases), research and innovation, policy-making and regulatory activities of Member States in the area of public health.

5. Common European **financial data space**

In the financial sector, EU legislation requires financial institutions to disclose a significant amount of data products, transactions and financial results. Moreover, the revised Payment Services Directive marks an important step towards open banking, where innovative payment services can be offered to consumers and businesses on the basis of the access to their bank account data. Going forward, enhancing data sharing would contribute to stimulating innovation as well as achieving other important policy objectives at EU level.

The Commission will set out concrete initiatives on this in its upcoming Digital Finance Strategy in Q3 2020 along the following considerations:

- The Commission will further facilitate access to public disclosures of financial data or supervisory reporting data, currently mandated by law, for example by promoting the use of common pro-competitive technical standards. This would facilitate more efficient processing of such publicly accessible data to the benefit of a number of other policies of public interest, such as enhancing access to finance for European businesses through more integrated capital markets, improving market transparency and supporting sustainable finance in the EU.

[65] https://ec.europa.eu/health/funding/programme_en.

- On the basis of recent market developments on open finance, the Commission will continue to ensure full implementation of the revised Payment Services Directive and explore additional steps and initiatives building on this approach.

6. Common European **energy data space**

In the energy sector, several Directives establish customer access to and portability of their meter and energy consumption data on a transparent, non-discriminatory basis and in compliance with data protection law. The specific governance frameworks are to be defined at the national level. Legislation also introduced data-sharing obligations for electricity network operators. Regarding cybersecurity, work is ongoing to address energy-specific challenges, notably: real-time requirements, cascading effects and the mix of legacy technologies with smart/state-of-the-art technology .

The availability and cross-sector sharing of data, in a secure and trustworthy manner can facilitate innovative solutions and support the decarbonisation of the energy system. The Commission will address these issues as part of the smart sector integration strategy to be adopted in the second quarter of this year as announced in the Communication on the European Green Deal.

The Commission will:

- Adopt implementing act(s)[66] setting out the interoperability requirements and non-discriminatory and transparent procedures for access to data, building on existing national practices on the basis of the Electricity Directive 2019/944 (2021/2022).
- Consider actions for improving the interoperability in smart buildings and products, with a view to improve their energy efficiency, optimise local consumption and broaden the integration of renewable energy sources (Q4 2020).

7. Common European **agricultural data space**

Data is one key element to enhance the sustainability performance and competitiveness of the agricultural sector. Processing and analysing production data, especially in combination with other data on the supply chain and other types of data, such as earth observation or meteorological data, allows for precise and tailored application of production approaches at farm level. A code of conduct for sharing of agricultural data by contractual agreement was developed in 2018 by EU stakeholders, involving – among others – the farming as well as the machinery sector.

A common data space for agricultural data based on existing approaches towards data sharing could lead to a neutral platform for sharing and pooling agricultural data, including both private and public data. This could support the emergence of an innovative data-driven ecosystem based on fair contractual relations as well as strengthen the capacities for monitoring and implementing common policies and reducing administrative burden for

[66] Article 24 Directive (EU) 2019/944.

government and beneficiaries. In 2019, Member States have joined forces and signed a declaration of cooperation 'A smart and sustainable digital future for European agriculture and rural areas'[67], which recognises the potential of digital technologies for the agricultural sector and rural areas and supports the setting up of data spaces.

The Commission will:

- Take stock with Member States and stakeholder organisations of experiences gained with the stakeholder code of conduct on agricultural data sharing by contractual agreement, also on the basis of the current market for digital farm solutions and their requirements in terms of data availability and use (Q3/Q4 2020).
- Take stock of agricultural data spaces in current use, including funded under the Horizon 2020 programme, with stakeholders and Member State organisations and take decision on an EU approach (Q4 2020/Q1 2021).

8. Common European **data spaces for public administrations**

Public administrations are big producers and also users of data in different areas. The data spaces for public administrations will reflect this. Actions in this areas will focus on law and public procurement data and other areas of public interest such as data use for improving law enforcement in the EU in line with EU law, including the principle of proportionality and data protection rules.

Public procurement data are essential to improve transparency and accountability of public spending, fighting corruption and improving spending quality. Public procurement data is spread over several systems in the Member States, made available in different formats and is not easily possible to use for policy purposes in real-time. In many cases, the data quality needs to be improved.

Similarly, seamless access to and easy reuse of EU and Member State legislation, jurisprudence as well as information on e-justice services is critical not only for the effective application of EU law but also enables innovative 'legal tech' applications supporting practitioners (judges, public officials, corporate counsel and lawyers in private practice).

The Commission will:

- Elaborate a data initiative for public procurement data covering both the EU dimension (EU datasets, such as TED[68]) and the national ones (Q4 2020). It will be complemented by a procurement data governance framework (Q2 2021);
- Issue guidance on common standards as well as interoperable frameworks for legal information[69] held at European and national level, in close cooperation with Member States (Q1 2021);

[67] The declaration has been signed by 25 Member States. For further information on the declaration, see https://ec.europa.eu/digital-single-market/en/news/eu-member-states-join-forces-digitalisation-european-agriculture-and-rural-areas.
[68] Tenders Electronic Daily.

- work with Member States to ensure that data sources related to the implementation of the EU budget are Findable, Accessible, Interoperable and Reusable (FAIR).

9. Common European **skills data space**

The skills of its people are Europe's strongest asset. In a global race for talent, the European education and training systems and labour markets need to quickly adapt to new and emerging skills needs. This requires high-quality data on qualifications, learning opportunities, jobs and the skill sets of people. Over the past years, the Commission has put in place a range of open standards, reference frameworks and semantic assets to increase data quality and interoperability[70]. As announced in the Digital Education Action Plan[71], the Commission also developed the Europass Digital Credentials framework to issue credentials to learners in a secure and interoperable digital format.

The Commission will:

- Support Member States in the development of digital credential transformation plans and in the preparation of re-usable data-sets of qualifications and learning opportunities (2020-2022);
- Establish a governance model for the on-going management of the Europass Digital Credentials Framework in close cooperation with Member States and key stakeholders (by 2022).

10. European **Open Science Cloud**

In addition to the creation of nine Common European data spaces, work will continue on the European Open Science Cloud, which provides seamless access and reliable re-use of research data to European researchers, innovators, companies and citizens through a trusted and open distributed data environment and related services. The European Open Science Cloud is therefore the basis for a science, research and innovation data space that will bring together data resulting from research and deployment programmes and will be connected and fully articulated with the sectoral data spaces.

The Commission will:

- Deploy European Open Science Cloud operations to serve EU researchers by 2025; Steer the underpinning development of a stakeholder-driven EOSC governance structures, possibly in connection with the launch of the corresponding EOSC European partnership by end 2020;

[69] E.g. on the use of the ELI and ECLI identifiers and on publishing law online with an official translation in order to support the further use of machine translation.
[70] E.g. Europass Learning Model; European Qualifications Framework for lifelong learning (EQF); European Skills, Competences, Qualifications and Occupations (ESCO), Digital Competence Framework (DigComp).
[71] COM(2018)22 final.

- In the medium term, open up, connect and articulate EOSC beyond the research communities, with the wider public sector and the private sector from 2024 onwards.

公益翻译小组荣誉出品

欧洲委员会《欧盟数据战略》中译本

译校者：李烨茗、李恺祺、洪振宇、汪琛、李芊晔、林鑫、JUN ZHANG、赵晨明

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译校者简介及工作分工

【组长】

李烨茗　国际知名律师事务所（知识产权部） 律师助理

负责分工、组织翻译、校对和排版

【翻译】

李恺祺　硕士研究生（第 1 章、第 2 章，p1-4）

洪振宇　外资信评机构信息安全治理即数据保护总监（第 3 章、第 4 章前半部分，p4-8）

汪　琛　中国科学技术大学科技哲学研究生（第 4 章后半部分，p8-11）

李芊晔　车企 IT 合规经理（第 5 章 A、D 部分，p11-15，21-23）

李烨茗　国际知名律师事务所（知识产权部）律师助理（第 5 章 B、C 部分，p15-21）

林　鑫　网络数据中心公司法律顾问（第 6 章、第 7 章，p23-25）

JUN ZHANG　运动品牌消费者数据总监（附录第 1-4 部分，p26-30）

赵晨明　数据治理&隐私保护负责人（附录第 5-10 部分，p30-35）

【校对】

所有翻译人员均参与第一轮校对

李烨茗负责第二轮全文校对

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欧盟数据战略

欧盟数据战略

1.引言

在过去的几年里，数字技术改变了经济和社会的发展，影响着所有领域的活动和欧洲人的正常生活。数据是本次变革的核心环节，并将带来更多的改变。以数据为驱动的创新将为公民带来巨大的利润。例如，改进个性化医学、提供新的出行方式，以及为《欧盟绿色协议》作出贡献。在每个个体会产生越来越多数据的社会里，根据欧洲价值观、基本权利和规则，在搜集和使用个人数据时，应将个人利益置于首要位置。只有当欧洲公民确信在欧盟境内任何的个人数据共享将会完全遵守欧盟的数据保护规则时，公民才会相信和接受这样以数据为驱动的创新。同时，随着数据存储和处理的技术发展，在欧盟境内，越来越多的非个人数据和公共数据不断增长。这将构成潜在的增长和创新来源，并应被利用。

公民应根据对非个人数据的理解，来赋予作出更好的决定的权利。这些非个人数据，无论公有或私有、大或小、初创或巨型，都应对所有人开放。这将有助于社会最大程度地发挥创新和竞争的作用，以确保每个人都能从数字红利中有所收益。这个数字化的欧洲应当反映欧洲最好的一面——开放、公平、多样化、民主和自信。

欧盟**能够成为在商业和公共领域中借助数据来做出更好的决策的社会榜样**。为了实现这个抱负，欧盟在数据保护、基本权利和网络安全方面建立强有力的法律框架，以及欧盟市场内部各种规模和各行业的竞争公司。若欧盟要想在数据经济中取得领先地位，就必须立即有所行动，并通过协商的方式解决从连接对象到数据的处理和存储、计算能力和网络安全。此外，欧盟还将不得不改善治理结构用于处理数据，并且提高可供使用和重复使用的质量数据。

最终，欧盟目标在于获得更好地利用数据的收益，包括提高生产力和竞争性市场，而且改善健康、福利、环境、透明治理和便捷的公共服务。本文提出的举措有助于采取综合的数据经济方法，旨在整个单一市场上提高数据和支持数据的产品和服务的使用和需求。

本文概述了未来五年实现数据经济的政策举措和投资策略。在这一数据策略提出的同时，委员会的“塑造欧洲的数字未来”和人工智能白皮书指出，委员会将如何支持和推动整个欧盟人工智能的发展和利用。

根据这个战略，委员会就能采取哪些措施使欧盟保持在数据敏捷经济发展前列，并且尊重和推动欧洲社会基本价值观进行了全面磋商。

2.重要趋势

增长的数据量和科技发展

全球数据的产生量正在不断增长，2018 年产生 33ZB（泽字节, 33 ZB 约等于 33 兆 GB，译者注），而这一数字到 2025 年预计达到 175ZB[1]。每一个新的数据浪潮都为欧盟成为这个领域的世界领先者提供了重要的机会。而且，数据存储和处理方式在未来五年将发生巨大变化。目前，80%的数据处理和分析发生在数据中心和集中式计算设施，20%发生在智能连接对象，例如汽车、家用电器或工业机器人，和靠近用户的计算设施（“边缘计算”）。到 2025 年，这两者的比例有可能发生反转。[2]除了发展带来的经济和可持续优势，它为企业提供了开发增强自身数据控制工具的业务创造更多优势。

数据对经济和社会的重要性

数据重新打造了我们生产、消费和生活的方式。数据带来的好处体现在我们生活的方方面面，从更有意识的能源消费和生产，材料和食品的追溯，到更健康的生活方式和更好的医疗保健。

> *个性化医学有助于医生在数据的基础上做出决策，以更好地满足患者的需求。这将使制定正确的医疗策略，以便在合适的时间满足合适的人的需要，和/或确定疾病的易患体质和/或及时提供针对性预防。*

数据是经济发展的命脉：它是许多产品和服务的基础，推动了经济各领域生产力和资源效率的提高，从而提供更多个性化产品和服务、制定更好的政策和升级政府服务。数据是初创企业和中小企业（“SMEs”）开发产品和服务的基本环节。随着产品和服务从洞察和识别模式迅速发展为更复杂的预测技术，数据的使用价值对于人工智能系统培训而言至关重要，以便做出更好的决策。

数据还将推动变革性实践的广泛实施，例如制造业中数字孪生的使用。

> *数字孪生创造了实体产品、方法或系统的虚拟复制品。例如，复制品可以在数据分析的基础上，预测机器什么时候出现故障，从而通过预防性维护来提升生产力。*

此外，提供更多可用的数据和改善数据的使用方式，对于处理与社会、气候和环境有关的挑战而言至关重要。这有助于建立更健康、繁荣和可持续的社会。例如，制定更好的政策来达到《欧盟绿色协议》的目标。同时，据估计，信息通

[1]互联网数据中心（IDC） 2018。

[2]Garten, 2017.

信行业当前的生态足迹占全球用电总量的 5%到 9%之间，占所有排放量的 2%以上。其中，一大部分的排放量是数据中心、云服务和连接器造成的。欧盟的数字战略“塑造欧盟的数字未来”提出了信息通信行业的绿色转型举措。

欧盟在未来数据经济中已万事俱备

当前，一小部分的大型科技公司拥有世界上大部分的数据。这可能会减少以数据为驱动的业务在欧盟兴起、增长和创新的可能性，但未来仍有许多机会。未来一大部分数据将会来自于工业和专业上的应用，涉及公共利益的领域或物联网在日常生活中的应用。在这些领域，欧盟都具有雄厚的实力。随着欧盟提供在边缘云等业务领域的新视角，机会还将来自于技术变革、严格的安全性应用程序解决方案，以及量子计算。这些趋势表明今天的赢家将不一定是明天的赢家。但是，未来几十年数据经济的竞争力来源现在确定了。这就是欧盟应当有所行动的原因。

欧盟具有在数据敏捷的经济中成功的潜力。欧盟拥有技术、专业技术和技术高度熟练的劳动者。然而，竞争对手，例如中国和美国已经在迅速创新，并且在全球范围内提出他们数据访问和使用的概念。在美国，由于数据空间组织具有巨大的集中效应，所以由私营部门负责。中国将政府监督和大型科技企业对大量数据的强大控制结合，却没有为个人提供足够的保障。

为了释放欧洲的潜能，我们必须发现属于我们的欧洲之路，以便在平衡数据流动和广泛使用的同时，保持很高的隐私、安全、稳定性和伦理标准。

到目前为止做过些什么？

自 2014 年起，委员会已经采取了一些措施。通过颁布《通用数据保护条例》[3]（“GDPR”），欧盟为数字信任创造了坚实的框架。即将到来的 GDPR 审查可能会在这方面提供更多有用的信息。其他促进数据经济发展的措施包括《非个人数据自由流动条例》[4]（“FFD”），《网络安全法》[5]（CSA），以及《开放数据指令》[6]。委员会还致力于数字外交，目前已经承认了 13 个国家具有提供充足的个人数据保护水平。

特定部门的数据访问立法已经被采用来解决已发现的市场失灵，诸如汽车业[7]、支付服务提供商[8]、智能计量信息[9]，电网数据[10]，或者智能运输系统[11]。在消

[3]欧盟条例 2016/679。

[4]欧盟条例 2018/1807。

[5]欧盟条例 2019/881。

[6]欧盟指令 2019/1024。

[7]根据欧盟条例 595/2009 修改的欧盟条例 715/2007。

[8]支付服务指令 2015/2366。

[9]欧盟电力指令 2019/944，欧盟燃气表指令 2009/73。

费者接受电子服务并提供对其数据的访问时，《数字内容指令》[12]通过引入合同权利来提高公民的地位。

3. 愿景

委员会的愿景源自欧洲认同的价值和基本权利以及以人为本的信念。委员会坚信欧盟的企业和公共部门通过使用数据能够做出更好的决策，从而更上一层楼。抓住数据带来的机遇，促进社会和经济发展是一个十分吸引人的做法。这得益于数据不同于大多数的经济资源，可以近乎零成本的方式被复制，个人或组织机构对数据的使用并不会影响其他个人或组织同时使用它。这份潜力应该用于满足个体的需求，从而为经济和社会创造价值。为了释放这份潜力，需要确保更好地访问数据以及负责任的使用。

欧盟应该创造一个有吸引力的政策环境，使得欧盟到 2030 年能够通过选择而不是法令实现在数据经济中所占的份额，包含数据的储存、处理以及有价值的使用，至少能够与其经济权重相匹配。我们的目标是构建一个统一的欧洲数据空间，一个真正向全世界数据开放的统一的数据市场，在这里无论是个人还是非个人数据，包括敏感商业数据都会被妥善保护，企业也可便捷地访问几乎无限量的高质量行业数据，提高增长和创造价值同时最小化人为碳排放和环境影响。这应是一个欧盟法律可被有效执行的空间，同时所有数据导向的产品和服务都应遵循欧盟统一市场的相关规范。为此，欧盟应当在投资标准、工具、基础设施和数据处理能力的基础上，整合适用的法律和治理方式以确保数据可用性。这种促进激励和选择的有利环境，将会使得更多的数据在欧盟存储和处理。

欧洲数据空间将会给予欧盟内的企业以机会，使其有可能在统一市场内发展。欧洲共同规则和有效的执行机制应确保:

- 数据可以在欧盟内部、跨行业流动；
- 欧洲规则和价值，特别是个人数据保护、消费者保护立法和竞争法得到充分尊重和实施；
- 数据的访问和使用规则公平、切实可行且清晰；具有清晰可信的数据治理机制；采取基于欧洲价值观的开放且自主的方式。

在此列出的用于访问数据的步骤需要与更为宽泛的数据敏捷经济产业策略相配合。数据空间应该培育一个由公司、民间社会和个人组成的生态系统，创建基于数据更容易的新产品和服务。公共政策可以增加对数据支持产品的需求，一方面通过提高公共部门本身将数据用于决策和公共服务的能力，另一方面过更新

[10]欧盟条例 2017/1485，欧盟条例 2015/703。

[11]欧盟指令 2010/40。

[12]欧盟指令 2019/770。

法规和部门政策来反映数据提供的机遇，并确保它们不会阻碍生产性数据的使用。

欧洲数据空间的运作将取决于欧盟对下一代技术的投资、基础设施的建设以及数据素养等数字能力的培养，这反过来又将增强欧洲在数据经济关键技术和基础设施方面的技术主权。基础设施应支持建立欧洲数据池，支持大数据分析和机器学习，并遵循数据保护立法和竞争法，允许数据驱动的生态系统出现。这些数据池可以以集中式或分布式的方式组织起来[13]。贡献数据的组织将获得以下形式的回报：获取更多的数据访问的机会、源自数据池的数据分析结果以及诸如预测维护服务或授权费等减免等。

尽管数据是所有经济和社会产业所必需的资源，每个领域都有自己独特的情况且不是所有领域都以相同的速度发展。因此，建设欧洲数据空间中的跨行业协作需要与各战略性行业（例如：制造业、农业、健康和交通）数据空间的发展配套。

4.问题

部分问题限制了欧盟在数据经济中释放潜力。

成员国之间的碎片化是实现欧洲共同数据空间的愿景和进一步发展真正统一数据市场的主要风险。一部分成员国已经开始对其法律框架进行调整，如政府如何使用私有数据[14]、为科学研究目的处理数据[15]或调整竞争法[16]。其他成员国则只是刚刚开始探索如何处理相关事宜。这些新出现的分歧强调利用欧盟内部市场规模协调共同行动的重要性。为此，需要在下列问题上共同取得进展：

数据可用性：数据的价值存在于对其的利用和再利用。目前没有足够的可用数据用于创新性的再利用，包括为了人工智能的开发。这些问题可按谁是资料拥有人及谁是资料使用者进行分类，但同时也取决于所涉及的数据性质（包括：个人数据、非个人数据、或是两者的混合数据集[17]）。部分问题还需考虑到数据可

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> ***公共利益数据***：*由社会产生并可用于应对紧急事件的数据，例如洪灾和森林火灾；用于确保人民可健康长寿；用于提升公共服务；用于阻止环境恶化和全球变暖；以及在必要时且均衡时，确保更有效地打击犯罪。由公共部门产生的数据且其所创造的价值应被用于实现公共利益并确保通过优先接入，此类数据可被研究人员、其他公共机构、中小型企业或是创业公司利用。来源于私营部门的数据也可以为公共利益带来重大贡献。举例而言，使用聚合且匿名化的社交媒体数据可作为在疫情爆发期间对全科医生报告进行补充的有效方法。*

字时代竞争政策”的报告。

[17]就更多的法律确定性，欧洲委员会在 2019 年 5 月发布了《如何处理混合数据的实际操作指南》，详见 COM（2019）250，详见 https://ec.europa.eu/digital-single-market/en/news/practical-guidance-businesses-how-process-mixed-datasets.

用性对公共利益的影响。

- *企业使用公共部门信息（公对私——G2B——数据共享）*。开发政府所持有的信息是欧盟长久以来的政策[18]。这些数据是由公共资金提供的，因此应该有益于社会。近期修订的《开放数据指令》[19]以及其他行业立法确保了在根据独立公开政策评估框架下，公共部门产生的数据可被更方便地使用[20]，特别是对中小型企业但也包括社会各界以及科学界。但是政府可以做的有更多。即使在在同等条件下，高价值数据库的可用性即使在欧盟间也未必能实现，由于碎片化所造成的此类损害对于使用数据的中小企业而言是难以承受的。与此同时，由于缺乏在能够符合个人数据保护规定的前提下进行专门研究的能力或机制，即使基于研究目的，公共数据库中的敏感数据（例如：健康数据）也经常无法获取。

- *与其他公司共享和利用私有数据（私对私——B2B——数据共享）*。尽管存在经济潜力，但企业间数据共享的规模还不够大。这是由于缺乏经济激励（包括担心失去竞争实力）、经营者之间对对方依照合同条款使用数据缺乏信任、不平衡的谈判实力、对于第三方滥用数据的担忧以及在谁可以如何使用数据这一问题上缺乏明确的法律阐述（例如，共同创造的数据，特别是物联网数据）。

- *政府使用私有数据（私对公——B2G——数据共享）*。目前没有足够的私用数据可供公共部门使用来促进基于证据导向的政策制定[21]、公共服务例如交通管理亦或是改进官方统计的范围和及时性[22]、以及因此带来的其在新型社会性发展背景下的相关性。委员建立的专家组的建议[23]包括创建国家层面的私对公数据共享结构，发展适合的数据共享文化的激励机制、以及建立探索欧盟用于治理公共部门为了公共利益对私有数据再利用的合规框架。

- *公权力机关间的数据共享*同样重要。这可为促进政策制定和公共服务带来显著的贡献，同时减少公司在统一市场监运营时面临的行政管理负累（“只需一次”原则）。

[18]自采纳执行关于公共部门信息再使用的欧盟指令 2003/98/EC 起。

[19]欧盟指令 2019/1024，推翻了根据欧盟指令 2013/37/EU 修改的欧盟指令 2003/98/EC。

[20]欧洲公开数据平台包含了在欧洲的不同企业受益于数据开放的示例。如果没有数据可用性，某些示例将无法实现。详见 https://www.europeandataportal.eu/en/using-data/use-cases。

[21]举例而言，新领域包括平台工作。

[22]私对公（B2G）工作的范围不包括为了司法目的使用数据。任何在此领域中使用数据的行为应该遵守数据隐私保护的相关法规。

[23]详见：https://ec.europa.eu/digital-single-market/news-redirect/666643。

市场力量失衡：除了供应高度集中的云服务和数据基础设施以外，在数据的访问和使用方面也存在市场失衡的现象，例如中小企业的数据获取方面。大型在线平台就是典型的例子，少部分参与者能够积累下大量的数据，从这些丰富多样的数据中收集到重要的见解和竞争优势。这转而会影响特定情况下市场的可竞争性——不仅影响此类平台服务的市场，还会影响平台所提供的各自特定商品和服务市场，当平台本身活跃于此类相关市场时尤为如此。“数据优势”赋予大型企业在市场竞争中有更高的地位，使其可以在平台上设定规则，单方面为数据的访问和使用设置条件，或事实上，在开发新服务和拓展新市场时利用这种“权力优势”。这种不平衡也发生于其他场景，例如行业和消费者设备联合产生的物联网中的数据获取。

数据的互操作性与质量：数据的互操作性和质量以及数据的结构、真实性和完整性是开发数据价值的关键，在布局人工智能的背景下尤为如此。数据生产者和使用者已经认识在互操作性上存在的问题阻碍了行业内不同来源数据的组合，而在不同行业间这种问题甚至更加显著。实现信息通信行业的标准化的计划应不断完善[24]，并且同时（就公共服务而言）强化欧洲各国间的互操作性框架，以此实现跨部门或在全产业链中一致的、具有互操作性且适用于不同数据源的数据收集和处理标准化以及共享兼容格式和协议的应用[25]。

数据治理：关于进一步加强在社会和经济发展中数据使用治理能力的呼声一直存在[26]。为了使这些数据空间更具可操作性，需要在现有法律框架的基础上，建立一种有组织的方法及架构（包括公共和个人两个方面）来实现数据驱动的创新。

数据基础设施和技术：欧盟经济的数字化转型取决于是否可以拥有一种同时具有安全、节能、可负担和高质量这四种特性的数据处理能力，例如在数据中心和边缘的云基础架构和服务提供的数据处理能力。由此可知，欧盟需要减少其对这些处于数据经济中心的战略基础设施的技术依赖。

然而，问题仍然存在于云的供应和需求方面。

首先，从供给方来看：

- 欧盟的云服务提供商在整个云市场中只占很小的份额，这使得欧盟高度依赖外部的提供商，易受外部数据挑战的影响，同时也使得欧洲数字产业丧失其在数据处理市场上的投资潜力；

- 在欧盟运营的服务提供商可能也会受到第三方国家法律的约束，可能会

[24]详见 https://ec.europa.eu/digital-single-market/en/news/rolling-plan-ict-standardisation.

[25]详见 https://ec.europa.eu/isa2/eif_en; see: COM(2017)134 final.

[26]例如，最近欧洲委员会举办的一系列关于“欧洲共同数据空间”概念的研讨会，详见 https://ec.europa.eu/digital-single-market/en/news/report-european-commissions-workshops-common-european-data-spaces。

导致欧盟公民和企业的数据被与欧盟数据保护框架相抵触的第三国司法管辖区获取。尤其存在对几部与网络安全和国家情报有关的中国法律的担忧；

- 尽管诸如美国《云计算法》（US CLOUD Act）之类的第三国法律获取部分数据的基础是公共政策（例如执法部门获取用于刑事调查的数据），但是外国司法管辖区法律的适用却引起了欧洲的企业、公民和政府当局对法律不确定性和对欧洲法律（如数据保护规则）适用合规性的关注。欧盟正在采取通过互惠互利的国际合作（例如拟议中的旨在促进跨境获取电子证据的欧盟-美国协议）来减缓此类担忧，降低法律冲突的风险并为欧盟的公民和企业建立明确的数据保障措施。欧盟还在包括欧洲理事会在内的多边层面上，在高度保护基本权力和程序权力的基础上，制定有关获取电子证据的通用准则。

- 云服务提供商在数据保护等方面是否遵守重要的欧盟规则和标准存在不确定性。

- 中小微型企业由于违约或不公平合同条款等与合同有关的问题而遭受经济损失[27]。

其次，从需求方来看：

- 欧洲的云服务普及率很低（四家企业只有一家会使用云服务，对于中小企业来说五家中只有一家会使用云服务[28]）。会员国之间在采用云服务上也存在着明显差异（有的国家企业使用率仅有不到 10%，而有的国家却高达 65%以上）。

- 具体来看，欧洲公共部门的云服务使用率很低。着可能会导致数字类公共服务的效率降低，一方面是因为采用云服务可以有效降低 IT 成本，另一方面政府需要云计算的可拓展性来部署像人工智能这样的技术。

- 创新云服务的小型(通常是欧洲)提供商的市场知名度往往不足。

- 欧洲企业通常会遇到多云互操作性问题，尤其是数据的可移植性。

赋予个人行使其权利：个体价值受到《通用数据保护条例》和《隐私和电子通信指令》（ePrivacy）给予的高度保护。然而，因为缺乏技术工具和标准，人们行使权利还较为复杂。欧盟委员会和成员国政府[29](不限于欧盟[30])的报告已提到，

[27]不公平，不平衡的云计算合同条款对经济的损害研究。

[28]详见 https://ec.europa.eu/eurostat/statistics-explained/index.php/Cloud_computing_-_statistics_on_the_use_by_enterprises.

[29]例如 Cremer/de Montjoye/Schweitzer，数字时代的竞争政策；Furman，为英国政府提供《解锁数字竞争》的报告；德国数据伦理委员会。

[30]查看澳大利亚新的消费者数据权简介，

GDPR 第 20 条在促进新的数据流动和提升竞争方面的潜力。然而，由于其设计是为了实现服务提供商的交换，而不是实现数据在数字生态系统中的再利用，因此该权利在实践中存在限制。

由于大量的数据是在消费者使用物联网设备和数字服务中产生的，因此消费者可能面临歧视、不公平和“锁定”（“lock-in”）效应的风险。消费者和创新授权的考虑是《支付服务指令》数据访问和重复使用条款的基础。

为此，有一些关于为个人提供工具和方法的呼声，希望个人在更为具体的层面能够自主决定其数据该被如何处置（通过“我的数据”（“Mydata”）运动等）[31]。这将给个人带来许多好处，包括有利于身体健康，提高福利水平，改善个人财务状况，减少生态足迹，更简便得获得公共和私人服务，以及对个人数据的更大监督和透明度。这些工具和方法包括知情同意管理工具、个人信息管理应用程序(包括基于区块链的完全去中心化解决方案)，以及个人数据合作社或信托机构，它们在个人数据经济中扮演着新型中立中介的角色[32]。目前这些工具仍处于起步阶段，它们有很大的潜力，但仍需要一个可以支撑其发展的环境。

技能与数据素养：大数据及其分析技能严重短缺。2017 年，欧盟 27 国在大数据及其分析领域大约有 496 000 个职位空缺[33]。此外，劳动人群和整体人口的总体数据素养都相对较低且存在参与度的代际显著差距（例如在老年人群中）。如果不解决这个问题，数据专家的短缺和数据素养的缺乏将影响欧盟应对数据经济和社会挑战的能力。

网络安全:在网络安全领域，欧洲已经制定了一个全面的框架，以支持成员国、企业和公民应对网络安全威胁和攻击，欧洲将继续发展和完善其保护数据和服务的机制。数据驱动的产品和服务的安全和广泛使用也同样取决于最高的网络安全标准。欧盟网络安全认证框架和欧盟网络安全机构(ENISA)[34]预计将在这方面发挥重要作用。

但是，新的数据范式将更少的数据存储在数据中心，而更多的数据将以无所不在的方式遍布于离用户更近的“边缘”，这给网络安全带来了新的挑战。在交换数据时，保持数据安全性是必需的。确保跨数据价值链的访问控制（即如何管理和尊重数据的安全属性）的连续性是促进数据共享和确保欧洲数据生态系统不同参与者之间信任的关键但极具挑战性的先决条件。

> ***区块链****等新的分散数字技术为个人和公司基于个人的自由选择和自决权管理数据流和使用提供了进一步的可能性。这些技术将使个人和公司能够实时移植动态数据，同时还将提供各种补偿模型。*

（https://www.accc.gov.au/focus-areas/consumerdata-right-cdr-0 ）以及有关新加坡数据可移植性的咨询。

[31]详见 https://mydata.org/; https://www.decodeproject.eu/; https://solid.mit.edu/, https://radicalxchange.org/.

[32]见德国数据伦理委员会的报告第 133 页，以及员工工作文件第 8 页。

[33]互联网数据中心（IDC） 2019。

[34]欧盟法规 2019/881 -欧洲网络安全法。

5.战略

本欧洲数据战略旨在实现真正的单一数据市场的愿景，并在过去几年所取得成就的基础上，解决通过政策和资金措施发现的问题。

每一项新的立法措施都将完全依照更好的监管原则来制定和评估。

这些行动基于如下四个方面：

A、有关数据访问和使用的跨部门治理框架

跨部门（或横向）进行数据访问、使用的措施应建立服务于数据敏捷经济的、必要的总体性框架，从而避免部门间或成员国间因行动不一致而造成的市场内部隔阂。当然，这些措施也应考虑到部门和成员国的具体情况。

欧盟委员会的监管方法通过建立框架来明确内容，并支持发展充满生机的生态系统。由于这个转换很难完全穷尽数据敏捷经济的所有因素，欧盟委员会有意避免过于详细、繁重的事前监管，而更倾向于采用一种灵活的治理方式以便于进行管理实验（如监管沙盒）、更新和差异化管理。

相应地，实现这一愿景的第一要务是**为欧洲数据共同空间的治理建立一个有利的立法框架（2020 年第 4 季度）**。此类治理架构在考虑各部门当局的部门要求的基础上支持何种情况下使用哪些数据的决策、促进跨境数据使用、并优先采用相应领域内及跨领域间的可操作性要求和标准。此框架将加强成员国及欧盟层面的必要结构，以便利于领域内或某特定区域上甚至是跨领域的、基于数据的业务创新。它将以成员国[35]和单个领域内的最新举措为基础解决下列一个或多个问题：

- 加强欧盟层面及其成员国内在数据共同空间及跨领域所使用数据的治理机制，涉及私营和公共参与者。它可能是这样一种机制，以优先通过标准化活动[36]，致力于形成对数据集、数据对象和标识符的统一描述和概览，以促进相关领域间及各领域内的数据流通（即数据在技术层面的可

[35] 芬兰健康和社会数据许可局（https://www.findata.fi/en/）、法国健康数据中心（https://www.Health-Data-Hub.fr/）、德国研究数据中心（https://www.forschungsdatenzentrum.de/en）。

[36]其理念不是创建一个开发新标准的机构，而是能够在现有标准和未来要开发的标准之间进行优先排序。

用性[37]）[38]。这可以在考虑特定领域监管机构的发展和抉择的基础上，在实现数据可查找性、可访问性、流通性及可重用性（FAIR)等原则的过程中一并达成。

- 以符合 GDPR 的方式，支持有关科学研究情况哪些数据可以被谁以何种方式进行进行使用的决策。尤其适用于那些包含了未在公开数据指引（Open Data Directive）提及的敏感数据的公共数据库；

- 以符合 GDPR 的方式，便利个人允许使用他们为公共利益产生的数据，如果他/她希望这样做的话（“数据利他主义”）。

其次，委员会将致力于实现更多高质量公共数据的再利用，尤其关注此内容对中小企业的促进作用。为了开放关键的公共数据集支持创新，应启动采用依公开数据指引（Open Data Directive）编制的**高价值数据集实施法案（2021 年第 1 季度）**的程序，使这些数据集在欧盟内部，以机器可读格式通过标准化应用程序编程接口（API）免费提供。委员会将研究考虑中小企业特殊需要的机制，并将协助成员国确保在 2021 年 7 月 17 日前及时准确地转换至公开数据指引中的新规则。

再次，委员会将探讨**是否需要就影响数据敏捷经济中参与者之间关系的问题采取立法行动**，以鼓励跨领域的横向数据共享（作为对附录中所述领域内数据共享的补充）。以下一个或多个问题将在**《数据法》（2021 年）**中做出进一步规定：

- 根据企业与政府数据贡献专家组报告中的相关建议，应促进企业与政府间、为公众利益的数据共享。

- 支持企业间的数据共享，尤其是解决由共同生成数据（如工业环境中的物联网数据）的使用权而导致的相关问题，这部分在私有合同中普遍缺失。委员会还将设法识别并解决妨碍数据共享的任何现有的未决障碍，并明确相应数据责任的规则（如法律责任）。通用原则为促进数据的自愿共享。

- 仅如此所示[39]，在公平、透明、合理、相称和/或非歧视性条件下，才可强制访问数据。[40]

- 以推进数据访问和使用的角度审视知识产权框架（IPR framework）（包

[37] FAIR 数据原则内容参见 https://www.force11.org/group/fairgroup/fairprinciples。

[38]例如，2017 年《塔林电子政务部长级宣言》呼吁各国政府“提高关键基础登记册中数据的可查找性、质量和技术可访问性”。

[39] 数据访问权只应针对特定部门，只有在确定/可以预见该部门的市场失灵时才给予，而竞争法无法解决这一问题。数据访问权的范围应当考虑到数据持有人的合法利益，并需要尊重法律框架。

[40] 这一原则的变化特别适用于根据第 715/2007 号法规可获取的某些机动车维修和保养信息，以及根据第 1907/2006 号法规（REACH）对脊椎动物进行化学品测试所产生的信息。

括对数据库指引[41]可能进行的修订，以及将商业秘密保护指引[42]作为一个扶持性框架的可能的澄清）。

此外，委员会将评估建立供数据分析和机器学习所用的数据池的必要措施。

委员会将通过更新横向合作指南（Horizontal Co-operation Guidelines）[43]，就数据共享和汇集安排是否符合欧盟竞争法之要求，向利益相关方提供更多指导。如有需要，委员会还准备提供与项目相关的关于与欧盟竞争规则的兼容性的额外指导。在行使合并控制权的实践中，委员会将密切关注通过并购而实现的大规模数据积累对竞争可能产生的影响，以及通过数据访问或数据共享补偿控制来解决任何顾虑。

在对一些国家援助准则的持续审查中，委员会将审视公众对企业的支持（例如数字转型）与受益人间数据共享要求造成的竞争扭曲最小化间的关系。

根据市场参与者所取得的进展，对目前云服务供应商自律方法[44]的审查可能会有进一步行动。

委员会还将审议与数据有关的管辖权问题。这些问题给可能面临冲突规则的企业带来了不确定性。欧盟不应在其原则上妥协：所有在欧盟销售与数据敏捷经济相关的商品或提供服务的公司都必须尊重欧盟立法，这不应因来自欧盟以外的管辖权要求而妥协。

委员会将考虑采取措施以促进在产品和服务中使用数据，并增加对数据所驱动的服务的需求。各领域内的审查应识别有关数据使用及数据驱动的产品方面、来自监管和非监管层面的障碍。提高数据的可用性和标准化也能促进实现及时、跨境合规，从而减少行政负担和单一市场壁垒。此外，政府还可以通过在公共服务和决策中更多地使用数据分析及自动化服务来促进此类需求的产生。

在线平台经济（the Online Platforms Economy）的观察机构正在分析大型科技公司大量数据的积累、数据在造成或加强谈判能力失衡方面的作用以及这些公司跨部门使用和共享数据的方式。这个问题在《数据法》中不会被探讨，但在对某些平台的高度市场话语权的广泛事实调查中，以及委员会《数字服务法》（the Digital Services Act）的一揽子工作背景下会被进行处理。根据这一事实调查结果，委员会将考虑如何最好地解决与平台和数据相关的系统性问题，包括酌情通过事前监管以确保市场保持开放和公平。

[41]欧盟指令 96/9/EC。

[42]欧盟指令 2016/943。

[43] 2011/C 11/01。

[44]详见 https://swipo.eu/ ，该方法基于数据规定的自由流动，欧盟法规 2018/1807。

以身作则

欧盟委员会将在自身数据组织方式上力求卓越，利用数据更好地支持政策制定，并将其生成的数据和资金通过包括欧盟开放数据门户（the EU Open Data Portal）[45]在内的方式提供给他人。

欧盟将秉承“尽可能开放、尽可能封闭”（ ‘as open as possible, as closed as necessary’）的原则，提供其研究和部署方案产生的数据，并将继续促进研究人员通过欧洲开放科学云（EOSC）[46]对其数据和服务的了解、共享、访问和重用。

欧盟还将分享哥白尼地球观测计划的数据和基础设施，以支持相关的欧洲数据空间。同时，通过运用欧洲数字技术解决方案实现哥白尼生态系统的加强，将为数据空间的公共及私人支持者提供新的创新机会。

欧盟将寻求在其内部流程中更多运用数据和数据分析的机会，并将其作为委员会决策和审查现有政策的一项输入。

关键行动

- 提出欧洲数据公共空间治理的法律框架，2020 第四季度。
- 采纳一项高价值数据集实施方案，2021 第一季度。
- 合适的话，提出《数据法案》，2021 年。
- 分析数字化经济中数据的重要性（如通过在线平台经济的观察机构），审查当前《数字服务法》一揽子工作中现有政策框架内容，2020 第四季度。

B. 推动者：为数据、及加强欧洲在数据托管、处理和使用上互操作性的能力和基础设施进行投资

欧洲数据战略依赖于一个从数据中创造经济和社会价值的蓬勃发展的私营企业生态系统，。初创企业及成长性企业将在充分利用数据革命进而建立、发展新的颠覆性商业模式方面发挥关键作用。欧洲应该提供一个支持数据驱动创新的环境，并刺激依赖于数据作为重要生产要素的产品和服务的需求。

要在数据驱动创新的战略领域取得迅速进展，需要私营和公共部门的投资。欧盟委员会将利用其召集权和欧盟资助计划，提高欧洲对数据敏捷经济的技术自主权。这将通过制定标准、开发工具、收集关于如何处理个人数据（特别是经过假名化处理）的最佳实践以及构建下一代数据处理基础设施来实现。相应地，这些投资将与成员国有关监管机构协同，并根据国家援助规则，与国家和区域资金、以及通过结构和投资基金进行的投资配对。

[45]详见 https://data.europa.eu/euodp/en/data/

[46] https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud. 也可参见 COM (2016) 178 final and SWD(2018)83.

2021 年至 2027 年间，**欧盟委员会将投资一个对欧洲数据空间和联盟云基础设施有重大影响的项目。**

该项目将为基础设施、数据共享工具、架构和治理机制提供资金，以促进数据共享和人工智能生态系统的建立。它将建立在欧洲联盟的节能、可信边缘和云基础设施（“基础设施即服务”、“平台即服务”和“软件即服务”）基础上，解决欧盟行业的特定需求，包括允许在边缘进行无延迟（云到边缘）的数据处理的混合云部署模型。数据密集型公司组成的欧洲生态系统将参与在这个项目中并从中获益。同时，该项目也将支持欧洲公司和公共部门的数字转型。

该项目需要足够的投资才能成为一个泛欧洲倡议。成员国及行业将和委员会共同进行投资，总投资额将达到 40 至 60 亿欧元，其中基于下一个多年度金融框架下的协议，欧盟委员会可通过不同的开支项目投资 20 亿欧元。

该项目源于更广泛的欧盟新技术战略投资，而这部分战略投资将作为欧盟委员会于 2020 年 3 月提出的产业战略的一部分。对边缘计算、高性能计算/量子计算、网络安全、低功耗处理器和 6G 网络的资助特别受到关注。这些投资对于欧盟未来的数据基础设施至关重要，以使欧洲拥有能够处理数据所需的适当的基础设施、计算能力、加密能力和网络安全工具。

重大影响项目：开发通用的欧盟数据空间和相互连接的云基础设施

具体而言，欧盟委员会计划在战略部门资助**建立欧盟范围内共同的、可互操作的数据空间**。通过组合必要的工具和基础设施，通过建立空间的共同规则来解决信任问题，这些空间旨在克服跨组织间数据共享的法律和技术障碍。这些空间将包含：（1）部署数据共享工具和平台；（2）建立数据治理框架；（3）提高数据可用性、质量和互操作性——在特定领域设置及跨部门。资金还将支持成员国有关当局提供高价值的数据集以供在不同公共数据空间中的重复使用。

对数据空间的支持还将包括符合环境性能、安全、数据保护、互操作性和可伸缩性等基本要求的数据处理和计算能力。

考量欧盟层面对具有明显附加价值的领域的支持，这些投资可能还涉及成员国[47]和欧洲层面现有计算能力的互联，包括高性能计算能力[48]及（如必要）整合数据处理资源的能力。其目标是帮助公共数据和为公共利益的世界级云基础设施的出现，为公共部门和研究机构提供安全的数据存储和处理。类似的积极影响也出现在欧洲开放科学云（EOSC）及支持对哥白尼地球观测数据访问服务的数据信息访问服务（DIAS）云平台的互联中。

私营部门，特别是中小型企业，也需要具备安全性、可持续性、互操作性和可伸缩性这些关键特性的数据、云基础设施和服务。这对于欧洲企业从数据生成、处理、访问和再利用[49]的完整价值链中获益至关重要。这条投资轨道将汇集私营

[47]例如，法国的“信任云”计划或波兰的“共同国家信息技术基础设施计划”(WIIP)。

[48]特别是“EuroHPC 倡议”所支持的能力。

[49]例如，行业对德国 Gaia-X 项目的支持。

企业和公众的支持以开发共同的平台，为数据的安全存储和共享提供多种云服务访问，以及从人工智能到仿真、建模、数字孪生和高性能计算（HPC）资源等应用程序。该平台将覆盖所有的数据层、计算基础设施和服务，并将抓住最新发展带来的机遇，如边缘计算、5G 部署以及工业部门对物联网的使用。它还将有助于建立一个动态生态系统，从而在价值链上形成基于数据和云的欧洲供应行业。

重大影响项目的云联合要素将促进云中的集中数据基础设施与边缘的高分布式、智能数据处理之间的逐步再平衡。因此，这样的项目应该从一开始就实现新兴边缘计算能力的互联。随着时间的推移，该项目应进一步支持访问高端高性能计算机，并与主流数据处理服务集成。这将提供一个无缝计算连续体，以最大限度地促进和实现欧洲公共数据空间在公共、工业和科学领域的应用。

基于此，委员会将促进欧洲云联盟的工作与成员国自主计划（如 Gaia-X[50]）之间的协作。这对于避免分散的云联盟和数据共享计划的增加是必要的，因为这样一个计划的成功将取决于泛欧洲的参与程度和扩展能力。出于这个原因，委员会将从现有的云联盟和数据共享计划着手，**在 2020 年第三季度之前促成与成员国的谅解备忘录**。

允许访问具有竞争力、安全和公平的欧洲云服务。

为了保护欧盟企业和公民的权益，在成员国有关部门的支持下，欧盟委员会将特别关注在欧盟市场运营的云服务提供商对欧盟规则的遵守程度(如《通用数据保护规定》,《自由流动的非个人数据管理规范》和《网络安全法案》)，以及，他们实施的、通过自律和共同监管机制及技术手段来增加信任的设计，例如基于设计的安全性和自动化遵从性性。目前，没有针对云服务提供商和用户的欧盟规则和自律/联合监管计划的全面概述可供使用。在此背景下，委员会将在 **2022 年第二季度之前**以“**云规则手册**”的形式，围绕云服务的不同适用规则（包括自律机制）制定一个连贯的框架。首先，云规则手册将就安全、能源效率、服务质量、数据保护和数据可移植性等方面提出、基于**现有云行为规范和认证准则的连贯框架**。考虑在能源效率领域率先开展行动。

与此同时，委员会还将促进建立有关公共采购**数据处理服务的欧洲共同标准和要求**。这将助力欧洲、国家、区域和地方一级的公共部门成为欧盟新的数据处理能力驱动者，而不仅仅是此类欧洲基础设施的受益者[51]。

为了充分发挥这一潜能，应该做更多的工作将私营和公共部门需求方与定制化数据处理服务（尤其是“平台即服务”和“软件即服务”）所提供的创新服务联系起来。至 **2022 年第四季度**，欧盟委员会将促进为来自私营和公共部门的欧盟用户建立一个**云服务市场**。市场将使潜在用户（特别是公共部门和中小企业）能够选择符合数据保护、安全、数据可移植性、能源效率和市场实践等一系列要

[50] 德国政府于 2019 年 10 月 29 日提出了一项从德国角度刺激云联盟的倡议。该项目的目的是迎合欧洲标准和参考架构，创建基于欧盟的“虚拟超大规模供应商”。

[51] 类似的公共采购项目可以从第三国借鉴，如美国的“FedRAMP”政府采购项目。它为跨联邦机构的云产品和服务提供了安全评估、授权和持续监控的标准化方法。

求的云处理、软件和平台服务。参与市场的服务提供者将以透明、公平的合同条件为条件使用数据，而现有市场并不总是提供这种条件，特别是对微型企业和中小企业用户[52]。市场可以为公共部门采购提供替代解决方案，同时公共部门巨大的采购需求可以有效支撑市场。

虽然许多成员国已经在自身国家层面上建立了类似的市场,但一个欧盟层面的云服务市场有以下双重好处：首先，它可以解决当前市场的不对称问题，这些问题发生在提供包含应用在内的综合解决方案的超大型全球行动者和小型（欧盟）参与者之间。。其次，它可以促使云服务相关规则遵从性的清晰化。这将确保欧盟提供的产品更好地与需求匹配，尤其是那些来自公共行政领域、服务于公共利益和中小企业的需求。

支持数据技术的进步

“欧洲地平线”项目将一如既往地支持对下一阶段数据经济至关重要的技术，如隐私保护技术以及支撑工业和个人数据空间的技术。一些在筹备中的“欧洲地平线”候选合作伙伴，如人工智能、数据和机器人合作伙伴及欧洲开放科学云合作伙伴，可以帮助引导这一领域的投资。

关键行动

-投资**欧洲数据空间的重大影响项目**,包括数据共享架构（含数据共享标准、最佳实践、工具）和治理机制，以及欧洲联合组织内的节能、可信赖的云基础设施及其相关服务,辅以 40 至 60 亿欧元的投资组合,其中包含欧盟委员会的 20 亿投资。第一阶段预计 2022 年实施完成;

-与成员国签署云联合方面的谅解备忘录。2022 年第三季度;

-建立一个欧洲云服务市场，集成所有云服务供应商。2022 年第四季度;

-创造欧盟（自我）监管云规则手册 2022 年第二季度。

C．能力：增强个人能力、投资技能和中小企业

授权个人使用他们的数据

应进一步支持个人使用其自身所产生数据的权利。他们可以被授权通过工具和方法来控制他们的数据，并在一定程度上决定其数据（“个人数据空间”）被用于何处。通过提高对 GDPR 第 20 条所约定的可移植性条款的实施程度，个人将

[52]详见《Study on the economic detriment to SMEs arising from unfair and unbalanced cloud computing contracts》,
https://ec.europa.eu/info/sites/info/files/dg_just_cloud_computing_final_report_web_final.pdf.

能更多地控制谁能访问并使用机器生成的数据，例如通过对实时访问数据的接口实施更严格的要求，强制使用机器可读格式读取特定产品和服务中的数据（如来自智能家用电器或可穿戴设备的数据）。此外，可以考虑制定对个人数据应用程序提供商或新型数据中介（如个人数据空间提供商）的规则，确保其角色中立[53]。这些问题可以在上文提及的《数据法案》中进行进一步探讨。“数字欧洲”计划亦会支持“个人数据空间”的发展和实现。

对技能和通用数据能力的投资

“数字欧洲”项目下专门用于技能提升的资金将有助于缩小大数据和分析能力之间的差距。该项目将为扩大数字人才库提供资金支持，从而使约 25 万人将能够在整个欧盟的企业中部署最新技术。鉴于数据在数字经济中的重要性，其中许多技术可能与数据有关。

总体而言，到 2025 年，欧盟及其成员国应将目前 100 万数字专家的缺口缩小一半，包含通过关注提高女性参与度上。

企业至政府数据共享专家组提出的“跨数据密集型组织（包括企业和公共部门）数据管理员网络”的概念将得到进一步探讨。

在通用的数据能力方面，“强化技能”议程将提供一条可能的路径，指导欧盟及其成员国将拥有基本数字技能的人口在欧盟总人口中的占比，从目前的 57%提高到 2025 年的 65%。

大数据和学习分析为获取、分析和使用数据以改善教育和培训提供了新的机遇。最新的“**数字教育行动计划**”将加强更方便地访问和使用数据作为其主要优先事项之一，以使教育和培训机构适应数字时代，并使它们具备作出更好决策的能力，提高技能和竞争力。

培养中小型企业的专门能力

即将出台的“欧洲中小企业战略”将确定为中小企业和初创企业建立能力的措施。在这种情况下，数据是一项重要的资产，因为创建或扩展一个基于数据的公司并不需要大量的资本。中小企业和初创企业往往需要法律和监管方面的建议，才能尽早从基于数据的商业模式中充分抓住未来的许多机会。

“地平线欧洲”和“数字欧洲”计划以及结构和投资基金将为数据经济中的中小企业创造机会，使它们能够更好地获取数据，并通过孵化计划等方式开发基于数据的新服务和应用。

[53] 安全且普遍通用的数字身份对于个人访问和控制其数据也至关重要。

关键行动

-根据 GDPR 第 20 条，探索强化个人可移植性权利的可能性，让人们对谁可以访问和使用机器生成的数据有更多的控制权(可能作为 2021 年《数据法案》的一部分)。

D、战略部门和公共利益领域的欧洲公共数据空间

作为对横向框架，以及对章节 A、B 和 C 项下个人技能和赋权的行动及资金支持安排[54]的补充，欧盟委员会将促进在战略经济部门和公共利益领域建立欧洲公共数据空间。在这些部门和领域使用数据将对整个生态系统及其公民产生系统性影响。

这将导致应为这些部门和领域提供大量数据池，并同时结合进行数据使用及交换所需的技术工具、基础设施及适当的治理机制等内容。虽然没有普遍适用的方法，但可以在不同的部门复制共同的治理概念和模型。

适当的话，横向框架将与关于数据访问、使用的部门立法及机制结合，共同确保数据互操作性。部门间差异取决于各部门对其数据可用性的讨论及处理其所发现问题的成熟度。另一个相关因素是公众对特定部门的关注度和参与度，比如在卫生等领域可能较高，而在制造业等领域则较低。部门间跨部门数据使用的可能性也应被考虑到。数据空间的建立将遵循数据保护规则以及更高的、可适用的网络安全标准。

数据空间的完善依赖激励数据使用的政策和对数据赋能服务的需求。数据价值链上各部门采取的措施将作为其部门数据空间工作的有益补充。

结合欧洲开放科学云研究社群所积累的持续经验，欧盟委员会还将支持建立以下九个欧洲公共数据空间：

一个欧洲工业（制造业）数据公共空间，以支持欧盟工业竞争力及表现，从而捕捉在制造业中使用非个人数据的潜在价值(到 2027 年估计为 1.5 万亿欧元)。

一个欧洲绿色协议数据公共空间，利用数据的主要潜力以支持绿色协议中有关气候变化、循环经济、零污染、生物多样性、森林砍伐和合规保证等优先行动。“绿色数据为大家”（ “GreenData4All”）和“目的地：地球”（“Destination Earth”）（地球的数字孪生）计划将涵盖具体行动。

一个欧洲移动数据公共空间，将欧洲定位于包括车联网和其他交通形式在内的智能交通系统发展的前沿。这类数据空间将有助于访问、汇集和共享现有和未

[54]行业数据空间的名单尚未穷尽且可被扩展。

来交通及移动数据库中的数据。

一个欧洲卫生数据公共空间，对于取得疾病预防、检测和治疗的优势地位，以及提高医疗系统可访问性、有效性和可持续性以便做出知情、循证决策至关重要。

一个欧洲金融数据公共空间，来促进数据共享、创新、市场透明度、可持续金融以及为欧洲企业提供融资渠道，并形成一个更一体化的市场。

一个欧洲能源数据公共空间，以围绕客户、安全可靠的方式促进实现更强大的数据可用性和跨部门共享，因为这将有利于解决方案创新并支持能源系统脱碳。

一个欧洲农业数据公共空间，通过对生产及其他数据的处理和分析提高农业部门的可持续性绩效和竞争力，并支持在农场一级实现精确、有针对性的生产方法。

公共行政层面的欧洲数据公共空间，以提高欧盟和各成员国层面公共支出及支出质量透明度和问责制，打击腐败，解决执法需求，支持欧盟法律的有效应用，并促进“执政技术”、“监管技术”和“法律技术”的应用，支持从业人员和其他为公共利益的服务。

一个欧洲技能数据公共空间，以减少这部分技能对应于现有教育、培训体系间的不匹配，以及对应于劳动力市场需求方面的不匹配。

附件中更详细地介绍了各特定部门和领域内欧洲数据公共空间内容，其中包含特定在不同部门和领域建立此类空间所依据的特定部门政策和立法背景，并明确提出了各部门的行动安排，这些行动可量化、成规模、围绕数据展开，并有可实现的时间表。

委员会可能考虑在其他部门按顺序启动额外的欧洲数据共同空间。

6、一个开放，但更加积极的国际化路径

基于欧洲价值观，统一的欧洲数据空间愿景，意味着对国际数据流动要采取开放但同时又果断的方式。当今欧洲的企业在一个超出欧盟范围的互联生态中经营发展，国际数据流对其竞争力是必不可少的。在单一市场优势之上建立监管环境，欧盟对于领导并支持国际间涉及到数据的合作，塑造全球标准并且创造一个充分遵循欧盟法律的、经济与科技共同繁荣发展环境，有着巨大利害关系。

同时，一部分在第三方国家开设企业的欧洲国家面临不公正壁垒及数字化限

制的情况在增加。欧盟将继续采取双边会谈以及国际论坛（包含世界贸易组织）的方式，继续应对这些在数据流方面不公正的限制。对于在促进欧洲数据发展、保护欧洲数据方面的处理规则和标准，应充分遵从欧盟立法。欧盟委员会应格外注意欧洲公民及企业在权利、责任、利益方面的保护及行使，尤其在数据保护、安全以及可靠的市场惯例方面。欧盟委员会深信，国际合作一定基是以促进发展欧盟基本价值为基础的，包括隐私保护。由此，欧盟必须确保，任何访问其公民个人数据以及欧洲商业敏感数据是符合欧盟价值和立法框架要求的。在此背景下，彼此信任国家间的数据传输和共享才能得到发展。至于个人数据，跨境数据传输要经过充分决策，且无论数据处于何地，其他现有的传输工具都要确保防卫保护伴随该数据的流动。另外，在不损害欧盟框架对个人数据保护的情况下，保证其数据在第三方国家的自由安全流动，但要遵守欧盟的公共安全例外和限制情况、公共秩序、其他合法的公共政策目标，以及国际义务。这会使欧盟拥有一个开放但果断的、基于欧盟价值观和战略性利益的国际化数据运行方式。

欧盟委员会将持续提升其自身分析欧盟战略利益的能力，包含进一步为数据流创造便利条件。为了达到这个目标，欧盟委员会将在 2021 第四季度创造一个欧洲数据流测算分析性框架。该框架的适用，为欧盟数据处理部门提供数据流和经济发展持续性分析，包括可靠的方法、经济估计和数据收集机制。这将有助于对欧盟境内及在欧盟和欧盟外国际社会间数据流及其重心模式有更好的理解。并且，在必要时，成为委员会建立适当的政策基础，还应促进足够的投资去消除可能存在的防止数据流动的障碍。因此，欧盟委员会将适时寻求与相关国际金融组织就数据流测量框架方面的合作。(例如： EIB, EBRD, OECD, IMF)。

欧盟应该利用其有效的数据管理及框架政策，吸引其他国家和区域数据的本地存储及处理，同时增加从数据空间获取的高价值随附的创新力。欧盟欢迎世界各地合作伙伴来使用欧盟数据空间，但同时也要遵守包括数据共享在内的适用标准。欧洲联通设施计划（“CEF”）、新的外部文书《邻居、发展和国际合作》，以及《加入前援助》将支持欧洲与第三国的联系，从而提升欧盟与相关合作国间的数据交流的吸引力。

同时，欧盟将会和来自全世界的合作伙伴积极推进其制定的标准和价值[55]。欧盟将会从多边角度防止如政府对数据超限滥用的行为的发生，例如欧盟数据保护规则与个人数据访问的规定是不一致的。为了促进欧洲模式在世界范围推广，欧盟将会与值得信赖的伙伴共同合作来分享共同的标准和价值，从而为其他与欧盟有共同价值观的，且希望其公民在数据领域更具控制权的伙伴提供支持。例如，欧盟将会协助非洲创设一个对其公民及企业有益的非洲数据经济体。

关键行动：

创立一个测量数据流的框架并估计在欧洲国家间、及欧洲国家和世界其他地方的经济价值，2021 年第四季度。

[55]巴西和肯尼亚采用了以 GDPR 为模板的规则。

7 结论

结论表明指向欧洲数据的战略部署，旨在使欧盟成为最具吸引力、最安全、数据敏捷度最高的经济体-即，提高欧盟在数据方面的决策力从而使欧盟全体公民更好地生活。并且，结论列举了许多为达到这一目标所需要的政策措施和投资。

这个目标很高，因为欧盟技术的未来取决于其是否能成功利用其自身优势并抓住来自不断增长的数据产生和使用所带来的机会。欧洲掌握数据的方式，将确保更多数据用于应对社会挑战，并且同样作用于经济，这需要尊重和促进我们欧洲共同的价值观。

为了确保数字未来，欧盟必须抓住数据经济的机会之窗。

“欧洲数据战略”附录

战略性行业和公共利益领域中的欧洲公共数据空间

“欧洲数据战略”宣布创建特定行业和领域的数据空间。

本文件提供了针对特定行业的政策和法规的补充背景，这些政策和法规为在不同行业和领域中创建此类空间提供了基础。

1. 常见的欧洲**工业（制造业）数据空间**

欧洲拥有强大的工业基础，尤其是制造业，在这一领域中，数据的生成和使用可以显著改变欧洲工业的效能和竞争力。一项 2018 年的研究估计，到 2027 年，制造业中使用非个人数据的潜在价值为 1.5 万亿欧元[56]。

为了释放这种潜力，委员会将：

- 解决与共同生成的工业数据（在工业环境中创建的物联网数据）的使用权相关的问题，作为更广泛的《数据法案》的一部分（2021 年第四季度）。

- 召集制造业的主要参与者，在符合竞争规则和公平合同的原则基础上，讨论并同意共享数据以及进一步促进数据产生的条件，尤其是通过智能互联产品产生的数据（2020 年第二季度起）。如果涉及个人生成的数据，则在此过程中应充分考虑他们的利益，并且必须确保遵守数据保护法规。

2．欧洲公共**绿色协议数据空间**

欧洲绿色协议为欧洲制定了雄心勃勃的目标，即到 2050 年成为世界上第一个气候无害的大洲。欧洲委员会的通讯明确强调了数据对于实现这一目标的重要性。欧洲绿色数据空间可以利用主要的数据潜力来支持有关气候变化、循环经济、零污染、生物多样性、森林砍伐和合规保证的绿色协议的优先行动。

在这方面，委员会将：

- 启动“绿色数据为大家”（“GreenData4All”）计划。这包括评估和审查在欧盟建立空间信息基础设施的指令（INSPIRE），以及对环境信息访问的指南（2021 年第四季度或 2022 年第一季度）。它将根据技术和创新的机会对行政机构进行现代化改造。使欧盟的公共机构，企业和公民更支持向绿色和零碳排放的经济转型，并减轻行政负担。

[56]德勤 2018

- 大规模推出可复用的数据服务，以协助收集，共享，处理和分析大规模的数据，以确保遵守与绿色协议中设定的优先行动相关的环境法规和条例。（2021年第四季度）

- 为智能循环应用建立一个公共的欧洲数据空间，以提供最相关的数据来实现沿着供应链的循环价值创造。将特别关注《循环经济行动计划》所针对的行业，例如建筑环境，包装，纺织品，电子，信息和通信以及塑料。将开发数字"产品护照"，以提供有关产品来源，耐用性，成分，回收利用，维修和拆除可能性以及报废处理的信息。研发架构和治理流程（2020 年），行业数据战略（2021年），通过产品护照、资源映射（2021 年）和废物运输追踪的来实现可持续产品的政策。

- 在"零污染愿景"的背景下启动数据战略的先行试点，来发挥已在化学物质、空气、水和土壤排放、消费品中的有害物质等数据丰富领域的潜力。这些领域的数据潜能尚未得到充分利用。早期成果可以使消费者和全球环境直接受益（2021 年第四季度）。

- 启动"目的地：地球"（ 'Destination Earth'）计划

> *"目的地：地球"（ 'Destination Earth'）计划将汇集欧洲最优秀的科学和工业知识，来开发高精度的地球数字模型。这项具有开创性的计划将提供一个数字建模平台，来可视化，监视和预测地球上的自然和人类活动，以支持可持续性发展，从而支持绿色协议中规定的欧洲为改善环境做出的努力。从 2021 年开始，将开始逐步建立地球的数字孪生。*

3.公共欧洲**交通数据空间**

交通运输和出行数据处于数据共享辩论的焦点，而这方面欧洲拥有丰富的资源。这涉及汽车领域，其中联网汽车以及其他运输模式严重依赖数据。所有运输模式和物流中的数字化和数据将是**"智能和可持续化运输战略"**（2020 年第四季度）中"欧洲运输系统"最关键的组织部分。这些重点包括在运输部门以及跨模式数据共享物流和乘客生态系统中采取的行动。

汽车行业

如今，现代的汽车每小时产生约 25 GB 的数据，而无人驾驶汽车将产生数个 TB 的数据，这些数据可用于与创新出行相关的服务以及维修和保养服务。在这一领域的创新需要在许多不同参与者之间的竞争规范的基础上，通过安全且结构合理的方式共享汽车数据。自 2007 年以来，欧盟车辆批准法规[57]对车内数据的访问进行了监管，以确保独立维修人员能够公平地访问某些汽车数据。现在正在更新该法规，以考虑到越来越多的数据信道的使用（3G-4G，所谓的远程诊断）

[57]欧盟法规 715/2007。

[58]，尊重产生数据的车主的权益，并且确保遵守数据保护法规。

完整的运输系统

预计 2015 到 2050 年间客运活动将增长 35%。预计到 2050 年，内陆模式的货运量将比客运增长更快，达到 53%[59]。数字化和数据在支持运输可持续性方面发挥着越来越重要的作用。几个立法框架已经包含数据共享义务，这些义务标明了数据集的列表（包括有关公共交通的数据集）。此外，数字运输和物流论坛正在研究“联合平台”的概念，定义需要在欧盟级别来完成的工作，以通过连接不同的公共和私有平台来促进数据共享/重用。此外，会员国国内接入点组成的网络利用公共和私营部门生成的数据为道路安全，交通管理和多模式联运信息服务提供支持。公共交通系统中广泛可用的数据为把它们变得更高效、更绿色和更加方便客户提供了无限潜力。把数据用于改善交通系统也是智慧城市的主要特征。

委员会将：

- 审查当前的欧盟汽车类批准法规（当前侧重于用于维修和保养的无线数据共享），以使其适用于更多基于汽车数据的服务（2021 年第一季度）。审查将特别关注汽车制造商如何访问数据，以及为了符合数据保护法规和保护车主权利所需要的流程。

- 审查关于内河航运信息系统的指令[60]和关于智能交通系统的指令[61]，包括进一步促进数据可用性、重用性和互操作性的授权法规（均为 2021 年），并建立更强大的协调机制，通过欧盟 CEF 计划支持行动（2020 年）里制定的智能交通系统指令来建立国家接入点。

- 修订关欧洲单一天空法规[62]的提案，包括关于数据可用性和数据服务提供商的市场准入的新规定，以促进空中交通管理的数字化和自动化（2020 年）。这将提高空中交通的安全性，效率和容量。

- 审查 2022 年铁路运输中可互操作数据共享的监管框架。

- 建立海上单一窗口法规[63]中所设想的公共数据集，并在最终通过后，制定电子货运信息法规[64]（第一个法案将分别在 2021 年第 3 季度和 2022 年第 4 季

[58]欧盟法规 2018/858 第 61 章所要求。

[59] 委员会通告 COM（2018）77“全民清洁星球：建议繁荣，现代，具有竞争里和气候中立的欧洲经济长期战略远景”支持的深度分析

[60]欧盟指令 2005/44/EU。

[61]欧盟指令 2010/40/EU。

[62] 通告 COM(2013) 410 定稿。

[63]欧盟法规 2019/1239。

[64] 与共同立法者的谈判结束，预计将于 2020 年中期通过.

度通过），以促进企业和管理部门之间的数字交换和数据重用。

4.欧洲**健康数据公共空间**

当前的监管和研究模型依赖于对健康数据的访问，包括来自患者的个人数据。加强和扩展健康数据的使用和再利用对于医疗保健行业的创新至关重要。它还可以帮助医疗机构制定基于询证的决策，以改善医疗系统的可触达性，有效性和可持续性。它还有助于提高欧盟工业的竞争力。更好地访问健康数据可以极大地支持医疗保健系统中监管机构的工作，评估医疗产品并证明其安全性和有效性。

公民尤其有权访问和控制其个人健康数据并要求其具有可移植性，但该权利的实施是碎片化的。努力确保每个公民都能安全访问其电子病历（EHR），并确保其数据的可移植性（边界内和跨边界）将改善医疗服务的获取和服务质量，优化成本效益，推动医疗体系的现代化。

还需要向公民确保，一旦他们同意共享其数据，医疗系统将通过符合社会道德的方式使用这数据，并确保公民可以随时撤回授权。

医疗是欧盟可以从数据革命中受益的领域，既可以提高医疗质量，又可以降低成本。进展通常会取决于会员国和医疗服务提供商的意愿，在符合 GDPR 的前提上，协同找到使用和整合数据的模式。健康数据应受到具体保护。尽管 GDPR 为个人健康数据的使用创造了一个公平的竞争环境，但在成员国内部和成员国之间，仍然存在着碎片化问题。访问数据的治理模型也是多种多样。尤其是在跨境服务时，数字医疗的格局仍然是支离破碎的。

委员会将：

- 为欧洲健康数据空间制定针对特定部门的立法或措施，以补充公共数据空间的框架。采取措施加强公民对健康数据的可访问性和这些数据的可移植性，并降低跨境提供数字健康服务和产品的障碍。根据 GDPR 第 40 条，为制定医疗部门处理个人数据的行为法规提供便利。这些行动将建立在会员国对个人健康数据的使用蓝图和健康规划（2020-2023）[65]行动结果的基础上。

- 为欧洲健康数据空间部署数据基础设施、工具和算力，更具体地，通过电子健康记录交换格式的应用，支持国家电子健康记录（EHR）发展以及健康数据的互操作性。扩大健康数据的跨境交流；通过安全的联合存储库，关联和使用特定种类的健康信息，例如符符合 GDPR 的 EHR，基因组信息（到 2025 年至少有 1000 万人）和数字影像。到 2022 年，使 22 个参与 eHealth 数字服务基础设施（eHDSI）的会员国之间能够交换电子患者摘要和电子处方；通过使用 eHDSI 的医学影像，实验室结果和出院报告，以及虚拟问诊模型模型和欧洲参考网络，开始跨境电子数据交换。支持监管机构推动的大数据项目。这些行动将有力支持会员国在公共卫生领域的预防，诊断和治疗（特别是针对癌症，罕见病以及常见

[65]详见 https://ec.europa.eu/health/funding/programme_en.

和复杂疾病），研究和创新，决策和监管活动。

5.欧洲**公共金融数据空间**

在金融领域，欧盟法规要求金融机构披露大量数据产品、交易和财务结果。此外，修订后的《支付服务指令》标志着迈向开放式银行的重要一步，在开放式银行中，可以基于访问对消费者和企业的银行账户的数据，向他们提供创新的支付服务。展望未来，加强数据共享将有助于刺激创新以及实现欧盟一级的其他重要政策目标。

委员会将在即将到来的 2020 年第三季度《数字金融战略》中针对此问题制定具体举措，并考虑以下方面：

- 委员会将进一步促进法律规范目前授权的财务数据或监督报告数据的公开披露，例如通过推动使用有利于竞争的通用技术标准。这将有助于更有效地处理此类可公开访问的数据，从而使许多其他公共利益政策受益，例如通过强化一体化的资本市场增加欧洲企业的融资渠道，增加市场透明度，并支持欧盟的可持续性融资。

- 基于最近的开放式金融市场发展，委员会将继续确保全面执行修订后的《支付服务指令》，并在此方法的基础上探索其他步骤和举措。

6.欧洲**公共能源数据空间**

在能源领域，一系列的指令使得客户可以在透明、非歧视基础并且合服数据保护法的规定的基础上访问和迁移他们的量表和能源效率数据。具体的治理框架应在国家级层面确定。法规还引入了电网运营商的数据共享义务。关于网络安全，正在努力解决特定于能源领域的挑战，特别是：实时性要求，级联效应以及传统技术与智能/最新技术的融合。

以安全、可信的方式提供跨行业的数据共享可以促进解决方案的创新并支持能源系统的脱碳。正如欧洲绿色协议通讯中宣布的那样，欧盟委员会将作为今年第二季度采用的智慧部门整合战略的一部分来解决这些问题。

委员会将：

- 根据 2019/944 电力指令，在现有国家实践的基础上，实施法案[66]来规定数据访问需确保互操作性、非歧视和流程透明（2021/2022 年）。

- 考虑采取措施来提升智慧大楼和产品的互操作性，以提高其能源效率，优化本地消费并扩大可再生能源的整合（2020 年第四季度）。

7.欧洲**公共农业数据空间**

[66]欧盟指令 2019/944。

数据是提高农业部门持续性表现和竞争力的一个关键要素。处理和分析生产数据，特别是结合涉及供应链的数据以及其他类型的数据，例如地球监测或气象数据，让我们可以精确且可以定制在农场基层的生产手段。2018 年欧盟各参与者通过协议的方式制订了一项共享农业数据的行为守则准则，其中包含农业和机械行业

根据现有的数据共享模式为农业数据建立一个公共数据空间，可以为共享和汇集农业数据（包括私人和公共数据）提供一个中立的平台。这不仅会有助于在公平的合同关系基础上建立一个创新的数据驱动生态系统，还可以加强监管和执行公共政策的能力，并且为政府和受益人减轻行政负担。在 2019 年，欧盟成员国联合签署了一份合作宣言——欧洲农业和农村地区的智能且可持续的未来[67]。该宣言认识到数字技术在农业部门和农村地区的价值潜力，并支持建立数据空间。

委员会将：

- 与成员国和利益相关者组织评估利益相关者通过行为守则在农业数据共享方面获得的经验，同时也基于当前的数字农场解决方案市场及其在数据可用性和使用方面的要求（2020 年第三/四季度）。

- 与利益相关者和成员国组织共同评估当前使用的农业数据空间，包括根据地平线 2020 计划提供的资金，并就欧盟的方案做出决定（2020 年第四季度/2021 年第一季度）。

8.欧洲**公共行政数据空间**

公共行政机构是不同领域的数据的生产者与使用者，公共行政管理的数据空间就将反映这一点。该领域上的措施将会集中在法律和公共采购数据以及其他公共利益领域，例如根据欧盟法律中的机会原则和数据保护原则利用数据改善欧盟执法。

公共采购数据对于在公共开支、打击腐败、提高支出质量方面的透明度和问责制度的改善至关重要。公共采购数据分散在成员国的几个系统中，并且以不同的格式提供，对用于实时政策方面是不容易的。在多数情况下，我们都需要提高数据的质量。

同样，欧盟和成员国立法、判例以及线上法务服务的无缝访问和便于复用的特性，不仅对欧盟法律的有效应用至关重要，而且还促使从业人员（法官、公职人员、公司顾问和私人律师）对创新的“司法技术”的应用。

委员会将：

[67] 该宣言已由 25 个成员国签署。有关声明的更多信息，详见 https://ec.europa.eu/digital-single-market/en/news/eu-member-states-join-forces-digitalisation-european-agriculture-and-rural-areas。

- 为涵盖欧盟层面（欧盟数据集，如 TED[68]）和国家层面的公共采购数据制定数据计划，（2020 年第四季度）。采购数据管理框架将作为补充（2021 年第二季度）；

- 与成员国密切合作，在欧洲和国家一级发布关于通用标准和可互操作法律信息框架的指导意见[69]（2021 年第一季度）；

- 与成员国合作，确保与欧盟预算执行有关的数据源是可查寻、可访问、可互操作和可复用的（FAIR）。

9.欧洲**公共技能数据空间**

欧洲人民的技能是欧洲最强有力的资产。在全球化的人才竞争中，欧洲的教育和培训系统以及人力市场需要快速适应新型的以及新兴技能的需要。这就需要高质量的关于资质、学习机会、工作、人员技能的数据。过去几年，委员会制定了一系列开放标准、参考框架和语义资产来提高数据质量和互操作性[70]。正如数字化教育行动计划[71]中所宣布的，委员会还开发了 Europass 数字证书框架，以安全和可互操作的数字方式向学习者颁发证书。

委员会将：

- 支持成员国制定数字证书转换计划，编制可重复使用的资质和学习机会等系列的数据集（2020-2022 年）；

- 与成员国和关键利益相关方密切合作，为正在进行的欧洲数字证书框架建立治理模型（2022 年）。

10.欧洲**开放科学云**

除了创建九个欧洲数据公共空间外，欧洲开放科学云还将通过可信和开放的分布式数据环境和相关服务继续开展工作，为欧洲研究人员、创新者、公司和公民提供无缝访问和可靠复用研究数据。因此，欧洲开放科学云是一个科学、研究和创新数据空间的基础，该空间将汇集研究和部署项目产生的数据，并将实现与行业数据空间的连接和充分互动。

委员会将：

- 2025 年前部署服务于欧盟研究人员的欧洲开放科学云；指导以利益相关

[68]TED 指每日电子投标（Tenders Electronic Daily）。

[69] 例如，关于 ELI 和 ECLI 标识符的使用，以及为了支持进一步使用机器翻译而在网上发布官方翻译的法律。

[70]例如，Europass 学习模型；欧洲终身学习资格框架（EQF）；欧洲技能，能力，资格和职业（ESCO），数字能力框架（DigComp）。

[71] COM（2018）22 定稿。

者为主导的欧洲开放科学云治理结构的发展，可能于 2020 年底启动相应的欧洲开放科学云欧洲伙伴关系；

- 中期，从 2024 年起，在研究社区之外，实现欧洲开放科学云与更广泛的公共部门和私营部门的开放、连接和互动。